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Comparative Research Performance Analyses of the Departments of Botany and Zoology of the University of Burdwan from 1960- 2000

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Introduction

India invests a huge amount of money and time for the production of doctorates to meet its R&D needs. Evaluation of research institutions is very important for their ranking, proper funding, grant releasing etc. Very few studies have been made to compare and evaluate the research output of the universities and R&D organizations of West Bengal. In recent past NAAC started evaluation of overall activities of the universities of our country. In a 5 to 1 star ranking by NAAC, The University of Burdwan received four-star status, which is later revised to B+. The University of Burdwan was established in 1960 as a rural base university. Since then it has made a considerable contribution in the field of Biological sciences research.

However, no specific effort has been made to evaluate the research contributions of the university. In the present work an attempt is made to study the comparative research performance of Botany and Zoology department of The University of Burdwan by analysing the awarded theses and related published literature outputs.

Literature Review

A number of scientometric analyses have been carried out during the last two decades to evaluate the research productivity of Indian scientists.

In a study of the literature use pattern by the researchers in the field of Botany: A citation study of doctoral theses, Maheswarappa and Prakash (1982) analysed 2726 references from fifteen doctoral theses in Botany accepted by Mysore University during 1973-1980. They found out the bibliographic forms used, ranked list of core journals, self citation pattern, obsolescence, etc. The average self-citation rate was 3.22%.

Mahapatra (1983) in his thesis prepared a rank list of botany journals analyzing 17802 journal articles. Maheswarappa and Nagappa (1984) studied the Indian phytopathology literature. After analysing 20 dissertations of plant pathology of Rajendra Agricultural University. Lal and Panda (1996) created a ranked list of the 100 most frequently cited core periodicals.

Lal (1993) reported the results of a bibliometric analysis of 4136 citations of articles published in the Indian Journal of Genetics and Plant Breeding and prepared a rank list of the 60 most cited primary periodicals. He has also illustrated the contribution of Indian and foreign theses and the authorship pattern revealing that multi authored papers were more in practice.

Begum and Rajendra (1990) in their study observed the dominance of multiple authorship over single authorship in zoological sciences.

Vimala and Pulla Reddy (1996) studied the trend in 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.

Kumar, S., Kumar, S., and Shah, G (2007) analysed 1429 research papers comprising 1117 articles and 312 short notes published in fifteen volumes, published for the year 1989-2003 in Indian Journal of Entomology. They analysed year wise distribution, length of articles, authorship pattern and calculates collaboration coefficients and most prolific contributors.

Objectives

The objectives of the present study are:

1. To analyse and compare the trend of doctoral research in Botany and Zoology department in the University of Burdwan during 1960-2000.
2. To find out and compare year wise publication productivity in Botany and Zoology department.
3. To study and compare the pattern of authorship collaboration in Botany and Zoology department.
4. To identify and compare the most prolific authors of the Botany and Zoology department with their credit and Impact.
5. The citation scenario of the outstanding authors of Botany and Zoology department.
6. To identify and compare the journal preference of the researchers in which they have communicated their research findings.
7. To find out the country wise distribution of journals.

Methodology

There were 160 no. of Botany and 236 no. of Zoology doctoral dissertations awarded from the department of Botany and Zoology of this University from 1960 to 2000. The published articles appended in these theses and the articles reported in the Annual Reports of the University were taken as the input for the study.

All the bibliographic details of those theses and related articles were noted on separate 8 X 5 inches slips. A computerized database is then created for in-depth analysis.

Analysis

Year-wise distribution of theses over a five year grouping in Botany and Zoology

The year wise thesis submission over a five-year grouping is shown in Table 1. During the time

span 1981-1985 the highest 40 number theses were submitted in Botany and during the time span 1986-1990 the highest 64 number theses were submitted in Zoology.

Table 1. Year-Wise Distribution of Theses over a five-year grouping in Botany, and Zoology

Year	No. of Theses In Botany	No. of Theses In Zoology
1960-65	0	0
1966-70	1	0
1971-75	17	5
1976-80	22	31
1981-85	40	52
1986-90	30	64
1991-95	31	47
1996-2000	19	37
Total	160	236

Guide rank of Botany and Zoology Theses during 1960-2000

A ranked list of the guides of the Botany and Zoology Departments of this University is shown in Table – 2. D K Chaudhuri (Zoology Department) topped the list with 48 theses, followed by G Majumdar (Zoology Department) with 39 theses, B Nandi (Botany Department) with 22 theses and A K Banerjee (Botany Department) & S Roy (Zoology Department) with 18 theses each. Fig. – 1 represents the top 10 supervisors during 1960-2000 within Botany and Zoology.

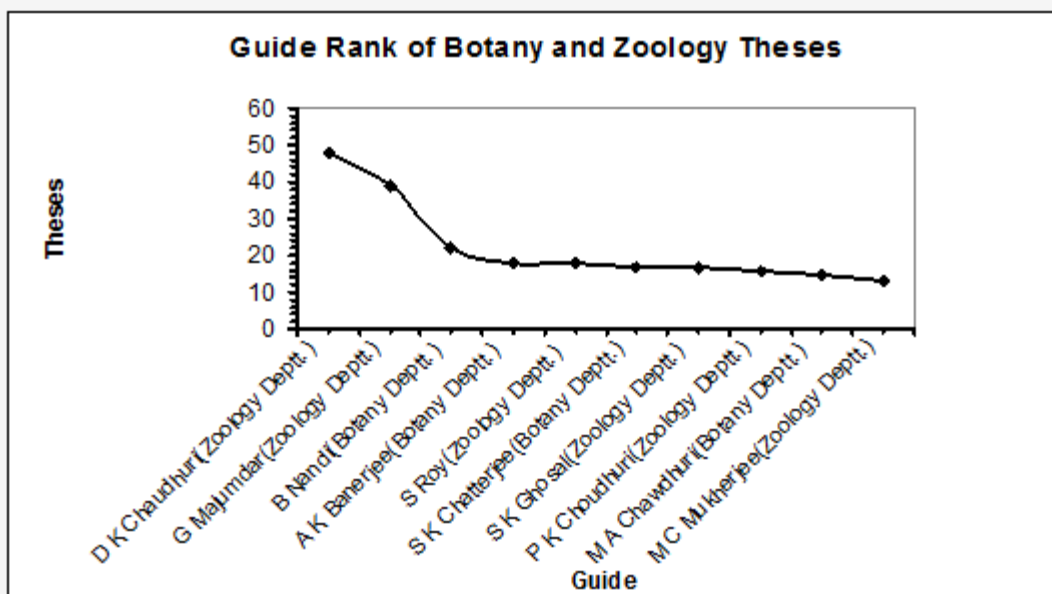
Table 2. Guide Rank of Botany and Zoology Theses

