



Bibliometric Study Journal of Ecology

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Abstract

This paper presents a Bibliometric analysis of the journal titled "Journal of Animal ecology" "British ecological society during the periods of 2010-2019. To study the year wise Distribution of articles, To study To study Distribution of contributions. (Authorship Pattern), To find out Institution-wise distribution of contribution, To find out country-wise distribution of contribution, To Study relative growth Doubling Timing

Keywords: Bibliometrics, journal of Animal ecology, authorship pattern, Degree of collaboration

1. Introduction

Bibliometrics is the quantitative analysis of scholarly publication based on citations and it can be used to measure the impact of a research paper, individual research, journal, etc. The word "Bibliometric" has been derived from the Latin and Greek words "Biblio" and "metrics" which refer to the application of mathematics to the study of bibliography. "Sengupta has defined Bibliometrics as an organization, classification and quantitative evaluation of Publication pattern of macro and micro communication along with their authorship by mathematical and statistical calculations." Journal of Ecology publishes original research on all aspects of plant ecology (including algae), in both aquatic and terrestrial ecosystems The Journal of Ecology is a bimonthly peer-reviewed scientific journal covering all aspects of the ecology of plants. It was established in 1913 and is published by Wiley-Blackwell on behalf of the British Ecological Society

The journal publishes papers on plant ecology (including algae) in both terrestrial and aquatic ecosystems. In addition to population and community ecology, articles on biogeochemistry, ecosystems, microbial ecology, physiological plant ecology, climate change, molecular genetics, mycorrhizal ecology, and the interactions between plants and organisms such as animals or bacteria, are published regularly. Besides primary research articles, it publishes "Essay Reviews" and "Forum" articles. In 2008, the first papers in a new series called "Future

Directions" were published. These short papers are intended to stimulate debate as to where a field within plant ecology is going, or needs to go. In addition, the journal contains a long-running series on the "Biological Flora of the British Isles". Over 300 accounts (each of a different species) have been published so far, all of which, from 1998 onwards, can be accessed free of charge via the journal's website. The site also has a list of the species covered.

In celebration of the journal's 100th anniversary, a Centenary Symposium was held during the British Ecological Society's Annual Meeting in Sheffield (United Kingdom) in September 2011. A group of researchers were invited to talk on topics in which the journal has published major contributions over the last century and in which significant progress is currently being made. The contributors to the Centenary Symposium produced written versions of their papers for publication in the journal's Centenary Special Issue.

02. Definitional Analysis

2.1. Bibliometric Analysis

Bibliometrics is the application of statistical and mathematical methods to books and other communication (Pritchard, 1969). Bibliometrics is type of research method used in Library and Information sciences. It is an emerging area of research in the LIS field. The quantitative analysis and statistics to describe patterns of publication within a given field of body of literature are utilized. (George, 2012) Bibliometric term introduced by Alan Pritchard in 1969 (Jena, 2006)

2.2. British Ecological Society

The British Ecological Society is a learned society in the field of ecology that was founded in 1913. It is the oldest ecological society in the world. The Society's original objective was "to promote and foster the study of Ecology in its widest sense" and this remains the central theme guiding its activities today. The Society had, circa 2024 around 7,000 members of which 14% are students. Of its members, 42% are outside the United Kingdom, in a total of 92 countries. The head office is located in London.

2.3 Journal of Ecology

Journal of Ecology publishes papers on all aspects of the college plant (Including algae), in both aquatic and terrestrial ecosystems. Papers concerned solely with cultivated plants and agriculture systems may be considered if they address important ecological or evolutionary questions. Studies of plant communities, populations or individual species are accepted, as well studies of the interactions between plants and animals, fungi or bacteria, providing they focus on the ecology of the plants.

4. Methodology

Bibliometric analysis of research articles published in 12 volumes appeared in the journal of ecology during the period of 2010-2019 was carried out. Each volume of the journal consists of 12 issues. However, issue 12 only is taken for the analysis to limit volume of work. The bibliographical details of journal articles indicated references were downloaded from the online archive of the

available <https://www.britishecologicalsociety.org/publications/journals/journal-of-ecology/> the data collected on journal articles consist of year of publication

5. Literature Review:

Gaikwad Deepa N. and Dongare Sudesh N. (2022) made study on Bibliometric study on Research analytics & Programming tools The study analysed the In this study examines three of Bibliometric laws i.e. Lotkas's law, (No. of authors) Bradford law, (No. of journals) Zip's law of (Word Occurrence). Also analyses the trends on authorships such as Relative growth rate & Doubling Time, Pareto 80/20Rule. This study focuses on Research Technique and programming tool and uses review analysis to determine important issues raised by recent research conducted

Khaparde Vaishali and Fawaz Abdullah Alhamdi (2015) made study on The Electronic Library Journal: A bibliometric study (2010 to 2014). Focussed on the number of articles published per volume in each specific year, authorship patterns. Found that As DC value is more than 0.5, it is evident that multiple authored articles occupy the prominent position indicating the supremacy of solo research in the "The Electronic Library".

