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– Review –

Asian Aquaculture Journals : Problems and Possibilities

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Global status of aquaculture and aquaculture scientific journals is briefly described. Asia is the centre of fishing and aquaculture activities but most publishers, editors and editorial board members of fisheries and aquaculture journals are from Europe and/or USA. The contribution by Asian fisheries/ aquaculture scientists to these journals remains low. Language barrier and requirement for monitory investment seem to inhibit Asian participation in this realm of scientific activity. The need for globalization of aquaculture scientific journals is emphasized. Selected strategies, which are adopted by the Western journals to improve their image and management, are indicated.

Key words : Globalization, Asian Fisheries Journals

Introduction

With the global population projected to increase to 8 billion by 2025, the production of aquatic food will have to be increased from the present 100 to 165 million ton (m/t) to maintain the existing *per capita* fish availability (New, 1991). However, the global fish production has begun to stagnate since 1990 at around 90 m/t and it is likely that sustainable fish harvest may not exceed 100 m/t, even with all the technical advancement, additional financial input and increased human efforts (Nair, 1995). Moreover, with progressively declining *per capita* land availability, scientists all over the world are looking upon water as a major source of food production. Furthermore Asia should play an important role in food production especially in fisheries and aquaculture based on the following reasons. Firstly, the need for finding ways and means to produce at least 50 m/t or more fish by aquaculture is obvious. With a 30 billion dollar investment in global aquaculture, and with the 10 % annual growth rate (DeSilva and Anderson, 1995), the contribution to fish production through aquaculture is in the range of 36 m/t and Asia's contribution to production is 85 % (FAO, 1999). Understandably, about 60 % of Asians derive more than 30 % of their animal protein from fisheries (Pandian, 1998). Secondly, Asia is the centre of fishing and aquaculture activities. Fisheries and aquaculture constitute a highly productive venture, a source of food and employment, and a net contributor to payment to many Asian countries. For instance, India ranks second in culture and third in capture fisheries (Pandian, 1999). South Korea's contribution to aquaculture production is in the range of 0.4 m/t, but its fishes fetch two times higher price than that of India (FAO, 1999). Thirdly, aquaculture is a growing enterprise in many developing Asian countries, as it is characterized by (i) high productivity, (ii) high food conversion ratio, (iii) putting agricultural and animal waste to good use, (iv) offering healthy protein-food at the cheapest cost and (v) high employment, especially in rural areas. The returns from aquaculture is 2-15 times higher than that of traditional agriculture.

As in any productive activity, the development of

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aquaculture requires a strong scientific and technical support. Without scientific input, profitable aquaculture cannot be maintained. A couple of examples from India may be cited. 1. The then Central Inland Fisheries Research Institute (Barrackpore) published the first report on successful induced breeding of carps in 1957. Subsequently, technologies on induced breeding and larval rearing were developed for a number of carp species. These research developments paved the way for the current annual carp production of > 1 m/t in India alone. 2. The Central Marine Fisheries Research Institute (Kochi) developed the hatchery technology of penaeid shrimps in 1973, and by 1978, larval rearing technologies for several shrimps were successfully developed and documented. In 1999-2000, India exported farmed shrimps about a billion dollars worthy.

The need for scientific research on aquaculture by Asians is even greater in the light of the following: Aquaculture is more complicated than agriculture/animal husbandary owing to the diversity of the taxonomic groups and the environment/medium involved; for instance, while scientific knowledge is required for just 4 species in aviculture (chicken, turkey, duck and goose) and 5 species in animal husbandary (cattle, buffalo, swine, goat and sheep), aquaculture science has to be developed for over 300 fish species, which are presently farmed (Kutty, 2001). The species-wise diversification even preferred to sustain eco-friendly aquaculture. Korea must be complimented for having developed the science and technology for mass culture of as many as 52 aquatic species, whereas the Chinese, who are responsible for 67% of global aquaculture productivity, have done so far 29 species only. As shown in Table 1, the aquaculture productivity during the last 10 years has begun to decrease in the developed Asian countries like Japan, Korea and Taiwan, while many other Asian countries have registered more than 100% increase. Therefore, the Korean Aquaculture Society has an additional responsibility to sustain the level and diversification of aquaculture in the years to come.

