

## CITATION BEHAVIOR OF PHILIPPINE BIOLOGICAL SCIENTISTS

J.L. MacLEAN and M.J.M. VEGA  
ICLARM, MC P.O. Box 1501, Makati,  
Metro Manila 1229, Philippines

### ABSTRACT

journals over a 10-year period compared favorably with some Asian newly industrialized countries in terms of age measured as proportion of citations five years old or less. The mean proportion of such references by Philippine authors in a national fisheries journal studied (33%) was close to that by Philippine authors in overseas journals (36%), but less than that of north American authors in one of the overseas journals (43%). However, pooling data over time was found to be inappropriate because the proportion of five-year-old or less citations in one Philippine journal decreased significantly over time while the other showed a marked significant increase over time. Also the proportion of recent foreign literature in the citations of one journal decreased markedly over time, while the reverse was true of the other. The journal exhibiting decline closed in 1988. This study indicates the need for a more systematic approach to the study of citation behavior of scientists in developing countries.

## INTRODUCTION

The debate about the usefulness or otherwise of the Science Citation Index (SCI) of the Institute of Scientific Information as a measure of the value of developing-country science has been largely based on SCI itself (e.g., Calleja 1980; Garfield 1983; Yutharong 1983; Arunachalam and Garg 1985, 1986; Singh and Arunachalam 1990).

Davis and Eisemon (1989) gave the most recent summary of what they call "mainstream and non mainstream science" and analyzed the latter in four Asian newly industrialized countries (NICs), Korea, Taiwan, Singapore and Malaysia.

The Philippines clearly also represents the non mainstream case. However, this country hosts several international and regional research centers such as the International Rice Research Institute (IRRI), the Aquaculture Department of the Southeast Asian Fisheries Development Center (SEAFDEC), the International Center for Living Aquatic Resources Management (ICLARM), and regional education centers (such as the Diliman and Los Banos campuses of the University of the Philippines).

We examined two locally published vehicles for research dissemination: (i) the Philippines Journal of Biology (Kalikasan), which was published three times a year between 1972 and 1983. It was included in the abstracting and indexing coverage of Chemical Abstracts, Biological Abstracts, Guide to Botanical Periodicals, Agrindex, Flora Malesiana Bulletin, Abstracts Journal, Entomology Abstracts, Asia Science Research References, Microbiology Abstracts, Cambridge Scientific Abstracts, Current Advances in Plant Sciences, Current Advances in Ecological Sciences, and Current Contents; (ii) The Fisheries Research Journal of the Philippines (FRJP), a semi-annual publication of the Fisheries Research Society of the Philippines produced with support from the Philippine Council for Aquatic and Marine Research Development (PCMARD) and the Bureau of Fisheries and Aquatic Resources. It commenced publication in January 1976 and continues to the present. It is monitored by the FAO Aquatic Sciences and Fisheries Information System (ASFIS) which produces a globally used abstracts journal. Except for two Tagalog (Philippine national language) articles in Kalikasan, both journals publish in English and accept articles by non-Filipino authors.

## METHODOLOGY

Table 1. Proportion of citations by authors in different journals according to age and source of citation

Journal	Years covered	Total citations	Proportion 5 years old (%)	Proportion by citation type(%) <sup>3</sup>			Mean Age (years) <sup>3</sup>	
				OO <sup>4</sup>	OP	PO		
FRJP all	1976-1986	1827	26	54	3	4	18	10.8
FRJP <sup>1</sup> subset	1983-1986	550	33	54	7	3	22	9.2
<u>Kalikasan</u>	1972-1983	3135	28	70	1	2	10	10.1
Overseas <sup>2</sup>	1983-1986	478	36	75	6	11	2	9.0
Aquaculture	1985	290	43	100	-	-	-	8.1

<sup>1</sup>Fisheries Research Journal of the Philippines, subset for 1983-1986 to compare with the "Overseas" journal data

<sup>2</sup>Articles by Philippine scientist in Aquaculture, Aquaculture and Fisheries Management