(Alhamdi, Khaparde & Kanekar, 2014) They attempted on a bibliometric analysis of ten volumes (57-66) in the field of journal of Documentation. It is based on the references appended to International Journal of "Journal of Documentation" during 2001-2010. The present study is based on 15150 references appended to 364 articles contributed by the authors in Journal of Documentation. It was found that Journals Citations are more in number than other citations. Also it was found that Solo Researchers are Predominant than Collaborative Researchers. The extent of collaboration was not much popular among the Journal of Documentation. The mean relative growth for articles and citation in the first five years 2001 to 2005 is reduced according to the last five years 2006 to 2010. The value of group co-efficient (gp) was only 0.46. It was seen that researchers cited latest documents. Out of 364 articles there are 175 articles have pages length from 11 to 20.

Thanuskodi (2010), that bibliometrics analysis serves as a useful tool in evaluation the quality of a journal and its contents. Bibliometrics studies is mainly applied to scientific researches and deal with various metadata elements such as author, year of publication, title, publication, subject, place of publication and other core elements of metadata. This kind of study yield helpful indication of scientific productivity, trends, researcher performance for publication, and journal ranking (Jacobs, 2001).

6. Objective of the Study

1. Author ship pattern of distribution of contribution
2. The Degree of Authors Collaboration
3. Authorship pattern of Distribution of contribution (Lotka's Law)
4. Institute wise Distribution of contribution Article
5. Relative Growth Rate & Doubling Timing of Articles
6. Volume wise of distribution of contribution of article
7. Country wise Distribution of contribution Article

7. Hypothesis of the Study

- Majority of the contributions are contributed by single authors
- USA is the highest productive country

8. Scope and Limitation of the Study:

The present study is based on the A Bibliometric study in Journal of ecology. The present study is based on overall 4166 contributions during 2010 -2019.

9. Data Collection

Data can be numerically expressed that is quantified quantifiable or objective (Fasibs off and Dely, 1990) the data was collected from, Scopus with the help of Excel. Total 4166 articles during 2010-2019 on this topic.

10. Data Analysis

The analysis will be done as per the parameters laid down in the objectives of the study. The data collection & analysis is done for Journal of ecology a Bibliometric study of total 4166 articles was collected & was analysed as per the objective laid down as well as by using various statistical tools.

Table No .1 Author ship pattern of distribution of contribution

year	Single	Two	Three	Four	Five	Six	Seven	eight	Nine	Ten	More than Ten	Total
2010	109	65	49	44	22	22	21	21	19	21	36	429
2011	112	59	47	33	21	21	18	22	24	24	40	421
2012	114	56	51	35	24	22	15	27	22	21	41	428
2013	117	57	44	39	39	20	14	18	22	29	65	464
2014	114	58	43	41	24	21	12	21	23	32	36	425
2015	120	54	33	40	19	27	11	19	22	21	39	405
2016	118	49	36	36	21	21	10	21	24	29	35	400
2017	118	55	35	37	22	21	12	22	25	29	33	409
2018	124	51	41	36	19	22	14	18	18	22	32	397
2019	112	55	29	33	21	21	10	22	21	25	39	388

Total	1158	559	408	374	32	218	137	211	220	253	396	166
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Table No 1. indicates that the details about the authorship pattern it was seen that 1158 articles (27.80%) out of 4166 articles have been contributed by single author 559 articles (13.42 %) by two authors and 408 articles (9.79 %) by three authors. 374 (8.98 %) articles by more than ten authors “Majority of contribution are contributed by single author(Hypotheses No 1) Valid”

The Degree of Authors Collaboration

Year	Single(N _s)	%	Multiple(N _m)	%	N _s +N _m	DC
2010	09	9.41	320	10.63	429	0.25
2011	12	9.67	309	10.27	421	0.26
2012	14	9.84	314	10.43	428	0.26
2013	17	10.10	347	11.53	464	0.25
2014	14	9.84	311	10.33	425	0.26
2015	20	10.36	285	9.47	405	0.29
2016	18	10.18	282	9.37	400	0.29
2017	118	10.18	291	9.67	409	0.29
2018	124	10.70	273	9.07	397	0.31
2019	112	9.67	276	9.17	388	0.28
	1158	100	3008	100	4166	0.27

Various methods have been proposed to calculate the degree of research collaboration. Here, in this study the formula proposed by Subramanian (1983) has been used.

