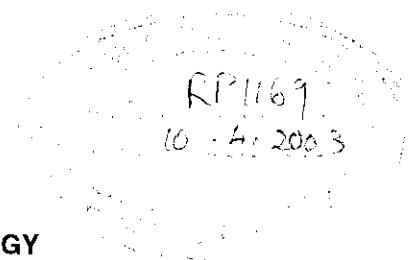


JOURNAL OF PLANTATION CROPS - A BIBLIOMETRIC APPRAISAL

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Articles published in the Journal of Plantation Crops during the period 1973-96 have been subjected to bibliometric analysis. The study throws light on the different aspects of the publications such as nature of communication, geographical distribution, authorship pattern and citations. Quantitative output in the different areas of research pertaining to plantation crops has been projected.

INTRODUCTION

The term *Bibliometrics* has been defined as 'organisation, classification, and quantitative evaluation of publication patterns of macro and micro communications along with their authorship by mathematical and statistical calculus'[1]. The usage of the term 'plantation crops' probably originated in the US colonial period, when slaves were widely employed as labourers in cotton and sugar cane plantations [2]. There are a group of commercial crops of perennial nature cultivated extensively in the tropics/sub tropics, which demand employment of labour throughout the year[3]. In India, the major plantation crops of economic importance are tea, coffee, rubber, cardamom, cinchona, cotton, coconut, arecanut, pepper and sugarcane. Of late, oil palm, tree spices and cocoa have also gained significance.

At present, researches on plantation crops in India are being organised and managed by different agencies like the Indian Council of Agricultural Research (ICAR), Spices Board, Rubber Board, Coffee Board, United Planters' Association of South India (UPASI), Tea Research Association and the various agricultural and other universities.

METHODOLOGY

In this study an attempt has been made to analyse the articles published in the 24 volumes of *Journal of Plantation Crops* (JPC) (1973-96) employing bibliometric techniques. JPC is the official organ of the Indian Society for Plantation Crops (ISPC) which was founded in 1971. Its headquarters is at the Central Plantation Crops Research Institute (CPCRI), Kasaragod which is one of the major Research Institutes under the ICAR. The publication of the JPC was started in 1973 with the release of a single issue in that year. From 1974 onwards annual volumes each comprising 2 half yearly numbers are being published. The journal publishes original research papers, reviews, short scientific reports and book reviews pertaining to plantation crops.

All the articles have been scrutinised and grouped under different categories and the data presented in appropriate tables. This study does not include the proceedings of the *Plantation Crops Symposia* held under the auspices of the ISPC.

RESULTS AND DISCUSSION

The 24 volumes of the journal under study carried a total of 558 articles. Of these, 320 (57.35%) are full length research articles, 177(31.72%) are short scientific reports/notes, 46(8.24%) are review articles and 15(2.69%) are other communications in the form of reports or comments etc. as shown in Table 1.

Table 1

Form-wise distribution of Communications

Volume No.	Research Articles	Short Scientific Reports	Review Articles	Other Communications	Total
1	8	0	1	0	9
2	18	6	0	0	24
3	18	3	2	0	23
4	11	8	2	0	21
5	10	8	5	3	26
6	13	6	2	1	22
7	9	2	2	1	14
8	10	4	2	1	17
9	15	6	1	1	23
10	11	6	2	0	19
11	19	5	2	1	27
12	18	10	0	2	30
13	13	14	2	1	30
14	19	6	1	0	26
15	13	13	1	1	28
16	12	14	1	0	27
17	15	10	1	0	26
18	12	6	2	0	20
19	6	5	12	0	23
20	17	11	1	0	29
21	10	17	0	1	28
22	12	8	1	1	22
23	16	4	1	1	22
24	15	5	2	0	22
Total	320	177	46	15	558
(%)	(57.35)	(31.72)	(8.24)	(2.69)	(100)

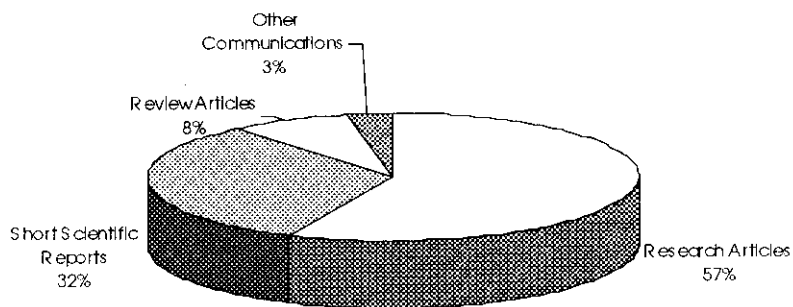


Fig 1 : Form-wise distribution of Communications

Geographical distribution

Five hundred and two articles (89.96%) are authored by Indians and the rest 56 (10.04%) are

contributed by foreign authors. The ratio between Indian and foreign contributions is 9:1 (Table 2).

