"CITATION ANALYSIS OF DOCTORAL THESES IN BIOSCIENCE ACCEPTED BY THE KUVEMPU UNIVERSITY"

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DOCTOR OF PHILOSOPHY

IN

LIBRARY AND INFORMATION SCIENCE

Submitted by

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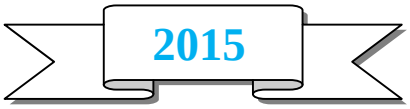

Dedicated to

My Beloved Parents and Teachers

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DECLARATION

I, **Mr. KOTEPPA BANATEPPANAVAR** hereby declare that the thesis entitled **"CITATION ANALYSIS OF DOCTORAL THESES IN BIOSCIENCE ACCEPTED BY THE KUVEMPU UNIVERSITY"** which is being submitted for the award of the degree of Doctor of Philosophy in Library and Information Science is the original work carried out by me under the guidance of **Dr. B. S. BIRADAR,** Professor, Department of P. G. Studies and Research in Library and Information Science, Kuvempu University, Jnana Sahyadri, Shankaraghatta, Shivamogga.

I further declare that this work or part thereof has not been the basis for the award of any other degree/diploma or such other similar title in any institution or any other university.

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CERTIFICATE

This is to certify that the thesis entitled ***"CITATION ANALYSIS OF DOCTORAL THESES IN BIOSCIENCE ACCEPTED BY THE KUVEMPU UNIVERSITY"*** submitted to Kuvempu University for the award of the Degree of Doctor of Philosophy in Library and Information Science is a bonafide record of the research work carried out by **Mr. KOTEPPA BANATEPPANAVAR**, in the Department of P.G. Studies and Research in Library and Information Science, Kuvempu University, under my guidance.

This is also to certify that the thesis represents his independent and original investigations without forming previous part of the material for the award of any degree, associateship, fellowship etc., of any other University or Institution.

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Place: **Shankaraghatta**

Date: **(KOTEPPA BANATEPPANAVAR)**

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CHAPTER-I

PRESENT STUDY

1.1 Introduction

Scientific inventions and discoveries have changed the way mankind lives in the modern world. Technological advancements have made our lives completely different compared to how our ancestors lived. The most vital area of advancements is in the field of Bioscience (WABRE, Association). The Bioscience comprise the fields of science that involve the scientific study of living organisms such as microorganisms, plants, animals and human beings as well as related considerations like bioethics. While biology remains the centre piece of the life sciences, technological advances in molecular biology and biotechnology have led to a burgeoning of specializations and interdisciplinary fields. Biosciences is focused on some type of studies such as Biotechnology, Environmental Science, Applied Botany and Applied Zoology (http://en.wikipedia.org).

In case of Biotechnology, it is a fascinating subject in the present education field. Presently, biotechnology research is being treated as one of the world's foremost and essential research compared to all other subject areas. It deals with the application of biological knowledge and techniques pertaining to molecular, cellular and genetic processes to develop significantly improved products and services. And also Biotechnology is a branch of science where living organisms and their products are used for the production of food, drink, medicine or for other benefits to the human race, or other animal species. It is the practice of using plants, animals and micro-organisms such as bacteria, as well as biological processes to affect outcomes such as the ripening of fruit (Sevukan, 2008).

Environmental Science is the field of science that studies the interactions of the physical, chemical, and biological components of the environment and also the

relationships and effects of these components with the organisms in the environment (http://www.tezu.ernet.in/). Environmental Science is also referred to as an interdisciplinary field because it incorporates information and ideas from multiple disciplines. Within the natural sciences, such fields as biology, chemistry and geology are included in environmental science. When most people think of environmental science, they think of these natural science aspects, but what makes environmental science, such a complex and broad field is that it also includes fields from the social sciences and the humanities (http://education-portal.com/).

Botany is another most important branch of Biosciences. It studies the plant life and its interaction with the environment which would also study the food crops such as grain and vegetables. The study of plants is vital because they underpin almost all animal life on earth by generating a large proportion of the oxygen and food that provide humans and other organisms with aerobic respiration with the chemical energy they need to exist (http://en.wikipedia.org/wiki/Botany). Zoology is the aspect of natural science that deals with the study of the animals' evolution, habitat and behavior. It is also concerned with every level of biological organization from the gene to the ecosystem and with the structure, physiology, behavior, genetics, development, distribution, and evolution of animals in all taxonomic groups. In a broad sense, Zoology also deals with the interrelationships between humans and other animals (Michigan State University).

There is ample scope for students to obtain a broad education in Bioscience. It is a wide field offering many career opportunities for research, especially in abroad. Because still there is a great deal to learn about it. The need for information support to education, research and practice in Bioscience has been felt and recognized in the world for the past

several decades. Bioscience is one of the growing disciplines in the education sphere. However, it has made huge development in a short span of time. The importance and significance of Bioscience can be understood by the fact that its development has been associated with almost every field. Research trend in this discipline is increasing day by day. There is a huge amount of information resources are available on the Bioscience subjects. Bioscience is interdisciplinary in nature. The exhaustive information is being produced in this discipline. There is thousands of bio-science journals are available to satisfy the researcher's information need. But researchers and the librarians both found it difficult to access the exact information because of its over-production.

Libraries are the chief sources of information which impart need based information to the information needy. The library is an organization which collects, store, maintains and disseminates the information to its users. Information explosion created a sort of confusion for libraries to select the quantitative and qualitative information to satisfy its user community. The increasing cost of information on one hand and the shrinking budget on the other hand leads the libraries to face obstacles in developing a quality collection. This chaotic situation in libraries caused the librarians to think about the new ways to develop their different forms of collection. The information in the form of periodicals provides primary, up-to-date information in the concerned subject in which they are being published. Journals being the vital source of information about the new ideas and lifeblood of research in any subject help research community. The researchers concentrate more on the journals to seek the current and up-to-date information.

Hence, the bibliometric study in general and citation analysis in particular is the solution to examine the nature of the literature i.e. measurement of the scientific

literature, recognition of scientists who have major contribution in their discipline and recognition of core journals in the discipline etc. So this type of research has now become a well established part of information research and quantitative approach to the description of documents and examination of services is gaining ground both in research and practice. And also bibliometric study is a continuous process at regular intervals to know the research trend. Besides this theses/dissertations clearly indicate the needs of doctoral students and also indicate the research specialties of the faculty and departments as a whole. With exceptions for new (or defunct) programs, current and historic data is readily available in an institution's dissertations. Therefore, there is great need to understand the information use pattern of Bio-scientists. Further, no this kind of study is conducted in the field of Bioscience, hence the present study is undertaken to investigate the use pattern of literature as revealed through the citation analysis of 204 doctoral theses submitted to the Kuvempu University during 1998-2012 in different branches of Bioscience.

1.2 Need of the study

The most obvious feature of knowledge is its continuous growth. Every day there is some addition of new information to the existing universe of knowledge. New subject fields are emerging due to continuous research in many subject areas and literature explosion. In this regard Kemp (1976) says, "One of the numerous reasons for the growth of knowledge, one is quite simple, knowledge and new knowledge are essential for man's survival in either the individual or the collective sense". In recent past, the rate of growth is not only increasing at an exponential rate, but also it varied from one discipline to another and among the branches within a discipline. Due to the growth of the subjects

and the trend towards interdisciplinary nature of research, the literature of a particular discipline is not only widely scattered in large number of periodicals, but also widely scattered by country, language and is recorded on a variety of media.

Bibliometric is the ideally accepted term in the field of library and information science. It is not merely a theoretical discipline, but has practical applications in information centre management or in measuring the quality of journals. Understanding the user requirement is the major part of the work, while providing information services. The needs and requirements of users constantly changes (Arora, 1994).

Citation analysis has become a major thrust area of bibliometrics research today. It primarily denotes the statistical and mathematical analysis of references or citations appended at the end of each scientific communication as an essential and integrated part of it. The author, while writing a research paper takes the help of a number of documents and finally quotes them with its bibliographical details. Citations implies relationship between a part or the whole of the cited documents and a part or the whole of the citing documents White (1985) is of the opinion that citation analysis plays a prominent role for easy identification of earlier research. Citation analysis is therefore one of the technique adopted to determine the core collection, in the library in order to distinguish between the most used with that of unused materials in the library.

This method emphasizes that journals most profusely cited can be taken to be the most desirable ones in a library collection, for they are likely to be frequently used by the scientists. Citation analysis provides a number of interesting and useful insights into the network of journals that function as the primary formal communication medium of science (Garfield, 1979). Citation analysis gives an indication not only about the use

pattern and trend in which it moves, but also helps to discover as to how far a research must go back to obtain representative sample of the published literature in a given field.

The exponential growth of literature & the interdisciplinary nature of research and trend towards specialization has posed many problems for both scientists and librarians. The rising cost of reading materials in one hand and the financial constraints on the other are the factors that compel the librarians of modern times to think in terms of adopting scientific techniques for rational decision making. The study provides guidelines for working librarians in the decision making process with regards to subscription to journals and retention of back volumes, weeding out of old documents and also the binding policy (Mondal, 2014).

Journals are mostly useful in research work and it is a sensitive indicator of new emerging ideas on the subject. Also, these are the indicators of literature growth in any field of knowledge. They emerge as the main channel for transmitting knowledge. Due to the escalating cost of the periodicals and lack of adequate library budgets the selection of any particular journal in a library should be done more carefully.

This study will be helpful to research scholars who want to identify the primary sources of information for pursuing their research work. Studies of this nature will be helpful for professionals of library and Information centers who want to provide better quality services for users and researchers. It can also be served as feedback mechanism to librarians in the review of current selection and acquisition of documents more useful to research scholars and scientists in the field of Bioscience. In this direction bibliometric analysis has now become a well established part of information research. So far no comprehensive study on the pattern of the use of literature by the researchers in

Bioscience has been made. Hence, with a view to provide some basic information about the characteristics of literature used by the researchers in Bioscience, the present study, entitled "Citation Analysis of Doctoral Theses in Bioscience Accepted by the Kuvempu University" has been undertaken.

1.3 Statement of the problem

The present study has been undertaken to study the information use pattern by the research scholars in the field of Bioscience. Hence the study entitles "Citation Analysis of Doctoral Theses in Bioscience Accepted by the Kuvempu University".

1.4 Scope and limitations of the study

The present investigation is concerned with the analysis of 51168 citations cited at the end of each chapter in the doctoral theses accepted in the field of Bioscience for the award of doctoral degrees by Kuvempu University. 204 theses are available in the library of Kuvempu University. The span of 14 years was taken into consideration that is from 1998-2012. The Bioscience comprises four subjects viz; Biotechnology (62), Environmental Science (66), Applied Botany (43) and Applied Zoology (33). These theses are taken as a source of data for the present investigation.

1.5 Objectives of the study

The objective of this study is to determine the information materials used in doctoral theses submitted to the Bioscience departments of the Kuvempu University during 1998-2012. The following are the main objectives of the study.

i. To determine the use of different forms of documents like books, journals, conference proceedings, theses etc.
ii. To study the collaborative research by analyzing the authorship pattern of the citations
iii. To study the distribution of documents, according to their subject, language and country of origin
iv. To know the chronological distribution of citations
v. To study the obsolescence and half-life of Bioscience journal literature
vi. To compile a rank list of core journals in various branches of Bioscience
vii. To find out the availability of cited journals in the Kuvempu University Library
viii. To know the productivity of journals
ix. To apply Bradford's Law to the journal citations

1.6 Methodology

A list of theses submitted to the Bioscience department has been collected from the examination branch of the Kuvempu University. Then the theses were identified in the library and the same have been sorted out department wise for primary data collection. The title page of the each thesis and the reference list/bibliography appeared in respective thesis was photocopied. Separate excel sheets have been created for each department to enter the metadata related to the theses, such as name of the author, guide and co-guide, title, year of Ph.D awarded, number of references and name of the department.

The methodology preferred for this study is based on the analysis of bibliographic references appended at the end of each chapter and footnotes, if any. The research design

adopted was a descriptive study. Each thesis was manually examined and citations were extracted from each of the thesis. All the references were noted down on 5”x 3” size standard catalogue card. Later the data were fed into the computer using MS-Excel software and data has been transferred to SPSS software for analysis.

204 doctoral theses submitted to the Kuvempu University in the field of Bioscience during 1998-2012 have been taken as the source of data for the present study; these doctoral theses generated 51,168 total citations. Then, the primary data collected to achieve the objectives of the study, has been entered into the excel sheet. Separate sheets and columns were created to enter data such as, number of theses submitted to each department. Further, all the references cited in the collected theses were examined to enter the bibliographic data which include number of authors out of which separated as Indian and Foreign, chronological wise, bibliographical form of cited documents, subject and so on. Duplicate citations were removed from the data set. But the ‘Ibid’ and ‘Opcit’ references were considered while entering the data.

The form of documents entered to the MS-Excel includes journals, books, conferences proceedings and reports etc. The date on journal citations were separated and used to create ranking list of journals, country-wise distribution of journals, and language of journals. Further, to know commonly cited journals in all four subjects of bio-science discipline, the data were merged and sorted in MS-Excel to identify rank list the commonly cited journal citations.

The study attempted to rank the documents, particularly journals on the basis of their usage and list the most productive journals. If the citation is from a journal, the information regarding the country of publication, language in which it is published is

obtained from 'Ulrich's Periodicals Directory'. After entering all above mentioned attributes to MS-Excel necessary tables have been generated to meet the objectives of the study.

1.7 Scheme of Chapterization

The present research work is given in the following chapters.

Chapter – 1: Present Study

This chapter deals with the introduction, need of the study, statement of the problem, scope and limitations of the study, objectives, methodology and scheme of chapterization.

Chapter – 2: Review of Literature

Here an attempt has been made to review the existing literature in the field of science and technology by giving much focus on Bioscience. The collected articles are reviewed under seven major headings.

Chapter – 3: Bibliometrics: An overview

This chapter deals with the concept of bibliometrics, meaning and definitions, its applications, laws, meaning and definition of citation analysis, types of citation analysis, application of citation analysis etc.

Chapter – 4: Analysis and Interpretation of Data

This chapter deals with analysis and interpretation of data. The entire result is presented in different headings along with the tables and graphs.

Chapter –5: Findings, Suggestions and Conclusion

The fifth chapter presents the major findings, suggestions and conclusion.

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CHAPTER-II

REVIEW OF LITERATURE

2.1 Introduction

Research is defined as a systematic inquiry. All research must follow some method, in successfully performing the task and getting the right result. For any scientific investigation, it is necessary to carry out a literature search in the concerned research field. Therefore, serious attempt has been made to collect and review the articles.

A large number of citation analysis studies have been conducted on various subject fields in India and Abroad mainly on doctoral dissertations. The present study focuses on the citation analysis of doctoral theses in the Bioscience Department of Kuvempu University. There has been no study yet on the citation analysis of doctoral theses in Bioscience Department. There has been building interest in such studies in other fields. Research in science and technology in general and Bioscience in particular has been extending both in qualitative and quantitative terms across the globe. A review of related literature reveals that a considerable number of studies have been carried out on bibliometrics and citation analysis on various disciplines. Totally these studies have been published in an extremely diverse forms viz, conference proceedings, journal publications and editorial books also in websites. Though researcher got large number of literature on research topic, researcher selected some core works to review. This review of literature and analyses will benefit to the researcher for conducting future studies. The literature reviewed for purpose of the present study falls under the following broad categories.

- Citation analysis on doctoral theses/dissertations
- Citation analysis of authorship pattern
- Citation study on journals and ranking of core journals
- Citation study of identifying the forms of documents

- Geographical distribution
- Studies on application of Bradford's Law
- Obsolescence of literature

2.2 Citation analysis on doctoral theses/dissertations

The studies on the doctoral theses and dissertations submitted to the universities. Citation analysis reveals the information sources preferred by the research fraternity of the university. This also helps to determine the core journals and other types of information sources that are frequently used. Many bibliometrics studies have been carried out to understand the citation behavior in the doctoral theses and dissertations. **Walcott's (1991)** in her study discussed the Geo-science dissertations revealed that 79.60% of the citations were from serials. With nearly 97% of the serials coming from English language publications, she suggested that Geo-science librarians cut back on purchasing foreign language publications. Same author carried out a study on graduate student's biology theses and dissertations in the year 1989-1992. She found that they cited approximately 95% serials and only 5% books **(Walcott's, 1994)**. A similar type of study was conducted by **Vimala (1997)** studied the Ph.D theses in Biological Sciences submitted for the award of doctoral degree to S.V. University. She analysed 39,453 citations appended to the theses. More number of citations from journals accounting for 85.34%. Followed by 91% of citations was published in English language.

Biradar and Premalatha (1998) conducted a study on 14 MD psychiatric dissertations submitted to the Department of Psychiatry, NIMHANS, Bangalore, during the period, 1974-1995. Most of the citations (73.22%) are articles in periodicals.

The other bibliographic forms are books (16.32%), reports (4.35%), seminar/conference proceedings (2.32%), manuals (0.94%) and other forms (1.8%).

Ting (1999) analyzed PhD theses in sciences submitted to the University of Malaya during 1986 to 1995. The subjects included in this study, according to the Library of Congress Classification are: QA Mathematics, QC Physics, QD Chemistry, QK Botany, QL Zoology and QR Microbiology. Out of the 663 records found, only 41 theses belonged to Science from the year 1986 to 1995 were used in the data collection. A total of 8,736 citations was collected. Journals and monographs were the two formats that were most frequently cited, 74.94% and 15.76% respectively. The two most frequently cited journal titles were: Journal of Organometallic Chemistry and Journal of Chemical Society. **Aruna Prasad Reddy (1999)** analyzed 186 doctoral dissertations in the field of Chemistry, submitted to Sri Venkateswara University, Tirupati. The Bibliographic form-wise distribution of citations revealed that journal literature was the most referred source of information (85.03%), followed by books (10.44%), patents (1.25%), dissertations (1.12%) and others (2.18%). Researchers of Chemistry preferred documents published in the English language (73.86%). The country-wise scattering of citations showed that USA alone covered 35.51% of total citations. The study of the authorship trend showed that papers with multi -authored were the highest in number (77.50%). Similarly, in the same field study conducted by **Gooden (2001)** has identified some important evaluation a citation analysis of dissertations accepted in the Department of Chemistry at the Ohio State University between 1996 - 2000 was performed as a way to determine material use. The 30 dissertations studied generated a total of 3,704 citations. Journal articles were cited more frequently than monographs. 85.8% of the citations were journal articles and

8.4% of the citations were monographs. The results of this study may be used to assist OSU and other universities in chemistry collection development. **Doraswamy and Pulla Reddy (2001)** in their study analyzed 2471 citations appended to Geographical theses submitted to Sri Venkateswara University for the award of doctoral degree during the period 1991-2000. Books appeared to be the most preferred source of information contributing the highest number of citations (41.89%). Most of the citations (76.12%) are single authored papers. The articles are scattered in 154 different journals. The Journal, 'Geographical Review of India' got the first rank. The country-wise scatter of citations showed that India occupied first position with 32.41% of the total citations.

Shafi and Gazi (2005) investigated one hundred doctoral dissertations submitted to Kashmir University during the period 1980-2000 in the field of Natural Sciences. Journals are most used bibliographic form accounting for 8,076 (68.08%) citations out of total number of 11,862 citations. Followed by seminar papers 1,038 (8.750%) of citations. The book citations are the least forming 01.47 %. **Pillai (2007)** studied 690 journals containing 11412 citations are appeared in 71 doctoral theses which have been awarded by Indian Institute of Science, during 1999-2003. It was observed that journals are the most frequently cited bibliographic forms of citations and it amounts 84.67% of the total citations. Physicists cite only 16 Indian journals, among them Pramana is the top ranked Indian journal. **Lokhande and Chikate (2008)** conducted a comprehensive work on doctoral dissertations submitted to the Department of Library and Information Sciences at Poona University Poona, A total of 20 dissertations was studied which generated a total of 5252 citations. The study revealed that journals were the most preferred sources accounting for 45.16% of total citations. The journal Scientometrics

was ranked the highest with 98 citations accounting for 4.13% of the total journal citations.

Shi-Jian Gao, etal. (2009) investigated 56 PhD theses submitted in 2005 at Wuhan University in China. In their study analyzed 10,222 citations in theses in Library and Information Science, Biology, Photogrammetry and Remote Sensing, and Stomatology and reviewed and compared the characteristics of the literature cited in the four disciplines. The results revealed that in Biology and Stomatology mainly English language publications were cited. In Photogrammetry and Remote Sensing, citations were almost evenly split between English and Chinese sources. **Olatokun and Makinde (2009)** studied citation analysis of doctoral works accepted at the Department of Animal Science, University of Ibadan, Nigeria. The highest overall citation to journals was in 2004, with 2,243 citations, followed by 1,481 in 2007. Journal articles and textbooks were more cited while web resources had the lowest citations; probably the doctoral students were yet to appreciate web resources references or had little or no access to internet. **Nasir Jamal and Devendra Kumar (2010)** analyzed 4,875 citations from 40 doctoral dissertations submitted between 1990-2010 in the Department of Economics, Aligarh Muslim University, Aligarh, India. The study found that books (44.77%) were the most dominant form in which information is communicated in economics. The dominant language of the literature cited is English (93.10%) and the single authorship prevails in the citations. Another similar study carried out by same author in the same university but different subject by **Nasir Jamal et al., (2010)** study on doctoral dissertations submitted to Department of History, Aligarh Muslim University during the year 1990–2010. The study deals with the citation analysis of 4500 citations.

The result shows that the books have the highest number of citations, accounting 72.50% of the total citation. The majority of the documents are in English Language i.e. 45.52% and the rest are in other languages i.e. 54.56%. 77.41% of the articles have been produced by single author followed by a team of two authors, three and more than three authors. The Journal of Bihar Research Society occupied the first position with the highest citation numbers i.e. 6.44%. **Verma and Thakur (2010)** conducted study on doctoral dissertations in Botany Submitted to Pt. Ravishankar Shukla University. Studied 35 doctoral dissertations in the area of Botany awarded during the period of 1966-2004. A total of 7,916 references was analyzed for identifying their bibliographic form, authorship pattern, and ranking of journals.

Many bibliometrics studies have also been witness in this decade. **Anil Kumar and Dora, Mallikarjun (2011)** carried out a study for analyzing the citations of the 49 doctoral dissertations submitted at the Indian Institute of Management, Ahmadabad, during the period 2004 to 2009. Study were found that journals are the most cited sources, and based on the pattern of citations, a local ranking list of journals has been developed. The study was applied Bradford's law to identify the groups of journals differentiated by their use. Final results indicated that the top 48 journals that were ranked among the 30 most used journals, contributed to more than 55% of the journal citations. **Pramod Kumar and Ramesh (2012)** made a study on Ph.D. theses submitted to the Department of Psychology at H N B Garhwal University has revealed many outcomes. A total of 18 theses generated a total of 3442 citations. The results reveal that journals are the most preferred sources of information used by researchers in the field of Psychology accounting for 42.71% of total citations. Most of the citations cited from

journals are from USA accounting 40.18%. This study will also provide guidelines in the decision making process with regard to acquisition and organization of documents and in quality collection of H. N. B. Garhwal University Library. **Kumar and Raghunadha (2013)** carried out a study on master's degree dissertations submitted to the Department of Library and Information Science, Sri Venkateswara University, Tirupathi during the period 2000 - 2007. The study found that journals were the most utilized reference materials in the dissertations. Frequency of citation found to be higher in dissertations of library science in general (32.19%) than other branches. The authorship patterns in library and information science renews that 80.32% of citations are contributed mainly by single authors. It seems that most of the authors in library and information science are conducting research and publishing books and articles individually. Analysis on distribution of various bibliographical forms reveals that journal articles contributed highest number of citations accounting for 40.06%. The findings from this study could serve as a user study with implications for collection, development and user services designing in libraries.

Aram Tirgar et al; (2013) has conducted a study on citation analysis of graduate Dental theses at Babol University of Medical Sciences during 2007-2010. The data were collected by means of a tailor-made data collection sheet and analyzed using descriptive statistical indexes and ANOVA test. The outcome extracted of 111 theses and 5334 citations showed that journals were the most frequent format (80%) and there were not any statistical significant difference between numbers of cited references over the four years. Furthermore, there was not any positive effect on age of cited references.

Ziaur Rahman and Bhattacharaya (2013) have studied the form and country wise dispersion and ascertaining of core journals in Physics at North Bengal University. The study is based on 8,182 citations appended to 50 doctoral theses in Physics submitted during 1987 to 2007. Among the citations from journal literature, the majority are from foreign journals, though the journals of Indian origin have also extensively been used by the North Bengal University Physics researchers. Journals published in USA, India, Netherland and UK occupies premier positions while journals from other countries are also cited. The most frequently cited journal titles were, The Physics Letter and Physics Review A. The findings from this study could serve as a collection development, a model that libraries could use to identify the primary sources, budget planning, to guide collection maintenance and user services design in libraries. **Singh and Bebi (2013)** evaluated PhD theses submitted to the Department of Sociology of the University of Delhi during 1995-2010. The study was based on the 5766 citations taken out from 25 PhD theses of sociology. The authors found that highest number of citations were single authored (83.94%) and 67.23 % citations were from books and only 22.20 % citations were from journals. **Banateppanvar et al; (2013)** carried out a study on citation analysis of doctoral theses in Biotechnology submitted to Kuvempu University. The authors found that journals were the most preferred sources of information for the researchers in the field of biotechnology accounting for 79.72% of total citations. Citations from books, proceedings, theses, reports and patents are also found. Plant Cell Tissue and Organ Culture (Netherlands) has ranked the first with 121 citations accounting for 4.16% of the total journal citations. Further, Bradford's law of scattering was applied. It is observed that major citations from journal literature, besides that study examined the authorship

pattern more cited resources were contributed by multi authors and degree of collaboration is 0.85.

A citation analysis of doctoral dissertations in Atmospheric and Environmental Science at the University at Albany was carried out by **Sue Kaczor**in (**2014)**. A total of 20 dissertations submitted to Atmospheric Science, University of Albany between the years 2000 and 2010 yielded 3,298 citations. These graduate students relied on journal articles (85.1%) than books (7.6%). A list of 26 core titles was created. These results are useful for the University Libraries and other institutions with collections in Atmospheric and Environmental Sciences. **Gohain, Anjan et al; (2014)** analyzed 10983 citations, appended in the 30 PhD theses of Chemical Sciences submitted to Tezapur University, Assam during 2008-2012. The study revealed that journals were the most preferred source of information for the researchers in the field of Chemical Sciences, accounting 78.83% of total citations, followed by books with 15.57 % citations. The Journal of American Chemical Society has ranked the first with 617 citations accounting for 7.13% of the total journal citations. The findings of the study revealed that out of the total number of 8658 journal citations, 39.89% are by more than three authors.

2.3 Citation analysis of authorship pattern

Citation analysis of authorship pattern is summarized as follows:

Subramanyam (1983) reviewed the research on collaborations and identifies six types of collaboration depending on the participant's viz., teacher-pupil collaboration, collaboration among colleagues, superior-assistant collaboration, researcher-consultant collaboration, collaboration between organization and international collaboration. Multiple authorship trends in Botany for the period 1973-83 in India. Study has been

investigated by **Maheshwarappa and Nagarajulu (1988)** they have found that more than half of the papers account for two authored papers. 70.89% of the papers were the result of collaborative efforts of scientists and the remaining 29.11% was single authors. An average of 1.92% authors per paper. The preparation of single authored papers has decreased from 38.18% in 1973 to 26.53% in 1983 while the average number of authors per paper increasing from 1.75 to 2.01 for the same period.

Karisiddappa et al; (1990) Studies the authorship pattern and collaborative research in Psychology, based on the data collected from Psychological Abstracts for the year 1988. The proportion or single authored papers have fallen to 39.43% indicating the trend towards multiple authorship. The pattern of authorship varies from one subject field to another. The proportion of multi-authored papers was very high (87%) in one sub-field, and it ranged between 20-69% in other sub-fields. The degree of collaboration in research is 0.60 in Psychology as a whole and ranged between 0.29 to 0.87 among the various sub-fields. There is a significant difference between pairs of sub-fields as regards the proportion of single and multi authored papers in Psychology. **Begum and Rajendra (1990)** made a study on collaborative research in Zoological sciences in India based on Indian Science Abstracts. The study revealed that most of the papers (67.02%) were contributed by multiple authors. **Vimala and Pullareddy (1996)** investigated the authorship pattern and collaborative research in Zoology with a sample of 19,323 journal citations figured in the theses on Zoology accepted for the award of the doctoral degree by Sri Venkateswara University, Tirupati, India. The study indicates that multi-authored papers are maximum accounting for 74.85% of the total cited papers. It is observed that the proportion of single-authored papers is likely to be insignificant after the year 2030.

The degree of collaboration in research is 0.75 in Zoology as a whole. This clearly indicates the trend towards collaborative research.

Sangam and Savanur (2006) were conducted a study on "Dr. N. Rudraiah: A bibliometric study". Dr. Raudraiah has worked in various fields in applied mathematics like fluid mechanics, magneto hydrodynamics, electrodynamics and smart materials of nanostructures. In his 43 years of productive life. He has collaborated with 102 colleagues and students and has published 271 papers during 1962-2004. The collaboration co-efficient is 0.54 highest collaborations were with M.Venkatachalappa (31) and B.C. Chandrashekar (21). **Ezhilrani et al; (2006)** An investigation was made on the authorship pattern in Aquaculture Journals, based on the data collected from Aquatic Sciences and Fisheries Abstracts Part I (ASFA I) for a period of 3 years i.e. 1991, 1996 and 2001. In all the years, multiple authored contributions were more than that of single authors in all broad areas of aquaculture as the values of contributions of multiple authors ranged from 57.1% to 90.8% in different aspects of Aquaculture. The degree of collaboration was found to be 0.85 for all the three years and it ranged from 0.83 (1991) to 0.86 (1996 and 2001). Collaborative researches were considered as an important facet of modern science, hence **Zafrunnisha and Pullareddy (2009)** conducted a study related to authorship trend. The study presented authorship pattern and collaborative research in the field of Psychology. The collected data included 22,565 citations, among these only journal citations were considered for the study, which were appended to the 141 theses. A total 14374 journal citations came out and were utilized for the study. Predominance of multi-authored papers over single authored papers was seen. The degree of collaboration in Psychology was 0.53. USA deference first by producing 42.28% of cited journals.

The majority of the cited journals of Psychology (94.54%) was in English language. **Zafrunnisha (2009)** the study examined authorship pattern and degree of collaboration in Indian Journal of Management. The required data have been collected from the 'Prabandhan: Indian Journal of Management' published during the period 2008-2011. The result shows that multi-authored paper's contribution is more in number (54.37%) compared to single authored papers (45.63%). The degree of collaboration, is 0.54 and average number of authors per citation is 1.76.

Krishnamurthy et al; (2011) carried out a study on 'Meteorology' from 2006 to 2009 as available in the database ISI Web of Science. A total of 1651 articles was collected related to the subject Meteorology for the study. The result shows that the highest numbers of articles are contributed by multiple authors, which are 844 articles i.e. 51.14% of the total articles. English is the major language of publication with 1618 articles constituting 98% of the total articles. The average collaborative coefficient (CC) is 0.604 and the degree of collaboration (DC) is observed to be 0.890. **Pallab Pradhan et al. (2011)** made an attempt to study the authorship pattern and author's collaborative research in Indian Chemistry literature with a sample of 53,977 articles downloaded from SCI-Expanded database in Web of Science during the period 2000-2009. The average number of authors per article is 3.55%. In this study the degree of collaboration (C) during the overall 10 years (2000-2009) was 0.03, but the year wise degree of collaboration was almost same in all the years of mean value 0.97. In the 10 years of the period, the multi-authored articles are higher and predominant on single authorship. The study found that the researchers in chemistry are keen towards team research or group research rather than solo research.

Chanda Arya (2012) in their study analysed authorship pattern and collaborative research trends in the field of Veterinary medicine based on the data collected from 'Indian Journal of Veterinary Medicine' published during the period 1999 - 2007. They have found that multi authored papers (95.55%) are predominate than single authored papers (4.45%). The degree of collaboration in the field of Veterinary medicine is 0.96. This study favors the fact that scientific research is collaborative in nature. **Ziaur Rahman (2012)** examined the collaboration research and authorship pattern in the field of life science (Zoology and Botany). A sample of 22020 citations are from the 118 doctoral theses accepted by the University of North Bengal during the years 1987-2007. They have found that collaborative research has been preferred by the scientists over that of solitary research. The average degree of collaboration was found to be 0.74 in Zoology and 0.64 in Botany, which also indicates dominance of collaborative research over solo research. The study indicates that although multiple-authorship is dominant, solo research also exists.

Vaishali and Shubhangi (2013) have studied trends in authorship pattern and author's collaborative research in Information Technology with a sample of 17917 articles collected from LISA during 2000-2009. The average number of authors per article is 1.80. In the study the degree of collaboration (C) during the overall 10 years (2000-2009) is 0.71. The study found that the researchers in Information Technology are keep toward team research or group research rather than solo research. **Goyal et al; (2013)** examined authorship trends and collaborative research in the field of chemical sciences based on the data collected from Indian Journal of Chemistry section-B (IJCB) published during the 2002-2011. Findings revealed that multi authored articles 97.24%

prevail the single authored articles 2.75%. The degree of collaboration in the field of chemical sciences is 0.97 and average number of authors per paper varies from 3.21-3.78.

Amsaveni et al; (2013) analyzed the authorship pattern and collaborative research in Bioinformatics. Totally 91655 authors were produced 17318 articles in this subject. 9.77% of articles were single authors' contribution. 90.17 % of articles produced by collaborative authors. Two authors team has produced more articles and team highest number of authors for each article is 6.

Saba Siamaki et al; (2014) studied collaboration and co-authorship patterns in library and information science studies in Iran between 2005 and 2009. The findings showed that among 942 investigated documents, 506 documents (53.70%) were created by individual researcher and 436 documents (46.30%) were the result of collaboration between two or more than two authors. The average degree of collaboration between researchers in the investigated papers was 0.46, which shows that library and information science researchers have a tendency for co-authorship. **Ifeanyi and Brendan (2014)** study carried out on citation analysis and authorship patterns of two linguistics journals. Results revealed that sole authorship (63.2%) dominated reports on linguistic research, while 36.8% had multiple authors. The degree of collaboration in linguistics research was very low, with joint research projects making up only 0.37 percent of the articles.

2.4 Citation study on journals and ranking of core journals

A study conducted by **Mubeen (1994)** on citation analysis of Vikalpa: A bibliometric study. Study (308 articles) contributed to the journal Vikalpa from the years 1985-1990. Study analyses the country-wise and institution-wise scattering of contributions. It also gives a list of 10 highly cited journals for more than 10 times. **Biradar and Kumbar (1998)** made a comprehensive work on citation pattern in the field of Environmental Sciences. The study presents and analyses 2993 references appended to 274 articles published in Indian Journal of Environmental Protection, Vol. 14 and 15, 1994 and 1995 respectively. Results indicate that major form of document is periodical 1795 (59.973%). Authorship pattern shows, highest contribution is made by two authors 613 (34.150%) and in this field research go back to 20 years, it accounts 1390 (77.437%).

A similar study by **Kumbar and Syeda (1998)** examined 7451 citations appended to the 322 articles published in the American Journal of Ophthalmology, Vol. 117 to 120 during the year 1994-95. Results indicate that major type of document was periodical as 682 (91.63%) and authorship pattern showed the highest contribution made by three authors (72%). The US journal of Ophthalmology had the highest overall number of citations i.e. 998 (14.61%).

Study was performed by **Paul Kelsey and Tom Diamond (2003)** establishing a core list of journals for forestry: A citation analysis from faculty at Southern Universities. Citations of articles published from 1990 to 2002 of faculty teaching at selected southern universities are counted and analyzed to form a core list of the highly cited journals in the field of forestry. The analysis focuses on the similarities and differences of both studies,

and discusses the importance of ecological and interdisciplinary journals to forestry research.

Sharif & Mahmood (2004) carried out study on selected volumes of the Pakistan Development Review (PDR) and the Pakistan Economic and Social Review (PESR) were analysed to find the citation pattern of their articles. Eight volumes of each journal were selected. The results revealed that the PDR has been the most cited journal. The mean score of citations per article remained insignificantly different in the two core journals. More than 50 percent of the citations from both journals were single-authored. More than 50 percent of the citations were from non-journal sources, mainly books. Although citations from online sources were seen, it was a negligible number. About 47 percent of the total citations of the PDR were up to five years old compared with the citations of the PESR, where only 25 percent fell into this category. Most of the authors used foreign books as citations. There is a significant similarity in the top most cited journals in both cases. Most of the frequently cited journals were from the USA. The top position occupied the Journal Pakistan Development Review with 376 citations followed by American Economic Review with 86 citations in PDR journal study. And in PESR study found Pakistan Development Review with 102 citations occupied the top position followed by Journal of Political Economy with 23 citations.

Ahmed Olakunle Simisaye and Osinaike (2010) undertook a study on citation analysis of all the journal articles published in the Journal of Library and Information Science (JOLIS) from 2004-2009. 72 articles were published in the journal during this period. The highest number of 14 articles were published in 2007 and 2008. A total of 998 references was generated by the journals, indicating that 13.7 average citation per

articles. The result showed that journals were the most cited materials as it accounted for 37.14% of the total citations, followed by books with 33.14%. African Journal of Library Archive and Information Science occupy the first rank with 40 (23.25%). The individual articles that had the highest citation had 44 references and was published in 2008. The majority (38.2%) of materials cited was published in 1995 and beyond, authorship pattern shows that (79.85%) of the materials cited was written by single authors while only 8.8% of the total citations were Internet resources. **Hussain & Swain (2011)** evaluated the top papers of Computer Science as reflected in science direct. The citations data have been collected from the quarterly list of hottest 25 research articles in the subject field of Computer Science from science direct database. The results reveal that out of 495 top papers; three-authored articles are little ahead than two authored articles followed by four-authored articles and the country productivity of USA is at the top followed by UK. Moreover, it found that European Journal of Operational Research occupies the top position with 78 citations followed by Computers in Human Behavior with 52 citations.

Surendra Kumar and Kumar (2011) in their study analysed 8093 citations in the Journal of Oilseed Research (JOR) published during 1993 to 2004 (V.10-21). Out of 8093 citations 5642 are given in main articles and 2551 in short communications of the JOR. Further analysed types of documents cited, authorship pattern and identified core journals. Maximum numbers of 5704 (70.48%) citations are from journals. Indian Journal of Agronomy occupies the first place with 494 (8.66%) of the total citations. Finally, concluded that only 20 core periodicals are covered more than 50% references and also indicated that collaborative research was new trend in oil seeds research. Further study carried out by **Jadhav et al. (2011)** on citation analysis of the journal articles published

in the journal 'University News' from January 2004 to December 2008 which comprises 5 volumes and 261 issues in which 1949 articles were covered. The citations were taken for the study was 5968. The maximum number of citations was referred in 2007 to 2008 that was 2950 (50.6%), the most cited type of document was book 1549 (26.39%), the maximum number of citations were from India 3675 (62.61%), in authorship pattern single author citations were dominant than others 3011 (51.30%). In ranking of journals the self citation of University News journal is first ranked journal in the total journal citations that is 492 (40.36%). Ranking of authors was observed that 'APJ Abdul Kalam' is first ranked author with 34 (0.94%) citations.

Thanuskodi (2011) conducted a study on bibliometric analysis of the journal titled Library Herald for the period between 2006 -2010. The results showed that out of 138 articles single author contributed 72 (52.17%) articles while the rest 66 (47.83%) articles were contributed by joint authors. The majority of the contributors preferred journals as the source of information which occupied the top position with the highest number of citations 494 (32.42%) of the total 1524 citations. Library Herald Journal is the highly preferred journal for communication by the library and information science professionals. The study also reveals that most of the contributions were from India with 89.85 % and the rest 10.15 % only from foreign sources.

Swain Dillip and Panda (2012) made a bibliometric study on the Journal of Intellectual Property Rights. A total of 332 articles carrying 1,541 journal citations during the period of 2002-2010. 471 authors contributed articles during the nine years. Due to the absolute domination of solo contributions, the visibility of collaborative contribution was found remarkably less. The study found that self-citations among authors constituted

22.01% of the total cited scholarly papers. It is also found that top cited journals, namely; Journal of Intellectual Property Rights has been cited most with 129 citations, followed by European Intellectual Property Review (38), Research Policy (32) and World Patent Information (31). **Dillip et al; (2012)** made a study on the Journal of Interlending & Document Supply (ILDS) during 2001 to 2010 using different bibliometric indicators and to find out various dimensions of publication trends of this journal. In their study examined 315 scholarly articles published in ILDS for a period of 10 years. The study results reveal that the highest numbers of articles are found single authored contributions, followed by two-authored contributions. The authorship productivity pattern partially complies with Lotka's law. In regard to country productivity, UK stands the highest with 158 citations followed by USA with 64 citations of the total. The most cited Journal is Interlending & Document Supply 505 (19.40%) citations followed by Serials 99 (3.8%) citations.

Roy and Basak (2013) examined the articles published in Journal of Documentation. Studies found that majority of papers are multi- authored. The degree of collaboration is found to be 0.51. The geographical distribution reveals that the contribution by UK is the highest accounts for (32.11%). The average citations per paper are 41**.** Most of the contributions are on Information Retrieval (22.76%). Information Science (philosophy and theory) (11.78%), Cataloguing and Classification (10.16%), Knowledge & Information Management with (8.94%) and ICT, Digital libraries & Web Technologies (8.52%) has too good share in the papers published during 2005-2010.

Gupta et al; (2013) analysed articles appeared in the online journal, Information Research: An International Electronic Journal during the period 2008-2012. The

maximum number of articles (57) as well as maximum number of citations (2324) was published in the year 2008. The average number of citations per article was 43.21. More than half of the citations (51.44%) were multi-authored, whereas 48.56% of citations were single-authored. Journal of the American Society for Information Science and Technology was the most cited journal accounts for 341 (6.68%). **Gurjeet (2014)** carried out study on citation analysis of all the articles published in the journal Pakistan Journal of Library and Information Science. LIS professionals have used 848 citations for writing 40 articles during the period 2006-2012. Results represents that the maximum number of citations are in the year 2009, i.e. 156 (18.4%) and the minimum number of citations are in the year 2007, i.e. 91 (10.73%). In the chronological distribution of citations, maximum citations 310 (36.56%) are from the period 1999-2005. Single author citations (59.55%) are more in number than multiple authors which shows authors prefer individual work. Out of 848 citations, 436 citations are from periodicals. Information Outlook is the most cited journal with 44 (10.01%).

2.5 Citation study of identifying the forms of documents

Aravinda and Pulla Reddy (1996) analyzed the Journal Annual Review of Physical Anthropology for the period 1980 to 1994. Out of the total citations, 59.33% of citations were from journals, followed by books (31.71%), conference proceeding papers (4.66%) and technical reports (1.19%). **Vimala (1997)** analyzed the citations in Biological Sciences by studying the citations of 200 doctoral theses submitted to Sri Venkateswara University, Tirupati. The bibliographic form-wise distribution of citations showed that journals covered 85.34% of the total citations, followed by books (9.89%) and conference proceedings (2. 05%).

The study of **Tapaswi and Maheswarappa (1999)** reveals that 66% of citations were from journals, followed by books (16.71%), technical reports (7%) and conference proceedings (6%). **Biradar and Sujatha (2000)** carried out a comprehensive work on research collaboration in various disciplines of S&T. Results reveals that major contribution made to the field of forestry, pathology and civil engineering is by single author (37.45%), six and above (29.16%) and two authors (43.96%) respectively. Study also found that in 1997 average number of journal articles published in the journal of pathology is high (217) followed by 1992 with 156. **Das and Sen (2001)** analyzed 1,049 citations appended to 34 research articles in the Journal of Biosciences for the year 2000. It was found that out of the total citations, 85.89% of citation belong to journal articles, followed by monographs (10.10%) and others 4.01%.

Susanta and Sen (2003) studied 457 citations cited in the Indian Journal of Physiology and Allied Science for the period of two years i.e. 2001-2002. The analysis shows that 76.09% of the total citations were from journals, followed by monographs

(18.59%), conference proceedings (1.53%), theses (0.66%), research reports (1.53%), manuals (0.22%) and others (0.66%). **Nasir and Roza (2010)** carried out citation analysis of 3109 citations that has covered doctoral dissertations submitted to the Department of Education, Aligarh Muslim University (AMU), during 1990–2005. The citations pertained to many bibliographic forms such as journals, books, dissertations, theses, reports, conferences, newspapers etc. was analyzed. They have identified that the books were the highest cited sources accounting 46.05% of the total citations. It is observed that 713 of the articles are published from India. 2547 (81.92%) of the articles are contributed by a single author.

Another study on doctoral dissertations has been carried out by **Dhanamjaya et al; (2011)** they have studied 17151 citations appeared in 137 doctoral dissertations awarded in Engineering and Technology awarded by the universities of Karnataka during 1961-2008. The study revealed that the journals are heavily cited (43.54%) and books stands in the next order with (11.74%) followed by conference proceedings, reports and symposia papers. A study of 52 doctoral theses in Marine Geology submitted to Andhra University during the period 1954-2009 has been conducted by **Siva Prasad et al; (2011)** a total of 9,453 citations was analyzed for identifying their bibliographic forms, authorship pattern, ranking of cited journals and subject wise distributions of citations. The finding reveals that nearly 71.27% citations were from journals and 13.51% from books, conference proceedings, accounts 6.07% and dissertations 5.52% respectively. **Trayambakrao and Sonwane (2012)** studied 2876 citations appended in 34 theses of Economics submitted to Dr. Babasaheb Ambedkar Marathwada University during 2000-2010. The study shows that most cited documents are from Books (57.86%) and

remaining (42.14%) citations were from reports, journals, government publication, theses and others. So it was concluded that, researchers depend more on books literature for their investigations. The chronological distribution of citations shows that maximum number of citations are covered during the period of 1999-2008 i.e. 977 (33.97%). The authorship pattern of citations shows that the single authored citations are more in number that others that is 2094 (72.81%).

A study by **Hema Haldua et al (2012)** on dissertations in Molecular Biology and Biotechnology submitted to G. B. Pant University of Agriculture and Technology, India has witnessed citations of journals alone accounted for 88.02% of the total citations (8,490), followed by books (7.75%) and conference proceedings (1.95%). The rest of the forms of documents were cited less than 1% respectively. **Zafrunisha (2012)** study analysed 9,162 citations, appended in the 77 doctoral theses of Sociology submitted to Sri Venkateswara University, Tirupati and Osmania University, Hyderabad during the period 1974-2005. Results reveal that the book source (59.62%) is the most preferred source of information compared to other sources for the sociology researchers. Journals and seminar/conference proceedings secured second (30.07%) and third (1.03%) places respectively. It is observed from authorship study that the works of single authors have been cited frequently in books (76.77%) in Sociology. In Journals multi authored papers have been cited more in number, i.e., 55.57%. It is also found that most of the publications cited by the sociology researchers were published by developed countries and all the citations were published in English language only.

Thanuskodi (2012) has studied doctoral theses in Botany submitted to Annamalai University. The study covered the theses submitted during 1990-2010. A total of 19735

citations was analyzed. Study witnessed the journals are the highly used bibliographic form of source with 69.09%, followed by books (14%), conference proceedings (11. 21%) and theses (2.12%). In the same field another study on citation analysis of 75 doctoral theses submitted to the North Bengal University, Darjeeling, during 1987 to 2007 has been carried out by **Ziaur Rahman and Udayan Bhattacharya** in the year **(2013)**. The 75 Botany PhD theses contain 13,542 bibliographic references. Study witnessed that the maximum number of documents used was journal articles (72.87%) followed by monographs/books (13.33%), Seminar/conference proceedings (4.62%), PhD theses and dissertations (2.85%) and reviews and reports (1.92%).

Another study by **Joseph and Hilary (2013)** has covered doctoral theses across disciplines. A total of 30 theses, including 8425 citations was analyzed. The study covered 10 theses each from 3 disciplines, namely, Animal Plant and Environmental Science (APES), Literature (LIT) and Sociology (SOC). In APES journals covered 69.99% of the total, followed by 8.37% of book chapters, 7.33% of books and conference proceedings (5%). In Literature, books were highly cited bibliographic form (64.4%) followed by 15.6% of journals and 14.5% of book chapters. Sociology theses were also having journals in second rank with 23.96% in which the books stands at first rank (31.7%). A recent study has been carried out by **Anjan and Mukesh (2014)** covered 30 PhD theses submitted to Department of Chemical Sciences, Tezpur University during 2008-2012. A total of 10983 citations was analyzed. The study results revealed that journals were the most preferred sources of information in the field of chemical sciences, accounting for 78.83% of total citations, followed by books with 15.57 % citations. Out

of the total number of 8658 journal citations, 39.89% are by more than three authors, followed by two authors with 22.28 %.

2.6 Geographical distribution

Maheswarappa and Prakash (1982) examined 5,533 citations in the Journal of Phytomorphology for the period 1975 to 1979. They analyzed the geographical distribution of citations. The study shows that USA occupied the first place accounting for 28.44 percent of the total journal citations followed by India (14.85%), UK (13.45%) and Germany (11.29%). **Kapoor (1984)** conducted study on the Journal Annual Review of Earth and Planetary Sciences for the period 1973 to 1981 and prepared a ranked list of 82 journals contributing 76% of the total citations out of the 833 journals cited. The country wise distribution of citations shows that USA occupied the first position by contributing 56.02 % of the total citations followed by UK (23.25%).

Sangam and Biradar (1990) studied 7,576 citations appended to 145 Master of Science dissertations in surgery accepted by the Gulbarga University, Gulbarga during the period 1982 to 1989. The geographical distribution of cited documents shows that USA occupied first position accounting for 41.71 percent of the total cited documents followed by UK (28.45%), India (26.38%) and other countries (3.46%). **Satish and Kabir (2001)** made an attempt to study the citation patterns in the Quarterly Journal of Economics. The authors studied the country-wise distribution of citations which shows that USA occupied first position with 60.8 percent of the total citations followed by UK (14.38%).

Biswas et al. (2007) analyzed 358 original contributions published in the Journal Economic Botany during 1994-2003. Contributions by single author and small teams

comprising two or three authors account for about 80% of the papers. Among the citations, books accounted for 59%, and articles 41%. The length of maximum number of articles (38%) ranges from 6 to10 pages. Articles occupying 11 to 15 pages rank next accounting for 31%. The highest number of articles totaling 217 (60.61%) has emanated from academic institutions such as universities. It is also observed that the highest number of publications are from USA i.e. 100 (27.9%). Next comes UK with 36 articles (10.1%) followed by Mexico with 33 articles (9.2%). India ranks 4th with 16 articles (4.5%). It may be noted that the first four countries are responsible for 51.7% of the articles, the first ten countries for 67.8%, the first 15 countries 78.6% of the articles. **Ipsita Panda et al; (2013)** made an attempt to study the publication and citation patterns in the Journal of Information Literacy (JIL) an open access journal from 2007-2012. The results show that the number of research articles 68 (51.9%) is highest among other types of publications such as book reviews 36 (27.49), conference papers 27 (20.61%), etc. A majority of contributions 94 (71.75%) emanating from the UK and other countries has a very meager contribution. Almost all the papers 124 (94.65%) are from academic institutions and a very few papers 7 (5.35) are from non-academic institutions. The citations demonstrated that individual research 90 (68.7%) is much higher than collaborative research.

Singh et al. (2014) study conducted on PhD theses in Social Sciences awarded by the University of Delhi during 1995-2008. Results reveal that 51889 citations were made from 259 theses in Social Sciences. The analysis of these citations shows that books are the most preferred sources of citations in all disciplines except Economics and constitutes about 55.5% of total citations. The study also found that country-wise scattering of

citations was found that India ranked first with 29071 (56.00%) citations followed by USA with 9457 (18.20%) and UK 8604 (16.50%) citations. **Somashekara and Kumbar (2014)** analyzed doctoral theses in Physics submitted to Bangalore University. The study covers 2485 citations. The study analyzed the result that are from major part of citations journal (80.68%) followed by books (10.99%) and 1.21 % is e-resources. The study also reveals that collaborative authorship is the highest (72.39%). Large numbers of citations are from USA (42.34%), UK (13.87%) and India (8.13%).

2.7 Studies on application of Bradford's Law

Maheswarappa and Prakash (1982) carried out a study on literature use pattern by the researcher's in the field of Botany: a citation study of doctoral theses. The study examined 2,726 citations and they were analyzed on the basis of principal of bibliographic forms, obsolescence and Bradford's law was applied to the botanical literature. **Mubeen (1996)** studied 22 doctoral dissertations in Chemistry submitted to Mangalore University since its inception were analyzed to study the information use pattern of researchers. The study identified 60 core journals, out of total 418 journals, referred by the researchers. The application of Bradford's law of scattering to the literature of chemistry reveals an exponential trend when plotted on the graph. The Bradford's multiplier was seen to observe a geometric series pattern over the literature. **Lal and Panda (1999)** studied based on 20 doctoral theses in Plant Pathology submitted to Rajendra Agricultural University, Bihar, India from 1980- 1993. The applicability of 2 formulations (verbal and graphical) of Bradford's Law of Scatter was tested in 3 separate parameters to avoid arbitrary scattering. The conformation of the verbal and graphic formulations was found to be very close. Suggests that at a practical level, application of

the Bradford distribution may provide a means for selecting those journals dealing with a given subject that are the most productive in terms of the number of relevant articles.

Sevukan et al; (2007) the study conducted on research output in plant sciences of the faculties in central universities in India has been analyzed bibliometrically. The study analyzed a total of 348 bibliographic records of plant sciences for a period of 10 years from 1997 to 2006. The results of the study reveal that i) the plant sciences literature has grown steadily during the study period except for 1997 to 2002 ii) the productivity of authors fits Lotka's distribution while, scattering of journal articles does not fit into Bradford's distribution. **Sevukan and Sharma Jaideep (2008)** made an attempt to study the analysis of research performance of Biotechnology faculties in central universities in India from 1997-2006. The results indicated that the growth of literature in Biotechnology has steadily increased from 15 articles in 1997 to 43 articles in 2006; two-authored publications predominated amongst the pattern of authorship; applicability of Lotka's law was validated from the values n = 2.12, C =0.669, and D = 0.027 obtained using least square method. The application of Bradford's law does not fit to the literature analysed.

Sudhier (2010) analysed the five years data of journals cited by the physicists at the University of Kerala (UoK), India has been carried out to examine the applicability of Bradford's law of scattering on a sample of 303 journals containing 2655 citations collected from 12 doctoral theses during the period 2004-08. Ranked list of journals are prepared, and the most preferred journal is Journal of Geophysical Research with the highest of 345 (12.97%) citations. The journal distribution pattern of the doctoral theses does not confirm the Bradford's distribution pattern. The distribution of the journals in

three zones done and the number of references in each zone is then calculated. **MENG Fan-Hong et al; (2012)** investigated 164 doctoral dissertations of China Academy of Chinese Medical Sciences (CACMS) from the period 2007 to 2009. The total numbers of citations are 24379. A result shows that Journals (77.2%) and books (17.7%) are the most heavily used material formats. The journal citations are from 1481 Chinese journals and 1723 journals in other languages. A total of 214 Chinese journals and 142 journals in other languages are cited 10 or more times. Study concludes doctoral students have very heavily demands for literature in Chinese and English. The journals are the mainly information source, and the journal articles being cited conform to Bradford's law of scattering.

Gupta Jyoti and Khare (2013) examined the pattern of citations by the researchers of Dr. Harisingh Gour University, Sagar and applying Bradford's Law of scattering. The study covers 255 periodicals with 2953 citations collected from 35 doctoral theses till the year 2010. The time span 1986−1995 was the most productive years of cited periodicals. Contributions of journals are from USA, and the most cited journal is IASLIC Bulletin. Applying the Bradford Law of distribution to find out the core journals in the field of library and information science. The journal distribution pattern of the LIS doctoral theses does not fit the graphical Bradford's distribution pattern. The distribution of journals was in three zones and the number of references in each zone calculated as 3:26:226. The value of Bradford multiplier is 8.55. **Banateppanavar, K et al; (2014)** investigated the research output performance of LIS Professionals and to study the citation analysis of all the journal articles published in the Library Management Journal during 2010-2012. The study reveals that journals (50.37%

of citations) are the most preferred sources of information used by the researchers in the field of LIS. Library Review (UK) has ranked the first with 31 (1.91%) citations. Further, Bradford's law of scattering was applied. It is observed that major citations are from journal literature. In addition, more cited materials were contributed by multi authors and degree of collaboration is 0.40.

2.8 Obsolescence of Literature

Ting (1999) analyzed PhD theses in Sciences submitted to the University of Malaya during 1986 to 1995. A total of 8,736 citations were collected. Journals and monographs were the two formats that were most frequently cited, 74.94% and 15.76% respectively. The average half-life period for the entire literature is found to be over 13 years. **Aruna Prasad Reddy (1999)** examined 186 doctoral dissertations in the field of Chemistry submitted to Sri Venkateswara University, Tirupati. Results revealed that journal literature was the most referred source of information (85.03%), followed by books (10.44%). The half-life period for journal citations was found to be 17.84 and 17.68 years for book citations. **Harwade and Dankhade (2002)** investigated 23 doctoral theses in Economics submitted to Nagpur University during the period 1996-99. The bibliographic form-wise distribution of citations showed that books accounted for 42.77% of citations, followed by journals (32.81%), theses (14.70%), newspapers (4.50%) and others (5.22%). The results revealed that the single authored papers were the highest in number. Half-life period for journals was found to be 22 years.

Biradar and Sampath (2003) study conducted based on the references appended to the articles published in Indian Journal of Chemical Technology during the year 1994, 1997 and 1999. In their study obsolescence of literature was studied and half life of

literature was found to be 11.8 years. The results of the study would be very useful for librarians and managers of information centers to organize the most frequently and less frequently used materials in the library collections. **Shafi and Wahida (2005)** analysed 100 doctoral dissertations submitted to Kashmir University during the period 1980-2000 in the field of Natural Sciences. Among them 17 theses were from Zoology. A total of 11,862 citations was analysed for identifying bibliographic form, citation potential, journal ranking and obsolescence rate. The Study found that the half life of journal citations is 37 years. It shows non use of adequate literature in the respective fields.

Yaar Tonta and Umut (2006) studies scatter and obsolescence of journals cited in theses and dissertations of librarianship. 100 theses and dissertations completed at the Department of Librarianship of Hacettepe University between 1974 and 2002. Almost quarters (24%) of all dissertations were on university libraries, followed by public libraries (9%). The study found that monographs received more citations (50%) than journal articles (42%). No correlation was found between the frequency of citations of the most frequently cited journals and their impact factors. The distribution of citations to foreign journal titles fit Bradford's law of scattering. The mean half-life of all cited sources was 9 years.

Similar study conducted by **Pillai Sudhier (2007)** the obsolescence and aging studies are important areas of citation analysis in Library and Information Science. The study is based on the 3,180 citations, cited in the 12 doctoral dissertations of Physics awarded from University of Kerala, India during the period of 1999-2003. The findings show that the half-life of journals citations was 14 years and for books it was 25 years. The mean year of journals was calculated as 17.58 and 23.09 years for the books.

Núria and Sabaté (2008) carried out on the citations within the Chemistry field Ph.D. dissertations to ascertain what types of documents are the most frequently used in the research process, the most frequently consulted journals and obsolescence rate of the journals etc. The analysis covered 46 doctoral theses presented at the Institute Químic de Sarriá (IQS) from1995 to 2003. The results obtained from the 4,203 citations revealed that the most frequently used documents were scientific papers, which accounted for 79 percent of the total; 33 journals met 50 percent of the informational needs; and the age of 50 percent of the citations was not older than 9 years. Finally, the results can be used as a tool for the collection management of the library.

Zafrunnisha and Pulla Reddy (2010) in their study examined 141 theses in Psychology, accepted between 1963-2005 by Sri Venkateswara University,Tirupati, Osmania University, Hyderabad, and Andhra University, Visakhapattanam. The total number of journal and book citations found in those theses is 14,374 and 7,110. The analysis of different characteristics of the literature was carried out on the citations. Nearly 27 percent of journal citations are 8 years old or less, 50 percent are 14 years old or less and 75 percent are 22 years old or less. 27 percent of book citations are 11 years old or less. 51 percent are 19 years old or less. 75 percent are 28 years old or less. Half-life of journal citations in psychology is 14 years, while it is 19 years for book citations.

2.9 Conclusion

The purpose of present study was to analyze the current information needs, trends in research and use of literature by Bioscience research scholars. In order to get an idea about the past studies conducted in the area of citation analysis and related areas, an exhaustive literature survey was carried out. This study gave an idea about what has already been done with their research, how these analyses have been carried out and what methodologies have been followed.

The above studies exhibit that the trend, that the shift from single author publications to two authors and multiple authors continue in various fields such as Zoology, Botany, Psychology and Chemistry etc. It may be observed from the above studies that in large number of cases the two authors and multiple author's publications range between 60 to 80 percent whereas single author publications range between 20 to 30 percent. More recently the multiple authorship patterns with more than five authors are also witnessed.

Citing of electronic journals is recent phenomenons though compare to print publications. Citation studies in the field of science and technology include subjects like Botany, Biotechnology etc., reveals that the research scholars significantly use 70 to 85 percent of scholarly journal articles followed by books and conference papers etc. The above studies also reveals that books are major sources of reference for social science research scholars subjects like Education, Economics and Sociology.

The above studies on geographical distribution of citations reconfirmed the fact that the USA occupies the first place in majority of the studies. However the citations to Indian publications in the field of social sciences occupied first rank. The above studies

reaffirm the fact that English is the predominant language used by the research scholars in various fields of study.

The above studies reconfirm the fact that there are a few core journals which are more productive where number of articles are distributed in large number of journals of other subjects but are related to the core subjects of study. Most of the studies confirm the Bradford's law of scattering. And some of the studies the application of Bradford's law does not fit to the literature analyzed.

It may be observed from the above studies that obsolescence of literature varies from subject to subject. While in most of the cases half life of literature is found to be 13 years (Ting, 1999) to 17 years (Arun Prasad, 1999). In subjects like department of librarianship and chemistry it is proved to be 9 years (Yaar Tonta, 2006 and Nuria, 2008).

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CHAPTER-III

BIBLIOMETRICS: AN OVERVIEW

3.1 Origin and Development

"Bibliometrics" is still considered as one of the most fascinating field of study among the library and information scientists. The study is popular because it helps to improve scientific documentation, information and communication activities by quantitative analysis of library collections and services. It is also being used as one of the techniques to evaluate and study the scientific works. It is surprising to note that till 1968 there was not even a single article on "Bibliometrics" which has got immense uses in various fields of study. But soon after that in 1980s quite a large number of works were published on the subject mostly in the form of journal articles.

Bibliometric is just one of many sciences whose name ends with "Metrics". Many scientists used the term under different names, but the concepts were more or less supplementary and complementary to each other with some broader and narrower extension of human ideas. One name that was used quite early, but very scarcely was a statistical analysis of the literature by F.J. Cole and Nellie B. Eates presented the first recorded study on bibliometrics in 1917 in Science Progress. The project analyzed publications in comparative anatomy from 1543-1860 by simply counting the number of titles, both books, and journal articles. They mainly studied the functions of interest and distribution of literature among countries. This kind of study was named as statistical analysis of literature. In 1923 E.W. Hulme introduced the term "Statistical bibliography". This is considered as second reported work on bibliometrics; Where Hulme analyzed the journal articles in "English International Catalogue of Scientific Literature" and derived the ranking of countries by their productivity. However, in 1927 the first recorded study of citation data (being the third in bibliometric study) was brought out by Gross and

Gross. But finally in 1969 Alan Pritchard is actually credited with introducing the term ”Bibliometrics” to replace the earlier word “Statistical bibliography” used for the same concept. Pritchard coined this term in a paper “Statistical bibliography or Bibliometrics” which was published in the Journal of Documentation (1969).

In 1948, S. R. Ranganathan introduced the term “Librametry” to study the various library operations by applying statistics. In 1970s, Russian concept “Scientometrics” and FID’s “Informetrics” were also applied almost for the same concept bibliometrics. In 1969, Vassily V. Nalimov and Z. M. Mulchenko coined the Russian equivalent of the term as ‘Scientometrics’ (naukometriya), which has grown in popularity and is used to describe the study of science: growth, structure, interrelationships, and productivity. As the name would imply, this term is mainly used for the study of all aspects of literature of science and technology.

The term Scientometrics gained wide recognition by the publication of the journal ‘Scientometrics’ by Tibor Braun in Hungary in 1978. According to Hood and Wilson (2001) much of the Scientometrics studies are indistinguishable from bibliometrics and much bibliometric researches are published in the journal Scientometrics.

In 1979 Nacke introduced a term ‘Informetrics’ which is also closely related to Scientometrics and bibliometrics. Rather Scientometrics is considered as a sister field of Informetrics within information science. The term Informetrics which has got wide spread recognition like the two other terms, comes from the German term, ‘Informetrie’. After the introduction of the term a lot of discussions were done and was compared with ‘Bibliometrics’ and ‘Scientometrics’.

In addition to this with the introduction World Wide Web (Wilsonred, 2001), three additional metric terms entered into the literature of Information Science. In 1995, Bossy introduced the term 'Netometrics' to describe Internet-mediated scientific interaction.

In 1997 Almind and Ingwersen suggested 'Webometrics' for the study of World Wide Web, and all network-based communication, by Informetrics methods. A similar, but not necessarily identical, sub field is suggested by the publication of an electronic journal Cybermetrics in 1977 in Madrid, under the editorship of Isidro Aguillo. The main interest of the journal is to publish articles on evaluation of e-journals on the web and on the application of information techniques to cyberspace communication in general (Hood and Wilson, 2001).

3.2 Meaning and Definitions

The word bibliometrics is a combination of two words i.e. Biblio and Metrics. Biblio is derived from Latin/Greek word "Biblion" means "Books". On the other hand Metrics is derived either from Latin/Greek word means "Metricus" (in Latin) or "Metrikos" (in Greek). The meaning of this word Metrics is measurement. In other words Metrics is "Science of Meter, (Measurement)". The purpose of Statistical Bibliography is to shed light on the process of written communications and of the nature and course of development of a discipline (in so far as this is displayed through written communication) by means of counting and analyzing the various facets of written communication.

Pritchard (1969) stated that bibliometrics deals with application of mathematics and statistical methods to books and other media of communication. In general bibliometrics may be defined as the quantitative analysis of the characteristics, behavior

and productivity of all aspects of written communications, library staff and information users. Egghe (1988) explained bibliometrics as the development and application of mathematical models and techniques to all aspects of communications.

Librametrics

Librametry means study of library operations using statistical calculus. But the term has not got much recognition like other related terms such as Bibliometrics or Scientometrics or Informetrics. However, Wilson recently in 2001 indicated, that there may be value in retaining the term 'Librametrics' or 'Librametry' for such studies not specifically analyzing literatures, or at least not specifically directed to the goals of Bibliometrics and of information retrieval. These include analyses of book circulation of library collection overlap of library acquisition of fines policy and of shelf allocation frequently using optimization techniques from operations research. Nicholas and Ritche (1978) accepted the definition of bibliometrics as the statistical or quantitative description of literature. Diodato (1994) described bibliometrics as the study of publications and communication patterns in the distribution of information by using mathematical and statistical techniques, from counting to calculus.

Scientometrics

"Scientometrics has been typically defined as the quantitative study of science and technology". Bibliometrics refers to all quantitative aspects and models of science communication, storage, dissemination and retrieval of scientific information (Wormell, 1998). Bibliometrics applied to scientific articles is called Scientometrics.

According to Beck (1978) Scientometrics is defined as the quantitative evaluation and inter-comparison of scientific activity, productivity and progress. Nalimov and

Mulchenko (1969) of USSR defined Scientometrics as the quantitative methods which deals with the analysis of science viewed as an information process. Brookes (1990) gave a further insight into the use and definition and stated that "the term Scientometrics, nurtured by Tybor Braun, has become fruitful in significant role in the social sciences. Applications are so far been restricted to exploitation of citation data provided by ISI but further refinements are now being critically examined". Bookstein (1995) defined Scientometrics as "the science of measuring science" Scientometrics is also considered as bibliometric measurement for evaluation of scientific development, social relevance and impact of application of science and technology, etc.

Informetrics

Informetrics is a popularly known subject since the mid 1980s formalizes and consolidates measurement studies, which focus on information productivity. It integrates information technology and complex intersections of information theory, Cybermetrics, decision theory, etc. While Bibliometrics and Scientometrics refer to all quantitative aspects and models of printed media and sciences, Informetrics is not limited to media or scientific communication. Neither, it is restricted to scientific research. However, it is considered usable for tasks such as issue management, gathering of business intelligence and research evaluation (Almind and Ingwersen, 1997). Informetrics is, thus, an emerging subfield in information sciences, which is based on the combination of advances of information retrieval and quantitative studies of information flows. Tague-Sutcliffe (1992) defined Informetrics as the study of the quantitative aspects of information in any form, not just records or bibliographies, and in any social group, not just scientists. According to Ingwersen & Christensen (1997) the term Informetrics

designates a recent extension of the traditional bibliometric analyses, also to cover non-scholarly communities in which information is produced, communicated, and use. Hood and Wilson (2001) stated that Informetrics covers the empirical studies of literature and documents, as well as theoretical studies of the mathematical properties of the laws and distributions that have been discovered.

Webometrics

Webometrics is the quantitative study of web phenomena, encompassing a variety of types of research. Some of these date back to the early years of the web although the wide spread adoption of the term itself is relatively new. Webometrics is the quantitative aspects of the construction and use of information resources, structures and technologies on the www drawing on Bibliometric and Informetric approaches.

The term Webometrics was coined by 'Tomas Almind' along with 'Peter Ingwerson'. The dynamic, diversified and far reaching nature of the web provides a fertile ground for knowledge discovery. Frequencies and patterns of word and phrase usage on web pages can provide information for search algorithms.

