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ORIGINAL ARTICLE

COMPARISON BETWEEN SEASONS OF SUMMER AND WINTER CULTURE ECONOMICS, LITOPENAUS VANNAMEI IN TAMILNADU COASTAL AREAS.

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ABSTRACT

The prevalence of Arbuscular mycorrhizal fungal association has been well reported from several natural ecosystems, information on AM fungal association and their abundance are unknown for Shola ecosystems. In the present study, 71 plant species (in 35 families) examined all the families were colonized by AM fungi except two species in a genus *Psychotria*. AM association was observed in members of supposedly non-mycorrhizal families Commelinaceae, Cleomaceae and Convolvulaceae. Thirty four of the plant species had *Arum*-type morphology, 25 had Intermediate- type and 12 had typical *Paris*-type morphology. There were large differences in the extent of AM colonization and root lengths with AM fungal structure between plant species.

Keywords: : AM fungi, Arum-type, Shola forest

1.INTRODUCTION

Shrimp has arisen as a significant consumable product in the world seafood production. Many Asian countries like India, Indonesia, Taiwan, and Thailand have appeared as worldwide leaders in shrimp production. To fill the gap between world demand and supply of shrimp, many developing and developed countries have started the severe shrimp farming with intensive application of fertilizers and chemicals to boost the productivity. This strengthened application in production had led to a squirt in production of shrimp till in the middle of 1990's. In 1995-96, a enormous disease outbreak caused in shrimp production and results in deprivation of the production system, leads to drop in world shrimp production.

Thus, sustainability of shrimp farming is evolving as a key policy alarm in the context of further development of shrimp farming as a money spinner. The sustainability issues are tangled with the environmental and social impacts of shrimp farming.

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The environmental influences which include conversion and degradation of mangrove plantation sites into shrimp ponds and resulting in loss of the direct and indirect benefits from mangrove ecosystems, conversion of agricultural land, reduction in paddy production in areas, salinization of the agricultural land, where shrimp ponds are located. Salinity factors which affect and cause decline in the quality of underground water and discharging of waste effluents by shrimp farms to the close estuaries and riverside causing worsening of quality of water both irrigation and drinkable in the particular areas (Primavera 1991, Pillay, 1992, Rajalakshmi,2002). The shrimp farming is extended and it was subjected to disparagement and not only the offsite environmental factors but also for its on-site difficulties. Unsuitable and huge amount in using of chemical substances, fertilizers and accumulation of excess feed in the pond bottom makes the soil acidic and inappropriate for any other further use either for agriculture or other fish culture, at least in the short run. This will pave the way in irreversibility (Krutilla and Fisher, 1985) of environmental damage created by a particular economic activity. Furthermore, strong usage of chemicals, fertilizers and wide range of antibiotics interpret into the disease outbreaks in shrimp ponds and hence it leads attitude in their financial risk to the shrimp farmers. The tent and nature of the above-mentioned environmental

effects depend also on the production system adopted for shrimp farming.

Now a day, shrimp farming has played an important role by providing substitute source of earnings for shrimp farmers laterally in the coastal districts of TamilNadu and is measured as an emerging sector for supporting economic development. Shrimp farm performs and have involved in substantial attention for its food supply and became a major share towards foreign exchange earner. Due to this fact, other countries have also provided opportunity for the shrimp farmers as a high priority in their fisheries programs.

In India, the Ministry of Agriculture, Government of India has given permission in 2008 for importing the brood stock of *L. vannamei*, which has benefited shrimp production in India. Coastal Aquaculture Authority had approved *L.vannamei* culture in the States of Tamil Nadu, Maharashtra, Andhra Pradesh, Gujarat, Orissa, Goa and Union Territories of Diu, Karaikal and Pondicherry. So, the present work was evaluated for the economic profit analysis of summer and winter culture in Tamil Nadu.

2.MATERIALS AND METHODS

Among the seven coastal districts (Tuticorin, Ramanathapuram, Pudukottai, Pattukottai, Nagapattinam, Villupuram, Ponneri), Pattukottai and Nagapattinam district more shrimp practice was noted. Socio economic profile and status of the shrimp farmers of the respective states was studied by visiting the shrimp farmers of each farming in their districts in person. Under this study farm size, farming experience, acknowledgment as well as their technical assistance contacts was recorded.

