

# **Functional Ecology Journal**

## **A Bibliometric Study**

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### **ABSTRACT**

*The study aims to analysis the functional ecology journal of British ecological society for period 2010-2019 total no of articles 4238 this study the issue wise number articles, the authorship pattern and the degree of coloration are analyzed the study also analyses the country wise distribution of contribution of articles the length of titles articles in the basics of pages and the number of references.*

**KEYWORDS:** British Ecological Society Bibliometric, Function ecology journal.

### **INTRODUCTION**

Bibliometrics is a set of techniques devoted to the quantitative analysis of scientific and technical activities. These techniques implement statistical and mathematical tools to measure the data that measure researcher's contributions to science and technical development. The data used for bibliometrics studies mainly stem from information produced by the activity of researcher's communication. These quantitative studies of researcher's communication activities tend to have a better understanding of phenomena of construction, dissemination and use of scientific and technical knowledge. Bibliometrics is considered as a standard tool of science policy and research management in the last decades. All significant compilations of science indicators heavily rely on publication and citation statistics and other, more sophisticated bibliometrics techniques.

### **Definitional analysis**

#### **Bibliometric analysis**

Bibliometric is defined as "the application of mathematics and statistical methods to books and other media of communication." Potter (1981) defines bibliometric as "the study and measurement of the publication pattern of all forms of written communication and their author". (**Bibliometric according to Pritchard, 1969**)

#### **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.<sup>[1]</sup> 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 2013

around 4,000 members <sup>1</sup> of which 14% are students. It has always had an international membership and currently <sup>1</sup> 42% are outside the United Kingdom, in a total of 92 countries. The head office is located in London. The Society's mission is to generate, communicate and promote ecological knowledge and solutions and it achieves this through a wide range of activities. It disseminates academic research through its internationally renowned journals, organizes major scientific meetings, awards many grants each year to support the ecological community, is active in informing and influencing policy makers, and works to improve the teaching and learning of ecology in schools. In 2013 the Society celebrated its centenary, organizing a wide range of events and activities including a major public engagement programme of over 140 events across the United Kingdom.

## **1. FUNCTIONAL ECOLOGY JOURNAL**

Functional ecology is a branch of ecology that focuses on the roles, or functions, that species play in the community or ecosystem in which they occur. In this approach, physiological, anatomical, and life history characteristics of the species are emphasized. The term "function" is used to emphasize certain physiological processes rather than discrete properties, describe an organism's role in a trophic system, or illustrate the effects of natural selective processes on an organism.<sup>[1]</sup> This sub-discipline of ecology represents the crossroads between ecological patterns and the processes and mechanisms that underlie them. It focuses on traits represented in large number of species and can be measured in two ways – the first being screening, which involves measuring a trait across a number of species, and the second being empiricism, which provides quantitative relationships for the traits measured in screening.<sup>[2]</sup> Functional ecology often emphasizes an integrative approach, using organism traits and activities to understand community dynamics and ecosystem processes, particularly in response to the rapid global changes occurring in earth's environment.

## **2. OBJECTIVE OF THE STUDY**

1. To study authorship patterns of contribution
2. To find out the Co-authorship pattern of contribution year wise
3. To identify the year -wise degree of collaboration
4. To identify the mail domain wise contribution
5. To study research article contributions by institute wise
6. To find out the Relative Growth Rates [R(c)] and Doubling Time [DT(c)] for publication
7. To find out contribution in length title of each paper
8. To analyses the continent wise distribution of contributions.

## **3. METHODOLOGY**

The source of the data for the present study in the function ecology journal during the period year of 2010-2019 a total number of articles 4238 the data extracted were analyses using MS-Excel software.

## **4. REVIEW OF LITERATURE**

- Fair Thorne defines Bibliometric as “Quantitative treatment of properties of recorded discourse and behavior pertaining to it. Bibliometric is also named as quantitative analysis of bibliographical features of a body of literature”. (Fair Thorne, 1969)

- Bibliometric is that techniques which are used for variety of purposes such as evaluation of scientific output, journal selection of libraries, forecasting the potential of a particular field (Zafrunnisha, 2012).
- Suggested that ‘Bibliometric’ is a study which gives a detailed statistical analysis of published literature in different fields of learning. (Isiakpona, 2012)
- Bibliometric is described essentially a quantitative analysis of publications for the purpose of ascertaining specific kinds of phenomena (Nimale, Khaparde, Alhamdi )
- Bibliometric 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).(Shafullah Y, khaparde & Alhamdi