Rank No	Supervisor Name	No. of Theses	Department	Span of Teaching
1	Deb Kumar Chaudhuri	48	Zoology	1971-1994 (23Yrs)
2	Giridhari Majumdar	39	Zoology	1971-2000 (29yrs)
3	Balen Nandi	22	Botany	1970-2000 (30yrs)
4	Ajit Kumar Banerjee	18	Botany	1966-1995 (29yrs)
4	Subrata Roy	18	Zoology	1969-2000 (31yrs)
6	Salil Kumar Chatterjee	17	Botany	1973-1977 (04yrs)
6	Sudhansu Kumar Ghosal	17	Zoology	1972-2000 (28yrs)

8	Prasanta Kr. Choudhuri	16	Zoology	1977-2000 (23yrs)
9	M A Chawdhuri	15	Botany	1970-2000 (30yrs)
10	Manik Chand Mukherjee	13	Zoology	1971-2000 (29yrs)
11	Param Nath Bhaduri	12	Botany	1978-1989 (11yrs)
11	Siba Prasad Chatterjee	12	Botany	1974-2000 (26yrs)
13	Kajal Gupta	11	Botany	1974-2000 (26yrs)
13	Asit Kumar Sarkar	11	Zoology	1970-1997 (27yrs)
13	Sankar Kumar Moitra	11	Zoology	1969-1992 (23yrs)
16	Saurendra Kumar Roy	10	Botany	1966-1975 (09yrs)
17	Priti Sadhan Basu	9	Botany	1975-2000 (25yrs)
17	Gour Mohan Sinha	9	Zoology	1977-2000 (23yrs)
17	Mohitosh Banerjee	9	Zoology	1978-2000 (22yrs)
20	Samar Chakraborty	7	Zoology	1980-2000 (20yrs)
20	Tara Charan Banerjee	7	Zoology	1977-2000 (23yrs)
22	Jitendra Nath Medda	6	Zoology	1968-2000 (32yrs)
23	Pushpendu Bairagi	5	Botany	1971-1991 (20yrs)
23	C R Maity	5	Zoology	1977-1996 (31yrs)
23	Soumen Kumar Moitra	5	Zoology	1984-2000 (16yrs)
26	Debiprasad Kushari	4	Botany	1975-2000 (25yrs)
26	Pranjit Sarma	4	Botany	1964-2000 (36yrs)
26	Anadi Prasad Nandi	4	Zoology	1978-2000 (22yrs)
29	Anjali Ray	2	Botany	1974-1990 (16yrs)
29	Arun Kumar Biswas	2	Botany	College Teacher
29	Pankaj Kumar Pal	2	Botany	1985-2000 (15yrs)

29	Paragranjan Dasgupta	2	Botany	1986-1995 (09yrs)
29	Prodyot Bhanja	2	Botany	1974-1997 (23yrs)
29	Radhanath Mukherjee	2	Botany	1981-2000 (19yrs)
29	Goutam Chandra	2	Zoology	1991-2000 (09yrs)
29	Padmanabha Chakraborty	2	Zoology	1984-2000 (16yrs)
37	Ambarish Mukherjee	1	Botany	1993-2000 (07yrs)
37	Independently	1	Botany	
37	Madhuri Some	1	Botany	1971-2000 (29yrs)
37	N C Chatterjee	1	Botany	1991-2000 (09yrs)
37	P K Bhattacharya	1	Botany	1981-2000 (19yrs)
37	P K Mukherjee	1	Botany	1981-2000 (19yrs)
37	Sakuntala Nandi	1	Botany	1981-1993 (12yrs)
37	Samir Chandra Rakshit	1	Botany	1975-1978 (03yrs)
37	U Sen	1	Botany	1970-1997 (27yrs)
37	A K Hazra	1	Zoology	Part Time Teacher
37	Nirmal Chandra Sukul	1	Zoology	Part Time Teacher
37	S K Dasgupta	1	Zoology	Part Time Teacher
37	Samir Kumar Banerjee	1	Zoology	Part Time Teacher
37	Shyamal Kumar Bose	1	Zoology	Part Time Teacher
37	Somnath Banerjee	1	Zoology	Part Time Teacher
37	Subimal Kr. Chatterjee	1	Zoology	Part Time Teacher

Figure 1



Year-wise distribution of articles over a five-year grouping in Botany and Zoology

The article publication over a five-year grouping is shown in Table - 3. During the time span of 1986 to 1990 maximum number (251) of articles was published from Zoology Department followed by 189 articles from Botany Department during 1976 to 1980.

Table 3. Year-Wise Ranking of Articles over a Five-year Grouping in Botany and Zoology

Year	No. of Articles	Department.
1986-90	251	Zoology
1976-80	189	Botany
1991-95	150	Botany
1986-90	149	Botany
1996-2000	141	Botany
1991-95	132	Zoology
1996-2000	122	Zoology
1976-80	111	Zoology
1981-85	102	Botany
1981-85	80	Zoology
1971-75	22	Zoology

1971-75	8	Botany
1966-70	1	Zoology
1960-65	0	Botany
1966-70	0	Botany
1960-65	0	Zoology

Degree of Collaboration of articles in Botany and Zoology

Degree of collaboration among co-authors:- The degree of collaboration among authors is measured by the following formula given by Subramanyam, K (1983).