A research programme was carried out in the pond to check the performances. Twenty shrimp farmers 'sites were selected in each district to analyse the economy (revenue analysis) of farming operation during the year 2016. To study the performance of the pond, two shrimp ponds were selected randomly from each shrimp farmer. These shrimp farmers were visited once in a week by throughout the culture period. Much information like the details of the performance of pond, pond area, stocking density, days of culture (DOC), size at harvest, feed conversion ratio (FCR), selling price, feed price, total feed cost, seed price, total seed cost, total income etc., were documented from twenty selected shrimp farmers.

3.RESULTS

In Tamil Nadu, overall 90% farmers are involved in *L.vannamei* farming and 10 % are practicing *P.monodon* as their primary occupation. All the farmers are well equipped with techno-feasibility of shrimp culture and are progressive in nature. Government Institutions such as MPEDA, CAA, CIBA, RGCA and private feed companies are regularly conducting short term training programmes and had helped them to increase their level of awareness. Operational feedbacks are also provided time to time by input supplier of seed, feed and equipment companies. Nearly, 60% of the shrimp farmers have built their farms in their own vacant area and 40% land was procured by taking lease with proper documentation.

In the present study summer culture maximum stocking density was done at Pattukottai (80m^2) and followed by Tuticorin region (70 m^2). In winter culture maximum stocking density was done at Pattukottai and Tuticorin district (60 m^2).

In summer culture the maximum production cost was value was shown in Tuticorin region (272Rs) and followed by Ramnad region (237Rs). The minimum production cost was found in Nagapattinam region (201Rs) and followed by Ponneri region (206Rs).

4.DISCUSSION

The financial analysis of shrimp farming in Tamil Nadu during summer and winter seasons crops and the annual combined costs for the two crops. Profitability of a farm is a function of costs and returns. Cost of production depends mainly on culture technologies used and prices of the production inputs, while the returns depend on production levels and market values of the species(Shang, 1986). Several interdependent factors are reported to affect growth rate and productivity, including environmental factors, water quality, stocking rate, feed supply, fertilization, labour input along with duration of culture and size of the pond (Ahmed *et al.*, 2008).

In the present work, a considerable difference was seen in the summer and winter culture. Detailed analyses on production and profit of *P.vannamei* culture clearly showed that the economic income is not only related to the yield but also depends on the farming inputs such as cost for seed, feed, operational expense and also on the population structure of final harvested shrimps in terms of their mean weight and marketable yield structure. The results of the production function analysis showed that two inputs viz., stocking density and cost of pond preparation were significant, and that increasing the application of these two inputs substantially affects the profitability from *P.vannamei* shrimp farming. A similar observation through Cobb-Douglas type of production function showed farm size, capital and management practices as significant factors affecting production in fresh water prawn farms (Liao, 1996) in Taiwan.

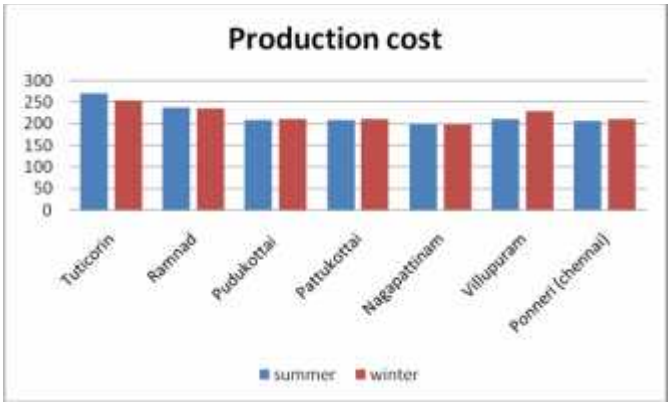
Ahmed et al. (2008) observed the rate of fertilizer used in farms to have a direct bearing on the economics of freshwater prawn farming. In the present study also conforming to earlier reports pre-stocking management practices which included pond preparation, liming and fertilization had direct effect on the economics of shrimp farming. Another observation worth mentioning despite being the largest contributor to operational expense; feed cost have influence on the farming economics. Hence economic analysis of every ecosystem is essential to evaluate the viability of investment in aquaculture, determine the efficiency of resource allocation, improve existing management practices, evaluate new culture technology, assess market potential and identify areas in which research success would have high potential payoffs. In order to bring out an economically viable and sustainable aquaculture practice of *L. vannamei* in Tamil Nadu, standardisation of cost and quantity of input parameters are very essential.