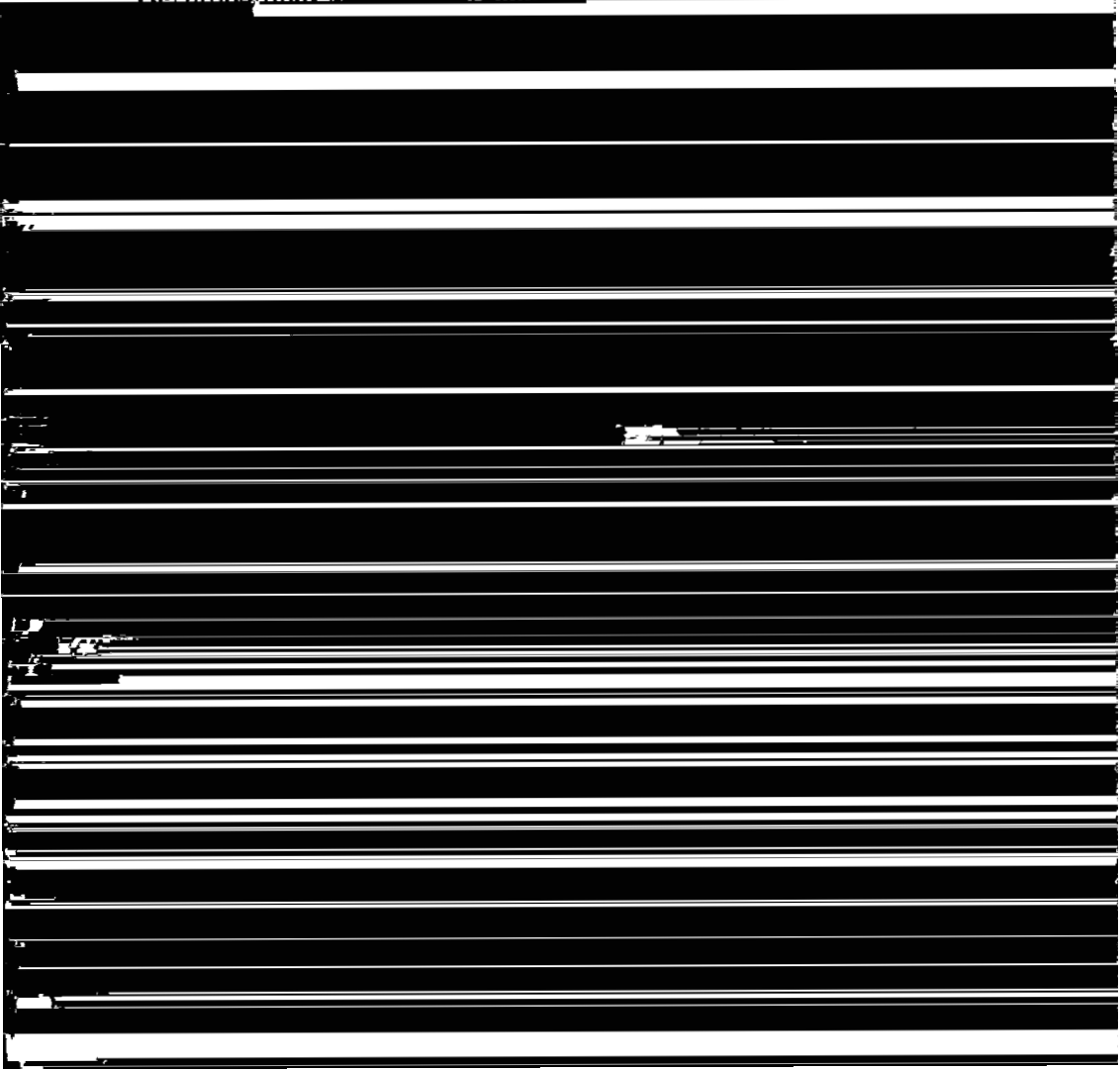
<sup>3</sup>This part of the table excludes papers published before 1950 (16.6%)

4.OO = overseas authors in overseas journals; OP = overseas authors in Philippine journals; PO = Philippine authors in overseas journals; PP = Philippine authors in Philippine journals.