## 5. Data Analysis & Interpretation

### Authorship patterns of contribution

**Table No 5.1** Authorship patterns of contribution

Year	Single	Two	Three	Four	Five	Six	Seven	Eight	More than eight author	Total
2010	126	45	21	21	24	11	10	20	42	320
2011	149	44	23	32	22	22	18	12	51	373
2012	212	32	30	31	24	22	19	18	62	450
2013	222	66	45	46	21	29	39	22	84	574
2014	121	78	44	52	44	43	23	16	51	472
2015	123	46	16	46	32	14	22	19	62	380
2016	210	47	21	15	19	21	25	24	46	428
2017	139	21	21	23	19	23	21	22	62	351
2018	166	49	35	21	25	25	22	42	58	443
2019	216	52	19	21	25	19	21	12	62	447
	1684 (39.73)	480 (11.32)	261 (6.15)	308 (7.26)	255 (6.01)	229 (5.4)	220 (5.19)	177 (4.17)	580 (13.68)	4238

Table No 5,1 indicates that the details about the authorship pattern it was seen that 1684 articles (39.73%) out of 4238 articles have been contributed by single author 480 articles (11.32%) by two authors and 261 articles (6.15. %)by three authors.186 (4.38%) articles by more than eight authors **Majority of the contributions are contributed by single authors Hypothesis No. 2) is valid”**

### The Degree of Authors Collaboration

Year	Single(Ns)	Percentage	Multiple(Nm)	Percentage	Ns+Nm	DC
2010	126	7.48	194	7.59	320	0.6
2011	149	8.84	224	8.77	373	0.6
2012	212	12.58	238	9.31	450	0.52
2013	222	13.18	352	13.78	574	0.61
2014	121	7.18	351	13.74	472	0.74

2015	123	7.3	257	10.06	380	0.67
2016	210	12.47	218	8.53	428	0.5
2017	139	12.48	212	8.3	351	0.6
2018	166	8.25	277	10.84	443	0.62
2019	216	12.82	231	9.04	447	0.51
	1684	100	2554	100	4238	0.6

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

Nm = Number of multi authored paper in the discipline

Ns = Number single authored paper in the discipline

$$DC=2554$$

Here, Nm=2554

Ns= 1684

$$C = \frac{2554}{1684+2554} = 0.60$$

### Co-authorship pattern of contribution year wise

**Table No 5.2** Co-authorship pattern of contribution year wise

Year	Author nature	Frequency	Total	Percentage	Cumulative
2010	Single author	126	320	41	40
	Co - authors	194		60	100
2011	Single author	149	373	40	40
	Co - authors	224		60	100
2012	Single author	212	450	47	47
	Co - authors	238		53	100
2013	Single author	222	574	39	39
	Co - authors	352		61	100
2014	Single author	121	472	26	26
	Co - authors	351		74	100
2015	Single author	123	380	33	33
	Co - authors	257		67	100
2016	Single author	210	428	50	50
	Co - authors	218		50	100
2017	Single author	139	351	40	40
	Co - authors	212		61	100
2018	Single author	166	443	39	39
	Co - authors	233		54	100

2019	Single author	216	447	49	49
	Co - authors	231		52	100
<b>Total</b>			<b>4238</b>		

It is observed from the table No.5.2 that the value of co- authorship pattern for single authored papers during 2010-2019 was highest with 222 publications (39%) in 2013 and the same year co - authorship pattern for multi authored papers highest with 352 publications (61%), which indicates that the collaborative research is increasing in the study

**Research Article Contributions by Institute wise**

**Table No 5.3** Research Article Contributions by Institute wise

Year	Institute	University	Department	School	Research	Centre	NA	Total	Percentage
2010	162	71	72	70	52	41	2	470	11.09
2011	172	79	65	52	45	50	1	464	10.94
2012	114	60	69	49	51	65	2	410	9.67
2013	106	71	64	65	62	53	1	422	9.95
2014	114	56	65	64	52	65	1	417	9.83
2015	116	65	70	59	54	52	3	419	9.88
2016	129	61	69	46	44	58	2	409	9.65
2017	116	56	70	65	64	36	3	410	9.67
2018	112	66	60	47	62	48	2	409	9.65
2019	111	71	69	51	51	54	1	408	9.62
Total	1252	656	673	568	537	522	18	4238	100

Table No.5.3 shows the distribution of institutions wise contribution year wise. It was seen that university wise contribution was maximum (1252) than institution wise (673) Department (656) Institute (568) school (537) research and (522) center contributions were contributed by the colleges. Table no.4.5 shows that the highest number of contributions is of university level