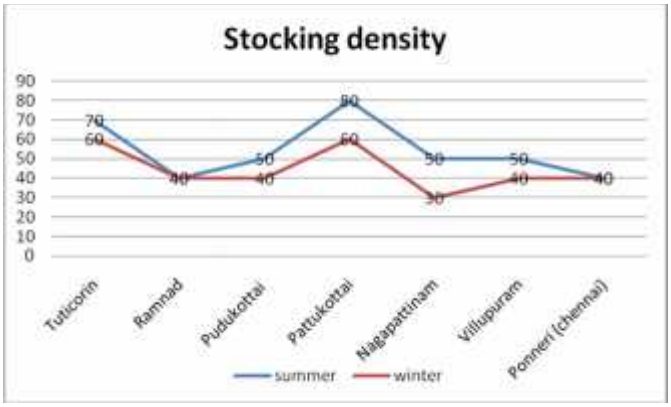
Financial investigation of summer culture results

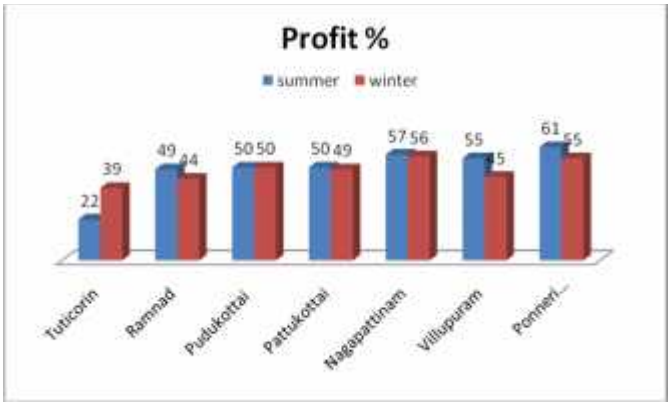
Details	Tuticorin	Ramnad	Pudukottai	Pattukottai	Nagapattinam	Villupuram	Ponneri (chennai)
Area (Ha)	0.7	0.6	0.6	0.6	0.5	0.6	0.6
Density Pcs/m²	70	40	50	80	50	50	40
Culture Period	150	150	140	120	110	120	110
Harvest Size (GM)	20	30	25	25	30	30	35
Count(Pcs/Kg)	50	33	40	40	33	33	28
Shrimp Harvest (Kgs)	5880	5040	5625	9000	6000	6300	6300
Survival %	60	70	75	75	80	70	75
Total Feed Used (Kgs)	11172	8568	8473	13500	8400	9450	8820
FCR	1.9	1.7	1.5	1.5	1.4	1.5	1.4
ADG	0.13	0.2	0.18	0.21	0.27	0.25	0.32
Production(Kg/Ha)	8400	8400	9375	15000	12000	10500	10500
Seed cost/kg shrimp	42	24	20	20	16	17	14
Feed cost/kg shrimp	156	139	123	123	115	123	115
Pond preparation/kg	2.5	2.5	2	2	2	3	3
Water treatment/ kg	4	3	3	2	2	3	3
Feed probiotic/ kg	2	2	2	2	2	2	3
Water probiotic/kg	2	2	2	2	3	3	3
Bottom probiotic/kg	3	3	3	2	3	3	3
Carbon source/ kg	1	1	1	2	3	2	3
Minerals	3	3	2	2	3	2	3
Chemicals/kg	2.5	3	2.5	3	1.5	2	1
Feed supplement/kg	1.5	2	2	3	3	2	2
Diesel/kg	26	26	23	20	22	23	25
Electricity/kg	18	18	15	16	16	17	18
Labour/kg	4	4	4	4	4	4	4
Farm lease/kg	2	2	2	3	3	3	3
Maintanance& repair/kg	1	1	1	1	1	1	1
Others/kg	1.5	1.5	1.5	2	1.5	2	2
Total production cost	272	237	209	209	201	212	206
Material price (Rs)	350	470	420	420	470	470	530
Profit / kg	78	233	211	211	269	258	324
% of Total profit	22	49	50	50	57	55	61

