

## INDIAN JOURNAL OF PLANT PHYSIOLOGY: A CITATION ANALYSIS

**Ashu Shokeen**

Department of Library  
and Information Science  
Kurukshetra University  
Kurukshetra

**Sanjay K. Kaushik**

M. D. University  
Rohtak - 124 001  
Haryana

*The present paper is aimed to find out the authorship pattern and citation pattern of articles that appeared in Indian Journal of Plant Physiology. The study covers issue nos. 1 to 4 of volume 7 published between January to December 2002, covering 61 articles published in these issues. Overall 1149 citations featuring 2770 authors have been made during the year. The results indicate that 39% articles published (citing articles) in these issues are three-authored. However, it is found that two-authored citations (cited articles) are more common which is followed by singel-authored papers. The results reveal that journal articles are predominant with 81% of total citations. The ratio of author self citation to total citations is 1:16.65. The ratio of Journal Self Citation to total citation is 1:31.91. The results also highlight that 398 citations are below 10 years old, whereas 358 citations are below 20 years but more than 10 years old. It is clear that a majority of documents cited in these issues were published not more than twenty years ago.*

### INTRODUCTION

It is believed that for about half a million years wandering men in small groups lived the life of food-gatherers, taking shelter sometimes in caves and at other times leading natural life in the open. It was during this period that stone tools were brought into use for the purpose of hunting. This period is known as the old Stone Age. Some archaeologists believe that wood, a botanical product, was also used along with stone during this era. The oldest record of use of botanical products in India is from the sites of Indus Valley Civilization, in which cereals, woods and other plant products were used [1]. During the vedic period, the *Rigveda* has frequent references to the use of the plough, the sowing of seeds, the cutting of corn with the sickle, the threshing and winnowing of the corn, the practice of channel irrigation and the like. The development of plant science in post Vedic period is highlighted in varied types of

Sanskrit literature. We have the medical treatises of *Charaka*, *Susruta*, *Vagbhata* and their various recensions and commentaries. The *Agnipurana*, the *Arthasatra* and the *Brhatsamhita* have each a section or sections devoted to plant science in general [2].

It was noticed by the various philosophical schools in India that plants possess several characteristics of life such as growth, movement, sleep, waking, disease, transmission of characters, etc. Plant diseases and their treatment received careful attention. According to *Varahamihira*, plant diseases are caused by cold climate (low temperature), wind (dryness) and sun (heat) and indicated by the yellowness of the leaves, non-or underdevelopment of buds, dryness of the branches and the exudation of the sap. Kasyapa held the same view. *Gunaratna* observes that plants are afflicted by diseases, displacement or dislocation of flower, fruit, leaves and bark in the same way as the human body suffers from jaundice, dropsy, emaciation, stunted growth of finger, nose, etc., and respond to treatment like human bodies. For the cure of barrenness, the *Brhatsamhita* and *Agnipurana* prescribe a hot decoction prepared of kulattha (*Dolichos biflorus*), masa (*Phaseolus mungo*), mudga, tila and yava, which is to be applied to the root [3].

*The Indian Society for Plant Physiology* was founded in 1958. The society is functioning under Indian Agricultural Research Institute, New Delhi. The objectives of the society are: -

- To provide opportunities for personal contact and fellowship between workers interested in the field of plant physiology.

- To publish *Indian Journal of Plant Physiology*
- To hold symposia and meetings relating to plant physiology and related interests, and
- To organise activities as may be necessary to realize the aims and objects of the society

Apart from *Indian Journal of Plant Physiology*, there are a number of journals being published in the field of Plant Sciences. Some of these are: - *Advances in Plant Sciences* (1988), *Annals of Plant Physiology* (1987), *Glimpses in Plant Research* (1980), *Indian Journal of Plant Pathology*, *Journal of Plant Anatomy and Morphology* (1990), *Plant Physiology and Bio-Chemistry* (1974), etc. For this study *Indian Journal of Plant Physiology* (1958) has been selected. The reason being that not only is the journal an established one but it also has been covered by various Abstracting and Indexing Services like *Biological Abstracts*, *Chemical Abstracts*, *Current Contents*, *Indian Science Abstracts*, etc.

The journal is being published since 1958 and in 1996 new series was started with volume number 1.

## OBJECTIVES

The chief objectives of the present study are to find out: -

- Authorship pattern of citing articles as well as cited references,
- Ratio of Indian versus foreign contributors of citing articles,
- Type of institutions to which contributors belong,
- Institutional involvement in citing articles,
- Percentage of different types of publications cited,
- Ratio of Author Self Citation to total number of citations, and
- Ratio of Journal Self Citation to total number of citations,

## SCOPE

In the present study 1149 citations appended to 61 articles that appeared in *Indian Journal of Plant Physiology* published between January to December 2002 have been analyzed. The issue numbers 1 to 4 volume 7 have been covered in this study.

## METHODOLOGY

To record the data, a computerized data input sheet was prepared. The data was then recorded in coded form in the data input sheet from the journals itself. The data was input in the computer and the results were obtained in tabular form by using SPSS (Statistical Package for Social Sciences).