Nm

C = -----

Nm + Ns

Where C = Degree of Collaboration.

Nm = Number of multi authored article.

Ns = Number of single authored article.

The degree of collaboration among the Botany and Zoology Departments of this University is presented in Table – 4. The highest degree of collaboration is found in Botany Department (0.70) followed by and Zoology Department (0.51).

Table 4. Degree of Collaboration of articles in Botany and Zoology

Department	Degree of Collaboration
Botany	0.70
Zoology	0.51

Most prolific authors in Botany and Zoology during 1960-2000 (according to 1st author)

Considering the name of the first authors only, the most prolific author was P K Choudhuri (Zoology Deptt.) who topped the list with 80 publications followed by M A Choudhuri (Botany Deptt.) with 54 publications, D K Choudhuri & S Chakraborty (Zoology Deptt.) with 49 publications each, A Mukherjee (Botany Deptt.) with 48 publications and S K Ghosal (Zoology Deptt.) with 45 publications,. Table – 5 provides a ranked list of authors with their publications while Fig. – 2 represent the top 10 authors during 1960-2000 (considering the 1st author only). The first authors of the articles who produced at least 10 articles are only taken into consideration for preparing the ranked list.

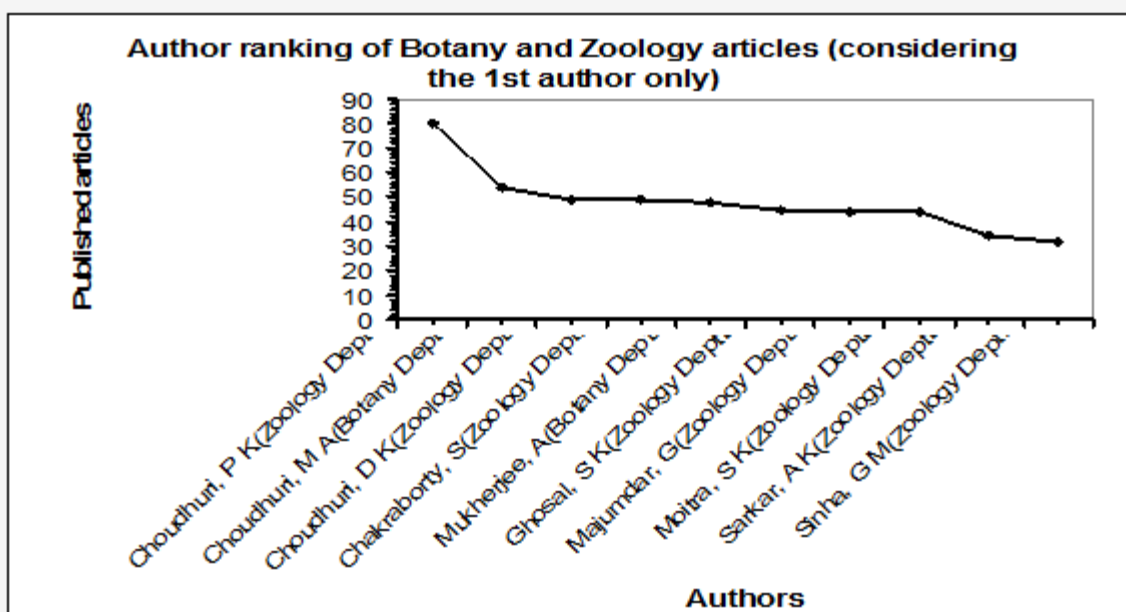
Table 5. Author ranking of Botany and Zoology articles (considering the 1st author only)

Rank No	Author Name	No. of articles	Department
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1	Choudhuri, P K	80	Zoology
2	Choudhuri, M A	54	Botany
3	Choudhuri, D K	49	Zoology
3	Chakraborty, S	49	Zoology
5	Mukherjee, A	48	Botany
6	Ghosal, S K	45	Zoology
7	Majumdar, G	44	Zoology
7	Moitra, S K	44	Zoology
9	Sarkar, A K	34	Zoology
10	Sinha, G M	32	Zoology
11	Basu, P S	31	Botany
12	Gupta, K	30	Botany
13	Chakraborty, P	28	Zoology
14	Nandi, B	27	Botany
14	Chandra, G	27	Zoology
16	Roy, S	26	Zoology
17	Kushari, D P	24	Botany
17	Biswas, A K	24	Botany
17	Mukhopadhyay, M C	24	Zoology
20	Chottopadhyay, N C	22	Botany
20	Medda, J N	22	Zoology
22	Basu, S	18	Botany
23	Mukherjee, A K	17	Botany
23	Mallick, E H	17	Botany

23	Chatterjee, S P	17	Botany
26	Banerjee, T C	15	Zoology
27	Khan, R I	14	Botany
28	Mukhopadhyay, R	13	Botany
28	Ghosh, M L	13	Botany
30	Pal, P K	11	Botany
31	Roy, S K	10	Botany

Figure 2



Co-authorship and credit study for the individual authors in Botany and Zoology

The Co-authorship of an author is calculated by taking the number of papers published by the author as first, second, third, fourth, fifth or sixth author. The total credit given for a paper is one. For a single authored article, the author is given a credit point of one. For a double-authored article, each author is given a credit point of 0.5. For a multi-authored paper, the first author is given a credit point of 0.5 and 0.5 credit point is distributed dividing equally among the other authors. The authors who have credited minimum of 5 points are only taken into consideration for preparing the ranked list. The ranked list of authors according to their credit is shown in Table - 6. The most credited author was M A Choudhuri (Botany Department) who topped the list with 97.25 points, followed by P K Choudhuri (Zoology Department) with 62 points, S K Moitra (Zoology Department) with 59.25 points, B Nandi (Botany Department) with 51 points, D K Choudhuri (Zoology Department) with 49.33 points and S Chakraborty (Zoology Department) with 47.16 points. Fig. – 3 represent the top 10 credited authors.