Aquaculture Journals

Scientific journal

Scientific journals are universally recognized as an effective medium of communication of research activities. They play a vital role in maintaining permanent records of research findings and in certain cases, directing future research. The publication process comprises production of the research manuscript, quality control, i.e. manuscript evaluation by referees, improvement and selection, dissemination and utilization of

Table 1. Aquaculture (fish & shellfish) production (m/t) in leading producer countries in 1988 and 1997 (from FAO, 1999; modified)

Country	1988 Production		1997 Production		Value (billions $)	Production increase (%) 1988-1997	Price ($/kg)
	m/t*	(%)	m/t	(%)			
China	5.63	48	19.3	67	20.51	243	1.06
India	0.89	8	1.78	6	2.0	99	1.11
Japan	0.81	7	0.81	3	3.5	-1	4.37
Indonesia	0.41	4	0.78	3	2.2	82	2.95
Korea Rep.	0.46	4	0.39	1	0.9	-14	2.33
Philippines	0.35	3	0.33	1	0.9	-4	2.72
Taiwan	0.29	3	0.26	1	0.9	-13	3.68
Thailand	0.22	2	0.56	2	1.8	161	3.10
USA	0.36	3	0.44	1.5	0.8	34	1.76
France	0.23	2	0.30	1.0	0.6	26	2.20

*m/t means million tonne

knowledge (Fig. 1). Its links are represented, respectively, by authors, editors and referees, publishers and users (readers). The formalized publication process provides the foundation for orderly worldwide communication among scientists and for establishing priority in scientific findings and ideas (Kinne, 1988). The very first scientific periodical in the English language, namely, *'Philosophical Transactions'*, was published by the Royal Society, London on the 6th of May 1665 (Houghton, 1976). The production and publication of scientific journals were initially one of the major functions of the scientific societies and academies. Subsequently, commercial publishers undertook the responsibility of publishing journals on behalf of some of these scientific bodies. Today there are scientific journals that are totally managed by the publishers alone. With this kind of expanding history of scientific journals, there has been a tremendous increase in the number of publications of papers and journals. In the 1950s, there were about 600 journals publishing 80,000 articles per annum and by 1990s these numbers increased to 3,000 for journals and 600,000 for articles *per annum* (Pandian and Sarma, 1992).

In general, most scientific journals are published from the Western countries and are managed by editors, who are Europeans and/or Americans. Aquacultural Science is not an exception to this. Table 2 lists selected scientific journals, which regularly publish articles relevant to mostly aquaculture and fisheries

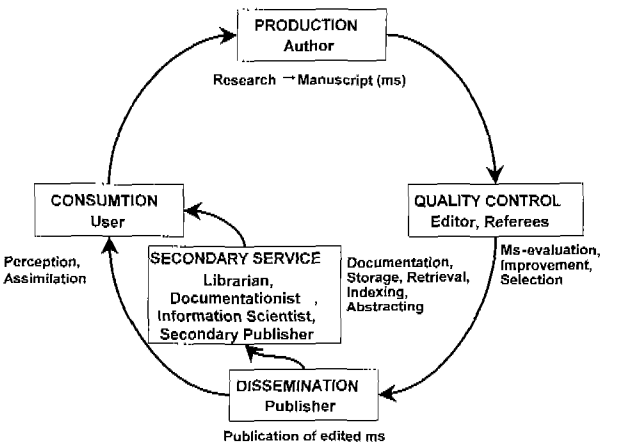

Fig. 1. Linkages between author, editor, publisher and user of scientific journals (from Kinne, 1988; adopted with permission)

science. The classification of aquaculture journals cleary indicates that most publishers, or editors of aquaculture journals are from Europe and/or USA. Whereas European or American dominated publications are expected for many disciplines of sciences, it is fondly awaited that Asians, who dominate aquaculture activity, also do the same in publishing and/or editing aquaculture journals or at least a large number of Asians experts serve in the editorial boards of these journals. Unfortunately, less than 10 % editorial board members of aquaculture journals hail from Asia (Table 3, 4); even the few, who serve as editorial board members, are Japanese. Perhaps language could be a plausible reason for the non-inclusion of Koreans and Chinese in the editorial boards of some of the aq-

