

BIBLIOMETRIC STUDY OF DEPARTMENTS IN BIOSCIENCE AND BIOTECHNOLOGY IN BABASAHEB BHIMRAO AMBEDKAR UNIVERSITY, LUCKNOW

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ABSTRACT

The study deals about the bibliometric analysis of 62 selected doctoral theses of School for Bioscience and Biotechnology awarded at Babasaheb Bhimrao Ambedkar University, Lucknow during 2005-2015. Factor considered for the study include year-wise distribution, gender-wise contribution, discipline-wise distribution, degree of collaboration, distribution of references in theses, authorship pattern etc. The data for this study was collected from theses section of the Gautam Buddha Central Library and the Ph.D cell of Controller of Examination office of the University. The study revealed that highest numbers of theses were submitted during the year 2013-14. It has been found that Male scholar have taken more interest in research rather than females scholars which is evident from the number of theses awarded in the school. Study also revealed that the most common discipline selected by research scholars for research are Insect culture and Garden crops (Horticulture). Bibliometric law is applied for the accuracy of the study.

INTRODUCTION

Bibliometric is a word used for quantitative analysis and valuable studies in Library Science, Information Science, Information Technology and other streams also. Bibliometric is useful in research and study. Bibliometrics is a quantitative evaluation of publication patterns of all macro and micro communication along with their authorship by mathematical and statistical calculation (Sengupta, 1985). Bibliometrics can be used to derive information on the development of the field of science over time, the importance of particular publications, the importance of particular authors,

Universities, subjects of study, and many other things (De Bellis, 2009).

The present study is based on Doctoral theses awarded in the School for Bioscience and Biotechnology at Babasaheb Bhimrao Ambedkar University, Lucknow from 2005-2015 on various aspects such as year-wise distribution, gender-wise contribution, supervisor-wise productivity, discipline-wise distribution etc.

SOME OTHER METRICS

Metrics is a generic term which is used for measurement. Some metrics are very useful in research and study of some other streams like

Library and Information Science, Information Technology, Computer Science etc.

Webometrics: First coined the term webometrics by Almind and Ingwersen in 1997. Webometrics tries to evaluate the World Wide Web to get facts about the number and types of hyperlinks, the structure of the World Wide Web and usage patterns. Webometrics is the study of the quantitative aspects of the construction, use of information resources, the structures and technologies on the Web drawing on bibliometric and Informetrics approach (Bjorneborn and Ingwersen, 2004).

Scientometric: is a quantitative aspect of science. Nalimove and Mulchenko define Scientometrics as the application of those quantitative methods which deal with the analysis of science viewed as an information process (Hood and Wilson, 2001).

Informetrics: It comes from the French term 'informetrie' and as one of the fields of information science, it deals with the measurement of mathematical statistical analysis to the discipline's problems (Wolfram, 2000).

Librametrics: It is useful to measure all the characteristics of books, readers and staff of the library. It is a combination of two words 'Libra' means Library and 'metric' means measurement (Ranganathan, 1969).

Cybermetrics: Cybermetrics is a branch of knowledge which employs mathematical and statistical techniques of quantity websites. It studies the efficiency of cyber information services and systems, services and products and assesses the impact of cyber age on society (Sengupta, 1990).

SCHOOL FOR BIOSCIENCE AND BIOTECHNOLOGY

In Babasaheb Bhimrao Ambedkar University, the School for Bioscience and Biotechnology offers Postgraduate studies and research programmes. The School has four Departments, viz., Department of Applied Animal Science, Department of Applied Plant Science, Department of Biotechnology and

Department of Pharmaceutical Science offering M. Sc., M. Pharm. and Ph. D. Programmes. The school aims at giving its students updated knowledge and skill development in futuristic areas of applied sciences and technology (website BBAU).