3.3 Scope of Bibliometrics

Nicholas & Ritche (1978) provided the scope of bibliometrics more clearly. They divided bibliometrics studies in two broad groups: One describing the characteristic features of a body of literature (i.e. Descriptive studies) and the other examining the relationship formed between components of a literature (i.e. Behavioral studies). It is also mentioned that both descriptive and behavioral studies are complementary to each other.

Descriptive Studies: The descriptive studies are also known as **productive counts** and have following fields of study.

1. Bodies i.e. authors or organizations responsible for the production and transmission of information.
2. Form of transmission (i.e. Journals, monographs, etc.).
3. Medium of communication (i.e. Articles, letters, etc.).
4. Nature of information conveyed (i.e. how much literature exists on various languages and subjects).
5. Timing and frequency with which information is conveyed.
6. Amount if information conveyed by various individuals, groups, organizations, countries, etc.
7. Geographical distribution of documents.

Behavioral studies: The other type of study, which is commonly referred to as **"Citation studies",** relates to what authors cite. Citation analysis reflects two major themes that are use of citation as tools for librarians to evaluate the library collections and services and use of citations as tools to analyze the research activity. However, citation analysis is concerned with the following phenomena:

1. Which authors are most cited?
2. Which journals are most cited?
3. What linkages exist between the citing and the cited works (i.e. self – citation)?
4. Languages of documents selected for use as citation.
5. Type of documents used for citation.
6. Subject distribution and how quickly the literature on some subject becomes out of date i.e. obsolescence study.

3.4 Applications of Bibliometrics

The bibliometrics study besides its theoretical content has various practical applications in library management and helps in deciding science policy on researches. Some of these practical applications of bibliometrics are as follows:

1. The bibliometric study aims to improve the bibliographical control because bibliometric analysis helps to know the character of literature in different fields. The volume and growth of primary literature have a direct effect on structure of secondary literature. Therefore, the computed growth rates and direction of change may be of considerable assistance to editors of secondary services in determining their future approach and coverage.
2. A major area of bibliometrics study is to determine statistics of literature relating to the country of origin, subject, and form and language distribution translation. These data will provide useful information determining the scope of work, and can suggest weakness in the coverage or areas of possible improvement of secondary services.
3. Bibliometric study derives the subject relationships, which suggest desirable general patterns of secondary service coverage. Such studies can also help to establish the framework for a service in a particular subject area.
4. The citation data analysis and the volume of publication in year-wise can be used in planning, retrospective bibliographies which will provide some indication of both the age of material used in a discipline and to the extent which more recent publication supersede the older ones, if at all.

5. The bibliometric analysis helps in comparative assessment of the secondary services, particularly and to overall figures on size of literature and to subject links. This may help the publishers in getting an idea of their achievements and competitions and could be useful for marketing purposes.
6. The bibliometrics data also helps in taking some management decisions. For example, it is useful in selecting specific primary and secondary journals and helps in planning future staff, building needs and in improving library services.
7. The citations data also determines the list of highly cited journals or books, which can be used in taking decision while discarding the stock of the library.
8. Citations analysis can find out subject relationships which help in suggesting titles of journals relevant to a given discipline in a particular library.

3.5 Laws of Bibliometrics

One of the main areas in bibliometric research concerns the application of bibliometric laws. The three most commonly used laws in bibliometrics are:

3.51 Lotka's Law

3.52 Bradford's Law

3.53 Zipf's Law

3.51 Lotka's Law

Lotka's Law describes the frequency of publication by authors in a given field. It states that "the number (of authors) making 'n' contributions is about $1/n^2$ of those making one; and the proportion of all contributors, that make a single contribution, is about 60 percent". This means that out of all the authors in a given field, 60 percent will have just one publication, and 15 percent will have two publications ($1/2^2$ times.60). 7

percent of authors will have three publications ($1/3^2$ times.60), and so on. According to Lotka's Law of scientific productivity, only six percent of the authors in a field will produce more than 10 articles. Lotka's Law, when applied to large bodies of literature over a fairly long period of time, can be accurate in general, but not statistically exact. It is often used to estimate the frequency with which authors will appear in an online catalogue.

3.52 Bradford's Law

Bradford (1934) published his first paper entitled 'Sources of information on specific subjects'. He observed and examined two bibliographies prepared in the Science Library (Britain) on Applied Geophysics (1928-1931) and Lubrication (1932-1937). He prepared a list of journals arranged in decreasing order of source items contributed by the journals of bibliographies. He noticed that journals in a single field can be divided into three parts, each containing the same number of articles:

a. A core of journals on the subject, relatively few in number that produces approximately one-third of all the articles.
b. A second zone, containing the same number of articles as the first, but a greater number of journals.
c. A third zone, containing the same number of articles as the second, but a still greater number of journals. The mathematical relationship of the number of journals in the core to the first zone is a constant 'n' and the second zone of relationship is n^2. Bradford expressed this relationship as 1: n: n^2.

Totally Bradford's Law serves as a general guideline to librarians in determining the number of core journals in any given field.

3.53 Zipf's Law

Zipf's Law is often used to predict the frequency of words within a text. The law states that in a relatively lengthy text, if you list the words accruing within that text in order of decreasing frequency, the rank of a word on that list multiplied by its frequency will equal a constant. The equation for this relationship is

R * f = k

R= is the rank of the word

F=is the frequency

K=is the constant.

Zipfs found that the rank of the word multiplied by the frequency of the word

3.6 Citation Analysis

Another major area of bibliometric research uses various methods of citation analysis in order to establish relationships between authors or their work. When one author cites another author, a relationship is established. Citation analysis uses citations in scholarly works to establish links. Many different links can be ascertained, such as links between authors, between scholarly works, between journals, between fields, or even between countries. Citations both from and to a certain document may be studied. One very common use of citation analysis is to determine the impact of a single author on a given field by counting the number of times the author has been cited by others.

3.61 Citation Analysis: Meaning and Definitions

Analysis of citations is in the sociology of science. Approaches to citations - citation patterns or citation behavior-allows deriving maps of the structure of scientific specialties or disciplines and helps to construct typologies of different varieties of references and citations by content analysis (Gilbert, 1977). In the process of citation analysis citations explore the structure of science. The primary idea goes back to Derek de Solla Price, who documented the growth of scientific literature in his book Little Science, Big Science (1963). This book became a classic, suggesting that science is not a unified whole, but a mosaic of specialty areas. This new understanding fostered an effort to map the intellectual structure of science. The techniques for this analysis were taken from bibliometrics.

The tradition of providing citations at the end of technical writing is quite an old phenomenon. They have their own origin in the referencing practices of researches and writers (White, 1985). It is reported that the "concept of identification of the source if an idea or quotation developed during Renaissance, (i.e. from 14^{th} to 16^{th} century) after the invention of printing. However, the precise origin of use of footnotes or references is obscure. The earliest example provided in the Oxford English Dictionary is William Savage's a dictionary of the Art of Printing (1941), containing 88 bottom notes or footnotes. It is mentioned that earlier examples of notes resembling footnotes are the Reheims-Douai version of the Bible (1763). Barr (1966) pointed out that notes in the margins function as references in John Wolfe's 1582 printing of Thomas Watson's Hekatompathia: or Passionate century of Love. In 20^{th} century maximum changes occurred in the concept of bibliographic references and citations. Thus citations today are

accepted as an integral part of scholarship. The present format of bibliographic description has passed from title as entry word to author, further surname of author's as entry word instead of forename. These citations and references are considered as the basic parameters of bibliometric studies. In fact, citation is the representation of a decision made by an author who wants to show the relation between the documents he is writing and the work of another (at a particular point). Similarly Show (1979) stated that citation establishes a relation among authors who is a measure of the extent to which they communicate indirectly through the literature". The citations are the established scientific practice for an author to cite earlier articles, which relates to his scientific subject. When one document (B) mentions or refers to another document (A), the later (A) has been listed by former (B) as a source's of information, as support for the point of view, as authority for a statement of fact, etc. The word citation is used to indicate not only the fact that the document A has been cited in reference of document B, but also for the description of document A contained in the reference. In this case, not only document (A) is a reference of document (B). In other words, according to bibliometrics terminology document (B) is citing document.

Example:

Decision table: a tool of systems study. M.M.Kasyap. Journal of Library and Information Science. Vol. 5, no. 1; June 1980;pp. 43-51-(B)

Reference-(A)

1. Gildersleeve (Thomas R). Decision table and their practical application in data processing. 1970. Prentice-Hall International, London.pp.237.

2. Hayes (Robert M) and Becker (Joseph). Handbook of data processing for libraries. 1970. Becker and Hayes, New York, p.157-60.

Citations are reported to serve as a label for intellectual property in all types of scholarly literature. It has drawn the attention of most of the specialists in the field of library and information science. The primary function of these citations is to provide a connection between two documents, one which cites and the other which is cited (Martyn, 1975). The citation represents a relationship between the cited and citing documents. The nature of this relationship is although difficult to characterize. Garfield (1965) identified some fifteen reasons of why authors cite.

These are:

1. Paying homage to pioneers.
2. Giving credit for related work (homage to peers).
3. Identifying methodology, equipment etc.
4. Providing background reading.
5. Correcting one's own work.
6. Correcting the work of others.
7. Criticizing previous work.
8. Substantiating claims.
9. Altering forthcoming work.
10. Providing leads to poorly disseminate poorly indexed or uncited work.
11. Authenticating data and classes of fact-physical constants etc.
12. Identifying original publications in which an idea or concept was discussed.
13. Identifying original publications or other work describing an economic concept or

term…

14. Disclaiming work or ideas of others (negative claims).
15. Disputing priority claims of others (negative homage).

3.62 Uses of Citation Analysis

The use of citation analysis to produce measures, or indicators, of scientific performance have generated a considerable amount of discussion. Published descriptions of how citation analysis is being used to define the history of scientific development, or to measure the activity and interaction of scientific specialties, generate relatively little comment from the scientific community at large. In contrast, any mention of using citation analysis to measure the performance of specific individual or group produces an automatic, and often heatedly, emotional, response from the same people.

3.63 Types of Citation Analysis Studies

There is a rapid growth in the number and types of studies using citation analysis. The citation analysis since its introduction has developed various techniques and measures, the exploitation of new tools and the study of different unit of analysis. The most common and simple technique in citation analysis is citation count method. Here the citation count technique is applied to determine how many citations are being received by a given document or a set of documents or by an author over a period of time from a particular set of citing documents. The main areas of this type of study are: authorship study, type of documents used, ranking of journals, dispersion of subjects and obsolescence & citation half –life studies.

A. Citation analysis on simple counting methods

i. Authorship Study

This is a common type of study, which determines the extent of citations received by different authors. Authors may write articles independently or on collaborative basis. This study may find out how single author publications in different subjects get citations in comparison to collaborative works. This also provides useful ideas about the probable reasons of getting citations by a particular group and not by others. The authorship study also determines data related to individual authors' productivity, which is useful in determining the status of the author among his/her co-workers within a field. The trend of author's productivity is also studied in different subjects which is named as Lotka's law of Author's productivity. Another important study is calculation of group coefficient, which is done fair collaborative authors publications, which get citations. So authorship study includes rate of single and multiple author citations, calculation of group coefficient value, verification of Lotka's law of authors' productivity study and self-citation study, etc.

ii. Types of Document Used

The analysis of citation reveals various kinds of documents that the author of a scientific work preferred to use. There are various types of documents used in different subjects such as books, journals, conference proceedings, seminar papers, reports, thesis and other unpublished documents, standards, patents etc. the type and the number of documents referred reveal the nature of a subject. For example the citation analysis shows that in science and technology, journals are cited more in number than any other

document, which indicates that, the scientists mostly depend on journal literature. But books are referred more in number than journals in social science and humanities.

Example: During 1980s in library and information science literature in India, number of book citations was 41, 23 percent and number of journal citations were 38.44 percent.

iii. Language of the Cited Documents

In the free flow of knowledge, language plays one of barrier in transferring it from one to another. The citations analysis studies reveal the most preferred language of the authors. Studies show that among all the languages, English is the most predominant language and most of the scientists, regardless of their native language or languages cite their literature exclusively in English. For example in:

Indian Anthropology journals-94.13 percent citations, and in Indian Linguists – 92.58 percent citations, and in Indian Library and Information Science literature 97.72 percent citations are in English. Throughout the world in all the subjects, especially in science till now English language citations top the list.

iv. Ranking of Journals

The ranking of journals by counting the citations received by an article of a journal over a specific period is the most common type of study in citation analysis. The journals in a specific subject can be ranked on the basis of simply counting the citations that the articles of that journal received over a span of time. This may be done directly by collecting the citation data. The most cited ones figures at the top of the rank followed by less cited ones. The period of study may be one year or more. But the larger the sample the more reliable is the rank likely to be. However, this method of ranking may not show

correct ranks of a younger journal or the journal having less number of published articles to its credit. Because apart from the quality of the articles, age of the journal and the number of source items published in a journal per year also play certain role in getting more citations by the journal.

V. Subject Dispersion

Subject dispersion means scattering of subjects among the citations. Citation analysis is the most reliable tool through which the scattering of subjects can easily be detected. The authors refer to publications on various subjects, which are relevant to a specific field of study while writing a research article. Therefore citation analysis will reveal the specific subjects that are related to a field of study. This will also show the most popular or key fields in a subject.

vi. Obsolescence and Citation Half-Life

The obsolescence study is very useful for the libraries. Obsolescence is the decline overtime in validity or utility of information (Line and Sandison, 1974). The obsolescence study is one way of assessing utility or validity of a scientific literature. Assessing decline is subjective and not easy to calculate. The criteria generally used to measure the decline are:

i. Age of the document,

ii. Citation to the document in the subsequent literature, and

iii. Utilization of the document.

Brookes (1973) has evolved the concept of "Utility in relation to journal aging" for taking a decision as regards to discard the back volumes of individual journals on the basis of half-life calculations. The age of the document an important criteria for

obsolescence study is related to the date of publication or origin of the document. It is the difference between the date of publication or origin to that of its actual use. It is generally considered that the demand decreases with the age, but this is not true in all the cases. It depends on the subject, nature of study or use made and the worth of publication. Analysis of citations by age of the cited documents can indicate the useful life of documents. This useful life /period is called as the half-life of periodicals. The concept of half-life has been borrowed from the field of nuclear physics to illustrate journal obsolescence. The citation half-life provides a quantitative measure of the rate at which scientific papers become obsolete. The number of journal literature in Science & Technology grows in much faster rate. There is also high probability of use of journal literature in the immediate years after their publication, but their subsequent uses decreases rapidly as these journals become old. The half-life in its original context refers to "time required for disintegration of one half of atoms of radio-active substance". But half-life of literature "is the time by which one half of the currently published literature become obsolescent" (Narayana, 1991). It is also found that half-life in citation is same as the half-life for the literature growth. Citation half-life of a literature can be calculated by plotting the cumulative volumes of active literature or citations against the years.

The citation half -life is related to the growth of literature. The value of half-life for a given subject is not constant for all the times. In case of new subject area emerged, the discovery paper, which originates the new research area, will have no prior literature to cite. Hence the half-life of citations will be zero.

3.64 Application of Citation Analysis

Citation analysis has two broad areas of applications. One of them is suitable for librarians where citations are used to find out various features of literature use like type of documents, languages, age, country of origin, subject distribution, highly cited authors, journals, citation rate, authorship pattern etc. and the other kind of study is useful to derive the research productivity in a field of study. Smith (1981) reviewed the literature on applications of citation analysis and identified the following areas of applications of citation analysis and identified the following areas of applications.

1. Literature of studies: In this case citations in a particular subject area are to be studied to describe the pattern of citations. The source for this kind of analysis may many sources, including types of material in addition to journals. Characteristics of cited materials frequently examined includes types, age, highly cited authors and journals, languages and countries of origin, and subject distributions, One application of this type of study is the definition of appropriate secondary service coverage and scope of retrospective bibliographies in a given subject area. The study of range of subjects, countries, languages, and document forms referred to by a group of known core subjects one can begin to establish the boundaries of a subject with the limitations of citations that do not reflect all literature use. Bibliographic coupling and co-citation have been used to create mapping of the micro- and macrostructures and relationships of disciplines. For explore the relationship of information science to the social sciences.

2. Type of literature studies: Citation analysis can be used to gauge the dissemination of results reported in certain types of literature such as government documents, dissertations, or the exchange of literature of regional scientific societies. The source of

citations uses for analysis clearly can determine the generality of one's conclusions in this type of study.

3. User studies: The application of citation analysis technique in determining user needs is very much useful for collection development and design if library services. Here the term papers, thesis /dissertations or technical reports submitted to the organizations are verified references are collected in order to determine type of materials, age of materials, language, and finally determines whether available locally in their own library or not. The results of this study are thus helpful for collection development. Citation analysis can also be used to compare user behaviour today with user behaviour several years ago.

4. Historical studies: Citations can be used to trace the chronology of events, relationships among them, and their relative importance. The subject of study may range from the influence of single idea to an individual's entire scientific career. It is also found that Patent citation networks offer a new technique for displaying the history of technical subjects. The changes in the patterns of co-citation from year to year can reveal something about the history of ideas in a given specialty. Besides this the co-citation context analysis has been proposed as a means for elucidating the structure of paradigms, the consensual structure of concepts in a field.

5. Communication pattern: It is stated that citations can be thought of as a plausible indicators of scientific communication patterns. It is believed that although the citation linkages do not necessarily reflect social contacts, but it may show certain amount of resemblance between documental and social structures. The analysis of citation pattern can identify the problem areas of communications. These could include linguistic

isolation, limited dissemination of new ideas, and barriers between basic and applied science or between specialists and the public at large.

6. Evaluative bibliometrics: It is defined as evaluation and interpretation of citations received by articles, scientists, universities, countries and other aggregates of scientific activity, used as a measure of scientific influence and productivity. This area of study is being highly used as an evaluative tool by science administrators.

7. Collection development: Citation analysis can be used as a tool for collection development. The journals are mostly costlier than books and number titles of journals are many and the collections also grow very quickly. So in library proper policy should be adopted for journal collection. The citation analysis will help in deciding titles of journals to be acquired to continue or discontinue a subscription, to weed or not to weed a backset. Since 1927 Gross and Gross used citation analysis to measure journals of significance, in-spite of the criticisms following uses of ranked lists of journals have been derived from citation counts. These are:

i) Highly ranked journals not available locally and within the subject scope are worth examining in more detail;

ii) Low ranked journals that are procured locally likewise be examined; and

iii) Lists based on source journals in a particular subject can indicate journals outside the A subject which may not yet acquired, but may be valuable for local users.

The citation analysis is therefore having many applications.

3.7 Problems and Limitations of Bibliometric Methods

Bibliometrics like any other technique is not free from criticism (Lancaster, 1991). Some of the major problems and limitations of bibliometrics are:

i) Bibliometric study does include the informal publications and communications. Therefore, the scientific development cannot be predicted properly.

ii) The bibliographical references, which are taken for citation analysis study, are not always standardized. This causes problem which ranking the authors on the basis of the frequency of their getting citations. For example, the author S.R.Ranganathan has been cited variously as Siyali Ramamrita Ranganathan, S.Ranganathan and S.R. Ranganathan. This may cause scattering of citations of same person-works. At the same time, it may also happen that there may be more than one author under the same name and it may be difficult to distinguish them.

iii) Fluctuations with time. There may be large variations in citation counts from one year to another, so citation data should not be too restricted in time.

iv) Field variations. Citation rates (citations per publication) vary greatly in different fields, leading to difficulties in cross-discipline comparisons. Bates has proposed the criterion rate as a refinement of citation rate, because citation counts as a measure of the quality of a researcher's work are influenced not only by the inherent value of that work, but also by the size of the pool of available citers in a given field. A researcher's work can be evaluated in relation to a criterion rate of citation, the citation rate of the top researchers in that field (Bates, 1980).

v) In case of collaborated authors, the cited articles appear only under the name of the first author as listed in each article. Here one must determine the names of

individual contributors who have collaborated the work to get the actual rank of the authors. This is very difficult and tedious process.

vi) Citation Index is also not free from limitations. As already discussed under the SCI major limitations of citation index, is the coverage of journals in SCI.

vii) Self-citation is another limitation of citation of single author publications can be determined and eliminated, but in case of collaborated works it is difficult to find out the self-citations of authors especially for authors in second or later positions.

viii) A serious problem of citation study is "**Hello citations"** (Mahapatra, 1992), where author intentionally cite another author as only goodwill. It is not easy to estimate such citations while ranking the authors on the basis of their citations.

ix) Another problem of citation analysis is that in some cases the citation itself is not proper to the context of the citing articles. In some case the citations are also incomplete.

x) Occurrence of **"Implicit Citations"** is one more problem with bibliometric study. Some of the established scientists are not acknowledged for their work, although the work has been referred in thousands of articles. The articles referring the work do not provide bibliographical details of the source where the referred articles appeared first. For example, the work of Einstein is no longer felt necessary to acknowledge although many of the present work are study based on Einstein's work. As a result of this, the citation count that is carried out to find out the rank of authors does not give proper weightage to the contributions of many such will-established contributors in different field.

In spite of the limitations of bibliometrics study, it is observed to be one of the best way in getting knowledge of scientific productivity of individual authors/scientists, institutions and journals and to study the pattern of growth of literature and nature of research publications, age of literature used, information needs of scientists, etc.

3.8 Conclusion

Bibliometrics is an important field of information science because it represents a unique set of techniques for the monitoring and analysis of information resources and for the management of knowledge in social and organizational contexts. Bibliometric methods are used in studies of properties and behavior of recorded knowledge, for analysis of the structures of scientific and research areas, and for evaluation of research activity and administration of scientific information. Various statistical methods are applied to study, to measure, authorship, citation and publication pattern, and the relationship within scientific domains and research communities and to structure of specific fields. In this sense, bibliometrics is also relevant for researchers, policy and decision makers and also researchers outside the library and information science.

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CHAPTER-IV

ANALYSIS AND INTERPRETATION OF DATA

4.1. Introduction

Analysis of data is the penultimate step in the research process. It is the link between raw data and significant results leading to conclusions. This process of analysis has to be result oriented. In other words, it must aim at objectives of the study. This analysis is a process of summarizing or transforming raw data into useful information. Citation studies attempt to study the characteristics of subject literatures. They are used to know the publication pattern, authorship pattern, language, subject-wise, country of origin, rank list of journals etc. The investigations of such kind of studies are found to be useful to manage the information resources and services in the libraries and information centers.

To achieve the objectives of the present study "Citation Analysis of Doctoral Theses in Bioscience Accepted by the Kuvempu University" is taken as a source of data. The data is restricted only to the Bioscience, which comprises Biotechnology, Environmental Science, Applied Botany and Applied Zoology. A total number of 51168 citations are collected from 204 theses. Highest number of citations are from Biotechnology with 18758 citations from 62 theses followed by Environmental Science with 14688 citations from 66 theses, Applied Botany with 10943 citations from 43 theses and Applied Zoology with 6779 citations from 33 theses. The same data have been presented in table 1 to facilitate to analyze and interpret.

4.1.1 Year -wise distribution of theses

Table-1Year-wise distribution of theses

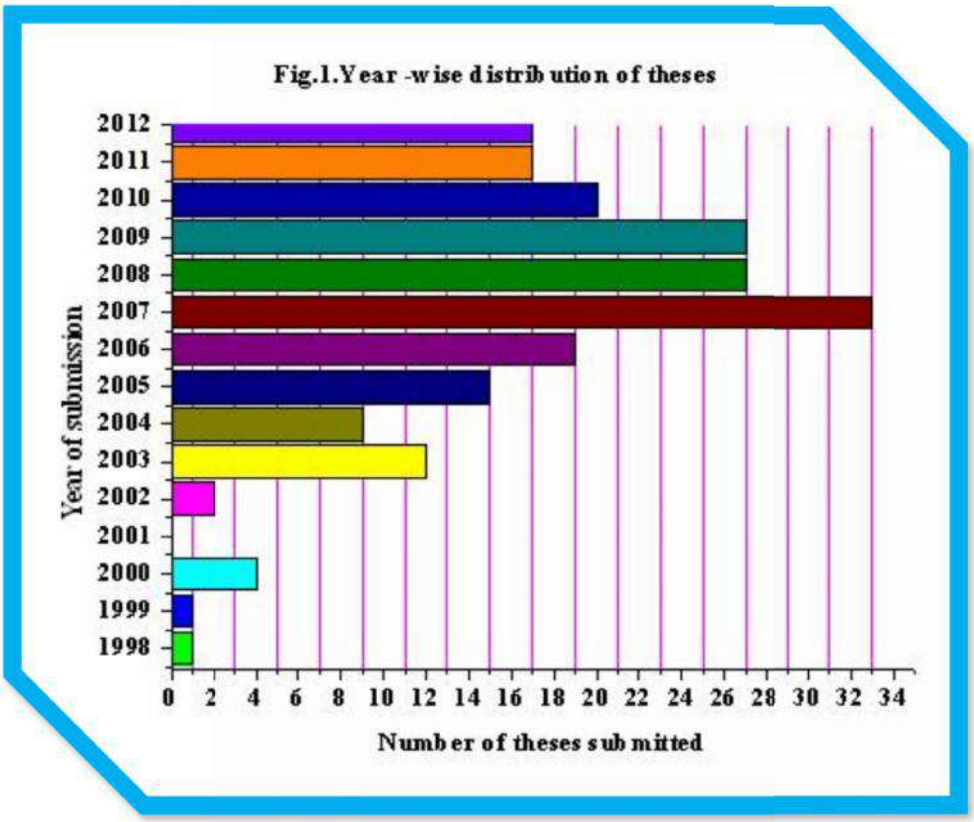
Sl. No.	Year	BT No. of theses	%	ES No. of theses	%	AB No. of theses	%	AZ No. of theses	%	BS No. of theses	%
1.	1998			1	1.51					1	0.49
2.	1999			1	1.51					1	0.49
3.	2000			3	4.55	1	2.33			4	1.96
4.	2002					1	2.33	1	3.03	2	0.98
5.	2003	4	6.45	5	7.58	2	4.65	1	3.03	12	5.88
6.	2004	3	4.84	1	1.51	2	4.65	3	9.09	9	4.41
7.	2005	5	8.06	4	6.06	1	2.33	5	15.15	15	7.35
8.	2006	3	4.84	9	13.64	4	9.30	3	9.09	19	9.31
9.	2007	9	14.52	16	24.24	5	11.63	3	9.09	33	16.18
10.	2008	8	12.90	5	7.58	7	16.28	7	21.22	27	13.24
11.	2009	11	17.75	9	13.64	5	11.63	2	6.06	27	13.24
12.	2010	9	14.52	2	3.03	6	13.95	3	9.09	20	9.80
13.	2011	5	8.06	6	9.09	3	6.97	3	9.09	17	8.33
14.	2012	5	8.06	4	6.06	6	13.95	2	6.06	17	8.33
	Total	**62**	**100.00**	**66**	**66**	**43**	**100.00**	**33**	**100.00**	**204**	**100.00**

BT= Biotechnology, ES= Environmental Science AB= Applied Botany AZ= Applied Zoology BS= Bioscience.

Table-1 and fig.1 shows the total number of theses according to the year of their submission to various departments in Bioscience during 1998 to 2012. Data presented in table-1 indicates that highest number of theses was submitted in the Department of Environmental Science (66) followed by 62 theses in the Department of Biotechnology and 43 theses in the Department of Applied Botany. The least number of theses are submitted to the Department of Applied Zoology (33). From the above table, we can see that there is a steady growth in the number of doctorate degrees awarded in the field of Bioscience from 2003 onwards.

The study shows that the highest number of doctorates i.e. 33 (16.18%) was awarded in the year 2007 followed by 2008 and 2009 (each 27 theses). Out of 87 theses submitted during 2007 to 2009, 30 theses are from Environmental Science and 28 theses are from the Biotechnology department. Overall results clearly represent that highest number of theses were submitted during 2005 to 2012 (175 theses), which accounts 85.78% of the total

submission of theses. The least number of theses was submitted during the period 1998 to 2004 with 29 theses (14.21%).



4.1.2 Average number of citations per thesis

Table-2 shows the year wise distribution of theses, the corresponding total number of citations and the average number of citations per thesis.

Table-2 Average number of citations per thesis

Sl. No.	Year	BT (No. of theses)	No. of Citations	Average Citation Per thesis	ES (No. of theses)	No. of Citations	Average Citation Per thesis	AB (No. of theses)	No. of Citations	Average Citation Per thesis	AZ (No. of theses)	No. of Citations	Average Citation Per thesis	BS (No. of theses)	No. of Citations	Average Citation Per thesis
1.	1998				1	216	216.00							1	216	216.00
2.	1999				1	264	264.00							1	264	264.00
3.	2000				3	730	243.33	1	305	305.00				4	1035	258.75
4.	2002							1	329	329.00	1	184	184.00	2	513	256.50
5.	2003	4	1101	275.25	5	1062	212.40	2	321	160.50	1	219	219.00	12	2703	225.25
6.	2004	3	692	230.66	1	381	381.00	2	397	163.50	3	482	160.66	9	1952	216.89
7.	2005	5	900	180.00	4	696	174.00	1	168	168.00	5	859	171.80	15	2623	174.87
8.	2006	3	952	317.33	9	2151	239.00	4	1270	317.50	3	590	196.66	19	4963	261.21
9.	2007	9	2542	282.44	16	3467	216.68	5	1537	307.40	3	851	283.66	33	8397	254.45
10.	2008	8	3189	398.62	5	903	180.60	7	1399	199.85	7	1466	209.43	27	6957	257.67
11.	2009	11	3128	284.36	9	2674	297.11	5	1126	225.20	2	609	304.50	27	7537	279.15
12.	2010	9	2798	310.88	2	546	273.00	6	1660	276.66	3	528	176.00	20	5532	276.60
13.	2011	5	1071	214.20	6	1058	176.33	3	626	208.66	3	607	202.33	17	3362	197.76
14.	2012	5	2385	477.00	4	540	135.00	6	1805	300.83	2	384	192.00	17	5114	300.82
	Total	**62**	**18758**	**302.54**	**66**	**14688**	**222.54**	**43**	**10943**	**254.48**	**33**	**6779**	**205.42**	**204**	**51168**	**250.82**

BT=Biotechnology, ES=Environmental Science, AB=Applied Botany, AZ= Applied Zoology, BS=Bioscience

The table-2 shows that considerable variations exist among the theses submitted during 1998-2012. It is found that a total of 51168 citations distributed over 204 theses. It is found that the rate of citations of theses has witnessed an increasing trend. The result shows that the average number of citations received per thesis is highest in 2012 (300.82 citations per thesis) followed by 279.15 citations per thesis in 2009. The overall average citation per thesis is 250.82 was found in the study.

Further, it is observed from the table that among the four departments the highest overall average number of citations received per thesis in Biotechnology is 302.54 and the lowest overall average number of citations is 205.42 in case of Applied Zoology.

4.1.3 Distribution of citations according to bibliographic forms

In any discipline the literature is published in different bibliographic forms such as journals, books, theses, reports, conference proceedings etc. Therefore, one of the objectives of the study is to identify the different bibliographic forms of the literature used by the Bioscience researchers. Table-3 represents the form wise distribution of citations.

Table-3 Distribution of citations according to bibliographic forms

Bibliographic Forms	BT No. of Citations	%	ES No. of Citations	%	AB No. of Citations	%	AZ No. of Citations	%	BS No. of Citations	%
Journals	15864	84.57	10612	72.25	8411	76.86	5053	74.54	39940	78.06
Books and Monographs	2137	11.39	2084	14.19	1560	14.26	1174	17.32	6955	13.59
Conference Proceedings	309	1.65	1015	6.91	431	3.94	242	3.57	1997	3.90
Theses and Dissertations	159	0.85	385	2.62	238	2.17	145	2.14	927	1.81
Reports	50	0.27	264	1.80	164	1.50	120	1.77	598	1.17
Web Resources	164	0.87	36	0.24	90	0.82	23	0.34	313	0.61
Patents	16	0.09	4	0.03	6	0.06	4	0.06	30	0.06
News Papers			1	0.01	8	0.07	10	0.14	19	0.04
Standards	2	0.01	9	0.06					11	0.02
Gazette			9	0.06					9	0.02
Magazines					2	0.02			2	0.00
Others	57	0.30	269	1.83	33	0.30	8	0.12	367	0.72
Total	**18758**	**100.00**	**14688**	**100.00**	**10943**	**100.00**	**6779**	**100.00**	**51168**	**100.00**

BT=Biotechnology, ES=Environmental Science, AB=Applied Botany, AZ= Applied Zoology, BS=Bioscience

Table-3 and fig.2 shows the distribution of citations among different documentary forms such as journals, books, conference proceedings, theses, web resources, reports, patents etc. Analysis of citations according to document type reveals that in all disciplines journals and books are the most cited source of information for the Bioscience researchers at Kuvempu University.

From the above table it is clear that the journals have the highest number of citations accounting to 78.06% of the total citations. It shows the researchers in the field of Bioscience are mainly depending upon journals for collecting the information. It is the most preferred source of information. Books are the second preferred source of information (13.59%). The result of this study is in accordance with the findings of Vimal (1997), Ting (1999), Thanuskodi (2012), Banateppanvar et al; (2013), Ziaur Rahman and Bhattacharya (2013), Gohain, Anjan et al; (2014), Somashekar and Kumbar (2014). In other words journals and books together constitute 91.65%. The rest of the citations were scattered in several other document types. Among the rest, conference proceedings and theses & dissertations were cited more as compared to other document sources. The remaining citations are distributed in other bibliographic forms, namely reports (1.17%), patents (0.06), standards (0.02%) and other documents (1.39%) of the total citations. It is observed that new source of information, i.e. the web resource is also found in the place with 0.61% of the total citations. Therefore, it is suggested that library administrators must pay close attention to the present trend.

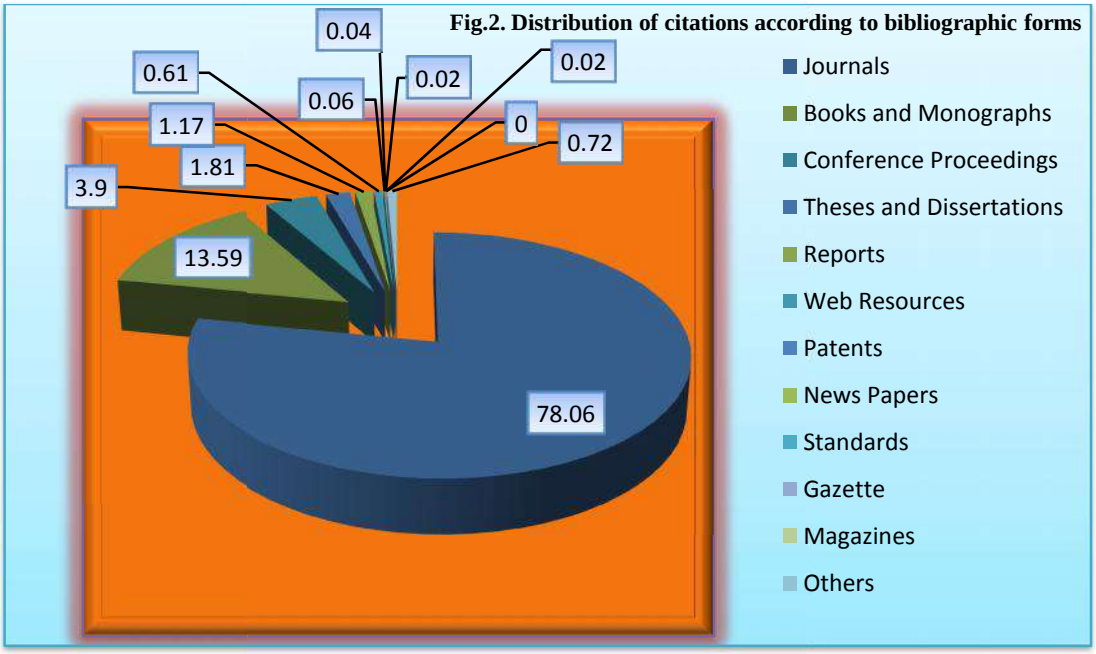


Fig.2. Distribution of citations according to bibliographic forms

4.1.4 Geographical distribution of citations with bibliographic forms in Bioscience (BS)

Literature in science is being published from different parts of the world in several subject areas. The relevance and importance of the maximum used material can be related to the country producing the largest usable literature. The citation study of the research can lead to understand the country wise use pattern of resources by researchers in Bioscience.

Table-4 Geographical distribution of citations with bibliographic forms in BS

Sl. No	Country	J	B&M	C P	T&D	R	P	WR	N	S	G	M	O	Total	%
1.	India	10828	2339	1389	840	392		153	18		9	2	184	16154	31.57
2.	USA	10707	2499	295	34	104	11	149	1	3			129	13932	27.23
3.	UK	5677	1317	29	10	19	6	3					17	7078	13.83
4.	Netherlands	3543	127	15	3	1				6			1	3696	7.22
5.	Germany	2013	131	15	1		3							2163	4.23
6.	Japan	926	45	20	1	7	4						3	1006	1.97
7.	Italy	655	44	20		11		2					7	739	1.44
8.	Ireland	710	6	2										718	1.40

Sl. No	Country	J	B&M	C P	T&D	R	P	WR	N	S	G	M	O	Total	%
9.	Canada	550	35	18	3	7								613	1.20
10.	Switzerland	442	83	9		7		6		1			8	556	1.09
11.	South Africa	352	13	10	4	9							2	390	0.76
12.	China	336	17	8		2								363	0.71
13.	Australia	199	42	21	1	4							4	271	0.53
14.	Korea	216	1	1										218	0.43
15.	Brazil	195	6	6	4									211	0.41
16.	Denmark	167	13	3		6								189	0.37
17.	France	154	21	10		3							1	189	0.37
18.	Pakistan	148	10	2	2	2								164	0.32
19.	Russia	104	9	2	1		4							120	0.23
20.	Poland	114	1	1	1					1				118	0.23
21.	Malaysia	70	31	11	2	4								118	0.23
22.	Taiwan	89	2	3										94	0.18
23.	Turkey	87	1	5										93	0.18
24.	Belgium	83	2	2	2	1								90	0.18
25.	Philippines	85	1	1										87	0.17
26.	Egypt	67			1	1								69	0.13
27.	Austria	62	2	3										67	0.13
28.	Czech Republic	50		1										51	0.10
29.	Spain	40	7	2		1								50	0.10
30.	Bangladesh	47		1										48	0.09
31.	Israel	38	5	2										45	0.09
32.	Sweden	29	10	1	3									43	0.08
33.	Thailand	30	2	6		3								41	0.08
34.	Greece	34												34	0.07
35.	New Zealand	24	5	2			1						2	34	0.07
36.	Hungary	29		2										31	0.06
37.	Nigeria	17	6	2	2	1							1	29	0.06
38.	Chile	27			1									28	0.05
39.	Hong Kong	23	2		2									27	0.05
40.	Kenya	20	1	2		1								24	0.05
41.	Slovakia	20	1	1	1									23	0.04

Sl. No	Country	J	B&M	C P	T&D	R	P	WR	N	S	G	M	O	Total	%
42.	Costa Rica	22												22	0.04
43.	Norway	22												22	0.04
44.	Srilanka	15	3	2		1								21	0.04
45.	Mexico	18		1										19	0.04
46.	Trinidad & Tobago	18												18	0.04
47.	Cuba	16				1							1	18	0.04
48.	Singapore	15												15	0.03
	Iran	13											1	14	0.03
49.	Indonesia	7		3	1									11	0.02
50.	Argentina	9												9	0.02
51.	Peru	9												9	0.02
52.	Venezuela	9												9	0.02
53.	Suriname	8												8	0.02
54.	Ukraine	8												8	0.02
55.	Finland	6	1											7	0.01
56.	Puerto Rico	6												6	0.01
57.	Saudi	6												6	0.01
58.	Other Countries	56	20	14	3	1							6	100	0. 19
59.	Un Identified	670	94	54	4	9	1							832	1.64
	Total	**39940**	**6955**	**1997**	**927**	**598**	**30**	**313**	**19**	**11**	**9**	**2**	**367**	**51168**	**100.00**

J=Journals, BM=Books & Monographs, CP=Conference Proceedings, TD=Theses & Dissertations, R=Reports, P=Patents, W=Web Resources, N= Newspapers, S=Standards, G=Gazette, M=Monographs, O=Others

The journals and other forms of documents are analyzed according to their country of origin and the result of the most productive countries is shown in table-4. The data shows that, out of 51,168 citations, 16154 (31.57%) citations are from India, followed by USA with covering 13932 (27.23%) citations. Whereas, 7078 citations (13.83%) are from UK. 3696 citations (7.22%), 2163 citations (4.23%) and 1006 citations (1.97%) are from Netherlands, Germany and Japan respectively.

4.1.4 (A). Geographical distribution of citations with bibliographic forms in Biotechnology (BT)

Table-5 Geographical distribution of citations with bibliographic forms in BT

Sl. No	Country	J	B&M	C P	T&D	R	P	WR	S	O	Total	%
1.	USA	4992	750	89	6	7	5	107	2	24	5982	31.89
2.	India	2452	693	135	137	32		51		20	3520	18.77
3.	UK	2586	459	13	3	2	5	2		5	3075	16.39
4.	Netherlands	1241	32	5						1	1279	6.82
5.	Germany	1152	67	1							1220	6.50
6.	Ireland	604	4								608	3.24
7.	Italy	521	7	2				1		1	532	2.84
8.	Japan	483	17	10	1	2	1				514	2.74
9.	Switzerland	153	21	1		3		3		2	183	0.98
10.	China	155	8	2							165	0.88
11.	Canada	144	1	10							155	0.83
12.	South Africa	114	2	1		2				2	121	0.65
13.	Korea	108	1	1							110	0.59
14.	Denmark	93	2	1							96	0.51
15.	Brazil	70	2	5	2						79	0.42
16.	France	63	9	4		2					78	0.42
17.	Pakistan	63	6	2	2						73	0.39
18.	Australia	46	9	5							60	0.32
19.	Belgium	47	2	2	1						52	0.28
20.	Russia	32	1	1			4				38	0.21
21.	Austria	37									37	0.20
22.	Turkey	32									32	0.17
23.	Greece	31									31	0.17
24.	Malaysia	13	13	4							30	0.16
25.	Taiwan	27	1	1							29	0.15
26.	Israel	23		1							24	0.13
27.	Thailand	20	1	1							22	0.12
28.	Spain	19		2							21	0.11
29.	Poland	19	1								20	0.11
30.	Hong Kong	16	2		2						20	0.11
31.	Hungary	18									18	0.10
32.	Czech Republic	16									16	0.09
33.	Sweden	9	5	1							15	0.08
34.	Norway	14									14	0.07
35.	Philippines	14									14	0.07
36.	Chile	11			1						12	0.06
37.	Bangladesh	11									11	0.06
38.	Egypt	8									8	0.04
39.	Mexico	8									8	0.04
40.	Nigeria	7		1							8	0.04
41.	Iran	7									7	0.04
42.	Singapore	7									7	0.04
43.	Indonesia	5		2							7	0.04
44.	Slovakia	6									6	0.03
45.	Trinidad & Tobago	6									6	0.03
46.	Cuba	5									5	0.03
47.	Saudi	4									4	0.02
48.	New Zealand	2	1							1	4	0.02
49.	Srilanka	2	2								4	0.02

Sl. No	Country	J	B&M	C P	T&D	R	P	WR	S	O	Total	%
50.	Rome	1	1	1						1	4	0.02
51.	Argentina	3									3	0.02
52.	Costa Rica	3									3	0.02
53.	HRV	3									3	0.02
54.	Ludhiana	3									3	0.02
55.	Suriname	3									3	0.02
56.	Ukraine	3									3	0.02
57.	Venezuela	3									3	0.02
58.	Kenya	2	1								3	0.02
59.	Bulgaria	2									2	0.01
60.	Croatia	2									2	0.01
61.	Nepal			2							2	0.01
62.	Botswana	1									1	0.01
63.	Cameroon	1									1	0.01
64.	Ethiopia	1									1	0.01
65.	Fiji	1									1	0.01
66.	Finland	1									1	0.01
67.	Jordan	1									1	0.01
68.	Moldova	1									1	0.01
69.	Portugal	1									1	0.01
70.	Puerto Rico	1									1	0.01
71.	Virginia				1						1	0.01
72.	Unidentified	311	16	3	3		1				334	1.78
		15864	**2137**	**309**	**159**	**50**	**16**	**164**	**2**	**57**	**18758**	**100.00**

J=Journals, BM=Books & Monographs, CP=Conference Proceedings, TD=Theses & Dissertations, R=Reports, P=Patents, W=Web Resources, S=Standards, O=Others

Table-5 represents the geographical distribution with bibliographic forms. It has been observed from the analysis that USA is the leading country and occupies the top position with 5982 (31.89%) citations. This result confirms the earlier studies findings of Pillai, Sudhier (2007) Pramod Kumar and Ramesh (2012), Rahman and Bhattacharaya (2013). India is placed second with 3520 (18.77%) citations, followed by UK in the third place with 3075 (16.39%) citations. The fourth place is occupied by Netherlands with 1279 (6.82%) citations, and fifth position is occupied by Germany with 1220 (6.50%) citations. Ireland, Italy, Japan, China, and Switzerland placed in sixth, seventh, eighth, ninth and tenth positions, respectively. These top ten countries contribute 91.05% of the total citations. It indicates that scholars depend mostly on the literature published from these top countries.

4.1.4 (B). Geographical distribution of citations with bibliographic forms in Environmental Science (ES)

Table-6 Geographical distribution of citations with bibliographic forms in ES

Sl. No.	Country	J	B&M	C P	T&D	R	P	WR	N	G	S	O	Total	%
1.	India	4265	729	822	366	164		23	1	9		144	6523	44.41
2.	USA	2057	841	109	8	55	2	12			1	86	3171	21.59
3.	UK	1265	278	8	1	9						10	1571	10.70
4.	Netherlands	1175	47	4	1						6		1233	8.39
5.	Germany	436	15	5									456	3.10
6.	Canada	188	22	3	2	5							220	1.50
7.	South Africa	165	1	5		2							173	1.18
8.	Switzerland	112	41	3		3		1			1	6	167	1.14
9.	Japan	150	7	1		2	1					3	164	1.12
10.	Australia	48	18	8	1	4						4	83	0.57
11.	China	68	2	2		2							74	0.50
12.	Italy	37	12	7		6						6	68	0.46
13.	Pakistan	41	2			2							45	0.31
14.	Russia	36	8										44	0.30
15.	Denmark	29	8	1		6							44	0.30
16.	Brazil	38	3										41	0.28
17.	Poland	38		1							1		40	0.27
18.	Turkey	33	1	4									38	0.26
19.	Malaysia	23	8	3									34	0.23
20.	France	23	4	4		1						1	33	0.22
21.	Egypt	23											23	0.16
22.	Philippines	21	1	1									23	0.16
23.	Bangladesh	19											19	0.13
24.	New Zealand	14	2	1			1					1	19	0.13
25.	Slovakia	14	1	1	1								17	0.12
26.	Taiwan	14											14	0.10
27.	Austria	9	2	3									14	0.10
28.	Chile	13											13	0.09
29.	Nigeria	3	6		2							1	12	0.08
30.	Virginia		8	1	1							2	12	0.08
31.	Israel	8	2										10	0.07
32.	Spain	5	4			1							10	0.07
33.	Norway	8											8	0.05
34.	Papua New Guinea		5	1								2	8	0.05
35.	Korea	7											7	0.05
36.	Hungary	5		2									7	0.05
37.	Sweden	4	1		2								7	0.05
38.	Belgium	6											6	0.04
39.	Singapore	6											6	0.04
40.	Trinidad & Tobago	6											6	0.04
41.	Czech Republic	5		1									6	0.04
42.	Iran	5										1	6	0.04
43.	Srilanka	4	1	1									6	0.04
44.	Ireland	3	2	1									6	0.04

Sl. No.	Country	J	B&M	C P	T&D	R	P	WR	N	G	S	O	Total	%
45.	Thailand	2		4									6	0.04
46.	Costa Rica	5											5	0.03
47.	Cuba	3				1						1	5	0.03
48.	Ukraine	3											3	0.02
49.	Croatia	2											2	0.01
50.	Estonia	2											2	0.01
51.	Hong Kong	2											2	0.01
52.	Puerto Rico	2											2	0.01
53.	Bulgaria	1	1										2	0.01
54.	Amman Jordan			2									2	0.01
55.	Montenegro			1								1	2	0.01
56.	Tanzania			2									2	0.01
57.	Colombia	1											1	0.01
58.	Ethiopia	1											1	0.01
59.	Finland	1											1	0.01
60.	Indonesia	1											1	0.01
61.	Kenya	1		1									2	0.01
62.	Lithuania	1											1	0.01
63.	Ludhiana	1											1	0.01
64.	Mauritius	1											1	0.01
65.	Nepal	1											1	0.01
66.	New Caledonia	1											1	0.01
67.	Venezuela	1											1	0.01
68.	Yugoslavia	1											1	0.01
69.	Honiara (Solomon Islands)					1							1	0.01
70.	Latvian			1									1	0.01
71.	Mexico			1									1	0.01
72.	Romania		1										1	0.01
73.	Unidentified	149											149	1.01
	Total	**10612**	**2084**	**1015**	**385**	**264**	**4**	**36**	**1**	**9**	**9**	**269**	**14688**	**100.00**

J=Journals, BM=Books & Monographs, CP=Conference Proceedings, TD=Theses & Dissertations, R=Reports, P=Patents, W=Web Resources, N= Newspapers, G=Gazette, S=Standards, O=Others

Table-6 furnishes information on the range of countries active in the field of Environmental Science, and their relative contribution. It is also present country wise distribution of different forms of documents in Environmental Science. While India takes the top position with its contribution of 6523 (44.41%) among the total citations contribution from Indian journals is 4265 citations, followed by the USA stood second on the list of countries with 3171 (21.59%). UK and Netherlands stood in third and fourth place with 1571 (10.70%) and 1233 (8.39%) citations.

4.1.4 (C). Geographical distribution of citations with bibliographic forms in Applied Botany (AB)

Table-7 Geographical distribution of citations with bibliographic forms in AB

Sl. No.	Country	J	B&M	C P	T&D	R	P	WR	N	M	O	Total	%
1.	India	2993	573	293	215	126		64	8	2	17	4291	39.21
2.	USA	2096	447	34	6	11	2	23			15	2634	24.07
3.	UK	1025	333	5	2	3		1			1	1370	12.52
4.	Netherlands	500	21	4	1	1						527	4.82
5.	Germany	286	31	7	1		2					327	2.99
6.	Japan	187	8	8		2	2					207	1.89
7.	Switzerland	149	14	3				2				168	1.54
8.	Canada	116	4	1		1						122	1.11
9.	Italy	61	19	8		1						89	0.81
10.	Australia	71	10	7								88	0.80
11.	Korea	86										86	0.79
12.	China	77	4	3								84	0.77
13.	Ireland	83										83	0.76
14.	Brazil	54	1		1							56	0.51
15.	Malaysia	32	8	3	2	4						49	0.45
16.	South Africa	41										41	0.37
17.	Pakistan	39	1									40	0.37
18.	Taiwan	34	1	1								36	0.33
19.	Poland	35										35	0.32
20.	France	24	3	2								29	0.27
21.	Egypt	25			1	1						27	0.25
22.	Philippines	26										26	0.24
23.	Denmark	23	3									26	0.24
24.	Belgium	21			1	1						23	0.21
25.	Czech Republic	22										22	0.20
26.	Sweden	14	3		1							18	0.16
27.	Austria	16										16	0.15
28.	Russia	14		1	1							16	0.15
29.	South Africa		6	3	4	2						15	0.14
30.	Turkey	13		1								14	0.13
31.	Kenya	10		1		1						12	0.11
32.	Costa Rica	11										11	0.10
33.	Bangladesh	9		1								10	0.09
34.	Srilanka	8		1								9	0.08
35.	Peru	8										8	0.07
36.	Spain	8										8	0.07
37.	Thailand	4	1			3						8	0.07
38.	Cuba	7										7	0.06
39.	Mexico	7										7	0.06
40.	Hungary	6										6	0.05
41.	Israel	3	3									6	0.05
42.	Nigeria	5										5	0.05
43.	Suriname	5										5	0.05
44.	Venezuela	5										5	0.05
45.	Nepal	4	1									5	0.05
46.	Rome	1	3		1							5	0.05

Sl. No.	Country	J	B&M	C P	T&D	R	P	WR	N	M	O	Total	%
47.	Papua New Guinea	4										4	0.04
48.	Chile	3										3	0.03
49.	Hong Kong	3										3	0.03
50.	New Zealand	3										3	0.03
51.	Puerto Rico	3										3	0.03
52.	Trinidad & Tobago	3										3	0.03
53.	Portugal	2										2	0.02
54.	Saudi	2										2	0.02
55.	Uganda	2										2	0.02
56.	Bulgaria	1		1								2	0.02
57.	Finland	1	1									2	0.02
58.	Indonesia			1	1							2	0.02
59.	Croatia	1										1	0.01
60.	Ghana	1										1	0.01
61.	Iran	1										1	0.01
62.	Jordan	1										1	0.01
63.	Qatar	1										1	0.01
64.	Ukraine	1										1	0.01
65.	West Indies			1								1	0.01
66.	Un Identified	114	61	41		7						223	2.04
	Total	**8411**	**1560**	**431**	**238**	**164**	**6**	**90**	**8**	**2**	**33**	**10943**	**100.00**

J=Journals, BM=Books & Monographs, CP=Conference Proceedings, TD=Theses & Dissertations, R=Reports, P=Patents, W=Web Resources, N= Newspapers, M=Magazines, O=Others

Table-7 shows the country wise analysis of the most cited forms of documents. It indicates that out of 8411 cited journals, India occupies the top position with 2993 journal citations and it also contributes to the highest citations accounting for 4291 (39.21%) of total citations. The second highest utilized sources are from the USA with 2634 (24.07%), followed by the UK, which is in third place and accounts for 1370 (12.52%) citations, fourth place is occupied by Netherlands 527 (4.82%) and fifth place Germany with 327 (2.99%) citations. The countries like Japan, Switzerland, Canada, Korea, and Ireland placed in sixth, seventh, eighth, ninth and tenth positions. The analysis reveals that the research scholars are depending largely on the literature published from India, USA, and UK only.

4.1.4 (D). Geographical distribution of citations with bibliographic forms in Applied Zoology (AZ)

Table- 8 Geographical distribution of citations with bibliographic forms in AZ

Sl. No.	Country	J	B&M	C P	T&D	R	P	WR	N	O	Total	%
1.	USA	1562	461	63	14	31	2	7	1	4	2145	31.64
2.	India	1118	344	139	122	70		15	9	3	1820	26.85
3.	UK	801	247	3	4	5	1			1	1062	15.67
4.	Netherlands	627	27	2	1						657	9.69
5.	Germany	139	18	2			1				160	2.36
6.	Japan	106	13	1		1					121	1.78
7.	Canada	102	8	4	1	1					116	1.71
8.	Italy	36	6	3		4		1			50	0.74
9.	France	44	5								49	0.72
10.	China	36	3	1							40	0.59
11.	Australia	34	5	1							40	0.59
12.	South Africa	32	4	1		3					40	0.59
13.	Switzerland	28	7	2		1					38	0.56
14.	Brazil	33		1	1						35	0.52
15.	Philippines	24									24	0.35
16.	Denmark	22		1							23	0.34
17.	Poland	22			1						23	0.34
18.	Russia	22									22	0.32
19.	Ireland	20		1							21	0.31
20.	Korea	15									15	0.22
21.	Taiwan	14		1							15	0.22
22.	Egypt	11									11	0.16
23.	Spain	8	3								11	0.16
24.	Belgium	9									9	0.13
25.	Turkey	9									9	0.13
26.	Bangladesh	8									8	0.12
27.	New Zealand	5	2	1							8	0.12
28.	Czech Republic	7									7	0.10
29.	Kenya	7									7	0.10
30.	Argentina	6									6	0.09
31.	Pakistan	5	1								6	0.09
32.	Israel	4		1							5	0.07
33.	Thailand	4		1							5	0.07
34.	Malaysia	2	2	1							5	0.07
35.	Nigeria	2		1		1					4	0.06
36.	Costa Rica	3									3	0.04
37.	Finland	3									3	0.04
38.	Greece	3									3	0.04
39.	Mexico	3									3	0.04
40.	Trinidad & Tobago	3									3	0.04
41.	Uganda	3									3	0.04
42.	Sweden	2	1								3	0.04
43.	Hong Kong	2									2	0.03
44.	Singapore	2									2	0.03

Sl. No.	Country	J	B& M	C P	T&D	R	P	WR	N	O	Total	%
45.	Srilanka	1				1					2	0.03
46.	Colombia	1									1	0.01
47.	Cuba	1									1	0.01
48.	Indonesia	1									1	0.01
49.	Iraq	1									1	0.01
50.	Kuwait	1									1	0.01
51.	Peru	1									1	0.01
52.	Ukraine	1									1	0.01
53.	Yugoslavia	1									1	0.01
54.	Europe			1							1	0.01
55.	Unidentified	96	17	10	1	2					126	1.86
	Total	**5053**	**1174**	**242**	**145**	**120**	**4**	**23**	**10**	**8**	**6779**	**100.00**

J=Journals, BM=Books & Monographs, CP=Conference Proceedings, TD=Theses & Dissertations, R=Reports, P=Patents, W=Web Resources, N= Newspapers, O=Others

It has been observed from the above table- 8; USA is the leading country and occupies the top position with 2145 (31.64%) citations. India is placed second with 1820 (26.85%) citations, followed by UK at third place with 1062 (15.67%) citations, followed by fourth place occupied by Netherlands with 657 (9.69%) and Germany at fifth position 160 (2.36%) citations. Japan, Canada, France, China, and Italy are placed in sixth, seventh, eighth, ninth, and tenth positions, respectively. These top ten countries contribute to 91.75% of the total citations. It can be concluded that the research scholars depend mostly on the literature published from these top countries. Only 8.25% of the citations are from remaining 44 countries.

4.1.5 Chronological distribution of citations

Chronological table reveals the number of citations scattered during a particular year. It is easy to identify subject interest or development in a year. From the table-9 it was seen that the duration of the whole period is divided in various groups from 1700-2012. This kind of study helps to know the growth and development of a subject in terms of research activities over a period. The table also provides the data regarding how frequently Bioscience researchers make use of references in the preparation of their theses.

Table-9 Chronological distribution of citations

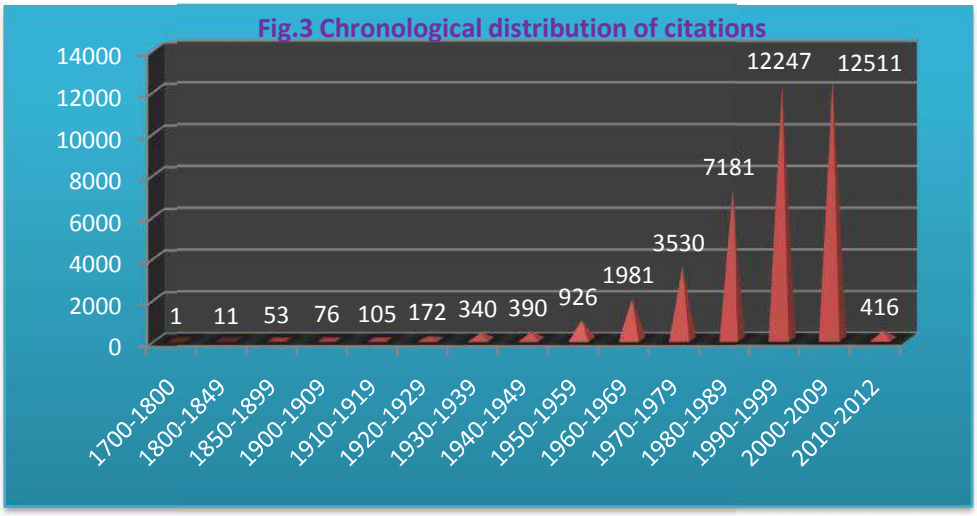
Period	BT No. of Citations	%	ES No. of Citations	%	AB No. of Citations	%	AZ No. of Citations	%	BS No. of Citations	%
1700-1800	1	0.01							1	0.00
1800-1849	3	0.02	2	0.02	5	0.06	1	0.02	11	0.03
1850-1899	19	0.12	12	0.11	15	0.18	7	0.14	53	0.13
1900-1909	16	0.10	37	0.35	16	0.19	7	0.14	76	0.19
1910-1919	27	0.17	39	0.37	23	0.27	16	0.32	105	0.26
1920-1929	52	0.33	41	0.38	50	0.60	29	0.58	172	0.43
1930-1939	111	0.70	112	1.06	84	1.00	33	0.65	340	0.85
1940-1949	105	0.66	116	1.09	111	1.32	58	1.15	390	0.98
1950-1959	293	1.85	246	2.32	250	2.97	137	2.71	926	2.32
1960-1969	610	3.85	509	4.80	545	6.48	317	6.27	1981	4.96
1970-1979	954	6.01	1000	9.42	909	10.81	667	13.20	3530	8.84
1980-1989	2063	13.00	2361	22.25	1622	19.28	1135	22.46	7181	17.98
1990-1999	4817	30.36	3278	30.89	2538	30.17	1614	31.94	12247	30.66
2000-2009	6537	41.21	2850	26.85	2100	24.97	1024	20.26	12511	31.32
2010-2012	256	1.61	9	0.09	143	1.70	8	0.16	416	1.04
Total	**15864**	**100.00**	**10612**	**100.00**	**8411**	**100.00**	**5053**	**100.00**	**39940**	**100.00**

BT= Biotechnology, ES= Environmental Science AB= Applied Botany AZ= Applied Zoology BS= Bioscience

In table-9 and fig.3 shows, the citations are divided into 15 groups. A total of 39940 citations were analyzed for determining the age of utility of the publications. The study covers the periods as indicated under period column. Each comprising time span of 100 years up to 1800 and 50 years up to 1900. Followed by the time span of 10 years up to 2009 and 2 year from 2010-2012.

It is observed that the highest number of citations were found in 2000-2009 i.e. 12511 (31.32%) citations are the most productive decade. Out of that Biotechnology contributes the maximum number of citations that is 6537 (41.21%), followed by Environmental Science with 2850 (26.85%) of the total citations. A decade 1990-1999 followed by the second position which account 12247 (30.66%) of citations. It is also observed from the table that researchers of Environmental Science, Applied Botany and Applied Zoology cited more number of citations during 1990-1999 than 2000-2009. The rate of citations is slightly less in later decades. Lowest number of citations were cited during 1700 to 1929 that is 418 (1.04%). The study clearly shows that Bioscience

researchers are in need of recent information for their research and developmental activities. It is also identified that a very small percent of references are cited which are published about a century ago.



4.1.6 Authorship pattern

The characteristics of any subject literature include not only the basic publishing patterns, but that of the authors themselves. Therefore, the authorship pattern is analyzed to determine the percentage of a single author to fifteen-and-above authors and corporate authors. The result is presented in fig.4 and table-10.

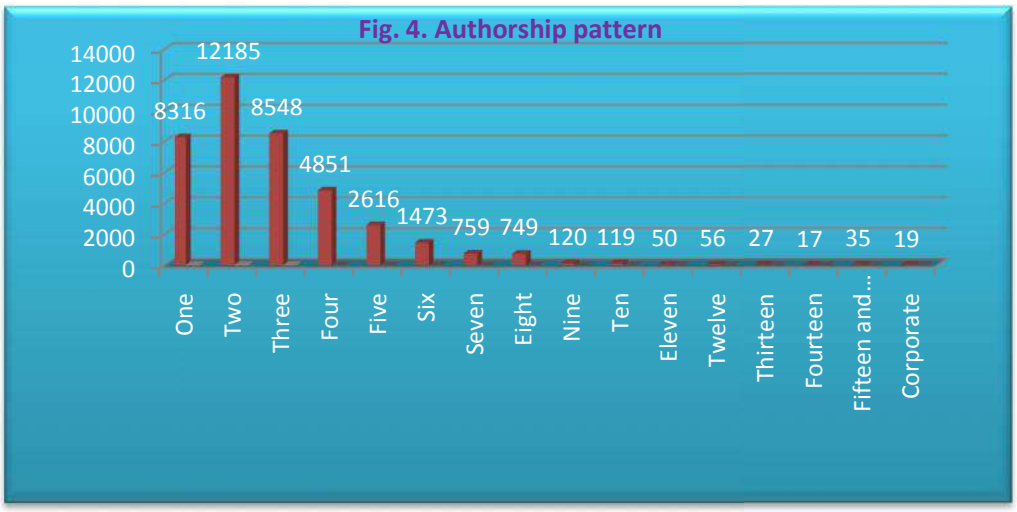


Table-10 Authorship pattern

Authors	Biotechnology			Environmental Science			Applied Botany			Applied Zoology			Bioscience			
	Total Citations	Foreign Authors	Indian Authors	Total Citations	Foreign Authors	Indian Authors	Total Citations	Foreign Authors	Indian Authors	Total Citations	Foreign Authors	Indian Authors	No. of Citations	%	Foreign Authors	Indian Authors
One	2193 (13.82)	1782 (11.23)	411 (2.59)	2843 (26.80)	1250 (11.78)	1593 (15.02)	1929 (22.93)	1125 (13.37)	804 (9.56)	1351 (26.74)	1002 (19.83)	349 (6.90)	8316	20.82	5159 (12.92)	3157 (7.90)
Two	3875 (24.42)	2456 (15.48)	1419 (8.94)	3729 (35.14)	2245 (21.16)	1484 (13.98)	2825 (33.59)	1232 (14.65)	1593 (18.94)	1756 (34.75)	1038 (20.54)	718 (14.21)	12185	30.51	6971 (17.45)	5214 (13.05)
Three	3502 (22.08)	2253 (14.20)	1249 (7.88)	2235 (21.06)	1327 (12.50)	908 (8.56)	1894 (22.52)	972 (11.56)	922 (10.96)	917 (18.15)	611 (12.09)	306 (6.06)	8548	21.40	5163 (12.93)	3385 (8.48)
Four	2418 (15.24)	1577 (9.94)	841 (5.30)	1032 (9.72)	550 (5.18)	482 (4.54)	932 (11.08)	504 (5.99)	428 (5.09)	469 (9.28)	328 (6.49)	141 (2.79)	4851	12.15	2959 (7.41)	1892 (4.74)
Five	1531 (9.66)	1021 (6.44)	510 (3.22)	425 (4.00)	188 (1.77)	237 (2.23)	39 6(4.71)	245 (2.91)	151 (1.80)	264 (5.22)	215 (4.25)	49 (0.97)	2616	6.55	1669 (4.18)	947 (2.37)
Six	977 (6.16)	701 (4.42)	276 (1.74)	173 (1.63)	82 (0.77)	91 (0.86)	199 (2.37)	138 (1.64)	61 (0.73)	124 (2.45)	107 (2.12)	17 (0.34)	1473	3.69	1028 (2.57)	445 (1.11)
Seven	473 (2.98)	384 (2.42)	89 (0.56)	80 (0.75)	27 (0.25)	53 (0.50)	121 (1.44)	89 (1.06)	32 (0.38)	85 (1.68)	75 (1.48)	10 (0.20)	759	1.90	575 (1.44)	184 (0.46)
Eight	579 (3.65)	516 (3.25)	63 (0.40)	27 (0.25)	4 (0.04)	23 (0.21)	73 (0.86)	55 (0.65)	18 (0.21)	70 (1.39)	60 (1.19)	10 (0.20)	749	1.88	635 (1.59)	114 (0.29)
Nine	85 (0.54)	71 (0.45)	14 (0.09)	15 (0.14)	3 (0.03)	12 (0.11)	15 (0.19)	12 (0.16)	3 (0.03)	5 (0.10)	3 (0.06)	2 (0.04)	120	0.30	89 (0.22)	31 (0.08)
Ten	89 (0.56)	71 (0.45)	18 (0.11)	15 (0.14)	4 (0.04)	11 (0.10)	11 (0.13)	9 (0.11)	2 (0.02)	4 (0.08)	4 (0.08)		119	0.30	88 (0.22)	31 (0.08)
Eleven	34 (0.21)	26 (0.16)	8 (0.05)	7 (0.07)	1 (0.01)	6 (0.06)	8 (0.09)	7 (0.08)	1 (0.01)	1 (0.02)	1 (0.02)		50	0.13	35 (0.09)	15 (0.04)
Twelve	45 (0.28)	24 (0.15)	21 (0.13)	3 (0.03)	2 (0.02)	1 (0.01)	4 (0.05)	3 (0.04)	1 (0.01)	4 (0.08)	2 (0.04)	2 (0.04)	56	0.14	31 (0.08)	25 (0.06)
Thirteen	22 (0.14)	12 (0.08)	10 (0.06)	1 (0.01)		1 (0.01)	2 (0.02)	2 (0.02)		2 (0.04)	2 (0.04)		27	0.07	16 (0.04)	11 (0.03)
Fourteen	12 (0.08)	8 (0.05)	4 (0.03)	4 (0.04)	2 (0.02)	2 (0.02)	1 (0.01)	1 (0.01)					17	0.04	11 (0.03)	6 (0.02)
Fifteen and above	29 (0.18)	22 (0.14)	7 (0.04)	4 (0.04)	1 (0.01)	3 (0.03)	1 (0.01)	1 (0.01)		1 (0.02)	1 (0.02)		35	0.09	25 (0.06)	10 (0.03)
Corporate				19 (0.18)	19 (0.18)								19	0.05	19 (0.05)	
Total	**15864 (100.00)**	**10924 (68.86)**	**4940 (31.14)**	**10612 (100.00)**	**5705 (53.76)**	**4907 (46.24)**	**8411 (100.00)**	**4395 (52.26)**	**4016 (47.74)**	**5053 (100.00)**	**3449 (68.25)**	**1604 (31.75)**	**39940**	**100.00**	**24473 (61.27)**	**15467 (38.73)**

Table-10 depicts the authorship pattern of journal citations. It indicates that out of 39940 citations, majority of authors preferred to carry out their research work in collaboration. Particularly large number of publications are in two authorship mode, i.e., 12185 (30.51%). This result is in accordance with the previous studies findings of Maheshwarappa and Nagarajulu (1988), Begum and Rajendra (1990), Vimala and Pullareddy (1996), Ziaur Rahman (2012), Amsaveni et al; (2013). Out of 30.51% of two authored citations foreign author's contribution constitutes 17.45% and Indian author's contribution constitutes 13.05%. Out of 39940 citations, the contribution of foreign authors was 61.27%, whereas the Indian author's contribution counts 38.73%. Second place is occupied by work involving three authors (21.40%), followed by single authors (20.82%) and four authors (12.15%). Remaining 15.12% citations are contributed by five to fifteen-and-above authors. It is also observed from table-10 that 0.05% of citations having corporate authorship.