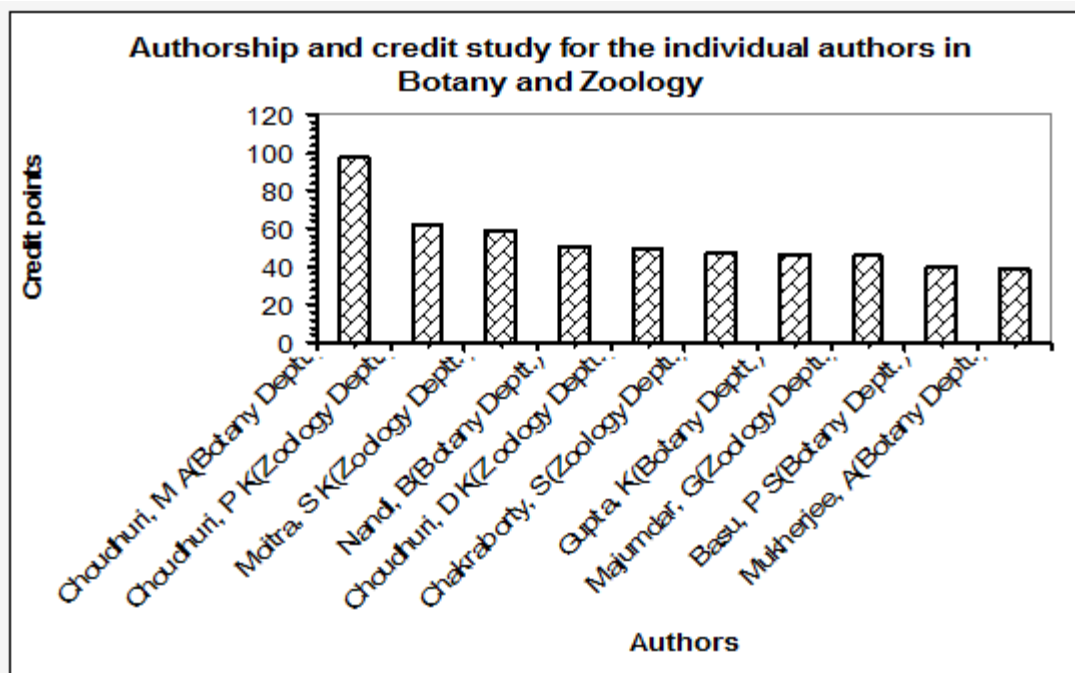
Table 6. Authorship and credit study for the individual authors in Botany and Zoology

Rank No.	Author's Name	Total Credit	Department	Specialisations
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1	Choudhuri, M A	97.25	Botany	Plant Physiology
2	Choudhuri, P K	62	Zoology	Entomology
3	Moitra, S K	59.25	Zoology	Cell Biology
4	Nandi, B	51	Botany	Microbiology
5	Choudhuri, D K	49.3335	Zoology	Entomology
6	Chakraborty, S	47.1668	Zoology	Cytogenetics
7	Gupta, K	46.4167	Botany	Plant Physiology
8	Majumdar, G	45.5003	Zoology	Parasitology
9	Basu, P S	40	Botany	Microbiology
10	Mukherjee, A	39.25	Botany	Ecology
11	Ghosal, S K	35.7504	Zoology	Cytology & Genetics
12	Sarkar, A K	32	Zoology	Cell Biology
13	Sinha, G M	27.9167	Zoology	Fishery
14	Kushari, D P	26.5	Botany	Ecology
15	Roy, S	23.3334	Zoology	Soil Zoology
16	Mukhopadhyay, M C	22	Zoology	Entomology
17	Chakraborty, P	21.5	Zoology	Fishery
17	Chandra, G	21.5	Zoology	Parasitology
19	Chatterjee, S P	19.1667	Botany	Microbiology
20	Basu, S	18	Botany	Plant Physiology
21	Banerjee, A K	16.75	Botany	Microbiology
22	Chatterjee, N C	15.75	Botany	Plant Pathology
23	Biswas, A K	15.25	Botany	Plant Physiology
24	Mukherjee, A K	15	Botany	Plant Physiology

25	Banerjee, T C	14	Zoology	Ecology
26	Roy, S K	13	Botany	Paleobotany
27	Mukhopadhyay, R	12.75	Botany	Pteridology
28	Chatterjee, S K	11.5	Botany	Plant Pathology
29	Mallick, E H	11	Botany	Plant Physiology
30	Meddy, T	9.1671	Zoology	Cytogenetics
31	Bairagi, P	8.75	Botany	Cytogenetics
32	Pal, P K	8	Botany	Paleobotany
33	Medda, J N	7.55	Zoology	Cell Biology
34	Khan, R I	7	Botany	Plant Physiology
34	Nandi, A P	7	Zoology	Parasitology
35	Bhattacharya, S	6.9167	Zoology	Cytology & Genetics
36	Maity, C R	6.8339	Zoology	Biochemistry
37	Ghosh Hazra, N	6.75	Botany	Plant Physiology
39	Ghosh, M L	6.5	Botany	Plant Physiology
39	Taheruzzaman, Q	6.5	Botany	Ecology
41	Ghosh, A K	6.3334	Botany	Plant Physiology
42	Banja, P	6	Botany	Cytogenetics
43	Ghosh, A	5.25	Botany	Plant Physiology
44	Dey, M	5.0001	Zoology	Cell Biology
45	Bandyopadhyay, M	5	Zoology	Ecology

Figure 3



Author's Impact in Botany and Zoology (according to 1st author)

The Impact of an author (Table – 7, Fig. – 4) with reference to a journal is calculated by taking the number of papers published by the author (as first author) in the journal multiplied by the average Impact Factor of the journal. The total impact of an author is calculated by summing all such values with reference to that author. The average Impact Factors of the journals are taken as per "SCIENCE JOURNAL RANKING BY AVERAGE IMPACT FACTORS, Version 2002" created by Acad. Prof. Dr. Ioan-Iovitz Popescu Based on ISI annual datasets of SCI-JCR(1974-2000). Popescu Ioan-Iovitz (2002). Count of papers published in such journals, average impact factors of which were not available in this list has been excluded from this study. The authors who have minimum impact of 2 are only taken into consideration for preparing the ranked list.