OBJECTIVES OF THE STUDY

- To find out a year-wise distribution of theses
- To know Gender-wise contribution of theses
- To find out the Discipline-wise
- **To analyse degree of collaboration**
- To reveal the distribution of references in theses

METHODOLOGY

For analysis of the study, data has been collected from the period 2005 to 2015. Selected data were analysed and manipulated in excel sheet to find out:- the year-wise contribution of research, a male/female who contributed more in research, which discipline was more selected by scholars for their study, degree of collaboration, distribution of references.

DATA ANALYSIS AND INTERPRETATION

Research data analysis was done on some parameters like year-wise, supervisor-wise, gender-wise and discipline-wise etc.

YEAR-WISE DISTRIBUTION OF THESES

Year-wise distribution of theses selected as an indicator to achieve the research output. The 1st Doctoral thesis was awarded in 2005. The following analysis shows the year-wise distribution of Doctoral

theses under the School for Bioscience and Biotechnology.

Table1: Year-wise distribution

S. No.	Year	Number of theses count	Cumulative count	Percentage of theses	Cumulative percentage
1	2005	1	1	1.61	1.61
2	2006	2	3	3.23	4.84
3	2007	3	6	4.84	9.68
4	2008	3	9	4.84	14.52
5	2009	3	12	4.84	19.35
6	2010	4	16	6.45	25.81
7	2011	5	21	8.06	33.87
8	2012	4	25	6.45	40.32
9	2013	6	31	9.68	50.00
10	2014	24	55	38.71	88.71
11	2015	7	62	11.29	100.00
Total		62		100.00	

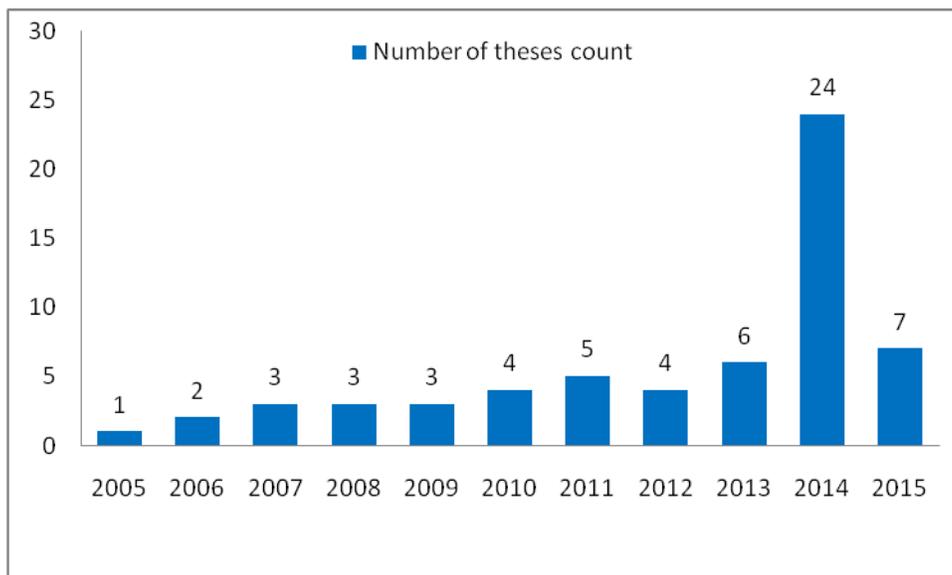


Figure1: Year-wise distribution

Table and figure indicate that in 2014 the highest number of theses were awarded, 24 (38.71%) followed by the year 2015, 7 (11.29%). During 2013 the number of theses awarded 6 (9.68%). In years 2010 and 2012 theses awarded, 4 (6.45%). During the year 2011, 5 (8.06%) theses were awarded.

GENDER-WISE CONTRIBUTION

Gender has been selected as an indicator to find out the research contribution of Male and female.