Collaborative research is the common phenomenon in the field of science and technology, in general, and Bioscience in particular. According to Derek Desollo Price (1963) there has been a consistent trend towards increased collaboration. The collaborative research is a well-recognized feature of modern science, and there has been a consistent trend towards increased collaboration in all branches of science during the present century. An attempt is made to know the existence of a trend towards increased collaboration in Bioscience.

Table-10 shows that the majority of the cited documents were by two and more than two authors which means the collaborative research is prevailing on Bioscience subject. Further, the table shows that 20.82% of all the citations are in favor of single

authors, and remaining 79.18% of citations are in favor of team research. The high incidence of multiple authorship is a characteristic of the science.

Degree of author collaboration

The extent of collaboration in research can be measured with the help of multi-authored works. To determine the degree of collaboration in quantitative terms, the formula given by K. Subramanyam (1983) has been used. The formula is as follows:

$$C = \frac{NM}{NM+NS}$$

where, C = Degree of collaboration in a discipline
Nm= No. of multi-author papers
Ns= No. of single author papers

$$\frac{31624}{31624+8316} = \frac{31624}{39940} = 0.79$$

In the present study, the degree of collaboration is C= 0.79 as a whole. This clearly indicates the trend towards collaborative research. This reflects the degree of prevalence of multiple authored publications in bioscience, which reflects higher level of collaboration.

4.1.7 Language wise distribution of citations

It is a known fact that the scientific literature is published in different languages of the world. In other words, the scientific findings are communicated through a variety of languages known to researchers. Their preferences for language medium mostly depend on the language of the source document in which they would like to publish their research findings. There are other reasons like the availability of literature in a particular language, researcher's knowledge of foreign languages, and the availability of translation facilities. The language wise distribution of the citations cited by the researchers reveals the predominant language in which most of the citations cited are published

(Govindaraju, 2013). The languages of the cited documents are traced out from 'Ulrich's Periodicals Directory' and all the cited documents are grouped according to their language.

Table-11 presents the language wise distribution of citations in Bioscience. The distribution of Bioscience literature in many languages shows its international nature.

Table-11 Language wise distribution of citations

Sl. No.	Language	BT No. of Citations	%	ES No. of Citations	%	AB No. of Citations	%	AZ No. of Citations	%	Language	BS No. of Citations	%
1.	English	13678	86.22	9792	92.27	7619	90.58	4537	89.79	English	35626	89.20
2.	German	806	5.08	302	2.85	202	2.40	112	2.22	German	1422	3.56
3.	Japanese	395	2.49	127	1.20	131	1.56	82	1.62	Japanese	735	1.84
4.	Italian	374	2.36	44	0.41	39	0.46	29	0.57	Italian	486	1.22
5.	Chinese	101	0.64	59	0.56	42	0.50	27	0.53	Chinese	229	0.57
6.	Korean	87	0.55	6	0.06	54	0.64	8	0.16	Korean	155	0.39
7.	Danish	74	0.47	36	0.34	21	0.25	14	0.28	Danish	145	0.36
8.	French	59	0.37	21	0.20	24	0.29	33	0.65	French	137	0.34
9.	Dutch	39	0.25	4	0.04	21	0.25	6	0.12	Russian	95	0.24
10.	Russian	31	0.20	36	0.34	12	0.14	16	0.32	Polish	86	0.22
11.	Turkish	28	0.18	28	0.26	10	0.12	6	0.12	Turkish	72	0.18
12.	Greek	27	0.17							Dutch	70	0.18
13.	Spanish	17	0.11	8	0.08	8	0.10	10	0.20	Spanish	43	0.11
14.	Polish	16	0.10	32	0.30	22	0.26	16	0.32	Czech	38	0.10
15.	Hungarian	14	0.09	5	0.05	4	0.05			Swedish	30	0.08
16.	Swedish	12	0.08	5	0.05	11	0.13	2	0.04	Greek	27	0.07
17.	Czech	11	0.07	4	0.04	19	0.23	4	0.08	Hungarian	23	0.06
18.	Portuguese					2	0.02			Portuguese	2	0.01
19.	Other languages			34	0.32	38	0.45	24	0.47	Other languages	96	0.24
20.	Unidentified	95	0.60	69	0.65	132	1.57	127	2.51	Unidentified	423	1.06
Total		**15864**	**100.00**	**10612**	**100.00**	**8411**	**100.00**	**5053**	**100.00**		**39940**	**100.00**

BT= Biotechnology, ES= Environmental Science AB= Applied Botany AZ= Applied Zoology BS= Bioscience

Total number of citations distributed in different languages are as shown in table-11. It shows that the maximum number of citations is from English language accounting for 35626 (89.20%). This result confirms the findings of Aruna Prasad Reddy (1999), Zafrunnisha and Pullareddy (2009), Nasir Jamal (2010), Krishnamurthy et al; (2011). It is followed by German with 1422 (3.56%) citations, 735 (1.84%) citations were in Japanese language, 486 (1.22%) citations were in Italian language and 229 (0.57%) citations were in Chinese language. These five languages together contribute 96.39% of the total percentage. Other languages such as Korean, Danish, French, Russian, Polish etc., cover only 3.61%.

Table-11 represents ascending order of language distribution. In Environmental Science the Danish and Russian language, both have placed at sixth place against to the order of languages provided in table-11. In Applied Botany Polish language stands at ninth position if it is arranged in ascending order. Further, it is observed that French language stands in fourth position in the Applied Zoology.

4.1.8 Subject wise distribution of citations in Bioscience

Subject-wise analysis of total citations appended to the theses in Bioscience shows the distribution of citations among various subject specialization and associated disciplines. This shows the outgrowth of specializations from a basic discipline on one hand and interdisciplinary nature of the literature on the other hand (Govindaraju, 2013). The subject-wise distribution of citations in Bioscience is shown in table-12.

Table-12 Subject wise distribution of citations

Sl. No	Subject	No. of Citations	Cumulative Citations	%	Cumulative %
1.	Medicinal Plant Research	2549	2549	6.38	6.38
2.	Pharmacology	2372	4921	5.94	12.32
3.	Water Ecology	2328	7249	5.83	18.15
4.	Plant Pathology	2154	9403	5.39	23.54
5.	Phytochemistry	2017	11420	5.05	28.59
6.	Entomology	1468	12888	3.68	32.27
7.	Seed Pathology	1103	13991	2.76	35.03
8.	Environmental Ecology	1077	15068	2.70	37.72
9.	Molecular Biology	1076	16144	2.69	40.42
10.	Toxicology	965	17109	2.42	42.83
11.	Ecology	944	18053	2.36	45.20
12.	Genetics	861	18914	2.16	47.35
13.	Limnology	817	19731	2.05	49.40
14.	Ground Water Pollution	764	20495	1.91	51.31
15.	Environmental Chemistry	753	21248	1.89	53.20
16.	Plant Tissue Culture	746	21994	1.87	55.07
17.	Plant Biotechnology	734	22728	1.84	56.90
18.	Animal Science	659	23387	1.65	58.55
19.	Soil Science	597	23984	1.49	60.05
20.	Mycology	564	24548	1.41	61.46
21.	Cancer Research	563	25111	1.41	62.87
22.	Plant Biodiversity	560	25671	1.40	64.27
23.	Bacteriology	527	26198	1.32	65.59
24.	Water Pollution	515	26713	1.29	66.88
25.	Environmental Pollution	510	27223	1.28	68.16
26.	Biodiversity	508	27731	1.27	69.43
27.	Horticulture	482	28213	1.21	70.64
28.	Aquaculture	439	28652	1.10	71.74
29.	Agronomy Botany	421	29073	1.05	72.79
30.	Bioinformatics	373	29446	0.93	73.72
31.	Agriculture Biotechnology	333	29779	0.83	74.56
32.	Agricultural Biology	325	30104	0.81	75.37
33.	Natural Remedy	314	30418	0.79	76.16
34.	Proteomics	308	30726	0.77	76.93
35.	Geonomics	291	31017	0.73	77.66
36.	Cell Biology	287	31304	0.72	78.38
37.	Biochemistry	275	31579	0.69	79.06
38.	Ethnobotany	273	31852	0.68	79.75
39.	Industrial Ecology	273	32125	0.68	80.43
40.	Plant Genetics	267	32392	0.67	81.10
41.	Forest Ecology	257	32649	0.64	81.74
42.	Microbiology	252	32901	0.63	82.37
43.	Conservation Biology	241	33142	0.60	82.98
44.	Ornithology	234	33376	0.59	83.56
45.	Fish Diversity	232	33608	0.58	84.14
46.	Land Use Land Cover Studies	231	33839	0.58	84.72
47.	Hepatology	221	34060	0.55	85.28
48.	Environmental Biology	208	34268	0.52	85.80
49.	Diversity	202	34470	0.51	86.30
50.	Sericulture	186	34656	0.47	86.77
51.	Vermin Composting	176	34832	0.44	87.21

Sl. No	Subject	No. of Citations	Cumulative Citations	%	Cumulative %
52.	Crop Physiology	159	34991	0.40	87.61
53.	Ethnopharmacology	155	35146	0.39	87.99
54.	Apiculture	144	35290	0.36	88.36
55.	Water Quality	144	35434	0.36	88.72
56.	Population Ecology	142	35576	0.36	89.07
57.	Food Chemistry	136	35712	0.34	89.41
58.	Physiology	136	35848	0.34	89.75
59.	Virology	136	35984	0.34	90.09
60.	Floristics Studies	135	36119	0.34	90.43
61.	Butterfly Diversity	130	36249	0.33	90.76
62.	Phytopathology	126	36375	0.32	91.07
63.	Air Pollution	124	36499	0.31	91.38
64.	River Ecology	124	36623	0.31	91.69
65.	Biotechnology	120	36743	0.30	91.99
66.	Fermentation Technology	118	36861	0.30	92.29
67.	Water Microbiology	118	36979	0.30	92.58
68.	Reproductive Biology	117	37096	0.29	92.88
69.	Transgenic Plants	113	37209	0.28	93.16
70.	Micro Propagation	112	37321	0.28	93.44
71.	Environmental Biotechnology	111	37432	0.28	93.72
72.	Field Ecology	107	37539	0.27	93.99
73.	Traditional Knowledge	106	37645	0.27	94.25
74.	Immunology	104	37749	0.26	94.51
75.	Species Diversity	102	37851	0.26	94.77
76.	Water Harvesting	102	37953	0.26	95.02
77.	Enzymology	100	38053	0.25	95.27
78.	Biocontrol	98	38151	0.25	95.52
79.	Nutrition and Metabolism	98	38249	0.25	95.76
80.	Hydrobiology	93	38342	0.23	96.00
81.	Anatomy & Morphology of Plants	92	38434	0.23	96.23
82.	Biostatistics	90	38524	0.23	96.45
83.	Histopathology	90	38614	0.23	96.68
84.	Vegetational Analysis	85	38699	0.21	96.89
85.	Algaelogy	80	38779	0.20	97.09
86.	Post Harvest Technology	71	38850	0.18	97.27
87.	Animal Behaviour	64	38914	0.16	97.43
88.	Endocrinology	64	38978	0.16	97.59
89.	Epidemiology	63	39041	0.16	97.75
90.	Human Genetics	62	39103	0.16	97.90
91.	Lichenology	61	39164	0.15	98.06
92.	Resistance Mechanism	60	39224	0.15	98.21
93.	Amphibian Studies	56	39280	0.14	98.35
94.	Remote Sensing	49	39329	0.12	98.47
95.	Biofertilizer	47	39376	0.12	98.59
96.	Fungal Biology	47	39423	0.12	98.70
97.	Adoption Biology	40	39463	0.10	98.80
98.	Environmental Toxicology	39	39502	0.10	98.90
99.	Stress Physiology	37	39539	0.09	98.99
100.	Bioremediation	36	39575	0.09	99.08
101.	Chemical Control	30	39605	0.08	99.16
102.	Bryology	28	39633	0.07	99.23

Sl. No	Subject	No. of Citations	Cumulative Citations	%	Cumulative %
103.	Environmental Sociology	28	39661	0.07	99.30
104.	Behaviour Study	25	39686	0.06	99.36
105.	Hazards Waste Management	25	39711	0.06	99.42
106.	BT- Cotton	24	39735	0.06	99.48
107.	Hurdle Technology	24	39759	0.06	99.54
108.	Developmental Biology	23	39782	0.06	99.60
109.	Biological Control	21	39803	0.05	99.65
110.	Mass Spectrometry	18	39821	0.05	99.70
111.	Neurology	18	39839	0.05	99.75
112.	Histochemistry	17	39856	0.04	99.79
113.	Coffee Cultivation	15	39871	0.04	99.83
114.	System Biology	15	39886	0.04	99.86
115.	Control Management	12	39898	0.03	99.89
116.	Respiration and Transpiration	12	39910	0.03	99.92
117.	Water Physiology	10	39920	0.03	99.95
118.	Un identified subjects	10	39930	0.03	99.97
119.	Population Dynamics	10	39940	0.03	100.00
	Total	**39940**		**100.00**	

It is observed from the table that the cited references in Bioscience are scattered among 119 subjects. Among them, Medicinal Plant Research stands in the first place with 2549 (6.38%) citations. The second place occupied by Pharmacology with 2372 (5.94%) citations followed by Water Ecology with 2328 (5.83%), Plant Pathology with 2154 (5.39%), Phytochemistry with 2017 (5.05%), Entomology with 1468 (3.68%), Seed Pathology with 1103 (2.76%), Environmental Ecology with 1077 (2.70%), Molecular Biology with 1076 (2.69%), and Toxicology with 965 (2.42%) citations. These subjects are stands third, fourth, fifth, sixth, seventh, eighth, ninth and tenth places respectively. The above mentioned top ten subjects together contribute 42.83% of the total citations.

4.1.8 (A) Subject wise and sub-branch wise distribution of citations in Bioscience

Table-13 Subject wise and sub-branch wise distribution of citations in Bioscience

Sl. No	Biotechnology			Environmental Science			Applied Botany			Applied Zoology		
	Subject	**No. of Citations**	**%**	**Subject**	**No. of Citations**	**%**	**Subject**	**No. of Citations**	**%**	**Subject**	**No. of Citations**	**%**
1.	Pharmacology	2329	14.68	Water Ecology	1563	14.73	Plant Pathology	886	10.53	Entomology	539	10.67
2.	Medicinal Plant Research	1795	11.32	Environmental Ecology	857	8.08	Medicinal Plants	639	7.60	Animal Physiology	307	6.08
3.	Photochemistry	1781	11.23	Ground Water Pollution	764	7.20	Seed Pathology	582	6.92	Animal Genetics	305	6.04
4.	Plant Biotechnology	734	4.63	Environmental Chemistry	753	7.10	Ecology	507	6.03	Ecology	296	5.86
5.	Genetic Engineering	618	3.90	Limnology	554	5.22	Mycology	388	4.61	Ornithology	234	4.63
6.	Plant Tissue Culture	596	3.76	Water Pollution	515	4.85	Plant Biodiversity	291	3.46	Fish Diversity	232	4.59
7.	Cancer Research	542	3.42	Environmental Pollution	452	4.26	Seed Technology	271	3.22	Toxicology	219	4.33
8.	Plant Pathology	483	3.04	Water Chemistry	399	3.76	Bacteriology	264	3.14	Plant Insect Interaction	210	4.16
9.	Molecular Biology	453	2.86	Toxicology	323	3.04	Molecular Biology	249	2.97	Aquatic Biology	132	2.61
10.	Horticulture	439	2.77	Soil Pollution	296	2.79	Ethnobotany	234	2.78	Genetic Engineering	132	2.61
11.	Bioinformatics	373	2.35	Forest Ecology	257	2.42	Seed Biology	229	2.73	Cytogenetic	131	2.60
12.	Entomology	358	2.26	Land Use Land Cover Studies	231	2.18	Conservation Biology	228	2.71	Pisciculture	118	2.34
13.	Agriculture Biotechnology	333	2.10	Industrial Ecology	228	2.15	Pest Management	204	2.44	Reproductive Biology	117	2.31
14.	Molecular Genetics	322	2.03	Plant Pathology	202	1.90	Agronomy	188	2.24	Pesticides Effect	112	2.22
15.	Natural Remedy	314	1.98	Habitat Ecology	193	1.82	Phytochemistry	181	2.15	Genetics	111	2.20
16.	Proteomics	308	1.94	Vermin Composting	176	1.66	Economic Botany	164	1.95	Biodiversity	108	2.14
17.	Geonomics	291	1.83	Biodiversity	169	1.59	Biodiversity	143	1.70	Butterfly Ecology	83	1.64

Sl. No	Biotechnology			Environmental Science			Applied Botany			Applied Zoology		
	Subject	**No. of Citations**	**%**	**Subject**	**No. of Citations**	**%**	**Subject**	**No. of Citations**	**%**	**Subject**	**No. of Citations**	**%**
18.	Plant Disease Management	228	1.44	Bacteriology	156	1.47	Diversity	138	1.64	Insect Diversity	82	1.62
19.	Hepatology	221	1.39	Heavy Metal	149	1.40	Water Management	135	1.60	Sericulture	81	1.60
20.	Biochemistry	183	1.16	Soil Science	138	1.30	Physiology of Plants	120	1.43	Evaluation	78	1.54
21.	Mycology	176	1.12	Ecology	134	1.26	Water Microbiology	118	1.40	Microbiology	78	1.54
22.	Apiculture	144	0.90	Agricultural Studies	130	1.23	Traditional Knowledge	106	1.26	Human Genetics	62	1.23
23.	Virology	136	0.86	Air Pollution	124	1.17	Toxicology	102	1.21	Resistance Mechanism	60	1.19
24.	Floristics Studies	135	0.85	River Ecology	124	1.17	Water Harvesting	102	1.21	Limnology	58	1.15
25.	Plant Biodiversity	130	0.82	Plant Science	120	1.13	Anatomy & Morphology of Plants	92	1.09	Environmental Biology	56	1.11
26.	Cytogenetics	121	0.76	Plankton Studies	110	1.04	Agronomic Biology	88	1.05	Animal Behaviour	55	1.09
27.	Fermentation Technology	118	0.74	Field Ecology	107	1.01	Phytopathology	86	1.02	Endocrinology	54	1.07
28.	Transgenic Plants	113	0.71	Species Diversity	102	0.96	Plant Breeding	82	0.97	Molecular Genetics	52	1.03
29.	Micro Propagation	112	0.70	Population Ecology	96	0.90	Medicinal Plant Taxonomy	81	0.96	Aquaculture	52	1.03
30.	Bacteriology	107	0.67	Water Quality Studies	78	0.74	Plant Genetics	81	0.96	Butterfly Diversity	47	0.93
31.	Microbiology	102	0.64	Hydrological Studies	74	0.70	Algae logy	80	0.95	Population Genetics	46	0.91
32.	Biocontrol	98	0.62	Manure Studies	74	0.70	Microbiology	72	0.86	Taxonomy	42	0.83
33.	Immunology	92	0.58	Biotechnology	72	0.68	Post Harvest Technology	71	0.84	Water Management	42	0.83
34.	Environmental Biotechnology	90	0.57	Biostatistics	66	0.62	Geographical Distribution of	69	0.82	Adoption Biology	40	0.79

Sl. No	Biotechnology			Environmental Science			Applied Botany			Applied Zoology		
	Subject	**No. of Citations**	**%**	**Subject**	**No. of Citations**	**%**	**Subject**	**No. of Citations**	**%**	**Subject**	**No. of Citations**	**%**
							Plant					
35.	Histopathology	90	0.57	Environmental Biodiversity	66	0.62	Physico Chemical Studies of Water	68	0.81	Ethnology	39	0.77
36.	Biodiversity	88	0.55	Environmental Biology	65	0.61	Epidemiology	63	0.75	Pest Control	39	0.77
37.	Food Chemistry	88	0.55	Water Biology	63	0.59	Lichenology	61	0.73	Food Habitat	38	0.75
38.	Plant Physiology	87	0.55	Crop Science	59	0.56	Taxonomy	59	0.70	Biochemistry	35	0.69
39.	Psciculture	85	0.54	Amphibian Studies	56	0.53	Crop Physiology	58	0.69	Medicinal Plants	34	0.67
40.	Vegetational Analysis	85	0.54	Diversity	54	0.51	Plant Physiology	58	0.69	Water Ecology	31	0.61
41.	Ethnopharmacology	77	0.49	Fungal Biology	47	0.44	Nutritional Analysis	55	0.65	Pharmacology	31	0.61
42.	Sericulture	75	0.47	Horticulture	43	0.41	Biochemical Study	49	0.58	Chemical Control	30	0.59
43.	Toxicology	71	0.45	Animal Science	37	0.35	Remote Sensing	49	0.58	Social Behaviour	30	0.59
44.	Plant Biochemistry	70	0.44	Water Science	36	0.34	Biotechnology	48	0.57	Water Quality	30	0.59
45.	Plant Breeding	61	0.38	Industrial Chemistry	31	0.29	Biofertilizer	47	0.56	Phytochemistry	29	0.57
46.	Pest Management	60	0.38	Plant Ecology	29	0.27	Soil Microbiology	46	0.55	Aquatic Biology	28	0.55
47.	Environmental Pollution	58	0.37	Agricultural Research	28	0.26	Nutrition and Metabolism	43	0.51	Environmental Ecology	27	0.53
48.	Enzymology	51	0.32	Environmental Sociology	28	0.26	Enzymology	39	0.46	Behaviour Study	25	0.49
49.	Insect Morphology	44	0.28	Photo Catalyst Study	26	0.25	Agriculture Management	38	0.45	BT- Cotton	24	0.47
50.	Phytopathology	40	0.25	Environmental Biotechnology	21	0.20	Soil Management	38	0.45	Hurdle Technology	24	0.47
51.	Environmental	39	0.25	Seed	21	0.20	Stress	37	0.44	Biological	21	0.42

Sl. No	Biotechnology			Environmental Science			Applied Botany			Applied Zoology		
	Subject	**No. of Citations**	**%**	**Subject**	**No. of Citations**	**%**	**Subject**	**No. of Citations**	**%**	**Subject**	**No. of Citations**	**%**
	Toxicology			Technology			Physiology			Control		
52.	Bioremediation	36	0.23	Agricultural Biology	17	0.16	Agronomy Botany	35	0.42	Cancer Biology	21	0.42
53.	Cell Biology	35	0.22	Agricultural Science	17	0.16	Soil Biology	31	0.37	Agronomy of Coffee	20	0.40
54.	Insect Management	30	0.19	Industrial Biology	14	0.13	Bryology	28	0.33	Histochemistry	17	0.34
55.	Plantation Crops	30	0.19	Plant Genetics	14	0.13	Hazards Waste Management	25	0.30	Physiology	16	0.32
56.	Soil Biology	27	0.17	Soil Ecology	11	0.10	Biostatistics	24	0.29	Coffee Cultivation	15	0.30
57.	Aquatic Toxicology	24	0.15	Animal Pathology	10	0.09	Crop Management	24	0.29	Agronomy	14	0.28
58.	Developmental Biology	23	0.14	Animal Biology	9	0.08	Environmental Biology	21	0.25	Control Management	12	0.24
59.	Crop Physiology	18	0.11	Water Fermentation	9	0.08	Phytoplankton and Zooplankton	21	0.25	Immunology	12	0.24
60.	Mass Spectrometry	18	0.11	Biochemistry	8	0.08	Water Biology	18	0.21	Diversity	10	0.20
61.	Neurology	18	0.11	Agricultural Statistics	7	0.07	Conservation Biodiversity	13	0.15	Enzymology	10	0.20
62.	Hydrobiology	16	0.10				Phenology	12	0.14	Population Dynamics	10	0.20
63.	System Biology	15	0.09				Respiration and Transpiration	12	0.14	Eco-biology	7	0.14
64.	Food Processing	10	0.06				Soil Environment	10	0.12	Hydrobiology	3	0.06
65.	Endocrinology	10	0.06				Water Physiology	10	0.12			
66.	Un identified	10	0.06									
	Total	**15864**	**100.00**		**10612**	**100.00**		**8411**	**100.00**		**5053**	**100.00**

Table-13 shows the subject wise and sub branch wise distribution of citations in Bioscience. In Biotechnology subject data shows that highly cited documents were in the Pharmacology which has 2329 (14.68%) citations. This is closely followed by Medicinal Plant Research with 1795 (11.32%) citations, Photochemistry with 1781 (11.23%) citations, Plant Biotechnology 734 (4.63%), Genetic Engineering 618 (3.90%), Plant Tissue Culture 596 (3.76%), Cancer Research 542 (3.42%), Plant Pathology 483 (3.04%), Molecular Biology 453 (2.86%) and Horticulture 439 (2.77%) citations. These ten subjects contribute to 61.61% of the total citations. The remaining 38.39% of the total citations are from the subject area of Bioinformatics (2.35%), Entomology (2.26%), Agriculture Biotechnology (2.10%), Molecular Genetics (2.03%), Natural Remedy (1.98%) etc. This clearly shows that above mentioned subjects are more important for the Biotechnologists. It can be seen from table-13 that the cited references in Environmental Science are scattered among 61 subjects. Among them, Water Ecology stands in first place with 1563 (14.73%) citations. The second and third places are occupied by Environmental Ecology with 857 (8.08%) and Ground Water Pollution with 764 (7.20%) citations respectively. Environmental Chemistry and Limnology stood in fourth and fifth places with 753 (7.10%) and 554 (5.22%) citations respectively.

The table also reveals the Applied Botany results most of the citations (10.53%) are from Plant Pathology. It is also evident that 7.60% of the total citations are from Medicinal Plants followed by Seed Pathology (6.92%) and Ecology (6.03%). The remaining citations are from other subjects like Mycology, Plant Biodiversity, Seed Technology, Bacteriology, Molecular Biology and Ethno-botany etc. Table-13 also shows the subject wise distribution of citations in Applied Zoology. The whole citations

are distributed among 65 subjects. It is observed from the table that Entomology 567 (10.67%), Animal Physiology 307 (6.08%), Animal Genetics 305 (6.04%), Ecology 296 (5.86%), Ornithology 234 (4.63%), Fish Diversity 232 (4.59%), Toxicology 219 (4.33%), Plant Insect Interaction 210 (4.16%), Aquatic Biology 132 (2.61%), and Genetic Engineering 132 (2.61%) are the top ten subjects contributing to 51.58% of the total citations. On remaining subjects its accounts 48.42% of the total citations.

4.1.9 Rank list of journals in Bioscience

The librarian has to perform major role in collection development policy and selection of library materials. Periodicals are an important source of information in academic and special libraries because of its current and high valued information. Periodical is one of the important media for communicating the recent scientific information among scientist, doctors, engineers, researcher etc. The shrinking budget and escalating costs of journals pose problems to the librarians and information scientists in the selection of the need-based collection. For selection of periodicals in libraries, librarian has to consult different selection tool, among them one of the important tool is citation studies (Dharanikumar, 2014).

Table-14 provides an overall rank list of journals. This is done by counting the total number of citations from the source document and on the basis of grand total a rank list has been made according to descending order of arrangement. The table shows that the journal with the highest number of citations occupies the highest rank, therefore, it is the most important journal referred by authors in Bioscience. The less important titles are placed at the bottom in the table and the rest of the journals having less than 10 citations are given as the last rank.

Table-14 Rank list of journals in Bioscience

Sl. No.	Rank	Name of the Journal	Country	Number of Citations	Cumulative Citations	%	Cumulative %
1.	1	Hydrobiologia	Netherlands	719	719	1.80	1.80
2.	2	Journal of Ethnopharmacology	Ireland	642	1361	1.61	3.41
3.	3	Indian Journal of Environmental Health	India	622	1983	1.56	4.96
4.	4	Phytopathology	USA	585	2568	1.46	6.43
5.	5	Indian Phytopathology	India	569	3137	1.42	7.85
6.	6	Fitoterapia	Italy	456	3593	1.14	9.00
7.	7	Indian Journal of Environmental Protection	India	454	4047	1.14	10.13
8.	8	Current Science	India	451	4498	1.13	11.26
9.	9	Mutation Research	Netherlands	421	4919	1.05	12.32
10.	10	Pollution Research	India	402	5321	1.01	13.32
11.	11	Plant Cell Reports	Germany	368	5689	0.92	14.24
12.	12	Plant Disease	USA	343	6032	0.86	15.10
13.	13	Plant Cell Tissue & Organ Culture	Netherlands	330	6362	0.83	15.93
14.	14	Indian Journal of Experimental Biology	India	326	6688	0.82	16.74
15.	15	Nature	UK	301	6989	0.75	17.50
16.	16	Phytochemistry	UK	294	7283	0.74	18.23
17.	17	Indian Journal of Pharmaceutical Science	India	283	7566	0.71	18.94
18.	18	Journal of Environmental Biology	India	271	7837	0.68	19.62
19.	19	Indian Journal of Mycology & Plant Pathology	India	244	8081	0.61	20.23
20.	20	Applied and Environmental Microbiology	USA	231	8312	0.58	20.81
21.	21	Science	USA	227	8539	0.57	21.38
22.	22	Planta Medica	Germany	220	8759	0.55	21.93
23.	23	Phytotheraphy Research	UK	215	8974	0.54	22.47
24.	24	Indian Drugs	India	210	9184	0.53	22.99
25.	25	Journal of Ecology	UK	207	9391	0.52	23.51
26.	26	Plant Physiology	USA	190	9581	0.48	23.99
27.	27	Indian Forester	India	192	9773	0.48	24.47
28.	28	Journal of Biological Chemistry	USA	189	9962	0.47	24.94
29.	29	Ecology Environment & Conservation	India	178	10140	0.45	25.39
30.	30	Journal of Agricultural & Food Chemistry	USA	173	10313	0.43	25.82
31.	31	Proc. Ind. Acad. Sci. Plant Science Journal	India	172	10485	0.43	26.25
32.	32	Theoretical and Applied Genetics	Germany	167	10652	0.42	26.67
33.	33	Journal of Indian Society of Soil Science	India	166	10818	0.42	27.09
34.	34	Environmental and Ecological Statistics	USA	163	10981	0.41	27.49
35.	35	Journal of Indian Botanical Society	India	154	11135	0.39	27.88
36.	36	Journal of Natural Products	USA	150	11285	0.38	28.25
37.	37	Journal of Bombay Nat History Society	India	149	11434	0.37	28.63
38.	38	Phykos	India	141	11575	0.35	28.98
39.	38	Plant Science	USA	141	11716	0.35	29.33
40.	39	Conservation Biology	USA	139	11855	0.35	29.68
41.	40	Journal of Aquatic Biology	South Africa	135	11990	0.34	30.02
42.	40	Journal of Inland Fish Soc India	India	135	12125	0.34	30.36
43.	41	Nucleic Acids Research	UK	130	12255	0.33	30.68
44.	42	Indian Journal of Agricultural Science	India	125	12380	0.31	31.00
45.	43	Plant Pathology	Korea	121	12501	0.30	31.30
46.	44	Geobios	India	114	12615	0.29	31.58

Sl. No.	Rank	Name of the Journal	Country	Number of Citations	Cumulative Citations	%	Cumulative %
47.	45	Aquaculture	Netherlands	113	12728	0.28	31.87
48.	45	Indian Journal of Environmental Pollution	India	113	12841	0.28	32.15
49.	45	Proc Nat. Acad. Sci. USA	USA	113	12954	0.28	32.43
50.	46	Plant Cell And Environment	UK	112	13066	0.28	32.71
51.	47	Indian Journal of Pharmacology	India	111	13177	0.28	32.99
52.	48	Crop Science	USA	107	13284	0.27	33.26
53.	49	Water Research	UK	104	13388	0.26	33.52
54.	50	Food Chemistry	UK	97	13485	0.24	33.76
55.	51	Journal of Economic Entomology	USA	96	13581	0.24	34.00
56.	52	Seed Science & Technology	Switzerland	95	13676	0.24	34.24
57.	53	Pharmaceutical Biology	Netherlands	94	13770	0.24	34.48
58.	54	Madras Agric Journal	India	89	13859	0.22	34.70
59.	55	Phytomedicine	Germany	85	13944	0.21	34.91
60.	56	Archives fuer Hydrobiologie	Germany	84	14028	0.21	35.12
61.	56	Bulletin of Botanical Survey India	India	84	14112	0.21	35.33
62.	56	Euphytica	Netherlands	84	14196	0.21	35.54
63.	56	Plant Molecular Biology	Netherlands	84	14280	0.21	35.75
64.	57	Journal of Fish Biology	UK	83	14363	0.21	35.96
65.	58	African Journal of Biotechnology	South Africa	81	14444	0.20	36.16
66.	58	Indian Journal of Ecology	India	81	14525	0.20	36.37
67.	59	Canadian Journal of Botany	Canada	79	14604	0.20	36.56
68.	59	Journal of Medicinal and Aromatic Plant Sciences	India	79	14683	0.20	36.76
69.	60	Annual Review of Phytophathology	USA	76	14759	0.19	36.95
70.	60	In Vitro Cellular & Developmental Biology Plant	USA	76	14835	0.19	37.14
71.	61	Comparative Biochem. And Physiology	USA	75	14910	0.19	37.33
72.	62	International Revue. Gesamtan. Hydrobiology	Germany	72	14982	0.18	37.51
73.	62	Journal of Coffee Research	India	72	15054	0.18	37.69
74.	63	Indian Journal of Fisheries	India	71	15125	0.18	37.87
75.	63	Journal of Bacteriology	USA	71	15196	0.18	38.05
76.	64	Canadian Journal of Fisheries and Aquatic Sciences	Canada	69	15265	0.17	38.22
77.	64	Ecology	USA	69	15334	0.17	38.39
78.	64	Journal of Hazardous Materials	Netherlands	69	15403	0.17	38.57
79.	65	Acta Horticulturae	Belgium	68	15471	0.17	38.74
80.	65	American Journal of Botany	USA	68	15539	0.17	38.91
81.	65	Genome Research	USA	68	15607	0.17	39.08
82.	65	Journal of Mycology Series	USA	68	15675	0.17	39.25
83.	66	Annals of Botany	UK	67	15742	0.17	39.41
84.	66	Indian Journal of Environment and Ecoplan	India	67	15809	0.17	39.58
85.	66	Transactions of the British Mycological Society	UK	67	15876	0.17	39.75
86.	67	Bioresource Technology	Netherlands	66	15942	0.17	39.91
87.	67	Journal of Tropical Ecology	UK	66	16008	0.17	40.08
88.	67	Physiological and Molecular Plant Pathology	UK	66	16074	0.17	40.25
89.	68	Indian Journal of Agronomy	India	64	16138	0.16	40.41

Sl. No.	Rank	Name of the Journal	Country	Number of Citations	Cumulative Citations	%	Cumulative %
90.	68	Soil Biology and Biochemistry	UK	64	16202	0.16	40.57
91.	69	Limnology and Oceanography	USA	63	16265	0.16	40.72
92.	69	Mysore Journal of Agricultural Science	India	62	16327	0.16	40.88
93.	70	Indian Journal of Traditional Knowledge	India	61	16388	0.15	41.03
94.	71	Environment and Ecology	India	60	16448	0.15	41.18
95.	71	Journal of Virology	USA	60	16508	0.15	41.33
96.	71	Oryza	India	60	16568	0.15	41.48
97.	72	Canadian Journal of Microbiology	Canada	59	16627	0.15	41.63
98.	72	Indian Journal of Natural Products	India	59	16686	0.15	41.78
99.	72	Plant and Soil	Netherlands	59	16745	0.15	41.93
100.	73	Cancer Research	USA	57	16802	0.14	42.07
101.	73	Chemical & Pharmaceutical Bulletin	Japan	57	16859	0.14	42.21
102.	73	Indian Bee Journal	India	57	16916	0.14	42.35
103.	73	Journal of Applied Bacteriology	UK	57	16973	0.14	42.50
104.	73	Oecologia	Germany	57	17030	0.14	42.64
105.	74	Journal of the Bombay Natural History Society	India	56	17086	0.14	42.78
106.	75	Biological Conservation	UK	54	17140	0.14	42.91
107.	75	South Indian Horticulture	India	54	17194	0.14	43.05
108.	76	Annual Review of Entomology	USA	53	17247	0.13	43.18
109.	76	Indian Journal of Entomology	India	53	17300	0.13	43.31
110.	76	Journal of Food Science	USA	53	17353	0.13	43.45
111.	76	Journal of Molecular Biology	UK	53	17406	0.13	43.58
112.	77	Evolution	USA	52	17458	0.13	43.71
113.	78	Applied Microbiology	Japan	51	17509	0.13	43.84
114.	78	Biological and Pharmaceutical Bulletin	Japan	51	17560	0.13	43.97
115.	78	General & Comparative Endocrinology	USA	51	17611	0.13	44.09
116.	78	Mutagenesis	UK	51	17662	0.13	44.22
117.	79	Biotropica	USA	50	17712	0.13	44.35
118.	79	International Rice Research Notes	USA	50	17762	0.13	44.47
119.	79	Journal of Food Protection	USA	50	17812	0.13	44.60
120.	79	Mycologia	USA	50	17862	0.13	44.72
121.	80	Journal of Tropical Medicinal	Japan	49	17911	0.12	44.84
122.	81	Annals of Applied Biology	UK	48	17959	0.12	44.96
123.	81	Indian Coffee	India	48	18007	0.12	45.08
124.	81	Journal of Natural Remedies	USA	48	18055	0.12	45.21
125.	81	Seed Science Research	UK	48	18103	0.12	45.33
126.	82	Crop Protection	UK	47	18150	0.12	45.44
127.	82	Mycopathologia	Netherlands	47	18197	0.12	45.56
128.	82	Nature Environment And Pollution	UK	47	18244	0.12	45.68
129.	83	Biochemistry Series	USA	46	18290	0.12	45.79
130.	83	Indian Journal of Medical Research	India	46	18336	0.12	45.91
131.	83	Indian Journal of Sericulture	India	46	18382	0.12	46.02
132.	83	Journal of Plant Physiology	Germany	46	18428	0.12	46.14
133.	83	Pharmacogenetics	USA	46	18474	0.12	46.25
134.	84	Crop Research Hissar	India	45	18519	0.11	46.37
135.	85	EMBO Journal	UK	44	18563	0.11	46.48
136.	85	Environmental Pollution	UK	44	18607	0.11	46.59
137.	85	Molecular Ecology	UK	44	18651	0.11	46.70
138.	86	Biotechnology Abstracts	UK	43	18694	0.11	46.81
139.	86	Biotechnology Letters	Netherlands	43	18737	0.11	46.91

Sl. No.	Rank	Name of the Journal	Country	Number of Citations	Cumulative Citations	%	Cumulative %
140.	86	Indian Journal of Microbiology Ecology	India	43	18780	0.11	47.02
141.	86	Journal of Ethnobiology	USA	43	18823	0.11	47.13
142.	87	Environmental Monitoring and Assessment	Netherlands	42	18865	0.11	47.23
143.	87	European Journal of Plant Pathology	Netherlands	42	18907	0.11	47.34
144.	87	Journal of Ecotoxicology and Environmental Monitoring	India	42	18949	0.11	47.44
145.	87	Journal of General Virology	UK	42	18991	0.11	47.55
146.	88	Annual Review of Ecology and Systematics	USA	41	19032	0.10	47.65
147.	88	Copeia	USA	41	19073	0.10	47.75
148.	88	Indian Journal of Nematology	India	41	19114	0.10	47.86
149.	88	Journal of Maharashtra Agricultural Universities	India	41	19155	0.10	47.96
150.	88	New Phytologist	UK	41	19196	0.10	48.06
151.	88	Pest Management in Horticultural Ecosystem	USA	41	19237	0.10	48.16
152.	88	Seed Research	India	41	19278	0.10	48.27
153.	89	Genetics Research	UK	40	19318	0.10	48.37
154.	90	Animal Behaviour	UK	39	19357	0.10	48.46
155.	90	Molecular Breeding	Netherlands	39	19396	0.10	48.56
156.	90	Phytomorphology	India	39	19435	0.10	48.66
157.	90	Proc. Natl. Acad. Science USA	USA	39	19474	0.10	48.76
158.	91	Geobios New Reports	India	38	19512	0.10	48.85
159.	91	Hepatology	USA	38	19550	0.10	48.95
160.	91	Indian Journal of Marine Science	India	38	19588	0.10	49.04
161.	91	Journal of Animal Ecology	UK	38	19626	0.10	49.14
162.	91	Journal of Freshwater Ecology	USA	38	19664	0.10	49.23
163.	91	Journal of Indian Public Health Engineering	India	38	19702	0.10	49.33
164.	91	Journal of Indian Soc.Cotton Improve	India	38	19740	0.10	49.42
165.	91	Journal of Phys. Chemistry	USA	38	19778	0.10	49.52
166.	91	Soil Science	USA	38	19816	0.10	49.61
167.	92	Entomologia Experimentalis et Applicata	Netherlands	37	19853	0.09	49.71
168.	92	Environmental Toxicology & Chemistry	USA	37	19890	0.09	49.80
169.	92	Heredity	UK	37	19927	0.09	49.89
170.	92	Indian Journal of Biotechnology	India	37	19964	0.09	49.98
171.	92	Journal of Mysore University Section B	India	37	20001	0.09	50.08
172.	92	Letters in Applied Microbiology	UK	37	20038	0.09	50.17
173.	92	Methods in Enzymology	USA	37	20075	0.09	50.26
174.	92	Scientia Horticulturae	Netherlands	37	20112	0.09	50.36
175.	92	Trans American Fish. Society	USA	37	20149	0.09	50.45
176.	93	Biochimica et Biophysica Acta	Netherlands	36	20185	0.09	50.54
177.	93	Economic Botany	USA	36	20221	0.09	50.63
178.	93	FEBS Letters	Netherlands	36	20257	0.09	50.72
179.	93	Fishery Technology	India	36	20293	0.09	50.81
180.	93	Journal of American Society for Horticultural Science	USA	36	20329	0.09	50.90
181.	93	Journal of Ecobiology	India	36	20365	0.09	50.99
182.	93	Journal of Food Science & Technology	India	36	20401	0.09	51.08
183.	93	Life Science	USA	36	20437	0.09	51.17

Sl. No.	Rank	Name of the Journal	Country	Number of Citations	Cumulative Citations	%	Cumulative %
184.	93	Soil Science Society American Journal	USA	36	20473	0.09	51.26
185.	94	Annual Review of Biochemistry	USA	35	20508	0.09	51.35
186.	94	Biochemistry & Biophysics	USA	35	20543	0.09	51.43
187.	94	Botanical Review	USA	35	20578	0.09	51.52
188.	94	Canadian Journal of Plant Pathology	Canada	35	20613	0.09	51.61
189.	94	Indian Journal of Genetics & Plant Breeding	India	35	20648	0.09	51.70
190.	94	International Journal of Ecology Environmental Science	India	35	20683	0.09	51.78
191.	94	Journal of American Water Works Assoc	USA	35	20718	0.09	51.87
192.	94	Journal of Inverte Pathology	USA	35	20753	0.09	51.96
193.	94	Nature Biotechnology	USA	35	20788	0.09	52.05
194.	94	Plant Journal	UK	35	20823	0.09	52.14
195.	95	Advances in Plant Science	India	34	20857	0.09	52.22
196.	95	Entomon	India	34	20891	0.09	52.31
197.	95	Environmental Entomology	USA	34	20925	0.09	52.39
198.	95	Genetics	USA	34	20959	0.09	52.48
199.	95	Journal of Indian Microbial	India	34	20993	0.09	52.56
200.	95	The Lancet	UK	34	21027	0.09	52.65
201.	96	Food Science & Technology	USA	33	21060	0.08	52.73
202.	96	Hortscience	USA	33	21093	0.08	52.81
203.	96	Journal of Biosciences	India	33	21126	0.08	52.89
204.	96	Oikos	Denmark	33	21159	0.08	52.98
205.	96	Pharmacological Research	UK	33	21192	0.08	53.06
206.	96	Tetrahedron Letters	UK	33	21225	0.08	53.14
207.	96	Water, Air and Soil Pollution	Netherlands	33	21258	0.08	53.22
208.	97	Annals Review of Plant Physiology & Plant Mol. Biol.	USA	32	21290	0.08	53.30
209.	97	Bioscience, Biotechnology & Biochemistry	Japan	32	21322	0.08	53.38
210.	97	Chemosphere	UK	32	21354	0.08	53.46
211.	97	Forest Ecology & Management	Netherlands	32	21386	0.08	53.55
212.	97	Indian Farming	India	32	21418	0.08	53.63
213.	97	Journal of General Microbiology	UK	32	21450	0.08	53.71
214.	97	Molecular Plant Microbe Interaction	USA	32	21482	0.08	53.79
215.	97	World Journal of Microbiology and Biotechnology	UK	32	21514	0.08	53.87
216.	98	Biochemical Pharmacology	USA	31	21545	0.08	53.94
217.	98	Environmental Health Perspectives	USA	31	21576	0.08	54.02
218.	98	Journal of Alternative and Complementary Medicine	USA	31	21607	0.08	54.10
219.	98	Journal of American Oil Chemical Society	USA	31	21638	0.08	54.18
220.	98	Journal of Groundwater	USA	31	21669	0.08	54.25
221.	98	Karnataka Journal of Agricultural Sciences	India	31	21700	0.08	54.33
222.	98	Science and Culture	India	31	21731	0.08	54.41
223.	98	Water Science and Technology	UK	31	21762	0.08	54.49
224.	99	Environmental Science & Technology	Netherlands	30	21792	0.08	54.56
225.	99	Indian Journal of Horticultural Science	India	30	21822	0.08	54.64
226.	99	Indian Journal of Plant Protection	India	30	21852	0.08	54.71

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227.	99	Journal of Experimental Botany	UK	30	21882	0.08	54.79
228.	99	Journal of Plankton Research	UK	30	21912	0.08	54.86
229.	99	Process Biochemistry	UK	30	21942	0.08	54.94
230.	99	Zoos Print Journal	India	30	21972	0.08	55.01
231.	100	Annuals of Botany	UK	29	22001	0.07	55.08
232.	100	Biotechnology Advances	USA	29	22030	0.07	55.16
233.	100	Freshwater Biology	UK	29	22059	0.07	55.23
234.	100	Journal of Agricultural Science	UK	29	22088	0.07	55.30
235.	100	Journal of Entomological Research	India	29	22117	0.07	55.38
236.	100	Journal of Environmental Quality	USA	29	22146	0.07	55.45
237.	101	Annals of Biochemistry	USA	28	22174	0.07	55.52
238.	101	Canadian Journal of Plant Science	Canada	28	22202	0.07	55.59
239.	101	Food & Chemical Toxicology	UK	28	22230	0.07	55.66
240.	101	Horticulture Science	Czech Republic	28	22258	0.07	55.73
241.	101	Indian Council for Agril Research	India	28	22286	0.07	55.80
242.	101	Indian Journal of Chemistry	India	28	22314	0.07	55.87
243.	101	Insect Environment	UK	28	22342	0.07	55.94
244.	101	Journal of Economic and Taxonomic Botany	India	28	22370	0.07	56.01
245.	101	Journal of Vegetation Science	Switzerland	28	22398	0.07	56.08
246.	101	Journal of Virological Methods	Netherlands	28	22426	0.07	56.15
247.	101	Pakistan Journal of Botany	Pakistan	28	22454	0.07	56.22
248.	101	Tobacco Research	India	28	22482	0.07	56.29
249.	102	Ecological Applications	USA	27	22509	0.07	56.36
250.	102	Ground water	USA	27	22536	0.07	56.42
251.	102	International Journal of Cancer	USA	27	22563	0.07	56.49
252.	102	International Journal of Systematic Bacteriology	UK	27	22590	0.07	56.56
253.	102	Journal of Agriculture Research	Taiwan	27	22617	0.07	56.63
254.	102	Journal of Environmental Science and Engineering	Canada	27	22644	0.07	56.69
255.	102	Journal of Immunology	USA	27	22671	0.07	56.76
256.	102	Journal of Plantation Crops	India	27	22698	0.07	56.83
257.	102	Oncogene	UK	27	22725	0.07	56.90
258.	102	Oriental Insects	USA	27	22752	0.07	56.97
259.	102	Toxicology	Ireland	27	22779	0.07	57.03
260.	103	Acta Phytopathologica Sinica	China	26	22805	0.07	57.10
261.	103	Applied Microbiology & Biotechnology	Germany	26	22831	0.07	57.16
262.	103	Biotechnology & Bioengineering	USA	26	22857	0.07	57.23
263.	103	Journal of Biotechnology	Netherlands	26	22883	0.07	57.29
264.	103	Journal of Experimental Zoology	USA	26	22909	0.07	57.36
265.	103	Journal of Geological Society of Indian	India	26	22935	0.07	57.42
266.	103	Journal of Phytopathology	Germany	26	22961	0.07	57.49
267.	103	New Phytopathology	UK	26	22987	0.07	57.55
268.	104	Analytical Chemistry	USA	25	23012	0.06	57.62
269.	104	Annals of Agricultural Research	India	25	23037	0.06	57.68
270.	104	Clinical Chemistry	USA	25	23062	0.06	57.74
271.	104	FEMS Microbiological Review	Netherlands	25	23087	0.06	57.80
272.	104	Free Radical Biology and Medicine	USA	25	23112	0.06	57.87
273.	104	Indian Journal of Agricultural Research	India	25	23137	0.06	57.93

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274.	104	Indian Journal of Inland Fish Soc India	India	25	23162	0.06	57.99
275.	104	Journal of Applied Microbiology	UK	25	23187	0.06	58.05
276.	104	Journal of Hydrogeology	Germany	25	23212	0.06	58.12
277.	104	Pesticides Abstracts	USA	25	23237	0.06	58.18
278.	104	Verch. Internat. Verein. Limnology	Germany	25	23262	0.06	58.24
279.	105	Asian Journal of Chemistry	India	24	23286	0.06	58.30
280.	105	Biodiversity & Conservation	Netherlands	24	23310	0.06	58.36
281.	105	Ecological Monograph	USA	24	23334	0.06	58.42
282.	105	International Journal of Remote Sensing	UK	24	23358	0.06	58.48
283.	105	Journal of Chemical Technology and Biotechnology	UK	24	23382	0.06	58.54
284.	105	Journal of Hepatology	Denmark	24	23406	0.06	58.60
285.	105	Newsletter for Birdwatchers	India	24	23430	0.06	58.66
286.	105	Pakistan Journal of Biological Science	Pakistan	24	23454	0.06	58.72
287.	105	Tropical Ecology	India	24	23478	0.06	58.78
288.	106	Acta Hydrobiologia Sinica	Poland	23	23501	0.06	58.84
289.	106	Agronomy Journal	USA	23	23524	0.06	58.90
290.	106	Biologia Plantarum	Netherlands	23	23547	0.06	58.96
291.	106	Biological Review	UK	23	23570	0.06	59.01
292.	106	Bulletin of Seric. Expt. Sta. Japan	Japan	23	23593	0.06	59.07
293.	106	Cell	USA	23	23616	0.06	59.13
294.	106	Diversity and Distributions	UK	23	23639	0.06	59.19
295.	106	Indian Journal of Genetics	India	23	23662	0.06	59.24
296.	106	International Journal of Environmental Studies	Switzerland	23	23685	0.06	59.30
297.	106	Journal of Hydrology	Netherlands	23	23708	0.06	59.36
298.	106	Journal of Indian Water Works Association	India	23	23731	0.06	59.42
299.	106	Journal of Proteome Chemistry	USA	23	23754	0.06	59.47
300.	106	Molecular & General Genetics	Germany	23	23777	0.06	59.53
301.	106	Pflanzenphysiol	Germany	23	23800	0.06	59.59
302.	106	Physiologia Plantarum	Denmark	23	23823	0.06	59.65
303.	106	Plant Cell	USA	23	23846	0.06	59.70
304.	107	American Naturalist	USA	22	23868	0.06	59.76
305.	107	Analytica Chemica Acta	Netherlands	22	23890	0.06	59.81
306.	107	Analytical Biochemistry	USA	22	23912	0.06	59.87
307.	107	Bioinformatics	UK	22	23934	0.06	59.92
308.	107	Fertilizer News	India	22	23956	0.06	59.98
309.	107	Gastroenterology	USA	22	23978	0.06	60.03
310.	107	Genetic Resources & Crop Evaluation	Netherlands	22	24000	0.06	60.09
311.	107	Indian Journal of Agriculture Economics	India	22	24022	0.06	60.15
312.	107	Indian Journal of Botany	India	22	24044	0.06	60.20
313.	107	Indian Perfumer	India	22	24066	0.06	60.26
314.	107	Journal of American Chemical Society	USA	22	24088	0.06	60.31
315.	107	Journal of Chemical Ecology	USA	22	24110	0.06	60.37
316.	107	Journal of Environment and Ecology	India	22	24132	0.06	60.42
317.	107	Journal of Pharmaceutical Sciences	USA	22	24154	0.06	60.48
318.	107	Lichenologist	UK	22	24176	0.06	60.53
319.	107	Soil Science and Plant Nutrition	Japan	22	24198	0.06	60.59
320.	107	The Science of the total Environment	Netherlands	22	24220	0.06	60.64
321.	107	Turkish Journal of Biology	Turkey	22	24242	0.06	60.70

Sl. No.	Rank	Name of the Journal	Country	Number of Citations	Cumulative Citations	%	Cumulative %
322.	108	Advance in Plant Science	India	21	24263	0.05	60.75
323.	108	Antimicrobial Agents and Chemotherapy	USA	21	24284	0.05	60.80
324.	108	Aquatic Toxicology	Netherlands	21	24305	0.05	60.85
325.	108	Archives of Biochemistry & Biophysics	USA	21	24326	0.05	60.91
326.	108	Biochemistry Journal	USA	21	24347	0.05	60.96
327.	108	Bioved	India	21	24368	0.05	61.01
328.	108	Bulletin of Entomological Research	UK	21	24389	0.05	61.06
329.	108	Bulletin of Japan Soc. Sci. Fish	Japan	21	24410	0.05	61.12
330.	108	Chemical Review	USA	21	24431	0.05	61.17
331.	108	Drosophila. Information Service	USA	21	24452	0.05	61.22
332.	108	European Journal of Pharmacology	Netherlands	21	24473	0.05	61.27
333.	108	Herpetological Journal	UK	21	24494	0.05	61.33
334.	108	Journal of Fish Res. Board Canada	Canada	21	24515	0.05	61.38
335.	108	Journal of Plant Nutrition	USA	21	24536	0.05	61.43
336.	108	Transgenic Research	Netherlands	21	24557	0.05	61.48
337.	109	American Nutrition	USA	20	24577	0.05	61.53
338.	109	Asian Journal of Micro. Biotech. Env. Science	India	20	24597	0.05	61.58
339.	109	Biomass and Bioenergy	UK	20	24617	0.05	61.63
340.	109	Bioorganic & Medicinal Chem Letters	UK	20	24637	0.05	61.68
341.	109	Bulletin of Environmental Contamination & Toxicology	USA	20	24657	0.05	61.73
342.	109	Carcinogenesis	USA	20	24677	0.05	61.78
343.	109	Dyes and Pigments	UK	20	24697	0.05	61.84
344.	109	Experientia	Switzerland	20	24717	0.05	61.89
345.	109	Indian Journal Environmental and Ecoplan	India	20	24737	0.05	61.94
346.	109	International Journal of Food Microbiology	Netherlands	20	24757	0.05	61.99
347.	109	International Journal of Pharma Medicine	USA	20	24777	0.05	62.04
348.	109	Journal of Biological Control	USA	20	24797	0.05	62.09
349.	109	Journal of Karnataka Univ. Science	India	20	24817	0.05	62.14
350.	109	Journal of Mycology and Plant Pathology	India	20	24837	0.05	62.19
351.	109	Journal of Water Research	UK	20	24857	0.05	62.24
352.	109	Journal of Zoology	UK	20	24877	0.05	62.29
353.	109	Molecular & Cellular Proteomics	USA	20	24897	0.05	62.34
354.	109	Plant Breeding	Germany	20	24917	0.05	62.39
355.	109	Proc. Academic Environmental Biology, India	India	20	24937	0.05	62.44
356.	109	Virology	USA	20	24957	0.05	62.49
357.	110	American Journal of Clinical Pathology	USA	19	24976	0.05	62.53
358.	110	Clinical Microbiology Reviews	USA	19	24995	0.05	62.58
359.	110	Critical Reviews in Toxicology	USA	19	25014	0.05	62.63
360.	110	Current Research	UK	19	25033	0.05	62.68
361.	110	Cytologia	Japan	19	25052	0.05	62.72
362.	110	FAO Plant Protection Bulletin	Italy	19	25071	0.05	62.77
363.	110	Genes & Development	USA	19	25090	0.05	62.82
364.	110	Indian Journal of Environmental Science	India	19	25109	0.05	62.87
365.	110	Journal of Aquatic Animal Health	USA	19	25128	0.05	62.91
366.	110	Journal of Biogeography	UK	19	25147	0.05	62.96

Sl. No.	Rank	Name of the Journal	Country	Number of Citations	Cumulative Citations	%	Cumulative %
367.	110	Journal of Cell Biology	USA	19	25166	0.05	63.01
368.	110	Journal of Photochem. Photobiol. A: Chem	Switzerland	19	25185	0.05	63.06
369.	110	Journal of Plant Biochemistry and Biotechnology	India	19	25204	0.05	63.10
370.	110	Journal on Water Pollution Control Federation	USA	19	25223	0.05	63.15
371.	110	Limnologica (Berlin)	Germany	19	25242	0.05	63.20
372.	110	Mycological Research	UK	19	25261	0.05	63.25
373.	110	Pesticides	UK	19	25280	0.05	63.29
374.	110	Plant Protection Bulletin Taiwan	Taiwan	19	25299	0.05	63.34
375.	110	Proteomics	Germany	19	25318	0.05	63.39
376.	111	Australian Journal of Plant Physiology	Australia	18	25336	0.05	63.43
377.	111	Biochemical and Systematics & Ecology	UK	18	25354	0.05	63.48
378.	111	Bryologist	USA	18	25372	0.05	63.53
379.	111	Clinical Cancer Research	USA	18	25390	0.05	63.57
380.	111	Indian Journal of Microbiology	India	18	25408	0.05	63.62
381.	111	Journal of Environmental Science & Pollution	USA	18	25426	0.05	63.66
382.	111	Journal of Horticultural Science and Biotechnology	UK	18	25444	0.05	63.71
383.	111	Journal of Living World	USA	18	25462	0.05	63.75
384.	111	Journal of Nature Conservation	India	18	25480	0.05	63.80
385.	111	Journal of Pharmacology and Experimental Therapeutics	USA	18	25498	0.05	63.84
386.	111	Journal of Pharmacology Medicine	UK	18	25516	0.05	63.89
387.	111	Journal of Science Food & Agriculture	Netherlands	18	25534	0.05	63.93
388.	111	Journal of the Institution of Public Health Engineers-India	India	18	25552	0.05	63.98
389.	111	Journal of Tropical Forest Science	Malaysia	18	25570	0.05	64.02
390.	111	Microbiological Review	USA	18	25588	0.05	64.07
391.	111	Natural Products Letters	Switzerland	18	25606	0.05	64.11
392.	111	Nematologia Mediterranea	Italy	18	25624	0.05	64.16
393.	111	Trends in Ecology & Evolution	UK	18	25642	0.05	64.20
394.	112	Achieves of Virology	Austria	17	25659	0.04	64.24
395.	112	Acta Botanica Indica	India	17	25676	0.04	64.29
396.	112	Advance in Agronomy	USA	17	25693	0.04	64.33
397.	112	Advances in Applied Microbiology	USA	17	25710	0.04	64.37
398.	112	Biological Control	USA	17	25727	0.04	64.41
399.	112	Canadian Journal of Zoology	Canada	17	25744	0.04	64.46
400.	112	Experimental Cell Research	USA	17	25761	0.04	64.50
401.	112	Himachal Journal of Environment Zoology	India	17	25778	0.04	64.54
402.	112	Human Molecular Genet	UK	17	25795	0.04	64.58
403.	112	Indian Hydrobiology	India	17	25812	0.04	64.63
404.	112	Indian Journal of Plant Physiology	India	17	25829	0.04	64.67
405.	112	Journal of Hygiene Research	China	17	25846	0.04	64.71
406.	112	Journal of Industrial Pollution Control	India	17	25863	0.04	64.75
407.	112	Journal of Insect Physiology	UK	17	25880	0.04	64.80
408.	112	Netherlands Journal of Plant Pathology	Netherlands	17	25897	0.04	64.84
409.	112	Science & Technology	USA	17	25914	0.04	64.88

Sl. No.	Rank	Name of the Journal	Country	Number of Citations	Cumulative Citations	%	Cumulative %
410.	113	Acta Hydrochemica et Hydrobiologica	Germany	16	25930	0.04	64.92
411.	113	American Journal of Med Genet. Supplements	USA	16	25946	0.04	64.96
412.	113	American Journal of Public Health	USA	16	25962	0.04	65.00
413.	113	Annals of Phytopathological Society of Japan	Japan	16	25978	0.04	65.04
414.	113	Applied Catalysis B: Environmental	Netherlands	16	25994	0.04	65.08
415.	113	Biosciences	USA	16	26010	0.04	65.12
416.	113	Ethenobotany	India	16	26026	0.04	65.16
417.	113	FAO Fish Report	USA	16	26042	0.04	65.20
418.	113	Florida Entomologist	USA	16	26058	0.04	65.24
419.	113	IWWA (Indian Waste Water Analysis)	India	16	26074	0.04	65.28
420.	113	Journal of Biological Science	India	16	26090	0.04	65.32
421.	113	Journal of Experimental Biology	UK	16	26106	0.04	65.36
422.	113	Journal of Nutrition	USA	16	26122	0.04	65.40
423.	113	Journal of Pathology	UK	16	26138	0.04	65.44
424.	113	Journal of Soil and Water Conservations	USA	16	26154	0.04	65.48
425.	113	Journal of Soil Biology and Ecology	India	16	26170	0.04	65.52
426.	113	Millet News Letter	India	16	26186	0.04	65.56
427.	113	Nature Genetics	USA	16	26202	0.04	65.60
428.	113	Proc. Zool. Society London	UK	16	26218	0.04	65.64
429.	113	Rec. Indian Mus.	India	16	26234	0.04	65.68
430.	113	The Plant Cell	USA	16	26250	0.04	65.72
431.	114	Cell	USA	15	26265	0.04	65.76
432.	114	Agriculture Ecosystems and Environment	Netherlands	15	26280	0.04	65.80
433.	114	Alcoholism Clinical Experimenta Research	USA	15	26295	0.04	65.84
434.	114	American Journal of Entomology Viticulture	USA	15	26310	0.04	65.87
435.	114	Annals of Internal Medicine	USA	15	26325	0.04	65.91
436.	114	Arch Hydrobiolgia	Germany	15	26340	0.04	65.95
437.	114	Asian Journal of Molecular Biology & Biotechnology	Malaysia	15	26355	0.04	65.99
438.	114	Biology & Fertility of Soils	Germany	15	26370	0.04	66.02
439.	114	Bulletin OILB SROP	USA	15	26385	0.04	66.06
440.	114	Current Opinion in Plant Biology	UK	15	26400	0.04	66.10
441.	114	Endocrinology	USA	15	26415	0.04	66.14
442.	114	Free Radical Research	Switzerland	15	26430	0.04	66.17
443.	114	Indian Agriculturist	India	15	26445	0.04	66.21
444.	114	Indian Journal of Animal Science	India	15	26460	0.04	66.25
445.	114	International Review Hydrobiology	Germany	15	26475	0.04	66.29
446.	114	Journal of Cellular Science	UK	15	26490	0.04	66.32
447.	114	Journal of Gastroenterology	Japan	15	26505	0.04	66.36
448.	114	Journal of Horticulture Science	UK	15	26520	0.04	66.40
449.	114	Journal of Lakes and Reservoirs: Research and Management	USA	15	26535	0.04	66.44
450.	114	Journal of Pharmacy and Pharmaceutical Science	Canada	15	26550	0.04	66.47
451.	114	Legume Research	India	15	26565	0.04	66.51
452.	114	Natural Products Research & Development	China	15	26580	0.04	66.55

Sl. No.	Rank	Name of the Journal	Country	Number of Citations	Cumulative Citations	%	Cumulative %
453.	114	Oriental Journal of Chemistry	India	15	26595	0.04	66.59
454.	114	Physiological Plant Pathology	UK	15	26610	0.04	66.62
455.	114	Proc. Roy. Soc London	UK	15	26625	0.04	66.66
456.	115	Annals of Plant Protection Sciences	India	14	26639	0.04	66.70
457.	115	Applied & Entomology & Zoology	Japan	14	26653	0.04	66.73
458.	115	Applied Geochem	UK	14	26667	0.04	66.77
459.	115	Archives of Environmental Contamination and Toxicology	USA	14	26681	0.04	66.80
460.	115	Archives of Pharmacological Research	Korea	14	26695	0.04	66.84
461.	115	Australian Journal of Agricultural Research	Australia	14	26709	0.04	66.87
462.	115	Botany Gazetter	Japan	14	26723	0.04	66.91
463.	115	Capsicum and Eggplant Newsletter	Italy	14	26737	0.04	66.94
464.	115	Cobras	USA	14	26751	0.04	66.98
465.	115	European Journal of Biochemistry	UK	14	26765	0.04	67.01
466.	115	Global Ecology & Biogeography Letters	UK	14	26779	0.04	67.05
467.	115	Hormones & Behavior	USA	14	26793	0.04	67.08
468.	115	Indian Engineering Chem. Research	India	14	26807	0.04	67.12
469.	115	Journal of Linn Soc Botany	UK	14	26821	0.04	67.15
470.	115	Journal of Lipid Research	USA	14	26835	0.04	67.19
471.	115	Journal of Marine Biology Association India	India	14	26849	0.04	67.22
472.	115	Kew Bulletin	UK	14	26863	0.04	67.26
473.	115	Mushroom science	UK	14	26877	0.04	67.29
474.	115	N Engl Journal of Med	UK	14	26891	0.04	67.33
475.	115	Natural Products Science	Korea	14	26905	0.04	67.36
476.	115	Plant Growth Regulation	Netherlands	14	26919	0.04	67.40
477.	115	Symposium for Society of Experimental Biology	USA	14	26933	0.04	67.43
478.	115	Taiwania	Taiwan	14	26947	0.04	67.47
479.	116	Acta Pharmacol et Toxicologica	Denmark	13	26960	0.03	67.50
480.	116	Advances in Biosensors	USA	13	26973	0.03	67.53
481.	116	American Journal of Clinical Nutrition	USA	13	26986	0.03	67.57
482.	116	American Midland Naturalist	USA	13	26999	0.03	67.60
483.	116	Amphibia-Reptilia	Netherlands	13	27012	0.03	67.63
484.	116	Annual Review of Pharmacology & Toxicology	USA	13	27025	0.03	67.66
485.	116	Asian Journal of Plant Science	India	13	27038	0.03	67.70
486.	116	BMC Bioinformatics	UK	13	27051	0.03	67.73
487.	116	British Journal of Cancer	UK	13	27064	0.03	67.76
488.	116	Chemical & Biological Interactions	USA	13	27077	0.03	67.79
489.	116	Current Opinion in Microbiology	UK	13	27090	0.03	67.83
490.	116	Electronic Journal of Env. Agric. And Food Chemistry	USA	13	27103	0.03	67.86
491.	116	Environmental Molecular Mutagenesis	USA	13	27116	0.03	67.89
492.	116	Enzyme & Microbi. Biotechnology	USA	13	27129	0.03	67.92
493.	116	Genetika	Russia	13	27142	0.03	67.96
494.	116	Geophytology	India	13	27155	0.03	67.99
495.	116	Indian Food Packer	India	13	27168	0.03	68.02
496.	116	Indian Veterinary Medical Journal	India	13	27181	0.03	68.05
497.	116	International Journal of Oncology	Greece	13	27194	0.03	68.09