## RESULTS AND ANALYSIS

### Authorship pattern of Citing Articles

Table 1 reveals that a total of 61 articles contributed by 187 authors were published in these four issues of *Indian Journal of Plant Physiology*. Out of these, 169 Authors are from India and rest 18 are from abroad. The average number of authors per article is 3.06. The highest number i.e., 24 (39.35%) articles have been contributed by three authors each. Only 2 (3.28%) articles are single authored. Sixteen (26.23%) articles are double authored, 14 (22.95%) articles featured four authors each and five authored articles is 8.19%.

Ninety contributors belong to research institutions, whereas 89 belong to universities. Only 8 contributors are from colleges (Table 2).

Table 1 — Authorship Pattern of Citing Articles

| Number of Authors | Number of Articles | Percentage |
|-------------------|--------------------|------------|
| Single            | 2                  | 3.28%      |
| Two               | 16                 | 26.23%     |
| Three             | 24                 | 39.35%     |
| Four              | 14                 | 22.95%     |
| Five              | 5                  | 8.19%      |
| More than Five    | NIL                | NIL        |
| Total             | 61                 | 100%       |

Table 2 — Types of Institutions of Contributors

| Type of Institution  | Number of Contributors | Percentage |
|----------------------|------------------------|------------|
| College              | 8                      | 4.28%      |
| University           | 89                     | 47.59%     |
| Research Institution | 90                     | 48.13%     |
| Total                | 187                    | 100%       |

Table 3 — Authorship Pattern of Citations

| Number of Authors | Number of Citations | Percentage |
|-------------------|---------------------|------------|
| Single            | 282                 | 24.54%     |
| Two               | 409                 | 35.6%      |
| Three             | 244                 | 21.24%     |
| Four              | 132                 | 11.49%     |
| Five or more      | 82                  | 7.13%      |
| Total             | 1149                | 100%       |

Table 4 — Distribution of Citations Form Wise

| Form of Cited Document | Number of Citations | Percentage |
|------------------------|---------------------|------------|
| Journal Articles       | 932                 | 81.11%     |
| Books                  | 159                 | 13.84%     |
| Conference Proceedings | 32                  | 2.79%      |
| Theses                 | 18                  | 1.57%      |
| Others                 | 8                   | 0.6%       |
| Total                  | 1149                | 100%       |

As far as collaboration is concerned, 10 articles are the result of two-institutions collaborating. In the rest of 51 articles, no inter-institutional collaboration has been observed.

#### Authorship pattern of citations

Table 3 shows that single authored citations account for 24.54%, two-authored and three-authored citations amount to 35.6% and 21.24% respectively. Only 11.49% and 7.13% citations are contributed by four and more than four

authors respectively. The results highlight that in the field of plant physiology there is substantial solo research.

#### Distribution of Citations form wise

It is revealed from table 4 that majority of citations pertain to the journal articles. Only 13.84% of citations pertain to books whereas 32 and 18 citations pertain to conference proceedings and theses respectively.

#### Ratio of Author Self-Citation to Total Citations

Author self citation accounts for only 69 citations. The ratio of author self citation to total citations is 1 : 16.65.

#### Ratio of Journal Self-Citation to Total Citations

Journal self citation accounts for 36 citations only. The ratio of Journal self citation to total citations is 1: 32.92.

#### CONCLUSION

The results highlight that only 18 contributions are from outside India. It reflects that the international scope of the journals is limited. The journal self citation is also very low, which reflects that the journal does not figure on the priority list among Indian Plant Physiologists. The average number of citations per article is 18.84, which is almost similar to that of *Indian Journal of Pure and Applied Physics* (18.12) [4], and *Indian Journal of Economics* (where average number of citations per article are 18.94) [5]. The average number of articles published in each issue is 15.25, which is higher than *Indian Journal of Pure and Applied Mathematics* (where average number of articles published in each issue is 10 [6], and *Indian Journal of Economics* (where average number of articles published in each issue is 9.25) [7].

## REFERENCES

1. CHOWDHURY (K A). Prehistoric period. In A Concise History of Science in India. P. 371.
2. GHOSH (A K) and SEN (S N). The Vedic and Post-Vedic period. In A Concise history of Science in India. 375-79.
3. Ibid., 383-85
4. DUTTA (Bidyarthi) and SEN (B K). Indian Journal of Pure and Applied Physics: An analysis of citation pattern. *ILA Bulletin*. 36, 3; 2000; 65-68.
5. SHOKEEN (Ashu) and KAUSHIK (Sanjay Kumar). Indian Journal of Economics: A citation analysis. *Library Herald* 41, 2; 2003; p. 109-114.
6. DUTTA (Bidyarthi) and SEN (B K). *Indian Journal of Pure and Applied Mathematics*: An analysis of citation pattern. *IASLIC Bulletin*. 46, 4: 2001; 221-26.
7. SHOKEEN (Ashu) and KAUSHIK (Sanjay Kumar). Op. Cit.