Table 2: Gender-wise contribution

S.No	Years	Male	%	Female	%
1	2005	1	2.5	0	0
2	2006	1	2.5	1	4.55
3	2007	3	7.5	0	0
4	2008	3	7.5	0	0
5	2009	1	2.5	1	4.55
6	2010	5	12.5	0	0
7	2011	4	10	1	4.55
8	2012	3	7.5	1	4.55
9	2013	5	12.5	1	4.55
10	2014	10	25	14	63.64
11	2015	4	10	3	13.64
	Total	40	100	22	100
	%	65%	100.00	35%	100.00

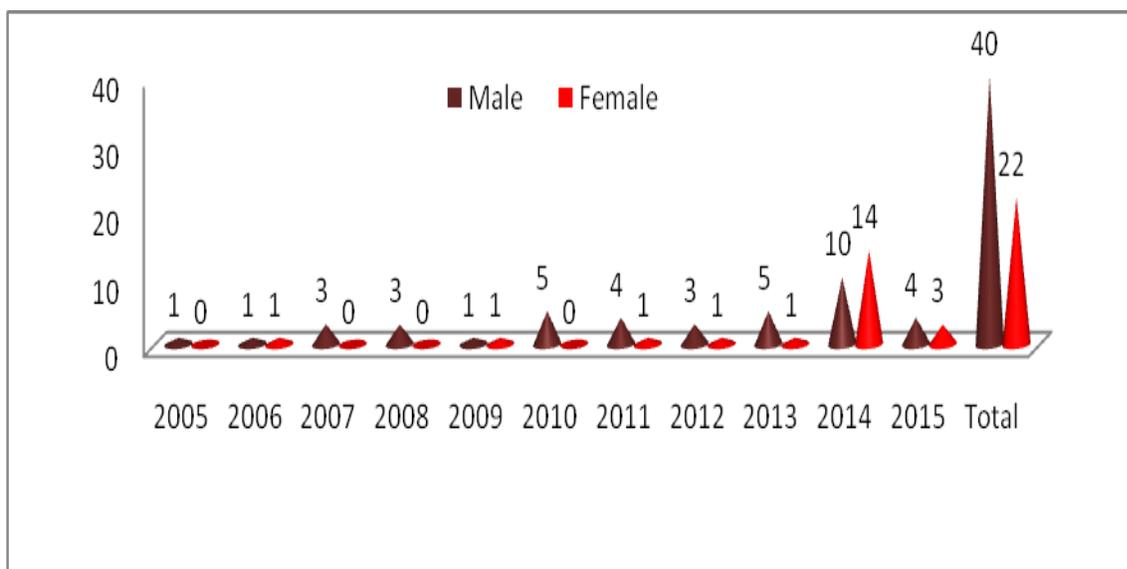


Figure 2: Gender-wise contribution

Above table shows that the highest contribution of male and female scholars were 10 (25%) and 14 (63.64%) during 2014, next contribution of these of male and female were 4 (10%) and 3(13.64%). In 2013 male contributed 5 (12.5%) while female contributed 1 (4.55%), total contribution of male

scholars were 40 (65%) and female contribution recorded 22 (35%).

DISCIPLINE-WISE DISTRIBUTION

Discipline has been selected as an indicator and categorized in various discipline.

Table 4: Discipline-wise distribution

S.No.	Discipline	Number of theses	Percentage	Rank
1	Insect Culture	9	14.52	1 st
2	Garden crops (Horticulture)	8	12.90	2 nd
3	Pharmacology and Therapeutics	7	11.29	3 rd
4	Microorganisms, fungi & algae	6	9.68	4 th
5	Agriculture related technologies	6	9.68	
6	Field and plantation crops	5	8.06	5 th
7	Diseases	5	8.06	
8	Orchards, fruits & forestry	4	6.45	6 th
9	Plant injuries, diseases & pests	4	6.45	
10	Genetics & evolution	3	4.84	7 th
11	Ecology	3	4.84	

