

**Controlling of Prevailing Diseases of Cultured Freshwater Shrimp (*Macrobrachium Rosenbergii*) in Egypt**Noor El –Deen, A. I.<sup>1</sup>; Mona, S. Zaki<sup>1</sup> and Shalaly, S.I.<sup>2</sup>.<sup>1</sup>Hydrobiology Department, Veterinary Division, NRC.<sup>2</sup>Reproduction Department, Veterinary Division, NRC.

**Abstract:** The objective of this research is to increase the production of cultured freshwater shrimp *macrobrachium rosenbergii* herein Egypt it will also give an approach to increase the economic and social income. Four approaches will be used to accomplish this goal; first was the collection and survey of the most recent literatures about farming and diseases which hinder and affect production of *Macrobrachium rosenbergii*, second was design experimental production of *M. rosenbergii* through small scale of farming to adjust the all conditions of farming at the environment of Egypt. Third one was making commercial farming with higher densities of *M. rosenbergii* using information of the experimental stage improving profitability of production. Fourth was routine inspection and examination of produced larvae, juveniles and adults for endemic diseases (bacterial, viral, parasitic and fungal ) of *M. rosenbergii* finally design scheme of endemic diseases of *Macrobrachium rosenbergii*, and methods of prevention and control. The project will deal with biology, habits, feeding and reproduction and artificial production including propagation with or without hormones; larvae nursing in cement ponds, including pond preparation, fertilization feeding and management in addition information will be provided about the endemic diseases affect *M. rosenbergii*, and methods of its control . diseases cause great economical losses for cultured freshwater shrimp *M. rosenbergii* in the last several years, prawn diseases have had a deviating effect on prawn farming causing great economical losses so diseases outbreak increase risk deterring investment the commercial development and production of *M. rosenbergii* . Using least possibilities in production of safe and cheap proteins of high nutritional value through farming of freshwater shrimp *M. rosenbergii*.

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**1. Introduction**

Freshwater prawn (*Macrobrachium rosenbergii* de Man 1879 ) is an important commercial species due to property as food supply as well as a valuable export product. In the last several years, prawn diseases have had a devastating effect on world prawn farming. Such diseases increase risk, deterring investment and commercial development. Out breaks of disease in prawns is often attributed to bacterial infection (Sung *et al.*, 2000; Phatarpeker *et al.*, 2002; Al-Harbi, 2003; Al-Horbi and Vddin 2004) bacterial species cause some diseases such as vibriosis are a ubiquitous and predominant component of prawn culture environment and comprise a major part of the normal flora or crustaceans (Lightner 1993; Gil *et al.*, 1998; Ruangpan *et al.*, 1999; Vandebreghe *et al.*, 1999; Thmopson *et al.*, 2003; Vaseeharan and Ramasamy, 2003; Vyayan *et al.*, 2006). Culture water is a major potential route for introducing pathogenic bacteria or parasite or viral into shrimp hatcheries. However absolute sterility of rearing water is very difficult to achieve in laboratory saturations and impossible in commercial shrimp hatcheries wide range methods are employed to limit and reduce the number of potential pathogens occurring in hatchery water

supplies, including antibiotics because of the disease agent cause a distinct pathological effect of an infected population also it cause significant economic losses increased mortality, reduced growth rates, decreased product quality and increased management costs. The study was planned to run for complete production cycles from eggs, larva, juvenile and adults. Parasitic, bacterial ,viral and fungal diseases of *Macrobrachium rosenbergii* monitored to those found in Egypt . This information highlights the high quality of farm raised *M. rosenbergii* from production ponds relative to wild – caught. Finally, will be focus on complete. Production system. Of *M.rosenbergii*.

