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Freshwater Prawn Farming and Its Grow Out System by Application of Modern Technology: A Case Study at Chandrabha Shrimp Hatchery, Konark, Odisha and Its Status and Prospects in India.

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ABSTRACT

The nutritional food security is a vital challenge at present for every population of India .Enhancement of freshwater prawn and fish production by utilizing our vast resources both in fresh water as well as brackish water is, badly needed to meet the challenge of today. Suddenly swiss over to fresh water prawn production by the entrepreneurs became a matter of concern due to spreading over of viral disease by P. monodon (brackish water sps.) during post nineties. Also the verdict of Supreme Court on CRZ issue made many low saline areas idle which subsequently turned to M. rosenbergii farming. The reliable Scampi seed production by the successful captive breeding during that time by fresh water prawn hatcheries encouraged the entrepreneurs to go for this culture. Recent two phase post larval rearing system and segregation of juvenile prawn before stocking to grow out ponds is no doubt a tremendous achievement by the fishery scientists towards fresh water prawn farming aspects .An experimental study was conducted to compare the growth, survivality, productivity and economic aspects of M.rosenbergii culture through monoculture, polyculture (carp & prawn) in a500sq mt cemented pond P1 and earthen pondP2 at Chandrabhaga prawn Hatchery, Konark, Puri. The experiment was conducted randomly with different hazards like, heavy rain, cyclonic weather with severe wind for a period of 6 months. The average weight, productivity, growth rate were studied which revealed that growth rate was highest in all male culture, 92 kg, and in poly culture, growth of carps and prawn were also good i.e. 35kg prawn& 70kgs of carps were harvested during the experimental production. Survivality in all two types of culture was good.

KEYWORDS | Giant Fresh water prawn (GPF), M. rosenbergii, Scampi, Polyculture, Monoculture, IMC.

INTRODUCTION: A vast democratic country like India, facing today a vital challenge to maintain sustainable "nutritional food security" for every growing population in the country. In order to meet the protein requirements of the corers of people, it is imperative to increase our "Fish & Prawn" production by application of high technology. Following the intervention of modern technology by the fishery scientists one revolutionary changes came up to swissover to fresh water prawn culture (M.rosenbergii) in order to compensate the fishing loss due to decline of brackish water shrimp (P. monodon). The verdict of Supreme Court on CRZ management issue, and infestation of dreaded viral disease after nineties forced the prawn entrepreneurs to utilize the idle low saline area to convert for fresh water prawn culture. It is no doubt a candidate species, having – fast growth, large size, good taste, and high demand both in domestic as well as foreign market. Presently this fresh water prawn farming provides business employment to the rural youth and alternative livelihood to the rural fishermen (SEAFDEC-PCM33-WP02-IV,30 Nov-2 Dec 2010).

Potentiality of fresh water prawn farming: In past when there was no technology for hatchery seed production, farmers were depending on natural seeds from-rivers, canals, reservoirs which were neither adequate to the demand nor quality seed for better production. The reliable seed production in captive came up after nineties for both fresh water and brackish water prawns. But the real picture that emerged was that, like P.monodon hatchery, Mrosenbergii hatchery was not properly standardized. It was during this time north Asian countries like- China, Thailand, Japan, India Bangladesh, and some Latin American countries have developed fresh water prawn farming. The present high return from Scampi farming have encouraged the entrepreneurs to undertake modern culture systems like ,all male culture (monoculture), polyculture with carps, with mullets, with chanos-chanos, pearl spots etc in low saline areas. In addition to the above techniques improved water quality managements, feed managements, controlled Physico- chemical parameters etc, are some of the major aspects that enhances the pond production capacity. (FAO, Tech, Paps, 428). The major achievements of scientists that act as a boon to fresh water prawn farmers is the identification of different types of farming techniques like-Intensive farming ,semi intensive farming, extensive farming, continuous farming, batch farming , combined farming etc. One of this farming must be followed to achieve higher production.

Study site- At chandrabhaga shrimp hatchery campus, we have undertaken one experimental culture on Gaint Fresh water prawn (M.rosenbergii) during the shut down period of hatchery on 2003-2004. Since it was rainy season, the salinity of the Chandrabhaga coast dropped and it was congenial for fresh water prawn culture.

Study area- We have chosen two ponds, one cemented pond having water area 500 sq mt and another earthen pond of water area 500sq mts. Pond no1 was cemented and Pond no2 was eathen pond situated in site the hatchery campus.