Table 2. Asian experts serving as editorial board members in selected aquaculture and fisheries journals

Journal	Board members (No.)	Asian board members	
		(No.)	(%)
Aquaculture	56	7	12.5
Aquaculture Nutrition	28	5	17.9
Aquaculture Research	27	2	7.5
Aquaculture International	20	5*	25.0
Canadian Journal of Fisheries & Aquatic Sciences	36	1*	2.8
Journal of Fish Biology	16	0	0.0
Journal of Fish Diseases	16	2*	12.5
Fish Physiology & Biochemistry	20	3*	15.0
Journal of Marine Biological Association of United Kingdom	24	1	4.2

*Includes asians settled in western countries

Table 3. Papers published by asian scientists in the journal "Aquaculture" during the last 10 years

Year	Papers published (No.)	Papers published by Asians	
		(No.)	(%)
1989	281	58	20.6
1990	251	44	17.5
1991	271	50	18.5
1992	251	50	19.3
1993	270	76	28.1
1994	316	44	13.9
1995	247	53	21.5
1996	242	52	21.5
1997	284	68	23.9
1998	279	54	19.4
1999	310	53	17.1
Total	3002	602	

Table 4. Papers published by asians scientists in the "Journal of Fish Biology" during the last 10 years

Year	Papers published (No.)	Papers published by Asians	
		(No.)	(%)
1989	187	17	9.1
1990	200	24	12.0
1991	183	20	11.0
1992	212	24	11.3
1993	188	20	10.6
1994	196	28	14.3
1995	191	15	7.9
1996	241	14	5.8
1997	231	17	7.4
1998	223	25	11.2
1999	206	18	8.7
Total	2258	222	

uaculture journals. An analysis was made on the contributions published in the journals *'Aquaculture'* and *'Journal of Fish Biology'* during the last 10 years. Clearly, western scientists publish a larger proportion of scientific articles relevant to aquaculture in indexed journals like *'Aquaculture'* and *'Journal of Fish Biology'*. At this juncture, two aspects have to be considered. Firstly, many Asian countries can ill-afford to invest adequate finance on aquaculture research proportionate to aquaculture productivity. This should call for more investments, more personnel and more dedicated research work by Asians in aquaculture. Secondly, most Asians may publish their findings in their respective national journals, though they may not be indexed. This kind of "nationalization" may be due to problems related to language, finance and quality. Contributions to fisheries science and aquaculture by the Japanese, Chinese, Korean and Indian scientists are amazingly large and in many cases they are of good quality of papers. For instance, 5.5% of the world literature on fisheries and aquaculture are from India (Jayashree and Arunachalam, 2000). However, language still remains a big barrier to Asians, as most of the western journals accept articles written in English only. Many society journals like *'Progressive Fish Culturists'*, *'Copeia'* demand page charges, which cannot be afforded by scientists from India, Indonesia and other Asian countries, who are not relatively rich. Lastly, many Asian scientists do not relish or appreciate the comments and suggestions made by critical, Western, peer-reviewers.

At this juncture, the Korean Aquaculture Society must try to globalize the national Society journal. The Japanese did this a decade ago. For instance, the Japanese bifurcated one of their prime journals, *Nippon Suisan Gakkaishi*. The first one continues to remain as *Nippon Suisan Gakkaishi*, publishing articles in Japanese and the second one, "*Fisheries Research*" accepts articles written in English. A glance over the papers published in these twin journals clearly indicates that *Fisheries Science* has grown dramatically. Incidentally, the Indian Academy of Sciences, Bangalore integrated their publication series in Plant Science and Animal Science into *'Journal of Bioscience'* a decade ago; improving the quality of production, the journal opened its door to foreign authors. Contributions from foreign authors began to trickle in but a couple of years ago, the new Editor globalized the Editorial Board, which was previously dominated by Indian experts only. With this kind of open door policy and globalizaiton of editorial boards, there has been a progressive increase in contributions by foreign authors.