The author with highest impact (according to 1st author) was M A Choudhuri (Botany Department) who topped the list with 20.93 points, followed by S Chakraborty (Zoology Department) with 13.10 points, S K Mitra (Zoology Department) with 11.74 points, G Majumdar (Zoology Department) with 11.11 points and P S Basu (Botany Department) with 8.89 points.

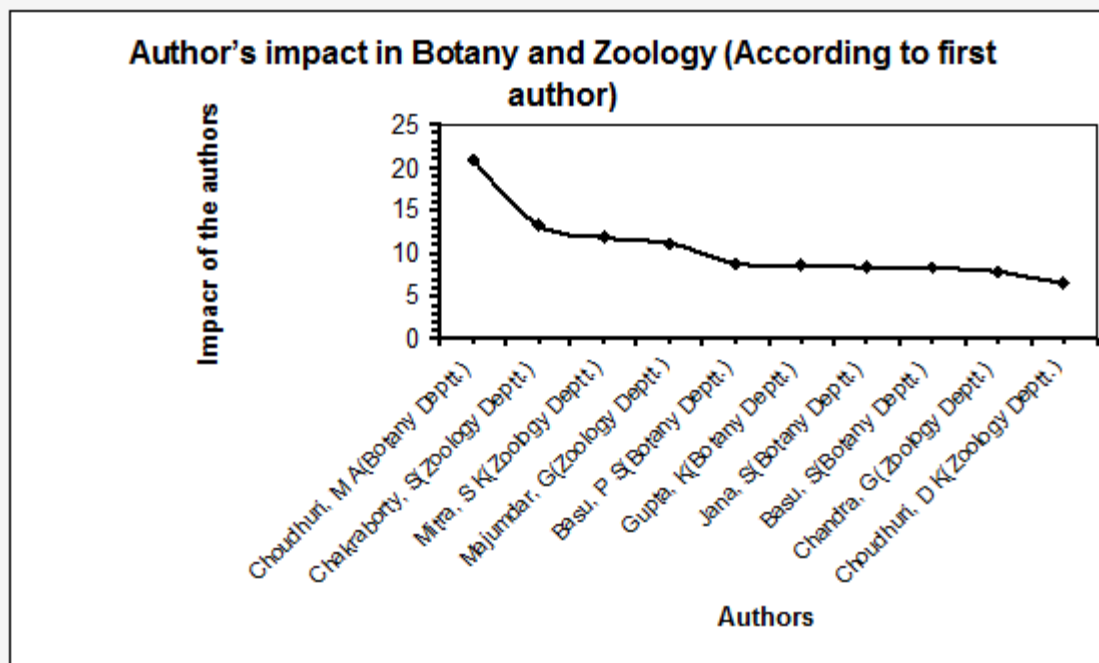
Table 7. Author's impact in Botany and Zoology (According to first author)

Rank No.	Author's Name	Total Impact of the author	Department
1	Choudhuri, M A	20.93	Botany
2	Chakraborty, S	13.10	Zoology
3	Mitra, S K	11.74	Zoology
4	Majumdar, G	11.11	Zoology
5	Basu, P S	8.89	Botany
6	Gupta, K	8.65	Botany

7	Jana, S	8.40	Botany
8	Basu, S	8.33	Botany
9	Chandra, G	7.76	Zoology
10	Choudhuri, D K	6.53	Zoology
11	Banerjee, A K	5.83	Botany
12	Kushari, D P	5.75	Botany
13	Roy, S	5.69	Zoology
14	Biswas, A K	5.52	Botany
15	Ghosal, S K	5.22	Zoology
16	Roy, S	4.99	Botany
17	Nandi, B	4.83	Botany
18	Khan, R I	4.56	Botany
19	Mukherjee, A K	4.47	Botany
20	Mukherjee, A K	3.90	Zoology
21	Banerjee, U	3.79	Zoology
22	Choudhuri, P K	3.68	Zoology
23	Bhattacharya, S	3.40	Zoology
24	Sinha, G M	3.39	Zoology
25	Mukhopadhyay, M C	3.34	Zoology
26	Mukherjee, A	3.13	Botany
27	Sarkar, A K	3.09	Zoology
28	Chakraborty, P	2.88	Zoology
29	Kar, C	2.61	Botany
30	Sarkar, B L	2.56	Botany

31	Sinha, B K	2.48	Botany
32	Chottopadhyay, S P	2.31	Botany
33	Banerjee, T C	2.17	Zoology
34	Dangar, T K	2.12	Botany
35	Roy, S K	2.09	Botany

Figure 4



Author's impact in Botany and Zoology considering all authors at any author position

The total credit given for a paper is one. For a single authored article, the author is given a credit point of one. For a double-authored article each author is given a credit point of 0.5. For a multi-authored paper, the first author is given a credit point of 0.5 and 0.5 credit point is distributed dividing equally among the other authors. The Impact of an author (Table – 8) with reference to a journal is calculated by taking such credit point of an author multiplied with the average Impact Factor of the journal. The total impact of an author is calculated by summing all such values with reference to that author. The average Impact Factors of the journals are taken as per Popescu loan-lovitz (2002). Count of papers published in such journals, average impact factors of which were not available in this list has been excluded from this study. The authors who have minimum impact of 2 are only taken into consideration for preparing the ranked list.

The author with highest impact (considering all authors at any authorship position with shared credit) was M A Choudhuri (Botany Department) who topped the list with 34.4725 points, followed by S K Mitra (Zoology Department) with 14.0350 points, P S Basu (Botany Department) with 10.8175 points and K Gupta (Botany Department) with 10.7033 points. Fig. – 5 represent the top 10-credited author's impact considering all authors at any author position.

