

## Publishing Patterns of Pteridologists: A Bibliometric Study based on Indian Fern Journal

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### ABSTRACT

*Indian Fern Journal that is a half-yearly publication of Indian Fern Society, Chandigarh (India) is used as a source journal for conducting bibliometric studies on different aspects of its publication. It is continuously being published since 1984. However, its volume 33 (2016) to volume 37 (2020) are considered in the present study that is conducted for ascertaining authorship pattern, degree of collaboration and length of the paper with average range of citations per paper published in five consecutive issues of the Indian Fern Journal. Hope this study will be beneficial to explore hidden pattern of the authors who contribute their articles/research papers and other things for them, such as degree of collaboration etc.*

**KEYWORDS:** Bibliometric study, Authorship pattern, Degree of collaboration and References.

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### INTRODUCTION

'Bibliometrics' that is a set of methods for measuring the production and dissemination of scientific knowledge is referring to the science of measurement relating to the books. Though the bibliometrics was started as the "statistical bibliography" for the citation counts made by Cole and Eales (1917) but it was Prichard (1969) who coined the term as "to shed light on the process of written communication and of the nature and course 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".

Maheswarappa (1997) is of the opinion that it has emerged as a research front in its own right in Library & Information Science. It is now being vigorously pursued and with the result, it has been found that one-fourth of all the articles published in Library and Information Science periodicals are on bibliometrics and its related topics. It has also been found that many of the Social Science and Science periodicals are also carrying a large number of articles on bibliometrics.

## REVIEW OF LITERATURE

Dhiman (2000) has made a bibliometric study on 'Ethnobotany' journal by taking its ten year issues published during 1989-1998. He has examined year-wise, institution-wise, country-wise, authorship pattern, range of references cited and length of the articles in 175 papers published in the Ethnobotany journal during the period of study. The study revealed that India constituted 81.7 percent of the total articles, followed by Canada (2.8 percent), USA (2.8percent), Nepal (2.8 percent) and Japan (1.6 percent), and on average 16 references are per paper / article are noted in the study.

Dhiman and Sinha (2001) have studied the nature and growth of literature on ethnobotany published during 1989-1998, where they have attempted to derive the nature of the growth of literature in ethnobotany during 1989-1999, type of collaboration among authors and the trend of growth during this period, degree of collaboration among various categories of authors, correlation of the growth of various authors and impact of collaboration on the growth of literature. It is concluded in the study that ethnobotany is a developing branch because the collaborative publications are being published regularly.

Dhiman and Rani (2005)'s study is based on the "Journal of Indian Botanical Society", one of the oldest journals in the field of Botany and its five years' issues for the duration 1997-2001 were studied. It was revealed from the study that maximum contribution came from universities which account 72.46 percent of the total contributions. It is followed by Colleges and Research Institutes which make 17.68 and 7.82 percent of the total contributions respectively. Single authored papers constituted only 17.4 percent of the total contributions. There is also seen an increase in collaborative research as the concept of multi-authorship is on the increase. Multi-authored papers constituted 82.6 percent of the total authorship production. A trend of multiple authorship contributions with 5-authored papers was also seen, which means the research/ projects are being carried out in more collaboration. It was also seen that there was no consistency in the distribution of the articles as

they range from 43 to 72, which means the difference of contributions is about 19. Lastly, all the contributions were from Indian authors except for one article which came from Utah.

Dhiman (2011) has conducted a bibliometric study on the "Ethnobotany" journal for the years 1999-2008 by studying its 10 year issues. The type of collaboration and degree of collaboration among authors, and pattern of researchers during the period of study were studied. A comparison of the present study was also made with the bibliometric study that was carried out by Dhiman (2000). He found that this time a much increase in total production by the authors is seen as 272 papers were published, which is much higher than its first decade of inception of 175 articles. Multi-authored trend was also found to be increased in present decade. This time, university contribution is much more than college contribution, which is 34.92 percent this time, while college contribution is only 19.11 percent. In state - wise dispersion of articles, Uttar Pradesh tops the list with 63 articles, followed by 24 from Maharashtra and 18-18 from Gujarat and Orissa respectively. Earlier, the degree of collaboration among authors were 50-69 while this time it came 64-87, which is much higher and it is interpreted that this subject is growing fast as collaboration is increasing among them.

Dhiman (2015) has also conducted a bibliometric study for "Ethnobotany" journal for two decades comprising of 1989-1998 and 1999-2008. It was carried out as preliminary study for the 20 issues of the journals since the inception of the journal itself in 1989 and later parts of the study is based on the citation analysis of the references appended in the journals. It presents a ranked list of the journals which make the ethnobotany as a subject that is followed by the list of most cited authors, books, edited books and the journals. Further, the work is appended with the appendix on various aspects of the ethnobotany.