**2. Literature review and expert opinions:**

Giant freshwater prawn (*Macrobrachium rosenbergii* de Man, 1879) (or scampi) is an important commercial species due to property as food supply as well as a valuable export product. giant freshwater prawn distributes mainly in the tropical and subtropical regions where environmental conditions are most favorable for the growth of scampi. Increasing demand of this species for domestic consumption and export markets has increased remarkably scampi cultured systems with

large scale, high stocking density and intensive feeding. Consequently, cultivation of this economic species is being expanded to culture in rice fields, orchard gardens, pens along river banks (Phuong *et al.*, 2002). Hence, disease is inevitable in these uncontrollable culture models. In addition, the use of antibiotics to control bacteria population and maintain healthy environment for prawn culture becomes popular. A wide range of antibiotics is now being used to treat bacterial diseases and to control bacterial population in the hatcheries and prawn farms. The potential consequences of used antibiotics for treatment may arise various antibiotic resistant, antibiotic-resistant bacteria. The phenomenon resistance was transfer to pathogenic bacteria, and led to reduce efficacy of antibiotic treatment for disease caused by the resistant pathogens (Frappalo *et al.*, 1986). Although serious mortality associated with pathogenic parasites and bacteria have not been recorded, understanding the pathological effect of these pathogens in freshwater prawns may help reduce incidence of this pathogen for both larval and adults stages. Therefore, this investigation aims reviewing the parasite, bacteria and mycotic pathogens isolated from different hosts, and verifying the pathogenicity of isolated bacterial strains by antimicrobial sensitivity tests and by challenge experiments. All the studies were conducted in the experimental hatchery and pathological laboratory at the College of Aquaculture and Fisheries, wide range of Universities.

### 3. Background and Rationale

Although reared in captivity from time immemorial, modern forming of this species originated in the early 1960s when FAO expert Shao – Wen Ling, working in Malaysia, found that freshwater prawn (*Macrobrachium rosenbergii*) larva required brackish conditions for survival. This discovery led to larval rearing on an experimental basis by 1972 the Hawaiian team led by Takuji Fujimura had developed mass rearing techniques for commercial scale hatchery production of prawn postlarvae (PL). This development spawned the first commercial farms in Hawaii and elsewhere. Both Thailand and Taiwan province of china became pioneers in modern giant river prawn culture. The introduction of broodstock, initially from Hawaii and Thailand, into non – indigenous areas around the world began in the 1970s. The first major FAO project designed to expand the culture of this species began in 1978 in Thailand since then, giant river prawn culture has developed in every continent, particularly in Asia and the Americas. Global production has increased to over 200000 tones / year by 2002 (including production in Viet Nam). The

main problem in production of *M. rosenbergii* of production was survival rate of larvae within nursing ponds. It has been suggested that it caused due the lack of appropriate feed and major disease problems effecting *M. rosenbergii* generally occur due to poor intake water treatment, poor husbandry, overcrowding, poor sanitation and non – existent or inadequate quarantine procedures the measures to combat these problems are referred to an improved husbandry in some cases antibiotics and other pharmaceuticals have been used in treatment and disinfection. In general diseases, Viral, bacterial, parasitic and fungal diseases. are serious problem facing production of prawn. Though treatment and prophylactic methods have been applied for the detection of prawn diseases, the effective measures are still need to be considered. , prawn diseases consist of fouling disease (44 %), blackening of gills (28 %), brown spots (28 %) (Be and Dung, 2002). In addition, “white muscle” disease rarely appears in the prawn farming system. According to the survey, feeding technique is the main problem producing parasites in the system. However, the mortality is not too high to be considered as a severe issue. Chlorine bags hung at the inlet water source was found to be very effective for the prevention of diseases in the system based on interviewed information. Investigation was carried out to record status of parasite population in freshwater prawns from 7 diseased ponds in An Giang province in November 2002 (Be and Dung, 2002). The analysis method developed by Jan Anderson (1993) was applied in this study. All of the collected prawns were attached by protozoan parasites such as *Zoothamnium*, *Epistylis*, *Vorticella* and *Acineta*. Among these, *Epistylis* was found to be the dominant species. These protozoans were mostly detected at gills (37 %), surface body (32 %), and swimming legs (31 %) (Be and Dung, 2002). The protozoans attach to the body and appendages of prawns, and disrupt mobility and feeding. Mortality occurs only in severe cases of susceptibility. Another survey was conducted at four different provinces in VietNam from August to December 2002 (Dat and Oanh, 2002). Identification of parasite was based on the taxonomy book of John (1979). For the parasite pathogens, fouling disease is the main disease shrimp farming system. In the study, fouling protozoans were detected with various species *Epistylis*, *Zoothamnium*, *Vorticella*, *Acineta*, *Paramecium*, *Pyxycola*, and *Sphaerophyla*. Of which *Epistylis* and *Zoothamnium* were found to be a dominant taxon and usually found in gills of adult prawns. Under light microscopes, *Zoothamnium*, *Acineta* and *Paramecium* were detected at the gill of prawns in most cases, while *Epistylis*, *Vorticella* and *Pyxycola* at swimming legs. Among the four studied