For comparison, articles by Filipinos published abroad and by foreign (North American) authors were examined using the same parameters. The north American author data were from the journal *Aquaculture* (covered by SCI) 1983-1986. Filipino articles were found in the journals *Aquaculture*, *Journal of Fish Biology*, *Journal of Coastal Research*, *Fish Pathology*, *Marine Biology*, *Aquaculture and Fisheries Management*, and *Acta Biologica Hungarica*, all of which are covered by *Current Contents*. The journals were searched successively over the years 1983-1986 until 30 articles were found. Cited articles published prior to 1950 were lumped and excluded in the computations of mean citation ages. The cutoff was fairly arbitrary but was made to keep taxonomy, etc., references, some of which date to previous centuries, from biasing the results.

## RESULTS

The proportions of Philippine authors in the two Philippine journals were:



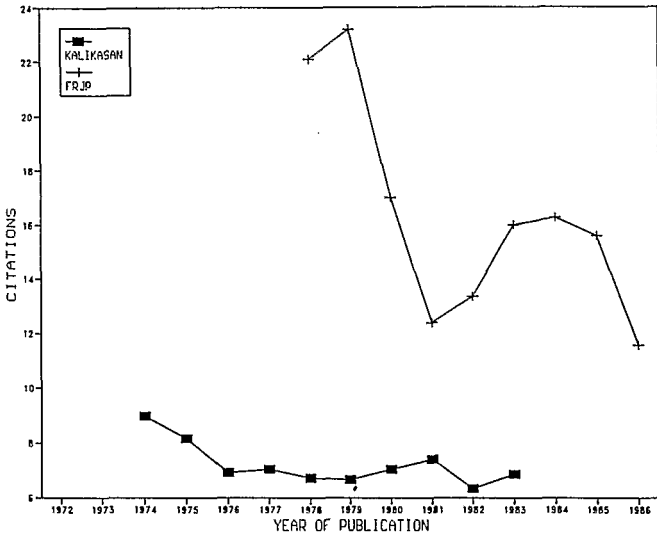


Fig. 1. Mean number over time of citations used per article for FRJP and Kalikasan. Points are 3-year running averages.

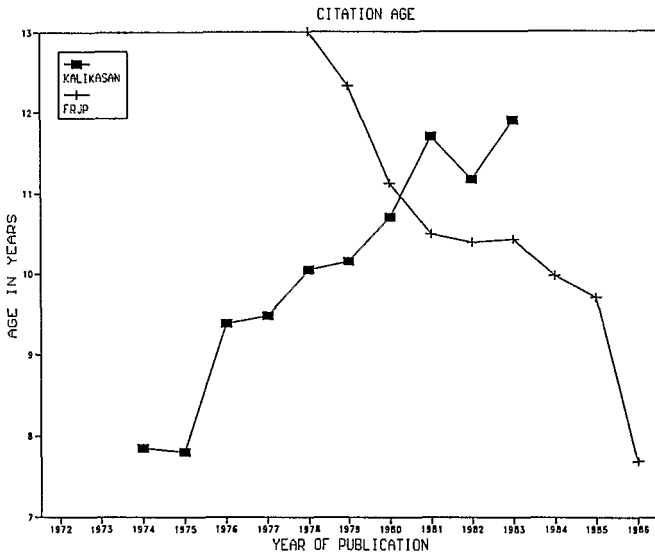


Fig. 2. Mean age over time of citations used for FRJP and Kalikasan. Points are 3-year running averages.

### Citation types

The overall citation patterns of Philippine authors in the different publications exhibited some differences (Table 1). Nearly 70% of Kalikasan citations were to overseas authors in overseas articles while only around 50% of FRJP citations were in this category. FRJP authors cited more Philippine authors in Philippine