Dhiman and Kaushik (2018) have conducted a bibliometric study based on the issues of "Employment News" published during 2016-2017 for the trends of the professions prevalent in present days available for young aspirants for making their future. This study was carried out

to analyze career-oriented articles and other articles published in one year in Employment News. Various fields of study or career are also identified based on the articles published in the employment news. Further, the pattern of authorship is also determined in the study.

Nayana and Padmavathi (2019) have conducted a bibliometric study on the botany subject related journals included in "Directory of Open Access Journals". A total of 75 journals were identified for the study from database and they were analyzed from different angles. The results of the study show that highest number 12 of (16%) journals were identified in the year 2016 and only one Journal is added in the year 2005 and 2014. English language was noted as the major language of the Botanists. Further, Brazil was noted to publish highest number of journals as compared to India.

Dhiman and Singh (2021) have conducted a bibliometric study for the 140 papers published in five volumes during the period from 2016 to 2020 in the *Granthalaya Vigyan*, which is supposed to be the only long survived Hindi journal of Library & Information Science. The study discusses about the year and volume wise number of articles, authorship pattern, most productive authors of the journal, state-wise contribution of the articles, average length of the articles, types of materials used and the number of references per article. Besides, the subject fields of the articles published in last five years are also analyzed to get the trends of the research being published in the journal. The study concludes that *Granthalaya Vigyan* is publishing good articles since its inception on different sub-fields in LIS. Further, it is also keeping pace with the changing time and articles on modern subjects, like- digital libraries, and ICT application in LIS etc. are continuously being published and year by year their numbers are increasing.

### **NEED OF THE STUDY**

It is very clear from the review of literature that not much bibliometric studies are carried out in the field of botany and especially on Pteridology. Pteridology is the branch of botany that deals with the study of ferns and related

plants. Pteridophytes are the vascular plants with xylem and phloem and only reproduced with the help of spores. While, pteridology and pteridologist is a science and its practitioner, respectively (<https://en.wikipedia.org/wiki/Pteridophyte>).

Thus, the present study is carried out to know various aspects of the Pteridologists in writing their articles and the research paper.

### **SOURCE JOURNAL**

Indian Fern Journal is a journal that is devoted to the study of Pteridophytes and is owned by Indian Fern Society, 1633 Sector -7 Chandigarh (UT) India. It publishes standard articles/research papers, notes of the conferences and book reviews etc. It is indexed in Web of Science (Clarivate Analytics) and also included in UGC Care list - II. Its website is commercially hosted over Connect Journals. National Academy of Agricultural Sciences (NAAS), a Government of India funded agency, provided this journal a score of 3.72 (Serial No. 2496 in their list of Science Journals), effective from 01 December 2019. Its SJIF Impact Factor for the year 2020 is 6.416. Its first issue was published in the year 1984 and since then its 39 volumes in 2022 (<https://indianfernjournal.com>). Its volume 33 (2016) to volume 37 (2020) are analyzed in the present study.

### **OBJECTIVES OF THE STUDY**

Keeping in the mind the lacunae in the study of Pteridophytes, the present study is carried out by taking five issues of the "Indian Fern Journal" in the study. However, the major objectives of the study are:

- To know the year wise and volume wise distribution of articles.
- To ascertain volume wise authorship pattern of contribution.
- To ascertain degree of collaboration among authors.
- To ascertain the average page length of the articles.
- To ascertain the number of references per article.

Thus, present study will be carried out by keeping above objectives in view.

## METHODOLOGY AND DATA ANALYSIS

The data collected from five volumes of the journal from 2016 to 2020 comprises of 127 articles that were published in Indian Fern Journal. All the articles and its references are scanned and the data thus, obtained are tabulated and analyzed as per the objectives of the study.