Table 2

Geographical Distribution of Communications

Volume No.	Indian	Foreign	Total
1	8	1	9
2	22	2	24
3	22	1	23
4	20	1	21
5	22	4	26
6	19	3	22
7	11	3	14
8	15	2	17
9	18	5	23
10	18	1	19
11	22	5	27
12	23	7	30
13	28	2	30
14	25	1	26
15	25	3	28
16	26	1	27
17	24	2	26
18	18	2	20
19	23	0	23
20	26	3	29
21	26	2	28
22	22	0	22
23	22	0	22
24	17	5	22
Total	502	56	558
(%)	(89.96)	(10.04)	(100)

The distribution pattern of the 56 foreign contributions (Table 3) is 24 from Sri Lanka, 16 from Nigeria, 6 from USA, 2 each from Bangladesh, Brazil and Netherlands and one each

from Costa Rica, Indonesia, Jamaica and Male. The predominance of contributions by Indian authors may be due to the fact that the crops dealt with are mostly indigenous.

Table 3

Contribution by Foreign Institutions

Sl. No.	Country	No. of Articles
1.	Sri Lanka	24
2.	Nigeria	16
3.	U S A	6
4.	Bangladesh	2
5.	Brazil	2
6.	The Netherlands	2
7.	Costa Rica	1
8.	Indonesia	1
9.	Jamaica	1
10.	Mali	1
Total		56

Authorship pattern

The analysis of authorship pattern reveals that two-author papers top the list (38.17%) followed by three-author papers(26.34%). This is followed by single author (20.07%) while 15.40% of the papers are by 4 or more authors. About 48% of the review articles are contributed by single authors. In one of the articles, the number of the authors is as high

as 14. A perusal of the general authorship pattern shows that about 80% of the papers are authored by two persons and above while the rest are single authored ones (Table 4). This indicates that there is a tilt towards multiple authorship. This can be attributed to the necessity for multidisciplinary approach in dealing with complex problems as is the case with plantation crop research.

Table 4

Authorship Pattern

	Single Author	Two Authors	Three Authors	Four Authors	Five Authors	Six & above	Total
Research articles	54 (16.88%)	128 (40.00%)	84 (26.25%)	36 (11.25%)	11 (3.44%)	7 (2.19%)	320 (100%)
Short scientific reports	27 (15.25%)	71 (40.11%)	48 (27.12%)	26 (14.69%)	3 (1.69%)	2 (1.13%)	177 (100%)
Review articles	22 (47.83%)	11 (23.91%)	12 (26.09%)	1 (2.17%)			46 (100%)
Other Communications	9 (60.00%)	3 (20.00%)	3 (20.00%)				15 (100%)
Total (%)	112 (20.07)	213 (38.17)	147 (26.34)	62 (11.11)	14 (2.51)	10 (1.79)	558 (100)

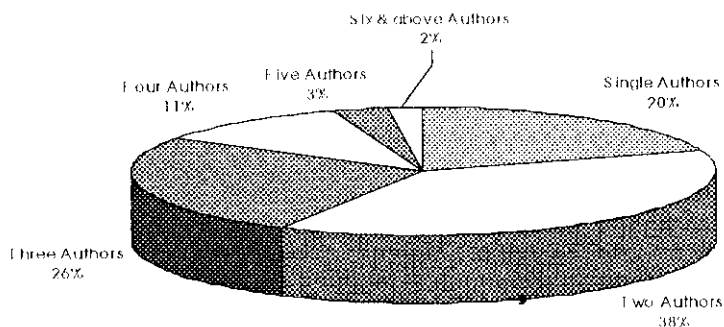


Fig 2 : Authorship Pattern

Institute wise distribution

A significant proportion of the total articles 239 (42.83%) has come from Central Plantation Crops Research Institute (CPCRI) followed by Kerala Agricultural University 51 (9.14%), University of Agricultural Science, Banagalore, 24 (4.29%), UPASI 15(2.69%), Tamil Nadu Agricultural University 14(2.51%), Rubber Research Institute

of India 11(1.97%), Andhra Pradesh Agricultural University 11(1.97%), Indian Institute of Spices Research (formerly National Research Centre for Spices) 10 (1.79%). Other 82 Institute/Universities have contributed 183 articles which is less than 10 articles each (Table 5). Of these 82 institutes, 51 are research centres, 26 are universities/ colleges, 3 are Krishi Vigyan Kendras and two are private sources.