Winter culture analysis

Details	Tuticorin	Ramnad	Pudukottai	Pattukottai	Nagapattinam	Villupuram	Ponneri (chennai)
Area (Ha)	0.7	0.6	0.6	0.6	0.5	0.6	0.6
Density Pcs/m²	60	40	40	60	30	40	40
Culture Period	150	140	130	110	90	110	90
Harvest Size (GM)	25	25	25	25	28	25	30
Count(Pcs/Kg)	40	40	40	40	35	40	33
Shrimp Harvest (Kgs)	7350	4500	4500	6750	5040	3600	5040
Survival %	70	75	75	75	60	60	70
Total Feed Used (Kgs)	13230	7200	6300	9450	6552	5400	6552
FCR	1.8	1.6	1.4	1.4	1.3	1.5	1.3
ADG	0.16	0.18	0.19	0.22	0.31	0.22	0.33
Production(Kg/Ha)	10500	8400	8400	11250	10080	6000	8400
Seed cost/kg shrimp	23	21	21	21	12	27	19
Feed cost/kg shrimp	148	131	115	115	107	123	107
Pond preparation/kg	2.5	2.5	2	2	2	3	3
Water treatment/ kg	5	4	4	3	3	4	4
Feed probiotic/ kg	3	3	3	3	3	3	4
Water probiotic/kg	3	3	3	3	4	4	4
Bottom probiotic/kg	4	4	4	3	4	4	4
Carbon source/ kg	1	1	1	2	2	2	2
Minerals	4	4	3	3	4	3	4
Chemicals/kg	2	3	2.5	3	1.5	2	2
Feed supplement/kg	2	2	2	3	3	2	2
Diesel/kg	30	30	25	24	26	25	28
Electricity/kg	19	19	16	17	17	18	19
Labour/kg	4	4	4	4	4	4	4
Farm lease/kg	2	2	2	3	3	3	3
Maintanance& repair/kg	1	1	1	1	1	1	1
Others/kg	1.5	1.5	1.5	2	1.5	2	2
Total production cost	255	236	210	212	198	230	212
Material price (Rs)	420	420	420	420	450	420	470
Profit / kg	165	184	210	208	252	190	258
% of Total profit	39	44	50	49	56	45	55







The cost of production depends directly on the level of input and price of input (Shang and Tisdell, 1997). In the present study while comparing the production of the summer and winter culture, the maximum of the region shows the high production in summer culture. The level of production seen in the present study was however, higher than those observed by Ahmed *et al.* (2008) in Mymensingh, Bangladesh. However, the benefit-cost ratio (BCR) or profitability index worked out for semi-intensive farms was less than those observed by Ahmed et al. (2008) and Shang et al. (1998).

Gomez-Gil et al. (2000) mentioned that probiotics plays an important role to provide a healthy environment to shrimp. Wang et al. (2005) investigated the effect of commercial probiotics on water quality in shrimp, *L.vannamei*, ponds and revealed that probiotics can significantly reduce the concentrations of nitrogen and phosphorus in pondwater compared with the control. Thus, the average cost for probiotics and medicine accounted for Rs.39, 133.33/ha/crop (3.35%) of TVC. In the present study summer culture probiotic cost is 17Rs and winter culture 22Rs.

Some of the shrimp farmers apply bleaching powder for treatment of intake water as well as for disinfection of implements during pond preparation. Application rate of bleaching powder varies depending upon the application purpose and its quantity ranges between 100-1000 kg/ha/crop (DeboralVimala *etal.*, 2015). According to Brijesh Kumar (2016) in shrimp farms salt and minerals are very important to control salinity and to trace nutrient in culture system and its average cost was Rs.19, 366.67 /ha/ crop (1.66%) of TVC. To disinfect the farm and to maintain the pH level, agriculture lime is used and average cost of this comes out nearly Rs.9,178.33ha/yr (0.79%) of TVC.