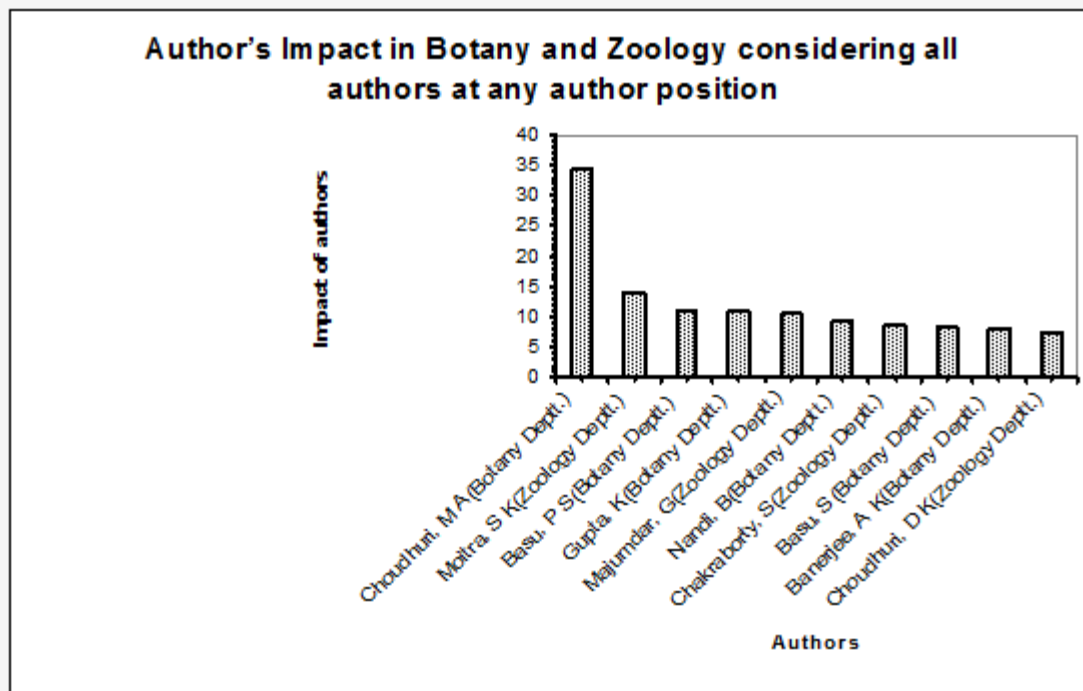
Table 8. Author's Impact in Botany and Zoology considering all authors at any author position

Rank No.	Author's Name	Total Impact of the author	Department
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1	Choudhuri, M A	34.4725	Botany
2	Moitra, S K	14.0350	Zoology
3	Basu, P S	10.8175	Botany
4	Gupta, K	10.7033	Botany
5	Majumdar, G	10.5616	Zoology
6	Nandi, B	9.1750	Botany
7	Chakraborty, S	8.8100	Zoology
8	Basu, S	8.3300	Botany
9	Banerjee, A K	8.0350	Botany
10	Choudhuri, D K	7.3525	Zoology
11	Chandra, G	6.5350	Zoology
12	Kushari, D P	5.8900	Botany
13	Roy, S	4.9225	Zoology
14	Jana, S	4.2000	Botany
15	Ghosal, S K	3.9600	Zoology
16	Mukherjee, A K	3.3400	Botany
17	Sinha, G M	3.1150	Zoology
18	Biswas, A K	2.9925	Botany
19	Choudhuri, P K	2.9575	Zoology
20	Mukhopadhyay, M C	2.9500	Zoology
21	Chatterjee, S P	2.7100	Botany
22	Roy, S	2.4950	Botany
23	Mukherjee, A	2.4600	Botany
24	Sarkar, A K	2.3750	Zoology

25	Khan, R I	2.2800	Botany
26	Roy, S K	2.2700	Botany
27	Mukherjee, A K	2.2300	Zoology
28	Chakraborty, P	2.1600	Zoology
29	Banerjee, T C	2.0350	Zoology

Figure 5



Citation scenario of the outstanding authors of Botany and Zoology

The citations received by the published articles of Botany and Zoology researchers are collected from Scopus™. From Table – 9 and Fig. - 6, it is evident that M A Choudhuri (Botany Department) received highest number of citations (233), with only 14 numbers of self citations whereas S K Moitra (Zoology Department) received 98 number of citations, with 34 self citations during this time span. The other authors P S Basu (Botany Department) received 75 number of citations (with 41 numbers of self citations), S K Ghosal (Zoology Department) received 50 number of citations (with 13 numbers of self citations) and B Nandi (Botany Department) received 40 number of citations (with 6 numbers of self citations).

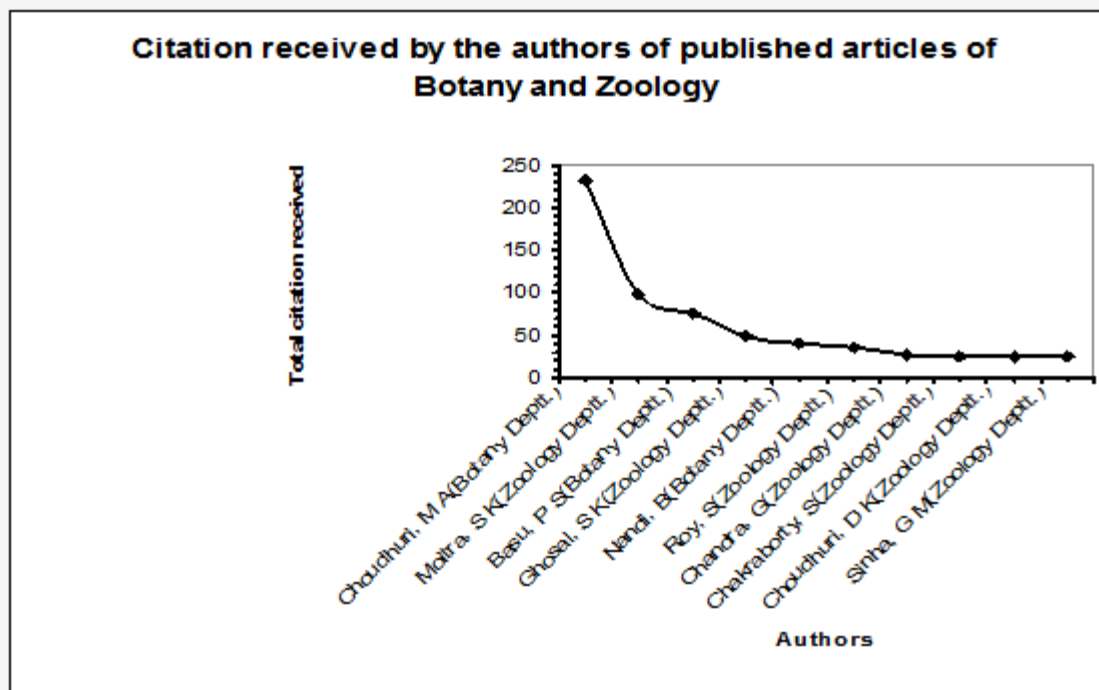
Table 9. Citation received by the authors of published articles of Botany and Zoology