The degree of collaboration

$$C = \frac{NM}{Nm + Ns}$$

Where,

C= Degree of collaboration in a discipline

N_m= Number of multi authored paper in the discipline

N_s= Number single authored paper in the discipline

DC=3008

Here, N_m=3008

N_s= 1158

$$C = \frac{3008}{1158 + 3008} = 0.72$$

Table No 2. Authorship pattern of Distribution of contribution (Lotka's Law)

X (no. of authors)	y (no. of publication)	log of x	log of y	Xy	x ²
1	1158	0	3.063	0	0
2	559	0.301	2.747	0.826	0.090
3	408	0.477	2.610	1.244	0.227
4	374	0.602	2.572	1.548	0.362
5	232	0.698	2.365	1.650	0.488
6	218	0.778	2.338	1.818	0.006
7	137	0.845	2.136	1.804	0.0906
8	211	0.903	2.324	2.098	0.227
9	220	0.954	2.342	2.234	0.910
10	253	1	2.403	2.403	1

The Distribution of contributions (Number of Authors –wise) is shown in Table No. 0.2 the Lotka's law (Number of Authors), the total 2549 authors has published the papers in the journal of ecology during 2010-2019 the highest number of publications were published by single author 11164(log of Y 3.066%), followed by two authors 142(log of Y2.152%), then three authors 132 (log of Y 2.121%), The lowest number of article were published by ten authors 52(log of Y 1.716%)

Table No 03 Institute wise Distribution of contribution Article

Year	University	Research	Institute	Centre	Department	School	NA	College	Total	Percentage
2010	85	66	52	61	49	49	3	41	406	9.75
2011	92	71	59	67	52	52	3	44	440	0.56
2012	77	62	62	62	59	49	8	45	424	0.18
2013	89	59	71	71	55	56	5	35	441	0.59
2014	84	56	56	69	49	69	6	46	435	0.44
2015	120	52	59	72	53	39	3	41	439	0.54
2016	69	56	55	62	54	5	5	43	349	8.38
2017	84	69	65	62	61	62	4	36	443	0.63
2018	66	61	68	59	62	35	3	36	390	9.36
2019	81	66	56	62	56	52	3	23	399	958
Total	847	618	603	647	550	468	43	390	4166	100

Table no 03 shows the distribution of institutions wise contribution year wise. It was seen that university wise contribution was maximum (847) than research wise (618) institute (603) center (647) department (550) and school

(468) contributions were contributed by the colleges. Table No. 03 shows that the highest number of contributions is of university level. **Majority of the contributions are contributed by authors Hypothesis No. 3) is valid”**

Table No 04 Relative Growth Rate Doubling Timing articles

Year	No. of Article	Cumulative No. of Article	W1	W2	[R(P)]	Mean [R(P)]	[Dt(P)]	Mean [(Dt(P))]
2010	417	417	6.03	6.03.	0	0.98	0	0.50
2011	418	835	6.03	6.72	0.69		1.0	
2012	415	1250	6.02	7.13	1.11		0.62	
2013	468	1718	6.03	7.44	1.41		0.49	
2014	389	2107	5.96	7.65	1.69		0.41	
2015	379	2486	5.93	7.81	1.88	2.07	0.36	0.33
2016	422	2908	6.04	7.97	1.93		0.35	
2017	412	3320	6.02	8.10	2.08		0.33	
2018	428	3748	6.05	8.22	2.17		0.31	
2019	418	4166	6.03	8.33	2.3		0.30	

The Relative growth [R(c)] and doubling time [Dt(c)] of citations were determined and provided in the table 6.5 in case of citations it was observed that the relative growth rate of citations was gradually decreased from 0.98 in 2014 to 2019 2.07 in 2019. The mean relative growth [R(c)] of citations during first five years (i.e. 2010 to 2014) was higher (0.98) than the last five years i.e. during 2010 to 2019 (2.07)

Table No 05. Volume wise of distribution of contribution of article

Year	Volume	Issue												Total articles	Cumulative articles frequency	Cumulative percentage
2010	98	71	69	73	62	78	64	-	-	-	-	-	-	417	417	10.00
2011	99	69	62	71	72	75	69	-	-	-	-	-	-	418	835	20.04
2012	100	62	66	73	74	68	72	-	-	-	-	-	-	415	1250	30.00
2013	101	78	72	76	75	81	86	-	-	-	-	-	-	468	1718	41.24
2014	102	59	61	69	67	61	72	-	-	-	-	-	-	389	2107	50.58
2015	103	68	64	53	59	65	70	-	-	-	-	-	-	379	2486	59.67
2016	104	75	65	71	60	77	74	-	-	-	-	-	-	422	2908	69.80
								-	-							
2017	105	72	65	69	71	74	61	-	-	-	-	-	-	412	3320	79.69
2018	106	69	74	79	65	69	72	-	-	-	-	-	-	428	3748	89.96
2019	107	65	57	69	72	76	79	-	-	-	-	-	-	418	4166	100