In the present study, corroborating to earlier reports of Sandifer et al. (1980), the essentiality of standardisation of stocking density in the natural grow-outs as a means to improve the economic viability of shrimp farming has been brought out. The results showed that as the price of shrimp differed with shrimp size, the economic yield from the farming was not found to have a linear relationship. The findings reveal that average cost, gross and net incomes during summer season was much higher than that in winter.

5.CONCLUSION

Man is showing growing interest in the sea and its inhabitants for varied reasons, the most important one being to meet his animal protein requirements. The sea with vast conventional and non-conventional living resources holds enough raw materials to do away with protein-amino deficiency that is afflicting the great majority of people. Therefore, tapping of the wealth of the oceans has become necessary for the wellbeing of the human race. With the decline in fishable stocks around the world, the single largest source of animal protein is become scarce. So, culture and diversified fishing activities have to be undertaken intensively to meet the demands. Hence fishing activities should be expanded to gain immense importance in the Indian scenario to meet the animal protein needs of the burgeoning population.

Among the edible marine crustaceans of India, shrimp ranks first by virtue of their importance as an esteemed gourmet and the value of fishery they support, while lobsters and crabs occupy the second and third places respectively. Among the commercially important shrimps the genus *Penaeus* ranks first (*P. monodon, L.vannamei and P. indicus*).In India culture technology is already available for black tiger shrimp. However, this industry is now suffering from viral disease and pollution problems. In this juncture introduction of white leg shrimp *L.vannamei* is great move by the Government of India. Being a new species to India, right now culture technology is not comparable with black tiger shrimp. Bearing all those in mind the present investigation was carefully designed to bring out a culture technology which will satisfy both academicians and farmers in terms of production and maintain sustainable environment. In the present investigation an attempt has been made in this thesis to study the effect on growth using auto feeder and boat feeding in shrimp ponds, and also evaluated the

economic profit analysis of summer and winter culture in *L. vannamei* culture in Tamilnadu. The findings are summarized below;

1. In all domesticated marine animals, always there is a relation between stocking density and survival. So study on different stocking density was designed in white leg shrimp *L. vannamei*. Pond water pH, temperature and DO readings were recorded. For the three culture ponds an overall average fluctuation of pH reading was between 7.9 and 8.6 in the early morning, while fluctuation of pH value was between 8.2 and 8.6 in the evening. DO values fluctuate between 4 mg/l to 8 mg/l. In general, AM readings became lower as the cycle progressed and the standing crop was increased. Average pond temperatures were 26 to 31° C, respectively the mean average growth of the shrimp at harvest were 28.5g, 26.8g and 25.3g for ponds A1, A2 & A3 respectively. Survivals were 80, 72 and 66% for ponds A1, A2 & A3 respectively; FCR was 1.4, 1.5 and 1.7 for ponds A1, A2 & A3, respectively. The average production was 18250, 23478 and 26640 kg/ha for ponds A1, A2 & A3, respectively. The bacterial population changed during every sampling. In general, the bacterial population yellow colony (beneficial bacteria count) in pond A1 maximum 320 and minimum 90 was recorded, in pond A2 , A3 the maximum yellow colony were recorded 190,520 and minimum 120,90 were recorded , respectively . The bacterial population green colony count (harmful bacteria) were recorded in maximum 120,60,200 at pond A1,A2 and A3, respectively. The minimum 10 was recorded in pond A1.

2. Feed cost accounts more than half of total expenses in shrimp farming. Therefore, benefits of using automatic feeder, apart from the feed expenses savings, are visible when compared to manual feeding. In the present study pond A (automatic feeder) showed the better FCR (1.2) and good growth (35grms). The suvival compare to Pond B (boat feeding) , the pond A showed 2 percent higher. The total feed used in pond A is 5376 kg and pond B is 6365 kg. The average daily gain results in pond A and B is .25 and .20grms respectively.

3. In the recent years, shrimp aquaculture has played a vital role by providing alternative source of income for shrimp farmers along the coastal districts of Tamilnadu and is considered as a sunrise sector for supporting economic development. In the present study summer culture maximum stocking density was done at Pattukottai (80m^2) and followed by Tuticorin region (70 m^2). In winter culture maximum stocking density was done at Pattukottai and Tuticorin district (60 m^2). In summer culture the maximum production cost was recorded in Tuticorin region (272Rs) and followed by Ramnad region (237Rs). The minimum production cost was recorded in Nagapattinam region (201Rs) and followed by Ponneri region (206Rs). In summer culture maximum profit obtained from Ponneri region (61%) and followed by Nagapattinam region (57%). The minimum profit recorded from Tuticorin region (22%). In winter culture maximum was recorded Nagapattinam region (56%) and followed by Ponneri region (55%). but in Pudukottai and Pattukottai region recorded same profit in both culture period.