Sl. No.	Rank	Name of the Journal	Country	Number of Citations	Cumulative Citations	%	Cumulative %
498.	116	International Journal of Plant Sciences	USA	13	27207	0.03	68.12
499.	116	Journal of AOAC International	USA	13	27220	0.03	68.15
500.	116	Journal of Apicultural Research	UK	13	27233	0.03	68.18
501.	116	Journal of Applied Ecology	UK	13	27246	0.03	68.22
502.	116	Journal of Asiatic Soc. Bengal	India	13	27259	0.03	68.25
503.	116	Journal of Herbs Species and Medicinal Plants	USA	13	27272	0.03	68.28
504.	116	Journal of Heredity	USA	13	27285	0.03	68.31
505.	116	Journal of Science India Research	India	13	27298	0.03	68.35
506.	116	Journal of Soil and Crops Society of Florida	USA	13	27311	0.03	68.38
507.	116	Journal of Stored Prod. Research	UK	13	27324	0.03	68.41
508.	116	Lancet	UK	13	27337	0.03	68.44
509.	116	Mycotaxonomy	USA	13	27350	0.03	68.48
510.	116	Natural Products Reports	UK	13	27363	0.03	68.51
511.	116	Phytoparasitica	Israel	13	27376	0.03	68.54
512.	116	The Phytoplankton Biology	USA	13	27389	0.03	68.58
513.	116	Tree Physiology	Canada	13	27402	0.03	68.61
514.	116	Trends in Biotechnology	UK	13	27415	0.03	68.64
515.	116	Zentralblatt-fuer-Bakteriologie-Mikorbiologie-und-hygiene-B	Germany	13	27428	0.03	68.67
516.	117	American Journal of Physiol. Gastrpomtest Liver Physiology	USA	12	27440	0.03	68.70
517.	117	Andhra Agricultural Journal	India	12	27452	0.03	68.73
518.	117	Annals of Tourism Research	UK	12	27464	0.03	68.76
519.	117	Aquatic Ecology	Netherlands	12	27476	0.03	68.79
520.	117	Archives Microbiology	Germany	12	27488	0.03	68.82
521.	117	Biologisches – Zentralblatt	Germany	12	27500	0.03	68.85
522.	117	BMC Cancer	USA	12	27512	0.03	68.88
523.	117	Chemical Engineering Journal	Switzerland	12	27524	0.03	68.91
524.	117	Current Opinion in Biotechnology	UK	12	27536	0.03	68.94
525.	117	Ecology Letters	UK	12	27548	0.03	68.97
526.	117	Environmentalist	USA	12	27560	0.03	69.00
527.	117	Fruits-	France	12	27572	0.03	69.03
528.	117	Fuel Processing Technology	Netherlands	12	27584	0.03	69.06
529.	117	Gayana Botany	Chile	12	27596	0.03	69.09
530.	117	Genetics & Molecular Biology	Brazil	12	27608	0.03	69.12
531.	117	Genomics	USA	12	27620	0.03	69.15
532.	117	ICLARM	USA	12	27632	0.03	69.18
533.	117	Journal of Animal Science	USA	12	27644	0.03	69.21
534.	117	Journal of Cotton Digest International	USA	12	27656	0.03	69.24
535.	117	Journal of Great Lakes Research	USA	12	27668	0.03	69.27
536.	117	Journal of Indian Chemical Society	India	12	27680	0.03	69.30
537.	117	Journal of Insect Behavior	USA	12	27692	0.03	69.33
538.	117	Journal of Scientific and Industrial Research	India	12	27704	0.03	69.36
539.	117	Journal of Toxicology and Environmental Health	USA	12	27716	0.03	69.39
540.	117	Journal of Tropical Agriculture	India	12	27728	0.03	69.42
541.	117	Journal of Water Resource Research	USA	12	27740	0.03	69.45
542.	117	Matsya	India	12	27752	0.03	69.48

Sl. No.	Rank	Name of the Journal	Country	Number of Citations	Cumulative Citations	%	Cumulative %
543.	117	Natural Product Research	China	12	27764	0.03	69.51
544.	117	Nutrition & Cancer	USA	12	27776	0.03	69.54
545.	117	Pakistan Journal of Scientific & Industrial Research	Pakistan	12	27788	0.03	69.57
546.	117	Pharmacological Review	USA	12	27800	0.03	69.60
547.	117	Pharmacology and Therapeutics	USA	12	27812	0.03	69.63
548.	117	Research Journal of Medicinal & Aromatic Plant	India	12	27824	0.03	69.66
549.	117	Trends in Biochemical Sciences	UK	12	27836	0.03	69.69
550.	117	Tropical Agriculture	Trinidad & Tobago	12	27848	0.03	69.72
551.	117	World Journal of Gastroenterology	China	12	27860	0.03	69.75
552.	118	Acta Entomologica Sinica	China	11	27871	0.03	69.78
553.	118	Advance Experimental Med & Biology	USA	11	27882	0.03	69.81
554.	118	African Journal of Biomedical Research	South Africa	11	27893	0.03	69.84
555.	118	Agrobios India	India	11	27904	0.03	69.86
556.	118	Arzneimittel forschung	Germany	11	27915	0.03	69.89
557.	118	Australian Journal of Botany	Australia	11	27926	0.03	69.92
558.	118	Canada Journal of Fish Aquat Science	Canada	11	27937	0.03	69.95
559.	118	Canadian Entomologist	Canada	11	27948	0.03	69.97
560.	118	E-Journal of Chemistry	Germany	11	27959	0.03	70.00
561.	118	Electronic Journal of Biotechnology	Chile	11	27970	0.03	70.03
562.	118	Environmental Biology of Fishes	Netherlands	11	27981	0.03	70.06
563.	118	Environmental Geology (Berlin)	Germany	11	27992	0.03	70.08
564.	118	Environmental Research	USA	11	28003	0.03	70.11
565.	118	Enzyme & Microbial Technology	USA	11	28014	0.03	70.14
566.	118	European Polymer Journal	UK	11	28025	0.03	70.17
567.	118	Fresh Water Biol. Stn. Madras	India	11	28036	0.03	70.20
568.	118	Fungal Genetics and Biology	USA	11	28047	0.03	70.22
569.	118	Genome Biology	UK	11	28058	0.03	70.25
570.	118	Geochemical et Cosmochemic Acta	UK	11	28069	0.03	70.28
571.	118	Haryana Journal of Horticulture Science	India	11	28080	0.03	70.31
572.	118	Hepatol. Research	Ireland	11	28091	0.03	70.33
573.	118	Horticulture Review	Canada	11	28102	0.03	70.36
574.	118	Indian Journal of Forestry	India	11	28113	0.03	70.39
575.	118	Indian Journal of Physiology and Pharmacology	India	11	28124	0.03	70.42
576.	118	Indian Journal of Soil Conservation	India	11	28135	0.03	70.44
577.	118	International Journal of Pharmaceutical Compounding	USA	11	28146	0.03	70.47
578.	118	International Journal of Pharmaceutics	Netherlands	11	28157	0.03	70.50
579.	118	International Review of Cytology	USA	11	28168	0.03	70.53
580.	118	Journal of Biochemistry	Japan	11	28179	0.03	70.55
581.	118	Journal of Botanical Society London	UK	11	28190	0.03	70.58
582.	118	Journal of Experimental & Clinical Medicine	USA	11	28201	0.03	70.61
583.	118	Journal of Herbal Pharmacotherapy	USA	11	28212	0.03	70.64
584.	118	Journal of Herpetology	USA	11	28223	0.03	70.66
585.	118	Journal of Invest Dermatology	USA	11	28234	0.03	70.69
586.	118	Journal of Wild Life Management	USA	11	28245	0.03	70.72
587.	118	Lebensmittel Wissenschaft &	UK	11	28256	0.03	70.75

Sl. No.	Rank	Name of the Journal	Country	Number of Citations	Cumulative Citations	%	Cumulative %
		Technologie					
588.	118	Molecular and Cellular Biochemistry	USA	11	28267	0.03	70.77
589.	118	Molecular Biology and Evolution	USA	11	28278	0.03	70.80
590.	118	My Forest	India	11	28289	0.03	70.83
591.	118	Pesticide Biochemistry & Physiology	USA	11	28300	0.03	70.86
592.	118	Proc. Crop. Sci. Soc Japan	Japan	11	28311	0.03	70.88
593.	118	Research Bulletin Punjab University	India	11	28322	0.03	70.91
594.	118	Sorghum Newsletter	India	11	28333	0.03	70.94
595.	118	Uttar Pradesh Journal of Zoology	India	11	28344	0.03	70.97
596.	119	Agricultural Science Digest	India	10	28354	0.03	70.99
597.	119	Agriculture Decisions	USA	10	28364	0.03	71.02
598.	119	American Journal of Surgery	USA	10	28374	0.03	71.04
599.	119	American Journal of Tropical Medicine	USA	10	28384	0.03	71.07
600.	119	American Zoologist	USA	10	28394	0.03	71.09
601.	119	Annals Review of Microbiology	USA	10	28404	0.03	71.12
602.	119	Bangladesh Journal of Zoology	Bangladesh	10	28414	0.03	71.14
603.	119	Biocontrol Science and Technology	UK	10	28424	0.03	71.17
604.	119	Biological Bulletin	USA	10	28434	0.03	71.19
605.	119	Blumea	Netherlands	10	28444	0.03	71.22
606.	119	Brazilian Journal of Medical and Biological Research	Brazil	10	28454	0.03	71.24
607.	119	Brazilian Journal of Pharmacognosy	Brazil	10	28464	0.03	71.27
608.	119	Bulletin of Grain Tech	India	10	28474	0.03	71.29
609.	119	Canadian Journal of Physiology	Canada	10	28484	0.03	71.32
610.	119	Canadian Journal of Soil Science	Canada	10	28494	0.03	71.34
611.	119	Cancer Letter	USA	10	28504	0.03	71.37
612.	119	Cereal Chemistry	USA	10	28514	0.03	71.39
613.	119	Current Genetics	Germany	10	28524	0.03	71.42
614.	119	Ecological Entomology	UK	10	28534	0.03	71.44
615.	119	Ecology Monographs	USA	10	28544	0.03	71.47
616.	119	Ecology of Polluted Waters	USA	10	28554	0.03	71.49
617.	119	Ekol. Pollution	Slovakia	10	28564	0.03	71.52
618.	119	Environment Geol. And Water Sciences	Germany	10	28574	0.03	71.54
619.	119	Fishing & Hunting News	USA	10	28584	0.03	71.57
620.	119	Fitopatologia Brasileira	Brazil	10	28594	0.03	71.59
621.	119	Food Microbiology	UK	10	28604	0.03	71.62
622.	119	Hum. Exp. Toxicology	UK	10	28614	0.03	71.64
623.	119	Human Mutation	USA	10	28624	0.03	71.67
624.	119	Hydrological Sciences Journal	UK	10	28634	0.03	71.69
625.	119	Insect Biochemistry and Molecular Biology	UK	10	28644	0.03	71.72
626.	119	Japanese Journal of Breeding	Japan	10	28654	0.03	71.74
627.	119	Journal of Agronomy & Crop Science	Germany	10	28664	0.03	71.77
628.	119	Journal of Applied Ichthyology	Germany	10	28674	0.03	71.79
629.	119	Journal of Current Biological Science	USA	10	28684	0.03	71.82
630.	119	Journal of Institution of Water Engineering	India	10	28694	0.03	71.84
631.	119	Journal of Spices and Aromatic Crops	India	10	28704	0.03	71.87
632.	119	Journal of Water Science & Technology	UK	10	28714	0.03	71.89
633.	119	Molecular General Genetics	Germany	10	28724	0.03	71.92
634.	119	New England Journal of Medicine	USA	10	28734	0.03	71.94

Sl. No.	Rank	Name of the Journal	Country	Number of Citations	Cumulative Citations	%	Cumulative %
635.	119	Pest Management Focus	UK	10	28744	0.03	71.97
636.	119	Plant Physiol. Lancaster	USA	10	28754	0.03	71.99
637.	119	Planter's Chronicle	India	10	28764	0.03	72.02
638.	119	Reviews of Geophysics	USA	10	28774	0.03	72.04
639.	119	Science Sinica	USA	10	28784	0.03	72.07
640.	119	Separation and Purification Technology	UK	10	28794	0.03	72.09
641.	119	Silvae Genetica	Germany	10	28804	0.03	72.12
642.	119	Trans. American Microso. Soc	USA	10	28814	0.03	72.14
643.	119	Trends in Genetics	UK	10	28824	0.03	72.17
644.	119	Tropical Pest Management	Japan	10	28834	0.03	72.19
645.	119	Turkish Journal of Botany	Turkey	10	28844	0.03	72.22
646.	119	Water Environmental Research	USA	10	28854	0.03	72.24
647.	119	Water Resources Research	USA	10	28864	0.03	72.27
648.	120	41 Journals with 9 Citations each		369	29233	0.92	73.19
649.	121	69 Journals with 8 Citations each		552	29785	1.38	74.58
650.	122	108 Journals with 7 Citations each		756	30541	1.89	76.47
651.	123	145 Journals with 6 Citations each		870	31411	2.18	78.65
652.	124	236 Journals with 5 Citations each		1180	32591	2.95	81.60
653.	125	316 Journals with 4 Citations each		1264	33855	3.16	84.77
654.	126	458 Journals with 3 Citations each		1374	35229	3.44	88.21
655.	127	959 Journals with 2 Citations each		1918	37147	4.80	93.01
656.	128	2793 Journals with 1 Citations each		2793	39940	6.99	100.00
		Total		**39940**		**100.00**	

In the table-14 rank list of journals it is found that Hydrobiologia published from Netherlands occupies the first rank as the most preferred journal having been cited 719 times followed by Journal of Ethnopharmacology published from Ireland with second highest citations i.e. 642 citations. The third rank goes to Indian Journal of Environmental Health from India with 622 citations and fourth rank goes to Phytopathology from USA with 585 citations. It is followed by Indian Phytopathology (India) with 569 citations, Fitoterapia (Italy) with 456 citations, Indian Journal of Environmental Protection (India) with 454 citations, Current Science (India) with 451 citations, Mutation Research (Netherlands) with 421 citations, and Pollution Research (India) with 402 citations. The first ten journals in the ranking list together account 13.32% of the total citations. Further, it is observed that 50.08% of citations are from first 171 journals out of 171 journals 55 journals are from India which accounts 7369 (18.45%) citations.

4.1.9 (A) Rank list of journals in Biotechnology

Table-15 Rank list of journals in Biotechnology

Sl. No	Rank	Name of the Journal	Country	Number of Citations	Cumulative Citations	%	Cumulative %
1.	1	Journal of Ethnopharmacology	Ireland	558	558	3.52	3.52
2.	2	Fitoterapia	Italy	435	993	2.74	6.26
3.	3	Plant Cell Reports	Germany	357	1350	2.25	8.51
4.	4	Plant Cell Tissue & Organ Culture	Netherlands	320	1670	2.02	10.53
5.	5	Indian Journal of Pharmaceutical Science	India	283	1953	1.78	12.31
6.	6	Indian Journal of Experimental Biology	India	260	2213	1.64	13.95
7.	7	Phytochemistry	UK	234	2447	1.48	15.43
8.	8	Phytopathology	USA	215	2662	1.36	16.78
9.	9	Indian Drugs	India	204	2866	1.29	18.07
10.	10	Planta Medica	Germany	187	3053	1.18	19.25
11.	11	Current Science	India	157	3210	0.99	20.24
12.	12	Plant Physiology	USA	156	3366	0.98	21.22
13.	13	Journal of Biological Chemistry	USA	149	3515	0.94	22.16
14.	14	Nature	UK	143	3658	0.90	23.06
15.	15	Journal of Natural Products	USA	136	3794	0.86	23.92
16.	16	Journal of Agricultural and Food Chemistry	USA	133	3927	0.84	24.76
17.	17	Theoretical and Applied Genetics	Germany	124	4051	0.78	25.54
18.	17	Science	USA	124	4175	0.78	26.32
19.	18	Plant Science	USA	122	4297	0.77	27.09
20.	19	Phytotheraphy Research	UK	110	4407	0.69	27.78
21.	20	Indian Journal of Pharmacology	India	104	4511	0.66	28.44
22.	20	Proc Natl Acad Sci USA	USA	104	4615	0.66	29.09
23.	20	Plant Cell and Environment	UK	104	4719	0.66	29.75
24.	20	Nucleic Acids Research	UK	104	4823	0.66	30.41
25.	21	Phytotherapy Research	UK	92	4915	0.58	30.99
26.	22	Mutation Research	Netherlands	91	5006	0.57	31.56
27.	23	Pharmaceutical Biology	Netherlands	86	5092	0.54	32.10
28.	24	Food Chemistry	UK	83	5175	0.52	32.62
29.	25	Phytomedicine- (Jena)	Germany	77	5252	0.49	33.11
30.	26	Applied and Environmental Microbiology	USA	70	5322	0.44	33.55
31.	27	Indian Phytopathology	India	66	5388	0.42	33.97
32.	27	Physiological and Molecular Plant Pathology	UK	66	5454	0.42	34.38
33.	28	In Vitro Cellular & Developmental Biology Plant	USA	64	5518	0.40	34.79
34.	29	Genome Research	USA	63	5581	0.40	35.18
35.	30	Plant Disease	USA	61	5642	0.38	35.57
36.	31	Journal of Virology	USA	60	5702	0.38	35.95
37.	32	Indian Bee Journal	India	57	5759	0.36	36.31
38.	32	African Journal of Biotechnology	South Africa	57	5816	0.36	36.66
39.	33	Indian Journal of Natural Products	India	54	5870	0.34	37.01
40.	34	Crop Science	USA	50	5920	0.32	37.32
41.	34	Euphytica	Netherlands	50	5970	0.32	37.64
42.	34	Plant Pathology Journal	Korea	50	6020	0.32	37.95
43.	35	Journal of Tropical Medicinal	Japan	49	6069	0.31	38.26
44.	36	Journal of Natural Remedies	USA	48	6117	0.30	38.56
45.	37	Plant Molecular Biology Reporter	Netherlands	47	6164	0.30	38.86

Sl. No	Rank	Name of the Journal	Country	Number of Citations	Cumulative Citations	%	Cumulative %
46.	38	Biochemistry Series	USA	46	6210	0.29	39.15
47.	38	Pharmacogenetics	USA	46	6256	0.29	39.44
48.	38	Biological & Pharmaceutical Bulletin	Japan	46	6302	0.29	39.73
49.	39	Chemical and Pharmaceutical Bulletin	Japan	45	6347	0.28	40.01
50.	39	Cancer Research	USA	45	6392	0.28	40.30
51.	40	Acta Horticulturae	Belgium	44	6436	0.28	40.57
52.	41	Biotechnology Abstracts	UK	43	6479	0.27	40.84
53.	42	Journal of General Virology	UK	42	6521	0.26	41.11
54.	43	Genetics Research	UK	40	6561	0.25	41.36
55.	44	Annual Review of Phytophathology	USA	39	6600	0.25	41.61
56.	44	Journal of Plant Physiology	Germany	39	6639	0.25	41.85
57.	44	Molecular Breeding	Netherlands	39	6678	0.25	42.10
58.	45	Indian Journal of Sericulture	India	38	6716	0.24	42.34
59.	45	Journal of Molecular Biology	UK	38	6754	0.24	42.58
60.	45	Hepatology	USA	38	6792	0.24	42.82
61.	46	American Journal of Botany	USA	37	6829	0.23	43.05
62.	46	Indian Journal of Biotechnology	India	37	6866	0.23	43.28
63.	46	Methods in Enzymology	USA	37	6903	0.23	43.52
64.	47	FEBS Letters	Netherlands	36	6939	0.23	43.74
65.	47	Life Science	USA	36	6975	0.23	43.97
66.	48	Biochemistry & Biophysics	USA	35	7010	0.22	44.19
67.	48	Plant Journal	UK	35	7045	0.22	44.41
68.	48	Journal of Inverte Pathology	USA	35	7080	0.22	44.63
69.	49	The Lancet	UK	34	7114	0.21	44.85
70.	50	Bulletin of Botanical Survey India	India	33	7147	0.21	45.05
71.	50	Indian Journal of Medical Research	India	33	7180	0.21	45.26
72.	50	EMBO Journal	UK	33	7213	0.21	45.47
73.	50	Journal of Economic Entomology	USA	33	7246	0.21	45.68
74.	50	Tetrahedron Letters	UK	33	7279	0.21	45.89
75.	51	Annals Review of Plant Physiology & Plant Mol. Biol.	USA	32	7311	0.20	46.09
76.	52	Journal of Alternative and Complementary Medicine	USA	31	7342	0.20	46.28
77.	52	Canadian Journal of Botany	Canada	31	7373	0.20	46.48
78.	53	Plant Molecular Biology	Netherlands	30	7403	0.19	46.67
79.	53	Journal of Bacteriology	USA	30	7433	0.19	46.86
80.	54	Phytomorphology	India	29	7462	0.18	47.04
81.	54	Annuals of Botany	UK	29	7491	0.18	47.22
82.	55	Indian Journal of Chemistry	India	28	7519	0.18	47.40
83.	55	Nature Biotechnology	USA	28	7547	0.18	47.58
84.	55	Canadian Journal of Plant Science	Canada	28	7575	0.18	47.75
85.	55	European Journal of Plant Pathology	Netherlands	28	7603	0.18	47.93
86.	55	Journal of Virological Methods	Netherlands	28	7631	0.18	48.11
87.	55	Scientia Horticulturae	Netherlands	28	7659	0.18	48.28
88.	56	Toxicology	Ireland	27	7686	0.17	48.45
89.	56	Journal of Immunology	USA	27	7713	0.17	48.62
90.	56	International Journal of Cancer	USA	27	7740	0.17	48.79
91.	57	Indian Forester	India	26	7766	0.16	48.96
92.	57	Indian Journal of Nematology	India	26	7792	0.16	49.12
93.	57	Journal of Phytopathology	Germany	26	7818	0.16	49.28
94.	58	Free Radical Biology and Medicine	USA	25	7843	0.16	49.44

Sl. No	Rank	Name of the Journal	Country	Number of Citations	Cumulative Citations	%	Cumulative %
95.	58	Biochimica et Biophysica Acta	Netherlands	25	7868	0.16	49.60
96.	58	Soil Biology and Biochemistry	UK	25	7893	0.16	49.76
97.	58	Bioscience Biotechnology & Biochemistry	Japan	25	7918	0.16	49.91
98.	58	Annual Review of Entomology	USA	25	7943	0.16	50.07
99.	58	Clinical Chemistry	USA	25	7968	0.16	50.23
100.	59	Indian Journal of Genetics & Plant Breeding	India	24	7992	0.15	50.38
101.	59	Molecular Plant Microbe Interactions	USA	24	8016	0.15	50.53
102.	59	Journal of Medicinal and Aromatic Plant Sciences	India	24	8040	0.15	50.68
103.	59	Plant and Soil	Netherlands	24	8064	0.15	50.84
104.	59	Journal of Hepatology	Denmark	24	8088	0.15	50.99
105.	59	Biochemical Pharmacology	USA	24	8112	0.15	51.14
106.	60	Bulletin of Seric. Expt. Sta. Japan	Japan	23	8135	0.14	51.28
107.	60	Madras Agricultural Journal	India	23	8158	0.14	51.43
108.	60	Molecular & General Genetics	Germany	23	8181	0.14	51.57
109.	60	Pflanzenphysiol	Germany	23	8204	0.14	51.72
110.	60	Journal of Proteome Chemistry	USA	23	8227	0.14	51.86
111.	60	Journal of Experimental Botany	UK	23	8250	0.14	52.01
112.	60	Plant Cell	USA	23	8273	0.14	52.15
113.	61	Journal of American Society for Horticultural Science	USA	22	8295	0.14	52.29
114.	61	Annals of Biochemistry	USA	22	8317	0.14	52.43
115.	61	Turkish Journal of Biology	Turkey	22	8339	0.14	52.57
116.	61	Analytical Biochemistry	USA	22	8361	0.14	52.71
117.	61	Biotechnology Letters	Netherlands	22	8383	0.14	52.85
118.	61	Bioinformatics	UK	22	8405	0.14	52.98
119.	61	Gastroenterology	USA	22	8427	0.14	53.12
120.	61	Journal of Pharmaceutical Sciences	USA	22	8449	0.14	53.26
121.	62	Bulletin of Japan Soc. Sci. Fish	Japan	21	8470	0.13	53.39
122.	62	Annals of Applied Biology	UK	21	8491	0.13	53.53
123.	62	Annual Review of Biochemistry	USA	21	8512	0.13	53.66
124.	62	Archives of Biochemistry & Biophysics	USA	21	8533	0.13	53.79
125.	62	Transgenic Research	Netherlands	21	8554	0.13	53.92
126.	62	Antimicrobial Agents and Chemotherapy	USA	21	8575	0.13	54.06
127.	63	Indian Journal of Agricultural Sciences	India	20	8595	0.13	54.18
128.	63	Molecular & Cellular Proteomics	USA	20	8615	0.13	54.31
129.	63	Plant Breeding	Germany	20	8635	0.13	54.43
130.	63	Seed Science and Technology	Switzerland	20	8655	0.13	54.56
131.	63	Virology	USA	20	8675	0.13	54.69
132.	63	Analytical Chemistry	USA	20	8695	0.13	54.81
133.	63	Bioorganic & Medicinal Chem Letters	UK	20	8715	0.13	54.94
134.	63	Ecology	USA	20	8735	0.13	55.06
135.	63	Hort science	USA	20	8755	0.13	55.19
136.	63	International Journal of Pharma Medicine	USA	20	8775	0.13	55.32
137.	63	Pharmacological Research	UK	20	8795	0.13	55.44
138.	64	American Journal of Clinical Pathology	USA	19	8814	0.12	55.56
139.	64	Journal of Bombay Natural History Society	India	19	8833	0.12	55.68
140.	64	Journal of Cell Biology	USA	19	8852	0.12	55.80
141.	64	Pesticides	UK	19	8871	0.12	55.92

Sl. No	Rank	Name of the Journal	Country	Number of Citations	Cumulative Citations	%	Cumulative %
142.	64	Journal of Plant Biochemistry and Biotechnology	India	19	8890	0.12	56.04
143.	64	Proteomics	Germany	19	8909	0.12	56.16
144.	64	Mycological Research	UK	19	8928	0.12	56.28
145.	64	Acta Phytopathologica Sinica	China	19	8947	0.12	56.40
146.	64	Clinical Microbiology Reviews	USA	19	8966	0.12	56.52
147.	64	Critical Reviews in Toxicology	USA	19	8985	0.12	56.64
148.	65	Oryza	India	18	9003	0.11	56.75
149.	65	Advances in Plant Sciences	India	18	9021	0.11	56.87
150.	65	Biologia Plantarum	Netherlands	18	9039	0.11	56.98
151.	65	Cell	USA	18	9057	0.11	57.09
152.	65	Natural Products Letters	Switzerland	18	9075	0.11	57.21
153.	65	Food and Chemical Toxicology	UK	18	9093	0.11	57.32
154.	65	Journal of Horticultural Science and Biotechnology	UK	18	9111	0.11	57.44
155.	65	Seminars in Liver Disease	USA	18	9129	0.11	57.55
156.	65	Journal of Pharmacology Medicine	UK	18	9147	0.11	57.66
157.	65	Journal of Pharmacology and Experimental Therapeutics	USA	18	9165	0.11	57.78
158.	66	Journal of American Oil Chemical Society	USA	17	9182	0.11	57.88
159.	66	Biotechnology- Advances	USA	17	9199	0.11	57.99
160.	66	Process Biochemistry	UK	17	9216	0.11	58.10
161.	66	New Phytologist	UK	17	9233	0.11	58.20
162.	66	Physiologia Plantarum	Denmark	17	9250	0.11	58.31
163.	66	Experimental Cell Research	USA	17	9267	0.11	58.42
164.	66	Human Molecular Genet	UK	17	9284	0.11	58.53
165.	66	Achieves of Virology	Austria	17	9301	0.11	58.63
166.	66	Crop Protection	UK	17	9318	0.11	58.74
167.	67	Indian Journal of Entomology	India	16	9334	0.10	58.84
168.	67	American Naturalist	USA	16	9350	0.10	58.94
169.	67	American Journal of Med Genet. Supplements	USA	16	9366	0.10	59.04
170.	67	Nature Genetics	USA	16	9382	0.10	59.14
171.	67	Canadian Journal of Microbiology	Canada	16	9398	0.10	59.24
172.	67	Journal of Pathology	UK	16	9414	0.10	59.35
173.	67	Journal of Nutrition	USA	16	9430	0.10	59.45
174.	68	American Journal of Entomology Viticulture	USA	15	9445	0.09	59.54
175.	68	Bulletin OILB SROP	USA	15	9460	0.09	59.63
176.	68	Indian Perfumer	India	15	9475	0.09	59.73
177.	68	Mysore Journal of Agric. Science	India	15	9490	0.09	59.82
178.	68	Free Radical Research	Switzerland	15	9505	0.09	59.92
179.	68	Biotechnology & Bioengineering	USA	15	9520	0.09	60.01
180.	68	Current Opinion in Plant Biology	UK	15	9535	0.09	60.11
181.	68	Cell	USA	15	9550	0.09	60.20
182.	68	Journal of General Microbiology	UK	15	9565	0.09	60.30
183.	68	Natural Products Research & Development	China	15	9580	0.09	60.39
184.	68	Alcoholism Clinical Experimenta Research	USA	15	9595	0.09	60.49
185.	68	Environmental and Ecological Statistics	USA	15	9610	0.09	60.58

Sl. No	Rank	Name of the Journal	Country	Number of Citations	Cumulative Citations	%	Cumulative %
186.	68	Journal of Horticulture Science	UK	15	9625	0.09	60.68
187.	68	Journal of Gastroenterology	Japan	15	9640	0.09	60.77
188.	68	Annals of Internal Medicine	USA	15	9655	0.09	60.86
189.	68	Oncogene	UK	15	9670	0.09	60.96
190.	68	Journal of Pharmacy and Pharmaceutical Science	Canada	15	9685	0.09	61.05
191.	69	Asian Journal of Microbiol Biotech Env. Science	India	14	9699	0.09	61.14
192.	69	Indian Journal of Environmental Health	India	14	9713	0.09	61.23
193.	69	N Engl Journal of Med	UK	14	9727	0.09	61.32
194.	69	Proc. Indian Acad Science	India	14	9741	0.09	61.41
195.	69	Symposium for Society of Experimental Biology	USA	14	9755	0.09	61.49
196.	69	Taiwania	Taiwan	14	9769	0.09	61.58
197.	69	International Rice Research Notes	USA	14	9783	0.09	61.67
198.	69	European Journal of Biochemistry	UK	14	9797	0.09	61.76
199.	69	Kew Bulletin	UK	14	9811	0.09	61.85
200.	69	Mushroom science	UK	14	9825	0.09	61.94
201.	69	Plant Growth Regulation	Netherlands	14	9839	0.09	62.02
202.	69	Evolution	USA	14	9853	0.09	62.11
203.	69	Genes and Development	USA	14	9867	0.09	62.20
204.	69	Archives of Pharmacological Research	Korea	14	9881	0.09	62.29
205.	69	European Journal of Pharmacology	Netherlands	14	9895	0.09	62.38
206.	69	Natural Products Science	Korea	14	9909	0.09	62.47
207.	70	American Journal of Clinical Nutrition	USA	13	9922	0.08	62.55
208.	70	Indian Food Packer	India	13	9935	0.08	62.63
209.	70	Journal of Indian Botany Society	India	13	9948	0.08	62.71
210.	70	Journal of Science India Research	India	13	9961	0.08	62.79
211.	70	Journal of Agricultural Science	UK	13	9974	0.08	62.88
212.	70	Journal of Apicultural Research	UK	13	9987	0.08	62.96
213.	70	Electronic Journal of Env. Agric. And Food Chemistry	USA	13	10000	0.08	63.04
214.	70	Oecologia	Germany	13	10013	0.08	63.12
215.	70	Trends in Biotechnology	UK	13	10026	0.08	63.20
216.	70	BMC Bioinformatics	UK	13	10039	0.08	63.28
217.	70	Current Opinion in Microbiology	UK	13	10052	0.08	63.37
218.	70	Molecular Ecology	UK	13	10065	0.08	63.45
219.	70	Hortscience	USA	13	10078	0.08	63.53
220.	70	British Journal of Cancer	UK	13	10091	0.08	63.61
221.	70	International Journal of Oncology	Greece	13	10104	0.08	63.69
222.	70	Acta Pharmacol et Toxicologica	Denmark	13	10117	0.08	63.78
223.	71	American Journal of Physiol. Gastrpomtest Liver Physiology	USA	12	10129	0.08	63.85
224.	71	Indian Journal of Horticultural Science	India	12	10141	0.08	63.93
225.	71	Indian Journal of Mycology & Plant Pathology	India	12	10153	0.08	64.00
226.	71	Journal of Indian Chemical Society	India	12	10165	0.08	64.08
227.	71	Research Journal of Medicinal & Aromatic Plant	India	12	10177	0.08	64.15
228.	71	Biological Control	USA	12	10189	0.08	64.23
229.	71	Trends in Biochemical Sciences	UK	12	10201	0.08	64.31

Sl. No	Rank	Name of the Journal	Country	Number of Citations	Cumulative Citations	%	Cumulative %
230.	71	Current Opinion in Biotechnology	UK	12	10213	0.08	64.38
231.	71	Journal of Biotechnology	Netherlands	12	10225	0.08	64.46
232.	71	World Journal of Microbiology and Biotechnology	UK	12	10237	0.08	64.53
233.	71	Annals of Botany	UK	12	10249	0.08	64.61
234.	71	Genomics	USA	12	10261	0.08	64.68
235.	71	Archives Microbiology	Germany	12	10273	0.08	64.76
236.	71	Pollution Research	India	12	10285	0.08	64.84
237.	71	Journal of Food Science & Technology	India	12	10297	0.08	64.91
238.	71	Food Science and Technology	USA	12	10309	0.08	64.99
239.	71	World Journal of Gastroenterology	China	12	10321	0.08	65.06
240.	71	BMC Cancer	USA	12	10333	0.08	65.14
241.	71	Oncology	USA	12	10345	0.08	65.21
242.	71	Nutrition & Cancer	USA	12	10357	0.08	65.29
243.	71	Pharmacological Review	USA	12	10369	0.08	65.36
244.	71	Pharmacology and Therapeutics	USA	12	10381	0.08	65.44
245.	72	Agronomy Journal	USA	11	10392	0.07	65.51
246.	72	Hepatol. Research	Ireland	11	10403	0.07	65.58
247.	72	Indian Journal of Physiology and Pharmacology	India	11	10414	0.07	65.65
248.	72	Journal of Experimental & Clinical Medicine	USA	11	10425	0.07	65.72
249.	72	Lebensmittel Wissenschaft & Technologie	UK	11	10436	0.07	65.79
250.	72	Nematologia Mediterranea	Italy	11	10447	0.07	65.86
251.	72	Proc. Crop. Sci. Soc Japan	Japan	11	10458	0.07	65.93
252.	72	Sorghum Newsletter	India	11	10469	0.07	66.00
253.	72	The Plant Cell	USA	11	10480	0.07	66.06
254.	72	Advance Experimental Med & Biology	USA	11	10491	0.07	66.13
255.	72	Genome Biology	UK	11	10502	0.07	66.20
256.	72	Journal of Soil Biology and Ecology	India	11	10513	0.07	66.27
257.	72	Biochemical and Systematics & Ecology	UK	11	10524	0.07	66.34
258.	72	Journal of Biochemistry	Japan	11	10535	0.07	66.41
259.	72	Molecular and Cellular Biochemistry	USA	11	10546	0.07	66.48
260.	72	Applied Microbiology & Biotechnology	Germany	11	10557	0.07	66.55
261.	72	Electronic Journal of Biotechnology	Chile	11	10568	0.07	66.62
262.	72	Enzyme & Microbial Technology	USA	11	10579	0.07	66.69
263.	72	Pakistan Journal of Botany	Pakistan	11	10590	0.07	66.76
264.	72	Journal of Applied Bacteriology	UK	11	10601	0.07	66.83
265.	72	Microbiological Review	USA	11	10612	0.07	66.90
266.	72	European Polymer Journal	UK	11	10623	0.07	66.97
267.	72	Aquaculture	Netherlands	11	10634	0.07	67.04
268.	72	Journal of Invest Dermatology	USA	11	10645	0.07	67.10
269.	72	Journal of Herbal Pharmacotherapy	USA	11	10656	0.07	67.17
270.	72	Arzneimittel forschung	Germany	11	10667	0.07	67.24
271.	72	International Journal of Pharmaceutical Compounding	USA	11	10678	0.07	67.31
272.	72	International Journal of Pharmaceutics	Netherlands	11	10689	0.07	67.38
273.	73	American Journal of Tropical Medicine	USA	10	10699	0.06	67.45
274.	73	Brazilian Journal of Pharmacognosy	Brazil	10	10709	0.06	67.51
275.	73	Canadian Journal of Plant Pathology	Canada	10	10719	0.06	67.57
276.	73	Journal of Maharashtra Agricultural	India	10	10729	0.06	67.63

Sl. No	Rank	Name of the Journal	Country	Number of Citations	Cumulative Citations	%	Cumulative %
		Universities					
277.	73	Science Sinica	USA	10	10739	0.06	67.70
278.	73	Japanese Journal of Breeding	Japan	10	10749	0.06	67.76
279.	73	Biocontrol Science and Technology	UK	10	10759	0.06	67.82
280.	73	Journal of Biosciences	India	10	10769	0.06	67.89
281.	73	Bioresource Technology	Netherlands	10	10779	0.06	67.95
282.	73	Australian Journal of Plant Physiology	Australia	10	10789	0.06	68.01
283.	73	Blumea	Netherlands	10	10799	0.06	68.08
284.	73	Journal of Mycology and Plant Pathology	India	10	10809	0.06	68.14
285.	73	Entomologia Experimentalis et Applicata	Netherlands	10	10819	0.06	68.20
286.	73	Environmental Entomology	USA	10	10829	0.06	68.26
287.	73	Insect Biochemistry and Molecular Biology	UK	10	10839	0.06	68.33
288.	73	Current Genetics	Germany	10	10849	0.06	68.39
289.	73	Human Mutation	USA	10	10859	0.06	68.45
290.	73	Mutagenesis	UK	10	10869	0.06	68.52
291.	73	Trends in Genetics	UK	10	10879	0.06	68.58
292.	73	Annals Review of Microbiology	USA	10	10889	0.06	68.64
293.	73	FEMS Microbiology Letters	Netherlands	10	10899	0.06	68.71
294.	73	Journal of Applied Microbiology	UK	10	10909	0.06	68.77
295.	73	Current Research	UK	10	10919	0.06	68.83
296.	73	Brazilian Journal of Medical and Biological Res	Brazil	10	10929	0.06	68.89
297.	73	New England Journal of Medicine	USA	10	10939	0.06	68.96
298.	73	Cancer Letter	USA	10	10949	0.06	69.02
299.	73	Clinical Cancer Research	USA	10	10959	0.06	69.08
300.	73	American Journal of Surgery	USA	10	10969	0.06	69.15
301.	74	Alternative Medicine Reviews	USA	9	10978	0.06	69.20
302.	74	Crop Research Hissar	India	9	10987	0.06	69.26
303.	74	Indian Journal of Environment and Ecoplan	India	9	10996	0.06	69.32
304.	74	Indian Journal of Gasteroenterology	India	9	11005	0.06	69.37
305.	74	International Journal of Green Pharmacy	USA	9	11014	0.06	69.43
306.	74	Karnataka Journal of Agriculture Science	India	9	11023	0.06	69.49
307.	74	Mycologia	USA	9	11032	0.06	69.54
308.	74	Pakistan Journal of Biological Science	Pakistan	9	11041	0.06	69.60
309.	74	Phcog Net	USA	9	11050	0.06	69.66
310.	74	Proc. Soc. Exp. Biology Med.	USA	9	11059	0.06	69.71
311.	74	Seed Research	India	9	11068	0.06	69.77
312.	74	Soil sd Soc Americal Proc .	USA	9	11077	0.06	69.83
313.	74	Zeitschrift fur Naturforshung	Germany	9	11086	0.06	69.88
314.	74	Journal of Economic and Taxonomic Botany	India	9	11095	0.06	69.94
315.	74	Comparative Biochem. And Physiology	USA	9	11104	0.06	70.00
316.	74	Lipids	USA	9	11113	0.06	70.05
317.	74	Physiological Plant Pathology	UK	9	11122	0.06	70.11
318.	74	Trends in Pharmacological Science	UK	9	11131	0.06	70.17
319.	74	Acta Botanica Sinica	China	9	11140	0.06	70.22
320.	74	Parasitology Research	Germany	9	11149	0.06	70.28
321.	74	Nematology	Netherlands	9	11158	0.06	70.34
322.	74	Chemical Review	USA	9	11167	0.06	70.40

Sl. No	Rank	Name of the Journal	Country	Number of Citations	Cumulative Citations	%	Cumulative %
323.	74	Gazz. Chim. Italica	Italy	9	11176	0.06	70.45
324.	74	Journal of Chemical Ecology	USA	9	11185	0.06	70.51
325.	74	Toxicology & Applied Pharmacology	USA	9	11194	0.06	70.57
326.	74	Capsicum and Eggplant Newsletter	Italy	9	11203	0.06	70.62
327.	74	Journal of Clinical Investigation	USA	9	11212	0.06	70.68
328.	74	Immunological Reviews	Denmark	9	11221	0.06	70.74
329.	74	Journal of Immunological Methods	Netherlands	9	11230	0.06	70.79
330.	74	Journal of Laboratory Clinical Medicine	USA	9	11239	0.06	70.85
331.	74	Archives of Internal Medicine	USA	9	11248	0.06	70.91
332.	74	Journal of Neuroscience	USA	9	11257	0.06	70.96
333.	74	British Medical Journal	UK	9	11266	0.06	71.02
334.	75	African Journal of Trad. Comp. Alt. Med	South Africa	8	11274	0.05	71.07
335.	75	American Journal of Physiology	USA	8	11282	0.05	71.12
336.	75	Brazil Arch. Boil. Technology	Brazil	8	11290	0.05	71.17
337.	75	Indian Journal of Med Microbiology	India	8	11298	0.05	71.22
338.	75	Indian Veterinary Medical Journal	India	8	11306	0.05	71.27
339.	75	Journal of Applied Horticulture	India	8	11314	0.05	71.32
340.	75	Journal of Research Indian Medicinal	India	8	11322	0.05	71.37
341.	75	Lloydia	USA	8	11330	0.05	71.42
342.	75	Nature Reviews Drug Discovery	Netherlands	8	11338	0.05	71.47
343.	75	Oriental Science		8	11346	0.05	71.52
344.	75	Pakistan Journal of Nutrition	Pakistan	8	11354	0.05	71.57
345.	75	Pest Manag Hort Ecosystems	USA	8	11362	0.05	71.62
346.	75	Phytoparastica	Israel	8	11370	0.05	71.67
347.	75	Proc. Int. Plant Protection Society USA	USA	8	11378	0.05	71.73
348.	75	South African Journal of Botany	South Africa	8	11386	0.05	71.78
349.	75	Transactions of the British Mycological Society	UK	8	11394	0.05	71.83
350.	75	Tropical Journal of Pharmaceutical Research		8	11402	0.05	71.88
351.	75	Annals of Agricultural Research	India	8	11410	0.05	71.93
352.	75	Journal of Sericulture Science Japan	Japan	8	11418	0.05	71.98
353.	75	Critical Reviews in Plant Sciences	USA	8	11426	0.05	72.03
354.	75	Journal of Essential Oil Research	USA	8	11434	0.05	72.08
355.	75	Experientia	Switzerland	8	11442	0.05	72.13
356.	75	Journal of Experimental Biology	UK	8	11450	0.05	72.18
357.	75	Int. Journal of Biochemistry	UK	8	11458	0.05	72.23
358.	75	Journal of Lipid Research	USA	8	11466	0.05	72.28
359.	75	Botany Bulletin Academica Sinica	Japan	8	11474	0.05	72.33
360.	75	International Journal of Plant Sciences	USA	8	11482	0.05	72.38
361.	75	Cytologia	Japan	8	11490	0.05	72.43
362.	75	Plant & Cell Physiology	Japan	8	11498	0.05	72.48
363.	75	Journal of Entomological Research	India	8	11506	0.05	72.53
364.	75	Journal of Heredity	USA	8	11514	0.05	72.58
365.	75	Microbiology and Molecular Biology Review	USA	8	11522	0.05	72.63
366.	75	Natural Products Reports	UK	8	11530	0.05	72.68
367.	75	International Journal of Food Science & Technology	UK	8	11538	0.05	72.73
368.	75	Archives of Medical Research	Mexico	8	11546	0.05	72.78
369.	75	Med. Principles and Practice	Switzerland	8	11554	0.05	72.83

Sl. No	Rank	Name of the Journal	Country	Number of Citations	Cumulative Citations	%	Cumulative %
370.	75	Infection & Immunity	USA	8	11562	0.05	72.89
371.	75	Neuroscience & Bio- Behav Reviews	UK	8	11570	0.05	72.94
372.	75	Annals of Surgery	USA	8	11578	0.05	72.99
373.	75	Advances in Pharmacology	USA	8	11586	0.05	73.04
374.	75	Journal of Infectious Disease	USA	8	11594	0.05	73.09
375.	75	Journal of Medicinal Chemistry	USA	8	11602	0.05	73.14
376.	75	Journal of Pharmaceutical Science & Technology	Japan	8	11610	0.05	73.19
377.	75	Korean Journal of Pharmacology	Korea	8	11618	0.05	73.24
378.	75	International Journal of Applied Research In Natural Products	USA	8	11626	0.05	73.29
379.	75	Naturewissenshaften	Germany	8	11634	0.05	73.34
380.	76	Agricultural Biological Chemistry	Japan	7	11641	0.04	73.38
381.	76	Botany Gazetter	Japan	7	11648	0.04	73.43
382.	76	Bulletin of the World Health Organization	Switzerland	7	11655	0.04	73.47
383.	76	Comptes Rendus de Academie des Science	USA	7	11662	0.04	73.52
384.	76	Current Opinion Genet Development	UK	7	11669	0.04	73.56
385.	76	Indian Coffee	India	7	11676	0.04	73.60
386.	76	Indian Journal of Clinical Biochemistry	India	7	11683	0.04	73.65
387.	76	Indian Journal of Mushrooms	India	7	11690	0.04	73.69
388.	76	Indian Silk	India	7	11697	0.04	73.74
389.	76	Journal of American College Nutrition	USA	7	11704	0.04	73.78
390.	76	Journal of American Medical Association	USA	7	11711	0.04	73.82
391.	76	Journal of Annals Surgery	USA	7	11718	0.04	73.87
392.	76	Journal of Experimental Medicine	USA	7	11725	0.04	73.91
393.	76	Journal of Linn Soc Botany	UK	7	11732	0.04	73.96
394.	76	Journal of Science Food & Agriculture	Netherlands	7	11739	0.04	74.00
395.	76	Pakistan Journal of Scientific & Industrial Research	Pakistan	7	11746	0.04	74.04
396.	76	Plant Tissue Culture & Biotechnology	Israel	7	11753	0.04	74.09
397.	76	Proc Am Soc Horticult Science	USA	7	11760	0.04	74.13
398.	76	Refertivnyizhusmrnal	Russia	7	11767	0.04	74.18
399.	76	Rus. Journal Genet	Russia	7	11774	0.04	74.22
400.	76	Sericologia	UK	7	11781	0.04	74.27
401.	76	Spice India (Malayalam)	India	7	11788	0.04	74.31
402.	76	Australian Journal of Agricultural Research	Australia	7	11795	0.04	74.35
403.	76	Potato Research	Netherlands	7	11802	0.04	74.40
404.	76	Vegetable Science	USA	7	11809	0.04	74.44
405.	76	Ancient Science of Life	India	7	11816	0.04	74.49
406.	76	Developmental Biology	USA	7	11823	0.04	74.53
407.	76	Ecology Environment & Conservation	India	7	11830	0.04	74.57
408.	76	Hydrobiologia	Netherlands	7	11837	0.04	74.62
409.	76	Methods in Molecular Biology	USA	7	11844	0.04	74.66
410.	76	Journal of Biochemistry & Molecular Biology Online	Hongkong	7	11851	0.04	74.71
411.	76	Nature Biotechnology	USA	7	11858	0.04	74.75
412.	76	Netherlands Journal of Plant Pathology	Netherlands	7	11865	0.04	74.80
413.	76	Journal of Plant Biology	India	7	11872	0.04	74.84
414.	76	Journal of Plant Research	Japan	7	11879	0.04	74.88
415.	76	Plant Physiology and Biochemistry	France	7	11886	0.04	74.93

Sl. No	Rank	Name of the Journal	Country	Number of Citations	Cumulative Citations	%	Cumulative %
416.	76	Plant Systematic & Evolution	Austria	7	11893	0.04	74.97
417.	76	Trends in Plant Science	UK	7	11900	0.04	75.02
418.	76	Molecular Boil of the Cell	USA	7	11907	0.04	75.06
419.	76	Protoplasma	Austria	7	11914	0.04	75.10
420.	76	Apidologie	France	7	11921	0.04	75.15
421.	76	Annals Review of Genetics	USA	7	11928	0.04	75.19
422.	76	Genetic Resources and Crop Evolution	Netherlands	7	11935	0.04	75.24
423.	76	Letters in Applied Microbiology	UK	7	11942	0.04	75.28
424.	76	Microbiology	UK	7	11949	0.04	75.32
425.	76	Chemical Bulletin	USA	7	11956	0.04	75.37
426.	76	Electrophoresis	Germany	7	11963	0.04	75.41
427.	76	Acta Crystallographica	Denmark	7	11970	0.04	75.46
428.	76	International Journal of Research in Pharmaceutical and Biomed Sci		7	11977	0.04	75.50
429.	76	Alcohol	USA	7	11984	0.04	75.55
430.	76	Horticultural Science	Czech republic	7	11991	0.04	75.59
431.	76	Journal of Clinical Microbiology	USA	7	11998	0.04	75.63
432.	76	Journal of Medicinal Food	USA	7	12005	0.04	75.68
433.	76	Molecular and Cellular Probes	UK	7	12012	0.04	75.72
434.	76	Digestive Diseases & Science	USA	7	12019	0.04	75.77
435.	76	Anticancer Research	Greece	7	12026	0.04	75.81
436.	76	Carcinogenesis	USA	7	12033	0.04	75.85
437.	76	Molecular Cancer Therapeutics	USA	7	12040	0.04	75.90
438.	76	Zhonghua Zhong Liu Za Zhi	China	7	12047	0.04	75.94
439.	76	Annals of Surgical Oncology	USA	7	12054	0.04	75.99
440.	76	Acta Pharmaceutica Hungarica	Hungary	7	12061	0.04	76.03
441.	76	International Immunopharmacology	UK	7	12068	0.04	76.07
442.	76	Fruits-	France	7	12075	0.04	76.12
443.	77	African Journal of Biomed Research	South Africa	6	12081	0.04	76.16
444.	77	American Journal of Pathology	USA	6	12087	0.04	76.19
445.	77	Archives Int. Pharmacodyn. Therapy	USA	6	12093	0.04	76.23
446.	77	Cardamom News	India	6	12099	0.04	76.27
447.	77	Current Medicinal Practice	India	6	12105	0.04	76.31
448.	77	Federal Proceedings	USA	6	12111	0.04	76.35
449.	77	Haryana Agricultural Univ. Journal of Research	India	6	12117	0.04	76.38
450.	77	Indian Farming	India	6	12123	0.04	76.42
451.	77	Journal of AOAC International	USA	6	12129	0.04	76.46
452.	77	Journal of Cellular Science	UK	6	12135	0.04	76.50
453.	77	Journal of Mysore Univ.B	India	6	12141	0.04	76.53
454.	77	Proteins	USA	6	12147	0.04	76.57
455.	77	Rec. Bot. Survey India	India	6	12153	0.04	76.61
456.	77	South Africa Journal of Agricultural Science	South Africa	6	12159	0.04	76.65
457.	77	Vitis	Germany	6	12165	0.04	76.69
458.	77	Journal of Agriculture Research	Taiwan	6	12171	0.04	76.72
459.	77	Tropical Agriculture	Trinidad &Tobago	6	12177	0.04	76.76
460.	77	Journal of Plantation Crops	India	6	12183	0.04	76.80
461.	77	Soil Science	USA	6	12189	0.04	76.84
462.	77	Journal of Asian Natural Products	Switzerland	6	12195	0.04	76.88

Sl. No	Rank	Name of the Journal	Country	Number of Citations	Cumulative Citations	%	Cumulative %
		Research					
463.	77	Bio Essays	UK	6	12201	0.04	76.91
464.	77	FASEBJ	USA	6	12207	0.04	76.95
465.	77	Stem Cells	USA	6	12213	0.04	76.99
466.	77	Folia Microbiologica	UK	6	12219	0.04	77.03
467.	77	Molecular and Cellular Biology	USA	6	12225	0.04	77.06
468.	77	Asian Journal of Plant Sciences	India	6	12231	0.04	77.10
469.	77	Botanical Review	USA	6	12237	0.04	77.14
470.	77	Ethenobotany	India	6	12243	0.04	77.18
471.	77	Journal of Phytology Online	Germany	6	12249	0.04	77.22
472.	77	Mycoscience	Japan	6	12255	0.04	77.25
473.	77	Tree Physiology	Canada	6	12261	0.04	77.29
474.	77	Annals Review of Cell & Developmental Biology	USA	6	12267	0.04	77.33
475.	77	Trends in Cell Biology	UK	6	12273	0.04	77.37
476.	77	Cytogenetic & Genome Research	Switzerland	6	12279	0.04	77.40
477.	77	Genetics and Molecular Biology	Brazil	6	12285	0.04	77.44
478.	77	FEMS Microbiology Ecology	Netherlands	6	12291	0.04	77.48
479.	77	International Journal of Systematic Bacteriology	UK	6	12297	0.04	77.52
480.	77	Molecular Microbiology	UK	6	12303	0.04	77.56
481.	77	Virus Genes	USA	6	12309	0.04	77.59
482.	77	Comparative Physiology Ecology	India	6	12315	0.04	77.63
483.	77	Physiological Reviews	USA	6	12321	0.04	77.67
484.	77	Journal of Nematology	USA	6	12327	0.04	77.71
485.	77	Pakistan Journal of Nematology	Pakistan	6	12333	0.04	77.75
486.	77	Oriental Journal of Chem	India	6	12339	0.04	77.78
487.	77	Rec Nat Production Reports	UK	6	12345	0.04	77.82
488.	77	Chemical & Biological Interactions	USA	6	12351	0.04	77.86
489.	77	Annual Review of Ecology Systematics	USA	6	12357	0.04	77.90
490.	77	Environment Health Perspectives	USA	6	12363	0.04	77.93
491.	77	Toxicologic Pathology	USA	6	12369	0.04	77.97
492.	77	Food Technology	USA	6	12375	0.04	78.01
493.	77	DNA News Letter	USA	6	12381	0.04	78.05
494.	77	Structura	Germany	6	12387	0.04	78.09
495.	77	European Journal of Clinical Investigation	UK	6	12393	0.04	78.12
496.	77	International Journal of Mol. Med	Greece	6	12399	0.04	78.16
497.	77	Journal of Clinical Pathology	UK	6	12405	0.04	78.20
498.	77	Singapore Med Journal	Singapore	6	12411	0.04	78.24
499.	77	Clinical Infectious Diseases	USA	6	12417	0.04	78.27
500.	77	Liver Transplantation	USA	6	12423	0.04	78.31
501.	77	Blood	USA	6	12429	0.04	78.35
502.	77	Blood coagulation & fibrinolysis	USA	6	12435	0.04	78.39
503.	77	Journal of Clinical Oncology	USA	6	12441	0.04	78.43
504.	77	British Journal of Nutrition	UK	6	12447	0.04	78.46
505.	77	Nutrition Research Review	UK	6	12453	0.04	78.50
506.	77	Journal of Natural Medicines	Japan	6	12459	0.04	78.54
507.	77	Current Medicinal Chemistry	Netherlands	6	12465	0.04	78.58
508.	77	Drug Development Research	USA	6	12471	0.04	78.62
509.	77	Drug Discovery Today	UK	6	12477	0.04	78.65
510.	77	General Pharmacology	USA	6	12483	0.04	78.69

Sl. No	Rank	Name of the Journal	Country	Number of Citations	Cumulative Citations	%	Cumulative %
511.	77	Die Pharmazie	Germany	6	12489	0.04	78.73
512.	77	Pharmacy Online	UK	6	12495	0.04	78.77
513.	77	Ying Yong Shen Tai Xu Bao	Japan	6	12501	0.04	78.80
514.	77	Emerging infect. Disease	USA	6	12507	0.04	78.84
515.	77	Chinese Journal of Biotechnology	USA	6	12513	0.04	78.88
516.	78	Akad wiss wien matts nature	Germany	5	12518	0.03	78.91
517.	78	American Journal of Pharmacology and Toxicology	USA	5	12523	0.03	78.94
518.	78	Annals of NY Acad Science	USA	5	12528	0.03	78.97
519.	78	Annals Review Botanical Garden Calcutta	India	5	12533	0.03	79.01
520.	78	Arch Int Pharmacodyn Therapy	Switzerland	5	12538	0.03	79.04
521.	78	Asian Journal of Experimental Science	India	5	12543	0.03	79.07
522.	78	Asian Pac Journal of Tropical Medicine	Egypt	5	12548	0.03	79.10
523.	78	Bee world	India	5	12553	0.03	79.13
524.	78	Bioprocess engineering	Germany	5	12558	0.03	79.16
525.	78	BMC Med Genomics	UK	5	12563	0.03	79.19
526.	78	Comprehen Rev Food Sci Food Safety	USA	5	12568	0.03	79.23
527.	78	Economic Botany	USA	5	12573	0.03	79.26
528.	78	Evidence Based Complementary and Alter Med	UK	5	12578	0.03	79.29
529.	78	Fitopatologia Brasileria	Brazil	5	12583	0.03	79.32
530.	78	Fundamentals Clinical Pharmacology	France	5	12588	0.03	79.35
531.	78	Genet. Sel.	France	5	12593	0.03	79.38
532.	78	Hepatogastroenterology	Greece	5	12598	0.03	79.42
533.	78	Human Exp Toxicology	USA	5	12603	0.03	79.45
534.	78	Indian Council of Agric. Research	India	5	12608	0.03	79.48
535.	78	Indian Journal of Environmental Protection	India	5	12613	0.03	79.51
536.	78	Indian Journal of Plant Protection	India	5	12618	0.03	79.54
537.	78	Indian Journal of Traditional Knowledge	India	5	12623	0.03	79.57
538.	78	Iranian Journal of Pharmaceutical Research	USA	5	12628	0.03	79.60
539.	78	Journal of Am Chem Society	USA	5	12633	0.03	79.64
540.	78	Journal of American Pharmaceutical Association	USA	5	12638	0.03	79.67
541.	78	Journal of Plant Disease Protection	India	5	12643	0.03	79.70
542.	78	Journal of Vet. Anim. Husb. Research	India	5	12648	0.03	79.73
543.	78	Med Clinical North America	USA	5	12653	0.03	79.76
544.	78	Molecular and Cells	Hong Kong	5	12658	0.03	79.79
545.	78	Natural Review Cancer	USA	5	12663	0.03	79.83
546.	78	Ophthalmic Drug Facts	USA	5	12668	0.03	79.86
547.	78	Philippine Agriculturist	Philippines	5	12673	0.03	79.89
548.	78	Plant Archives	USA	5	12678	0.03	79.92
549.	78	Plant Biology	Germany	5	12683	0.03	79.95
550.	78	Plant Biotechnology Reports	UK	5	12688	0.03	79.98
551.	78	Progressive Horticulture	USA	5	12693	0.03	80.01
552.	78	Reinwardtia	Indonesia	5	12698	0.03	80.05
553.	78	Reprod Boilogy	UK	5	12703	0.03	80.08
554.	78	Research on Crops	India	5	12708	0.03	80.11
555.	78	Sanshi Shikenjo Hokiku Tech Bull	Japan	5	12713	0.03	80.14
556.	78	Scand Journal of Gastroent	Sweden	5	12718	0.03	80.17

Sl. No	Rank	Name of the Journal	Country	Number of Citations	Cumulative Citations	%	Cumulative %
557.	78	Scientia Agricultura Sinica	Brazil	5	12723	0.03	80.20
558.	78	Soil Science and Plant Nutrition	Japan	5	12728	0.03	80.24
559.	78	Transitional Research of Entomological Soc London	UK	5	12733	0.03	80.27
560.	78	Agriculture Science Digest	India	5	12738	0.03	80.30
561.	78	Agriculture Ecosystems and Environment	Netherlands	5	12743	0.03	80.33
562.	78	Tropical Science	UK	5	12748	0.03	80.36
563.	78	Pesticide Research Journal	Denmark	5	12753	0.03	80.39
564.	78	Biotropica	USA	5	12758	0.03	80.42
565.	78	Molecular Biology and Evolution	USA	5	12763	0.03	80.46
566.	78	Biological Chemistry	Germany	5	12768	0.03	80.49
567.	78	Clinical Chem Clinical Biochemistry	USA	5	12773	0.03	80.52
568.	78	Int. Journal of Biochemistry and Cell Biology	UK	5	12778	0.03	80.55
569.	78	Genetica	Netherlands	5	12783	0.03	80.58
570.	78	Mycorrhiza	Germany	5	12788	0.03	80.61
571.	78	Phytopharmacology	India	5	12793	0.03	80.64
572.	78	Zeitschrift fur pflanzenkrankheiten and pflanzenschutz	Germany	5	12798	0.03	80.68
573.	78	Journal of Histochemistry & Cytochemistry	USA	5	12803	0.03	80.71
574.	78	Journal of Insect Physiology	UK	5	12808	0.03	80.74
575.	78	Journal of Genome Research	USA	5	12813	0.03	80.77
576.	78	Trends in Microbiology	UK	5	12818	0.03	80.80
577.	78	Angew Chem Int Ed Engl	Germany	5	12823	0.03	80.83
578.	78	Journal of Computer Chemistry	USA	5	12828	0.03	80.87
579.	78	Journal of Computer Aided Mole Design	Netherlands	5	12833	0.03	80.90
580.	78	Flavour and Fragrance Journal	UK	5	12838	0.03	80.93
581.	78	Conservation Biology	USA	5	12843	0.03	80.96
582.	78	Cell Biology & Toxicology	Netherlands	5	12848	0.03	80.99
583.	78	Cereal Chemistry	USA	5	12853	0.03	81.02
584.	78	My Forest	India	5	12858	0.03	81.05
585.	78	Horticulture Review	Canada	5	12863	0.03	81.09
586.	78	Journal of Medicine	USA	5	12868	0.03	81.12
587.	78	Med Science Monitoring	Poland	5	12873	0.03	81.15
588.	78	Nature Medicine	UK	5	12878	0.03	81.18
589.	78	Postgrad Med Journal	UK	5	12883	0.03	81.21
590.	78	Journal of Antimicrobial Chemotherapy	UK	5	12888	0.03	81.24
591.	78	Southest Asian Journal of Trop Med Pub Health	Thailand	5	12893	0.03	81.28
592.	78	Tropical Pest Management	Japan	5	12898	0.03	81.31
593.	78	Endocrinology	USA	5	12903	0.03	81.34
594.	78	Laboratory Investigation	USA	5	12908	0.03	81.37
595.	78	Advances in Cancer Research	USA	5	12913	0.03	81.40
596.	78	European Journal of Cancer	UK	5	12918	0.03	81.43
597.	78	Experintia Oncology		5	12923	0.03	81.46
598.	78	Journal of Cancer Research Clinical Oncology	Germany	5	12928	0.03	81.50
599.	78	Seminar in Oncology	USA	5	12933	0.03	81.53
600.	78	Wound Repair and Regeneration	USA	5	12938	0.03	81.56
601.	78	Arch Neurology	USA	5	12943	0.03	81.59

Sl. No	Rank	Name of the Journal	Country	Number of Citations	Cumulative Citations	%	Cumulative %
602.	78	Journal of Neurology	Germany	5	12948	0.03	81.62
603.	78	Molecular Medicinal Chemistry	USA	5	12953	0.03	81.65
604.	78	Annual Review of Pharmacology & Toxicology	USA	5	12958	0.03	81.68
605.	78	International Journal of Pharmaceutical Practice	UK	5	12963	0.03	81.72
606.	78	Journal of Pediatric Surgery	USA	5	12968	0.03	81.75
607.	78	Journal of Pharmaceutical Care	USA	5	12973	0.03	81.78
608.	78	Research Journal of Pharmaceutical Biological and Chem. Science	Netherlands	5	12978	0.03	81.81
609.	78	Biometrics	USA	5	12983	0.03	81.84
610.	78	Water Research	UK	5	12988	0.03	81.87
611.	78	Nature Immunity	Switzerland	5	12993	0.03	81.91
612.	79	115 Journals with 4 Citations each		460	13453	2.90	84.81
613.	80	200 Journals with 3 Citations each		600	14053	3.78	88.59
614.	81	368 Journals with 2 Citations each		736	14789	4.64	93.22
615.	82	1075 Journals with 1 Citations each		1075	15864	6.78	100.00
Total				**15864**		**100.00**	

Table-15 provides rank list of journals in Biotechnology. After analyzing the data, it is found that around 2369 journals have been cited in 62 theses and the complete list is provided in the form of table.

It is found that Journal of Ethnopharmacology published from Ireland occupies the first rank as the most preferred journal having been cited 558 times followed by Fitoterapia published from Italy with second highest citations i.e. 435 citations. The third rank goes to Plant Cell Reports from Germany with 357 citations, and fourth rank to Plant Cell Tissue & Organ Culture from Netherlands with 320 citations. It is followed by Indian Journal of Pharmaceutical Science (India) with 283 citations, Indian Journal of Experimental Biology (India) with 260 citations, Phytochemistry (UK) with 234 citations, Phytopathology (USA) with 215 citations, Indian Drugs (India) with 204 citations and Planta Medica (Germany) with 187 citations. The first ten journals in the rank list together account nearly 20% of the total citations. The first 98 journals in the rank list contribute 50% of the total citations. Out of 98 journals 16 journals are from

India, which accounts 1435 (9.05%) of citations. It is also evident from the table that 75% of total citations are contributed by the first 417 journals in the rank list. The remaining 25% of citations are scattered among 2369 journals.

4.1.9 (B) Rank list of journals in Environmental Science

Table-16 shows most cited journals in the field of Environmental Science. Out of the 1780 journals, 377 journals have been cited at least 5 times or more. These 377 journals account for 8398 (79.14%) out of 10612 citations. The rest of the journals having less than 5 citations are indicated in number i.e. how many journal titles having 4 citations each? how many journal titles having 3 citations each etc.