Materials & Methods- Both pond1 &pond No2 were filled with hatchery used plane water after filtration (passed through slow sand filter and 2 to5 micron filter).Physico-chemical parameters like- salinity, pH, hardness, Do, H2s,No3, No2,health monitoring, were done by the well equipped hatchery laboratory apparatus.

Hatchery equipments- Binocular compound microscope, pH meter, testing kits of measuring parameters like,Do,H2s,No3, No2,Wt,balance, Refrigerator, glass wares, feed and chemicals, medicines.

Study Period- Since the experimental culture period was 6 months during which all parameters stated above were properly monitored round the clock. Pond preparation- After cleaning and drying, pond1 was covered with sand of 6inches with a thin layer of clay. Similarly pond2 was cleaned and both ponds were filled with water as per requirements. After ponds were filled with water liming was done as per requirements. Similarly after 3 days manuring was done as per prescribed ta-

bles with help of both organic and inorganic manures. Bottom substrata and hide outs were also provided in both the ponds.

Stocking density- Both the ponds were of same water spread area; 20X25mt sq=500mt sq, pond1 &pond2. In P1 mono culture was taken up and stocking density was @2 to-3nos PL/mt sq=1200 no juvenile prawns. Similarly P2 (earthen pond) where poly culture was taken up and stocking density was 800nos of juvenile prawns along with 800 no of I.M.C. (Rohu, Catla Catla, Mirgal).

Feed & Feeding- In the present experiment, both the ponds were fed with pelletized feeds of different grades according to their no days growth (starter, grower, finisher),Rice bran/GOC. Since M.rosenbergii is cannibalistic in nature and are scavenger, they can consume natural feeds like aquatic insects, algal blooms, mollusks, crustaceans, small larvae etc.

Water parameters observation- Daily two times water parameters were brought from both P1and P2 and were tested by the technicians in the hatchery lab. (Tab-2).

Morpho-metric study and Health monitoring- Daily two times prawn samples were brought from both the ponds and microscopically checked up both health and growth aspects. Mostly fungal, bacterial,and protozoan diseases were seen during the course of experimental culture. Medicines were used like Chloromphenicol, Furazolidol, Oxy tetracycline, Treflanc etc.

Culture managemement &manipulation- After post nursery stage, segregation was done and only big size male prawns were stocked in pond no1, and in pond no2, post fries of Rohu,Catla, mirgal, along with prawns were stocked.

Harvesting and Marketing- Since the culture period was 6 moths (180days), single harvest was done. Heterogenous growth was observed in both the ponds, like in P1-around+_55gms, 80, gms, 100gms. Similarly in P2Catla+_1000gm, Rohu+_600gms, Mirgal 700gms, prawns average 50gms .Since this is an experimental single batch culture and harvest done by draining and a good harvest in both the pond observed.

Discussion: In the present experimental farming system, though growth and survival was good in both the ponds like P1 and P2, in spite of hazards like , heavy rain and cyclonic weather, disruption in feeding system(feed quantity, frequency), temperature, light, wind action during the experiments occurred. The resulting farming system showed encouraging results in both ponds still in P2 where poly culture system was adopted gave better yield, in quantity wise (Tab-3) but in retrospect the other pond no 1, gave qualitative prawn in better grade, uniform size and higher mean weight than P2 (Tab-3).In both the culture system P1 and P2 male group showed significantly higher growth than female and the growth of Indian Major Carps was also excellent.Catla production dominates in both mean size, and mean weight than Rohu and Mirgal. Although price of prawn differed, it was proved that qualities as well as quantity both are essential in prawn farming from economic analysis point of view. Economic analysis of every system is essential to evaluate the validity of investment in aquaculture. Economic efficiency of prawn farming is based on production efficiency (number of prawn per rearing unit) and the cost of production. In the present study, taking into account the cost of seed, cost of feed, operational cost, and other infrastructural management cost subject to marketable yield structure, both the pond no1 & pond no 2, satisfies all the norms, and both the culture system are economically viable.(Tab-4)

Conclusion: In the present culture study it was proved that the Fresh Water Prawn culture system by application of modern technology is definitely profitable and economically viable. Future prediction of this Scampi culture is no doubt brighter for two major factors such as domestically M.rosenbergii is preferred by people because of its good taste and high nutritional value. Secondly Scampi culture is likely to take bigger share in International market because of its quality and demand at par with Tiger prawn. One more strategy for future development of fresh water prawn culture is production of quality prawn seed is required for which more research activity should developed to improve genetically improved seed(from wild brood stock) avoiding inbreed brood stock. Similarly improved culture technique, marketing, processing and disease control technique can further enhance the production of fresh water prawn in future.