## Year Wise and Volume Wise Number of Articles

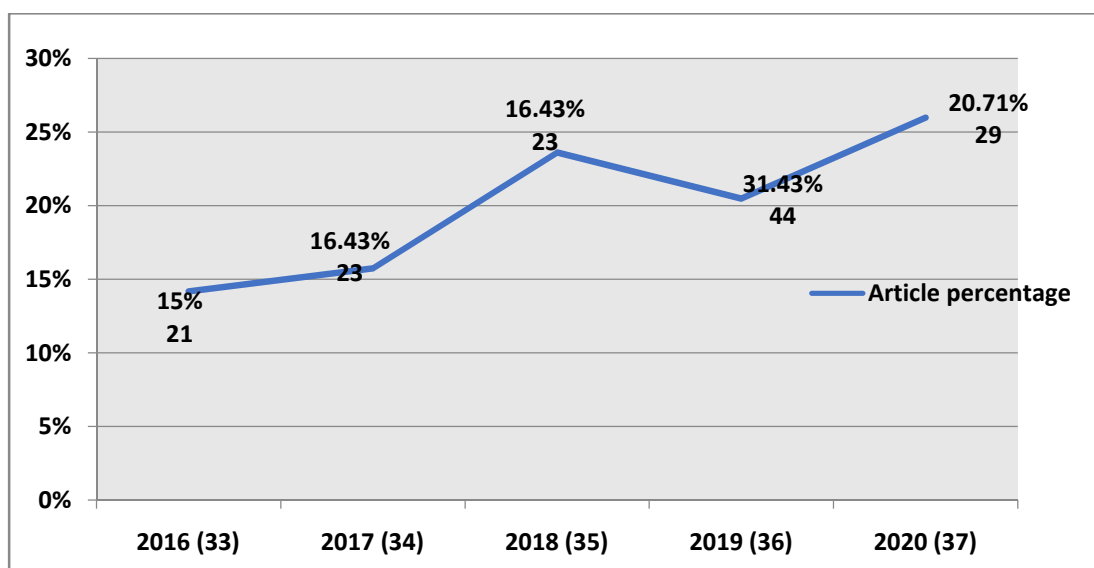
Table 1 shows the number of articles published in each volume of the Indian Fern Journal during 2016 to 2020. It is very clear that all in all 127 articles were published during the period in its five volumes. The maximum number of articles 33 was published in the year 2020 which constitute to 25.98% to total contribution made in the last five years in this journal. It is followed by 30 articles in its 35<sup>th</sup> volume in 2018 with 23.62% of the total articles. However, minimum number of articles 18 was published in the year 2016 comprising of 14.17% in its volume 33.

**Table 1:** Year Wise and Volume Wise Distribution of Articles

S. N.	Year	Volume	Number of Articles	Article percentage	Cumulative Percentage
1	2016	33	18	14.17	14.17
2	2017	34	20	15.74	29.91
3	2018	35	30	23.62	53.53
4	2019	36	26	20.47	74.00
5	2020	37	33	25.98	99.98
	<b>Total</b>	<b>05</b>	<b>127</b>	<b>100.00</b>	<b>100.00</b>

Figure 1 also depicts the same more clearly. It is very clear in the figure that the number of

articles/research papers is increasing day by day.



**Figure 1:** Year Wise and Volume Wise Distribution of Articles

### Authorship Pattern

Table 2 A gives the details the authorship patterns of the article contribution made by different categories of author time to time. It is clear from the data presented and analyzed in table 2A that the highest number of articles are published by two-authors which are 39 in number and constituting to 30.70% to the total

number of articles. Further, 35 articles are written by three authors which are 27.55% of the total contribution. The number of papers written by more than 3 authors are also 30 in number which constitute to 23.62% to the total contribution.

**Table 2A:** Authorship Pattern

S. N.	Number of Authors	Article Contribution	Percentage
1	Single Author	23	18.11%
2	Two Authors	39	30.70%
3	Three Authors	35	27.55%
4	More than Three Authors	30	23.62%
	<b>Total</b>	<b>127</b>	<b>99.98 = 100.00%</b>

However, single author contributions are for 23 papers which count to 18.11% to the total contribution of the papers. It means Pteridologists prefer to write in collaboration as 81.89% of the contribution came from joint

authorship or they are multi-authored publications. Further, table 2B presents the volume wise and year wise data for the authorship pattern.

**Table 2B:** Volume Wise Authorship Pattern

S.N.	Volume Number	Year	Single Author		Two Authors		Three Authors		More than Three Authors	
1	33	2016	04	17.39%	06	15.38%	03	08.57%	05	16.66%
2	34	2017	04	17.39%	07	17.94%	05	14.28%	04	13.33%
3	35	2018	02	08.69%	08	20.51%	11	31.42%	09	30.00%
4	36	2019	06	26.08%	09	39.13%	07	20.00%	04	13.33%
5	37	2020	07	30.43%	09	39.13%	09	25.71%	08	26.66%
		<b>Total</b>	<b>23</b>		<b>39</b>		<b>35</b>		<b>30</b>	

It is clearly seen that out of 23 single authors, maximum 07 authors consisting of 30.43% have contributed during 2019 with a minimum of 04 each in 2016 & 2017 that constitutes 17.39% each to the total single authored articles. Further, among two-authors, maximum contribution came during 2019 & 2020 when 09 (39.13%) each authors contributed their articles. However, least contribution among two-authors came in 2016 when 06 authors (15.38%) contributed 06 articles.