**Relative Growth Rates [R(c)] and Doubling Time [DT(c)] for publication**

**Table No 5.4** Relative Growth Rates [R(c)] and Doubling Time [DT(c)] for publication

Year	Article	Cumulative no. Of articles	W1	W2	Rgr	mean(rp)	Dt(p)	Min dt (p)
2010	416	416	6.03	6.03	0	<b>0.91</b>	0	<b>0.508</b>
2011	329	745	5.79	6.61	0.82		0.84	
2012	462	1207	6.13	7.09	0.96		0.72	
2013	457	1664	6.12	7.41	1.29		0.53	
2014	466	2130	6.14	7.66	1.52		0.45	
2015	429	2559	6.06	7.84	1.78	<b>2.078</b>	0.38	<b>0.332</b>
2016	456	3015	6.12	8.01	1.89		0.36	
2017	418	3433	6.03	8.14	2.11		0.32	
2018	379	3812	5.93	8.24	2.31		0.3	
2019	426	4238	6.05	8.35	2.3		0.3	

The Relative growth [R(c)] and doubling time [Dt(c)] of citations were determined and provided in the table No 5.4 in case of citations it was observed that the relative growth rate of citations was gradually decreased from 0.91 in 2014 to 2.078 in 2019. The mean relative growth [R(c)] of citations during first five years (2010 to 2014) was higher (0.91) than the last five years i. e. during 2008 to 2012 (2.078).

**Issue wise distributions of contribution articles**

**Table No 5.5** Issue wise distributions of contribution articles

year	volume	Issue												Total articles	Percentage
		1	2	3	4	5	6	7	8	9	10	11	12		
2010	24	66	74	71	67	76	71	-	-	-	-	-	-	426	10.05
2011	25	65	69	54	62	63	66	-	-	-	-	-	-	379	8.94
2012	26	64	76	67	71	74	76	-	-	-	-	-	-	428	10.09
2013	27	79	74	71	75	76	81	-	-	-	-	-	-	456	10.75
2014	28	71	74	72	69	70	73	-	-	-	-	-	-	429	10.12
2015	29	44	52	42	35	38	37	39	36	39	32	38	34	466	10.99
2016	30	37	40	35	38	37	39	36	39	42	38	40	36	457	10.78
2017	31	36	40	38	42	39	36	39	37	38	35	40	42	462	10.90
2018	32	29	28	25	30	28	35	26	25	30	30	26	20	332	7.83
2019	33	32	31	35	38	37	31	36	33	30	38	33	29	403	9.50
Total														4238	100.00

the table no 5.5 it is clear that the number of articles in each issue varies from the maximum Number 456(10.75%) is in the issue no 12 of 2015 & the lowest number 332(7.83%) is in 2<sup>nd</sup> issue of 2010 to issue of 2019 there is gradual increase in the number of articles from year 2010 to 2019 the last number of articles was published in 2018(332 articles) and the highest number of articles was published in 2017(466) it is shown in Gives us the cumulative distribution of articles in 2010 to 2019 and its percentage

**Contribution in length Title of each paper**

**Table No 5.6** Contribution in length Title of each paper

Sr. No	Length of Title	Frequency	Percentage
1	01—05	1872	44.12
2	06---10	1154	27.22
3	11—15	638	15.05
4	16—21	452	10.66
5	22---27	122	2.87
	Total	4238	100

Table No 5.6 shows the average title (per contributions). The maximum title was covered in the 1872(44.12%) & minimum pages were covered in the year of 122(2.87%)