provinces, protozoan parasites were commonly detected from cultivated prawns sampled from selective ponds of. Cultivated shrimps, which were collected, show a variety of parasites species despite low density. In addition, the result also revealed that the prevalence and variety of parasites differ from place to place, and from time to time.

#### 4. Conclusion

- 1- Production of large quantity of high quality and cheap source of animal protein of high nutritional value.
- 2- Control of the diseases of *M. rosenbergii* by complete prevention of introduction of pathogenic agents through water, facilities and eggs of *M. rosenbergii*.
- 3- Treatment of infectious and non-infectious disease reducing production of freshwater shrimps *M. rosenbergii*.
- 4- Solving the problem of shortage of animal proteins.
- 5- Introducing new jobs (economic and social impacts).
- 6- Servicing for the scientific research.
- 7- Drawing scheme including the endemic diseases of *M. rosenbergii* and methods of control.

#### References

1. **Be, L.M., 2002.** Investigation on diseases of giant freshwater prawn (*Macrobrachium rosenbergii*) in ponds and rice-prawn farming systems in AnGiang province, Msc. thesis (in Vietnamese).
2. **Dat, N.T., 2002.** Investigation on parasite and bacterial diseases in giant freshwater prawns (*Macrobrachium rosenbergii*) cultured in pond and rice-prawn with low density, Msc. Thesis (in Vietnamese).
3. **Frappaolo, P.J., Guest, G.B., 1986.** Regulatory status of tetracyclines, penicillin and other antimicrobial microbials drugs in animal feeds. Journal of Animal Sciences 62, 86-92.
4. **Hoa T.T.T., Oanh D. T. H. and Phuong N. T., 2000.** Characterization and Pathogenicity of *Vibrio* Bacteria Isolated from Freshwater Prawn (*Macrobrachium rosenbergii*) Hatcheries: Isolation and Identification of
5. ***Vibrio spp* from Larval Stages. Proceedings of the 2000 annual workshop of JIRCAS Mekong delta Project.**
6. **Masachika Maeda 1999.** Microbial Processes in Aquaculture. National Research Institute of Aquaculture. Nansei, Mie 516-0193, Japan
7. **Mercedes A and Anicet RB, 1994.** Improvement and update of a set of keys for biochemical identification of *Vibrio* species. Journal of Applied Bacteriology 77.719-721.
8. **Mercedes Alsina and Anicet RB, 1994.** A set of keys for biochemical identification of environmental *Vibrio* species. Journal of Applied Bacteriology 76.79-85.
9. **Morris P and Robert GH, 1995.** Classification of isolates of *Vibrio harveyi* virulent to *Penaeus monodon* larvae by protein profile analysis and M13 DNA fingerprinting. Disease of aquatic organism 21. 61-68.
10. **Te, B.Q. and Tam, V.T. 1994.** Common diseases in cultured fish and shrimp at Mekong delta - treatment and prevention methods. Agricultural Publishing House. (in Vietnamese).