It comprises of 08.57% of minimum and 25.71% of maximum in case of 03 authored

contributions in 2016 and 2018 respectively with 03 and 11 contributions. However, in case of more than 03 authored publications, it is 16.66% as minimum and 30.00% as maximum with 05 and 09 publications respectively.

### Degree of Collaboration

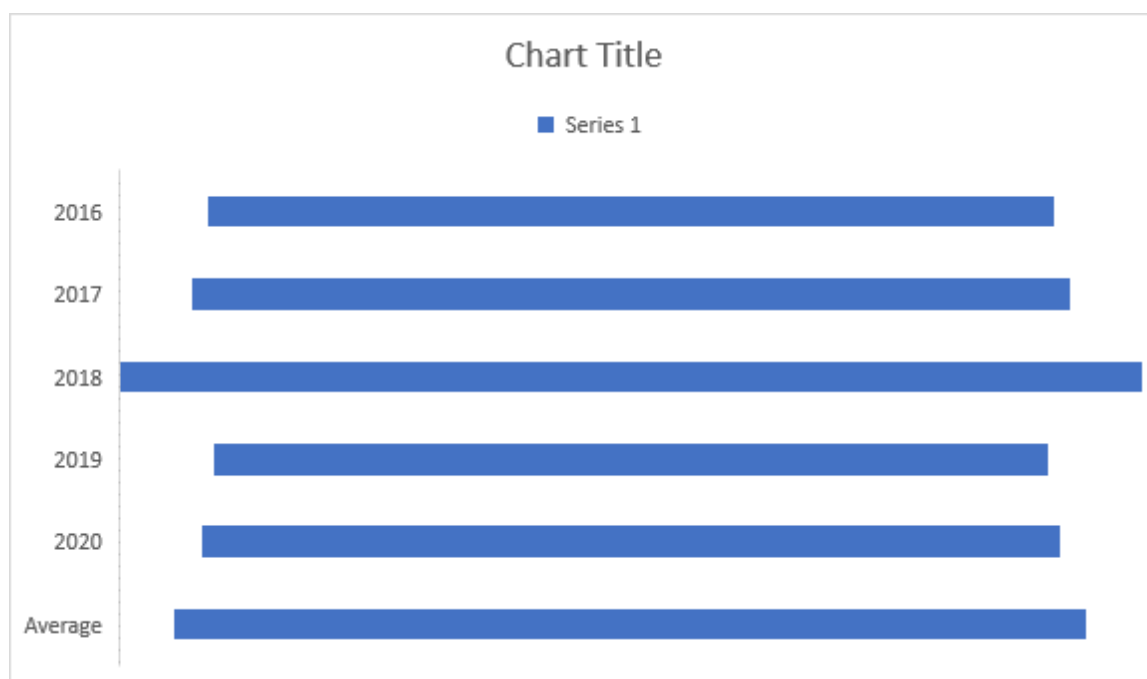
The 'Degree of Collaboration' is the ratio of the number of collaborative research papers to the total number of research papers in the discipline during a certain period of time (Subramanyam, 1983).

**Table 3:** Degree of Collaboration

S. N.	Year	Single Author	Two Authors	Three Authors	Multiple (More than Three Authors)	Total	Degree of Collaboration
1	2016	04	06	03	05	18	0.77
2	2017	04	07	05	04	20	0.80
3	2018	02	08	11	09	30	0.93
4	2019	06	09	07	04	26	0.76
5	2020	07	09	09	08	33	0.78
	<b>Total</b>	<b>23</b>	<b>39</b>	<b>35</b>	<b>30</b>	<b>127</b>	<b>0.83</b>

Table 3 depicts that the degree of collaboration is a maximum of 0.93 in 2018 and the lowest is

0.76 in 2019. More clearly, for different years, it is shown in figure 2.

**Figure 2:** Degree of Collaboration

#### Average Length of the Article / Research Paper

The average length of articles/research papers determines the nature of the articles. If it is review paper, of course, the number of pages

will be more than the articles published on the basis of primary research.