The following strategies may be adopted to improve the image of aquaculture journals published from Ko-

rea or Asia. Some of the attributes of a good journal are : 1. Quality of scientific papers published, 2. Punctuality of issue and the period elapsed between the receipt and publication of an article, 3. Quality of peer-reviewing, 4. Quality of production, printing, cover design, etc., and 5. Wide international circulation.

Scientific quality of publications

Originality and novelty are two important ingredients that confer credit to a scientific publications. For instance, the relatively unknown Chinese fishery biologist Z. Zhu reported a short communication in English in a not so popular German journal called *Journal of Applied Icthyology* (Z. *Angew, Icthyol,* 1985, 31-34). Irrespective of the visibility of the author and/or the journal, the publication made a wide impact and became visible. Hence, the visibility of a publication depends more on the quality rather than the visibility of the scientist or journal. In recent years, Citation Index is regarded as a measure of the impact a publication has made (e.g. Pandian, 1983). There have been repeated and extensive discussions on the reliability of Citation Index. Although Citation Index may not be the sole source for one to look into measure the impact, it does give a measure, from which one can judge the quality. To attract good quality articles, especially from younger scientists, the journal *Chromosoma* confers an annual award to the author(s), who have made, from the judgement of *Chromosoma,* the best paper published in the journal for the year.

Another strategy used by editors of the journal *Hydrobiologia* is such as to invite a "guest-editor", who is an expert or an organizer of a symposium to bring the best publication in that subject or the geographical region, in which the symposium is held. A third strategy adopted by journal like *Current Science* is to include book reviews. A fourth strategy adopted by journals like *Comparative Biochemistry and Physiology* is to include reviews by leading experts and thereby enhance the visibility of the journal. It is well known that a large number of reviews have become classics owing to the fact that progress in research is beginning to suffer acutely from hypertrophied production of articles. Hence, the frequent citation of reviews in fields, in which articles are 'fast raining' is expected (Pandian, 1988).

While quality must be the hallmark strategy, a journal supported by a society or the government of a country may have to consider other priorities. For-instance, some 3000-4000 active scientists in India working about 200 laboratories publish annually 10,000 articles, of which more than 60 % are published in foreign journals, which copy right them (Ramaseshan, 1992). Of these, a large number is published abroad, where the foreign journals copyright them. Thus many Indian scientists, like in the colonial past, when cotton was exported and textiles were imported, presently export scientific articles and import scientific journals. However, Indian fishery biologists publish 460 articles *per annum* (Jayashree and Arunachalam, 2000) and many are published in invisible Indian journals. Perhaps the situation may be true for other Asian countries also. Therefore, there is a need to globalize Asian journals of aquaculture and fisheries and to improve their visibility.

Periodicity

Punctuality of appearance is an important criterion, considered by Institute for Scientific Information, Philadelphia for indexing a journal. For want of adequate financial support, many journals supported by societies and governments do not keep up punctuality. In this computer epoch, fax, e-mail and on line services have enormously increased the speed of communication. Consequently, the authors, who are anxious about the priority of their publications, expect minimum time loss between communication and appearance of their articles. This can be achieved by adopting one or more of these modern facilities. For instance, the editor of *Journal of Aquaculture* (published by The Korean Aquaculture Society) can send me several articles by e-mail for peer-reviewing and language correction, and receives them within 48 hrs by e-mail. Alternatively, a journal can have several editors for different disciplines as in *Aquaculture, Journal of Experimental Zoology,* or reviewing editors, who receive

Table 5. Random survey on citations referred in publications from selected biological journals (from Pandian and Sarma, 1992)