12	Plants noted for characteristics & flowers	2	3.23	8th
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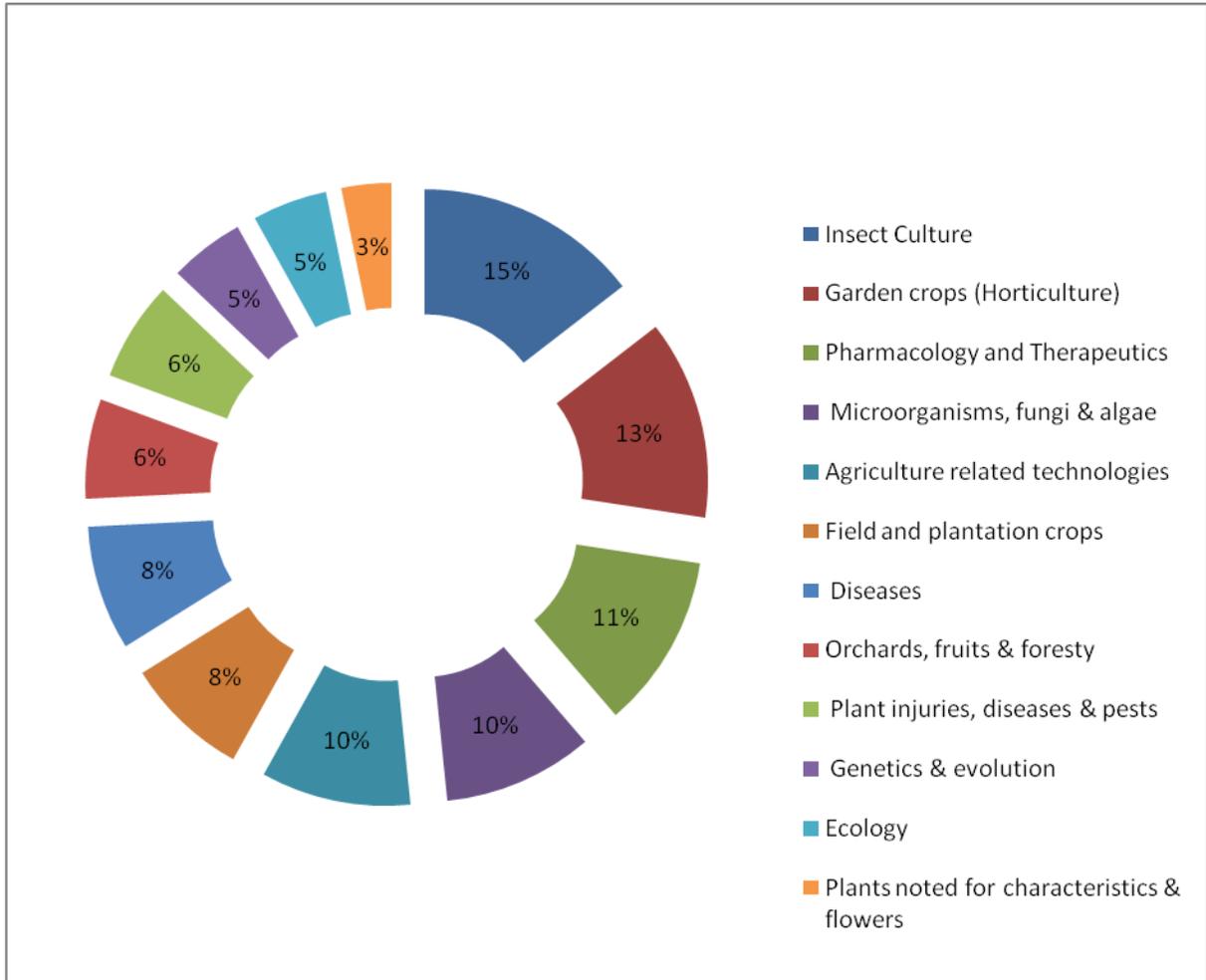


Figure 4: Discipline-wise distribution

The figure indicates that a larger portion of research is carried out in Insect culture is 9 (16%) and is with the first rank. Research carried out in Garden crops (Horticulture) is 8 (12.90%) is with the second rank. Pharmacology and therapeutics got the third rank with the number of Doctoral theses 7 (11.29%). Microorganisms, fungi & algae and Agriculture related technologies both got the fourth rank with the number of Doctoral theses 6 (9.68) each. In

discipline Field and plantation crops and Diseases, 5 (8.60%) each Doctoral research carried out with the fifth rank.