Rank No	Author Name	Total Citations >Received	No of Citation from other authors	Self-Citation	Department
1	Choudhuri, M A	233	219	14	Botany
2	Moitra, S K	98	64	34	Zoology

3	Basu, P S	75	34	41	Botany
4	Ghosal, S K	50	37	13	Zoology
5	Nandi, B	40	34	6	Botany
6	Roy, S	35	28	7	Zoology
7	Chandra, G	27	19	8	Zoology
8	Chakraborty, S	25	19	6	Zoology
9	Choudhuri, D K	24	22	2	Zoology
9	Sinha, G M	24	24	0	Zoology
11	Choudhuri, P K	18	11	7	Zoology
12	Dangar, T K	16	14	2	Botany
13	Gupta, K	10	7	3	Botany
13	Chakraborty, P	10	6	4	Zoology
15	Banerjee, T C	9	3	6	Zoology
16	De, P S	8	6	2	Botany
16	Mukherjee, R	8	6	2	Botany
16	Majumdar, G	8	5	3	Zoology
19	Banerjee, A K	7	4	3	Botany
19	Kundu, P K	7	5	2	Botany
21	De, A B	6	4	2	Botany
21	Hazra, N	6	3	3	Zoology
23	Kushari, D P	5	4	1	Botany
23	Majumdar, A	5	4	1	Zoology
23	Medda, J N	5	5	0	Zoology
26	Roy, M	4	2	2	Botany

26	Banerjee, A	4	4	0	Botany
28	Chottopadhyay, N C	3	2	1	Botany
29	Kar, R K	2	1	1	Botany
29	Khan, R I	2	1	1	Botany
31	Chattopadhyay, K K	1	1	0	Botany
31	Mondal, W A	1	1	0	Botany
31	Mukherjee, S P	1	1	0	Botany
31	Pal, D K	1	1	0	Botany
31	Saha, K	1	1	0	Botany
31	Chatterjee, S	1	0	0	Botany
31	Huda, R	1	0	1	Zoology
31	Midya, T	1	1	0	Zoology

Figure 6



Ranked list of journals preferred for publishing articles by the researchers of Botany and Zoology with their country of origin and average impact factors

The leading journals preferred by the researchers of Botany and Zoology Departments for publishing articles are *Ind JI Exp Biol* with 62 papers, *Sci Cult* with 39 papers, *Ind JI Plant Physiol* with 36 papers, *Geobios* with 33 papers and *Env Ecol* with 30 papers. Table – 10 provides journal preference by the researchers of Botany and Zoology Departments. The journals in which a minimum number of 5 articles are published have only been taken into consideration for preparing the ranked list.

Table 10. Ranked list of journals preferred for publishing articles by the researchers of Botany and Zoology with their country of origin and average impact factors

Rank No	Journal Name	No. of papers	Department	Country	Average IF of the journal
1	Ind JI Exp Biol	62	Botany	India	0.25
2	Sci Cult	39	Botany	China	
3	Ind JI Plant Physiol	36	Botany	India	0.06
4	Geobios	33	Botany	France	0.35
5	Env Ecol	30	Zoology	India	0.48
6	Ind JI Phys Alli Sci	24	Zoology	India	
7	Fol Microbiol	23	Botany	U K	0.40
7	Pers Cyto Genet	23	Zoology	India	
9	Trans Zool Soc Ind	21	Zoology	India	
10	Seed Sci Tech	20	Botany	Switzerland	0.19
11	Biochem Phy Pflanz	19	Botany	Germany	0.60
11	Biol Plant	19	Botany	Netherlands	0.32
13	Ind Fern JI	17	Botany	India	
13	Env Ecol	17	Botany	India	0.48
15	Curr Sci	16	Botany	India	0.26
15	Proc Zool Soc Cal	16	Zoology	India	
15	Ind Biol	16	Zoology	India	
18	Acta Biotech	14	Botany	Germany	
19	Ind JI Myco Res	13	Botany	India	

19	Ind JI Exp Biol	13	Zoology	India	0.25
21	Sci Cult	12	Zoology	China	
21	Orient Inst	12	Zoology	U S A	0.80
23	JI Mycopath Res	11	Botany	India	
23	Physiol Planterum	11	Botany	Denmark	1.64
25	Ind JI Pure Appl Bio	10	Botany	India	
25	Ind JI Nemat	10	Zoology	India	
25	JI Freshwater Biol	10	Zoology	India	
25	Rec ZSI	10	Zoology	India	
25	Folia Parasitol	10	Zoology	Czech Rep.	0.42
30	BU Sci JI	9	Botany	India	
30	Ind JI Bot	9	Botany	India	
30	Bull ZSI	9	Zoology	India	
30	JI Inter Cycle Res	9	Zoology	Netherlands	
30	Biol Rhythm Res	9	Zoology	Netherlands	0.47
35	Hydrobiol Bull	8	Botany	Netherlands	
35	Geophytology	8	Botany	India	
35	Zool Jb Anat	8	Zoology	Germany	
35	Rev Ecol Biol Sol	8	Zoology	France	0.27
39	Plant Soil	7	Botany	India	0.80
39	Aqua Bot	7	Botany	Netherlands	0.90
39	Ind JI Forestry	7	Botany	India	
39	Curr Sci	7	Zoology	India	0.26
39	Ind JI Med Res	7	Zoology	India	0.30