Table 5

Institutewise Distribution

Sl.no.	Institute	Articles	Percentage
1.	Central Plantation Crops Research Institute	239	42.83
2.	Kerala Agricultural University	51	9.14
3.	University of Agricultural Science	24	4.29
4.	United Planters Association of South India	15	2.69
5.	Tamilnadu Agricultural University	14	2.51
6.	Rubber Research Institute of India	11	1.97
7.	Indian Institute of Spices Research (formerly NRCS)	10	1.79
8.	Andhra Pradesh Agricultural University	11	1.97
9.	Other Institutes/Universities	183	32.80
Total		558	100.00

Table 6
Cropwise Distribution

Volume	Arecanut	Black Pepper	Cardamom	Cashew	Cinnamon	Clove	Cocoa	Coconut	Coffee	Ginger	Nutmeg	Oilpalm	Rubber	Tea	Turmeric	Mixed Cropping	General/ Others	Total
1	3	1	5	2														9
2	3	1	5	3	1				1									24
3	3	1	5	2						1			2					23
4	6	1	2	3										1				21
5	3	1	1	2					1	1					2			26
6	2	4	3								1							22
7	3	3	3	1					1									14
8	2	1	3	1														17
9	2	2	3	1						1								23
10	2	2	1	1						1								19
11	2	3	4	1														27
12	1	3	1	4														30
13	2	5	1	2						1								30
14	1	3	2	3														26
15	1	1	2	1					1									28
16	1	4	1	1														27
17	1	2	1	3						3								26
18	1	1	1															20
19	1	1	1	1						1								23
20		3	1	2														29
21	2		3	7					1									28
22			3	2														22
23	1	1	1	4					1									22
24	1	3	1						1									22
Total	37	45	33	45	3	6	23	167	8	12	7	13	24	41	19	19	56	538
(%)	(6.63)	(8.06)	(5.91)	(8.06)	(0.54)	(1.08)	(4.12)	(29.93)	(1.43)	(2.15)	(1.25)	(2.33)	(4.30)	(7.35)	(3.41)	(3.41)	(10.04)	(100.00)

The CPCRI has been dealing with a large number of plantation crops such as coconut, arecanut, oil palm, cocoa, cashew and spices (researches on spices and cashew were separated from the CPCRI in 1986 with the establishment of National Research Centre for Spices and Cashew). This may be the reason for the predominance of the contribution from the CPCRI.

Cropwise distribution

The maximum number of contributions are on coconut (167). The contributions on black pepper, cashew, tea, cardamom and arecanut ranges from 33 to 45. The minimum number(3) of articles have been published on cinnamon. Coconut is the most predominant among plantation crops which has a uniform distribution in Kerala and is being cultivated in sizable areas in the other southern states. Further, there are some very important problems posing challenge to the research workers in respect of coconut which has led to extensive investigations. This appears to be the reason for the publication of a large number of articles on the

crop. A sizable number of papers (56) are on the crops which are not generally categorised under plantation crops. They are aromatic grass, beetle vine, chillies, chestnut, citrus, eucalyptus, fennel, mushroom, mango, ornamental palms and vanilla. Of late special emphasis has been given to mixed/intercropping with a view to obtaining maximum returns from unit area of land and 19 papers are on this aspect. (Table 6).

Citation distribution

The citation count reveals that seven thousand eight hundred and nineteen (7,819) references have been cited under the different articles. (Table 7). An average of 14 references are cited per article. The citations in the review articles are comparatively high, the maximum being 214. The maximum number of citations (852) appear in volume 19 since this particular volume contained mostly review articles. This is quite logical since such articles are very comprehensive and exhaustive.

Table 7

Volumewise Distribution of Citations

Volume no.	No.of Articles	No.of Citations	Average Citations/Article
1	9	146	16.22
2	24	198	8.25
3	23	530	23.04
4	21	221	10.52
5	26	333	12.81
6	22	379	17.23
7	14	445	31.79
8	17	362	21.29
9	23	195	8.48
10	19	230	12.11
11	27	356	13.19
12	30	363	12.10
13	30	340	11.33
14	26	299	11.50

contd.

table 7 (contn.)

Volume no.	No.of Articles	No.of Citations	Average Citations/Article
15	28	290	10.36
16	27	267	9.89
17	26	238	9.15
18	20	269	13.45
19	23	852	37.04
20	29	396	13.66
21	28	291	10.39
22	22	239	10.86
23	22	275	12.50
24	22	305	13.86
Total	558	7819	14.01

CONCLUSION

This study was undertaken with the main objective of examining the work done on the various aspects of plantation crops research by subjecting the articles published in the JPC to bibliometric analysis. By and large the research output generated on the different facets of this field is disseminated through the academic journal JPC. The study has brought out many aspects of the work done in the field identifying the strengths and weaknesses of research process over the period.

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REFERENCES

1. SENGUPTA(IN). Bibliometrics: a bird's eye view. *IASLIC Bulletin*. 30,4; 1985; 167-14.
2. NAYAR (N M). Plantation crops. *Indian Horticulture*. 39,4; 1995; 25-29.
3. NELLIAT (E V). Diamond jubilee celebrations of coconut in India : a report. *Journal of Plantation Crops*. 5, 1;1977; 39-46.