NUMBER OF REFERENCES USED

To reveal the distribution of references in Doctoral theses the table below made.

Table 5: Number of referenced used

S.No.	Number of references	Number of theses	Rank
1	1-150	08	4 th
2	151-300	21	1 st
3	301-450	19	2 nd
4	451-550	14	3 rd

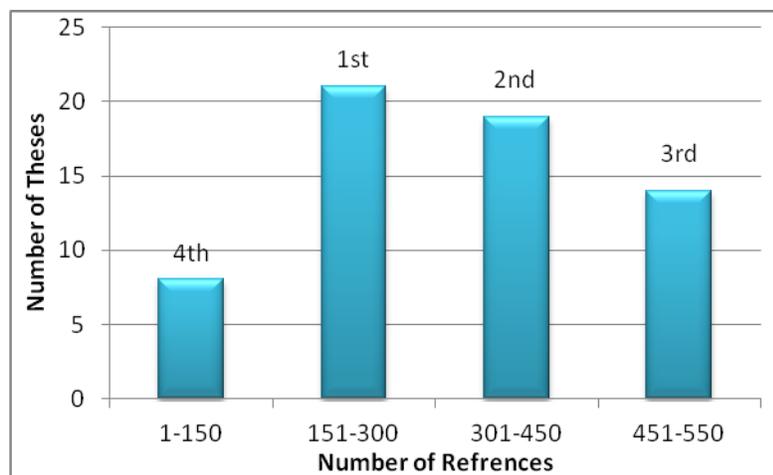


Figure 5: Number of referenced used

The above table shows that the number of references used by research scholar in 62 Doctoral theses. References are categorised in a order and are ranked. The table clearly indicates that the number of references 151-300 are used by more scholars in their 21 theses and it stands with the 1st rank, followed by 301-450 references in 19 Doctoral theses which are ranked 2nd. Research scholars used 451-550 references in 14 theses and it got the 3rd

rank. Number of references 1-150 got the 4th rank which is adopted by scholars in their 08 Doctoral theses.

AUTHORSHIP PATTERN

A table below shows the authorship pattern of citations of Doctoral theses.

Table 6: Authorship Pattern

Authorship Pattern	Number of Citations	Percentage	Cumulative Citations	Cumulative Percentages
Single Author	974	974	5.68	5.68
Two Authors	3780	4754	22.05	27.73
Three Authors	5985	10739	34.91	62.64
More than three Authors	6406	17145	37.36	100.00