Table- 16 Rank list of journals in Environmental Science

Sl. No	Rank	Name of the Journal	Country	Number of Citations	Cumulative Citations	%	Cumulative %
1.	1	Hydrobiologia	Netherlands	546	546	5.15	5.15
2.	2	Indian Journal of Environmental Health	India	540	1086	5.09	10.24
3.	3	Indian Journal of Environmental Protection	India	442	1528	4.17	14.40
4.	4	Pollution Research	India	349	1877	3.29	17.69
5.	5	Journal of Environmental Biology	India	193	2070	1.82	19.51
6.	6	Ecology Environment and Conservations	India	147	2217	1.39	20.90
7.	7	Environmental and Ecological Statistics	USA	140	2357	1.32	22.22
8.	8	Journal of Indian Society of Soil Science	India	135	2492	1.27	23.49
9.	9	Journal of Ecology	UK	126	2618	1.19	24.68
10.	10	Journal of Aquatic Biology	South Africa	116	2734	1.09	25.77
11.	11	Indian Journal of Environmental Pollution	India	113	2847	1.06	26.83
12.	12	Current Science	India	99	2946	0.93	27.77
13.	12	Geobios	India	99	3045	0.93	28.70
14.	13	Conservation Biology	USA	98	3143	0.92	29.62
15.	14	Journal of Inland Fish Society India	India	92	3235	0.87	30.49
16.	15	Journal of Indian Botanical Society	India	88	3323	0.83	31.32
17.	16	Phykos	India	86	3409	0.81	32.13
18.	17	Applied and Environmental Microbiology	USA	84	3493	0.79	32.92
19.	18	Archives fuer Hydrobiologie	Germany	77	3570	0.73	33.65
20.	18	Water Research	UK	77	3647	0.73	34.37
21.	19	Journal of Hazardous Materials	Netherlands	69	3716	0.65	35.02
22.	20	International Revue. Gesamtan. Hydrobiology	Germany	58	3774	0.55	35.57
23.	21	Limnology and Oceanography	USA	57	3831	0.54	36.11
24.	22	Journal of the Bombay Natural History Society	India	56	3887	0.53	36.63
25.	23	Bioresource Technology	Netherlands	51	3938	0.48	37.11
26.	24	Indian Journal of Environmental and Ecoplan	India	48	3986	0.45	37.57
27.	25	Nature Environment And Pollution	UK	47	4033	0.44	38.01
28.	26	Indian Journal of Ecology	India	46	4079	0.43	38.44
29.	26	Comparative Physiol. And Ecology	India	46	4125	0.43	38.88
30.	27	Nature	UK	45	4170	0.42	39.30
31.	28	Indian Journal of Microbiology Ecology	India	43	4213	0.41	39.71
32.	29	Journal of Ecotoxicology and Environmental Monitoring	India	42	4255	0.40	40.10
33.	30	Journal of Indian Public Health Engineering	India	38	4293	0.36	40.46
34.	30	Journal of Phys. Chemistry	USA	38	4331	0.36	40.82
35.	30	Journal of Freshwater Ecology	USA	38	4369	0.36	41.18
36.	31	Environmental Monitoring and Assessment	Netherlands	36	4405	0.34	41.51
37.	32	Journal of American Water Works Assoc	USA	35	4440	0.33	41.84
38.	33	Canadian Journal of Fisheries and Aquatic Sciences	Canada	34	4474	0.32	42.17
39.	33	Journal of Applied Bacteriology	UK	34	4508	0.32	42.49
40.	33	Science	USA	34	4542	0.32	42.81
41.	34	Indian Journal of Marine Science	India	33	4575	0.31	43.12
42.	34	Pest Management in Horticultural Ecosystem	USA	33	4608	0.31	43.43
43.	34	Water, Air and Soil Pollution	Netherlands	33	4641	0.31	43.74
44.	35	Indian Journal of Agronomy	India	32	4673	0.30	44.04
45.	35	Proc.Indian Nat.Sci.Acad.	India	32	4705	0.30	44.34
46.	36	Soil Biology and Biochemistry	UK	31	4736	0.29	44.63

Sl. No	Rank	Name of the Journal	Country	Number of Citations	Cumulative Citations	%	Cumulative %
47.	36	Journal of Groundwater	USA	31	4767	0.29	44.93
48.	37	Journal of Ecobiology	India	30	4797	0.28	45.21
49.	37	Journal of Plankton Research	UK	30	4827	0.28	45.49
50.	37	Environmental Science & Technology	Netherlands	30	4857	0.28	45.77
51.	38	Bulletin of Botanical Survey India	India	29	4886	0.27	46.05
52.	38	Geobios New Reports	India	29	4915	0.27	46.32
53.	38	Indian Journal of Agricultural Sciences	India	29	4944	0.27	46.59
54.	38	Indian Journal of Fisheries	India	29	4973	0.27	46.87
55.	38	Journal of Environmental Quality	USA	29	5002	0.27	47.14
56.	39	Chemosphere	UK	27	5029	0.25	47.40
57.	39	Madras Agricultural Journal	India	27	5056	0.25	47.65
58.	39	Soil Science	USA	27	5083	0.25	47.90
59.	39	Ground water	USA	27	5110	0.25	48.16
60.	39	Journal of Environmental Science and Engineering	Canada	27	5137	0.25	48.41
61.	40	Journal of Geological Society of Indian	India	26	5163	0.25	48.66
62.	40	Annals of Botany London	UK	26	5189	0.25	48.90
63.	40	New Phytopathology	UK	26	5215	0.25	49.15
64.	40	Copeia	USA	26	5241	0.25	49.39
65.	40	Environmental Pollution	UK	26	5267	0.25	49.64
66.	41	Indian Journal of Inland Fish Soc India	India	25	5292	0.24	49.87
67.	41	Verch. Internat. Verein. Limnology	Germany	25	5317	0.24	50.11
68.	41	Canadian Journal of Microbiology	Canada	25	5342	0.24	50.34
69.	41	Biological Conservation	UK	25	5367	0.24	50.58
70.	41	Journal of Hydrogeology	Germany	25	5392	0.24	50.82
71.	42	Tropical Ecology	India	24	5416	0.23	51.04
72.	42	Journal of Indian Water Works Association	India	23	5439	0.22	51.26
73.	43	Journal of Hydrology	Netherlands	23	5462	0.22	51.48
74.	43	International Journal of Ecology and Environmental Science	India	23	5485	0.22	51.69
75.	43	International Journal of Environmental Studies	Switzerland	23	5508	0.22	51.91
76.	43	Forest Ecology and Management	Netherlands	23	5531	0.22	52.13
77.	43	Water Science and Technology	UK	23	5554	0.22	52.34
78.	44	Journal of Environment and Ecology	India	22	5576	0.21	52.55
79.	44	Oryza	India	22	5598	0.21	52.76
80.	44	Analytica Chemica Acta	Netherlands	22	5620	0.21	52.96
81.	44	The Science of the total Environment	Netherlands	22	5642	0.21	53.17
82.	45	Trans. Br. Mycol. Soc.	UK	21	5663	0.20	53.37
83.	45	Herpetological Journal	UK	21	5684	0.20	53.57
84.	46	Indian Journal Environmental and Ecoplan	India	20	5704	0.19	53.76
85.	46	Proc. Academic Environmental Biology, India	India	20	5724	0.19	53.94
86.	46	Journal of Economic Entomology	USA	20	5744	0.19	54.13
87.	46	Dyes and Pigments	UK	20	5764	0.19	54.32
88.	46	Journal of Water Research	UK	20	5784	0.19	54.51
89.	47	Indian Journal of Environmental Science	India	19	5803	0.18	54.69
90.	47	Journal of Chemical Technology and Biotechnology	UK	19	5822	0.18	54.87
91.	47	Journal of Photochem. Photobiol. A: Chem.	Switzerland	19	5841	0.18	55.05
92.	47	Limnologica (Berlin)	Germany	19	5860	0.18	55.23

Sl. No	Rank	Name of the Journal	Country	Number of Citations	Cumulative Citations	%	Cumulative %
93.	47	Journal on Water Pollution Control Federation	USA	19	5879	0.18	55.40
94.	48	Asian Journal of Chemistry	India	18	5897	0.17	55.57
95.	48	Journal of Bombay Nat. Hist. Society	India	18	5915	0.17	55.74
96.	48	Journal of Living World	USA	18	5933	0.17	55.91
97.	48	Journal of the Institution of Public Health Engineers-India	India	18	5951	0.17	56.08
98.	48	South Indian Horticulture	India	18	5969	0.17	56.25
99.	49	Annals of Agricultural Research	India	17	5986	0.16	56.41
100.	49	Indian Journal of Botany	India	17	6003	0.16	56.57
101.	49	Journal of Industrial Pollution Control	India	17	6020	0.16	56.73
102.	49	Acta Hydrobiologica	Poland	17	6037	0.16	56.89
103.	49	Freshwater Biology	UK	17	6054	0.16	57.05
104.	49	Journal of Animal Ecology	UK	17	6071	0.16	57.21
105.	49	Journal of Hygiene Research	China	17	6088	0.16	57.37
106.	50	Crop Research Hissar	India	16	6104	0.15	57.53
107.	50	IWWA (Indian Waste Water Analysis)	India	16	6120	0.15	57.68
108.	50	Journal of Mysore University Section B	India	16	6136	0.15	57.83
109.	50	Journal of Soil and Water Conservations	USA	16	6152	0.15	57.98
110.	50	Biosciences	USA	16	6168	0.15	58.13
111.	50	Advances in Plant Science	India	16	6184	0.15	58.28
112.	50	Applied Catalysis B: Environmental	Netherlands	16	6200	0.15	58.43
113.	50	Ecological Monographs	USA	16	6216	0.15	58.58
114.	50	American Journal of Public Health	USA	16	6232	0.15	58.73
115.	50	Acta Hydrochemica et Hydrobiologica	Germany	16	6248	0.15	58.88
116.	50	Soil Science Society of American Journal	USA	16	6264	0.15	59.03
117.	51	Applied Microbiology	Japan	15	6279	0.14	59.17
118.	51	Indian Journal of Nematology	India	15	6294	0.14	59.32
119.	51	Journal of American Chemical Society	USA	15	6309	0.14	59.46
120.	51	Journal of Karnataka University Science	India	15	6324	0.14	59.60
121.	51	Pakistan Journal of Biological Sciences	Pakistan	15	6339	0.14	59.74
122.	51	Asian Journal of Molecular Biology & Biotechnology	Malaysia	15	6354	0.14	59.88
123.	51	Biomass and Bioenergy	UK	15	6369	0.14	60.02
124.	51	Environmental Toxicology & Chemistry	USA	15	6384	0.14	60.16
125.	51	Journal of Lakes and Reservoirs: Research and Management	USA	15	6399	0.14	60.31
126.	52	Indian Engineering Chem. Research	India	14	6413	0.13	60.44
127.	52	Indian Journal of Entomology	India	14	6427	0.13	60.57
128.	52	Journal of Tropical Ecology	UK	14	6441	0.13	60.70
129.	52	Botanical Review	USA	14	6455	0.13	60.83
130.	52	Plant and Soil	Netherlands	14	6469	0.13	60.96
131.	52	Ecology	UK	14	6483	0.13	61.10
132.	52	Applied Geochem	UK	14	6497	0.13	61.23
133.	52	Environmental Health Perspectives Supplement	USA	14	6511	0.13	61.36
134.	52	Archives of Environmental Contamination and Toxicology	USA	14	6525	0.13	61.49
135.	52	Journal of Food Science and Technology	India	14	6539	0.13	61.62
136.	52	Cobras	USA	14	6553	0.13	61.76
137.	53	Indian Journal of Agricultural Research	India	13	6566	0.12	61.88

Sl. No	Rank	Name of the Journal	Country	Number of Citations	Cumulative Citations	%	Cumulative %
138.	53	Indian Journal of Medical Research	India	13	6579	0.12	62.00
139.	53	Journal of Fish Res. Board Canada	Canada	13	6592	0.12	62.12
140.	53	Journal of Soil and Crops Society of Florida	USA	13	6605	0.12	62.25
141.	53	Science and Culture	India	13	6618	0.12	62.37
142.	53	The Phytoplankton Biology	USA	13	6631	0.12	62.49
143.	53	Zoos Print Journal	India	13	6644	0.12	62.61
144.	53	Biological Review	UK	13	6657	0.12	62.74
145.	53	Oecologia	Germany	13	6670	0.12	62.86
146.	53	Process Biochemistry	UK	13	6683	0.12	62.98
147.	53	Canadian Journal of Botany	Canada	13	6696	0.12	63.10
148.	53	Amphibia-Reptilia	Netherlands	13	6709	0.12	63.23
149.	53	Lancet	UK	13	6722	0.12	63.35
150.	53	Zentralblatt-fuer-Bakteriologie-Mikorbiologie-und-hygiene-B	Germany	13	6735	0.12	63.47
151.	54	Himachal Journal of Environment Zoology	India	12	6747	0.11	63.58
152.	54	Indian Hydrobiology	India	12	6759	0.11	63.70
153.	54	Journal of Nature Conservation	India	12	6771	0.11	63.81
154.	54	Tobacco Research	India	12	6783	0.11	63.92
155.	54	Agronomy Journal	USA	12	6795	0.11	64.04
156.	54	International Rice Research Notes	Philippines	12	6807	0.11	64.15
157.	54	Gayana Botany	Chile	12	6819	0.11	64.26
158.	54	Biotechnology Letters	Netherlands	12	6831	0.11	64.38
159.	54	Chemical Review	USA	12	6843	0.11	64.49
160.	54	Chemical Engineering Journal	Switzerland	12	6855	0.11	64.60
161.	54	Ecological Applications	USA	12	6867	0.11	64.72
162.	54	Fuel Processing Technology	Netherlands	12	6879	0.11	64.83
163.	54	Annals of Tourism Research	UK	12	6891	0.11	64.94
164.	54	Journal of Great Lakes Research	USA	12	6903	0.11	65.05
165.	54	Journal of Water Resource Research	USA	12	6915	0.11	65.17
166.	55	Canada Journal of Fish Aquat Science	Canada	11	6926	0.10	65.27
167.	55	Fresh Water Biol. Stn. Madras	India	11	6937	0.10	65.37
168.	55	Journal of Botanical Society London	UK	11	6948	0.10	65.48
169.	55	Mysore Journal of Agriculture Science	India	11	6959	0.10	65.58
170.	55	Biotropica	USA	11	6970	0.10	65.69
171.	55	Journal of Plant Nutrition (USA)	USA	11	6981	0.10	65.79
172.	55	E-Journal of Chemistry	Germany	11	6992	0.10	65.89
173.	55	Environmental Geology (Berlin)	Germany	11	7003	0.10	66.00
174.	55	Geochemical et Cosmochemic Acta	UK	11	7014	0.10	66.10
175.	55	Journal of Environment Science and Pollution	USA	11	7025	0.10	66.20
176.	56	African Journal of Biotechnology	South Africa	10	7035	0.09	66.30
177.	56	Bulletin of Grain Tech	India	10	7045	0.09	66.39
178.	56	Canadian Journal of Soil Science	Canada	10	7055	0.09	66.49
179.	56	Ekol. Pollution	Slovakia	10	7065	0.09	66.58
180.	56	Fertilizer News	India	10	7075	0.09	66.68
181.	56	Journal of Current Biological Science	USA	10	7085	0.09	66.77
182.	56	Journal of Institution of Water Engineering	India	10	7095	0.09	66.86
183.	56	Journal of Zoology London	UK	10	7105	0.09	66.96
184.	56	Soil Science Plant Nutrition	Japan	10	7115	0.09	67.05
185.	56	Trans. American Microso. Soc	USA	10	7125	0.09	67.15
186.	56	Agriculture Ecosystems and Environment	Netherlands	10	7135	0.09	67.24

Sl. No	Rank	Name of the Journal	Country	Number of Citations	Cumulative Citations	%	Cumulative %
187.	56	Journal of Agricultural Sciences	UK	10	7145	0.09	67.33
188.	56	Biology & Fertility of Soils	Germany	10	7155	0.09	67.43
189.	56	Legume Research	India	10	7165	0.09	67.52
190.	56	Diversity and Distributions	UK	10	7175	0.09	67.62
191.	56	Plant Physiol. Lancaster	USA	10	7185	0.09	67.71
192.	56	Turkish Journal of Botany	Turkish	10	7195	0.09	67.81
193.	56	Environment Geol. And Water Sciences	Germany	10	7205	0.09	67.90
194.	56	Reviews of Geophysics	USA	10	7215	0.09	67.99
195.	56	Hydrological Sciences Journal	UK	10	7225	0.09	68.09
196.	56	Crop Protection	UK	10	7235	0.09	68.18
197.	56	Separation and Purification Technology	UK	10	7245	0.09	68.28
198.	56	Ecology of Polluted Waters	USA	10	7255	0.09	68.37
199.	56	Water Environmental Research	USA	10	7265	0.09	68.47
200.	56	Journal of Biogeography	UK	10	7275	0.09	68.56
201.	56	Agriculture Decisions	USA	10	7285	0.09	68.65
202.	56	Fishing & Hunting News	USA	10	7295	0.09	68.75
203.	56	Journal of Water Science & Technology	UK	10	7305	0.09	68.84
204.	56	Water Resources Research	USA	10	7315	0.09	68.94
205.	57	Annals of Plant Protection Sciences	India	9	7324	0.08	69.02
206.	57	Journal of Maharastra Agricultural Universities	India	9	7333	0.08	69.11
207.	57	Pedobiologia	Germany	9	7342	0.08	69.19
208.	57	American Journal of Botany	USA	9	7351	0.08	69.28
209.	57	Annual Review of Entomology	USA	9	7360	0.08	69.36
210.	57	Orient Journal of Chemistry	India	9	7369	0.08	69.45
211.	57	Aquatic Toxicology	Netherlands	9	7378	0.08	69.53
212.	57	Gigiena-i-Sanitariya	Russia	9	7387	0.08	69.62
213.	57	Journal of Travel Research	USA	9	7396	0.08	69.70
214.	57	Regulated Rivers: Research and Management	UK	9	7405	0.08	69.78
215.	58	Biodiversity and Conservation	Netherlands	8	7413	0.08	69.86
216.	58	Bulletin of Canada Institute Min. Metal	Canada	8	7421	0.08	69.94
217.	58	Bulletin of Environmental Science	India	8	7429	0.08	70.01
218.	58	Bulletin of III Station Lab. Nat. History	India	8	7437	0.08	70.09
219.	58	Indian Journal of Geological Society of India	India	8	7445	0.08	70.16
220.	58	Indian Journal of Horticulture	India	8	7453	0.08	70.24
221.	58	Indian Phytopathology	India	8	7461	0.08	70.31
222.	58	Journal of the American Waterworks Association	USA	8	7469	0.08	70.39
223.	58	Applied Microbiology and Biotechnology	Germany	8	7477	0.08	70.46
224.	58	Journal of Phycology	USA	8	7485	0.08	70.54
225.	58	Phytopathology	USA	8	7493	0.08	70.61
226.	58	Journal of Applied Microbiology	UK	8	7501	0.08	70.69
227.	58	Solar Energy Materials and Solar Cells	Netherlands	8	7509	0.08	70.76
228.	58	Journal of Environmental Science & Technology	USA	8	7517	0.08	70.84
229.	58	Journal of Environmental Education	USA	8	7525	0.08	70.92
230.	58	Oikos	Denmark	8	7533	0.08	70.99
231.	58	Compost Science and Utilization	USA	8	7541	0.08	71.07
232.	58	Waste Management	UK	8	7549	0.08	71.14
233.	58	Journal of Food Protection	USA	8	7557	0.08	71.22
234.	58	Journal of Elisha Mitchell Scientific Soc.	USA	8	7565	0.08	71.29

Sl. No	Rank	Name of the Journal	Country	Number of Citations	Cumulative Citations	%	Cumulative %
235.	58	Water SA	South Africa	8	7573	0.08	71.37
236.	59	Cairo Bull Inst. Egypt	Egypt	7	7580	0.07	71.43
237.	59	Geological Society of India Mem	India	7	7587	0.07	71.50
238.	59	India Journal of Hydrobiology	India	7	7594	0.07	71.57
239.	59	Journal of Current Science	India	7	7601	0.07	71.63
240.	59	Journal of Indian Assoc. for Environment Management	India	7	7608	0.07	71.70
241.	59	Journal of Linn. Soc. Botany	UK	7	7615	0.07	71.76
242.	59	Journal of Madurai Univ. Supplement	India	7	7622	0.07	71.83
243.	59	Journal of Orchid Soc. India	India	7	7629	0.07	71.90
244.	59	Journal of Scientific and Industrial Research	India	7	7636	0.07	71.96
245.	59	Karnataka Journal of Agricultural Sciences	India	7	7643	0.07	72.03
246.	59	Plant Protection Bulletin Taiwan	Taiwan	7	7650	0.07	72.09
247.	59	Proc. Int. Ass. Limnology	Japan	7	7657	0.07	72.16
248.	59	Proc. Roy. Soc. London	UK	7	7664	0.07	72.23
249.	59	Scientific American	USA	7	7671	0.07	72.29
250.	59	Nematologica Mediterranea	Italy	7	7678	0.07	72.36
251.	59	Animal Feed Science and Technology	Netherlands	7	7685	0.07	72.42
252.	59	Aquatic Ecology	Netherlands	7	7692	0.07	72.49
253.	59	Revista Brasileira de Biologia	Brazil	7	7699	0.07	72.56
254.	59	Aquatic Botany	Netherlands	7	7706	0.07	72.62
255.	59	Bulletin of Entomological Research	UK	7	7713	0.07	72.69
256.	59	Entomologia Experimentalis et Applicata	Netherlands	7	7720	0.07	72.75
257.	59	Environmental Entomology	USA	7	7727	0.07	72.82
258.	59	Epidemiology and Infection	UK	7	7734	0.07	72.89
259.	59	Hamadryad	India	7	7741	0.07	72.95
260.	59	Aquatic Sciences	Switzerland	7	7748	0.07	73.02
261.	59	Japanese Journal of Limnology	Japan	7	7755	0.07	73.08
262.	59	New Zealand Journal of Marine and Freshwater Research	New Zealand	7	7762	0.07	73.15
263.	59	Combustion & Flame	USA	7	7769	0.07	73.21
264.	59	Annual Review of Ecology and Systematics	USA	7	7776	0.07	73.28
265.	59	Environmentalist	USA	7	7783	0.07	73.35
266.	59	Atmospheric Environment	UK	7	7790	0.07	73.41
267.	59	Journal of the Water Pollution Control Federation	USA	7	7797	0.07	73.48
268.	59	Desalination	Netherlands	7	7804	0.07	73.54
269.	59	Water International	USA	7	7811	0.07	73.61
270.	59	Water Supply and Management	UK	7	7818	0.07	73.68
271.	60	Ann. Mag. Natur. Hist.	USA	6	7824	0.06	73.73
272.	60	Annals of the Entomological Society of America	USA	6	7830	0.06	73.79
273.	60	Bhu. Jal News	India	6	7836	0.06	73.85
274.	60	Biological Wastes	USA	6	7842	0.06	73.90
275.	60	Bioved	India	6	7848	0.06	73.96
276.	60	Bulletin of Geol. Surv. Ind. Sor.	India	6	7854	0.06	74.02
277.	60	De.Che. Miana Germany	Germany	6	7860	0.06	74.07
278.	60	Egyptian Journal of Agricultural Research	Egypt	6	7866	0.06	74.13
279.	60	Indian Journal of Experimental Biology	India	6	7872	0.06	74.19
280.	60	Indian Journal of Forestry	India	6	7878	0.06	74.24
281.	60	Indian Journal of Pulses Research	India	6	7884	0.06	74.30

Sl. No	Rank	Name of the Journal	Country	Number of Citations	Cumulative Citations	%	Cumulative %
282.	60	Journal of Biosciences	India	6	7890	0.06	74.36
283.	60	Journal of Chem Soc Faraday Trans	USA	6	7896	0.06	74.41
284.	60	Journal of Entomological Research	India	6	7902	0.06	74.47
285.	60	Journal of Zoological Society India	India	6	7908	0.06	74.52
286.	60	Nat. Hist. Survey Bulletin USA	USA	6	7914	0.06	74.58
287.	60	Parlowia	USA	6	7920	0.06	74.64
288.	60	Research Journal of Chemistry and Environment	USA	6	7926	0.06	74.69
289.	60	Yojana	India	6	7932	0.06	74.75
290.	60	Tropical Agriculture	Trinidad & Tobago	6	7938	0.06	74.81
291.	60	Geoderma	Netherlands	6	7944	0.06	74.86
292.	60	American Naturalist	USA	6	7950	0.06	74.92
293.	60	Bionature	India	6	7956	0.06	74.98
294.	60	Ecology Letters	UK	6	7962	0.06	75.03
295.	60	Biotechnology & Bioengineering	USA	6	7968	0.06	75.09
296.	60	Lichenologist	UK	6	7974	0.06	75.15
297.	60	Mycologia	USA	6	7980	0.06	75.20
298.	60	Physiologia Plantarum	Denmark	6	7986	0.06	75.26
299.	60	Journal of Plant and Soil	Netherlands	6	7992	0.06	75.32
300.	60	Acta Entomologica Sinica	China	6	7998	0.06	75.37
301.	60	Journal of Stored Prod. Research	UK	6	8004	0.06	75.43
302.	60	Letters in Applied Microbiology	UK	6	8010	0.06	75.49
303.	60	Journal of General Microbiology	UK	6	8016	0.06	75.54
304.	60	Raffles Bulletin of Zoology	Singapore	6	8022	0.06	75.60
305.	60	Journal of Catalysis	USA	6	8028	0.06	75.66
306.	60	Froglog	Switzerland	6	8034	0.06	75.71
307.	60	Turkish Journal of Engineering Environment Science	Turkish	6	8040	0.06	75.77
308.	60	Environmental Management	USA	6	8046	0.06	75.83
309.	60	Journal of Environmental Management	UK	6	8052	0.06	75.88
310.	60	Environ. Poll. Ser. Ecol. Biology	Netherlands	6	8058	0.06	75.94
311.	60	Bulletin of Environmental Contamination and Toxicology	USA	6	8064	0.06	75.99
312.	60	Ann. Arbar Michigan	USA	6	8070	0.06	76.05
313.	60	Louisiana Municipal Review	USA	6	8076	0.06	76.11
314.	60	Bundesgesundheitsblatt-Gesundheits-forshung-Gesundheitsschut	Germany	6	8082	0.06	76.16
315.	60	Cicni. Cult. Brazil	Brazil	6	8088	0.06	76.22
316.	61	Australian Journal Marine Freshwater Research	Australia	5	8093	0.05	76.27
317.	61	Bangladesh Journal of Zoology	Bangladesh	5	8098	0.05	76.32
318.	61	Beil Forsch. Tech. New Zurcher Z	Germany	5	8103	0.05	76.36
319.	61	Bulletin of Cen. Inland Fish Res. Inst. Barrackpore	India	5	8108	0.05	76.41
320.	61	Canadian Journal of Forest Research	Canada	5	8113	0.05	76.46
321.	61	Canadian Journal of Zoology	Canada	5	8118	0.05	76.50
322.	61	Chinese Bulletin of Entomology	China	5	8123	0.05	76.55
323.	61	Food Microbiology	UK	5	8128	0.05	76.60
324.	61	ILL. Nat. Hist. Surv. Bulletin	USA	5	8133	0.05	76.65
325.	61	Indian Agriculturist	India	5	8138	0.05	76.69

Sl. No	Rank	Name of the Journal	Country	Number of Citations	Cumulative Citations	%	Cumulative %
326.	61	Indian Association of Aquatic Biologists	India	5	8143	0.05	76.74
327.	61	Indian Botanical Contractor	India	5	8148	0.05	76.79
328.	61	Indian Journal of Biology	India	5	8153	0.05	76.83
329.	61	Indian Journal of Geochem	India	5	8158	0.05	76.88
330.	61	Indian Veterinary Journal	India	5	8163	0.05	76.93
331.	61	Journal of ASCE Sanitary Engineering Div	USA	5	8168	0.05	76.97
332.	61	Journal of Chron. Dis	Netherlands	5	8173	0.05	77.02
333.	61	Journal of Indian Institute of Science	India	5	8178	0.05	77.07
334.	61	Journal of Indian Society Remote Sensing	India	5	8183	0.05	77.12
335.	61	Madras Journal Fish	India	5	8188	0.05	77.16
336.	61	Poll. Arch. Hydrobiologia	Germany	5	8193	0.05	77.21
337.	61	Trans. Am. Fish. Soc. Spcl. Publ.	USA	5	8198	0.05	77.26
338.	61	Plant Disease	USA	5	8203	0.05	77.30
339.	61	Acta Scientiarium: Biological Sciences	Brazil	5	8208	0.05	77.35
340.	61	Biological Invasions	Netherlands	5	8213	0.05	77.40
341.	61	Journal of Biological Research Report Uni. Jyyaskyta	Italy	5	8218	0.05	77.45
342.	61	Trends in Ecology and Evoluation	UK	5	8223	0.05	77.49
343.	61	Journal of Biological Chemistry	USA	5	8228	0.05	77.54
344.	61	Acta Botanical Indica	India	5	8233	0.05	77.59
345.	61	Aquatic Ecosystem Health and Management	UK	5	8238	0.05	77.63
346.	61	Biologia (BRATISL) Plantrum	Netherlands	5	8243	0.05	77.68
347.	61	Economic Botany	USA	5	8248	0.05	77.73
348.	61	Pakistan Journal of Botany	Pakistan	5	8253	0.05	77.78
349.	61	Australian Journal of Entomology	Australia	5	8258	0.05	77.82
350.	61	Florida Entomologiste	USA	5	8263	0.05	77.87
351.	61	Journal of Applied Entomology	Germany	5	8268	0.05	77.92
352.	61	Journal of Insect Behavior	USA	5	8273	0.05	77.96
353.	61	Journal of Fish Biology	UK	5	8278	0.05	78.01
354.	61	Pakistan Journal of Zoology	Pakistan	5	8283	0.05	78.06
355.	61	Pure and Applied Chemistry	USA	5	8288	0.05	78.11
356.	61	International Journal of Environmental Analytical Chemistry	Switzerland	5	8293	0.05	78.15
357.	61	Journal of Photochemistry	USA	5	8298	0.05	78.20
358.	61	Landscape and Urban Planning	Netherlands	5	8303	0.05	78.25
359.	61	American Journal of Science	USA	5	8308	0.05	78.29
360.	61	Limnology	Japan	5	8313	0.05	78.34
361.	61	Acta Ecologica	India	5	8318	0.05	78.39
362.	61	Advances in Ecological Research	USA	5	8323	0.05	78.44
363.	61	International Journal of Environmental Science	Switzerland	5	8328	0.05	78.48
364.	61	Japanese Journal of Ecology	Japan	5	8333	0.05	78.53
365.	61	Journal of Chemical Ecology	USA	5	8338	0.05	78.58
366.	61	CRC Critical Reviews in Environmental Control	USA	5	8343	0.05	78.62
367.	61	Biocycle	USA	5	8348	0.05	78.67
368.	61	FAO Fish Report	USA	5	8353	0.05	78.72
369.	61	Fishery Technology	India	5	8358	0.05	78.77
370.	61	The Cashew	India	5	8363	0.05	78.81
371.	61	Fluoride	New Zealand	5	8368	0.05	78.86

Sl. No	Rank	Name of the Journal	Country	Number of Citations	Cumulative Citations	%	Cumulative %
372.	61	Hydrology Metallurgy	Netherlands	5	8373	0.05	78.91
373.	61	Schweiz Z Hydrol	Switzerland	5	8378	0.05	78.95
374.	61	Transactions Wisconsin Acad Sci Arts and Letters	USA	5	8383	0.05	79.00
375.	61	Norsk-Veterinaertidsskrift	Norway	5	8388	0.05	79.05
376.	61	Journal of Applied Sciences	USA	5	8393	0.05	79.10
377.	61	Agrobios	India	5	8398	0.05	79.14
378.	62	91Journals with 4 Citations each		364	8762	3.43	82.57
379.	63	119 Journals with 3 Citations each		357	9119	3.36	85.93
380.	64	300 Journals with 2 Citations each		600	9719	5.65	91.58
381.	65	893 Journals with 1 Citations each		893	10612	8.42	100.00
Total				**10612**		**100.00**	

In the rank list of journals, Hydrobiologia occupies the first rank accounting to 546 (5.15%) citations, followed by Indian Journal of Environmental Health with 540 (5.09%) citations, Indian Journal of Environmental Protection with 442 (4.17%) and Pollution Research with 349 (3.29%) citations. It is very interesting to note that among the top ten journals, 6 journals are from India ranked from 2 to 5, and 8 in the list. It is observed that 50.11% of citations are from 67 journals and out of 67 journals 30 journals are from India which accounts 3023 (28.49%) citations.

4.1.9 (C) Rank list of journals in Applied Botany

Table-17 lists the journals cited by researchers in Applied Botany subject. Out of the 1567 journals, 324 journals have been cited at least 5 times or more. These 324 journals account for 6454 (76.74%) out of 8411 citations. The first 50 journals accounted for nearly 44% citations and 274 journals which are listed from serial number 51 to 324 in the rank list accounts more than 32% citations. The remaining 1243 journals with 1957 (23.26%) citations have less than 5 citations each.

Table-17 Rank list of journals in Applied Botany

Sl. No	Rank	Name of the Journal	Country	Number of Citations	Cumulative Citations	%	Cumulative %
1.	1	Indian Phytopathology	India	495	495	5.89	5.89
2.	2	Phytopathology	USA	356	851	4.23	10.12
3.	3	Indian Journal of Mycology and Plant Pathology	India	232	1083	2.76	12.88
4.	4	Plant Disease	USA	182	1265	2.16	15.04
5.	5	Indian Forester	India	154	1419	1.83	16.88
6.	6	Current Science	India	141	1560	1.68	18.55
7.	7	Hydrobiologia	Netherlands	120	1680	1.43	19.98
8.	8	Journal of Ecology	UK	81	1761	0.96	20.94
9.	9	Seed Science & Technology	Switzerland	75	1836	0.89	21.83
10.	10	Journal of Ethnopharmacology	Ireland	74	1910	0.88	22.71
11.	11	Plant Disease Research	India	72	1982	0.86	23.57
12.	12	Plant Pathology	Korea	71	2053	0.84	24.41
13.	13	Applied and Environmental Microbiology	USA	70	2123	0.83	25.25
14.	14	Journal of Mycology Series	USA	68	2191	0.81	26.05
15.	15	Indian Journal of Agricultural Science	India	67	2258	0.80	26.85
16.	16	Crop Science	USA	57	2315	0.68	27.53
17.	17	Indian Journal of Traditional Knowledge	India	56	2371	0.67	28.19
18.	18	Phykos	India	55	2426	0.65	28.85
19.	19	Journal of Medicinal and Aromatic Plant Sciences	India	55	2481	0.65	29.50
20.	20	Phytochemistry	UK	49	2530	0.58	30.08
21.	21	Journal of Indian Botanical Society	India	48	2578	0.57	30.66
22.	21	Seed Science Research	UK	48	2626	0.57	31.23
23.	22	Mycopathologia	Netherlands	47	2673	0.56	31.78
24.	23	Journal of Tropical Ecology	UK	46	2719	0.55	32.33
25.	24	Proc. Indian Nat. Sci. Acad.	India	45	2764	0.54	32.87
26.	25	Indian Journal of Environmental Health	India	44	2808	0.52	33.39
27.	26	Nature	UK	43	2851	0.51	33.90
28.	27	Science	USA	42	2893	0.50	34.40
29.	28	Plant Physiology	USA	41	2934	0.49	34.89
30.	29	Madras Agric Journal	India	39	2973	0.46	35.35
31.	30	Journal of Indian Soc.Cotton Improve	India	38	3011	0.45	35.80
32.	30	Transactions of the British Mycological Society	UK	38	3049	0.45	36.25
33.	30	Journal of Ethnobiology	USA	38	3087	0.45	36.71
34.	31	Journal of Coffee Research	India	37	3124	0.44	37.15
35.	31	Annual Review of Phyopathology	USA	37	3161	0.44	37.59
36.	31	Theoretical & Applied Genetics	Germany	37	3198	0.44	38.03
37.	32	Applied Microbiology	Japan	36	3234	0.43	38.45
38.	32	South Indian Horticulture	India	36	3270	0.43	38.88
39.	33	Canadian Journal of Botany	Canada	35	3305	0.42	39.30
40.	33	Mycologia	USA	35	3340	0.42	39.71
41.	34	Euphytica	Netherlands	34	3374	0.40	40.12
42.	34	Journal of Indian Microbial	India	34	3408	0.40	40.52
43.	34	Bio-Tropica	USA	34	3442	0.40	40.93
44.	35	Indian Journal of Agronomy	India	32	3474	0.38	41.31
45.	35	Seed Research	India	32	3506	0.38	41.69
46.	36	Journal of Indian Society of Soil Science	India	31	3537	0.37	42.06
47.	37	Indian Journal of Experimental Biology	India	29	3566	0.34	42.40

Sl. No	Rank	Name of the Journal	Country	Number of Citations	Cumulative Citations	%	Cumulative %
48.	37	Journal of Inland Fish Soc India	India	29	3595	0.34	42.75
49.	38	Indian Coffee	India	28	3623	0.33	43.08
50.	38	Indian Journal of Ecology	India	28	3651	0.33	43.41
51.	38	Journal of Environmental Biology	India	28	3679	0.33	43.75
52.	38	Journal of Vegetation Science	Switzerland	28	3707	0.33	44.08
53.	39	Annals of Applied Biology	UK	27	3734	0.32	44.40
54.	40	Indian Farming	India	26	3760	0.31	44.71
55.	40	Economic Botany	USA	26	3786	0.31	45.02
56.	40	Planta Medica	Germany	26	3812	0.31	45.33
57.	41	Canadian Journal of Plant Pathology	Canada	25	3837	0.30	45.62
58.	41	Pesticides Abstracts	USA	25	3862	0.30	45.92
59.	42	International Rice Research Newsletter	Philippines	24	3886	0.29	46.21
60.	42	New Phytologist	UK	24	3910	0.29	46.49
61.	42	Letters in Applied Microbiology	UK	24	3934	0.29	46.78
62.	42	International Journal of Remote Sensing	UK	24	3958	0.29	47.06
63.	43	Indian Council for Agril Research	India	23	3981	0.27	47.34
64.	43	Indian Journal of Genetics	India	23	4004	0.27	47.61
65.	44	Bulletin of Botanical Survey of India	India	22	4026	0.26	47.87
66.	44	Indian Journal of Agriculture Economics	India	22	4048	0.26	48.13
67.	44	Journal of Maharashtra Agricultural Universities	India	22	4070	0.26	48.39
68.	44	Mysore Journal of Agricultural Sciences	India	22	4092	0.26	48.66
69.	44	American Journal of Botany	USA	22	4114	0.26	48.92
70.	45	Advance in Plant Science	India	21	4135	0.25	49.17
71.	45	Journal of Plantation Crops	India	21	4156	0.25	49.42
72.	45	Journal of Agriculture Research	Taiwan	21	4177	0.25	49.67
73.	45	Fitoterapia	Italy	21	4198	0.25	49.92
74.	45	Plant and Soil	Netherlands	21	4219	0.25	50.17
75.	45	International Journal of Syst. Bacteriology	UK	21	4240	0.25	50.42
76.	45	Journal of Bacteriology	USA	21	4261	0.25	50.66
77.	45	Horticulture Science	Czech Republic	21	4282	0.25	50.91
78.	46	Oryza	India	20	4302	0.24	51.15
79.	46	Pollution Research	India	20	4322	0.24	51.39
80.	46	World Journal of Microbiology and Biotechnology	UK	20	4342	0.24	51.63
81.	47	Journal of Bombay Nat History Society	India	19	4361	0.23	51.85
82.	47	Journal of Economic and Taxonomical Botany	India	19	4380	0.23	52.08
83.	47	Annual Review of Ecology and Systematics	USA	19	4399	0.23	52.31
84.	47	Plant Science	USA	19	4418	0.23	52.53
85.	48	Indian Journal of Plant Protection	India	18	4436	0.21	52.75
86.	48	Science and Culture	India	18	4454	0.21	52.96
87.	48	Oecologia	Germany	18	4472	0.21	53.17
88.	48	Annals of Botany	UK	18	4490	0.21	53.39
89.	48	Bryologist	USA	18	4508	0.21	53.60
90.	48	Canadian Journal of Microbiology	Canada	18	4526	0.21	53.82
91.	48	Journal of Food Protection	USA	18	4544	0.21	54.03
92.	49	Advance in Agronomy	USA	17	4561	0.20	54.23
93.	49	Journal of Agriculture and Food Chemistry	USA	17	4578	0.20	54.43

Sl. No	Rank	Name of the Journal	Country	Number of Citations	Cumulative Citations	%	Cumulative %
94.	49	Nucleic Acids Research	UK	17	4595	0.20	54.64
95.	49	Acta Horticulturae	Belgium	17	4612	0.20	54.84
96.	49	Science & Technology	USA	17	4629	0.20	55.04
97.	50	Annals of Phytopathological Society of Japan	Japan	16	4645	0.19	55.23
98.	50	Millet News Letter	India	16	4661	0.19	55.42
99.	50	Proc. Ind. Acad. Sci. Plant Science Journal	India	16	4677	0.19	55.61
100.	50	Lichenologist	UK	16	4693	0.19	55.80
101.	50	Biodiversity & Conservation	Netherlands	16	4709	0.19	55.99
102.	51	Ecology Environment and Conservations	India	15	4724	0.18	56.17
103.	51	Karnataka Journal of Agricultural Sciences	India	15	4739	0.18	56.35
104.	51	Botanical Review	USA	15	4754	0.18	56.53
105.	51	Genetic Resources & Crop Evaluation	Netherlands	15	4769	0.18	56.70
106.	51	Arch Hydrobiolgia	Germany	15	4784	0.18	56.88
107.	52	Crop Research Hissar	India	14	4798	0.17	57.05
108.	52	International Rev Ges Hydrobiol Hydrogr	Germany	14	4812	0.17	57.22
109.	52	Journal of American Oil Chemists Soc	USA	14	4826	0.17	57.38
110.	52	Journal of American Soc. Hort. Sci.	USA	14	4840	0.17	57.55
111.	52	African Journal of Biotechnology	South Africa	14	4854	0.17	57.71
112.	52	European Journal of Plant Pathology	Netherlands	14	4868	0.17	57.88
113.	52	Global Ecology & Biogeography Letters	UK	14	4882	0.17	58.05
114.	52	Oikos	Denmark	14	4896	0.17	58.21
115.	53	Journal of Asiatic Soc. Bengal	India	13	4909	0.15	58.37
116.	53	Mycotaxonomy	USA	13	4922	0.15	58.52
117.	53	Biological Conservation	UK	13	4935	0.15	58.68
118.	53	Enzyme & Microbi. Biotechnology	USA	13	4948	0.15	58.83
119.	53	Phytotheraphy Research	UK	13	4961	0.15	58.99
120.	53	Crop Protection	UK	13	4974	0.15	59.14
121.	53	Geophytology	India	13	4987	0.15	59.30
122.	53	Pharmacological Research	UK	13	5000	0.15	59.45
123.	54	Fertilizer News	India	12	5012	0.14	59.59
124.	54	Indian Journal of Agricultural Research	India	12	5024	0.14	59.74
125.	54	Plant Protection Bulletin Taiwan	Taiwan	12	5036	0.14	59.88
126.	54	In Vitro Cellular and Development Biology Plant	USA	12	5048	0.14	60.02
127.	54	Pakistan Journal of Botany	Pakistan	12	5060	0.14	60.16
128.	54	Journal of Applied Bacteriology	UK	12	5072	0.14	60.31
129.	54	Chemical & Pharmaceutical Bulletin	Japan	12	5084	0.14	60.45
130.	54	Natural Product Research	China	12	5096	0.14	60.59
131.	54	Journal of Cotton Digest International	USA	12	5108	0.14	60.73
132.	55	Indian Journal of Gentetics and Plant Breeding	India	11	5119	0.13	60.87
133.	55	Indian Journal of Soil Conservation	India	11	5130	0.13	61.00
134.	55	Journal of Science Food & Agriculture	Netherlands	11	5141	0.13	61.13
135.	55	Soil Science Society American Journal	USA	11	5152	0.13	61.26
136.	55	Journal of Biological Chemistry	USA	11	5163	0.13	61.39
137.	55	Annals of Botany	UK	11	5174	0.13	61.52
138.	55	Fungal Genetics and Biology	USA	11	5185	0.13	61.65
139.	55	Plant Cell Reports	Germany	11	5196	0.13	61.78
140.	55	Journal of General Microbiology	UK	11	5207	0.13	61.91
141.	55	Journal of Tropical Forest Science	Malaysia	11	5218	0.13	62.04

Sl. No	Rank	Name of the Journal	Country	Number of Citations	Cumulative Citations	%	Cumulative %
142.	56	Agricultural Science Digest	India	10	5228	0.12	62.16
143.	56	Indian Journal of Horticulture	India	10	5238	0.12	62.28
144.	56	Indian Journal of Plant Physiology	India	10	5248	0.12	62.40
145.	56	Journal of Food Science & Technology	India	10	5258	0.12	62.52
146.	56	Journal of Mycology and Plant Pathology	India	10	5268	0.12	62.64
147.	56	Journal of Spices and Aromatic Crops	India	10	5278	0.12	62.76
148.	56	Netherlands of Journal of Plant Pathology	Netherlands	10	5288	0.12	62.87
149.	56	Phytomorphology	India	10	5298	0.12	62.99
150.	56	Tobacco Research	India	10	5308	0.12	63.11
151.	56	Journal of Agronomy & Crop Science	Germany	10	5318	0.12	63.23
152.	56	Ethnobotany	India	10	5328	0.12	63.35
153.	56	Journal of Plant Nutrition	USA	10	5338	0.12	63.47
154.	56	Plant Cell Tiss. & Org. Culture	Netherlands	10	5348	0.12	63.59
155.	56	Conservation Biology	USA	10	5358	0.12	63.71
156.	56	Ecology Monographs	USA	10	5368	0.12	63.83
157.	57	Australian Centre for International Agricultural Proceedings	Australia	9	5377	0.11	63.93
158.	57	Geobios New Reports	India	9	5386	0.11	64.04
159.	57	Journal of the Orchid Society of India	India	9	5395	0.11	64.15
160.	57	Kenya Coffee	Kenya	9	5404	0.11	64.25
161.	57	Proc Nat. Acad. Sci. USA	USA	9	5413	0.11	64.36
162.	57	International Journal of Agricultural & Biology	Switzerland	9	5422	0.11	64.47
163.	57	Journal of Oilseed Research	Australia	9	5431	0.11	64.58
164.	57	Journal of Biochemical & Biophysical Methods	Netherlands	9	5440	0.11	64.68
165.	57	Biochemistry Journal	Japan	9	5449	0.11	64.79
166.	57	Biotechnology Letters	Netherlands	9	5458	0.11	64.90
167.	57	Plant Ecology	Netherlands	9	5467	0.11	65.00
168.	57	FEMS Microbiological Review	Netherlands	9	5476	0.11	65.11
169.	57	Molecular Ecology	UK	9	5485	0.11	65.22
170.	57	Food Chemistry	UK	9	5494	0.11	65.32
171.	57	Ecology	USA	9	5503	0.11	65.43
172.	57	Forest Ecology & Management	Netherlands	9	5512	0.11	65.54
173.	57	Scientia Horticulturae	Netherlands	9	5521	0.11	65.65
174.	57	Journal of Biogeography	UK	9	5530	0.11	65.75
175.	57	Current Research	UK	9	5539	0.11	65.86
176.	57	Journal of Natural Products	USA	9	5548	0.11	65.97
177.	57	Global Biogeochemical Cycles	USA	9	5557	0.11	66.07
178.	57	Journal of Applied Sciences in Environmental Sanitation	China	9	5566	0.11	66.18
179.	57	Water Research	UK	9	5575	0.11	66.29
180.	58	Indian Journal of Fertilizer	India	8	5583	0.10	66.38
181.	58	Journal of Research ANGRAU	India	8	5591	0.10	66.48
182.	58	Proc. Roy. Soc London	UK	8	5599	0.10	66.57
183.	58	Plant Cell And Environment	UK	8	5607	0.10	66.67
184.	58	Molecular Plant Microbe Interaction	USA	8	5615	0.10	66.76
185.	58	Soil Biology and Biochemistry	UK	8	5623	0.10	66.86
186.	58	Journal of Biotechnology	Netherlands	8	5631	0.10	66.95
187.	58	Australian Journal of Plant Physiology	Australia	8	5639	0.10	67.05
188.	58	Fitopathologia	Peru	8	5647	0.10	67.14

Sl. No	Rank	Name of the Journal	Country	Number of Citations	Cumulative Citations	%	Cumulative %
189.	58	Systematic and Applied Microbiology	Germany	8	5655	0.10	67.24
190.	58	Environmental and Ecological Statistics	USA	8	5663	0.10	67.33
191.	58	Nat Env and Pollution Technology	UK	8	5671	0.10	67.43
192.	58	Journal of Herbs, Species and Medicinal Plants	USA	8	5679	0.10	67.52
193.	58	Journal of Ornamental Horticulture	UK	8	5687	0.10	67.62
194.	58	Phytomedicine	Germany	8	5695	0.10	67.71
195.	58	Pharmaceutical Biology	Netherlands	8	5703	0.10	67.81
196.	59	Andhra Agricultural Journal	India	7	5710	0.08	67.89
197.	59	Botanical Survey India	India	7	5717	0.08	67.98
198.	59	Botany Gazzet	Japan	7	5724	0.08	68.06
199.	59	Indian Journal of Arecanut Spices and Medicinal Plants	India	7	5731	0.08	68.14
200.	59	Indian Journal of Pharmacology	India	7	5738	0.08	68.23
201.	59	Indian Perfumer	India	7	5745	0.08	68.31
202.	59	Journal of Plant Disease Science	India	7	5752	0.08	68.39
203.	59	Journal of Tropical Agriculture	India	7	5759	0.08	68.47
204.	59	Myforest	India	7	5766	0.08	68.56
205.	59	JNKVV Research Journal	India	7	5773	0.08	68.64
206.	59	Annals of Agriculture Science	Poland	7	5780	0.08	68.72
207.	59	Journal of Agric Engineering Research	UK	7	5787	0.08	68.81
208.	59	Soil Science and Plant Nutrition	Japan	7	5794	0.08	68.89
209.	59	Plant Molecular Biology Reporter	Netherlands	7	5801	0.08	68.97
210.	59	Applied Microbiology and Biotechnology	Germany	7	5808	0.08	69.06
211.	59	Biotechnology Advances	USA	7	5815	0.08	69.14
212.	59	Annual Review of Plant Physiology Plant Molecular Biology	USA	7	5822	0.08	69.22
213.	59	Annual Review of Plant Physiology	USA	7	5829	0.08	69.31
214.	59	International Journal of Tropical Plant Diseases	India	7	5836	0.08	69.39
215.	59	Journal of Experimental Botany	UK	7	5843	0.08	69.47
216.	59	Nova Hedwigia	Germany	7	5850	0.08	69.56
217.	59	Tree Physiology	Canada	7	5857	0.08	69.64
218.	59	Acta Phytopathologica Sinica	China	7	5864	0.08	69.72
219.	59	Journal of Stored Products Research	UK	7	5871	0.08	69.81
220.	59	Journal of Microbiological Ecology	USA	7	5878	0.08	69.89
221.	59	Microbiological Review	USA	7	5885	0.08	69.97
222.	59	Comparative Physiology & Ecology	India	7	5892	0.08	70.06
223.	59	Journal of AOAC	USA	7	5899	0.08	70.14
224.	59	International Journal of Ecology and Environ. Science	India	7	5906	0.08	70.22
225.	59	Journal of Environmental Science & Pollution	USA	7	5913	0.08	70.31
226.	59	Food Control	UK	7	5920	0.08	70.39
227.	59	European Journal of Forest Pathology	Germany	7	5927	0.08	70.47
228.	59	Remote Sensing of Environment	USA	7	5934	0.08	70.56
229.	59	European Journal of Pharmacology	Netherlands	7	5941	0.08	70.64
230.	60	Acta Botanica Indica	India	6	5947	0.07	70.71
231.	60	Agriculture Res Journal of Kerala	India	6	5953	0.07	70.78
232.	60	Agrobios India	India	6	5959	0.07	70.85
233.	60	American Phytopathological Society	USA	6	5965	0.07	70.92

Sl. No	Rank	Name of the Journal	Country	Number of Citations	Cumulative Citations	%	Cumulative %
234.	60	Bull. Br. Mycol. Soc UK	UK	6	5971	0.07	71.00
235.	60	Café Cacao The (Cuba)	Cuba	6	5977	0.07	71.07
236.	60	Ethnobotany Research and Application	India	6	5983	0.07	71.14
237.	60	Experimental Agriculture	UK	6	5989	0.07	71.21
238.	60	Indian Drugs	India	6	5995	0.07	71.28
239.	60	Indian Geobios New Reports	India	6	6001	0.07	71.35
240.	60	Journal of Biological Sciences	India	6	6007	0.07	71.42
241.	60	Journal of Biosciences	India	6	6013	0.07	71.49
242.	60	Journal of Chromatography	Netherlands	6	6019	0.07	71.57
243.	60	Journal of Mar. Boil Assoc. UK	UK	6	6025	0.07	71.64
244.	60	Journal of Rural Development	India	6	6031	0.07	71.71
245.	60	Kavaka	India	6	6037	0.07	71.78
246.	60	Mysore Coffee Experimental Station Bulletin	India	6	6043	0.07	71.85
247.	60	Risoe	Denmark	6	6049	0.07	71.92
248.	60	Zoos Print Journal	India	6	6055	0.07	71.99
249.	60	Journal of Agricultural Science	UK	6	6061	0.07	72.07
250.	60	Communications in Soil Science and Plant Analysis	USA	6	6067	0.07	72.14
251.	60	Journal of Tree Fruit Production	USA	6	6073	0.07	72.21
252.	60	Acta Hydrobiologia Sinica	Poland	6	6079	0.07	72.28
253.	60	Annals of Biochemistry	USA	6	6085	0.07	72.35
254.	60	Diversity and Distributions	UK	6	6091	0.07	72.42
255.	60	Ecology Letters	UK	6	6097	0.07	72.49
256.	60	Trends in Ecology and Evolution	UK	6	6103	0.07	72.56
257.	60	Australian Journal of Botany	Australia	6	6109	0.07	72.64
258.	60	Bibliotheca Lichenologica	Germany	6	6115	0.07	72.71
259.	60	FAO Plant Protection Bulletin	Italy	6	6121	0.07	72.78
260.	60	Physiological Plant Pathology	UK	6	6127	0.07	72.85
261.	60	Phytopathology News	USA	6	6133	0.07	72.92
262.	60	Symbolae Botanical Upsalienses	Sweden	6	6139	0.07	72.99
263.	60	Annual Review of Microbiology	USA	6	6145	0.07	73.06
264.	60	Limnological & Oceanography	USA	6	6151	0.07	73.14
265.	60	Horticulture Review	Canada	6	6157	0.07	73.21
266.	60	Journal of Arid Environment	UK	6	6163	0.07	73.28
267.	60	Flora and Fauna	Italy	6	6169	0.07	73.35
268.	61	Advance in Forestry Research in India	India	5	6174	0.06	73.41
269.	61	Biol. Memories Lucknow	India	5	6179	0.06	73.47
270.	61	Harayana Journal of Hort. Science	India	5	6184	0.06	73.53
271.	61	Indian Coconut Journal	India	5	6189	0.06	73.59
272.	61	Indian Journal of Botany	India	5	6194	0.06	73.65
273.	61	Indian Journal of Dryland of Agric Res and Dev	India	5	6199	0.06	73.71
274.	61	Indian Journal of Forestry	India	5	6204	0.06	73.77
275.	61	Indian Journal of Natural Products	India	5	6209	0.06	73.82
276.	61	Journal of Indian Botany	India	5	6214	0.06	73.88
277.	61	Sydowia	Austria	5	6219	0.06	73.94
278.	61	Tex. Agric. Exp. Stn. Bull	USA	5	6224	0.06	74.00
279.	61	The American Phytopathological Society	USA	5	6229	0.06	74.06
280.	61	The Hindu Survey of Indian Agriculture	India	5	6234	0.06	74.12
281.	61	The Plant Cell	USA	5	6239	0.06	74.18

Sl. No	Rank	Name of the Journal	Country	Number of Citations	Cumulative Citations	%	Cumulative %
282.	61	Turrialba	Costa Rica	5	6244	0.06	74.24
283.	61	Uttar Pradesh Journal of Zoology	India	5	6249	0.06	74.30
284.	61	Bragantia	Brazil	5	6254	0.06	74.36
285.	61	Agriculture Experimental Station Reports	Suriname	5	6259	0.06	74.42
286.	61	World Journal of Agricultural Product	USA	5	6264	0.06	74.48
287.	61	Cotton Grower	USA	5	6269	0.06	74.54
288.	61	Journal of Dairy Science	USA	5	6274	0.06	74.60
289.	61	Biological Review	UK	5	6279	0.06	74.66
290.	61	Bio-systems	Ireland	5	6284	0.06	74.72
291.	61	Fresh Water Biology	UK	5	6289	0.06	74.78
292.	61	Journal of Applied Ecology	UK	5	6294	0.06	74.84
293.	61	Australian Journal of Biological Science	Australia	5	6299	0.06	74.89
294.	61	Journal of Aquatic Biology	South Africa	5	6304	0.06	74.95
295.	61	Advance in Applied Lipid Research	USA	5	6309	0.06	75.01
296.	61	Biochemica Biophysics Acta	Netherlands	5	6314	0.06	75.07
297.	61	Bio-resources Technology	Netherlands	5	6319	0.06	75.13
298.	61	Australasian Plant Pathology	Australia	5	6324	0.06	75.19
299.	61	Fitopatologia Brasileira	Brazil	5	6329	0.06	75.25
300.	61	International Journal of Plant Sciences	USA	5	6334	0.06	75.31
301.	61	Review of Plant Pathology	Italy	5	6339	0.06	75.37
302.	61	Molecular Plant Pathology	UK	5	6344	0.06	75.43
303.	61	Orchid Monograph	Netherlands	5	6349	0.06	75.49
304.	61	Planta Journal	Germany	5	6354	0.06	75.55
305.	61	Silvae Genetica	Germany	5	6359	0.06	75.61
306.	61	Summa Phytopathologica	Brazil	5	6364	0.06	75.67
307.	61	Hereditas	Sweden	5	6369	0.06	75.73
308.	61	Journal of Heredity	USA	5	6374	0.06	75.79
309.	61	International Journal of Syst. Evol. Microbiology	UK	5	6379	0.06	75.85
310.	61	Journal of Basic Microbiology	Germany	5	6384	0.06	75.91
311.	61	Southern Economist	India	5	6389	0.06	75.96
312.	61	Analytical Chemistry	USA	5	6394	0.06	76.02
313.	61	Natural Product Reports	UK	5	6399	0.06	76.08
314.	61	Biomass and Bio-Energy	UK	5	6404	0.06	76.14
315.	61	Pesticide Reform	USA	5	6409	0.06	76.20
316.	61	Journal of Soils Contamination	USA	5	6414	0.06	76.26
317.	61	Cereal Chemistry	USA	5	6419	0.06	76.32
318.	61	Capsicum and Eggplant Newsletter	Italy	5	6424	0.06	76.38
319.	61	Photogrammetric Engi. and Remote Sensing	USA	5	6429	0.06	76.44
320.	61	Tropical Pest Management Journal	Japan	5	6434	0.06	76.50
321.	61	Nahrung	Germany	5	6439	0.06	76.56
322.	61	Biological and Pharmaceutical Bulletin	Japan	5	6444	0.06	76.62
323.	61	Journal of Scientific and Industrial Research	India	5	6449	0.06	76.68
324.	61	Pakistan Journal of Scientific Industrial Research	Pakistan	5	6454	0.06	76.74
325.	62	75 Journals with 4 Citations each		300	6754	3.57	80.31

Sl. No	Rank	Name of the Journal	Country	Number of Citations	Cumulative Citations	%	Cumulative %
326.	63	126 Journals with 3 Citations each		378	7132	4.49	84.80
327.	64	237 Journals with 2 Citations each		474	7606	5.64	90.44
328.	65	805 Journals with 1Citation each		805	8411	9.56	100.00
Total				**8411**		**100.00**	

It is found that among the journals, Indian Phytopathology published from India occupies the top slot as the most preferred journal with 495 (5.89%) citations. It is followed by Phytopathology published from USA with a share of 356 (4.23%) citations. The third and fourth rank goes to Indian Journal of Mycology and Plant Pathology from India with 232 (2.76%) and Plant Disease from USA with 182 (2.16%) citations. The first ten journals in the rank list together account nearly 23% of the total citations. The first 74 journals in the rank list contribute 50% of the total citations. Out of 74 journals 34 journals are from India which accounts 2087 (24.81%) citations. It is also obvious from the table that 75% of total citations are contributed by the first 295 journals in the rank list. The remaining 25% of citations are scattered among 1567 journals (Table-17).

4.1.9 (D) Rank list of journals in Applied Zoology

It is evident from the table-18 that out of 1167 journals, 247 journals have been cited at least 5 times or more. These 247 journals account for 3674 (72.71%) citations out of 5053 citations. The first 50 journals accounted for nearly 41% citations and 197 journals which are listed from serial number 51 to 247 in the rank list accounts more than 32% citations. The remaining 920 journals with 1379 (27.29%) citations have less than 5 citations each.

Table-18 Rank list of journals in Applied Zoology

Sl. No	Rank	Name of the Journal	Country	Number of Citations	Cumulative Citations	%	Cumulative %
1.	1	Mutation Research	Netherlands	325	325	6.43	6.43
2.	2	Aquaculture	Netherlands	96	421	1.90	8.33
3.	3	Journal of Bombay Natural History Society	India	93	514	1.84	10.17
4.	4	Journal of Fish Biology	UK	78	592	1.54	11.71
5.	5	Nature	UK	70	662	1.39	13.10
6.	6	Proc. Indian Acad. Science	India	65	727	1.29	14.39
7.	7	Environment and Ecology	India	60	787	1.19	15.57
8.	8	Current Science	India	54	841	1.07	16.64
9.	9	Journal of Food Science	USA	53	894	1.05	17.69
10.	10	General & Comparative Endocrinology	USA	51	945	1.01	18.70
11.	11	Journal of Environmental Biology	India	50	995	0.99	19.69
12.	12	Hydrobiologia	Netherlands	46	1041	0.91	20.60
13.	13	Indian Journal of Fisheries	India	42	1083	0.83	21.43
14.	14	Mutagenesis	UK	41	1124	0.81	22.24
15.	15	Proc. Natl. Acad. Science USA	USA	39	1163	0.77	23.01
16.	15	Animal Behaviour	UK	39	1202	0.77	23.79
17.	16	Journal of Economic Entomology	USA	38	1240	0.75	24.54
18.	17	Journal of Coffee Research	India	35	1275	0.69	25.23
19.	17	Canadian Journal of Fisheries and Aquatic Sciences	Canada	35	1310	0.69	25.92
20.	18	Entomon	India	34	1344	0.67	26.60
21.	18	Genetics	USA	34	1378	0.67	27.27
22.	19	Evolution	USA	33	1411	0.65	27.92
23.	20	Trans. American Fish. Society	USA	32	1443	0.63	28.56
24.	20	Heredity	UK	32	1475	0.63	29.19
25.	21	Indian Journal of Experimental Biology	India	31	1506	0.61	29.80
26.	21	Fishery Technology	India	31	1537	0.61	30.42
27.	22	Science	USA	27	1564	0.53	30.95
28.	23	Journal of Experimental Zoology	USA	26	1590	0.51	31.46
29.	23	Conservation Biology	USA	26	1616	0.51	31.98
30.	23	Ecology	USA	26	1642	0.51	32.49
31.	24	Indian Journal of Environmental Health	India	24	1666	0.47	32.97
32.	24	Journal of Biological Chemistry	USA	24	1690	0.47	33.44
33.	24	Newsletter for Birdwatchers	India	24	1714	0.47	33.92
34.	24	Journal of Food Protection	USA	24	1738	0.47	34.39
35.	25	Indian Journal of Entomology	India	23	1761	0.46	34.85
36.	25	Insect Environment	UK	23	1784	0.46	35.30
37.	25	Journal of Agricultural & Food Chemistry	USA	23	1807	0.46	35.76
38.	26	Environmental Toxicology & Chemistry	USA	22	1829	0.44	36.19
39.	27	Drosophila. Information Service	USA	21	1850	0.42	36.61
40.	27	Pollution Research	India	21	1871	0.42	37.03
41.	28	American Nutrition	USA	20	1891	0.40	37.42
42.	28	Entomologia Experimentalist et Applicata	Netherlands	20	1911	0.40	37.82
43.	29	Annual Review of Entomology	USA	19	1930	0.38	38.19
44.	29	Oriental Insects	USA	19	1949	0.38	38.57
45.	29	Journal of Aquatic Animal Health	USA	19	1968	0.38	38.95
46.	30	Environmental Entomology	USA	17	1985	0.34	39.28
47.	30	Molecular Ecology	UK	17	2002	0.34	39.62
48.	31	Environmental Health Perspectives	USA	17	2019	0.34	39.95
49.	32	Proc. Zool. Society London	UK	16	2035	0.32	40.27

Sl. No	Rank	Name of the Journal	Country	Number of Citations	Cumulative Citations	%	Cumulative %
50.	32	Rec. Indian Mus.	India	16	2051	0.32	40.59
51.	33	Biological Conservation	UK	16	2067	0.32	40.90
52.	34	Journal of Mysore University Section B	India	15	2082	0.30	41.20
53.	34	Geobios	India	15	2097	0.30	41.50
54.	34	International Review Hydrobiology	Germany	15	2112	0.30	41.80
55.	34	Journal of Molecular Biology	UK	15	2127	0.30	42.09
56.	34	Journal of Entomological Research	India	15	2142	0.30	42.39
57.	34	Journal of Bacteriology	USA	15	2157	0.30	42.69
58.	34	Copeia	USA	15	2172	0.30	42.98
59.	34	Food Science & Technology	USA	15	2187	0.30	43.28
60.	35	Journal of Aquatic Biology	South Africa	14	2201	0.28	43.56
61.	35	Journal of Biological Control	USA	14	2215	0.28	43.83
62.	35	Journal of Inland Fish Soc India	India	14	2229	0.28	44.11
63.	35	Mysore Journal of Agricultural Science	India	14	2243	0.28	44.39
64.	35	Journal of Animal Ecology	UK	14	2257	0.28	44.66
65.	35	Annual Review of Biochemistry	USA	14	2271	0.28	44.94
66.	35	Journal of Marine Biology Association India	India	14	2285	0.28	45.22
67.	35	Applied & Entomology & Zoology	Japan	14	2299	0.28	45.50
68.	35	Bulletin of Environmental Contamination & Toxicology	USA	14	2313	0.28	45.77
69.	35	Hormones & Behavior	USA	14	2327	0.28	46.05
70.	36	Oecologia	Germany	13	2340	0.26	46.31
71.	36	Advances in Biosensors	USA	13	2353	0.26	46.56
72.	36	FAO Plant Protection Committee Bulletin	Italy	13	2366	0.26	46.82
73.	36	Environmental Molecular Mutagenesis	USA	13	2379	0.26	47.08
74.	36	Environmental Pollution	UK	13	2392	0.26	47.34
75.	36	Indian Coffee	India	13	2405	0.26	47.59
76.	36	Carcinogenesis	UK	13	2418	0.26	47.85
77.	36	Water Research	UK	13	2431	0.26	48.11
78.	37	Matsya	India	12	2443	0.24	48.35
79.	37	Experientia	Switzerland	12	2455	0.24	48.58
80.	37	Biologisches – Zentralblatt	Germany	12	2467	0.24	48.82
81.	37	Biochemistry Journal	USA	12	2479	0.24	49.06
82.	37	Journal of Insect Physiology	UK	12	2491	0.24	49.30
83.	37	Canadian Journal of Zoology	Canada	12	2503	0.24	49.53
84.	37	Aquatic Toxicology	Netherlands	12	2515	0.24	49.77
85.	37	ICLARM	Philippines	12	2527	0.24	50.01
86.	37	Indian Forester	India	12	2539	0.24	50.25
87.	37	Cancer Research	USA	12	2551	0.24	50.48
88.	38	Journal of Biosciences	France	11	2562	0.22	50.70
89.	38	Zoos Print Journal	India	11	2573	0.22	50.92
90.	38	Pesticide Biochemistry & Physiology	USA	11	2584	0.22	51.14
91.	38	EMBOJ	UK	11	2595	0.22	51.35
92.	38	Phytochemistry	UK	11	2606	0.22	51.57
93.	38	Cytologia	Japan	11	2617	0.22	51.79
94.	38	Canadian Entomologist	Canada	11	2628	0.22	52.01
95.	38	Environmental Biology of Fishes	Netherlands	11	2639	0.22	52.22
96.	38	Journal of Herpetology	USA	11	2650	0.22	52.44
97.	38	Journal of Wild Life Management	USA	11	2661	0.22	52.66
98.	38	Environmental Research	USA	11	2672	0.22	52.88

Sl. No	Rank	Name of the Journal	Country	Number of Citations	Cumulative Citations	%	Cumulative %
99.	38	Oikos	Denmark	11	2683	0.22	53.10
100.	38	FAO Fisheries Technical Paper	USA	11	2694	0.22	53.31
101.	39	Indian Journal of Environment and Ecoplan	India	10	2704	0.20	53.51
102.	39	Molecular General Genetics	Germany	10	2714	0.20	53.71
103.	39	Pest Management Focus	UK	10	2724	0.20	53.91
104.	39	Biological Bulletin	USA	10	2734	0.20	54.10
105.	39	Canadian Journal of Physiology	Canada	10	2744	0.20	54.30
106.	39	American Zoologist	USA	10	2754	0.20	54.50
107.	39	Journal of Applied Ichthyology	Germany	10	2764	0.20	54.70
108.	39	Journal of Zoology	UK	10	2774	0.20	54.90
109.	39	Ecological Applications	USA	10	2784	0.20	55.09
110.	39	Endocrinology	USA	10	2794	0.20	55.29
111.	39	Journal of Ethnopharmacology	Ireland	10	2804	0.20	55.49
112.	40	Genetics in Aquaculture	USA	9	2813	0.18	55.67
113.	40	Indian Journal of Agricultural Science	India	9	2822	0.18	55.85
114.	40	International Journal of Acad Ichthyol	Russia	9	2831	0.18	56.02
115.	40	Ecology Environment And Conservations	India	9	2840	0.18	56.20
116.	40	Nucleic Acids Research	UK	9	2849	0.18	56.38
117.	40	Journal of Cell Science	UK	9	2858	0.18	56.56
118.	40	Bulletin of Entomological Research	UK	9	2867	0.18	56.74
119.	40	International Journal of Food Microbiology	Netherlands	9	2876	0.18	56.91
120.	40	Annual Review of Ecology Systematic	USA	9	2885	0.18	57.09
121.	40	Archives Environment Contamination & Toxicology	USA	9	2894	0.18	57.27
122.	40	Aquatic Living Resources	France	9	2903	0.18	57.45
123.	40	Gerentologia	Poland	9	2912	0.18	57.63
124.	40	International Journal of Radiation Biology	UK	9	2921	0.18	57.81
125.	41	Indian Journal of Heredity	India	8	2929	0.16	57.96
126.	41	Journal of Fish Research Board Canada	Canada	8	2937	0.16	58.12
127.	41	Journal of Water Pollution Control Fed.	USA	8	2945	0.16	58.28
128.	41	Symp. Zool. Soc. London	UK	8	2953	0.16	58.44
129.	41	Biology of Reproduction	USA	8	2961	0.16	58.60
130.	41	Bioscience	USA	8	2969	0.16	58.76
131.	41	Journal of Applied Ecology	UK	8	2977	0.16	58.91
132.	41	Journal of Experimental Biology	UK	8	2985	0.16	59.07
133.	41	Marine Biotechnology	USA	8	2993	0.16	59.23
134.	41	Behavior Genetics	USA	8	3001	0.16	59.39
135.	41	Genetika	Russia	8	3009	0.16	59.55
136.	41	Journal of Freshwater Biology	USA	8	3017	0.16	59.71
137.	41	Ecological Monograph	USA	8	3025	0.16	59.86
138.	41	Journal of Chemical Ecology	USA	8	3033	0.16	60.02
139.	41	Clinical Cancer Research	USA	8	3041	0.16	60.18
140.	41	Annual Review of Pharmacology Toxicology	USA	8	3049	0.16	60.34
141.	41	Behaviorology	USA	8	3057	0.16	60.50
142.	41	American Midland Naturalist	USA	8	3065	0.16	60.66
143.	41	Water Science and Technology	UK	8	3073	0.16	60.81
144.	42	Acta Horticulturae	Belgium	7	3080	0.14	60.95
145.	42	Bulletin de la Entomological d Egypt	Egypt	7	3087	0.14	61.09
146.	42	Indian Journal of Ecology	India	7	3094	0.14	61.23
147.	42	Indian Journal of Environmental Protection	India	7	3101	0.14	61.37

Sl. No	Rank	Name of the Journal	Country	Number of Citations	Cumulative Citations	%	Cumulative %
148.	42	Indian Journal of Plant Protection	India	7	3108	0.14	61.51
149.	42	Indian Journal of Zoology	India	7	3115	0.14	61.64
150.	42	Proc. Of Hawaiian Entomological Society	USA	7	3122	0.14	61.78
151.	42	Rec. Zool. Surv. India	India	7	3129	0.14	61.92
152.	42	Archives Hydrobiologie	Germany	7	3136	0.14	62.06
153.	42	Diversity and Distributions	UK	7	3143	0.14	62.20
154.	42	Freshwater Biology	UK	7	3150	0.14	62.34
155.	42	Trends in Ecology & Evolution	UK	7	3157	0.14	62.48
156.	42	Journal of Insect Behaviour	USA	7	3164	0.14	62.61
157.	42	Journal of Research on the Lepidoptera	USA	7	3171	0.14	62.75
158.	42	Applied Environmental Microbiology	USA	7	3178	0.14	62.89
159.	42	Comparative Physiology & Ecology	India	7	3185	0.14	63.03
160.	42	Chem. & Biol. Interact	UK	7	3192	0.14	63.17
161.	42	Crop Protection	UK	7	3199	0.14	63.31
162.	42	Toxicology Letters	Ireland	7	3206	0.14	63.45
163.	42	American Fisheries Society Beth. Medicine	USA	7	3213	0.14	63.58
164.	42	Journal of Fisheries Sciences of China	China	7	3220	0.14	63.72
165.	42	Biochemical Pharmacology	USA	7	3227	0.14	63.86
166.	42	Planta Medica	Germany	7	3234	0.14	64.00
167.	43	Acta Botanica Indica	India	6	3240	0.12	64.12
168.	43	Asian Journal of Micro. Biotech. Env. Science	India	6	3246	0.12	64.24
169.	43	Bulletin of American Mus Nat History	USA	6	3252	0.12	64.36
170.	43	Indian Journal of Animal Science	India	6	3258	0.12	64.47
171.	43	Indian Journal of Comp. Animal Physiology	India	6	3264	0.12	64.59
172.	43	My Forest	India	6	3270	0.12	64.71
173.	43	Pestology	USA	6	3276	0.12	64.83
174.	43	Uttar Pradesh Journal of Zoology	India	6	3282	0.12	64.95
175.	43	Journal of Ecobiology	India	6	3288	0.12	65.07
176.	43	Journal of Morphology	USA	6	3294	0.12	65.19
177.	43	Molecular Boil. & Evol.	USA	6	3300	0.12	65.31
178.	43	Biological Abstract	USA	6	3306	0.12	65.42
179.	43	Biochemistry et Biophysica Acta	Netherlands	6	3312	0.12	65.54
180.	43	Journal of Lipid Research	USA	6	3318	0.12	65.66
181.	43	International Review of Cytology	USA	6	3324	0.12	65.78
182.	43	Advances Insect Physiology	USA	6	3330	0.12	65.90
183.	43	Florida Entomologist	USA	6	3336	0.12	66.02
184.	43	Chromosoma	Germany	6	3342	0.12	66.14
185.	43	Genetics & Molecular Biology	Brazil	6	3348	0.12	66.26
186.	43	Theor & Applied Genetics	Germany	6	3354	0.12	66.37
187.	43	Asian Fisheries Science	Philippines	6	3360	0.12	66.49
188.	43	Ecology of Freshwater Fish	Denmark	6	3366	0.12	66.61
189.	43	Journal of Mammology	USA	6	3372	0.12	66.73
190.	43	Mammalia	France	6	3378	0.12	66.85
191.	43	Physiological Zoology	USA	6	3384	0.12	66.97
192.	43	Zoological Science	Japan	6	3390	0.12	67.09
193.	43	Journal of Nature Conservation	India	6	3396	0.12	67.21
194.	43	Environmental Monitoring Assessment	Netherlands	6	3402	0.12	67.32
195.	43	Journal of Tropical Ecology	UK	6	3408	0.12	67.44
196.	43	Journal of Toxicology Environment Health	USA	6	3414	0.12	67.56

Sl. No	Rank	Name of the Journal	Country	Number of Citations	Cumulative Citations	%	Cumulative %
197.	43	Fisheries Research	Netherlands	6	3420	0.12	67.68
198.	43	North American Journal of Fisheries Management	USA	6	3426	0.12	67.80
199.	43	Journal of Aquatic Food Product Technology	USA	6	3432	0.12	67.92
200.	43	Journal of Comp. Psychology	USA	6	3438	0.12	68.04
201.	43	Canadian Field Naturalist	Canada	6	3444	0.12	68.16
202.	44	Acta Entomologica Sinica	China	5	3449	0.10	68.25
203.	44	Annot. Zoolo. Japan	Japan	5	3454	0.10	68.35
204.	44	Aquatic Fisheries Management	UK	5	3459	0.10	68.45
205.	44	DNA Repair	USA	5	3464	0.10	68.55
206.	44	Evergreen My Forest	India	5	3469	0.10	68.65
207.	44	Hum. Exp. Toxicology	UK	5	3474	0.10	68.75
208.	44	International Journal of Microbiology	Korea	5	3479	0.10	68.85
209.	44	Journal of Research Punjab Agric Univer.	India	5	3484	0.10	68.95
210.	44	PLACROSYM	India	5	3489	0.10	69.05
211.	44	Review Environ. Contam.Toxicology	USA	5	3494	0.10	69.15
212.	44	Zoological Survey of India	India	5	3499	0.10	69.24
213.	44	Cistrus & Subtropical Fruit Journal	USA	5	3504	0.10	69.34
214.	44	Journal of Animal Science	USA	5	3509	0.10	69.44
215.	44	Development Growth and Differentiation	Australia	5	3514	0.10	69.54
216.	44	Journal of Hydrobiology	India	5	3519	0.10	69.64
217.	44	Biotechnology Advances	USA	5	3524	0.10	69.74
218.	44	Cell	USA	5	3529	0.10	69.84
219.	44	Cell & Tissue Research	Germany	5	3534	0.10	69.94
220.	44	Ecological Entomology	UK	5	3539	0.10	70.04
221.	44	Entomology Newsletter	Brazil	5	3544	0.10	70.13
222.	44	Entomophaga	Netherlands	5	3549	0.10	70.23
223.	44	Journal of Aphidology	India	5	3554	0.10	70.33
224.	44	Genes & Development	USA	5	3559	0.10	70.43
225.	44	Genome research	USA	5	3564	0.10	70.53
226.	44	Journal of Genetics	India	5	3569	0.10	70.63
227.	44	Food Microbiology	UK	5	3574	0.10	70.73
228.	44	Auk	USA	5	3579	0.10	70.83
229.	44	Annual Review of Physiology	USA	5	3584	0.10	70.93
230.	44	Acta Ichthyologica et Piscatoria	Poland	5	3589	0.10	71.03
231.	44	Acta Zool Lilloana	Argentina	5	3594	0.10	71.12
232.	44	Australian Journal of Zoology	Australia	5	3599	0.10	71.22
233.	44	Bangladesh Journal of Zoology	Bangladesh	5	3604	0.10	71.32
234.	44	Himachal Journal of Environmental Zoology	India	5	3609	0.10	71.42
235.	44	Journal of Advanced Zoology	India	5	3614	0.10	71.52
236.	44	Zoological Studies	Taiwan	5	3619	0.10	71.62
237.	44	Food Chemistry	UK	5	3624	0.10	71.72
238.	44	Behavioral Ecology & Sociobiology	Germany	5	3629	0.10	71.82
239.	44	Environmentalists	USA	5	3634	0.10	71.92
240.	44	International Journal of Ecology Environmental Science	India	5	3639	0.10	72.01
241.	44	Chemosphere	UK	5	3644	0.10	72.11
242.	44	Food & Chemical Toxicology	UK	5	3649	0.10	72.21
243.	44	Planter's Chronicle	India	5	3654	0.10	72.31

Sl. No	Rank	Name of the Journal	Country	Number of Citations	Cumulative Citations	%	Cumulative %
244.	44	Human Reproduction	UK	5	3659	0.10	72.41
245.	44	Journal of National Cancer Institute	USA	5	3664	0.10	72.51
246.	44	Journal of Natural Products	USA	5	3669	0.10	72.61
247.	44	Research Bulletin Punjab University	India	5	3674	0.10	72.71
248.	45	38 Journals with 4 Citations each		152	3826	3.00	75.71
249.	46	71Journals with 3 Citations each		213	4039	4.22	79.93
250.	47	203 Journals with 2 Citations each		406	4445	8.03	87.96
251.	48	608 Journals with 1Citations each		608	5053	12.04	100.00
Total				**5053**		**100.00**	

Table-18 further reveals that among the journals, Mutation Research published from Netherlands occupies the top slot as the most preferred journal having been cited 325 (6.43%) times, followed by Aquaculture published from Netherlands with 96 (1.90%) citations. The third and fourth rank goes to Journal of Bombay Natural History Society from India with 93 (1.84%) and Journal of Fish Biology from UK with 78 (1.54%) citations, respectively. The first ten journals in the rank list together account to nearly 19% of the total citations. The first 85 journals in the rank list contribute to 50% of the total citations. Out of 85 journals 23 journals are from India, which accounts 715 (14.15%) citations. It is also observed from the table that 75% of citations are contributed by the first 248 journals in the rank list. The remaining 25% of citations are scattered among 1167 journals.