From the Table No.05. it is clear that the number of articles in each issue varies from the maximum Number 468 (11.23%) is in the issue no 100 of 2012 & the lowest number 379 (9.09%) is in issue no 102 2nd issue of 2010-2019 there is gradual increase in the number of articles from year 2010 to 2019 the last number of articles was

published in 2017 428 articles(10.27%) and the highest number of articles it is shown in Gives us the cumulative distribution of articles in2010 to 2019 and its percentage

Table No 06. Country wise Distribution of contribution Article

Sr No	Country	Frequency	Percent age	Cumulative Frequency	Cumulative Percentag e
1	USA	1026	24.62	1026	24.63
2	India	560	13.44	1570	37.69
3	United Statesof America	323	7.74	1893	45.43
4	Germany	310	7.43	2203	52.88
5	Australia	221	5.30	2424	58.18
6	Italy	200	4.79	2624	62.99
7	Canada	184	4.42	2808	67.40
8	The Netherlands	142	3.41	2950	70.81
9	France	120	2.88	3070	73.69
10	New York	80	1.92	3150	75.61
11	Brazil	85	2.04	3235	77.65
12	Switzerland	74	1.77	3309	79.42
13	Pakistan	62	1.48	3371	80.91
14	London	55	1.32	3426	82.23
15	Washington	54	1.29	3480	85.53
16	Spain	49	1.17	3529	84.70
17	Turkey	44	1.05	3573	85.76
18	Boston	40	0.95	3613	86.72
19	China	18	0.43	3631	87.15
20	Denmark	32	0.76	3663	87.92
21	South Africa	30	0.71	3693	88.64
22	Bristol	24	0.57	3717	89.22
23	Israel	23	0.55	3740	89.77
24	California	22	0.52	3762	90.30
25	Belgium	0	0.48	782	90.78
26	Sweden	1	0.43	793	91.04
27	Korea	0	0.39	803	91.28
28	Mexico	0	0.39	813	91.52
29	Poland	0	0.39	823	91.76
30	Norway		0.35	832	91.98
31	Ireland		0.35	841	92.19
32	Romania		0.35	850	92.41
33	Greece		0.31	858	92.60

34	Nigeria		0.31	866	92.79
35	Portland		0.31	874	92.99
36	Argentina		0.19	881	93.15
37	Chicago		0.16	888	93.32
38	Finland		0.16	895	93.49
39	Berlin		0.14	901	93.63
40	Malaysia		0.14	907	93.78
41	Toronto		0.14	913	93.92
42	Alexandria		0.12	918	94.04
43	Croatia		0.12	923	94.16
44	Portugal		0.12	928	94.28
45	Pennsylvania		0.12	933	94.40
46	North Carolina		0.12	938	94.04
47	New Zealand		0.12	943	94.64
48	Japan		0.12	948	94.76
49	Iran		0.12	953	94.88
50	Atlanta		0.12	957	94.98
51	Cambridge		0.9	961	95.07
52	Nepal		0.9	965	95.17
53	Russia		0.9	969	95.27
54	Scotland		0.9	973	95.36
55	Taiwan		0.9	977	95.46
56	San Francisco		0.9	981	95.55
57	Carolina		0.9	984	95.63
58	Florida		0.9	987	95.70
59	Newark		0.7	990	95.77
60	Philadelphia		0.7	993	95.84
61	South Carolina		0.7	996	95.91
62	single time country(1*118)	18	0.83	109	98.63
63	Two Time Country (1*71)	71	0.82	143	99.44
64	Not Mentioned	23	0.55	166	100

Table No 06 shows the country wise distribution of contributions which indicates that the majority of the contributions were contributed by USA (29.38%) were as the minimum contributions were contributed by other countries i.e. (1.49%) respectively. **“USA is the highest productive country (Hypothesis No. 2) is valid**

Findings

- The Journal of Ecology 4166 research papers during the period of study i.e. from 2010 to 2019. The journal on an average has published 419 research papers per year.

- The mean relative growth for articles in the first five years 2010 to 2019 is (0.98), reduced to (2.07) in the last five years 2010 to 2019.
- It was seen that university wise contribution was maximum (847) than research wise (618) Institute (603) centre (647) department (550) and school (468) contributions were contributed by the colleges
- The USA is ranked first with 1026 (24.63%) publication

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