44	Ind JI Agri Sci	6	Botany	India	0.03
44	Ind JI Microbiol	6	Botany	India	
44	Plant Physiol Bioche	6	Botany	India	1.21
44	Ind Biol	6	Botany	India	
44	Cell Chr Res	6	Zoology	India	
44	Ind Sci Cong	6	Zoology	India	
44	Jl Beng Nat Hist Soc	6	Zoology	India	
44	Ind JI Parasitol	6	Zoology	India	
44	Anat Anz	6	Zoology	Germany	
53	Plant Physiol	5	Botany	U S A	3.22
53	Phytomorphology	5	Botany	India	0.18
53	Ind Perfume	5	Botany	India	
53	Microbiol Res	5	Botany	Germany	0.39
53	PAVO	5	Zoology	India	
53	Proc Ind Sci Cong	5	Zoology	India	
53	Comp Physiol Ecol	5	Zoology	India	0.09
53	Korean JI Entomol	5	Zoology	Korea	
53	Jl Rep Biol Comp End	5	Zoology	India	
53	Ins Sci Appl	5	Zoology	Kenya	0.17
53	Folia Biol	5	Zoology	U K	0.47
53	Entomology News	5	Zoology	U S A	

Country-wise distributions of journals preferred for publishing articles by the researchers of Botany and Zoology department

Country wise distribution of journals preferred for publishing articles by the researchers of Botany and Zoology Departments are presented in Table – 11. Maximum percentage (61.18%) of papers of Zoology Department was published in Indian Journals followed by that of Botany Department

(50.47%). The researchers of the Botany Department published maximum articles in foreign journals 366 (49.53 %) followed by 279 (38.82 %) articles by the Zoology.

Taking all the papers of the two Departments together 813(55.76%) articles are published in Indian journals and 645 (44.24%) papers are published in foreign journals.

Table 11. Country-wise number of journals preferred for publishing articles by the researchers of Botany and Zoology Department

Country	Total No. of Journals in Botany	Total No. of Journals in Zoology	Total No. of Journals
INDIA	373(50.47%)	440(61.18%)	813(55.76%)
GERMANY	61(8.29%)	55(07.64%)	116(07.95%)
CHINA	53(7.17%)	25(03.47%)	78(05.35%)
NETHERLANDS	45(6.09%)	45(06.25%)	90(06.17%)
FRANCE	42(5.68%)	20(02.79%)	62(04.25%)
U K	40(5.41%)	24(03.38%)	64(04.38%)
SWITZERLAND	31(4.20%)		31(02.12%)
U S A	26(3.51%)	40(05.56%)	66(04.53%)
DENMARK	21(2.84%)	12(01.67%)	33(02.26%)
POLAND	11(1.48%)		11(00.75%)
AUSTRALIA	10(1.36%)		10(00.68%)
BANGLADESH	9(1.21%)		9(0062%)
SINGAPORE	8(1.08%)		8(00.55%)
EGYPT	6(0.81%)		6(0041%)
ITALY	3(0.40%)		3(00.20%)
BELGIUM		08(01.12%)	8(00.55%)
CZECH REP.		14(01.94%)	14(00.96%)
KOREA		12(01.67%)	12(00.82%)
KENIA		11(01.52%)	11(00.75%)
BRAZIL		07(00.97%)	7(0048%)

SLOVAKIA		06(00.84%)	6(0041%)
Total	739(100%)	719(100%)	1458(100%)

Summary and Conclusion

The study gives an insight of research publications of the Botany and Zoology department of the University of Burdwan. Scientometric analysis of 160 awarded Botany theses, 739 published Botany thesis articles and 236 awarded Zoology theses, 719 published Zoology thesis articles by the scholars of the The University of Burdwan during 1960-2000 were analyzed to compare the year wise productivity, authorship pattern and collaboration, Co-authorship pattern, Impact of authors, the citation scenario of the outstanding authors and ranked list of journals. The highest number of thesis (64) and highest number of thesis articles (251) was submitted by the Zoology Department during 1986-1990 whereas Botany department submitted highest number of theses (40) during 1981-1985 and highest number of thesis articles (189) during 1976-1980. The highest degree of collaboration is found in Botany Department (0.70) followed by Zoology Department (0.51). Considering the name of the first authors only, the most prolific author was P K Choudhuri (Zoology) who topped the list with 80 papers followed by M A Choudhuri (Botany) with 54 publications. The most credited author (considering fractional credit of authorship at any authorship position) was M A Choudhuri (Botany Department) who topped the list with 97.25 points, followed by P K Choudhuri (Zoology Department) with 62 points. The author with highest impact (according to 1st author) was M A Choudhuri (Botany Department) who topped the list with 20.93 points, followed by S Chakraborty (Zoology Department) with 13.10 points. The author with highest impact (considering all authors at any authorship position with shared credit) was M A Choudhuri (Botany Department) who topped the list with 34.4725 points, followed by S K Mitra (Zoology Department) with 14.0350 points. M A Choudhuri (Botany Department) received highest number of citations (233), whereas S K Mitra (Zoology Department) received 98 citations during this period. The leading journals preferred by the researchers of Botany and Zoology Departments for publishing articles are Ind JI Exp Biol with 62 papers followed by Sci Cult with 39 papers. Taking all the papers of the two Departments together 813(55.76%) articles are published in Indian journals and 645 (44.24%) papers are published in foreign journals.

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