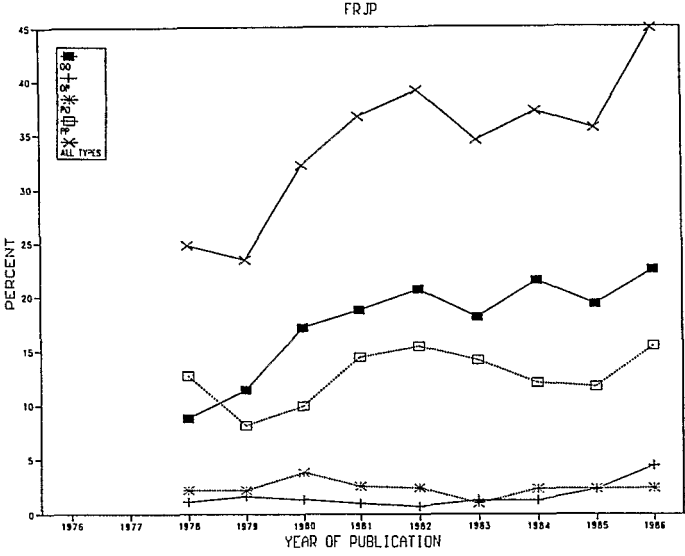


Fig. 3. Percentage over time of citations 5-years or less used in FRJP. Points are 3-year running averages.

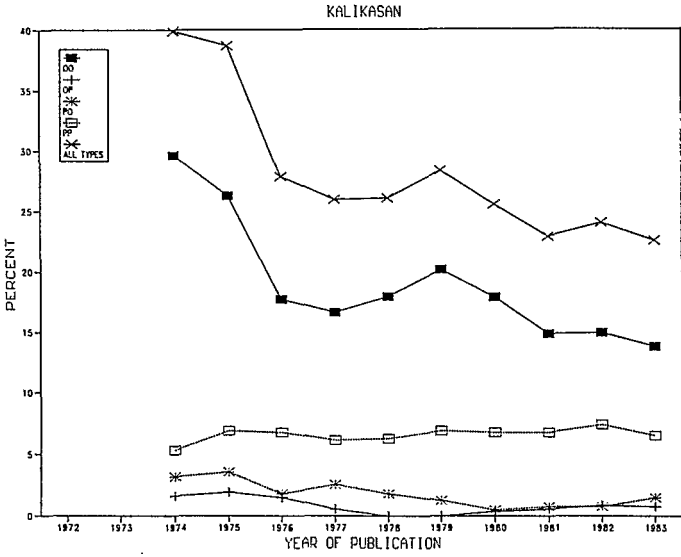


Fig. 4. Percentage over time of citations 5-years or less used in Kalikasan. Points are 3-year running averages.

Developing-country scientific literature is said to use older citations than its western counterpart. How old is old? Davis and Eisemon (1989) used the proportion of references five years old or less as a yardstick. They neglected to compare their data with mainstream articles in the same fields, so there was little to be gained in their analysis other than comparison across fields

The proportion of "young" citations in 1985 biology articles of the four Asian newly industrialized countries (NICs) studied by Davis and Eisemon (1989) was only 15%, well below the lower value (26%) for the Philippine journals. Figures for overall proportions of "young" citations in the NICs ranged from 20 to 33%



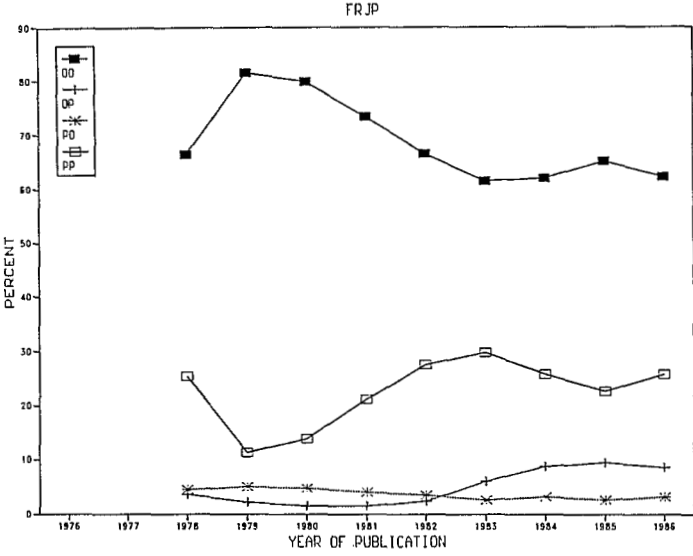


Fig. 5. Proportions over time of the different citation types used in FRJP. Note this includes citations prior to 1950. Points are 3-year running averages.