4.1.10 List of cited journals commonly cited by all departments

Table-19 List of cited journals commonly cited by all departments

Sl. No	Name of the Journal	Country	BT	ES	AB	AZ	Total Citations	Cited by No of Departments
1.	Hydrobiologia	Netherlands	7	546	120	46	719	4
2.	Journal of Ethnopharmacology	Ireland	558		74		632	2
3.	Indian Journal of Environmental Health	India	14	540	44	24	622	4
4.	Phytopathology	USA	215	8	356		579	3
5.	Indian Phytopathology	India	66	8	495		569	3
6.	Fitoterapia	Italy	435		21	2	458	3
7.	Indian Journal of Environmental Protection	India	5	442		7	454	3
8.	Current Science	India	157	99	141	54	451	4
9.	Mutation Research	Netherlands	91		3	325	419	3
10.	Pollution Research	India	12	349	20	21	402	4
11.	Plant Cell Reports	Germany	357		11		368	2
12.	Plant Cell Tissue & Organ Culture	Netherlands	320		10		330	2
13.	Indian Journal of Experimental Biology	India	260	6	29	31	326	4
14.	Nature	UK	143	45	43	70	301	4
15.	Phytochemistry	UK	234		49	11	294	3
16.	Indian Journal of Pharmaceutical Science	India	283		3	2	288	3
17.	Journal of Environmental Biology	India	1	193	28	50	272	4
18.	Plant Disease	USA	61	5	182		248	3
19.	Indian Journal of Mycology & Plant Pathology	India	12		232		244	2
20.	Applied and Environmental Microbiology	USA	70	84	70	7	231	4
21.	Science	USA	124	34	42	27	227	4
22.	Planta Medica	Germany	187		26	7	220	3
23.	Phytotheraphy Research	UK	202		13		215	2
24.	Indian Drugs	India	204		6	1	211	3
25.	Journal of Ecology	UK	2	126	81	2	211	4
26.	Plant Physiol. Lancaster	USA	156	10	42		208	3
27.	Indian Forester	India	26		154	12	192	3
28.	Journal of Biological Chemistry	USA	149	5	11	24	189	4
29.	Ecology Environment & Conservation	India	7	147	15	9	178	4
30.	Journal of Indian Society of Soil Science	India	2	135	31		168	3
31.	Theor & Applied Genetics	Germany	124		37	6	167	3
32.	Environmental and Ecological Statistics	USA	15	140	8		163	3
33.	Journal of Agricultural & Food Chemistry	USA	133			23	156	2
34.	Journal of Natural Products	USA	136		9	5	150	3
35.	Journal of Bombay Nat History Society	India	19	18	19	93	149	4
36.	Phykos	India		86	55	4	145	3
37.	Plant Science	USA	122	3	19		144	3
38.	Conservation Biology	USA	5	98	10	26	139	4
39.	Journal of Inland Fish Soc India	India	4	92	29	14	139	4
40.	Journal of Indian Botanical Society	India		88	48		136	2
41.	Journal of Aquatic Biology	South Africa		116	5	14	135	3

Sl. No	Name of the Journal	Country	BT	ES	AB	AZ	Total Citations	Cited by No of Departments
42.	Nucleic Acids Research	UK	104		17	9	130	3
43.	Proc. India Academic Science	India	14	3	45	65	127	4
44.	Indian Journal of Agricultural Science	India	20	29	67	9	125	4
45.	Plant Pathology	Korea	50		71		121	2
46.	Geobios	India	4	99		15	118	3
47.	Plant Cell And Environment	UK	104		8		112	2
48.	Aquaculture	Netherlands	11	4		96	111	3
49.	Crop Science	USA	50	4	57		111	3
50.	Indian Journal of Pharmacology	India	104		7		111	2
51.	Water Research	UK	5	77	9	13	104	4
52.	Food Chemistry	UK	83	2	9	5	99	4
53.	Seed Science & Technology	Switzerland	20	2	75		97	3
54.	Journal of Economic Entomology	USA	33	20	4	38	95	4
55.	Pharmaceutical Biology	Netherlands	86		8	1	95	3
56.	Madras Agric Journal	India	23	27	39	2	91	4
57.	Euphytica	Netherlands	50		34	2	86	3
58.	Journal of Fish Biology	UK	3	5		78	86	3
59.	Phytomedicine	Germany	77		8		85	2
60.	African Journal of Biotechnology	South Africa	57	10	14	3	84	4
61.	Bulletin of Botanical Survey India	India	33	29	22		84	3
62.	Indian Journal of Ecology	India	1	46	28	7	82	4
63.	Canadian Journal of Botany	Canada	31	13	35	1	80	4
64.	Journal of Medicinal and Aromatic Plant Sciences	India	24		55		79	2
65.	Annual Review of Phyopathology	USA	39		37		76	2
66.	In Vitro Cellular & Developmental Biology Plant	USA	64		12		76	2
67.	International Rev. Ges. Hydrobiol. Hydrogr.	Germany	3	58	14		75	3
68.	Journal of Coffee Research	India	2		37	35	74	3
69.	Indian Journal of Fisheries	India	2	29		42	73	3
70.	Canadian Journal of Fish. Aquat. Science	Canada		34	2	35	71	3
71.	Genome Research	USA	63		3	5	71	3
72.	Indian Journal of Environment and Ecoplan	India	9	48	4	10	71	4
73.	Acta Horticulturae	Belgium	44	2	17	7	70	4
74.	Journal of Bacteriology	USA	30	4	21	15	70	4
75.	Annals of Botany	UK	12	26	29	2	69	4
76.	Ecology	USA	20	14	9	26	69	4
77.	American Journal of Botany	USA	37	9	22		68	3
78.	Bioresource Technology	Netherlands	10	51	5	2	68	4
79.	New Phypathologist	UK	17	26	24	1	68	4
80.	Indian Journal of Agronomy	India	3	32	32		67	3
81.	Journal of Tropical Ecology	UK	1	14	46	6	67	4
82.	Comparative Physiol. And Ecology	India	6	46	7	7	66	4
83.	Limnological & Oceanography	USA		57	6	3	66	3
84.	Soil Biology & Biochemistry	UK	25	31	8	1	65	4
85.	Mysore Journal of Agric. Science	India	15	11	22	14	62	4
86.	Canadian Journal of Microbiology	Canada	16	25	18	2	61	4
87.	Indian Journal of Traditional	India	5		56		61	2

Sl. No	Name of the Journal	Country	BT	ES	AB	AZ	Total Citations	Cited by No of Departments
	Knowledge							
88.	Oryza	India	18	22	20		60	3
89.	Cancer Research	USA	45		2	12	59	3
90.	Indian Journal of Natural Products	India	54		5		59	2
91.	South Indian Horticulture	India	3	18	36	1	58	4
92.	Biological & Pharma. Bulletin	Japan	46		7	4	57	3
93.	Chemical & Pharmaceutical Bulletin	Japan	45		12		57	2
94.	Journal of Applied Bacteriology	UK	11	34	12		57	3
95.	Oecologia	Germany	13	13	18	13	57	4
96.	Plant Molecular Biology Reporter	Netherlands	47		7	3	57	3
97.	Applied Microbiology	Japan	4	15	36		55	3
98.	Annual Review of Entomology	USA	25	9	1	19	54	4
99.	Biological Conservation	UK		25	13	16	54	3
100.	Indian Journal of Entomology	India	16	14		23	53	3
101.	Journal of Molecular Biology	UK	38			15	53	2
102.	Mycopathologia	Netherlands	4	1	47		52	3
103.	Evolution	USA	14		4	33	51	3
104.	Journal of Tropical Medicinal	Japan	49		2		51	2
105.	Mutagenesis	UK	10			41	51	2
106.	Annals of Applied Biology	UK	21	1	27	1	50	4
107.	Biotropica	USA	5	11	34		50	3
108.	Mycologia	USA	9	6	35		50	3
109.	Journal of Natural Remedies	USA	48		1		49	2
110.	Indian Coffee	India	7		28	13	48	3
111.	Crop Protection	UK	17	10	13	7	47	4
112.	EMBO Journal	UK	33		2	11	46	3
113.	Indian Journal of Medical Research	India	33	13			46	2
114.	Journal of Plant Physiology	Germany	39	4	3		46	3
115.	Transactions of the British Mycological Society	UK	8		38		46	2
116.	Journal of Ecotoxicology & Environ. Monitoring	India		42	1	2	45	3
117.	Plant and Soil	Netherlands	24		21		45	2
118.	Indian Journal of Microbiology Ecology	India		43		1	44	2
119.	Indian Journal of Sericulture	India	38	2	2	2	44	4
120.	Biotechnology Letters	Netherlands	22	12	9		43	3
121.	Environmental Pollution	UK		26	4	13	43	3
122.	Journal of Ethnobiology	USA	4	1	38		43	3
123.	Journal of General Virology	UK	42		1		43	2
124.	Molecular Ecology	UK	13	4	9	17	43	4
125.	Environmental Monitoring and Assessment	Netherlands		36		6	42	2
126.	European Journal of Plant Pathology	Netherlands	28		14		42	2
127.	Journal of Food Protection	USA			18	24	42	2
128.	Molecular Breeding	Netherlands	39		3		42	2
129.	Phytomorphology	India	29	3	10		42	3
130.	Annual Review of Ecology and Systematics	USA	6	7	19	9	41	4
131.	Copeia	USA		26		15	41	2
132.	Crop Research Hisar	India	9	16	14	2	41	4
133.	Indian Journal of Nematology	India	26	15			41	2

Sl. No	Name of the Journal	Country	BT	ES	AB	AZ	Total Citations	Cited by No of Departments
134.	Journal of Maharashtra Agricultural Universities	India	10	9	22		41	3
135.	Methods in Enzymology	USA	37		2	2	41	3
136.	Pest Management in Horticultural Ecosystem	USA	8	33			41	2
137.	Seed Research	India	9		32		41	2
138.	Journal of Fresh Water Ecology	USA	2	38			40	2
139.	Journal of Indian Soc of Cotton Improvement	India			38	2	40	2
140.	Biochemistry & Biophysics	USA	35			4	39	2
141.	Economic Botany	USA	5	5	26	3	39	4
142.	Geobios New Reports	India		29	9	1	39	3
143.	Journal of Ecobiology	India	2	30	1	6	39	4
144.	Life Sci. Adv.	India	36	2	1		39	3
145.	Scientia Horticulturae	Netherlands	28	2	9		39	3
146.	Indian Journal of Biotechnology	India	37	1			38	2
147.	Soil Science	USA	6	27	4	1	38	4
148.	Entomologia Experimentalis et Applicata	Netherlands	10	7		20	37	3
149.	Environmental Toxicology & Chemistry	USA		15		22	37	2
150.	FEBS letter	Netherlands	36			1	37	2
151.	Journal of Animal Ecology	UK	3	17	3	14	37	4
152.	Journal of Inverte Pathology	USA	35			2	37	2
153.	Journal of Mysore Univ.B	India	6	16		15	37	3
154.	Letters in Applied Microbiology	UK	7	6	24		37	3
155.	Nature Biotechnology	USA	35			2	37	2
156.	Annual Review of Biochemistry	USA	21		1	14	36	3
157.	Fishery Technology	India		5		31	36	2
158.	Heredity	UK	3	1		32	36	3
159.	Indian Journal of Marine Science	India		33	1	2	36	3
160.	Journal of American Water Works Assoc	USA		35	1		36	2
161.	Journal of Food Science & Technology	India	12	14	10		36	3
162.	Tetrahedron	UK	33		2	1	36	3
163.	World Journal of Microbiology and Biotechnology	UK	12	4	20		36	3
164.	Advances in Plant Science	India	18	16		1	35	3
165.	Canadian Journal of Plant Pathology	Canada	10		25		35	2
166.	Entomon	India	1			34	35	2
167.	Indian Journal of Genetics & Plant Breeding	India	24		11		35	2
168.	International Journal of Ecology and Environ. Science	India		23	7	5	35	3
169.	Journal of Environmental Quality	USA	3	29		3	35	3
170.	Journal of Indian Microbial	India			34	1	35	2
171.	Pharmacological Research	UK	22		13		35	2
172.	Chemosphere	UK	2	27		5	34	3
173.	Environmental Entomology	USA	10	7		17	34	3
174.	Journal of Experimental Botany	UK	23	4	7		34	3
175.	Oikos	Denmark	1	8	14	11	34	4
176.	Process Biochemistry	UK	17	13	4		34	3

Sl. No	Name of the Journal	Country	BT	ES	AB	AZ	Total Citations	Cited by No of Departments
177.	Science & Culture	India	1	13	18	2	34	4
178.	Forest Ecology & Management	Netherlands		23	9	1	33	3
179.	Indian Farming	India	6	1	26		33	3
180.	Journal of Biosciences	India	10	6	6	11	33	4
181.	Journal of Plankton Research	UK		30	2	1	33	3
182.	Water Science & Technology	UK		23	2	8	33	3
183.	Bioscience Biotechnology & Biochemistry	Japan	25	2	3	2	32	4
184.	Environmental Health Perspectives	USA		14	1	17	32	
185.	Journal of Economic and Taxonomic Botany	India	9	4	19		32	3
186.	Journal of General Microbiology	UK	15	6	11		32	3
187.	Molecular Plant Microbe Interaction	USA	24		8		32	2
188.	Biochemical Pharmacology	USA	24			7	31	2
189.	Indian Journal of Plant Protection	India	5	1	18	7	31	4
190.	Journal of American Oil Chemical Society	USA	17		14		31	2
191.	Karnataka Journal of Agricultural Sciences	India	9	7	15		31	3
192.	Indian Journal of Chemistry	India	28		2		30	2
193.	Journal of Agricultural Science	UK	13	10	6	1	30	4
194.	Zoos Print Journal	India		13	6	11	30	3
195.	Biodiversity & Conservation	Netherlands	2	8	16	3	29	4
196.	Biotechnology Advances	USA	17		7	5	29	3
197.	Botanical Review	USA		14	15		29	2
198.	Canadian Journal of Plant Science	Canada	28	1			29	2
199.	Free Radical Biology & Medicine	USA	25			4	29	2
200.	Fresh Water Biology	UK		17	5	7	29	3
201.	Indian Council for Agril Research	India	5	1	23		29	3
202.	International Journal of Cancer	USA	27			2	29	2
203.	Journal of Entomological Research	India	8	6		15	29	3
204.	Journal of Vegetation Science	Switzerland			28	1	29	2
205.	Soil Science Society American Journal	USA		16	11	2	29	3
206.	Toxicology	Ireland	27			2	29	2
207.	Tropical Ecology	India		24	2	3	29	3
208.	Turkish Journal of Biology	Turkey	22		3	4	29	3
209.	Annals of Biochemistry	USA	22		6		28	2
210.	Clinical Chemistry	USA	25		1	2	28	3
211.	Food Science & Technology	USA	12	1		15	28	3
212.	Journal of Experimental Zoology	USA	1	1		26	28	3
213.	Journal of Hepatology	Denmark	24	4			28	2
214.	Pakistan Journal of Biological Science	Pakistan	9	15	4		28	3
215.	Pakistan Journal of Botany	Pakistan	11	5	12		28	3
216.	Analytical Chemistry	USA	20		6	1	27	3
217.	Applied Microbiology & Biotechnology	Germany	11	8	7	1	27	4
218.	Cell	USA	18		4	5	27	3
219.	Ecological Monograph	USA	3	16		8	27	3
220.	Insect Environment	UK	1	3		23	27	3
221.	International Journal of Environmental Studies	Switzerland	2	23	2		27	3
222.	International Journal of Syst.	UK	6		21		27	2

Sl. No	Name of the Journal	Country	BT	ES	AB	AZ	Total Citations	Cited by No of Departments
	Bacteriology							
223.	International Rice Comm Newsletter	USA		3	24		27	2
224.	Journal of Agriculture Research	Taiwan	6		21		27	2
225.	Journal of Plantation Crops	India	6		21		27	2
226.	Molecular & General Genetics	Germany	23		4		27	2
227.	Natural Product Research	China	15		12		27	2
228.	Tobacco Research	India	3	12	10	2	27	4
229.	Acta Phytopathologica Sinica	China	19		7		26	2
230.	Analytica Chemica Acta	Netherlands	4	22			26	2
231.	Antimicrobial Agents and Chemotherapy	USA	21		2	3	26	3
232.	Biotechnology & Bioengineering	USA	15	6	4	1	26	4
233.	Ecological Applications	USA	2	12	2	10	26	4
234.	International Journal of Remote Sensing	UK		2	24		26	3
235.	International Rice Research Notes	USA	14	12			26	2
236.	Journal of Biotechnology	Netherlands	12	4	8	2	26	4
237.	Plant Protection	Taiwan	3	7	12	4	26	4
238.	Bulletin of Seri. Exptal. Station Japan	Japan	23			2	25	2
239.	Indian Journal of Agricultural Research	India		13	12		25	2
240.	Journal of Applied Microbiology	UK	10	12	2	1	25	4
241.	Journal of Pharmaceutical Sciences	USA	22		2	1	25	3
242.	Physiologia Plantarum	Denmark	17	6	2		25	3
243.	Agronomy Journal	USA	11	12	1		24	3
244.	Analytical Bio Chemistry	USA	22	2			24	2
245.	Asian Journal of Chemistry	India	5	18	1		24	3
246.	Bioinformatics	UK	22	1	1		24	3
247.	Current Research	UK	10	2	9	3	24	4
248.	Experientia	Switzerland	8	1	3	12	24	4
249.	Journal of Chemical Ecology	USA	9	5	2	8	24	4
250.	Journal of Fish Res. Board Canada	Canada	3	13		8	24	3
251.	Plant Breeding	Germany	20		4		24	2
252.	Plant Cell	USA	23		1		24	2
253.	Proc. Acad. Environ. Biology	India		20		4	24	2
254.	Aquatic Toxicology	Netherlands	2	9		12	23	3
255.	Biological Review	UK	4	13	5	1	23	4
256.	Bulletin of Environ Contamination & Toxicology	USA	3	6		14	23	3
257.	Diversity and Distributions	UK		10	6	7	23	3
258.	FAO Plant Protection Bulletin	Italy	4		6	13	23	3
259.	American Naturalist	USA	16	6			22	2
260.	Bryologist	USA	1	3	18		22	3
261.	Bulletin of Japan Soc. Sci. Fish	Japan	21			1	22	2
262.	Fertilizer News	India		10	12		22	2
263.	Indian Journal of Botany	India		17	5		22	2
264.	Indian Perfumer	India	15		7		22	2
265.	International Journal of Pharma Medicine	USA	20		2		22	2
266.	Journal of Biogeography	UK		10	9	3	22	3
267.	Journal of Plant Biochemistry & Biotechnology	India	19		2	1	22	3
268.	Lichenologist	UK		6	16		22	2

Sl. No	Name of the Journal	Country	BT	ES	AB	AZ	Total Citations	Cited by No of Departments
269.	Limnologica	Germany	1	19	2		22	3
270.	Soil Science and Plant Nutrition	Japan	5	10	7		22	3
271.	Virology	USA	20		1	1	22	3
272.	Annals of Agricultural Research	India		17	4		21	2
273.	Biochemistry Journal	Japan			9	12	21	2
274.	Carcinogenesis	USA	7		1	13	21	3
275.	Chemical Review	USA	9	12			21	2
276.	European Journal of Pharmacology	Netherlands	14		7		21	2
277.	Genetic Resources & Crop Evaluation	Netherlands	7		14		21	2
278.	Indian Journal of Horticulture	India		8	10	3	21	3
279.	Journal of American Chemical Society	USA	3	15		3	21	3
280.	Journal of Plant Nutrition	USA		11	10		21	2
281.	Pesticides	UK	19	1		1	21	3
282.	Biologia Plantarum	Netherlands	18		2		20	2
283.	Biomass and Bioenergy	UK		15	5		20	2
284.	Biosciences	USA		16	4		20	2
285.	Bulletin of Entomological Research	UK	4	7		9	20	3
286.	Cytologia	Japan	8		1	11	20	3
287.	Journal of Nature Conservation	India	2	12		6	20	3
288.	Journal of Pathology	UK	16	4			20	2
289.	Journal of Zoology	UK		10		10	20	2
290.	Mycological Research	UK	19		1		20	2
291.	Trends in Ecology & Evolution	UK	2	5	6	7	20	4
292.	Canadian Journal of Zoology	Canada	2	5		12	19	3
293.	Experimental Cell Research	USA	17			2	19	2
294.	Genes & Development	USA	14			5	19	2
295.	Journal of Biological Control	USA	3		2	14	19	3
296.	Journal of Hort. Sci. and Biotechnology	UK	18		1		19	2
297.	Journal of Insect Physiology	UK	5	2		12	19	3
298.	Journal of Karnataka Univ. Science	India		15	1	3	19	3
299.	Journal of living world	USA	1	18			19	2
300.	Journal of Nutrition	USA	16	2		1	19	3
301.	Journal of Pharmacology & Experimental Therapeutics	USA	18			1	19	2
302.	Seminars in Liver Disease	USA	18			1	19	2
303.	Acta Botanica Indica	India	1	5	6	6	18	4
304.	Australian Journal of Plant Physiology	Australia	10		8		18	2
305.	Biological Control	USA	12	4		2	18	3
306.	Clinical Cancer Research	USA	10			8	18	2
307.	European Journal of Biochemistry	UK	14		2	2	18	3
308.	International Journal of Food Microbiology	Netherlands	2	4	3	9	18	4
309.	Journal of Indian Botany	India	13		5		18	2
310.	Journal of Linn Soc Botany	UK	7	7	4		18	3
311.	Journal of Pharmacy and Pharmaceutical Science	Canada	15		3		18	2
312.	Journal of Science Food & Agriculture	Netherlands	7		11		18	2
313.	Journal of Tropical Forest Science	Malaysia	3	4	11		18	3
314.	Microbiological Review	USA	11		7		18	2
315.	Nematologia Mediterranea	Italy	11	7			18	2
316.	Acta Hydrochemica et Hydrobiologica	Germany		16		1	17	2

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317.	American Journal of Public Health	USA	1	16			17	2
318.	Annals of Phytopathological Society of Japan	Japan	1		16		17	2
319.	Asia Pacific Journal of Mol. Boil. & Biotech	India	2	15			17	2
320.	Himachal Journal of Environment Zoology	India		12		5	17	2
321.	Indian Hydrobiology	India		12	1	4	17	3
322.	Indian Journal of Plant Physiology	India	3	4	10		17	3
323.	Journal of Biochemistry	Japan	11		4	2	17	3
324.	Journal of Experimental Biology	UK	8	1		8	17	3
325.	Journal of Marine Biology Ass. India	India		3		14	17	2
326.	Journal of Soil and Water Conservation	USA		16	1		17	2
327.	Netherlands Journal of Plant Pathology	Netherlands	7		10		17	2
328.	Phytoparasitica	Israel	8	2	3	4	17	4
329.	Trends in Biotechnology	UK	13		4		17	2
330.	Tropical Agriculture	Trinidad & Tobago	6	6	3	2	17	4
331.	Amphibia-Reptilia	Netherlands		13		3	16	2
332.	Annals of Internal Medicine	USA	15			1	16	2
333.	Current Opinion in Microbiology	UK	13		1	2	16	3
334.	Geophytology	India	1	2	13		16	3
335.	Indian Eng. Chemistry	India	2	14			16	2
336.	Indian Journal of Physiology and Allied Science	India	13		1	2	16	3
337.	International Review Hydrobiology	Germany	1			15	16	2
338.	Journal of Horticulture Science	UK	15			1	16	2
339.	Journal of Soil Biology and Ecology	India	11	2	3		16	3
340.	Oncogene	UK	15			1	16	2
341.	Pakistan Journal of Scientific & Industrial Research	Pakistan	7	4	5		16	3
342.	Pharmacological Review	USA	12	1		3	16	3
343.	Taiwania	Taiwan	14	1	1		16	3
344.	The Plant Cell	USA	11		5		16	2
345.	Advances in Biosensors	USA		2		13	15	2
346.	Annual Review of Pharmacology & Toxicology	USA	5		1	9	15	3
347.	Biology & Fertility of Soils	Germany	1	10	4		15	3
348.	Endocrinology	USA	5			10	15	2
349.	Environmentalist	USA	1	7	2	5	15	4
350.	Enzyme & Microb. Technology	USA	11	3		1	15	3
351.	Florida Entomologist	USA	4	5		6	15	3
352.	Genetics & Molecular Biology	Brazil	6		3	6	15	3
353.	Global Ecology & Biogeography Letters	UK		1	14		15	2
354.	Indian Food Packer	India	13		1	1	15	3
355.	Indian Journal of Animal Science	India	1	4	4	6	15	4
356.	International Journal of Plant Sciences	USA	8	2	5		15	3
357.	Journal of AOAC	USA	6	1	7	1	15	4
358.	Journal of Applied Ecology	UK		2	5	8	15	3
359.	Journal of Asiat. Soc. Beng.	India	1		13	1	15	3
360.	Kew Bull	UK	14		1		15	2

Sl. No	Name of the Journal	Country	BT	ES	AB	AZ	Total Citations	Cited by No of Departments
361.	Lebensmittel Wissenschaft & Technologie	UK	11			4	15	2
362.	Legume Research	India	4	10	1		15	3
363.	Mycotaxon	USA	2		13		15	2
364.	N Engl Journal of Med	UK	14	1			15	2
365.	Natural Products Science	Korea	14		1		15	2
366.	Physiological Plant Pathology	UK	9		6		15	2
367.	Plant Growth Regulation	Netherlands	14		1		15	2
368.	Proc. Roy. Soc London	UK		7	8		15	2
369.	Research Journal of Medicinal & Aromatic Plant	India	12		3		15	2
370.	Uttar Pradesh Journal of Zoology	India		4	5	6	15	3
371.	Annals of Plant Protection Sciences	India	2	9	3		14	3
372.	Australian Journal of Agricultural Research	Australia	7	4	3		14	3
373.	Biocontrol Science & Technology	UK	10		3	1	14	3
374.	Botany Gazetter	Japan	7		7		14	2
375.	British Journal of Cancer	UK	13			1	14	2
376.	Capsicum and Eggplant Newsletter	Italy	9		5		14	2
377.	Cereal Chemistry	USA	5	4	5		14	3
378.	Ecology Letters	UK		6	6	2	14	3
379.	Journal of Agronomy & Crop Science	Germany		4	10		14	2
380.	Journal of Apicultural Research	UK	13	1			14	2
381.	Journal of Biological Science	India	4	2	6	2	14	4
382.	Journal of Heredity	USA	8		5	1	14	3
383.	Journal of Indian Chemical Society	India	12			2	14	2
384.	Journal of Lipid Research	USA	8			6	14	2
385.	Journal of Science India Research	India	13			1	14	2
386.	Natural Product Reports	UK	8		5	1	14	3
387.	Pesticide Biochemistry & Physiology	USA	3			11	14	2
388.	Andhra Agricultural Journal	India	4	1	7	1	13	4
389.	Aquatic Ecology	Netherlands	1	7	2	3	13	4
390.	Asian Journal of Plant Science	India	6	3	4		13	3
391.	Canadian Entomologist	Canada		2	11		13	2
392.	European Polymer Journal	UK	11			2	13	2
393.	Fungal Genetics and Biology	USA	2		11		13	2
394.	Indian Agriculture	India	3	5	4	1	13	4
395.	Indian Journal of Soil Conservation	India		2	11		13	2
396.	International Journal of Green Pharmacy	USA	9		4		13	2
397.	International Journal of Pharmaceutics	Netherlands	12		1		13	2
398.	Journal of Great Lakes Research	USA		12	1		13	2
399.	Journal of Herbs Species and Medicinal Plants	USA	4		8	1	13	3
400.	Journal of Insect Behavior	USA	1	5		7	13	3
401.	Journal of Lab Clinical Medicine	USA	9		3	1	13	3
402.	Journal of Scientific and Industrial Research	India	1	7	5		13	3
403.	Journal of Stored Prod. Research	UK		6	7		13	2
404.	Nutrition & Cancer	USA	12			1	13	2
405.	Sorghum Newsletter	India	11		2		13	2
406.	Tree Physiology	Canada	6		7		13	2

Sl. No	Name of the Journal	Country	BT	ES	AB	AZ	Total Citations	Cited by No of Departments
407.	World Journal of Gastroenterology	China	12		1		13	2
408.	Agrobios	India	1	5	6		12	3
409.	American Midland Naturalist	USA		1	3	8	12	3
410.	Bangladesh Journal of Zoology	Bangladesh		5	2	5	12	3
411.	Biological Bulletin	USA	2			10	12	2
412.	Blumea	Netherlands	10	1	1		12	3
413.	Brazilian Journal of Med. & Boil. Res.	Brazil	10		1	1	12	3
414.	Environmental Research	USA		1		11	12	2
415.	Food Microbiology	UK	1	5	1	5	12	4
416.	Fruits	France	7	4		1	12	3
417.	Indian Journal of Microbiology	India	4	1	4	3	12	4
418.	Journal of Current Biological Science	USA		10		2	12	2
419.	Journal of Invest Dermatology	USA	11		1		12	2
420.	Journal of Research ANGRAU	India	2	2	8		12	3
421.	Journal of Toxicology and Environmental Health	USA	3	3		6	12	3
422.	Journal of Tropical Agriculture	India	3	2	7		12	3
423.	Journal of Wild Life Management	USA			1	11	12	2
424.	Molecular & Cellular Biochemistry	USA	11		1		12	2
425.	My Forest	India	5	1		6	12	3
426.	Systematic and Applied Microbiology	Germany	2	2	8		12	3
427.	Trends in Pharmacological Science	UK	9			3	12	2
428.	Tropical Pest Management	Japan	5	2	5		12	3
429.	Turkish Journal of Botany	Turkish		10	2		12	2
430.	Acta Entomologica Sinica	China		6		5	11	2
431.	Alternative Medicine Review	USA	9		2		11	2
432.	American Zoologist	USA		1		10	11	2
433.	Australian Journal of Botany	Australia	4	1	6		11	3
434.	British Medical Journal	UK	9	2			11	2
435.	Critical Reviews in Plant Sciences	USA	8		3		11	2
436.	Developmental Biology	USA	7			4	11	2
437.	FEMS Microbiological Review	Netherlands		2	9		11	2
438.	Genetika	Russia	3			8	11	2
439.	Horticulture Review	Canada	5		6		11	2
440.	Indian Journal of Forestry	India			5	6	11	2
441.	Indian Journal of Zoology	India		3	1	7	11	3
442.	International Journal of Radiat Biology	UK	2			9	11	2
443.	Journal of Clinical Microbiology	USA	7	2	2		11	3
444.	Journal of Spices and Aromatic Crops	India	1		10		11	2
445.	Journal of Water Pollution Control	USA	3			8	11	2
446.	Microbiology and Molecular Biology Review	USA	8		3		11	2
447.	Molecular Biology and Evolution	USA	5			6	11	2
448.	Naturewissenshaften	Germany	8	1	1	1	11	4
449.	New England Journal of Medicine	USA	10		1		11	2
450.	Nova Hedwigia	Germany	1	3	7		11	3
451.	Sericologia	UK	7			4	11	2
452.	Trends in Genetics	UK	10			1	11	2
453.	Advances in Agronomy	USA	4	4		2	10	3
454.	Advances in Applied Microbiology	USA	6	4			10	2
455.	African Journal of Biomed Research	South Africa	6		3	1	10	3

Sl. No	Name of the Journal	Country	BT	ES	AB	AZ	Total Citations	Cited by No of Departments
456.	Annual Review of Microbiology	USA		3	3	4	10	3
457.	Asian Journal of Micro. Biotech. Env. Science	India			4	6	10	2
458.	Bibliotheca Lichenologica	Germany		4	6		10	2
459.	Biology of Reproduction	USA	2			8	10	2
460.	Fitopatologia Brasileira	Brazil	5		5		10	2
461.	Folia Microbiologica	UK	6		4		10	2
462.	Gazz. Chim. Italica	Italy	9	1			10	2
463.	International Immunopharmacology	UK	7		3		10	2
464.	International Journal of Agricultural & Biology	Switzerland		1	9		10	2
465.	International Journal of Applied Research In Natural Products	USA	8		2		10	2
466.	International Review of Cytology	USA	4			6	10	2
467.	Journal of Applied Science	USA	2	6	2		10	3
468.	Journal of Chromatography	Netherlands	4		6		10	2
469.	Journal of Clinical Investigation	USA	9		1		10	2
470.	Journal of Elisha Mitchell Scientific Soc	USA		8	2		10	2
471.	Journal of Essent. Oil Research	USA	8		1	1	10	3
472.	Journal of Immunological Methods	Netherlands	9		1		10	2
473.	Journal of Indian Inst Science	India		5	4	1	10	3
474.	Journal of Infect Disease	USA	8	2			10	2
475.	Journal of Sericultural Science of Japan	Japan	8			2	10	2
476.	Lipids	USA	9		1		10	2
477.	Lloydia	USA	8	1		1	10	3
478.	Mycoscience	Japan	6		4		10	2
479.	Pedobiologia	Germany		9	1		10	2
480.	Plant Systematic & Evolution	Austria	7		3		10	2
481.	Silvae Genetica	Germany	3	2	5		10	3
482.	Turrialba	Costa Rica		1	9		10	2
483.	Wetlands	USA		3	4	3	10	3
484.	Zhongguo Zhong Yao Za Zhi	China	7		2	1	10	3
485.	American Journal of Physiology	USA	8		1		9	2
486.	Annals of the Entomological Society of America	USA		6		3	9	2
487.	Anticancer Research	Greece	7			2	9	2
488.	Australian Journal of Ecology	Australia	1	3	3	2	9	4
489.	Biochemical Syst. And Ecology	UK		3	3	3	9	3
490.	Biological Abstract	USA			3	6	9	2
491.	Biometrics	USA	5		3	1	9	3
492.	Bioscience	USA	1			8	9	2
493.	Canadian Journal of Forest Research	Canada	2	5	2		9	3
494.	Ecological Entomology	UK	4			5	9	2
495.	Egyptian Journal of Agricultural Research	Egypt		6	3		9	2
496.	Food & Chemical Toxicology	UK			4	5	9	2
497.	Indian Journal of Heredity	India	1			8	9	2
498.	International Journal of Food Science & Technology	UK	8		1		9	2
499.	International Journal of Pest Management	UK		4	3	2	9	3

Sl. No	Name of the Journal	Country	BT	ES	AB	AZ	Total Citations	Cited by No of Departments
500.	Journal of Applied Horticulture	India	8	1			9	2
501.	Journal of Applied Zoological Researches	India	2	3		4	9	3
502.	Journal of Asian Natural Product Research	Switzerland	6		2	1	9	3
503.	Journal of Biochemistry & Molecular Biology Online	Hongkong	7			2	9	2
504.	Journal of Current Science	India		7		2	9	2
505.	Journal of Dairy Science	USA	3	1	5		9	3
506.	Journal of Environmental Management	UK		6		3	9	2
507.	Journal of Freshwater Biology	USA			1	8	9	2
508.	Journal of Madhurai Uni Suppl	India		7		2	9	2
509.	Journal of Zoological Society India	India		6		3	9	2
510.	Marine Biotechnology	USA	1			8	9	2
511.	Microbiologia	Spain		2	3	4	9	3
512.	Microbiology	UK	7	1	1		9	3
513.	Molecular Cancer Therapeutics	USA	7			2	9	2
514.	Molecular Microbiology	UK	6	1	2		9	3
515.	Pakistan Journal of Nutrition	Pakistan	8		1		9	2
516.	Pakistan Journal of Zoology	Pakistan		5	2	2	9	3
517.	Progressive Horticulture	USA	5		4		9	2
518.	Pure and Applied Chemistry	USA	3	5	1		9	3
519.	Rec. Zool. Surv. India	India		2		7	9	2
520.	Research on Crops	India	5	4			9	2
521.	Scientific American	USA		7	2		9	2
522.	South African Journal of Botany	South Africa	8		1		9	2
523.	The American Phytopathological Society	USA	4		5		9	2
524.	Vitis	Germany	6		3		9	2
525.	Yojana	India	1	6	2		9	3
526.	Acta Crystallographica	Denmark	7			1	8	2
527.	American Journal of Hum Genet	USA	4		4		8	2
528.	Ancient Science of Life	India	7		1		8	2
529.	Annals of Agriculture Science	Poland	1		7		8	2
530.	Applied Entomology & Zoology	Japan	4	4			8	2
531.	Aquatic Sciences	Switzerland		7		1	8	2
532.	Asian Fisheries Science	USA	1	1		6	8	3
533.	Australian Journal of Entomology	Australia	1	5		2	8	3
534.	Biological Chemistry	Germany	6		2		8	2
535.	Bioved	India	1		4	3	8	3
536.	Botanical Survey India	India		1	7		8	2
537.	California agric.	USA	3	4	1		8	3
538.	Cotton Grower	USA		1	5	2	8	3
539.	Current Biology	USA	4			4	8	2
540.	Current Microbiology	USA		3	4	1	8	3
541.	Environmental Management	USA		6		2	8	2
542.	Food Control	UK	1		7		8	2
543.	Haryana Agric. Univ. Journal of Research	India	6		2		8	2
544.	Indian Journal of Arecanut Spices and Medicinal Plants	India	1		7		8	2

Sl. No	Name of the Journal	Country	BT	ES	AB	AZ	Total Citations	Cited by No of Departments
545.	Indian Silk	India	7	1			8	2
546.	International Journal of Food Science & Nutrition	UK	4	2		2	8	3
547.	International Journal of Syst & Evol Microbiology	UK	3		5		8	2
548.	International Journal of Tropical Plant Disease	India		1	7		8	2
549.	JNKVV Research Journal	India	1		7		8	2
550.	Journal of Applied Entomology	Germany	2	5		1	8	2
551.	Journal of Indian Assoc. for Environment Management	India		7	1		8	2
552.	Journal of Nat. Cancer. Inst.	USA	2		1	5	8	3
553.	Louisiana Municipal Review	USA		6	2		8	2
554.	Methods in Molecular Biology	USA	7		1		8	2
555.	Molecular Pharmacology	USA	4		1	3	8	3
556.	Molecular Plant Pathology	UK	3		5		8	2
557.	New Botanist	India	1	3	4		8	3
558.	Parlowia	USA		6	2		8	2
559.	Plant Physiology and Biochemistry	France	7	1			8	2
560.	Remote Sensing of Environment	USA		1	7		8	2
561.	Revista Brasileira de Biologia	Brazil		7		1	8	2
562.	Risoe	Denmark		2	6		8	2
563.	Schweiz Z Hydrol	Switzerland		5	3		8	2
564.	Sydowia	Austria	1	2	5		8	3
565.	Systematic Biology	USA		4	3	1	8	3
566.	Toxicology Letters	Ireland		1		7	8	2
567.	Tropical Science	UK	5		1	2	8	3
568.	Water Supply and Management	UK		7	1		8	2
569.	Weed Science	USA	3	3	2		8	3
570.	Advances in Botanical Research	USA	5	1	1		7	3
571.	American Journal of Pathology	USA	6			1	7	2
572.	Annot Zool Japan	Japan	2		5		7	2
573.	Applied Biochemistry & Biotechnology	USA	2	2	3		7	3
574.	Australian Journal Marine Fresh Water Research	Australia		5	2		7	2
575.	Australian Journal of Biological Science	Australia	1		5	1	7	3
576.	Bionature	India		6	1		7	2
577.	Cell & Tissue Research	Germany	2			5	7	2
578.	Cell Biology & Toxicology	Netherlands	5			2	7	2
579.	Chemical & Biological Interactions	USA	6		1		7	2
580.	Chromosoma	Germany	1			6	7	2
581.	Ecology of Freshwater Fish	Denmark		1		6	7	2
582.	Experimental Agriculture	UK	1		6		7	2
583.	Field Crops Research	Netherlands		1	2	4	7	3
584.	Flora and Fauna	Italy	1		6		7	2
585.	Food Technology	USA	6			1	7	2
586.	Gayana Botanica	Chile		5	2		7	2
587.	Japanese Journal of Ecology	Japan		5		2	7	2
588.	Journal of Arid Environment	UK			6	1	7	2
589.	Journal of Clinical Pathology	UK	6		1		7	2
590.	Journal of Indian Microb.	India	3	4			7	2

Sl. No	Name of the Journal	Country	BT	ES	AB	AZ	Total Citations	Cited by No of Departments
	Biotechnology							
591.	Journal of Microbiology Methods	Netherlands		3	4		7	2
592.	Journal of Natural Medicine	Japan	6		1		7	2
593.	Journal of Nematology	USA	6	1			7	2
594.	Journal of Oil Palm Research	Malaysia		3	4		7	2
595.	Journal of Rural Development	India		1	6		7	2
596.	Journal of Science Technology	UK		4		3	7	2
597.	Journal of Tree Fruit Production	USA		1	6		7	2
598.	Limnology	Japan		5		2	7	2
599.	Metabolism	USA	4	2	1		7	3
600.	Mycorrhiza	Germany	5		2		7	2
601.	Pakistan Journal of Agricultural Research	Pakistan	3	1	3		7	3
602.	Pestology	USA	1			6	7	2
603.	Physiological Zoology	USA		1		6	7	2
604.	Research Bulletin Punjab University	India		2		5	7	2
605.	River Ecology	USA		3	4		7	2
606.	Sarhad Journal of Agric	Pakistan	1	4	2		7	3
607.	Summa phytopathologia	USA	2		5		7	2
608.	Symbolae Botanical Upsalienses	Sweden		1	6		7	2
609.	The Botanical Review	USA		4	3		7	2
610.	Turkish Journal of Eng Environmental Science	Turkey	1	6			7	2
611.	Zeitchrift fur Pflanzenkrankheiten Pfalnzenchutz	Germany	5		2		7	2
612.	Zoological Studeies	Taiwan		2		5	7	2
613.	African Journal of Agricultural Research	South Africa	1	1	4		6	3
614.	Agrochemica	Italy		3	3		6	2
615.	Ambio	Switzerland		4	2		6	2
616.	Analyst	UK		3		3	6	2
617.	Asian Journal of Experimental Science	India	5	1			6	2
618.	Asian Pac Journal of Tropical Medicine	Egypt	5		1		6	2
619.	Biological Journal of the Linnean Soc.	UK			3	3	6	2
620.	Brazilian Journal of Biology	Brazil		3	3		6	2
621.	Bulletin of Korean Fish Society	Korea	2	4			6	2
622.	Critical Review Food Science & Nutrition	USA	4		1	1	6	3
623.	European Journal of Appl. Microbiol. Biotechnology	UK	1	3	1	1	6	4
624.	Evergreen My Forest	India			1	5	6	2
625.	Evidence Based Complement Alternat Med	UK	5		1		6	2
626.	FAO Fish Report	USA	1	5			6	2
627.	Flavour and Fragrance Journal	UK	5		1		6	2
628.	Fundamental & Clinical Pharmacology	France	5		1		6	2
629.	Genetica	Netherlands	5		1		6	2
630.	Haryana Journal of Horticultural Science	India	2	4			6	2
631.	Hereditas	Sweden	1		5		6	2
632.	Indian Journal of Dryland Agric Res	India	1		5		6	2

Sl. No	Name of the Journal	Country	BT	ES	AB	AZ	Total Citations	Cited by No of Departments
	Development							
633.	Indian Journal of Environmental Biology	India		3	1	2	6	3
634.	International Agrophysics	Poland	1	1	4		6	3
635.	Journal of Basic Microbiology	Germany		1	5		6	2
636.	Journal of Ferment Technology	Japan	2	4			6	2
637.	Journal of General Plant Pathology	Italy	2		4		6	2
638.	Journal of Histochem & Cytochemistry	USA	5			1	6	2
639.	Journal of Plant Growth Regulation	USA	2		4		6	2
640.	Journal of Theoretical Biology	UK	1	1	2	2	6	4
641.	Landscape Ecology	Netherlands		4	2		6	2
642.	Madras Journal Fish	India		5	1		6	2
643.	Microbial Ecology	USA	3	2		1	6	3
644.	Microbiology & Immunology	Japan	2		4		6	2
645.	Nahrung	Germany		1	5		6	2
646.	Nature Medicine	UK	5		1		6	2
647.	Obstetrics & Gynecology	USA	4			2	6	2
648.	Pesticide Research Journal	Denmark	5	1			6	2
649.	Photogrammetric Engi. and Remote Sensing	USA		1	5		6	2
650.	PLACROSYM	India			1	5	6	2
651.	Plant Biology	Korea	5	1			6	2
652.	Plant Genetic Resources News letter	Italy	3	1	2		6	3
653.	Planter's Chronicle	India			1	5	6	2
654.	Postgrad Med Journal	UK	5		1		6	2
655.	Queensland Agricultural Journal	Australia	2		1	3	6	3
656.	Resonance	India	1	1	3	1	6	4
657.	Southest China Journal of Agricultural Sciences	China	4	2			6	2
658.	Trans Linn. Soc. London	UK			3	3	6	2
659.	World Journal of Agricultural Product	USA		1	5		6	2
660.	Zoological Survey India	India		1		5	6	2
661.	Agronomie	France	3		2		5	2
662.	Alex Journal of Agriculture Research	Egypt		1	3	1	5	3
663.	American Journal of Epidemilogy	USA	3	1	1		5	3
664.	Applied Soil Ecology	Netherlands	1	2	1	1	5	4
665.	Archives of Insect Biochemistry & Physiology	USA	4			1	5	2
666.	Australian Journal of Experimental Agriculture	Australia	3		2		5	2
667.	Berichfe deutsche botanische gesellschaff	Germany		4	1		5	2
668.	Biotechniques	USA	4		1		5	2
669.	Canadian Journal of Genct. Cytology	Canada	4		1		5	2
670.	Cancer Review	USA	4			1	5	2
671.	Candollea		1		4		5	2
672.	Cellular & Molecular Biology Letter	USA	4		1		5	2
673.	China Cottons	China	1			4	5	2
674.	Climate Change Digest	Canada		4	1		5	2
675.	Commonwealth Forestry Rev.	UK		1	3	1	5	3
676.	Critical Reviews in Microbiology	USA	2	3			5	2

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677.	Current Nematology	India	4	1			5	2
678.	Dhaka Univ Journal of Pharm Science	Bangladesh	4		1		5	2
679.	Entomological Science	Japan		3		2	5	2
680.	European Journal of Soil Biology	France	1	3	1		5	3
681.	Everyman,s Science	India	1	2	2		5	3
682.	FEMS Immunological & Medicine Microbiology	Netherlands	4		1		5	2
683.	Fishery Bulletin	USA			1	4	5	2
684.	Gujarat Agriculture University Research Journal	India			3	2	5	2
685.	Helvetica Chimica Acta	Switzerland	1	1	1	2	5	4
686.	Indian Journal of Biochem. Biophys	India	4		1		5	2
687.	Indian Journal of Hil Farming	India	2	2	1		5	3
688.	Indian Journal of Plant Pathology	India	2		3		5	2
689.	Infection	Germany	4			1	5	2
690.	International Journal of Chemical Kinetics	USA	4		1		5	2
691.	Journal of Botany	China	4			1	5	2
692.	Journal of Chemistry Technology & Biotechnology	UK	2		3		5	2
693.	Journal of Clinical Biochemical & Nutrition	Japan	3		2		5	2
694.	Journal of Ferment & Bioengineering	Japan	4		1		5	2
695.	Journal of Food Biochemistry	USA	4	1			5	2
696.	Journal of Forestry Research	China		2	3		5	2
697.	Journal of Hill Research	India	2		3		5	2
698.	Journal of Organic Chemistry	USA	2		3		5	2
699.	Journal of Research Birsa Agric Universities	India	1	4			5	2
700.	Journal of Saint. Eng. Div. Am. Soc. Giv. Engrs.	USA		2	3		5	2
701.	Journal of Science and Technology	USA	3		2		5	2
702.	Journal of Science Food & Agriculture Immunology	UK		4		1	5	2
703.	Journal of Scientific Research in Plants & Med	India	1		4		5	2
704.	Journal of the American Society for Horticultural Science	USA	4	1			5	2
705.	Kisan World	India			3	2	5	2
706.	Korean Journal of Food Science & Technology	Korea	2		1	2	5	3
707.	Korean Journal of Plant Pathology	Korea	1		4		5	2
708.	Marine and Fresh Water Research	Australia		3	1	1	5	3
709.	Molecular Phylogenet & Evolution	USA	1	2	1	1	5	4
710.	Molecules	Switzerland	4		1		5	2
711.	Northwest Science	USA		3	2		5	2
712.	Oleagineux	France	1		4		5	2
713.	Pertanika Journal of Tropical Agric Science	Malaysia	1	1	3		5	3
714.	Phytopathologia Mediterranea	USA	1		4		5	2
715.	Revista Theobroma	Brazil		3	2		5	2

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716.	Revroum. Biol. Ser. Biol. Anim.	USA		4	1		5	2
717.	Rheedea	India		1	4		5	2
718.	Science Progress	UK		2	3		5	2
719.	Sewage and Industrial Wastes	UK		2	3		5	2
720.	Virginia Journal of Science	USA		4		1	5	2
721.	Water Air and Soil Pollution	Netherlands			1	4	5	2
722.	Acta Agronomica Sinica	China	2		2		4	2
723.	Acta Biotechnologica	Germany	2	2			4	2
724.	Agronomia Tropical	Venezuela	1	1	2		4	3
725.	American Orchid Soc. Bull	USA		1	3		4	2
726.	Amruth	India	3		1		4	2
727.	Annals of Entomological Soc. Am.	USA	1		1	2	4	3
728.	Annals of Forestry	India		1	3		4	2
729.	Archives of Phytopathol and Plant Protection	Switzerland	2		2		4	2
730.	Bangladesh Journal of Agricultural Science	Bangladesh	3			1	4	2
731.	Bangladesh Journal of Botany	Bangladesh		1	3		4	2
732.	Biochemistry Physiology	USA	3			1	4	2
733.	Biofactors	Netherlands	3	1			4	2
734.	Biologia Bratislava	Brazil	2		1	1	4	3
735.	Biomarkers	UK	1	1		2	4	3
736.	Biosensors and Bioelectronics	UK	3		1		4	2
737.	BMC Plant Biology	USA	3		1		4	2
738.	Botanical Magazine Tokyo	Japan	1		3		4	2
739.	Brazilian Arch Biol Technology	Brazil			3	1	4	2
740.	Breeding Science	Japan	3		1		4	2
741.	Bulletin of Dept. Agric. Mysore Ent. Ser.	India	3			1	4	2
742.	Bulletin of Soc. Chem. Farm	France	2	2			4	2
743.	Bulletin of Zoological Survey India	India		2		2	4	2
744.	Canadian Journal of Biochemistry	Canada	2		1	1	4	3
745.	Cancer Detection & Prevention	USA	2		2		4	2
746.	Critical Review in Environmental Science and Technology	USA		3		1	4	2
747.	Diseases of Aquatic Organisms	Germany		2		2	4	2
748.	Ecotoxicology	USA	1	3			4	2
749.	Evolutionary Ecology	Netherlands	1	3			4	2
750.	Experimental Gerontology	USA	1			3	4	2
751.	Experimental Mycology	USA	3	1			4	2
752.	Federal Chemical Toxicology	USA	3			1	4	2
753.	Food and Agricultural Immunology	UK	2		2		4	2
754.	Hawaii Agric Exp Station	USA	1		1	2	4	3
755.	Indian Journal of Peadiatrics	India	3			1	4	2
756.	Indian Journal of Science Technology	India	2		2		4	2
757.	Indian Rev Life Science	India		1		3	4	2
758.	Industrial and Eng Chemistry Research	USA		3	1		4	2
759.	International Journal of Environment & Pollution	Netherlands	1		1	2	4	3
760.	International Journal of Sustainable Development	Switzerland		1	3		4	2

Sl. No	Name of the Journal	Country	BT	ES	AB	AZ	Total Citations	Cited by No of Departments
761.	International Journal of Tropical Agriculture	India		3		1	4	2
762.	Journal of American Science	USA		1	3		4	2
763.	Journal of Aquaculture in the Tropics	Netherlands	3		1		4	2
764.	Journal of Dental Research	USA	3	1			4	2
765.	Journal of Food Engineering	UK			3	1	4	2
766.	Journal of Food Safety	USA			2	2	4	2
767.	Journal of Interacademica		2		1	1	4	3
768.	Journal of Palynology	India	3		1		4	2
769.	Journal of Physiology	UK	1		3		4	2
770.	Journal of Surgical Research	USA	3		1		4	2
771.	Journal of the American Oil Chemists Society	USA	1	1		2	4	3
772.	Journal of Toxicological Sciences	Japan	1			3	4	2
773.	Kuvempu University Science Journal	India	2	1		1	4	3
774.	Lancet Infect Disease	UK	1		3		4	2
775.	Life Sciences	USA			1	3	4	2
776.	Marine Biology	Germany		3	1		4	2
777.	Meat Science	UK	2			2	4	2
778.	Mem. Dep. Agr. India Botany	India	3		1		4	2
779.	Mycosystema	China	3		1		4	2
780.	Nature New Biology	USA	3		1		4	2
781.	New Agriculturist	UK		2	2		4	2
782.	Oil Crops of China	China	2		2		4	2
783.	Pesquisa Agropecuaria Brasileira	Brazil	1	1	1	1	4	4
784.	Pest Management and Economic Zoology	USA	2	2			4	2
785.	PKV Research Journal	India	1		3		4	2
786.	Plant Foods for Human Nutrition	Netherlands	3		1		4	2
787.	Recent Advanced in Freshwater Biology	UK		3		1	4	2
788.	Research Journal of Agricultural and Biological Science	USA		3	1		4	2
789.	Revista Brasileira de Zoologia	Brazil	2			2	4	2
790.	Russian Journal of Ecology	Russia		2		2	4	2
791.	SABRAO .J	Thailand		1	3		4	2
792.	Science Report	Japan		1	1	2	4	3
793.	Scientia Agricola	Brazil	1			3	4	2
794.	Shashpa		2	1		1	4	3
795.	Stain Technology	UK	2		2		4	2
796.	Svenks Botanisk Tidsskrift	Sweden		2	2		4	2
797.	Tappi Journal	USA		3	1		4	2
798.	Tropicultura	Belgium		2	1	1	4	3
799.	Turkish Journal of Agriculture	Turkey	2		2		4	2
800.	Turkish Journal of Zoology	Turkey		2		2	4	2
801.	Univ Agric Sci Bangalore	India		2	2		4	2
802.	Verhandlungen der Int. Vereinigung fur Theo. Und Ange Lim	Germany		1	3		4	2
803.	Water Pollution Control	USA		3		1	4	2
804.	Zentralbi Mikrobiology	Germany	1	2	1		4	3
805.	Acta Botanica Hungarica	Hungary		2	1		3	2
806.	Acta Botanica Malacitana	Spain		2		1	3	2

Sl. No	Name of the Journal	Country	BT	ES	AB	AZ	Total Citations	Cited by No of Departments
807.	Acta Genc Indica Chem	India	1	2			3	2
808.	African Crop Science Journal	South Africa			2	1	3	2
809.	African Journal of Ecology	UK		2		1	3	2
810.	Agriculture Today	India		1		2	3	2
811.	Agro Botanica	India	1	2			3	2
812.	Agro India	India	2			1	3	2
813.	Alimentaria	Spain	1			2	3	2
814.	American Eurasian Journal of Agric Envi Sci	USA	1		2		3	2
815.	American Journal of Medicine	USA	2		1		3	2
816.	American Society for Microbiology	USA		1	2		3	2
817.	Anatomical Record	USA		1		2	3	2
818.	Androligia	Germany	2		1		3	2
819.	Annals of Microbiology	Italy	1		2		3	2
820.	Antiviral Research	Netherlands	2		1		3	2
821.	Antonie van Leeuwenhoek	Netherlands		2		1	3	2
822.	Applied Herpetology	USA		2		1	3	2
823.	Aquatic Biology	Netherlands		1		2	3	2
824.	Australian Forestry	Australia		1	2		3	2
825.	Bangladesh Journal of Entomology	Bangladesh		1		2	3	2
826.	Biomedical Chromatography	UK	2		1		3	2
827.	Biotechnology Progress	USA	1		1	1	3	3
828.	Breast Cancer Research	UK	1			2	3	2
829.	Bulletin of Experimental Biology & Medicine	Netherlands	2			1	3	2
830.	Bulletin of Faculty of Agric Univ of Cairo	Egypt		2	1		3	2
831.	Canadian Inst of Food Science & Technology	Canada		1		2	3	2
832.	Caribbean Journal of Science	Puerto Rico		1	2		3	2
833.	Contraception	USA	2		1		3	2
834.	Economic and Pol. Weekly	India			2	1	3	2
835.	Energy convers & Management	UK	1	2			3	2
836.	Environmental Biology	USA	1	1		1	3	3
837.	Experimental Botany	USA	1	2			3	2
838.	Fed Procurement Update	USA	2		1		3	2
839.	Gartenbau Wissen Sehaft	Austria	1	1	1		3	3
840.	Genetical Research	UK	1			2	3	2
841.	Indian Horticulture	India	1	2			3	2
842.	Indian Journal of Environmental Toxicology	India		2		1	3	2
843.	Indian Journal of Toxicology	India			2	1	3	2
844.	International Journal of Antimicrobial Agents	Netherlands	1		2		3	2
845.	International Journal of Appl Biol and Pharma Tech		2		1		3	2
846.	International Journal of Epidema.	UK	2	1			3	2
847.	Journal of Agriculture Science Soc of North East India	India	1	2			3	2
848.	Journal of Community Health	USA	2		1		3	2
849.	Journal of Environment Pathol.	USA	1	1		1	3	3

Sl. No	Name of the Journal	Country	BT	ES	AB	AZ	Total Citations	Cited by No of Departments
	Toxicol.& Oncology							
850.	Journal of Environmental Science and Health Part A	USA		1		2	3	2
851.	Journal of Gastroenterol. Hepatology	Australia	2		1		3	2
852.	Journal of Islamic Acad of Sciences	India		2	1		3	2
853.	Journal of Nanjing Agricultural University	China		1	2		3	2
854.	Journal of Neurol Neurosurg Psychiatry	UK	2		1		3	2
855.	Journal of Nuclear Agric & Biology	India	1	1	1		3	3
856.	Journal of Plant Protection Research	Poland		1	2		3	2
857.	Journal of Southwest Agric. Univ.	USA	1			2	3	2
858.	Journal of Tennessee Acad. Science	USA		2	1		3	2
859.	Kankyo Gijustu	Japan	2	1			3	2
860.	Korean Journal of Crop Science	Korea	1		2		3	2
861.	Lindleyana	USA		1	2		3	2
862.	Mem Ind Mus	India		1		2	3	2
863.	Mem. Acad Roy Sci Denmark Sect Science	Denmark		2	1		3	2
864.	Met. Kem	USA		2	1		3	2
865.	Mine Water and the Environment	UK	1	2			3	2
866.	National Journal of Life science	USA		1		2	3	2
867.	Nature and Resources	France		1	2		3	2
868.	Nature and Science	Japan		1	2		3	2
869.	Nature Proceedings	Germany	2		1		3	2
870.	Nitrogen Fixing Tree Research Reports	USA		2		1	3	2
871.	Oceanography	USA		2	1		3	2
872.	Pakistan Journal of Phyto Pathology	Pakistan	1	2			3	2
873.	Pest Management Science	UK		1	2		3	2
874.	Plant and Nature	India		1		2	3	2
875.	Plant Varieties and Seeds	UK	2		1		3	2
876.	Proc. Zool. Science Calcutta	India		2		1	3	2
877.	Radiat Research	USA	1			2	3	2
878.	Renewable and Sustainable Energy Reviews	UK		2	1		3	2
879.	Sea Food Export Journal	India		2		1	3	2
880.	Sesame Safflower Newsletter	France	1		2		3	2
881.	Tamilnadu Journal of Veterinary & Animal Sciences	India	2		1		3	2
882.	The Andhra Agricultural Journal	India		1	2		3	2
883.	The Bryologist	USA		1	2		3	2
884.	The Nucleus	USA		1	1	1	3	3
885.	Toxicon	UK			1	2	3	2
886.	Turkish Journal of Fish Aquatic Science	Turkish			1	2	3	2
887.	Turkish Journal of Pharmaceutical Science	Turkey	2		1		3	2
888.	Water & Waste Treatment	UK		2		1	3	2
889.	Zashchita Rastenii	Russia			2	1	3	2
890.	Acta Theriologica	Poland			1	1	2	2
891.	Advances in Bio Chem. Eng	USA	1		1		2	2
892.	Advances in Genetics	USA	1			1	2	2
893.	African Journal of Aquatic Science	South Africa		1		1	2	2

Sl. No	Name of the Journal	Country	BT	ES	AB	AZ	Total Citations	Cited by No of Departments
894.	African Journal of Microbiology Research	South Africa	1		1		2	2
895.	Aichi-Ken Kogai Chosa Senta Shoho	China	1	1			2	2
896.	American Scientist	USA		1	1		2	2
897.	Annals of the Missouri Botanical Garden	India	1			1	2	2
898.	Annals of the Sri Lanka Department of Agriculture	Srilanka	1	1			2	2
899.	Annual Review of Genetics	USA			1	1	2	2
900.	Archives of Microbiology	Germany		1		1	2	2
901.	Arogya Journal of Health Science	India	1	1			2	2
902.	Australian Journal of Bas. Applied Science	Australia	1	1			2	2
903.	Australian Journal of Soil Research	Australia	1	1			2	2
904.	Batavia	Netherlands	1		1		2	2
905.	Bengal Agricultural Journal	India	1			1	2	2
906.	Biochemistry & Molecular Biology International	UK	1			1	2	2
907.	Biodegradation	Netherlands	1	1			2	2
908.	Biological Science	Japan		1	1		2	2
909.	Biotechnology News	USA		1		1	2	2
910.	Botany	Japan	1		1		2	2
911.	Brazilian Journal of Plant Physiology	Brazil	1		1		2	2
912.	British Journal of Haematology	UK	1			1	2	2
913.	Bulletin of Dept. Mar. Sci. Uni Cochin	India		1		1	2	2
914.	Bulletin of Mus. Hest. Nat. Ser. Paris	USA	1	1			2	2
915.	Butterworth	UK	1		1		2	2
916.	Canadian Journal of Chemistry	Canada	1	1			2	2
917.	Chemie Mikrobiologie Technologie der Levensmittel	Germany		1		1	2	2
918.	Clinical Microbiology Reviews	USA		1		1	2	2
919.	Conservation Genetics	Netherlands		1		1	2	2
920.	Current Opinion in Structure Biology	UK	1		1		2	2
921.	Ecological Economics	Netherlands		1		1	2	2
922.	Electronic Journal of Biotechnology	Chile		1	1		2	2
923.	European Journal of Scientific Research		1		1		2	2
924.	Fish Physiology & Biochemistry	Netherlands	1			1	2	2
925.	Functional Ecology	UK	1		1		2	2
926.	Indian Ecologist	India	1	1			2	2
927.	Indian Journal of Aquatic Biology	India		1		1	2	2
928.	Industrial Crops and Products	Netherlands	1		1		2	2
929.	Information Tech. Bulletin	India	1	1			2	2
930.	Innovative Food Sci Emerg Technologies	Netherlands	1			1	2	2
931.	International Journal of Eng. Science	UK		1	1		2	2
932.	International Journal of Health Sciences	USA	1		1		2	2
933.	International journal of Psychology	USA	1	1			2	2
934.	Iranian Journal of Agricultural Science	Iran	1		1		2	2
935.	Israel Journal of Entomology	Israel	1	1			2	2
936.	Journal of Antibiotics	Japan	1		1		2	2
937.	Journal of Applied Phyco	Netherlands		1	1		2	2

Sl. No	Name of the Journal	Country	BT	ES	AB	AZ	Total Citations	Cited by No of Departments
938.	Journal of Aquatic Science	Switzerland		1		1	2	2
939.	Journal of Biomed Science	Switzerland	1		1		2	2
940.	Journal of Chemistry & Education	USA	1		1		2	2
941.	Journal of Communicable Disease	India		1	1		2	2
942.	Journal of Cytology & Genetics	India	1			1	2	2
943.	Journal of Endocriminology	UK	1			1	2	2
944.	Journal of Evolutionary Biology	UK		1		1	2	2
945.	Journal of Food Hyg. Soc Japan	Japan			1	1	2	2
946.	Journal of Fruit Science	China	1		1		2	2
947.	Journal of Hum. Ecology	India		1	1		2	2
948.	Journal of Life Science	USA		1		1	2	2
949.	Journal of Mycopathological Research	India	1	1			2	2
950.	Journal of Root Crop	India		1	1		2	2
951.	Journal of Rubber Res	India	1		1		2	2
952.	Journal of Texture Studies	USA	1	1			2	2
953.	Journal of Turkish Phytopathology	Turkey	1		1		2	2
954.	Journal of University Bombay	India			1	1	2	2
955.	KFRI Research Report	India			1	1	2	2
956.	Korean Journal of Mycology	Korea	1		1		2	2
957.	Maharastra Journal of Horticulture	India	1			1	2	2
958.	Malay Agric. Journal	Malaysia	1		1		2	2
959.	Microbio. & Mol. Bio. Reviews	USA		1		1	2	2
960.	Mokuzai gakkaishi	Japan	1	1			2	2
961.	Mycological Soc. of American News letter	USA	1		1		2	2
962.	Neotropical Entomology	Switzerland	1	1			2	2
963.	News Letter	USA			1	1	2	2
964.	Orrisa Journal of Horticulture	India	1	1			2	2
965.	PCR Methods and Applications	USA	1		1		2	2
966.	Peanut Science	USA	1		1		2	2
967.	Photochem & Photobiology	USA		1	1		2	2
968.	Physiological Entomology	UK		1		1	2	2
969.	Phytotaxonomy	USA	1	1			2	2
970.	Plant Biochemistry & Biotechnology	India	1	1			2	2
971.	Plant Production Science	Japan		1	1		2	2
972.	Plasmid	USA	1			1	2	2
973.	PLOS Biology			1		1	2	2
974.	Przemysl Spozywezy	Poland		1		1	2	2
975.	Public Health Report Washington	USA		1	1		2	2
976.	Recent Advances in Phytochemistry	USA	1			1	2	2
977.	Recent Botanical Survey India	India		1	1		2	2
978.	Review in Toxicology	Netherlands	1			1	2	2
979.	Rheum. Disease Clin N Am	USA	1			1	2	2
980.	Samaru Journal of Agricultural Research	Nigeria			1	1	2	2
981.	Science Publicaiton of Fresh Water Biology Association	UK		1		1	2	2
982.	Songklanakarin Journal of Science Technology	USA	1	1			2	2
983.	Trends in Food Science & Technology	UK	1			1	2	2
984.	Ultrasonic Sonochemistry	Netherlands	1	1			2	2

Sl. No	Name of the Journal	Country	BT	ES	AB	AZ	Total Citations	Cited by No of Departments
985.	Van vigyan	India		1	1		2	2
986.	Vignana Bharathi	India			1	1	2	2
987.	Virus Research	Netherlands	1	1			2	2
988.	Voedingsmiddelentechnologie	Netherlands		1		1	2	2
989.	World Crop Pests	Netherlands	1		1		2	2
			10819	**7022**	**6462**	**3280**	**27583**	

BT=Biotechnology, ES=Environmental Science, AB=Applied Botany, AZ= Applied Zoology

Table-19 shows the list of journals which are commonly cited by at-least two departments of Bioscience discipline. Out of 39940 citations in Bioscience 27583 citations are commonly cited by four departments, of which 10819 citations are cited by the Biotechnology department, it is followed by the Environmental Science (7022). Hydrobiologia is a common journal to all four departments which has been cited 719 times. Journal of Ethnopharmacology has been cited by researchers of Biotechnology and Applied Botany department which counts a total of 632 citations. It is an interesting fact to know that among the top ten common cited journals five are Indian journals viz. Indian Journal of Environmental Health (622), Indian Phytopathology (569), Indian Journal of Environmental Protection (454), Current Science (451) and Pollution Research (402) have been cited frequently.