**Country wise distribution of Contribution****Table No 5.7** Country wise distribution of Contribution

<b>Sr No</b>	<b>Country</b>	<b>Frequency</b>	<b>Percentage</b>	<b>Cumulative Number</b>	<b>Cumulative percentage</b>
1	USA	924	21.8	924	21.8
2	United Kingdom	542	12.78	1466	34.59
3	Australia	469	11.06	1935	45.65
4	India	322	7.59	2257	59.62
5	Greece	201	4.74	2458	57.99
6	New Zealand	162	3.82	2620	62.45
7	New York	101	2.38	2721	64.84
8	Norway	88	2.07	2836	66.91
9	China	85	2	2809	68.92
10	Switzerland	84	1.98	2893	70.9
11	South Africa	84	1.98	2977	72.88
12	Croatia	77	1.81	3054	74.7
13	Germany	71	1.67	3125	76.38
14	Sweden	63	1.48	3188	77.86
15	Belgium	63	1.48	3251	79.35
16	Canada	58	1.36	3309	88.72
17	The Netherlands	55	1.29	3364	82.01
18	Spain	52	1.22	3416	83.24
19	Japan	52	1.22	3468	85.51
20	France	44	1.03	3512	58.51
21	Malaysia	44	1.03	3556	86.55
22	Poland	39	0.92	3595	87.47
23	Denmark	38	0.89	3633	88.36
24	Finland	35	0.82	3668	89.26
25	Italy	32	0.75	3700	90
26	Mexico	29	0.68	3729	90.7
27	Argentina	29	0.68	3758	91.38
28	Taiwan	26	0.61	3784	92
29	Israel	26	0.61	3810	92.61
30	, Panama	22	0.51	3832	93.12
31	Romania	22	0.51	3854	93.65
32	Georgia	18	0.42	3872	94.07
33	Portugal	18	0.42	3890	94.5
34	Iceland	16	0.37	3906	94.87
35	Brazil	16	0.37	3922	95.25
36	Egypt	11	0.25	3933	95.51
37	Colombia	10	0.23	3943	95.75

38	Slovenia	8	0.18	3951	95.94
39	Pakistan	8	0.18	3959	96.13
40	Pennsylvania	7	0.16	3966	96.29
41	Colorado	4	0.09	3970	96.38
42	Montana	4	0.09	3974	96.48
43	Kentucky	2	0.04	3976	96.53
44	Single Time Country(1*146)	146	3.44	4122	99.37
45	Not Mentioned	31	0.73	4238	100
	Total	4238	100		

Table No 5.7 countries wise distribution of contributions which indicates that the majority of the contributions were contributed by USA (21.8%) were as the minimum contributions were contributed by other countries i.e. (0.04%) respectively “USA is the highest productive country (Hypothesis No. 3) is valid”

### Year Wise Distribution of Contribution

Table No 5.8 Year Wise Distribution of Contribution

Year	No of articles	Percentage	cumulative	Total No of Reference	Percentage	Cumulative
2019	416	9.81	9.81	505	10.59	10.59
2018	329	7.76	17.57	426	8.91	19.5
2017	462	10.9	28.47	405	8.49	27.99
2016	457	10.78	39.25	484	10.15	38.14
2015	466	10.99	50.24	430	9.01	47.15
2014	429	10.12	60.36	485	10.17	57.32
2013	456	10.75	71.11	399	8.36	65.68
2012	418	9.86	80.97	488	10.23	75.91
2011	379	8.94	89.91	548	11.49	87.4
2010	426	10.05	100	598	12.54	100
Total	4238	100		4768	100	

The distribution of contributions (year- wise) is shown in table No 5.8 out of the total 4238 contributions majority of the contributions i.e. 466 (50.24 %) contributions were contributed in 2015 were as minimum contributions i.e. 329 contributions were contributed in 2018.

### Email Domain Distributions of Contribution

Table No 5.9 Email Domain Distribution of contribution

Sr. No	E mail domain	Frequency	Percentage
1	Gmail	509	12.01
2	Hotmail	429	10.12
3	Gwdg	333	7.85
4	Yahoo	343	8.09
5	Uniromal	189	4.45



6	ucdavis.	162	3.82
7	Berlin	152	3.58
8	Uni	142	3.35
9	Ndstate	132	3.11
10	Xtbg	122	2.87
11	Npolar	119	2.8
12	Illinois	112	2.64
13	Usf	112	2.64
14	Pitt	90	2.12
15	Uba	90	2.12
16	Cornell	84	1.98
17	uni-bayreuth	84	1.98
18	Inra	82	1.93
19	Indiana	82	1.93
20	Edu	62	1.46
21	Ac	62	1.46
22	Wur	52	1.22
23	Inra	52	1.22
24	Juniata	38	0.89
25	Ucr	38	0.89
26	Unb	28	0.66
27	Gmx	26	0.61
28	Ndstate	26	0.61
29	Vinca	19	0.44
30	Gwdg	19	0.44
31	Arizona	15	0.35
32	Stanford	14	0.33
33	Uno	14	0.33
34	Ird	14	0.33
35	Darmstadt	10	0.23
36	Usherbrooke	10	0.23
37	Ussieu	10	0.23
38	Mcgill	10	0.23
39	Csic	10	0.23
40	Umnine	10	0.23
41	Yale	8	0.18
42	Cantab	8	0.18
43	umsl.	8	0.18
44	Ernet	8	0.18
45	Unimi	7	0.16
46	ualberta.ca	7	0.16
47	kuleuven.	7	0.16