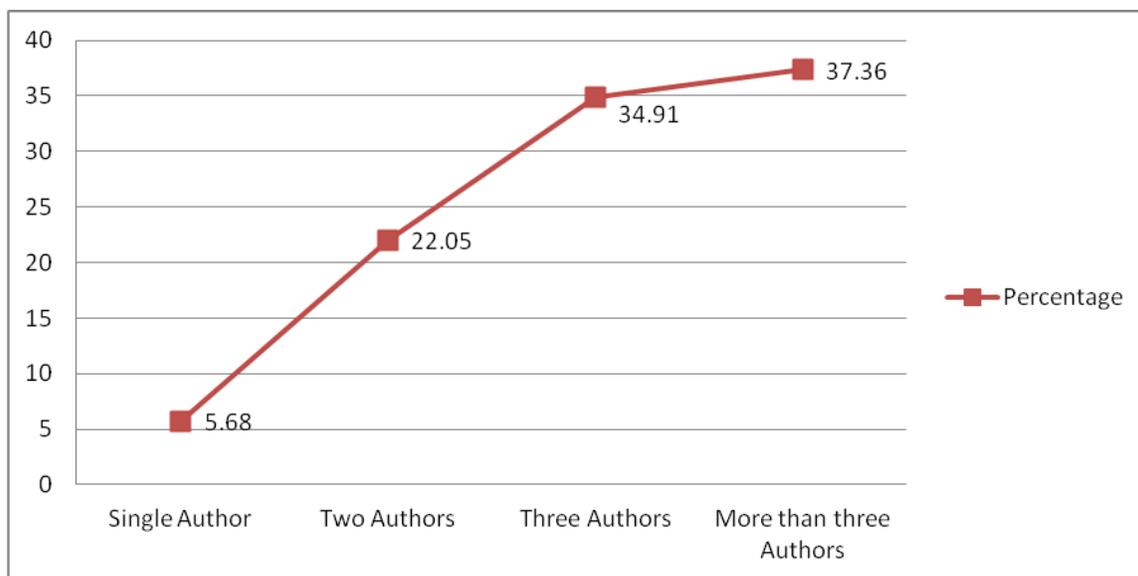


Figure 6: Authorship Pattern

To find out the authorship pattern citations were analysed in the Doctoral theses awarded in the School for Bioscience and Biotechnology. It is clear from the above table that citations to the single author is counted only 974 (5.68%) while for two authors citations is counted as 3780 (22.05%). It increases in three authors, which is 5985 (34.91%).

In More than three authors citation counted as 6406 (37.36%).

DEGREE OF COLLABORATION

The table below shows the degree of collaboration from 2005-2015 in the School for Bioscience and Biotechnology.

Table 7: Degree of collaboration

Author	Single	Two	Three	>Three
Total	974	3780	5985	65216
%	5.68	22.05	34.91	37.36

The formula of K. Subramanyam (1983) for calculation of a degree of collaboration of authorship (publications) expressed as: $C = Nm / (Nm + Ns)$

Where, C= degree of collaboration,
Nm=Number of multiple authors,
Ns= Number of single authors.

The degree of collaboration of authorship (publications) is calculated as 0.94.

ZIPF'S LAW OF WORD OCCURRENCE

To proof the study, Zipf's law applied to the five words taken from the title of the Theses and ranked them in decreasing order, according to the frequency of the words.

As per Zipf's law ' $rxf=c$ ', in which 'r' is a rank of a word and 'f' is its frequency and 'c' is constant.

Taking log on both sides: $\log(f) + \log(r) = \log c$

Log frequency of top five (5) words of the theses are:

Top five ranking of words

S.No.	Words	Rank	Frequency	Log (c)
1.	Study	1	24	1.380
2.	Growth	2	14	1.447
3.	Effect	3	12	1.556
4.	Bio-fertilizer	4	10	1.602
5.	Yield	5	09	1.652

The above table clearly shows that all the five (5) ranked words has almost (approx.) constant value.

So, the Zipf's law has scientifically proved the study.

CONCLUSION

The bibliometric analysis examines the 62 Doctoral theses have been awarded in the School for Bioscience and Biotechnology in Babasaheb Bhimrao Ambedkar University. In the year 2014 the highest number of theses awarded was 24 and in the same year, the contribution of male and female scholars was recorded 10 (25%) and 14 (63.64%), total contribution of male scholars was 40 (65%) and female contribution was recorded 22 (35%) during the period 2005-2015. Scholars selected Insect

culture discipline as a larger portion for research followed by Garden crops (Horticulture), Pharmacology and Therapeutics, Microorganisms, fungi & algae and Agriculture related technologies. The study also reveals that scholars used a number of references 151-300 in their 21 Doctoral theses followed by 301-450 references in 19 Doctoral theses, in 14 theses 450-550 references and in only 8 theses references used 1-150. Authorship pattern shows that more three authors citation counted as 6406 (37.36%). Degree of collaboration calculated as 0.94. Zipf's Law of word occurrence shows that all the five ranked words are almost constant value.

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