4.1.11 Availability of cited journals in Kuvempu University Library

Out of total 5772 cited journals, the researcher made an attempt to know department wise number of journals available in Kuvempu University Library. The same has been given in table-20 to 23.

4.1.111 Department of Biotechnology

Table-20 Department of Biotechnology

Sl. No	Name of the Journal	Total citations
1.	Indian Journal of Experimental Biology	260
2.	Indian Journal of Biotechnology	37
3.	Canadian Journal of Plant Science	28
4.	Journal of Genetics	24
5.	Indian Journal of Genetics and Plant Breeding	24
6.	Journal of Plant Biochemistry and Biotechnology	19
7.	Asian Journal of Microbiology Biotechnology and Environmental Science	14
8.	Trends in Biotechnology	13
9.	International Journal of Biotechnology	12
10.	Indian Journal of Physiology and Pharmacology	11
11.	Journal of Biosciences	10
12.	Journal of Mycology and Plant Pathology	10
13.	Biotechnology & Applied Biochemistry	4
14.	Advances in Biotechnology	4
15.	Indian Journal of Medicinal Research	4
16.	Bioinformatics Trends	4
17.	Journal of Food Science and Technology	3
		481
	Electronic Journals (UGC-Infonet)	
1.	Biotechnology Letters	22
2.	World Journal of Microbiology and Biotechnology	12
3.	Applied Microbiology & Biotechnology	11
4.	Bioprocess engineering	5
5.	Bioscience Reports	1
6.	Journal of Indus. Micro.& Biotechnology	1
7.	Marine Biotechnology	1
		53

Table-20 data deals with the journals available in Kuvempu University library which are cited by the Biotechnology research scholars. Out of 2369 cited journals by the Biotechnology research scholars only 24 journals have been subscribed by the Kuvempu University library. Out of 24 journals 17 journals are available in print version remaining 7 journals are available in electronic version accessible through UGC-Infornet consortia. These subscribed journals covering 534 citations to the total of 15864 journal citations. It is clearly indicating that only 3.37% of cited journals are available in the library. But, it is an interesting fact to know that Indian Journal of Experimental Biology has ranked in

6th position of journal ranking list with 260 citations. This journal is one among the journals available in the Kuvempu University library. Above results clearly indicates that university library is not meeting the information requirements of researchers in Biotechnology.

4.1.112 Department of Environmental Science

This section deals with the total number of journals cited by the Environmental Science research scholars and out of which how many journals are available in Kuvempu University Library?

Table-21 Department of Environmental Science

Sl. No	Name of the Journal	Total citations
1.	Indian Journal of Environmental Health	540
2.	Indian Journal of Environmental Protection	442
3.	Journal of Environmental Biology	193
4.	Journal of Ecology	126
5.	Geobios	99
6.	Indian Journal of Environment and Eco planning	48
7.	Nature, Environment and Pollution Technology	47
8.	Indian Journal of Ecology	46
9.	Journal of Ecotoxicology and Environmental Monitoring	42
10.	Indian Journal of Marine Sciences	33
11.	Journal of Environmental Engineering	27
12.	International Journal of Ecology and Environmental science	23
13.	Environment and Ecology	22
		1688
	Electronic Journals (UGC-Infonet)	
1.	Water, Air and Soil Pollution	33
2.	International Journal of Environmental Studies	23
3.	Archives of Environmental Contamination and Toxicology	14
4.	Journal of Tropical Ecology	14
5.	Environmental Management	6
6.	Journal of Chemical Ecology	5
7.	Landscape Ecology	4
8.	Toxicological and Environmental Chemistry	4
9.	Critical Reviews in Environmental Science and Technology	3
10.	Ecotoxicology	3
11.	Environment Development and Sustainability	3
12.	International Journal of Environmental Health Research	3
13.	Journal of Toxicology and Environmental Health	3
14.	Wetlands Ecology and Management	3
15.	Journal of Forestry Research	2
16.	Mine Water and the Environment	2

17.	Mitigation and Adaptation Strategies for Glob. Change	2
18.	Nutrient Cycling in Agroecosystems	2
19.	Researches on Population Ecology	2
20.	Russian Journal of Ecology	2
21.	Ecosystems	1
22.	International Journal of Phytoremediation	1
23.	Reviews in Environmental Science and Bio-Technology	1
		136

Table-21 reveals that out of 1780 cited journals, 36 journals are available in Kuvempu University library, of which 13 journals are available in print version remaining 23 are available in electronic version accessible through UGC-Infonet consortia. It is interesting to know that in the rank list among the top ten cited journals by the researchers 4 journals are available in the library such as Indian Journal of Environmental Health with 540 citations, Indian Journal of Environmental Protection with 442 citations, Journal of Environmental Biology with 193 citations and Journal of Ecology with 126 citations. It can be seen that 1824 (17.18%) citations are from these 36 journals.

4.1.113 Department of Applied Botany

Table-22 Department of Applied Botany

Sl. No	Name of the Journal	Total citations
1.	Indian Phytopathology	495
2.	Indian Forester	154
3.	Plant Disease Research	72
4.	Medicinal and Aromatic Plant Abstract	55
5.	Proceedings of Indian National Science Academy Part B-Biological Sciences	45
6.	Plant and Cell Physiology	41
7.	American Journal of Botany	22
8.	Advances in Plant Sciences	21
9.	Phytomorphology	10
10.	Indian Journal of Plant Physiology	10
11.	Rheedea	4
		929
	Electronic Journals (UGC- Infonet)	
1.	Mycopathologia	47
2.	Plant and Soil	21
3.	Genetic Resources & Crop Evaluation	15

4.	European Journal of Plant Pathology	14
5.	Plant Cell Reports	11
6.	Plant Ecology	9
7.	Planta Journal	5
8.	Journal of General Plant Pathology	4
9.	Journal of Plant Growth Regulation	4
10.	Mycoscience	4
11.	Molecular Breeding	3
12.	Plant Systematic and Evolution	3
13.	Edinburg Journal of Botany	1
14.	Genetica	1
15.	Mycological Research	1
16.	Plant Growth Regulation	1
17.	The Lichenologist	1
18.	Mycorrhiza	
		145

Table-22 shows that out of 1567 total cited journals only 29 journals are available in Kuvempu University library, of which 11 journals are available in print version and 18 available in electronic version accessible through UGC-Infonet consortia. But, it is an interesting fact to know that Indian Phytopathology with 495 citations and Indian Forester with 154 citations have ranked in 1st and 5th positions of journal ranking list. It can be observed that out of 8411 citations 1074 (12.77%) citations are from the journals available in Kuvempu University library.

4.1.114 Department of Applied Zoology

Table-23 Department of Applied Zoology

Sl. No	Name of the Journal	Total citations
1.	Indian Journal of Fisheries	42
2.	Entoman	34
3.	Insect Environment	23
4.	Journal of Aquatic Biology	14
5.	Zoo's Print	11
6.	Journal of Ecobiology	6
7.	Uttar Pradesh Journal of Zoology	6
8.	Indian Journal of Sericulture	4
9.	Himalayan Journal of Environment and Zoology	4
		144
	Electronic Journals (UGC - Infonet)	
1.	Journal of Zoology	10
2.	Journal of Insect Behaviour	7
3.	Reviews in Fish Biology and Fisheries	3
		20

In case of Applied Zoology, table-23 reveals the interesting fact that out of 1167 cited journals only 12 journals are available in Kuvempu University library, of which 9 journals are available in print version. 3 available in electronic version accessible through UGC-Infonet consortia and these journals contribute 164 (3.24%) citations.

4.1.12 Ranked Countries of Journals

While studying the use pattern of research literature in a particular discipline it becomes essential to determine the geographical scattering of cited journals and thereby that of articles. Literature covers research work from many parts of the world. The relevance and importance of the maximum used material can be related to the country producing the largest usable literature (Ziaur Rahman, 2011). The citation study of the research theses can lead to understand the country wise use pattern of researchers in Bioscience.

In table-24 all the cited journals categorized according to their country of origin to find out the most productive countries in the field of Bioscience. The countries of origin of the cited journals are traced out from 'Ulrich's Periodicals Directory'.

Table-24 Ranked Countries of Journals

Sl. No	Biotechnology			Environmental Science			Applied Botany			Applied Zoology			Bioscience		
	Rank	**Country**	**No of Journal cited**	**Rank**	**Country**	**No of Journal cited**	**Rank**	**Country**	**No of Journal cited**	**Rank**	**Country**	**No of Journal cited**	**Rank**	**Country**	**No of Journal cited**
1.	1	USA	721 (30.43)	1	USA	456 (25.62)	1	USA	406 (25.91)	1	USA	339 (29.05)	1	USA	1658 (28.72)
2.	2	UK	319 (13.47)	2	India	342 (19.21)	2	India	279 (17.80)	2	India	174 (14.91)	2	India	839 (14.54)
3.	3	India	269 (11.36)	3	UK	209 (11.74)	3	UK	192 (12.25)	3	UK	173 (14.82)	3	UK	749 (12.98)
4.	4	Netherlands	128 (5.40)	4	Netherlands	103 (5.79)	4	Netherlands	87 (5.55)	4	Netherlands	63 (5.40)	4	Netherlands	314 (5.44)
5.	5	Japan	101 (4.26)	5	Germany	81 (4.55)	5	Germany	64 (4.08)	5	Japan	46 (3.94)	5	Japan	244 (4.23)
6.	6	Germany	95 (4.01)	6	Japan	69 (3.88)	6	Japan	63 (4.02)	6	Germany	45 (3.86)	6	Germany	219 (3.79)
7.	7	China	60 (2.53)	7	Canada	36 (2.02)	7	China	38 (2.43)	7	Canada	20 (1.71)	7	China	107 (1.85)
8.	8	Switzerland	40 (1.69)	8	China	29 (1.63)	8	Brazil	30 (1.91)	8	Brazil	19 (1.63)	8	Switzerland	91 (1.58)
9.	9	Italy	36 (1.52)	9	Switzerland	28 (1.57)	9	Switzerland	25 (1.60)	9	China	17 (1.46)	9	Italy	77 (1.33)
10.	10	Brazil	27 (1.14)	10	Australia	23 (1.29)	10	Australia	23 (1.47)	10	Australia	16 (1.37)	10	Canada	75 (1.30)
11.	11	Canada	25 (1.06)	10	South Africa	23 (1.29)	11	Canada	21 (1.34)	11	France	15 (1.29)	11	Brazil	67 (1.16)
12.	12	France	23 (0.97)	11	Italy	19 (1.07)	12	Poland	17 (1.08)	12	Italy	14 (1.20)	12	Australia	61 (1.06)
13.	13	Australia	21 (0.89)	12	Russia	18 (1.01)	13	Italy	16 (1.02)	13	South Africa	11 (0.94)	13	France	45 (0.78)
14.	13	South Africa	21 (0.89)	13	Brazil	17 (0.96)	14	South Africa	15 (0.96)	13	Switzerland	11 (0.94)	14	Russia	42 (0.73)
15.	14	Pakistan	20 (0.84)	14	Poland	16 (0.90)	15	France	14 (0.89)	14	Poland	8 (0.69)	15	Poland	39 (0.68)
16.	15	Denmark	19	15	France	14	16	Egypt	12	14	Korea	8	16	South	36

Sl. No	Biotechnology			Environmental Science			Applied Botany			Applied Zoology			Bioscience		
	Rank	**Country**	**No of Journal cited**	**Rank**	**Country**	**No of Journal cited**	**Rank**	**Country**	**No of Journal cited**	**Rank**	**Country**	**No of Journal cited**	**Rank**	**Country**	**No of Journal cited**
			(0.80)			(0.79)			(0.77)			(0.69)		Africa	(0.62)
17.	16	Korea	16 (0.68)	16	Turkish	12 (0.67)	17	Korea	11 (0.70)	15	Denmark	7 (0.60)	17	Korea	35 (0.61)
18.	17	Poland	14 (0.59)	17	Denmark	11 (0.62)	17	Malaysia	11 (0.70)	16	Philippines	6 (0.51)	17	Pakistan	35 (0.61)
19.	18	Spain	13 (0.54)	17	Pakistan	11 (0.62)	18	Pakistan	10 (0.64)	16	Russia	6 (0.51)	20	Denmark	31 (0.54)
20.	19	Russia	10 (0.42)	18	Egypt	9 (0.51)	19	Russia	9 (0.57)	16	Taiwan	6 (0.51)	21	Turkey	29 (0.50)
21.	20	Ireland	9 (0.38)	19	Bangladesh	8 (0.45)	19	Turkish	9 (0.57)	17	Ireland	4 (0.34)	22	Malaysia	21 (0.36)
22.	20	Malaysia	9 (0.38)	20	Austria	7 (0.39)	20	Austria	7 (0.45)	17	Egypt	4 (0.34)	23	Egypt	20 (0.35)
23.	20	Thailand	9 (0.38)	20	Philippines	7 (0.39)	21	Srilanka	6 (0.38)	17	Turkey	4 (0.34)	24	Austria	19 (0.33)
24.	20	Turkey	9 (0.38)	21	Taiwan	6 (0.34)	22	Bangladesh	5 (0.32)	17	Spain	4 (0.34)	24	Spain	19 (0.33)
25.	21	Austria	8 (0.34)	22	Slovakia	5 (0.28)	22	Ireland	5 (0.32)	17	Czech Republic	4 (0.34)	24	Taiwan	19 (0.33)
26.	21	Czech Republic	8 (0.34)	23	Belgium	4 (0.22)	22	Nigeria	5 (0.32)	17	Kenya	4 (0.34)	25	Ireland	18 (0.31)
27.	21	Hungary	8 (0.34)	23	Czech Republic	4 (0.22)	22	Spain	5 (0.32)	18	Belgium	3 (0.26)	26	Bangladesh	17 (0.29)
28.	21	Israel	8 (0.34)	23	Hungary	4 (0.22)	23	Belgium	4 (0.26)	18	Bangladesh	3 (0.26)	27	Philippines	15 (0.26)
29.	21	Norway	8 (0.34)	23	Iran	4 (0.22)	23	Denmark	4 (0.26)	18	New Zealand	3 (0.26)	28	Thailand	13 (0.23)
30.	22	Taiwan	7 (0.30)	23	Israel	4 (0.22)	23	Hungary	4 (0.26)	18	Pakistan	3 (0.26)	29	Czech Republic	11 (0.19)
31.	23	Bangladesh	5 (0.21)	23	Korea	4 (0.22)	23	Mexico	4 (0.26)	19	Argentina	2 (0.17)	29	Israel	11 (0.19)
32.	23	Nigeria	5	23	Malaysia	4	23	Sweden	4	19	Costa Rica	2	29	Sweden	11

Sl. No	Biotechnology			Environmental Science			Applied Botany			Applied Zoology			Bioscience		
	Rank	**Country**	**No of Journal cited**	**Rank**	**Country**	**No of Journal cited**	**Rank**	**Country**	**No of Journal cited**	**Rank**	**Country**	**No of Journal cited**	**Rank**	**Country**	**No of Journal cited**
			(0.21)			(0.22)			(0.26)			(0.17)			(0.19)
33.	23	Philippines	5 (0.21)	23	Srilanka	4 (0.22)	24	Costa Rica	3 (0.19)	19	Finland	2 (0.17)	30	New Zealand	10 (0.17)
34.	23	Sweden	5 (0.21)	24	Ireland	3 (0.17)	24	Hong Kong	3 (0.19)	19	Greece	2 (0.17)	31	Hungary	9 (0.16)
35.	24	Belgium	4 (0.17)	24	New Zealand	3 (0.17)	24	Nepal	3 (0.19)	19	Trinidad & Tobago	2 (0.17)	31	Srilanka	9 (0.16)
36.	24	Egypt	4 (0.17)	24	Nigeria	3 (0.17)	24	New Zealand	3 (0.19)	19	Uganda	2 (0.17)	32	Hong Kong	8 (0.14)
37.	24	Greece	4 (0.17)	24	Norway	3 (0.17)	24	Philippines	3 (0.19)	19	Nigeria	2 (0.17)	32	Iran	8 (0.14)
38.	24	Hong Kong	4 (0.17)	24	Spain	3 (0.17)	24	Taiwan	3 (0.19)	19	Sweden	2 (0.17)	32	Nigeria	8 (0.14)
39.	24	Iran	4 (0.17)	24	Sweden	3 (0.17)	25	Chile	2 (0.13)		Other countries	15 (1.29)	33	Belgium	7 (0.12)
40.	25	Argentina	2 (0.08)	25	Chile	2 (0.11)	25	Cuba	2 (0.13)		Un indentified	96 (8.23)	33	Norway	7 (0.12)
41.	25	Cuba	2 (0.08)	25	Costa Rica	2 (0.11)	25	Czech Republic	2 (0.13)				33	Slovakia	7 (0.12)
42.	25	New Zealand	2 (0.08)	25	Cuba	2 (0.11)	25	Kenya	2 (0.13)				34	Costa Rica	6 (0.10)
43.	25	Saudi	2 (0.08)	25	Puerto Rico	2 (0.11)	25	Papua New Guinea	2 (0.13)				34	Kenya	6 (0.10)
44.	25	Singapore	2 (0.08)	25	Thailand	2 (0.11)	25	Portugal	2 (0.13)				35	Cuba	5 (0.09)
45.	25	Slovakia	2 (0.08)	25	Ukraine	2 (0.11)	25	Puerto Rico	2 (0.13)				35	Mexico	5 (0.09)
46.	25	Srilanka	2 (0.08)		Other Countries	18 (1.01)	25	Saudi	2 (0.13)					Other Countries	86 (1.49)
47.	25	Venezuela	2 (0.08)		Un identified	141 (7.92)	25	Thailand	2 (0.13)					Unidentified	604 (10.46)

Sl. No	**Biotechnology**			**Environmental Science**			**Applied Botany**			**Applied Zoology**			**Bioscience**		
	Rank	**Country**	**No of Journal cited**	**Rank**	**Country**	**No of Journal cited**	**Rank**	**Country**	**No of Journal cited**	**Rank**	**Country**	**No of Journal cited**	**Rank**	**Country**	**No of Journal cited**
		Other Countries	25 (1.06)				25	Venezuela	2 (0.13)						
48.		Un Identified	227 (9.58)					Other Countries	14 (0.89)						
49.								Un Identified	110 (7.02)						
Total			**2369** (**100.00**)			**1780** (**100.00**)			**1567** (**100.00**)			**1167** (**100.00**)			**5772 (100.00)**

The journals are analyzed according to their country of origin and the result of the most productive countries is shown in the table-24. All the countries which have cited more than two journals are figured in the table, countries responsible for the publication of one journal are grouped under others countries. It is noticed from the cited documents that the research scholars in bioscience have referred to the literature from different countries. Of all the countries USA is the leading country accounting for 1658 (28.72%) of the total cited journals; the result of this study is in accordance with the findings of Maheswarappa and Prakash (1982), Kapoor (1984), Sangam and Biradar (1990), Satish and Kabir (2001). India follows second position with a list of 839 (14.54%) journals. UK occupies the third place with a total of 749 (12.98%) journals. In case of other countries viz; Netherlands 314 (5.44%), Japan 244 (4.23%), Germany 219 (3.79%) and China 107 (1.85%) occupy the fourth, fifth, sixth and seventh places combining with 884 (15.31%) of citations.

These above mentioned seven countries together constitute 71.55%. The researchers have referred to only 28.45% of the citations from the remaining countries. However, the pattern of journals varied from one discipline to another discipline. Among the four departments studied, USA ranked first in number of times cited journals. India follows second position in all departments except Biotechnology. But in overall results indicate that India stands at the second position and UK third. It is followed by Netherlands, Japan, Germany, China, Switzerland, and other countries form a third category of countries, responsible for almost equal number of journals in all departments. From this, it can be said that the Bioscience researchers, have depended on western literature for their research and investigation.

4.1.13 Productivity of journals in Bioscience

In order to measure the productivity of journals, a total of 39940 citations were divided into four equal categories of citations. The number of journals covering the citations in each group is computed. The average rate of productivity (ratio of the number of citations to the number of journals) in each group is compared. The number of cited journals for each group is given in table-25.

Table-25 Productivity of journals in Bioscience

Sl. No	% of Citations	Biotechnology			Environmental Science			Applied Botany			Applied Zoology			Bioscience		
		No. of Citations	No. of Journals Covered	Average productivity of Journals	No. of Citations	No. of Journals Covered	Average productivity of Journals	No. of Citations	No. of Journals Covered	Average productivity of Journals	No. of Citations	No. of Journals Covered	Average productivity of Journals	No. of Citations	No. of Journals Covered	Average productivity of Journals
1	0-25	4051	17 (0.72)	238.29	2734	10 (0.56)	273.40	2123	13 (0.83)	163.30	1275	18 (1.54)	70.83	10140	29 (0.50)	349.66
2	26-50	3892	81 (3.42)	48.04	2583	57 (3.20)	45.31	2096	61 (3.89)	34.36	1252	67 (5.74)	18.68	9861	142 (2.46)	69.44
3	51-75	3957	319 (13.46)	12.40	2645	227 (12.75)	11.65	2090	221 (14.10)	9.45	1263	191 (16.37)	6.61	9959	611 (10.59)	16.30
4	76-100	3964	1952 (82.40)	2.03	2650	1486 (83.48)	1.78	2102	1272 (81.17)	1.65	1263	891 (76.35)	1.41	9980	4990 (86.45)	2.00
Total		**15864**	**2369 (100.00)**	**6.69**	**10612**	**1780 (100.00)**	**5.96**	**8411**	**1567 (100.00)0)**	**5.36**	**5053**	**1167 (100.00)**	**4.32**	**39940**	**5772 (100.00)**	**6.92**

Table-25 depicts that the first group of citations are to the first 29 journals of the rank list, thus signifying their high rate of productivity. The average productivity of each journal in the first group was 349.66 journals, where it has considerably gone down to 2.00 journals in the fourth category. This marked difference easily confirms the decreasing productivity of individual journals in the rank list.

4.1.14 Bradford's distribution of Bioscience

Bradford's law serves as a general guideline to librarians in determining the number of core journals in any given field. It states that journals in a single field can be divided into three parts, each containing the same number of articles.

One of the most widely applied tools to study the productivity of journals in citation analysis studies has been the Bradford's law. Bradford's law was formulated by Samuel Bradford in 1934 while studying the distribution of scientific literature. In the study, he found an inverse relation between the number of articles published in a subject area and the number of journals in which they were published. When groups or zones of journals are created with equal number of citations after ranking the journals by their productivity, one can easily see the pattern in the formation of these groups called as Bradford zones. The pattern is as:

- A core of journals on the subject, relatively few in number that produces approximately one-third of all the articles.
- A second zone, containing the same number of articles as the first, but greater number of journals.
- A third zone, containing the same number of articles as the second but a still greater number of journals.

The mathematical relationship of the number of journals in the core to the first zone is a constant 'n', and the second zone of relationship 'n^2'. Bradford expressed this relationship as 1: n: n^2.

In the present study, an attempt is made to find the distribution of citations among periodicals in Bioscience is in accordance with Bradford's law of scattering. For this purpose, a bibliography of cumulated some of citations verses rank was developed on semi-log graph paper.

Table-26 presents the data of journals ranked by citations and it is used for application of Bradford's law to identify the three zones of journals.

Table-26 Bradford's Zones for Bioscience

Sl. No.	Number of		Cumulative No. of	
	Citations	**Journals**	**Citations**	**Journals**
1	13284	52 (0.90)	13284	52
2	13281	399 (6.91)	26565	451
3	13375	5321 (92.19)	39940	5772

4.1.14 (A) Bradford's zones for subjects in Bioscience

Table-27 Bradford's zones for subjects in Bioscience

Sl. No	Biotechnology				Environmental Science				Applied Botany				Applied Zoology			
	Number of		Cumulative No. of		Number of		Cumulative No. of		Number of	Cumulative No. of			Number of	Cumulative No. of		
	Citations	Journals	Citations	Journals	Citations	Journals	Citations	Journals	Citations	Journals	Citations	Journals	Citations	Journals	Citations	Journals
1	5252	29 (1.22)	5252	29	3570	19 (1.07)	3570	19	2808	26 (1.66)	2808	26	1690	32 (2.74)	1690	32
2	5316	232 (9.80)	10568	261	3505	161 (9.04)	7075	180	2799	157 (10.02)	5607	183	1676	156 (13.37)	3366	188
3	5296	2108 (88.98)	15864	2369	3537	1600 (89.89)	10612	1780	2804	1384 (88.32)	8411	1567	1687	979 (83.89)	5053	1167

Study shows that there are 52 journals in the nucleus and they are the most productive journals devoted to Bioscience sharing 0.90% of total cited journals. The next zone is represented by 399 journals which share 6.91% of total journal, and the last zone is represented by 5321 journals which share 92.19% of total cited journals. Each zone has approximately one-third of the total citations. Table-26 and fig.5 also reveals the same results. The journals distribution as per the Bradford's law reveals the ratio of 52:399:5321.

52 represent the number of periodicals in the nucleus and n=10.50 is a multiplier. The mean value of multiplier is 10.50.

Therefore: 52:399:5321= 5772

$$\frac{399}{52} = 7.67$$

$$\frac{5321}{399} = 13.34$$

$$7.67 + 13.34 = 21.01$$

$$\frac{21.01}{2} = 10.50 \text{ Mean value of multiplier}$$

n= 10.50

52:52X10.50:52X $(10.50)^2$ ::1:n:n^2

52:546:5733>>52+546+5733=6331

$$\text{Percentage error} = \frac{6331-5772}{5772} \times 100$$

Error= 9.68

Since the percentage error is very high here data will not fit well the Bradford's Law.

It is evident from the above ratio that the number of journal titles in each zone is not increasing geometrically. Therefore, it is concluded that the dispersion of journal titles in Bioscience does not satisfy the verbal formulation of Bradford's law of scattering.

4.1.15 Distribution of cited journals by decreasing frequencies of citations in Bioscience

Bradford formulated a simple mathematical model to describe reference scattering. Cole (1962) statistically explained that "by plotting the cumulative fraction of total reference against the logarithm of the cumulative fraction total of titles. An approximately linear curve is obtained and the slope of this curve gives a reference scattering which may be characteristics of the study".

Table-28 Distribution of cited journals by decreasing frequencies of citations in Bioscience

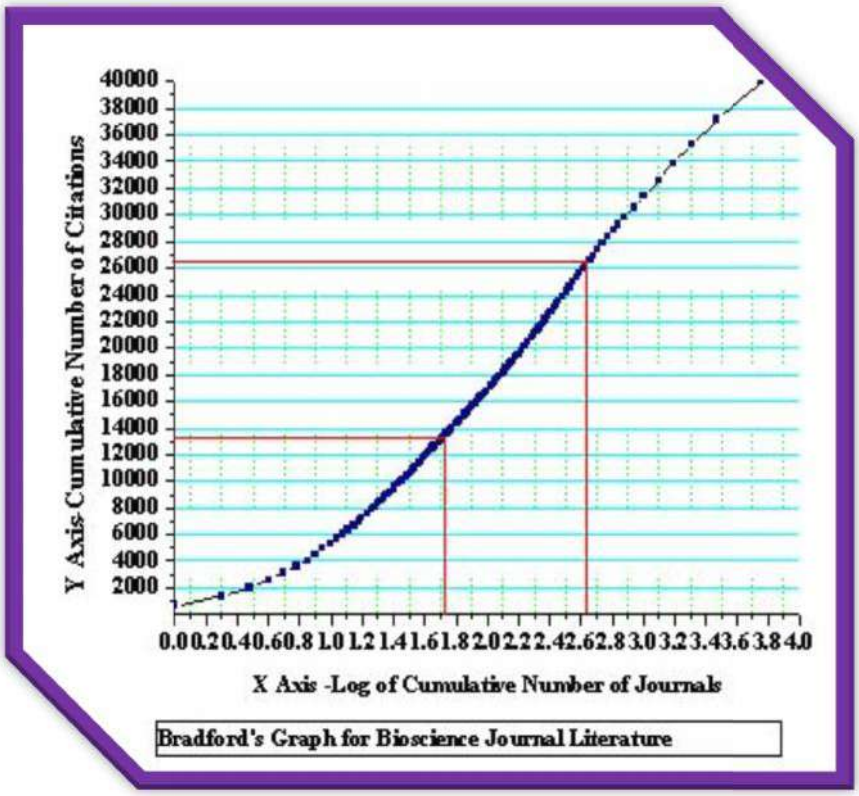
No. of Journals	Cumulative No. of Journals	Log of Cumulative Journals	No. of Citations	Total Citations	Cumulative Citations	% of Cumulative Citations	% of Cumulative Journals
1	1	0.00	719	719	719	1.80	0.02
1	2	0.30	642	642	1361	3.41	0.03
1	3	0.48	622	622	1983	4.96	0.05
1	4	0.60	585	585	2568	6.43	0.07
1	5	0.70	569	569	3137	7.85	0.09
1	6	0.78	456	456	3593	9.00	0.10
1	7	0.85	454	454	4047	10.13	0.12
1	8	0.90	451	451	4498	11.26	0.14
1	9	0.95	421	421	4919	12.32	0.16
1	10	1.00	402	402	5321	13.32	0.17
1	11	1.04	368	368	5689	14.24	0.19
1	12	1.08	343	343	6032	15.10	0.21
1	13	1.11	330	330	6362	15.93	0.23
1	14	1.15	326	326	6688	16.75	0.24
1	15	1.18	301	301	6989	17.50	0.26
1	16	1.20	294	294	7283	18.23	0.28
1	17	1.23	283	283	7566	18.94	0.29
1	18	1.26	271	271	7837	19.62	0.31
1	19	1.28	244	244	8081	20.23	0.33
1	20	1.30	231	231	8312	20.81	0.35
1	21	1.32	227	227	8539	21.38	0.36
1	22	1.34	220	220	8759	21.93	0.38
1	23	1.36	215	215	8974	22.47	0.40
1	24	1.38	210	210	9184	22.99	0.42
1	25	1.40	207	207	9391	23.51	0.43
1	26	1.41	190	190	9581	23.99	0.45
1	27	1.43	192	192	9773	24.47	0.47
1	28	1.45	189	189	9962	24.94	0.49
1	29	1.46	178	178	10140	25.39	0.50
1	30	1.48	173	173	10313	25.82	0.52
1	31	1.49	172	172	10485	26.25	0.54
1	32	1.51	167	167	10652	26.67	0.55
1	33	1.52	166	166	10818	27.09	0.57
1	34	1.53	163	163	10981	27.49	0.59
1	35	1.54	154	154	11135	27.88	0.61
1	36	1.56	150	150	11285	28.25	0.62
1	37	1.57	149	149	11434	28.63	0.64
2	39	1.59	141	282	11716	29.33	0.68
1	40	1.60	139	139	11855	29.68	0.69
2	42	1.62	135	270	12125	30.36	0.73
1	43	1.63	130	130	12255	30.68	0.74
1	44	1.64	125	125	12380	31.00	0.76
1	45	1.65	121	121	12501	31.30	0.78
1	46	1.66	114	114	12615	31.58	0.80
3	49	1.69	113	339	12954	32.43	0.85
1	50	1.70	112	112	13066	32.71	0.87
1	51	1.71	111	111	13177	32.99	0.88
1	52	1.72	107	107	13284	33.26	0.90
1	53	1.72	104	104	13388	33.52	0.92
1	54	1.73	97	97	13485	33.76	0.94

No. of Journals	Cumulative No. of Journals	Log of Cumulative Journals	No. of Citations	Total Citations	Cumulative Citations	% of Cumulative Citations	% of Cumulative Journals
1	55	1.74	96	96	13581	34.00	0.95
1	56	1.75	95	95	13676	34.24	0.97
1	57	1.76	94	94	13770	34.48	0.99
1	58	1.76	89	89	13859	34.70	1.00
1	59	1.77	85	85	13944	34.91	1.02
4	63	1.80	84	336	14280	35.75	1.09
1	64	1.81	83	83	14363	35.96	1.11
2	66	1.82	81	162	14525	36.37	1.14
2	68	1.83	79	158	14683	36.76	1.18
2	70	1.85	76	152	14835	37.14	1.21
1	71	1.85	75	75	14910	37.33	1.23
2	73	1.86	72	144	15054	37.69	1.26
2	75	1.88	71	142	15196	38.05	1.30
3	78	1.89	69	207	15403	38.57	1.35
4	82	1.91	68	272	15675	39.25	1.42
3	85	1.93	67	201	15876	39.75	1.47
3	88	1.94	66	198	16074	40.25	1.52
2	90	1.95	64	128	16202	40.57	1.56
1	91	1.96	63	63	16265	40.72	1.58
1	92	1.96	62	62	16327	40.88	1.59
1	93	1.97	61	61	16388	41.03	1.61
3	96	1.98	60	180	16568	41.48	1.66
3	99	2.00	59	177	16745	41.93	1.72
5	104	2.02	57	285	17030	42.64	1.80
1	105	2.02	56	56	17086	42.78	1.82
2	107	2.03	54	108	17194	43.05	1.85
4	111	2.05	53	212	17406	43.58	1.92
1	112	2.05	52	52	17458	43.71	1.94
4	116	2.06	51	204	17662	44.22	2.01
4	120	2.08	50	200	17862	44.72	2.08
1	121	2.08	49	49	17911	44.84	2.10
4	125	2.10	48	192	18103	45.33	2.17
3	128	2.11	47	141	18244	45.68	2.22
5	133	2.12	46	230	18474	46.25	2.30
1	134	2.13	45	45	18519	46.37	2.32
3	137	2.14	44	132	18651	46.70	2.37
4	141	2.15	43	172	18823	47.13	2.44
4	145	2.16	42	168	18991	47.55	2.51
7	152	2.18	41	287	19278	48.27	2.63
1	153	2.18	40	40	19318	48.37	2.65
4	157	2.20	39	156	19474	48.76	2.72
9	166	2.22	38	342	19816	49.61	2.88
9	175	2.24	37	333	20149	50.45	3.03
9	184	2.26	36	324	20473	51.26	3.19
10	194	2.29	35	350	20823	52.14	3.36
6	200	2.30	34	204	21027	52.65	3.47
7	207	2.32	33	231	21258	53.22	3.59
8	215	2.33	32	256	21514	53.87	3.72
8	223	2.35	31	248	21762	54.49	3.86
7	230	2.36	30	210	21972	55.01	3.98
6	236	2.37	29	174	22146	55.45	4.09

No. of Journals	Cumulative No. of Journals	Log of Cumulative Journals	No. of Citations	Total Citations	Cumulative Citations	% of Cumulative Citations	% of Cumulative Journals
12	248	2.39	28	336	22482	56.29	4.30
11	259	2.41	27	297	22779	57.03	4.49
8	267	2.43	26	208	22987	57.55	4.63
11	278	2.44	25	275	23262	58.24	4.82
9	287	2.46	24	216	23478	58.78	4.97
16	303	2.48	23	368	23846	59.70	5.25
18	321	2.51	22	396	24242	60.70	5.56
15	336	2.53	21	315	24557	61.48	5.82
20	356	2.55	20	400	24957	62.49	6.17
19	375	2.57	19	361	25318	63.39	6.50
18	393	2.59	18	324	25642	64.20	6.81
16	409	2.61	17	272	25914	64.88	7.09
21	430	2.63	16	336	26250	65.72	7.45
25	455	2.66	15	375	26625	66.66	7.88
23	478	2.68	14	322	26947	67.47	8.28
37	515	2.71	13	481	27428	68.67	8.92
36	551	2.74	12	432	27860	69.75	9.55
44	595	2.77	11	484	28344	70.97	10.31
52	647	2.81	10	520	28864	72.27	11.21
41	688	2.84	9	369	29233	73.19	11.92
69	757	2.88	8	552	29785	74.57	13.12
108	865	2.94	7	756	30541	76.47	14.99
145	1010	3.00	6	870	31411	78.65	17.50
236	1246	3.10	5	1180	32591	81.60	21.59
316	1562	3.19	4	1264	33855	84.76	27.06
458	2020	3.31	3	1374	35229	88.20	35.00
959	2979	3.47	2	1918	37147	93.01	51.61
2793	5772	3.76	1	2793	39940	100.00	100.00

The graphical and verbal interpretation of the Bradford's law of scattering has been applied to the literature of Bioscience. Table-28 represents journals arranged in decreasing frequency of citations. To testify the applicability of Bradford's law of scattering, a graph is plotted by taking the cumulative number of citations on "Y" axis and log of cumulative number of journals on "X" axis. It is observed that the resulting bibliography starts rising in an exponential nature and then follows the linear curve indicating the observance of Bradford's law of scattering. Here, it is observed that an experimental curve (continuous line) is closely in association with the theoretical line (dotted line) up to about 40000 citations and then starts dropping as shown in fig.5.

Fig.5. Bradford's Graph for Bioscience Journal Literature



4.1.15 (A) Distribution of cited journals by decreasing frequencies of citations in Biotechnology

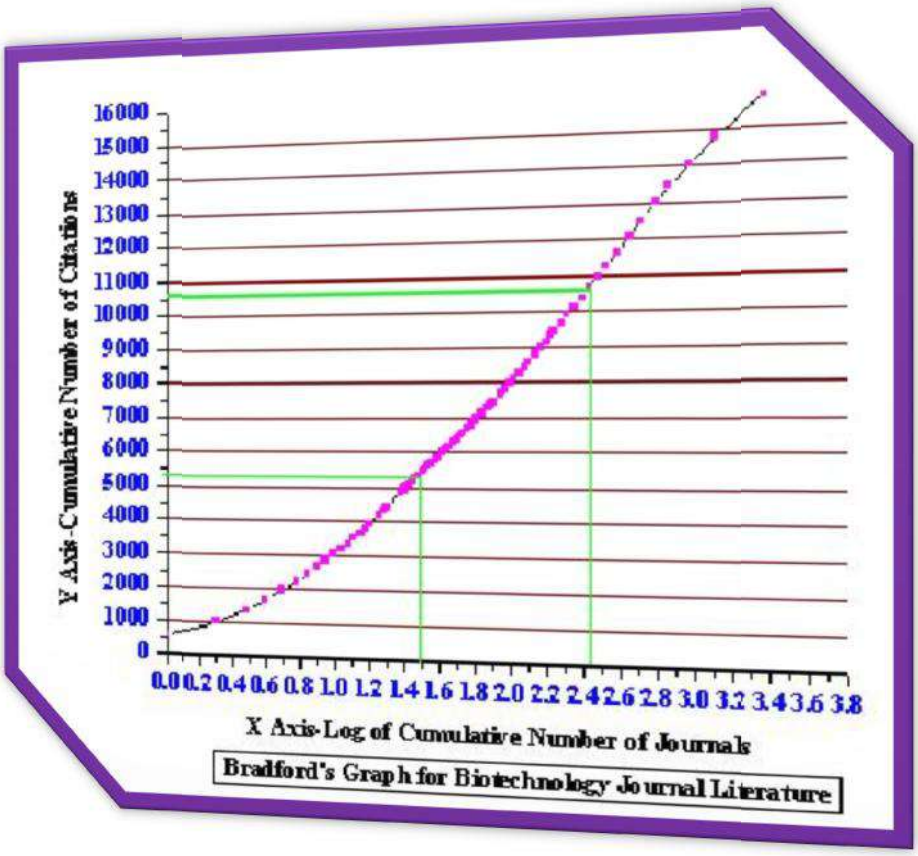
Table-29 Distribution of cited journals by decreasing frequencies of citations in Biotechnology

No. of Journals	Cumulative No. of Journals	Log of Cumulative Journals	No. of Citations	Total Citations	Cumulative Citations	% of Cumulative Citations	% of Cumulative Journals
1	1	0.00	558	558	558	3.52	0.04
1	2	0.30	435	435	993	6.26	0.08
1	3	0.48	357	357	1350	8.51	0.13
1	4	0.60	320	320	1670	10.53	0.17
1	5	0.70	283	283	1953	12.31	0.21
1	6	0.78	260	260	2213	13.95	0.25
1	7	0.85	234	234	2447	15.42	0.30
1	8	0.90	215	215	2662	16.78	0.34
1	9	0.95	204	204	2866	18.07	0.38
1	10	1.00	187	187	3053	19.24	0.42
1	11	1.04	157	157	3210	20.23	0.46
1	12	1.08	156	156	3366	21.22	0.51
1	13	1.11	149	149	3515	22.16	0.55
1	14	1.15	143	143	3658	23.06	0.59
1	15	1.18	136	136	3794	23.92	0.63
1	16	1.20	133	133	3927	24.75	0.68
2	18	1.26	124	248	4175	26.32	0.76
1	19	1.28	122	122	4297	27.09	0.80
1	20	1.30	110	110	4407	27.78	0.84
4	24	1.38	104	416	4823	30.40	1.01
1	25	1.40	92	92	4915	30.98	1.06
1	26	1.41	91	91	5006	31.56	1.10
1	27	1.43	86	86	5092	32.10	1.14
1	28	1.45	83	83	5175	32.62	1.18
1	29	1.46	77	77	5252	33.11	1.22
1	30	1.48	70	70	5322	33.55	1.27
2	32	1.51	66	132	5454	34.38	1.35
1	33	1.52	64	64	5518	34.78	1.39
1	34	1.53	63	63	5581	35.18	1.44
1	35	1.54	61	61	5642	35.56	1.48
1	36	1.56	60	60	5702	35.94	1.52
2	38	1.58	57	114	5816	36.66	1.60
1	39	1.59	54	54	5870	37.00	1.65
3	42	1.62	50	150	6020	37.95	1.77
1	43	1.63	49	49	6069	38.26	1.82
1	44	1.64	48	48	6117	38.56	1.86
1	45	1.65	47	47	6164	38.86	1.90
3	48	1.68	46	138	6302	39.73	2.03
2	50	1.70	45	90	6392	40.29	2.11
1	51	1.71	44	44	6436	40.57	2.15
1	52	1.72	43	43	6479	40.84	2.20
1	53	1.72	42	42	6521	41.11	2.24
1	54	1.73	40	40	6561	41.36	2.28
3	57	1.76	39	117	6678	42.10	2.41
3	60	1.78	38	114	6792	42.81	2.53
3	63	1.80	37	111	6903	43.51	2.66

No. of Journals	Cumulative No. of Journals	Log of Cumulative Journals	No. of Citations	Total Citations	Cumulative Citations	% of Cumulative Citations	% of Cumulative Journals
2	65	1.81	36	72	6975	43.97	2.74
3	68	1.83	35	105	7080	44.63	2.87
1	69	1.84	34	34	7114	44.84	2.91
5	74	1.87	33	165	7279	45.88	3.12
1	75	1.88	32	32	7311	46.09	3.17
2	77	1.89	31	62	7373	46.48	3.25
2	79	1.90	30	60	7433	46.85	3.33
2	81	1.91	29	58	7491	47.22	3.42
6	87	1.94	28	168	7659	48.28	3.67
3	90	1.95	27	81	7740	48.79	3.80
3	93	1.97	26	78	7818	49.28	3.93
6	99	2.00	25	150	7968	50.23	4.18
6	105	2.02	24	144	8112	51.13	4.43
7	112	2.05	23	161	8273	52.15	4.73
8	120	2.08	22	176	8449	53.26	5.07
6	126	2.10	21	126	8575	54.05	5.32
11	137	2.14	20	220	8795	55.44	5.78
10	147	2.17	19	190	8985	56.64	6.21
10	157	2.20	18	180	9165	57.77	6.63
9	166	2.22	17	153	9318	58.74	7.01
7	173	2.24	16	112	9430	59.44	7.30
17	190	2.28	15	255	9685	61.05	8.02
16	206	2.31	14	224	9909	62.46	8.70
16	222	2.35	13	208	10117	63.77	9.37
22	244	2.39	12	264	10381	65.44	10.30
28	272	2.43	11	308	10689	67.38	11.48
28	300	2.48	10	280	10969	69.14	12.66
33	333	2.52	9	297	11266	71.02	14.06
46	379	2.58	8	368	11634	73.34	16.00
63	442	2.65	7	441	12075	76.12	18.66
73	515	2.71	6	438	12513	78.88	21.74
96	611	2.79	5	480	12993	81.90	25.79
115	726	2.86	4	460	13453	84.80	30.65
200	926	2.97	3	600	14053	88.58	39.09
368	1294	3.11	2	736	14789	93.22	54.62
1075	2369	3.37	1	1075	15864	100.00	100.00

The graphical and verbal interpretation of the Bradford's law of scattering has been applied to the literature of Biotechnology. Here, it is observed that an experimental curve (continuous line) is closely in association with the theoretical line (dotted line) up to about 16000 citations and then starts dropping as shown in fig.6.

Fig.6. Bradford's Graph for Biotechnology Journal Literature



4.1.15 (B) Distribution of cited journals by decreasing frequencies of citations in Environmental Science

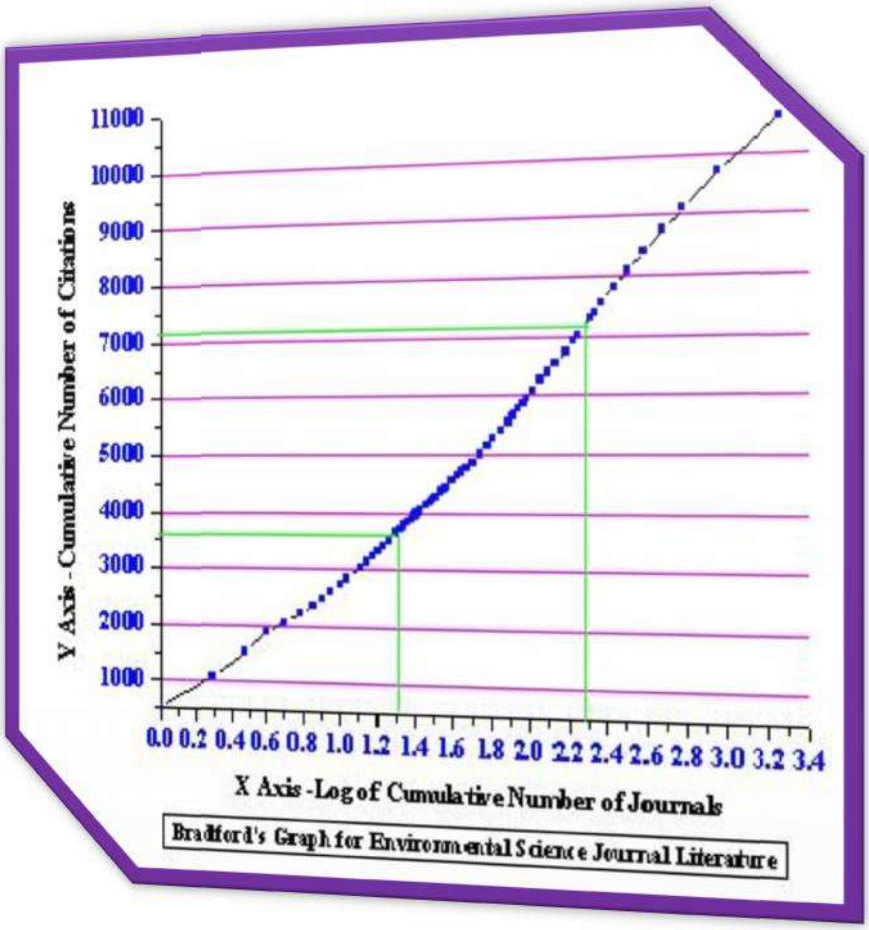
Table-30 Distribution of cited journals by decreasing frequencies of citations in Environmental Science

No. of Journals	Cumulative No. of Journals	Log of Cumulative Journals	No. of Citations	Total Citations	Cumulative Citations	% of Cumulative Citations	% of Cumulative Journals
1	1	0.00	546	546	546	5.15	0.06
1	2	0.30	540	540	1086	10.23	0.11
1	3	0.48	442	442	1528	14.40	0.17
1	4	0.60	349	349	1877	17.69	0.22
1	5	0.70	193	193	2070	19.51	0.28
1	6	0.78	147	147	2217	20.89	0.34
1	7	0.85	140	140	2357	22.21	0.39
1	8	0.90	135	135	2492	23.48	0.45
1	9	0.95	126	126	2618	24.67	0.51
1	10	1.00	116	116	2734	25.76	0.56
1	11	1.04	113	113	2847	26.83	0.62
2	13	1.11	99	198	3045	28.69	0.73
1	14	1.15	98	98	3143	29.62	0.79
1	15	1.18	92	92	3235	30.48	0.84
1	16	1.20	88	88	3323	31.31	0.90
1	17	1.23	86	86	3409	32.12	0.96
1	18	1.26	84	84	3493	32.92	1.01
2	20	1.30	77	154	3647	34.37	1.12
1	21	1.32	69	69	3716	35.02	1.18
1	22	1.34	58	58	3774	35.56	1.24
1	23	1.36	57	57	3831	36.10	1.29
1	24	1.38	56	56	3887	36.63	1.35
1	25	1.40	51	51	3938	37.11	1.40
1	26	1.41	48	48	3986	37.56	1.46
1	27	1.43	47	47	4033	38.00	1.52
2	29	1.46	46	92	4125	38.87	1.63
1	30	1.48	45	45	4170	39.30	1.69
1	31	1.49	43	43	4213	39.70	1.74
1	32	1.51	42	42	4255	40.10	1.80
3	35	1.54	38	114	4369	41.17	1.97
1	36	1.56	36	36	4405	41.51	2.02
1	37	1.57	35	35	4440	41.84	2.08
3	40	1.60	34	102	4542	42.80	2.25
3	43	1.63	33	99	4641	43.73	2.42
2	45	1.65	32	64	4705	44.34	2.53
2	47	1.67	31	62	4767	44.92	2.64
3	50	1.70	30	90	4857	45.77	2.81
5	55	1.74	29	145	5002	47.14	3.09
5	60	1.78	27	135	5137	48.41	3.37
5	65	1.81	26	130	5267	49.63	3.65
5	70	1.85	25	125	5392	50.81	3.93
1	71	1.85	24	24	5416	51.04	3.99
6	77	1.89	23	138	5554	52.34	4.33
4	81	1.91	22	88	5642	53.17	4.55
2	83	1.92	21	42	5684	53.56	4.66
5	88	1.94	20	100	5784	54.50	4.94

No. of Journals	Cumulative No. of Journals	Log of Cumulative Journals	No. of Citations	Total Citations	Cumulative Citations	% of Cumulative Citations	% of Cumulative Journals
5	93	1.97	19	95	5879	55.40	5.22
5	98	1.99	18	90	5969	56.25	5.51
7	105	2.02	17	119	6088	57.37	5.90
11	116	2.06	16	176	6264	59.03	6.52
9	125	2.10	15	135	6399	60.30	7.02
11	136	2.13	14	154	6553	61.75	7.64
14	150	2.18	13	182	6735	63.47	8.43
15	165	2.22	12	180	6915	65.16	9.27
10	175	2.24	11	110	7025	66.20	9.83
29	204	2.31	10	290	7315	68.93	11.46
10	214	2.33	9	90	7405	69.78	12.02
21	235	2.37	8	168	7573	71.36	13.20
35	270	2.43	7	245	7818	73.67	15.17
45	315	2.50	6	270	8088	76.22	17.70
62	377	2.58	5	310	8398	79.14	21.18
91	468	2.67	4	364	8762	82.57	26.29
119	587	2.77	3	357	9119	85.93	32.98
300	887	2.95	2	600	9719	91.58	49.83
893	1780	3.25	1	893	10612	100.00	100.00

The graphical and verbal interpretation of the Bradford's law of scattering has been applied to the literature of Environmental Science. Here, it is observed that an experimental curve (continuous line) is closely in association with the theoretical line (dotted line) up to about 11000 citations and then starts dropping as shown in fig.7.

Fig.7. Bradford's Graph for Environmental Science Journal Literature



4.1.15 (C) Distribution of cited journals by decreasing frequencies of citations in Applied Botany

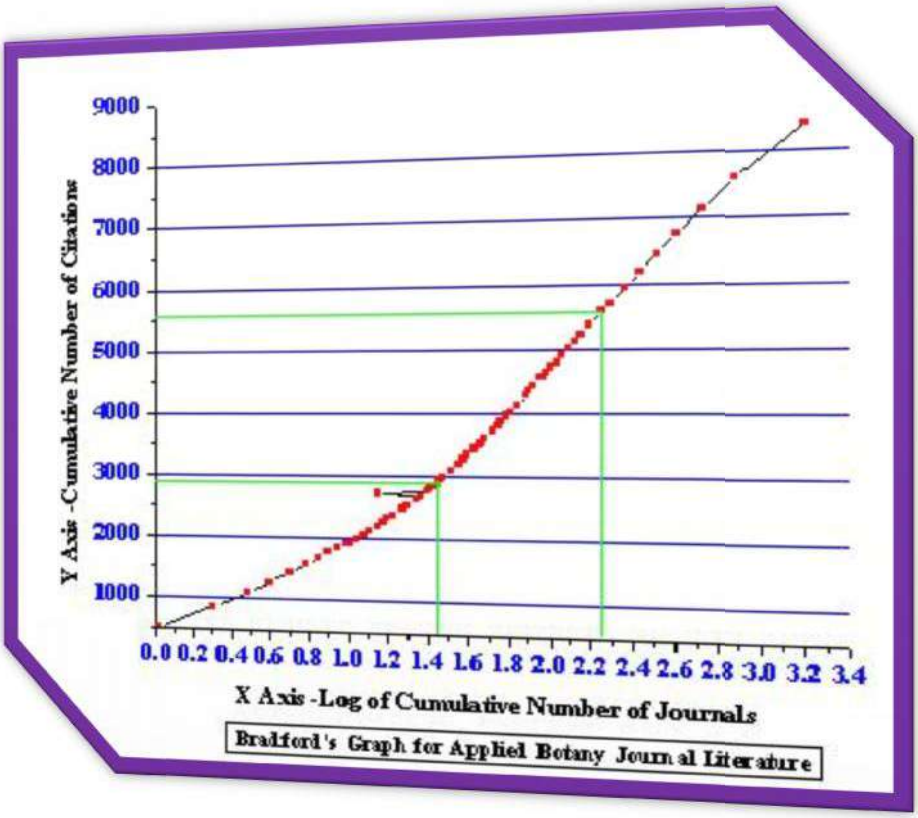
Table-31 Distribution of cited journals by decreasing frequencies of citations in Applied Botany

No. of Journals	Cumulative No. of Journals	Log of Cumulative Journals	No. of Citations	Total Citations	Cumulative Citations	% of Cumulative Citations	% of Cumulative Journals
1	1	0.00	495	495	495	5.89	0.06
1	2	0.30	356	356	851	10.12	0.13
1	3	0.48	232	232	1083	12.88	0.19
1	4	0.60	182	182	1265	15.04	0.26
1	5	0.70	154	154	1419	16.87	0.32
1	6	0.78	141	141	1560	18.55	0.38
1	7	0.85	120	120	1680	19.97	0.45
1	8	0.90	81	81	1761	20.94	0.51
1	9	0.95	75	75	1836	21.83	0.57
1	10	1.00	74	74	1910	22.71	0.64
1	11	1.04	72	72	1982	23.56	0.70
1	12	1.08	71	71	2053	24.41	0.77
1	13	1.11	70	70	2123	25.24	0.83
1	14	1.15	68	68	2191	26.05	0.89
1	15	1.18	67	67	2258	26.85	0.96
1	16	1.20	57	57	2315	27.52	1.02
1	17	1.23	56	56	2371	28.19	1.08
2	19	1.28	55	110	2481	29.50	1.21
1	20	1.30	49	49	2530	30.08	1.28
2	22	1.34	48	96	2626	31.22	1.40
1	23	1.36	47	47	2673	31.78	1.47
1	14	1.15	46	46	2719	32.33	0.89
1	25	1.40	45	45	2764	32.86	1.60
1	26	1.41	44	44	2808	33.38	1.66
1	27	1.43	43	43	2851	33.90	1.72
1	28	1.45	42	42	2893	34.40	1.79
1	29	1.46	41	41	2934	34.88	1.85
1	30	1.48	39	39	2973	35.35	1.91
3	33	1.52	38	114	3087	36.70	2.11
3	36	1.56	37	111	3198	38.02	2.30
2	38	1.58	36	72	3270	38.88	2.43
2	40	1.60	35	70	3340	39.71	2.55
3	43	1.63	34	102	3442	40.92	2.74
2	45	1.65	32	64	3506	41.68	2.87
1	46	1.66	31	31	3537	42.05	2.94
2	48	1.68	29	58	3595	42.74	3.06
4	52	1.72	28	112	3707	44.07	3.32
1	53	1.72	27	27	3734	44.39	3.38
3	56	1.75	26	78	3812	45.32	3.57
2	58	1.76	25	50	3862	45.92	3.70
4	62	1.79	24	96	3958	47.06	3.96
2	64	1.81	23	46	4004	47.60	4.08
5	69	1.84	22	110	4114	48.91	4.40
8	77	1.89	21	168	4282	50.91	4.91
3	80	1.90	20	60	4342	51.62	5.11
4	84	1.92	19	76	4418	52.53	5.36

No. of Journals	Cumulative No. of Journals	Log of Cumulative Journals	No. of Citations	Total Citations	Cumulative Citations	% of Cumulative Citations	% of Cumulative Journals
7	91	1.96	18	126	4544	54.02	5.81
5	96	1.98	17	85	4629	55.04	6.13
5	101	2.00	16	80	4709	55.99	6.45
5	106	2.03	15	75	4784	56.88	6.76
8	114	2.06	14	112	4896	58.21	7.28
8	122	2.09	13	104	5000	59.45	7.79
9	131	2.12	12	108	5108	60.73	8.36
10	141	2.15	11	110	5218	62.04	9.00
15	156	2.19	10	150	5368	63.82	9.96
23	179	2.25	9	207	5575	66.28	11.42
16	195	2.29	8	128	5703	67.80	12.44
34	229	2.36	7	238	5941	70.63	14.61
38	267	2.43	6	228	6169	73.34	17.04
57	324	2.51	5	285	6454	76.73	20.68
75	399	2.60	4	300	6754	80.30	25.46
126	525	2.72	3	378	7132	84.79	33.50
237	762	2.88	2	474	7606	90.43	48.63
805	1567	3.20	1	805	8411	100.00	100.00

The graphical and verbal interpretation of the Bradford's law of scattering has been applied to the literature of Applied Botany. Here, it is observed that an experimental curve (continuous line) is closely in association with the theoretical line (dotted line) up to about 8500 citations and then starts dropping as shown in fig.8.

Fig.8. Bradford's Graph for Applied Botany Journal Literature



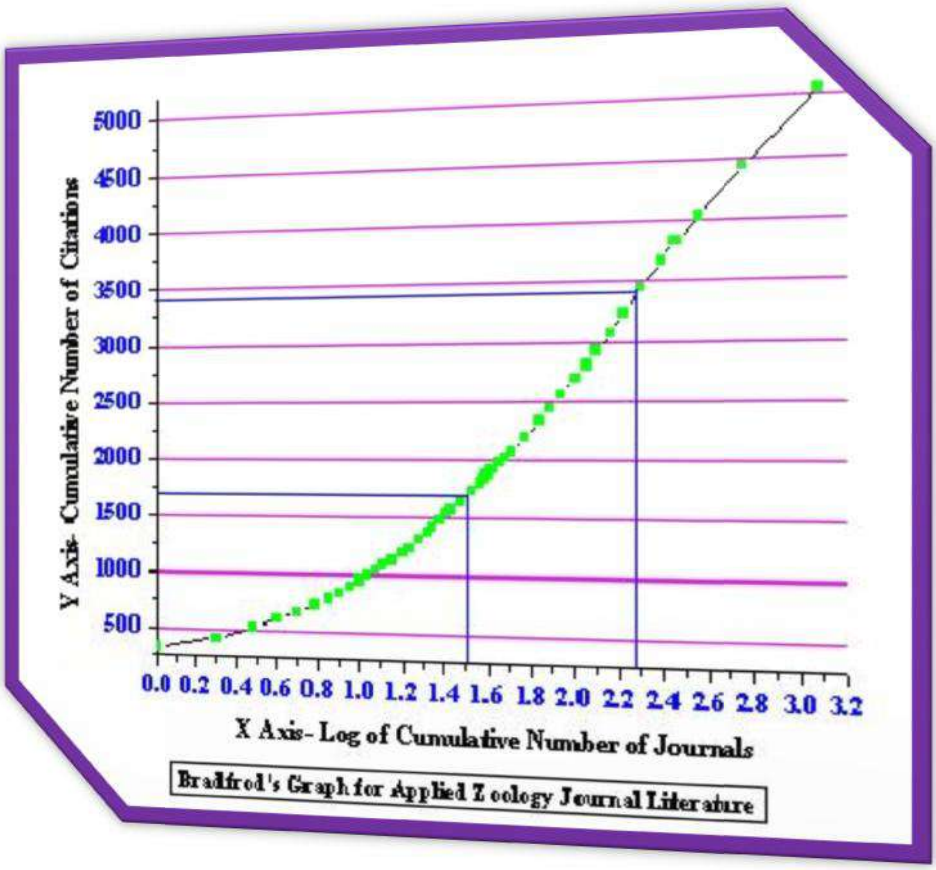
4.1.15 (D) Distribution of cited journals by decreasing frequencies of citations in Applied Zoology

Table-32 Distribution of cited journals by decreasing frequencies of citations in Applied Zoology

No. of Journals	Cumulative No. of Journals	Log of Cumulative Journals	No. of Citations	Total Citations	Cumulative Citations	% of Cumulative Citations	% of Cumulative Journals
1	1	0.00	325	325	325	6.43	0.09
1	2	0.30	96	96	421	8.33	0.17
1	3	0.48	93	93	514	10.17	0.26
1	4	0.60	78	78	592	11.72	0.34
1	5	0.70	70	70	662	13.10	0.43
1	6	0.78	65	65	727	14.39	0.51
1	7	0.85	60	60	787	15.57	0.60
1	8	0.90	54	54	841	16.64	0.69
1	9	0.95	53	53	894	17.69	0.77
1	10	1.00	51	51	945	18.70	0.86
1	11	1.04	50	50	995	19.69	0.94
1	12	1.08	46	46	1041	20.60	1.03
1	13	1.11	42	42	1083	21.43	1.11
1	14	1.15	41	41	1124	22.24	1.20
2	16	1.20	39	78	1202	23.79	1.37
1	17	1.23	38	38	1240	24.54	1.46
2	19	1.28	35	70	1310	25.93	1.63
2	21	1.32	34	68	1378	27.27	1.80
1	22	1.34	33	33	1411	27.92	1.89
2	24	1.38	32	64	1475	29.19	2.06
2	26	1.41	31	62	1537	30.42	2.23
1	27	1.43	27	27	1564	30.95	2.31
3	30	1.48	26	78	1642	32.50	2.57
4	34	1.53	24	96	1738	34.40	2.91
3	37	1.57	23	69	1807	35.76	3.17
1	38	1.58	22	22	1829	36.20	3.26
2	40	1.60	21	42	1871	37.03	3.43
2	42	1.62	20	40	1911	37.82	3.60
3	45	1.65	19	57	1968	38.95	3.86
3	48	1.68	17	51	2019	39.96	4.11
3	51	1.71	16	48	2067	40.91	4.37
8	59	1.77	15	120	2187	43.28	5.06
10	69	1.84	14	140	2327	46.05	5.91
8	77	1.89	13	104	2431	48.11	6.60
10	87	1.94	12	120	2551	50.48	7.46
13	100	2.00	11	143	2694	53.31	8.57
11	111	2.05	10	110	2804	55.49	9.51
13	124	2.09	9	117	2921	57.81	10.63
19	143	2.16	8	152	3073	60.82	12.25
23	166	2.22	7	161	3234	64.00	14.22
35	201	2.30	6	210	3444	68.16	17.22
46	247	2.39	5	230	3674	72.71	21.17
38	285	2.45	4	152	3826	75.72	24.42
71	356	2.55	3	213	4039	79.93	30.51
203	559	2.75	2	406	4445	87.97	47.90
608	1167	3.07	1	608	5053	100.00	100.00

The graphical and verbal interpretation of the Bradford's law of scattering has been applied to the literature of Applied Zoology. Here, it is observed that an experimental curve (continuous line) is closely in association with the theoretical line (dotted line) up to about 5500 citations and then starts dropping as shown in fig.9.