48	u-bordeaux1	7	0.16
49	vassar.	6	0.14
50	Ebd	6	0.14
51	Unibe	6	0.14
52	Duke	3	0.07
53	Concordia	3	0.07
54	Uqar	2	0.04
55	Utoronto	2	0.04
56	Libero	2	0.04
57	univ-tlse	2	0.04
58	Wcl	2	0.04
59	Kuleuven	2	0.04
60	Asu	2	0.04
61	Single time email domain(1*192)	192	4.53
62	Nor Mentioned	41	0.96
Total		4238	100

Table no 5.9 shows the websites on Gmail which were maximum 509(12.01%) out of 4238 of the articles have mentioned their email address in the paper. Followed by Hotmail domain of email 429 (10.12%) then gwdg domain of email the 333(7.85%)

**Year-wise Percentage of Articles having web references and Print References**

**Table No 5.10** Year-wise Percentage of Articles having web references and Print References

<b>Year</b>	<b>Total No. of Articles</b>	<b>Total No. Of Articles with Web references</b>	<b>Total No. of References</b>	<b>Total No. of Print Journal References</b>	<b>Total No. Web of References</b>
2010	416	1401	8896	7495	1401
2011	329	2134	41747	39613	2134
2012	462	1119	11358	10239	1119
2013	457	517	10928	10411	517
2014	466	143	5136	4993	143
2015	429	113	2288	2175	113
2016	456	56	1092	1036	56
2017	418	65	1249	1184	65
2018	379	46	698	652	46
2019	426	16	286	270	16
Total	4238	<b>5610</b>	83678	<b>78068</b>	

Out of 4238 contributions, it is seen that the maximum references 41747 (49.89%) 2014 in the year. Followed by minimum references were 286 (0.34%) in the year 2006. It was seen the maximum references were print references i.e.78068 where as5610 references were web references

## **FINDINGS**

The findings are based on the analysis of collected data appended in 4238 articles and 78068 references functional ecology journal on British ecological society

### **1. Authorship pattern of contribution**

The distribution of Authorship pattern is given in the Table No.5.1 The table shows the single authorship is predominant then multi authors. Table No5.1 indicates the majority of the contributions are contributed by two author. Therefore, the hypothesis “Majority of the contributions are contributed by Single authors” Hypothesis No. 1 is valid

### **2. Year-wise Distribution of Contributions**

Year wise distribution of contributions is shown in table no.5.3 out of the total 4238 contributions majority of the contributions 426 (12.54 %) contributions were contributed in 2011 were as minimum contributions i.e. 379 contributions were contributed in 2002

### **3. Domain name wise distribution of the article**

Can be observed from Table No.5.9 that, the high frequency domain name were com 509 (12.01 %) hotmail 429 (10.12 %), gwedge 333 (7.83%), yahoo 343 (8.09 %), 32 (2.16%) Single domain names of in the author contribution It.

### **4. Institution wise distribution of contribution**

Table no.5.3 Show the distribution of institutions wise contribution (year wise). It was seen that the institute wise contributions were maximum (1252 ) than University wise (656) Department (673 ) school (568) (90) and (537 ) contributions were contributed by the Table no 5.3 shows that the highest number of contributions is of Institute level.

### **5. Country wise distribution of the contribution**

Table No 5.7 countries wise distribution of contributions which indicates that the majority of the contributions were contributed by USA (21.8%) were as the minimum contributions were contributed by other countries i.e. (0.04%) respectively “USA is the highest productive country (Hypothesis No. 3) is valid”

### **6. Relative Growth Rate [RG(C)] and Doubling Time [Dt(c)]**

The Relative growth [R(c)] and doubling time [Dt(c)] of citations were determined and provided in the table No 5.4 in case of citations it was observed that the relative growth rate of citations was gradually decreased from 0.91 in 2014 to 2.078 in 2019. The mean relative growth [R(c)] of citations during first five years (2010 to 2014) was higher (0.91) than the last five years i. e. during 2008 to 2012 (2.078).

### **7. Contribution is length title of each paper**

Table No 5.6 shows the average title (per contributions). The maximum title was covered in the 1872(44.12%) & minimum pages were covered in the year of 122(2.87%)

### **8. No. of References wise distribution of contribution**

Out of 4238 contributions, it is seen that the maximum references 41747 (49.89%) 2014 in the year. Followed by minimum references were 286 (0.34%) in the year 2006. It was seen the maximum references were print references i.e.78068 where as5610 references were web references

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