Status and prospects in India: Indian aquaculture has been evolving from level of subsistence to that of an industry. India bestowed with vast inland resources suitable for fresh water prawn farming consisting- ponds and tanks (2.25 million hac), paddy fields (2.30 mil hact), beels &jheels (1.30mil hac), lakes and reservoirs (3.0 mil hac), paddy fields (2.30mil hac) for farming. Apart from this, some brackish water farms coming under CRZ act and basing on the verdict of Supreme Court of India,which are not in use can be converted to fresh water prawn farming. In addition, it is always stressed that there is a need to utilize the vast natural resources productively to ensure the much needed food security.

Considering the high export potential, the Gaint fresh water prawn (M.rosrnbergii) enjoys immense potential for culture in India. About 4 million hacts of impounded fresh water bodies in various states of India offer great potential for fresh water prawn culture. Scampi can be cultured for export, through different hi-tech systems mentioned earlier both in monoculture and polyculture systems. Mostly it is exported to EEC and USA. Since the world marketing is expanding with attractive price, there is great scope for Scampi production and export in India.

Although Scampi culture is now facing some problems and constraints, the industry is very likely to expand in future. This production is based on two major factors. The potentiality for fresh water prawn culture is huge. The other one is that domestically Scampi is much preferred because of high nutritional value, good taste, better price facing then any other fish and prawn.

An appropriate development strategy should be developed and implemented in line with the present status and needs of fresh water prawn culture in different parts of our country .Focusing on different areas where it needs exposure and providing them scientific research needs to carry out the – quality prawn seed production and improvement culture technique, not by farmers trial and experience)

Despite all fall in Gaint fresh water prawn from 2005 to 2007 total volume of Indian fresh water prawn farming in 2007 was nearly 27,262 ton, worth 118 million dollar. In Bangladesh , the production was 2300. (…. 0ton, (2007).In Thailand the production was 27650 ton,(2007). Global production during that time was over 221,000 ton ,ie 2.7 times greater than the decade earlier.

Table- 1: Culture status of two different cultures in P1 and P2

SlNo	No of ponds	Area of pods	Stocking density	Type of culture	Initial mean wt of prawn &carp	Final mean wt gain during harvesting	Total qty of prawn&fish harvested.
	P1	500sq mt	1200 nos	Mono(all male prawn)	1.5 gms	80gms	92 kg
	P2	do	800nos	Poly(prawn)	1.5 gms	50 gms	35 kgs
	P2	do	800nos	Carps	2 gms	800gms	70 kgs

Table-2: Physico chemical parameters of culture ponds

Sl No	No of ponds	Temp in centigrade	pH	Salinity in ppt	Medium of culture	Nitrite NO_2-N ppm	Nitrate NO_3-N ppm	Total hardness in ppm
1	P1	28 to32	7.5 to 8.5	0 to 3	Fresh water	<0.1	<20	<100
2	P2	do	do	do	do	Do	do	do
3	P2	do	do	do	do	Do	do	do

Table-3: Feed and Yield in both the ponds-

Sl No	No ponds	Pelletised feed	Ground Nut Oil Cake	Rice Bran	Total Yield in both the ponds	Percentage of survivality
1	P1	100 kg	-	-	92 kg	80 %
2	P2	50 kg	-	-	35 kg	70 %
3	P2	-	45kg	35 kg	70 kg	70%

Table-4: Economic analysis of all ponds

Sl No	No ponds	Cost of seed	Cost of feed	Cost of pond preparation	Total Expenditure incurred	Total prawn & fish sold	Profit incurred in both the ponds	
1	P1	Rs 600	Rs9900	Rs500	Rs 10,300	Rs 23000	Rs 8000	
2	P2	Rs200	Rs1800	Rs500	Rs 2000	Rs6300	Rs4300	
3	P2	Rs250	Rs1500	-	Rs 1700	Rs3500	Rs1800	
						Total	profit	Rs14100

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