Fig.9. Bradford's Graph for Applied Zoology Journal Literature



4.1.16 Obsolescence and Half-life of journal literature in Bioscience

Obsolescence has become one of the important characteristics of scientific literature. Growth and obsolescence are usually considered together, because they represent the initial and final stages of the information cycle. An obsolescence study could be treated as an aspect of citation analysis for journals. The study is useful for the practical librarians, who administer growing collections infinite space look to research on obsolescence to help them decide which item to keep and which to store for discard in order to make room for the new acquisitions (Biradar, 2003). Obsolescence has been defined by Line and Sandison (1974) as the decline over time in validity or utility of information. This concept is of obvious interest to information theoreticians who concern themselves with the development, career and eventual death or incorporation of particular kinds of information. Obsolescence study also, helpful for pioneers in a scientific discipline to know how far they must go back to obtain a published paper in their field of interest. Table-33 represents the age wise distribution of cited journal literature in the field of Bioscience.

Table-33 Obsolescence and Half-life of journal literature in Bioscience

Age in years	BT			ES			AB			AZ			BS				Citations in Total (t)
	No. of Citations	%	Cumulative %	No. of Citations	%	Cumulative %	No. of Citations	%	Cumulative %	No. of Citations	%	Cumulative %	No. of Citations	Cumulative Citations	%	Cumulative %	
0	231	1.456	1.456	71	0.669	0.669	88	1.046	1.046	43	0.851	0.851	433	433	1.084	1.08	39940
1	596	3.757	5.213	162	1.527	2.196	187	2.223	3.269	91	1.801	2.652	1036	1469	2.594	3.67	39507
2	719	4.532	9.745	245	2.309	4.504	268	3.186	6.456	123	2.434	5.086	1355	2824	3.393	7.07	38471
3	838	5.282	15.028	364	3.430	7.934	287	3.412	9.868	114	2.256	7.342	1603	4427	4.014	11.08	37116
4	913	5.755	20.783	439	4.137	12.071	350	4.161	14.029	168	3.325	10.667	1870	6297	4.682	15.76	35513
5	789	4.974	25.756	457	4.306	16.378	395	4.696	18.725	135	2.672	13.339	1776	8073	4.447	20.21	33643
6	880	5.547	31.303	502	4.730	21.108	340	4.042	22.768	185	3.661	17.000	1907	9980	4.775	24.98	31867
7	783	4.936	36.239	464	4.372	25.481	268	3.186	25.954	191	3.780	20.780	1706	11686	4.271	29.25	29960
8	817	5.150	41.389	481	4.533	30.013	259	3.079	29.033	199	3.938	24.718	1756	13442	4.397	33.65	28254
9	687	4.331	45.720	433	4.080	34.093	268	3.186	32.219	189	3.740	28.458	1577	15019	3.948	37.60	26498
10	666	4.198	49.918	379	3.571	37.665	258	3.067	35.287	217	4.294	32.753	1520	16539	3.806	41.41	24921
11	585	3.688	53.606	396	3.732	41.396	273	3.246	38.533	166	3.285	36.038	1420	17959	3.555	44.96	23401
12	533	3.360	56.965	382	3.600	44.996	238	2.830	41.362	147	2.909	38.947	1300	19259	3.255	48.22	21981
13	498	3.139	60.105	339	3.194	48.191	241	2.865	44.228	134	2.652	41.599	1212	20471	3.035	51.25	20681
14	498	3.139	63.244	336	3.166	51.357	199	2.366	46.593	126	2.494	44.093	1159	21630	2.902	54.15	19469
15	423	2.666	65.910	308	2.902	54.259	225	2.675	49.269	147	2.909	47.002	1103	22733	2.762	56.91	18310
16	415	2.616	68.526	289	2.723	56.983	242	2.877	52.146	129	2.553	49.555	1075	23808	2.692	59.61	17207
17	364	2.295	70.821	305	2.874	59.857	225	2.675	54.821	105	2.078	51.633	999	24807	2.501	62.11	16132
18	293	1.847	72.668	303	2.855	62.712	217	2.580	57.401	125	2.474	54.106	938	25745	2.349	64.46	15133
19	283	1.784	74.451	258	2.431	65.143	181	2.152	59.553	148	2.929	57.035	870	26615	2.178	66.63	14195
20	279	1.759	76.210	251	2.365	67.508	246	2.925	62.477	142	2.810	59.846	918	27533	2.298	68.93	13325
21	235	1.481	77.692	223	2.101	69.610	190	2.259	64.736	102	2.019	61.864	750	28283	1.878	70.81	12407
22	242	1.525	79.217	221	2.083	71.692	153	1.819	66.555	118	2.335	64.200	734	29017	1.838	72.65	11657
23	190	1.198	80.415	180	1.696	73.389	137	1.629	68.184	95	1.880	66.080	602	29619	1.507	74.15	10923
24	219	1.380	81.795	230	2.167	75.556	133	1.581	69.766	99	1.959	68.039	681	30300	1.705	75.86	10321
25	219	1.380	83.176	192	1.809	77.365	126	1.498	71.264	100	1.979	70.018	637	30937	1.595	77.45	9640
26	183	1.154	84.329	164	1.545	78.911	116	1.379	72.643	95	1.880	71.898	558	31495	1.397	78.85	9003
27	174	1.097	85.426	167	1.574	80.484	140	1.664	74.307	110	2.177	74.075	591	32086	1.480	80.33	8445
28	134	0.845	86.271	166	1.564	82.049	125	1.486	75.793	85	1.682	75.757	510	32596	1.277	81.61	7854
29	139	0.876	87.147	126	1.187	83.236	131	1.557	77.351	87	1.722	77.479	483	33079	1.209	82.82	7344
30	135	0.851	87.998	102	0.961	84.197	104	1.236	78.587	96	1.900	79.379	437	33516	1.094	83.91	6861

Age in years	BT			ES			AB			AZ			BS				Citations in Total (t)
	No. of Citations	%	Cumulative %	No. of Citations	%	Cumulative %	No. of Citations	%	Cumulative %	No. of Citations	%	Cumulative %	No. of Citations	Cumulative Citations	%	Cumulative %	
31	129	0.813	88.811	92	0.867	85.064	101	1.201	79.788	84	1.662	81.041	406	33922	1.017	84.93	6424
32	95	0.599	89.410	106	0.999	86.063	102	1.213	81.001	77	1.524	82.565	380	34302	0.951	85.88	6018
33	93	0.586	89.996	97	0.914	86.977	86	1.022	82.023	62	1.227	83.792	338	34640	0.846	86.73	5638
34	100	0.630	90.626	78	0.735	87.712	96	1.141	83.165	56	1.108	84.900	330	34970	0.826	87.55	5300
35	62	0.391	91.017	90	0.848	88.560	69	0.820	83.985	59	1.168	86.068	280	35250	0.701	88.25	4970
36	70	0.441	91.459	66	0.622	89.182	80	0.951	84.936	49	0.970	87.037	265	35515	0.663	88.92	4690
37	68	0.429	91.887	81	0.763	89.945	79	0.939	85.875	33	0.653	87.691	261	35776	0.653	89.57	4425
38	82	0.517	92.404	72	0.678	90.624	76	0.904	86.779	35	0.693	88.383	265	36041	0.663	90.23	4164
39	71	0.448	92.852	81	0.763	91.387	79	0.939	87.718	53	1.049	89.432	284	36325	0.711	90.94	3899
40	79	0.498	93.350	55	0.518	91.905	68	0.808	88.527	51	1.009	90.441	253	36578	0.633	91.58	3615
41	72	0.454	93.803	47	0.443	92.348	64	0.761	89.288	27	0.534	90.976	210	36788	0.526	92.10	3362
42	77	0.485	94.289	48	0.452	92.801	57	0.678	89.965	27	0.534	91.510	209	36997	0.523	92.63	3152
43	60	0.378	94.667	52	0.490	93.291	47	0.559	90.524	34	0.673	92.183	193	37190	0.483	93.11	2943
44	41	0.258	94.925	30	0.283	93.573	45	0.535	91.059	27	0.534	92.717	143	37333	0.358	93.47	2750
45	50	0.315	95.241	32	0.302	93.875	50	0.594	91.654	30	0.594	93.311	162	37495	0.406	93.87	2607
46	46	0.290	95.531	38	0.358	94.233	43	0.511	92.165	23	0.455	93.766	150	37645	0.376	94.25	2445
47	40	0.252	95.783	39	0.368	94.600	46	0.547	92.712	22	0.435	94.201	147	37792	0.368	94.62	2295
48	45	0.284	96.066	27	0.254	94.855	37	0.440	93.152	12	0.237	94.439	121	37913	0.303	94.92	2148
49	32	0.202	96.268	25	0.236	95.090	43	0.511	93.663	23	0.455	94.894	123	38036	0.308	95.23	2027
50	31	0.195	96.464	30	0.283	95.373	33	0.392	94.055	20	0.396	95.290	114	38150	0.285	95.51	1904
51	37	0.233	96.697	33	0.311	95.684	23	0.273	94.329	7	0.139	95.428	100	38250	0.250	95.76	1790
52	28	0.177	96.873	24	0.226	95.910	31	0.369	94.697	19	0.376	95.804	102	38352	0.255	96.02	1690
53	37	0.233	97.107	28	0.264	96.174	15	0.178	94.876	13	0.257	96.062	93	38445	0.233	96.25	1588
54	29	0.183	97.289	15	0.141	96.315	12	0.143	95.018	11	0.218	96.279	67	38512	0.168	96.42	1495
55	23	0.145	97.434	23	0.217	96.532	40	0.476	95.494	17	0.336	96.616	103	38615	0.258	96.68	1428
56	36	0.227	97.661	19	0.179	96.711	14	0.166	95.660	10	0.198	96.814	79	38694	0.198	96.88	1325
57	22	0.139	97.800	10	0.094	96.805	18	0.214	95.874	8	0.158	96.972	58	38752	0.145	97.02	1246
58	12	0.076	97.876	21	0.198	97.003	24	0.285	96.160	8	0.158	97.130	65	38817	0.163	97.18	1188
59	14	0.088	97.964	13	0.123	97.126	23	0.273	96.433	8	0.158	97.289	58	38875	0.145	97.33	1123
60	15	0.095	98.058	14	0.132	97.258	18	0.214	96.647	6	0.119	97.408	53	38928	0.133	97.46	1065
61	11	0.069	98.128	22	0.207	97.465	12	0.143	96.790	6	0.119	97.526	51	38979	0.128	97.59	1012
62	9	0.057	98.184	9	0.085	97.550	7	0.083	96.873	6	0.119	97.645	31	39010	0.078	97.67	961

Age in years	BT			ES			AB			AZ			BS				Citations in Total (t)
	No. of Citations	%	Cumulative %	No. of Citations	%	Cumulative %	No. of Citations	%	Cumulative %	No. of Citations	%	Cumulative %	No. of Citations	Cumulative Citations	%	Cumulative %	
63	8	0.050	98.235	5	0.047	97.597	12	0.143	97.016	8	0.158	97.803	33	39043	0.083	97.75	930
64	16	0.101	98.336	10	0.094	97.691	6	0.071	97.087	4	0.079	97.882	36	39079	0.090	97.84	897
65	13	0.082	98.418	9	0.085	97.776	17	0.202	97.289	2	0.040	97.922	41	39120	0.103	97.94	861
66	7	0.044	98.462	5	0.047	97.823	10	0.119	97.408	6	0.119	98.041	28	39148	0.070	98.01	820
67	12	0.076	98.537	11	0.104	97.927	16	0.190	97.598	4	0.079	98.120	43	39191	0.108	98.12	792
68	11	0.069	98.607	17	0.160	98.087	8	0.095	97.693	3	0.059	98.179	39	39230	0.098	98.22	749
69	13	0.082	98.689	11	0.104	98.191	14	0.166	97.860	4	0.079	98.258	42	39272	0.105	98.32	710
70	18	0.113	98.802	11	0.104	98.294	11	0.131	97.990	5	0.099	98.357	45	39317	0.113	98.44	668
71	18	0.113	98.916	10	0.094	98.389	8	0.095	98.086	3	0.059	98.417	39	39356	0.098	98.53	623
72	14	0.088	99.004	8	0.075	98.464	9	0.107	98.193	5	0.099	98.516	36	39392	0.090	98.62	584
73	12	0.076	99.080	6	0.057	98.520	7	0.083	98.276	4	0.079	98.595	29	39421	0.073	98.70	548
74	6	0.038	99.117	7	0.066	98.586	4	0.048	98.323	3	0.059	98.654	20	39441	0.050	98.75	519
75	8	0.050	99.168	13	0.123	98.709	7	0.083	98.407	3	0.059	98.714	31	39472	0.078	98.82	499
76	11	0.069	99.237	6	0.057	98.765	9	0.107	98.514	3	0.059	98.773	29	39501	0.073	98.90	468
77	4	0.025	99.262	4	0.038	98.803	7	0.083	98.597	4	0.079	98.852	19	39520	0.048	98.94	439
78	9	0.057	99.319	4	0.038	98.841	10	0.119	98.716	2	0.040	98.892	25	39545	0.063	99.01	420
79	6	0.038	99.357	6	0.057	98.897	4	0.048	98.763	3	0.059	98.951	19	39564	0.048	99.05	395
80	4	0.025	99.382	2	0.019	98.916	3	0.036	98.799	4	0.079	99.030	13	39577	0.033	99.09	376
81	7	0.044	99.426	5	0.047	98.963	5	0.059	98.858	5	0.099	99.129	22	39599	0.055	99.14	363
82	8	0.050	99.477	3	0.028	98.992	6	0.071	98.930	1	0.020	99.149	18	39617	0.045	99.19	341
83	6	0.038	99.514	4	0.038	99.029	3	0.036	98.965	4	0.079	99.228	17	39634	0.043	99.23	323
84	3	0.019	99.533	5	0.047	99.076	8	0.095	99.061	3	0.059	99.288	19	39653	0.048	99.28	306
85	6	0.038	99.571	7	0.066	99.142				3	0.059	99.347	16	39669	0.040	99.32	287
86	5	0.032	99.603	2	0.019	99.161	8	0.095	99.156				15	39684	0.038	99.35	271
87	2	0.013	99.615	5	0.047	99.208	7	0.083	99.239	3	0.059	99.406	17	39701	0.043	99.40	256
88	3	0.019	99.634	5	0.047	99.256	5	0.059	99.298	1	0.020	99.426	14	39715	0.035	99.43	239
89	5	0.032	99.666	4	0.038	99.293				2	0.040	99.466	11	39726	0.028	99.46	225
90	1	0.006	99.672	7	0.066	99.359	1	0.012	99.310	2	0.040	99.505	11	39737	0.028	99.49	214
91	4	0.025	99.697	1	0.009	99.369	4	0.048	99.358				9	39746	0.023	99.51	203
92	2	0.013	99.710	3	0.028	99.397	2	0.024	99.382	2	0.040	99.545	9	39755	0.023	99.53	194
93	3	0.019	99.729	7	0.066	99.463	5	0.059	99.441	5	0.099	99.644	20	39775	0.050	99.58	185
94	1	0.006	99.735	5	0.047	99.510	3	0.036	99.477	2	0.040	99.683	11	39786	0.028	99.61	165

Age in years	BT			ES			AB			AZ			BS				Citations in Total (t)
	No. of Citations	%	Cumulative %	No. of Citations	%	Cumulative %	No. of Citations	%	Cumulative %	No. of Citations	%	Cumulative %	No. of Citations	Cumulative Citations	%	Cumulative %	
95	4	0.025	99.760	3	0.028	99.538	1	0.012	99.489	1	0.020	99.703	9	39795	0.023	99.63	154
96	2	0.013	99.773	5	0.047	99.585	1	0.012	99.500	1	0.020	99.723	9	39804	0.023	99.66	145
97	2	0.013	99.786	5	0.047	99.632	3	0.036	99.536	1	0.020	99.743	11	39815	0.028	99.68	136
98	4	0.025	99.811	7	0.066	99.698				1	0.020	99.763	12	39827	0.030	99.71	125
99	1	0.006	99.817	4	0.038	99.736	4	0.048	99.584	1	0.020	99.782	10	39837	0.025	99.74	113
100	2	0.013	99.830	1	0.009	99.746	1	0.012	99.596	1	0.020	99.802	5	39842	0.013	99.75	103
101	3	0.019	99.849	3	0.028	99.774	1	0.012	99.607	1	0.020	99.822	8	39850	0.020	99.77	98
102	1	0.006	99.855	1	0.009	99.783	4	0.048	99.655	1	0.020	99.842	7	39857	0.018	99.79	90
103				2	0.019	99.802							2	39859	0.005	99.79	83
104	1	0.006	99.861	2	0.019	99.821	3	0.036	99.691				6	39865	0.015	99.81	81
105	1	0.006	99.867	2	0.019	99.840	1	0.012	99.703				4	39869	0.010	99.82	75
106				2	0.019	99.859							2	39871	0.005	99.82	71
107				1	0.009	99.868	2	0.024	99.726				3	39874	0.008	99.83	69
108	1	0.006	99.874				2	0.024	99.750				3	39877	0.008	99.84	66
110	1	0.006	99.880	2	0.019	99.887	2	0.024	99.774				5	39882	0.013	99.85	63
111	1	0.006	99.886				1	0.012	99.786				2	39884	0.005	99.86	58
112							2	0.024	99.810				2	39886	0.005	99.86	56
113				1	0.009	99.896				1	0.020	99.861	2	39888	0.005	99.87	54
114				1	0.009	99.906							1	39889	0.003	99.87	52
115	1	0.006	99.893				2	0.024	99.833				3	39892	0.008	99.88	51
116				2	0.019	99.925				1	0.020	99.881	3	39895	0.008	99.88	48
117				1	0.009	99.934	1	0.012	99.845				2	39897	0.005	99.89	45
119				2	0.019	99.953							2	39899	0.005	99.89	43
120							1	0.012	99.857	1	0.020	99.901	2	39901	0.005	99.90	41
121							1	0.012	99.869				1	39902	0.003	99.90	39
122	1	0.006	99.899							1	0.020	99.921	2	39904	0.005	99.91	38
123							1	0.012	99.881				1	39905	0.003	99.91	36
126							1	0.012	99.893	1	0.020	99.941	2	39907	0.005	99.91	35
127	2	0.013	99.912	1	0.009	99.962				2	0.040	99.980	5	39912	0.013	99.93	33
128							1	0.012	99.905				1	39913	0.003	99.93	28
129							1	0.012	99.917				1	39914	0.003	99.93	27
130	1	0.006	99.918										1	39915	0.003	99.93	26

Age in years	BT			ES			AB			AZ			BS				Citations in Total (t)
	No. of Citations	%	Cumulative %	No. of Citations	%	Cumulative %	No. of Citations	%	Cumulative %	No. of Citations	%	Cumulative %	No. of Citations	Cumulative Citations	%	Cumulative %	
132	1	0.006	99.924										1	39916	0.003	99.94	25
133							1	0.012	99.928				1	39917	0.003	99.94	24
134	1	0.006	99.931										1	39918	0.003	99.94	23
135							1	0.012	99.940				1	39919	0.003	99.94	22
136	1	0.006	99.937										1	39920	0.003	99.95	21
139	1	0.006	99.943										1	39921	0.003	99.95	20
141				1	0.009	99.972							1	39922	0.003	99.95	19
144	1	0.006	99.949										1	39923	0.003	99.95	18
145	1	0.006	99.956	1	0.009	99.981							2	39925	0.005	99.96	17
150	2	0.013	99.968										2	39927	0.005	99.96	15
152	1	0.006	99.975										1	39928	0.003	99.97	13
154							1	0.012	99.952				1	39929	0.003	99.97	12
157							1	0.012	99.964				1	39930	0.003	99.97	11
158	1	0.006	99.981				1	0.012	99.976				2	39932	0.005	99.98	10
160							1	0.012	99.988				1	39933	0.003	99.98	8
161							1	0.012	100.000				1	39934	0.003	99.98	7
163	1	0.006	99.987										1	39935	0.003	99.98	6
166	1	0.006	99.994										1	39936	0.003	99.99	5
168										1	0.020	100.000	1	39937	0.003	99.99	4
170				1	0.009	99.991							1	39938	0.003	99.99	3
211	1	0.006	100.000										1	39939	0.003	99.99	2
223				1	0.009	100.000							1	39940	0.003	100.00	1
	15864	**100.00**		**10612**	**100.00**		**8411**	**100.00**		**5053**	**100.00**		**39940**		**100.00**		

BT=Biotechnology, ES=Environmental Science, AB=Applied Botany, AZ= Applied Zoology, BS=Bioscience

Table-33 reveals the obsolescence of journal literature in the field of Bioscience. It is clearly shows that more number of citations (59.61%) are distributed in the age of 0-16 years. Nearly one-quarter of journal citations are 6 years old. Whereas in case of Biotechnology 5 years, Environmental Science & Applied Botany 7 years & Applied Zoology 8 years. It is also observed that 70% of citations are 21 years old. This indicates that librarians have to maintain 21 years and for biotechnology 17 years old periodicals in easily accessible place, rest of the 30% may be deposited in the dormitory section of the library. The documents as old as 223 years have also been cited fig.10 to 14.

Half- life of journal citations

A graph is plotted taking the age of citations in years on X-axis and cumulative percentage of citations on Y-axis to find out half-life of citations. A line parallel to the X-axis is drawn from a point say “A” drawn from point “B” to meet the X-axis at C. “C” represents the half-life period of citations. Half-life of journal citations is found in the field of Bioscience 13 years old.

Fig.10.Obsolescence of journal citations in Bioscience

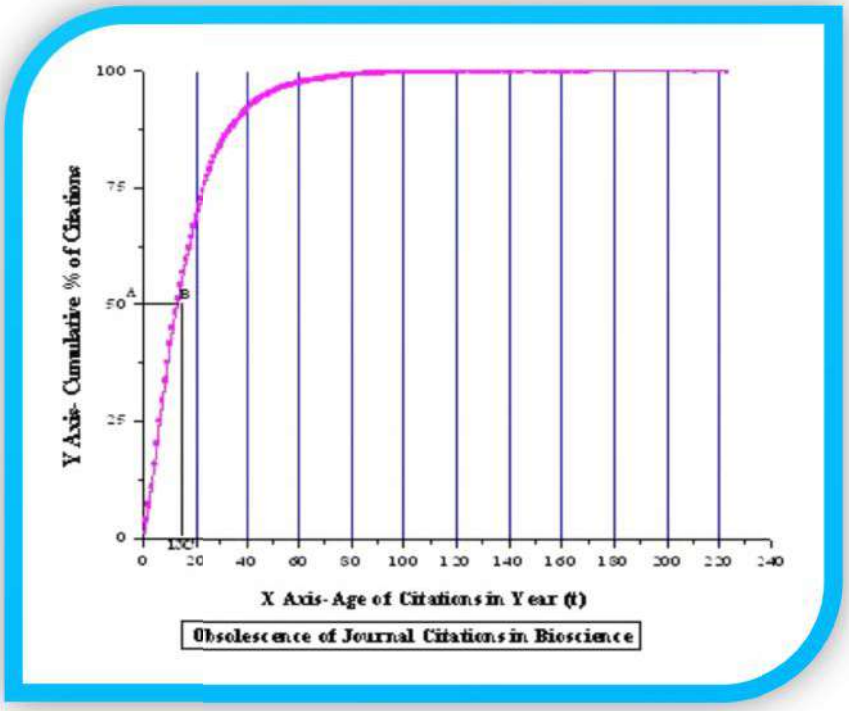


Fig.11. Obsolescence of journal citations in Biotechnology

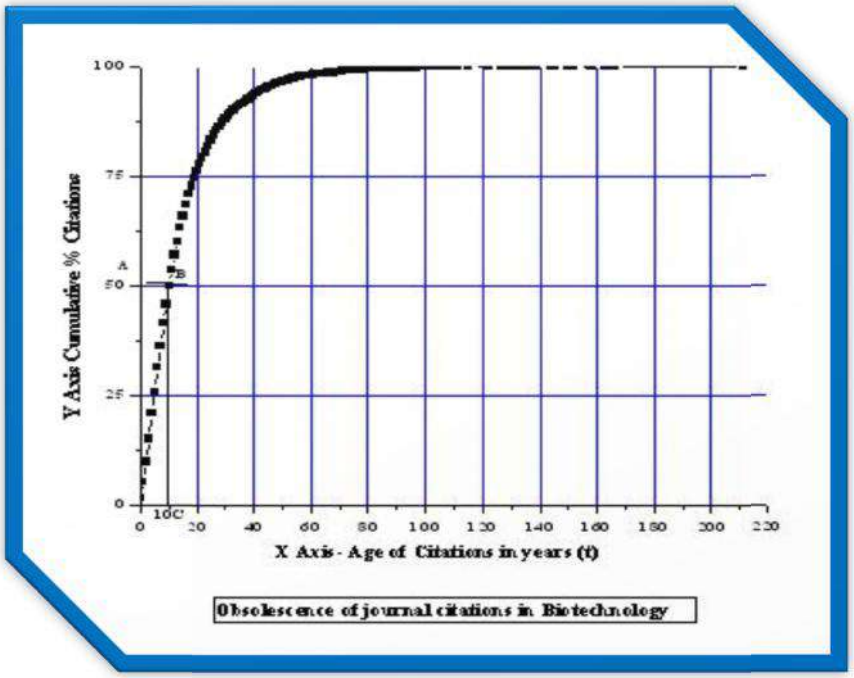


Fig.12. Obsolescence of journal citations in Environmental Science

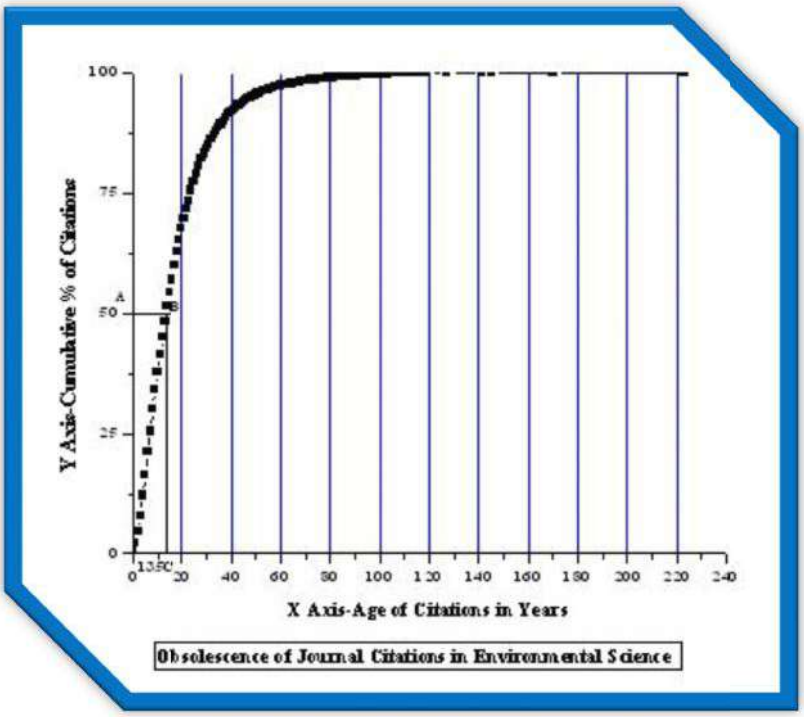


Fig.13. Obsolescence of journal citations in Applied Botany

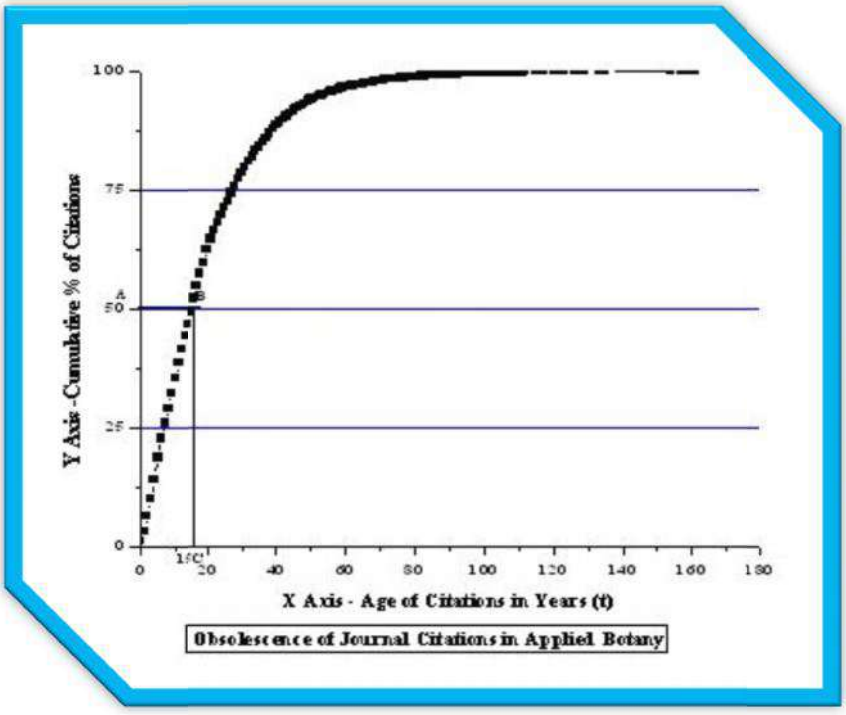
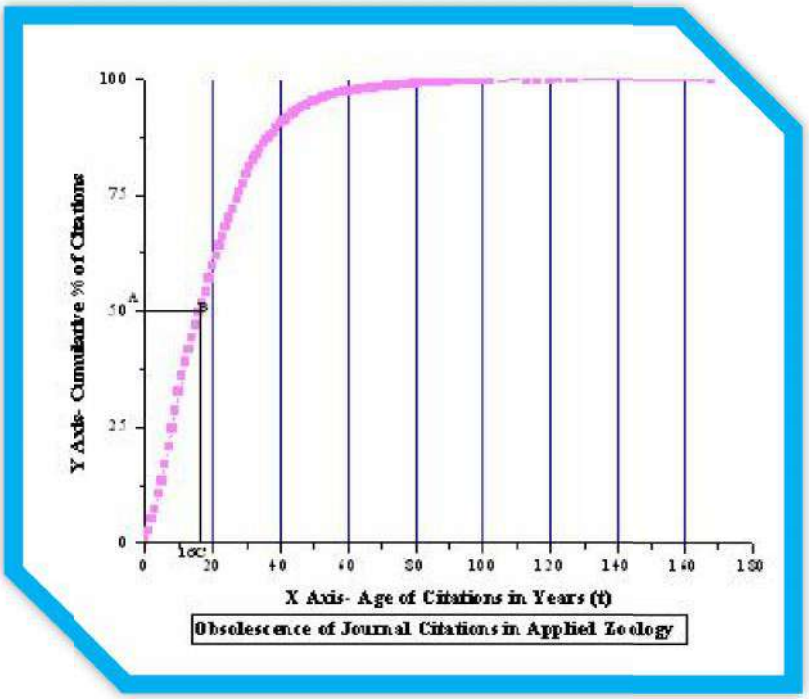


Fig.14. Obsolescence of journal citations in Applied Zoology



4.1.17 Conclusion

Citation analysis as taken to mean the analysis of the citation or reference which form part of the articles in journals or any communication, it is not taken to include the study of reference appearing in secondary periodicals. Citation analysis helps to know reading habits of users in every field of knowledge. It is also helpful to librarian for studying the present position of literature and to identify the core journals. Citation analysis is an effective tool to decide the use of literature in a specific field. This is indirect method like the analysis of the library record to determine the actual use of document sources. This type of information can be utilized for setting policies for different activities in library, e.g. acquisition of materials, selection of periodicals etc. The primary purpose of citation is to enable a reader to go the referred document for information on a point of check the authenticity of a particular view finding or method. Each citation is a message from the author of a document to his readers. Citation analysis provides relevant measurement of utility and relationship of journal whose primary function is to communicate research results. This analytical method is very useful in libraries.

This chapter presented the detailed analysis and overview of Bioscience research activity conducted in Kuvempu University. The analysis of data helped in finding many significant facts. The observations noticed in this study are useful for building findings and suggestions. The data analyses presented in this chapter fulfill the objectives. Such as to study the use of different information sources consulted and cited by Bioscience research scholars, while conducting research study and identification of cited sources and its ranking. This study also found the some results positively. Research scholars most preferred source is journal literature while conducting research study than other sources

and now use of web and internet sources are also used by the researchers in the field Bioscience. English is the dominant language and also an important communication language in the field of Bioscience. However, very small percent of researchers used literature published in other languages. Country wise distribution of journals reveals that USA ranked first in number of times cited journals. India stands second in the ranking.

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CHAPTER-V

FINDINGS, SUGGESTIONS AND CONCLUSION

5.1 Introduction

The main objectives of any research are either to extend the frontiers of knowledge or to bridge the gap in the existing knowledge. It may even mean giving new meanings to the accepted facts or discarding old accepted concepts in the light of nearly acquired knowledge. In any case, each researcher has its own objectives which lead to certain results. From the results we derive the conclusion and these conclusions help us in improvement. Research is a continuous process in the global scenario and hence one must try to identify areas of further research which helps in the development of the society.

Citations analysis studies reveals an effective collection, organization and dissemination of information for the library managers and research scholars. Librarians should be in a better position to rectify their subscription policy with their limited resources. This is possible by subscribing to a handful of core journals which covers a maximum segment of contemporary literature. Further, it is possible to provide correct and pinpointed services. Likewise the researcher will be kept abreast of the recent trends in their research field. The following are some of the major findings, suggestions and conclusion that have been drawn from this study.

5.2 Findings of the study

The major findings of the study are:

1. In the present study, we can see that there was a steady growth in the number of doctorates awarded in the field of Bioscience from 2003 onwards. The result reveals that the highest number of doctorates i.e. 33 (16.18%) were awarded in the year 2007 followed by 2008 and 2009 (each 27 theses). Out of 87 theses submitted during 2007 to 2009, 30 theses are from Environmental Science and 28 theses are from the Biotechnology department. Overall results clearly represent that highest number of theses were submitted during 2005 to 2012 (175 theses) which accounts 85.78% of the total theses submitted. The small number of theses was submitted during the period 1998 to 2004 with 29 theses (14.21%).
2. A total of 51168 citations are distributed over 204 theses. It is found that the rate of citations of theses has witnessed an increasing trend. It is clear from the result of the study that the average number of citations received per thesis is highest in 2012 (300.82 citations per thesis) followed by 279.15 citations in the year 2009. The overall average citation per thesis is 250.82 was found in the study.
3. It may be observed that in all disciplines, journals and books are the most cited source of information for the Bioscience researchers at Kuvempu University. A result shows that 78.06% of citations belong to the journals followed by books which secured the second highest number of citations accounting for 13.59% of total citations. In other words journals and books together constitute 91.65% of total citations. The rest of the citations were scattered in several other document types.

4. The journals and other forms of documents are analyzed according to their country of origin. It has been observed from the analysis, out of 51,168 citations; India is the leading country and occupies the top position with an accounting for 16154 (31.57%) citations. The USA is placed second with covering 13932 (27.23%) citations. UK is in third place which accounts 7078 (13.83%) citations. It reflects that these three countries have been well developed in the field of Bioscience.
5. Chronological distribution reveals that the highest numbers of citations were found in 2000-2009 i.e. 12511 (31.32%). It is the most productive decade. Out of which Biotechnology contributes the maximum number of citations that is 6537 (41.21%). Followed by Environmental Science with 2850 (26.85%) of the total citations. A decade 1990-1999 is in second position which accounts 12247 (30.66%) citations. The study clearly shows that Bioscience researchers are in need of recent information for their research and development activities (Table-9).
6. Authorship pattern indicates that out of 39940 citations the maximum citations are written by two authors' works comprised the highest 12185 (30.51%) of total citations. Among the two authorships, foreign author's contribution constitutes 17.45%, while Indian authors contributed 13.05%. Overall contribution indicates that foreign authors contributed 61.27%, whereas the Indian author's contribution counts 38.73%. Further, the table shows that 20.82% of citations are in favor of single authors, and remaining 79.18% of citations are in favor of team research. It is clearly indicated that team research is prevailing in the field of Bioscience. The degree of collaboration was found 0.79.

7. Maximum number of citations are in English language accounting for 35626 (89.20%) of the total citations. It is followed by German with 1422 (3.56%) citations, 735 (1.84%) citations were in Japanese language, 486 (1.22%) citations were in Italian language and 229 (0.57%) citations were in Chinese language. These five languages together contribute 96.39% of the total citation.
8. The study shows that cited references in Bioscience are scattered among 119 subjects. Among them, highest cited documents were in the field of Medicinal Plant Research which stands in the first place with 2549 (6.38%) citations. The second place occupied by Pharmacology with 2372 (5.94%) citations followed by Water Ecology with 2328 (5.83%), Plant Pathology with 2154 (5.39%), Phytochemistry with 2017 (5.05%). Finally result reveals that top ten subjects together contribute 42.83% of the total citations.
9. It was found that the Journal of Hydrobiologia published from Netherlands occupies the first rank as the most preferred journal having been cited 719 times. Followed by Journal of Ethnopharmacology published from Ireland with second highest citations i.e. 642 citations. The third and fourth rank goes to Indian Journal of Environmental Health from India with 622 citations and fourth rank goes to Phytopathology from USA with 585 citations. The first ten journals in the ranking list together account 13.32% of the total citations. Further, it is observed that 50.08% of citations are from first 171 journals out of 171 journals 55 journals are from India, which accounts 7369 (18.45%) citations.
10. The result of the study shows that the list of journals which are commonly cited by atleast two departments of Bioscience discipline. Out of 39940 citations in

Bioscience, 27583 citations are commonly cited by four departments, of which 10819 citations are cited by the Biotechnology department, it is followed by the Environmental Science (7022). Hydrobiologia is a common journal to all four departments which has been cited 719 times. It is an interesting fact to know that among the top ten common cited journals five are Indian journals viz. Indian Journal of Environmental Health (622), Indian Phytopathology (569), Indian Journal of Environmental Protection (454), Current Science (451) and Pollution Research (402) have been cited frequently.

11. Total 5772 cited journals by the research scholars of Bioscience. The researcher made an attempt to know department wise number of journals available in Kuvempu University library. This is very essential for the present study. Out of 2369 cited journals by the Biotechnology research scholars only 24 journals have been subscribed by the Kuvempu University library. Out of 24 journals 17 journals are available in print version remaining 7 journals are available in electronic version accessible through UGC-Infornet consortia. But, it is an interesting fact to know that Indian Journal of Experimental Biology has ranked in 6^{th} positions of the journal ranking list with 260 citations. This journal is one among the journals available in the Kuvempu University library.
12. Department of Environmental Science: out of 1780 cited journals 36 journals are available in Kuvempu University library, of which 13 journals are available in print version remaining 23 are available in electronic version accessible through UGC-Infonet consortia. It is interesting to know that in the rank list among the top ten cited journals by the researchers 4 journals are available in the library such as

Indian Journal of Environmental Health with 540 citations, Indian Journal of Environmental Protection with 442 citations, Journal of Environmental Biology with 193 citations and Journal of Ecology with 126 citations.

13. In the field of Applied Botany; Out of 1567 total cited journals only 29 journals are available in Kuvempu University library, of which 11 journals are available in print version and 18 available in electronic version accessible through UGC-Infonet consortia. But, it is an interesting fact to know that Indian Phytopathology with 495 citations and Indian Forester with 154 citations have ranked in 1st and 5th positions of the journal ranking list. It can be observed that out of 8411 citations 1074 (12.77%) citations are from the journals available in Kuvempu University library.
14. As far as Applied Zoology is concerned out of 1167 cited journals only 12 journals are available in Kuvempu University library, of which 9 journals are available in print version. 3 available in electronic version. It can be observed that out of 5053 citations 164 (3.25%) citations are from the journals available in Kuvempu University library.
15. It was observed from the analysis that USA is the leading country, accounting for 1658 (28.72%) of the total cited journals. Followed by the India and UK are the next two each covering 839 (14.54%) and 749 (12.98%) of the journals respectively. So it clearly indicates USA, India and UK are ranked as the first, second and third in disseminating information in the field of Bioscience. However, journals use pattern originated from a particular country varies from one discipline to another discipline. Among the four departments studied, the

USA ranked first in the number of times cited journals. India follows the second position in all departments except Biotechnology. But in overall results indicate that India stands in the second position and the UK third. The study concludes that Bioscience researchers have depended on western literature for their research.

16. Productivity of cited journals: The first 25% of the citation are covered by the first 29 journals on the rank list, thus signifying their high rate of productivity. The average productivity of each journal in the first group was 349.66 journals, where it has considerably gone down to 2.00 journals in the fourth category. This marked difference easily confirms the decreasing productivity of individual journals in the rank list.
17. Bradford's law of distribution: the basis for choosing the three zones is to find the variation among the number of citations in each zone. First 52 journals in the nucleus and they are the most productive journals devoted to Bioscience sharing 0.90% of total cited journals. The next zone is represented by 399 journals which share 6.91% of total journals, and the last zone is represented by 5321 journals which share 92.19% of total cited journals. Each zone has approximately one-third of the total citations. The journals distribution as per the Bradford's law reveals the ratio of 52:399:5321. It is observed from the above ratios that the number of journals in each zone is not increasing geometrically. Hence, it is established that the journal usage pattern in the Bioscience does not satisfy the Bradford's law of scattering. This may be due to the heavy concentration of citations in a few journals.

18. Obsolescence of journal literature in the field of Bioscience: The Obsolescence of literature in Bioscience discloses that more number of citations (59.61%) are distributed in the age of 0-16 years. Nearly one-quarter of journal citations are 6 years old. Whereas in case of Biotechnology 5 years, Environmental Science & Applied Botany 7 years & Applied Zoology 8 years. It is also observed that 70% of citations are 21 years old. This indicates that librarians have to maintain 21 years and for Biotechnology 17 years old periodicals in easily accessible place, the rest of the 30% may be deposited in the dormitory section of the library.

    Half-life of journal citations in Bioscience was found 13 years. Whereas it is 10 years for Biotechnology. Half-life of Environmental Science was found 14 years. More or less similar trend is observed with respect to the distribution of cited literature in Applied Botany and Applied Zoology.

19. The researcher observed that there is a lack of uniformity among the theses as far as the format of citations are concerned and many researchers have not followed available standard formats. Further the bibliographical details are also incomplete in many cases.

5.3 Suggestions

Based on the findings of the study, an attempt has been made to suggest a few useful suggestions, which will help both research scholars and faculty in getting the required information and information about current research and development activities in the field of Bioscience. It will also be helpful to the academic libraries and librarians to maintain the need based collection.

1. Research atmosphere and facilities in the foreign countries are better than that of India. We have to improve our conditions for the development of research activities in the universities and other institutions. It may be noted that the research environment in the universities of the USA is well planned. They engaged special staff who is designed as thesis editor, dissertation secretary, thesis co-ordinator etc. it is their responsibility to set and maintain thesis standard. The thesis co-ordinator of the Utah State University for example, checks the format of the bibliography and footnote entries in each thesis as well as taking care to correct statistical method of data analysis and quality of the content. In India, such provision does not exist.
2. The central and state government should give their attention for providing such conditions for research. The central and state government can provide such research environment of universities to bring India gradually on par with the USA research standards.
3. It is noticed that researchers do not follow the standard format for recording the bibliographic details and few citations don't carry full bibliographical descriptions for proper identification of the sources cited. Hence it creates difficulty for the

future researcher to find out the full text document. The researcher must have to take care and provide complete bibliographical details of the references in the research work and in case of internet resources researcher have to provide full URL and intellectual developer etc. (author, title etc.) to facilitate others to reach the source over the internet. This study suggests for imparting training for young researchers to follow appropriate reference styles and maintain the accuracy of the references.

4. As far as citations from other forms of documents are concerned, conference proceedings, reports, theses are least used because of the inadequacy of information about these documents. Further, they are not easily available and accessible due to the lack of collections and organisation. Hence, in this regard due care should be taken by a librarian in respect of collection and organization of particular forms of material.
5. English is the dominant language (89.20%) and also an important communication language in the field of Bioscience. However, very small percent of researchers used literature published in German and Japanese language. Therefore translation service may be expected by researchers; hence librarians have to make necessary arrangement if, any request is received from such research scholars and faculty members.
6. There is a heavy concentration of large number of citations in a few journals and there are large numbers of journals contributing relatively few citations. For example journals falling within the first 7 ranks accounts for as much as 10.13% and within the first 92 ranks covered 50% of total citations. Remaining

50% of citations are drawn from as many as 5601 journals. This has an implication for subscription to current journals (Table-14).

7. The acquisition policy of the university libraries should be examined in the light of the growing demands of the user needs and with the help of the rank list.
8. The rank list of journals prepared for all four branches of Bioscience may be considered as a practical tool to select journals to Kuvempu University library.
9. Country wise distribution of journals reveals that USA ranked first in the number of times cited journals. India stands second in the ranking except Biotechnology subject. In case of India, the study also reveals that large numbers of documents cited are books, conference proceedings, theses and other publications (Table-4-8). Only 50% of Indian journal titles are cited compare to USA. That means the researchers heavily depend on journal published from other advanced countries and more particularly those journals that are published in the USA. It is therefore necessary to take care by editorial board to include standard articles in Indian journals and there by researcher prefer to refer Indian journals rather than foreign journals. This helps in improving the impact factor of Indian journals.
10. The result of the study shows that the list of journals which are commonly cited by atleast two departments of Bioscience. Out of 39940 citations in Bioscience 27583 citations are commonly cited by four departments. Hence it is suggested that librarian should try to subscribe all those top ranked journals commonly cited by two or more than two departments.
11. Universities are conducting research programs it is noticed that more Indian journals are subscribed than foreign journals. It is suggested that based on the use

study and ranked journals from this study at least the first 52 ranked journals need to be subscribed for conducting the research programme in university. This rank list may be a guiding principle for universities as well as developing information consortia among Bioscience Departments.

12. It is also suggested that 13 years old literature should be placed at a convenient place for easy accessing. Beyond 13 years old literature may be placed in dormitory section.
13. The UGC should also extend helping hand to the university libraries in getting access to more and more number of e-journals under its UGC-Infonet programme, and other forms of the reading materials.
14. Orientation programme should be arranged for the research scholars from time to time in order to enable them to exploit the resources of the university library and keep them abreast of the available resources in the university libraries and also to orient them to follow standard tool for citing documents.
15. There should be a deliberate effort from faculty and department in organizing regular training/workshop on how to carry out the effective literature review by the research scholars with emphasis on the use of current information materials.
16. It is strongly suggested that the university and other organizations offering PhD programs in the field of Bioscience have to develop their own web page and provide updated information in respect of PhD degree awarded and ongoing research in their universities and make the data available to others. This will definitely useful for developing databases, providing links, and also very useful to the researchers and research guides in avoiding duplication of works.

17. Citation analysis, which is a valuable and measurable tool used in this study may be applied across other disciplines for the development of collection to meet research scholars' needs of Kuvempu University and other universities.

5.4 Conclusion

Citation studies do provide some guidelines for the librarians and information scientists in the decision making process in their acquisition policy. The exponential growth of knowledge, ever escalating costs of the documents, limited allocations of budget are some of the factors that are leading the librarians and information managers to adopt statistical and mathematical techniques for decision making process.

It is hoped that the present study will help the research scholars in identifying the primary sources of information from which citations have been made. These findings also are much helpful for librarians while taking decisions regarding collection development, selection and acquisition of the most useful journals within their limited budget. Further, weeding the outdated documents and also maintaining the need based collection in the library.

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APPENDICES

List of theses submitted to the Department of Biotechnology					
Sl. No	**Name of the Candidate**	**Name of the Guide**	**Title**	**Year of Award**	**No. of References**
1.	Shivanna, H.	Dr. Abdul Rahiman, B.	Cellular and molecular studies on differentiating diversified cytoplasmic genetic male sterility in jowar, sorghum bicolor (L.) Moench	2003	205
2.	Mahesh, T.	Dr. Abdul Rahiman, B.	Effects of dietary vitamin C, vitamin E and selenium on brood stock management in the Indian major carp-labeo rohita (Hamilton) with special reference to seed qualities.	2003	171
3.	Manjunath B K	Dr. Krishna, V.	Studies on the floristic composition of Davanagere District, Karnataka	2003	509
4.	Maruthi, K. R.	Dr. Krishna, V.	In vitro studies on celastrus paniculatus on endangered medicinal plant of the Western Ghats of Karnataka	2003	216
5.	Krishnamurthy, N. B.	Dr. Ramachandra Y.L.	Studies on the comparative growth of silkworm reared on different mulberry varieties in Shimoga and Chikkmagalur Districts of Karnataka	2004	180
6.	Dhananjaya Naik	Dr. Rao, M. S. Co-Guide: Dr. Abdul Rahiman, B.	Biotechnological approaches for the management of wilt disease complex in capsicum (Capsicum Annum L.) and egg plant (solanum melongena L.) with special emphasis on biological control	2004	208
7.	Nagaraja, Y. P.	Dr. Krishna, V.	In vitro studies on andrographis paniculata nees and andrographis alata nees	2004	304
8.	Mankanl Krishna Lingaraddi	Dr. Krishna, V.	Evaluation of phytochemical constituents and screening of hepatoprotective activities of some indigenous medicinal plants of Karnataka	2005	325
9.	Neeta V Vastrad	Dr. Prakash Patil,	Clonal propagation of papaya in vitro from field grown trees	2005	124
10.	Shylaja, M.	Dr. Rao, M. S.	Studies on the development of bio-intensive management strategies in tuberose using biological control agents	2005	166
11.	Lakshmana	Dr. Abdul Rahiman, B.	Fermentation study of some edible hilly fruits occurring in the Western Ghats with special reference to physicochemical characteristics, microbial spoilage and storage capacity	2005	152
12.	Mahantesh, R.	Dr. Ramachandra, Y. L.	Morphometric and melissopalynological studies on India honey bee apis cerana	2005	133
13.	Vidya, S. M.	Dr. Krishna, V.	Micropropagation and evaluation of pharmacological activities of clerodendrum serratum (L) moon. And entada pursaetha DC	2006	459
14.	Suneetha, C.	Dr. Mythili, J.B.	Isolation, cloning and characterization of chitinase gene from entomogenous funginomuraea releyiment arhizium anisopliae	2006	162
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16.	Prakash, D. P.	Dr. Lalitha Anand Co-Guide: Dr. Ramachandra, Y.L.	Genetic engineering of insecticidal cry lab BT. Gene into south Indian brinjal (Colanum melongena L.) CV. Manjarigota for resistance to the shoot and fruit borer (Leucinodes Orbonalis Guenee)	2007	411
17.	Liril Fernandez	Dr. Riaz Mahmood,	Sequence and genome analysis of banana bunchy top virus DNA components	2007	349
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20.	Sandhya Ravishankar	Dr. Meera Pandey, Co-Guide: Dr. Krishna, V.	Development of sporeless / low spore shedding strains of pleurotus species	2007	105
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22.	Ramanjini Gowda, P. H.	Dr. Krishan, V. Co-Guide: Dr.SiddarameGowda T.K.	Fegeneration and transformation of crop plants with glucanase chitinase gene for fungal disease resistance	2007	386
23.	Chandrashekara, K. N.	Dr. Akella Vani Co-Guide Dr. Ramachandra, Y.L.	Generation of single chain antibody fragments for detection ralstonia solanacearum causing bacterial wilt of tomato	2007	147
24.	Rashmi, H. J.	Dr. Mythili, J. B.	Agrobacterium mediated transformation of tomato and chilli for fungal resistance	2007	255
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26.	Pradeep Kumar, K. B.	Dr. Ramachandra, Y.L.	Impact of hexachlorocylohexane application in coffee plantations on the Western Ghats ecosystem	2008	99
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30.	Manoj Kumar, A.	Dr. Girija Ganeshan, Co-Guide: Dr. Ramachandra, Y.L.	Development of integrated disease management package and transgenic technology for the control of powdery mildew (Leveillul Taurica) in capsicum (Capsicum Annuum L)	2008	333
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32.	Manjula, R.	Dr. Sukhada Mohandas, Co-Guide: Dr. Ramachandra, Y.L.	Biochemical and molecular changes associated with interaction of trichoderma harzizamum and fusarium oxysporum F.SP.cubense in banana	2008	443
33.	Shubha, S.	Dr. Abdul Rahiman, B	Development of effective biocontrol agent against sucking pests of chilli, capsicum annuum, L., using verticillum lecanil metarrhizium anisopliae and fusarium SP	2009	204
34.	Raja Naika, H.	Dr. Krishna, V.	Micropropagation, evaluation of phytochemical constitutents and screening of pharmacological activities of clematis gouriana roxb and naravelia zeylanica (L) DC	2009	581
35.	Naveen Sharma G V	Dr. Riaz Mahmood,	Candidate genes, oligonucleo tide microarray markers for the QTLS controlling a biotic stress in rice (Oryza Stiva L)	2009	197
36.	Sharath, R.	Dr. Krishna, V. Co-Guide: Dr. Sathyanarayana, B.N	Studies on induction and evaluation of secondary metabolites in vitro and genetic finger printing of induced somaclonal variants using molecular markers for phytochemical constituents, particularly bacoside in brahmi (Bacopa monnieri(L) wettest)	2009	485
37.	Jagadish, K.	Dr. Akella Vani.	Generation of transgenic tomato carrying single chain antibody fragments (SCFV) against viral expressed genes of tospovirus	2009	316
38.	Suresh, Mathivanan	Dr. Akhilesh Pandey, Co-Guide: Dr. Riaz Mahmood	Integration of human genomic and proteomic data through distributed annotation	2009	42
39.	Deepali, B. S.	Dr. Lalitha. Anand, Co-Guide: Dr. Riaz Mahmood	Development of BT transgenic brinjal EV. Arka keshav, resistant to the brinjal shoot and frutt borer, leucinodes orbonalis	2009	369
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41.	Kavitha, B. T.	Dr. Ramachandra Y.L.	Isolation and characterization of bioactive compounds from tinospora cordifolia and hemidemum indicus	2009	327

42.	Kumaran Kandasamy	Dr.Akhilesh Pandey Co-Guide: Dr.Ramachandra Y.L.	Bioinformatics analysis of mass spectrometry derived data	2009	98
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54.	Manoj Kumar Kashyap	Dr. Akhilesh Pandey	Gene expression profiling of squamous cell carcinoma of esophagus	2011	282

55.	Sameer Kumar G S	Dr.Raghothama Chaerkady Co-Guide: Dr. Ramachandra Y.L.	Gene expression profiling of neurological disorders using whole human genome microarray	2011	157
56.	Telikicherla Deepthi	Dr. S. Sujatha Mohan Co-Guide: Dr. Ramachandra Y.L.	Breast cancer database (BCD): A database of the genomic, transcriptomic, proteomic and drug-induced molecular alterations in breast cancer	2011	29
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58.	Joy Harris Hoskeri	Dr. Krishna, V. Co-Guide: Dr.C.Amruthavalli	Proteomics analysis and in-silico drug designing studies on hepatoprotectivity of herbal constituents isolated from flaveria trinervia C.mohr	2012	540
59.	Nagaraja, T. S.	Dr.Riaz Mahmood Co-Guide: Dr. Krishna, V.	Phytochemical screening and pharmacological evaluation of erythrina mysorensis gamb	2012	551
60.	Ravishankar, P.	Dr.Ramesh, C. K. Co-Guide: Dr. Krishna, V.	Evaluation of elite lines for HCA content phytochemical studies and pharmacological properties of kokum (Garcinia Indica Choisy) and punarpuli (Garcinia Gummi-Gutta (L) Robson) in the Western Ghats of Karnataka	2012	451
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62.	Kalyani, G. A.	Dr.Ramesh, C. K. Co-Guide: Dr. Krishna, V.	Phytochemical investigations and evaluation of hepatoprotective and antioxidant activities of desmodium triquetrum (L) DC. and luffa acutangula (L) var amara (Roxb) CL. in CCL_4 induced liver damage in rats	2012	438

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Sl. No.	**Name of the Candidate**	**Name of the Guide**	**Title**	**Year of Award**	**No. of References**
1.	Patil, S. R.	Dr. Puttaiah, E.T.	Ecological studies on the river Tunga in Shimoga city starting from the Tunga reservoir (Gajnur)	1998	216
2.	Hina Kousar,	Dr. Puttaiah, E.T.	An Ecological investigation on the physico-chemical and biological characteristics of Shantisagar lake	1999	264
3.	Yogendra, K	Dr. Puttaiah, E.T.	Ecological investigations on certain lentic water bodies of Shimoga	2000	282
4.	Vanaja, R	Dr. Puttaiah, E.T.	Ecological studies on river Tungabhadra near Harihar, Chitradurga District	2000	260
5.	Aravinda H.B.	Dr. Manjappa, S.	Study of some physicochemical properties of river Tungabhadra in Karnataka	2000	188
6.	Vijaya kumara	Dr. Narayana, J. Co-Guide: Dr. Puttaiah E.T.	Studies on ground water quality of Bhadravathi town	2003	166
7.	Raja Naik	Dr. Puttaiah E.T.	Studies on biodegradation process in Bhadra river sediment by aquatic fungi	2003	120
8.	Gururaja, K.V.	Dr.Krishnamurthy, S.V.	Effect of habitat fragmentation on distribution and ecology of anurans in some parts of central Western Ghats	2003	295
9.	Syed Fasihuddin,	Dr. Puttaiah E.T.	Ecological studies on the Vanivilas Sagar reservoir, Chitradurga District	2003	312
10.	Muralidhara V.N.	Dr. Narayana J. Co-Guide: Dr. Puttaiah E.T.	Studies on algal diversity in certain lakes of Tumkur District	2003	169
11.	Ravikumar Patil, H.S.	Dr. Manjappa S Co-Guide: Dr. Puttaiah E.T.	Studies on the effect of industrial effluent on the quality of ground water near Shimoga city	2004	381
12.	Manjunatha Reddy, A. H.	Dr.Krishnamurthy, S. V.	Habitat qualities and ecological status of an endemic species of ranidae-anura: nyctifatrachus aliciae (Inger, Shaffer, Koshy and Bakde 1984) in Central Western Ghats	2005	117

13.	Jai Prakash, N.	Dr. Puttaiah, E.T.	Studies on the groundwater quality of Magadi Taluk, Bangalore rural District Karnataka, India	2005	218
14.	Harish Babu. K.	Dr. Puttaiah, E.T.	Studies on ground water quality of Tarikere Taluk	2005	244
15.	Sunitha Mohan,	Dr. Manjappa, S.	Studies on the effect of chromium on seed germination, growth and yield of some crop plants	2005	117
16.	Anil N Patel,	Dr. Puttaiah, E.T.	Studies on the impact of Kudremukh mining activity on the environment of the Western Ghats region.	2006	119
17.	Prathibha S,	Dr. Puttaiah, E.T. Co-Guide: Dr.Keshava Nireshwalia	Studies on the physico-chemical and bacteriological characteristics of river Tunga-near Shimoga city, Karnataka	2006	977
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19.	Shanmukha, D.	Dr. Narayana, J. Co-Guide: Dr. Puttaiah, E.T	Ecological studies on certain lentic water bodies of Davanagere District	2006	227
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36.	Sunil Kumar, S.	Dr. Manjappa, S. Co-Guide: Dr. Puttaiah, E.T.	Physico chemical biological and pollution aspects of river Tunga	2007	161
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49.	Siddaramu, D.	Dr. Puttaiah, E.T.	Assessment of nitrate and phosphate levels in surface, ground water and physico-chemical parameters of soil along the Tungabhadra river stretch of Central Western Ghats Karnataka.	2009	437

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53.	Mawhoob Noman Othman saif al-kadasi,	Dr. Puttaiah, E.T.	Water quality monitoring through biological agents	2009	266
54.	Naveen. D	Dr.Basavarajappa. B.E Co-Guide: Dr. Puttaiah, E.T.	Studies on the status of ambient air quality in Bhadravathi town	2009	297
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58.	Girish, K.G.	Dr.Krishnamurthy S.V.	Influence of habitat characters on population of endemic frog nyctibatrachus major (Boulenger, 1882) (Randidae: Anura) in Central Western Ghats	2011	208
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63.	Naik Suneel Seetaram	Dr. Yogendra K. Co-Guide: Dr. Mahadevan K.M.	Synthesis of nanoparticles and dispersion on polymers for the photocatalytic degradation of textile AZO dyes	2012	147
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66.	Prakash Kariyajjanavar	Dr. Narayana J. Co-Guide: Dr.Arthob Naik Y	Industrial wastewater treatment by chemical and electrochemical methods	2012	156

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2.	Onkara Naik, P.	Dr. Puttaiah. E.T.	Physico-chemical and biological characteristics of river Cauvery bordering Mysore District.	2002	329
3.	Nataraja, S.	Dr. Krishnappa, M.	Biology and control of seed-born diseases of rice, with special reference to kernel smut and stalk burn diseases.	2003	163
4.	Ramesh, B.H.	Dr. Krishnappa, M.	Studies on the bacterial diseases of French bean with special reference to halo blight.	2003	158
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6.	Thippeswamy, B.	Dr. Krishnappa, M.	Seed born fungal diseases of vegetable crops in Karnataka.	2004	199
7.	Chakravarthy C.N,	Dr. Krishnappa, M.	Investigations on bacterial blight in Karnataka.	2005	168
8.	Sunitha Bhaskaran,	Dr. Ganeshan, S.	Exsitu conservation strategies for threatened medicinal plant species.	2006	337
9.	Raghavendra, S.	Dr. Krishnappa, M.	Studies and management of soil born fungal diseases of betel vine.	2006	282
10.	Ramalingappa	Dr. Krishnappa, M.	Studies on characterization of lipase catalyst microorganisms in ground nut industrial waste.	2006	202
11.	Sringeswara, A.N.	Dr. Shivanna, M.B.	Vegetation analysis in Kudremuka national park region of the Western Ghats, Karnataka, India.	2006	449
12.	Parinitha Mahishi,	Dr. Shivanna, M.B.	Studies on diseases of medicinal herb in Bhadra wild life sanctuary, Karnataka, India.	2007	317
13.	Shashikala. J.	Dr. Krishnamurthy, Y.L.	Studies on aflatoxins in soybean (Glycine max (L) merrill) seeds.	2007	474
14.	Arasumallaiah, L.	Dr. Krishnamurthy, Y.L.	Studies on the management of foot rot (Quick wilt) of black pepper in Malnad regions of Karnataka.	2007	351
15.	Suresh G Mantur	Dr. Krishnamurthy, Y.L	Studies on epidemeology, host resistance and management of blast of finger millet (Eleusine Coracana) (L) gaertn).	2007	232

16.	Deepak, R.	Dr. Krishnappa. M.	Studies on seed Borne nature and transmission of corynebacterium michiganensis sub SP. Michiganensis in tomato (Lycopersicon Escculantum Mill) in Karnataka.	2007	163
17.	Sathisha, A. M.	Dr. Krishnappa, M.	Survey and documentation of bryophytes in Bhadra wildlife sanctuary Karnataka.	2008	119
18.	Mallikarjuna Swamy G.E.	Dr. Shivanna, M.B.	Studies on fungal diseases of medicinally important tree species in Bhadra wild life sanctuary Karnataka India.	2008	357
19.	Prakash, H.M.	Dr. Krishnamurthy, Y.L.	Plant diversity and dynamics among different forest communities in Bhadra Wildlife Sanctuary Karnataka.	2008	153
20.	Vasudev, H.S.	Dr. Shivanna, M.B.	Standardization of argo-techniques for production of quality seed in marigole (tagetes erectal).	2008	125
21.	Shankar Naik, B.	Dr. Krishnmurthy, Y.L.	A study on diversity of endophytic fungi in some tropical medicinal plants of Karnataka.	2008	223
22.	Prabhushankar, H.R.	Dr. Krishnamurthy, Y.L.	Genetic studies on new sterile (a), maintainer (b), restorer lines developed through recombination breeding in cotton gossypium hirsutum (L).	2008	257
23.	Suresh Somalingappa Nayaka,	Dr. Raja Naik,	Assessment of management induced changes on cropping pattern and its productivity a case study of Sujala Watershed, Haveri District of Karnataka.	2008	165
24.	Nanda, A.	Dr. Krishnamurthy, Y.L	Vegetative and reproductive phenology of tropical forest communities in the areas of Bhadra Wildlife Sanctuary, Karnataka.	2009	249
25.	Ramesh, G.	Dr. Santa Ram, A Co-Guide: Dr. Shivanna, M.B	Studies on combined use of organic and inorganic fertilizers on growth and yield of kalmegh (Andrographis paniculata L).	2009	300
26.	Dinesh, K.P.	Dr. Santa. Ram, A Co-Guide: Dr. Shivanna. M.B	Morphological biochemical and molecular characterization of ethiopian arabica coffee (Coffea Arabica L) germplasm in India.	2009	249
27.	Karegowda, C.	Dr. Gurumurthy, B.R.	Integrated management of damping-off disease of tobacco (Nicotiana Tobacum L) caused by pythium aphanidermatum (ED.) Fitz.	2009	82

28.	Nandini, G.M.	Dr. Ramesh Babu. H.N.	Impact of multi micronutrient mixture on seed germination, growth and productivity of groundnut (Arachis Hypogea L) in Davanagere District of Karnataka State.	2009	246
29.	Daivasikamani, S.	Dr. Raja Naika,	Epidemiology and management of leaf rust (Hemileia Vastatrix Berk. & BR.) on arabica coffee (Coffea Arabica L.) grown in Chikmagalur District of Karnataka.	2010	167
30.	Uppar Jyoti Shankareppa	Dr. Krishnappa M. Co-Guide: Dr. M Krishna Reddy	Molecular characterization of xanthomonas axonopodis PV, punicae, leaf and nodal blight causing pathogen of pomegranate (Punica Granatum L.)	2010	353
31.	Rajkumar, N.	Dr. Shivanna, M.B.	Documentation of phyto-ethno-medical knowledge of local communities in Shimoga District of Karnataka, India	2010	398
32.	Vasantha Kumar, K.	Dr. Krishnappa, M.	Studies on the ralstonia solanacearum causing bacterial wilt of the solanaceous vegetable crops in Karnataka	2010	193
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40.	Kumaraswamy Udupa, E.S.	Dr.Krishna Swamy, K.	Studies on distribution and biology of orchids in Chikamagalur District, Karnataka	2012	134

41.	Lokesh, G. H.	Dr.Parameswara Naik, T.	Studies on the ecological characteristics of a famous lake Kunigal, Tumkur District	2012	253
42.	G.F.D'Souza	Dr. Ramesh Babu, H.N.	Influence of rootstock scion combinations on physiology of coffee	2012	303
43.	Niranjan, H.G.	Dr.H.N.Ramesh Babu Co-Guide: Dr.Rajeshwari, N.	Evaluation of jatropha curcas accessions in Karnataka for agronomic traits and seed qualities	2012	306

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Sl. No	**Name of the Candidate**	**Name of the Guide**	**Title**	**Year of Award**	**No. of References**
1.	Sharathchandra, Y.	Dr. Venkateshwarlu, M	Contributions to the behaviour genetics of a drosophilla insect: phorticella striata	2002	184
2.	Nagabhushana,	Dr. Vasudev, V.	Studies on the biodiversity of drosophilla in Devarayanadurga, Tumkur District	2003	219
3.	Seetharama, H.G.	Dr. Vasudev, V.	Investigations on the biology and control of coffee white stem borer xylotrechus quadripes chevrolat (Coleoptera-Ceramby Cidae)	2004	122
4.	Sree Devi, K.	Dr. Abraham Verghese,	Bio-ecology and population dynamics and prey-predatorant interactions with reference to the aphid, aphis punicae a passerini in pomegranate ecosystem.	2004	198
5.	Ujwala, P.	Dr. Hosetti B.B.	Ecobiological studies on cyclopelta siccifolia (w) and its interactions with host plants.	2004	162
6.	Vinod Kumar, P. K.	Dr. Vasudev, V.	Bio-ecology of spalgis epius west wood (Lepidoptera: Lycaenidae) a predactor of coffee mealybugs (Howoptera: Pseudococcidae)	2005	225
7.	Dinesh, M. S.	Dr. Mani Co-Guide: Dr. Hosetti, B. B.	Biological control of spiralling whitetly aleurodicus dispersus russell (Aleyrodidae: Homoptera) on horticultural crops with special reference to guava	2005	125
8.	Shanthala, M.	Dr. Hosetti B.B.	Studies on the chemistry and biology of waste stabilization ponds, Shimoga city	2005	252
9.	Naveed, A.	Dr. Hosetti, B.B.	Chemical control of insect pest cyclopelta sisccifolia using some pesticides	2005	132
10.	Girish, A. C.	Dr. Hosetti, B.B.	Studies on feeding behaviour and pest status of porcupine in the palm ecosystem of Western Ghats, Karnataka	2005	125
11.	Nagaraju, D.K.	Dr. Avraham Verghese, Co-Guide: Dr. Vasudev,V.	Studies on the adultethology, life budget and growth modes of mango stone weevil (MSW) sternochetus magniferae on mango	2006	145
12.	Dayananda, G.Y.	Dr. Hosetti, B.B.	Ornitho-ecological studies on Gudavi bird sanctuary, Soraba Karnataka	2006	212
13.	Dhananjaya, S.G.	Dr. Vasudev V.	Studies on the adaptive response of drosophila melanogaster to a few alkylating agents	2006	233
14.	Subray Prabhakar Kamath,	Dr. Vasudev, V . Co-Guide: Dr. Hugar, P.S.	Studies on population dynamics of insects on BT. cotton and non BT cotton	2007	134

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17.	Pramod Kumar M.P.M	Dr. Hosetti, B.B.	Ecology of butterflies of the family papilionidae in mid Western Ghats of Shimoga District, Karnataka	2008	222
18.	Jothi Sri Gowri,	Dr. Venkateshwarlu. M.	Studies on physiology and overian cycles in the fresh water fish mystus cavasius (HAM) of Bhadra reservoir, Western Ghats	2008	225
19.	Krihnappa, G.R.	Dr. Venkateshwarlu, M.	Cyto-genotoxic studies of two cardamate pesticides on two species of limnonectes group of amphibians	2008	237
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21.	Ashashree, H.M.	Dr. Venkateshwariu, M.	Studies on physiology and testicular cycles in the freshwater fish mystus cauasius (HAM) of Bhadra reservoir, Western Ghats	2008	395
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26.	Samuel Christopher Sunderrraj	Dr. Hosetti, B.B.	Studies on the ornitho-ecological aspects of curtorim pond of salcette Goa	2010	114
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