**Table 4:** Average Length of the Article / Research Paper

Range of the Pages	Volume (33) 2016	Volume (34) 2017	Volume (35) 2018	Volume (36) 2019	Volume (37) 2020	Total	Percentage
0-5	02	04	07	03	01	17	13.38%
6-10	08	11	11	08	20	58	45.66%
11-15	05	03	06	05	09	28	22.04%
16-20	-	-	01	01	01	03	02.36%
21-25	02	01	04	05	-	12	03.93%
26-30	-	-	-	-	-	-	-
31-35	-	-	-	-	-	-	-
36-40	01	01	-	01	-	03	02.36%
41-45	-	-	-	01	-	01	00.78%
46-60	-	-	01	01	-	02	01.57%
50>	-	-	-	-	-	-	-
<b>Total</b>	<b>18</b>	<b>20</b>	<b>30</b>	<b>26</b>	<b>33</b>	<b>127</b>	<b>100.00</b>

It is clearly seen from the table 4 that maximum numbers of articles (58) are finishing in 06-10 range of references which constitute to 45.66% to the total articles. It is followed by 11-15 range of references of the articles with 22.04% that consists of 28 articles. And least number of article is 01 which comprises of 41-45 range of papers. However, there is no paper over 50 pages.

#### Average Number of References per Article/ Research Paper

The number of references per article also decides the nature of papers; for example, there are less number of references in any article that will be considered of primary nature. It means first time such research findings are noticed. However, a paper with plenty of references means this paper is review-type of the paper.

**Table 5:** Average Number of References per Article/ Research Paper

Range of References	Volume (33) 2016	Volume (34) 2017	Volume (35) 2018	Volume (36) 2019	Volume (37) 2020	Total	Percentage
0-10	04	03	06	03	01	17	13.38%
11-20	04	04	04	08	08	28	22.04%
21-30	03	04	09	04	13	33	25.98%
31-40	02	04	06	03	08	23	18.10%
41-50	01	03	02	03	02	11	08.66%
51-60	01	-	01	-	-	02	01.57%
61-70	02	-	01	-	-	03	02.36%
71-80	-	-	01	01	-	02	01.57%
81-90	-	02	-	01	-	03	02.36%
90-100	01	-	-	-	-	01	0.78%
100>	-	-	-	03*	01**	04	03.14%
<b>Total</b>	<b>18</b>	<b>20</b>	<b>30</b>	<b>26</b>	<b>33</b>	<b>127</b>	

Note: \* Three papers contain 239,102 & 77 references.

\*\*\*\* one paper contains 153 references.

It is seen from the table 5 that the maximum paper consisting of 33 in numbers constitute 25.98% in 21-30 range of references. It is followed by 22.04% contributions of 11-20 (22.04%) references per article. However, minimum number of reference range is 01-10 where 17 articles (13.38%) are published.

## MAJOR FINDINGS

The major findings of the study are:

- The maximum number of articles 33 was published in the year 2020 which constitute to 25.98% to total contribution. However, minimum number of articles 18 was published in the year 2016 comprising of 14.17% in its volume 33.
- Two authored publications (39) constituting to 30.70% to the total number of articles, is the highest contribution. Further, there are 3 articles written by three authors which are 27.55% of the total contribution; and the number of papers written by more than 3 authors are also 30 in number which constitute to 23.62% to the total contribution. While, single author contribution is low with 23 publications (18.11%) only. It means Pteridologists want to write in collaboration instead of solo authorship papers.
- The degree of collaboration is maximum 0.93 during 2018 and lowest is 0.76 in 2019. However, it is 0.83 on average. This fact also supports that Pteridologists want to write in collaboration instead of solo authorship papers.
- It is also seen that maximum number of articles (58) are finishing in 06-10 range of paper length which constitute to 45.66% to the total articles. It is followed by 11-15 range of paper length of the articles with 18.11% that consists of 23 articles. And least number of article is 1 that comprises of 41-45 range of paper length.

Last but not least, it is also noted that most of the articles/ research papers are finished within 11-20 and 21-30 reference limits. They are 28 plus 33 in number and if average is calculated it comes to 61 among total 127 articles that is around 48.03%. Thus, it can be said that the journal publishes primary research based articles in majority; however, many papers are of review type in nature too are there.

## CONCLUSION

It is noted that the acceptance of bibliometric techniques worldwide in different disciplines made tremendous growth of literature and its subsequent areas. Das (2021) mentions that this technique is favourable for a number of purposes which includes selection of journals for the libraries, showing the benefits of a desired field, scientific output evaluation, determining scientific indicators. Hence, bibliometric studies are used worldwide for various purposes.

On the basis of the data collected from the journal it can be concluded Indian Fern Journal is a pioneer journal for the study of Pteridophytes. It publishes world class articles which are primary research based. However, some review type articles are also published in this journal. Further, it is also keeping pace with the changing time and articles with 'doi' and web-based citations are also started to be given in the reference lists. Indeed, it is a good quality journal which is also proved on the basis of its present bibliometric study.

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