Journal	Volume number, Year	Total citations (No.)	Citations prior to 1980 (%)	Citation after 1981 (%)
Proceedings, NASI, Allahabad	61, 4 1991	116	68	32
Proceedings, INSA, Delhi	57, 5 1991	186	64	36
J. Bioscience, IAS, Bangalore	16, 1 1991	215	64	36
Indian J. Exp. Biol., CSIR, Delhi	30, 4 1991	125	50	50
Mar. Ecol. Prog. Ser., Ecol. Inst.	78, 3 1991	343	225	75

and process the manuscripts for publication in their areas of expertise. The standard of a journal is determined largely by its editor(s), members of the editorial board and peer-reviewers. Indeed, peer-reviewers are the backbone of a good journal. *Marine Ecology Progress Series*, the highest impact-making journal in marine sciences celebrated the appearance of 200th volume in less than 17 years, an astounding feet of achievement. The journal has about 100 review editors, who respond quickly by peer-reviewing a large number of manuscripts received by the journal.

Peer Reviewing

An aspect, which must be considered by Asian peer-reviewers, is the average age of references cited in the recommended manuscripts. Table 5 is an example of a random survey of citations referred to in publication of selected biological journals. An analysis indicates that the percentage of recent references cited is higher for *Marine Ecology Progress* Series than that of some of the Indian journals. Not surprisingly, O. Kinne, the editor of the journal, has achieved the highest recognition for his journal in the shortest span of time.

Circulation

Adequate finance is required to sustain quality of a journal. An aspect that must be given priority by non-English speaking Asians is to have a Consultant Editor or a Table Editor, who will be responsible for the language. When quality is assured, the journal will become visible and will have a wide circulation. To ensure financial support a strategy adopted by *Current Science* is to secure institutional membership, which guarantees subscription for 10 years or longer. For instance, to ensure financial support, *Asian Fisheries Science* secures sponsorship by a rich scientist or an organization to bear the entire production cost of anissue, but the Society retains the profit to its benefit. *Limnology and Oceanography* copyrights tables and figures, which appeared in it and accord permission for reproduction on payment of a nominal sum. When limited to academic relevance, advertisements, like those appearing in *Science* and *Nature* may also serve as a source of revenue.

References

DeSilva, S. S. and T. A. Anderson, 1995. Fish nutrition in aquaculture. Chapman & Hall, London, 319pp.

FAO, 1999. Aquaculture production statistics 1988-1997. FAO Fisheries Circular No. 185, Rev. 11. FAO, Rome, 203pp.

Houghton, A., 1976. Scientific periodicals. Their historical development, characteristics and control. Clive Bingley, London, 133pp.

Jayashree, B. and S. Arunachalam, 2000. Mapping fisheries research in India. Curr. Sci., 79 : 613-628.

Kinne, O., 1988. The scientific process, links, functions and problems. Naturwissenschaften, 75 : 275-279.

Kutty, N. M., 2001. Diversfiation of aquaculture. (*in*) Proc. Nat'l. Seminar on "Sustainable Fisheries for Nutritional Security", (ed.) T. J. Pandian. National Academy of Agricultural Sciences, New Delhi, 57pp.

Nair, N. B., 1995. Application of science to aquaculture. Proc. Indian Natl. Sci. Acad. 61B : 89-112.

New, M. B., 1991. Turn of the millennium aquaculture. Navigating troubled waters or riding crest of the wave. World Aquacult., 22 : 28-49.

Pandian, T. J., 1983. This week's citation classic. Curr. Cont., 14 : 19-20.

Pandian, T. J., 1988a. Lessons to learn from citation classics. J. Scient. Ind. Res., 47 : 35-36.

Pandian, T. J., 1998b. Aquaculture in the next millennium. (*in*) Dialogue 1998. M. S. Swaminathan Research Foundation, Chennai, 11pp.

Pandian, T. J., 1999. Preface to special section : Fisheries : Science and Technology. Curr. Sci. 76 : 313.

Pandian, T. J. and S. S. S. Sarma. 1992. The status and quality of scientific journals in India with special reference to biological sciences. pp. 18-27. (*in*) Proc. Symp., "Quality of scientific journals in India". Indian National Science Academy, New Delhi.

Ramaseshan, S., 1992. Quality of scientific journals published in India : Some random thoughts. pp. 4-17. (*in*) Proc. Symp., "Quality of scientific journals in India". Indian National Science Academy, New Delhi.

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