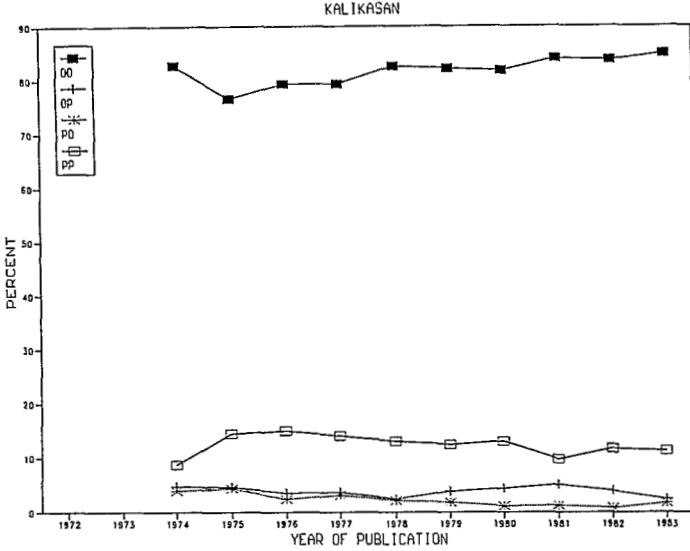
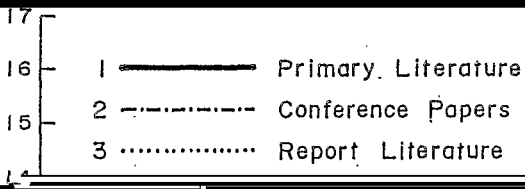


Fig. 6. Proportions over time of the different citation types used in Kalikasan. Note this includes citations prior to 1950. Points are 3-year running averages.



ICLARM has been running an international information service, sponsored by the International Development Research Centre (IDRC) of Canada, for the past 7 years. From 1988, IDRC changed its policy to requiring or at least promoting a user-pays approach to make such services self-financing. Our subsequent experience was that developing-country researchers cannot afford to pay for information, while the number of donor-financed researchers is also inadequate to sustain an information service.

Finally, the demise of Kalikasan in 1983 officially due to lack of funding support, was in spite of its more international character - less parochialism; high proportion of overseas reprint requests; and covered by Current Contents. However, the journal's death may also have been associated with authors' declining use of recent overseas literature; increasing age of citations; and declining numbers of citations in the Philippine primary literature. Perhaps these are some of the parameters that, taken together with others, provide indicators of scientific endeavor in developing countries.

## REFERENCES

- Arunachalam, S. and K.C. Garg. 1985. A small country in a world of big science: a preliminary bibliometric study of science in Singapore. *Scientometrics* 8:301-313.
- Arunachalam, S. and K.C. Garg. 1986. Science on the periphery - a scientometric analysis of science in the ASEAN countries. *J. Info. Sci.* 12: 105-117.
- Calleja, G.B. 1980. Science in the boondocks. *Filipinas, the Journal of Philippine Studies* (Kalamazoo, Michigan), 1:21-43.
- Davis, C.H. and T.O. Eisemon. 1989. Mainstream and nonmainstream scientific literature in four peripheral Asian scientific communities. *Scientometrics* 15: 215239.
- Dizon, L.B. In press. An analysis of citations to Kalikasan, the Philippine Journal of Biology and Fisheries Research Journal of the Philippines. Master of Library Science Special Problem. Institute of Library Science. University of the Philippines. Diliman.

Appendix I. Countries of authors publishing in Volumes 1-3 (1987-1990) of Asian Fisheries Science, showing number of authors from each country with number of papers of which they are authors, in parenthesis.

Australia	17	(11)
Bangladesh	13	(7)
China	3	(1)
France	2	(2)
Germany (West)	1	(1)
India	25	(9)
Iraq	1	(1)
Japan	3	(1)
Kuwait	4	(2)
Malaysia	8	(4)
Nepal	1	(1)
Philippines	22	(12)
Singapore	2	(2)
Sri Lanka	14	(9)
Taiwan	10	(5)
Thailand	2	(1)
UK	5	(4)
USA	6	(4)