5.CONCLUSION

From the present investigation it was concluded that *P.vannamei* culture is successful with different stocking and the growth is directly related to stocking density, proper water quality, aeration and feed management. To attain maximum survival and growth in addition to other routine management's attention on proper pond preparation and soil nutrients are also essential. The present study strongly recommending to use the automatic feeder forget low FCR and better growth, to shrimp farmers. The present study evaluated the economic profit analysis of summer and winter culture in *P.vannamei* culture in Tamilnadu. This evaluation will be very useful for the shrimp farmer community.

6.REFERENCES

APHA Method 4500-F (1998). Standard methods for the examination of water and waste water, 19th edn. American Public Health Association and Water pollution Control Federation, Washington DC, USA. pp. 59–64.

Arnold, S.J., M.J. Sellars, P.J. Crocos and G.J. Coman, 2006. An evaluation of stocking density on the intensive production of juvenile brown tiger shrimp (*Penaeus esculentus*). *Aquacult.*, 256: 174–179.

Atwood, H.L., S.P. Young, J.R. Tomasso and C.L Browdy (2003). Survival and growth of pacific white shrimp *Litopenaeus vannamei* post larvae in low-salinity and mixed-salt environments. *J. World Aquacult. Soc.*, 34: 518–523.

Audelo-Naranjo, J.M., J.L. Madero-Perez, O. Zamudio-Armenta and A. Garibaldi-Castro (1994). Growth of the white shrimp (*Penaeus vannamei* Boone) under semi-intensive culture conditions. School of Marine Sciences, Universidad Autonomade Sinaloa Mazatlan, Sinaloa, Mexico Mazatlan Cienc.1(13) pp. 17–20.

Bailey-Brock, J.H. and S.M. Moss (1992). Penaeid taxonomy, biology and zoogeography. *In*: Fast, A.W., L.J. Lester (eds.). Marine shrimp culture: principles and practices. Developments in aquaculture and fisheries science, volume 23. The Netherlands: Elsevier Science, Eldred. 9–27.

Dall, W., B.J. Hill, P.C. Rothlisberg and D.J. Staples (1990). Biology of the Penaeidae. *In*: Blaxter, J.H.S., A.J. Southward (Eds.). Advnces in Marine Biology, vol. 27. Academic Press, London, UK. 489 pp.

Felix, S. (2000). Occurrence of pathogenic bacteria in shrimp farming systems of Tamil Nadu. *J. Aquacult. Trop.*, 15: 365–369.

Fishery and Aquaculture Statistics. 2006 FAO yearbook. 58 pp.

Karthikean, J., (1994). Aquaculture (Shrimp farming) its influence on environment. Technical Paper submitted to the Seminar Our Environment-Its challenges to development projects. American Society of Civil Engineers, Culcutta, India.

Poh Yong Thong (2014). Feed Management Improves Profit in Shrimp Farming. July/August 2014 global aquaculture advocate. Pp. 26–28

Primavera, J.H. (1991). Intensive Prawn Farming in the Philippines: Ecological, Social and Economic Implications. *Ambio*, 20 (1): 28–33.

Selvam, S. and C. Ramaswamy (2001). Socio-Economic and Environmental Impacts of Shrimp Farming. *In:* M. Krishnan and P.S. Birthal (eds.), Aquaculture Development in India: Problems and prospects. National Centre for Agriculture Economics and Policy Research, New Delhi, India, 6-7 Sept. 1999, pp. 52–58.

Shang, Y.C. (1986). Research on aquaculture economics: a review. *Aquat. Eng.*, 5: 103–108.

Shang, Y.C., and C.A. Tisdell (1997). Economic decision making in sustainable aquaculture development. *In*: Bardach J.E. (ed.). Sustainable Aquaculture, John Wiley and Sons, Inc., Honululu, Hawaii, USA.