11. **Lavilla-Pitogo CR, Albright LJ, Paner MG, Sunaz NA, 1992.** Studies on the source of luminescent *Vibrio harveyi* in *Penaeus monodon* hatcheries. Disease in Asian aquaculture 157-164.
12. **Ruangpan L, Kitao T, 1991.** *Vibrio* bacteria isolated from black tiger shrimp, *Penaeus monodon* Fabricius Journal of Fish diseases 14.383-388.
13. **Uno, Y. and Soo KC, 1969.** Larval development of *Macrobrachium rosenbergii* reared in the laboratory. J. Tokyo Univ. Fish., 55(2): 79-90.
14. **Oanh, D.T.T., Hoa, T.T.T., Phuong, N.T., 2001.** Characterization and Pathogenicity of *Vibrio* bacteria isolated from Freshwater Prawn (*Macrobrachium rosenbergii*) Hatcheries. Proceedings of the 2001 annual workshop of JIRCAS Mekong delta Project.
15. **Pedersen, K., T. Tiainen & J.L. Larsen, 1995.** Antibiotic resistance of *Vibrio anguillarum*, in relation to serovar and plasmid contents. Acta vet.scand. 36:55-64.
16. **Phuong, N.T., Tuan, N.A., Hien, T.T.T., Hai, T.N., Wilder, M., Ogata, H., Sano, M., Maeno, Y., 2002.** Development of freshwater prawn (*Macrobrachium rosenbergii*) seed production and culture technology in the
17. **Mekong delta region of Vietnam: A review of the JIRCAS project at Cantho University.** Anonymous, 1978. "Aquaculture in the United States - Constraints and Opportunities." National Academy of Sciences, 123 p.
18. **Fujimura, T. and H. Okamoto, 1970.** Notes on progress made in developing a mass culture technique for *Macrobrachium rosenbergii* in Hawaii proceedings 14th Indo-Pacific Fish Council, 14 p.
19. **Hanson, Joe A. and Harold L. Goodwin, 1977.** "Shrimp and Prawn Farming in the

- Western Hemisphere.” Dowden, Hutchinson and Ross, Inc., 439 p.
20. **Al – Harbi, A.H., 2003** : Bacterial flora of freshwater prawn, *Macrobrachium rosenbergii* (de Man), cultured in concrete tanks in Saudi Arabia *Applied Aquacult*, 14: 1045 – 4488 .
  21. **Al – Harbe A.H. and M.N. Uddin, 2004** : Quantitative and qualitative study of the bacterial flora of farmed freshwater prawn (*Macrobrachium rosenbergii*) larvae *J. Applied Ichthyol.*, 20: 461 – 465 .
  22. **Gil, B.G., L.T. Mayen, A. Roque, J. F. Turnbull, V. Inglis and A.L.G.Flores, 1998**: Species of vibrio isolated from hepatopancreas, haemolymph and digestive tract of a population of healthy Juvenile *penaeus Vannamei*. *Aquaculture*, 163: 1 – 9 .
  23. **Sung, H.H., S.F. Hwang and F.M.Tasi, 2000** : Responses of Giant freshwater prawn *Macrobrachium rosenbergii* to challenge by two strains of *Aeromonas* spp. *J. Inverteb pathol.*, 76: 278 – 284 .
  24. **Vijayan, K.K., I.S. Singh, N.S. Jayaprakash, S.V. Alavandi, S. Pai, Preetha, J.J.S. Rajan and T.C. Santiago, 2006** : A brackish water isolate of *Pseudomonas* sp – 102, a potential antagonistic bacterium against pathogenic vibrio in penaeid and non – penaeid rearing systems *Aquaculture*, 251: 192 – 200 .
  25. **Ruangpan, L., Y. Danayadol, S. Direkbusarakom, S. Siurairastana and T.W. Flegel, 1999**: Lethal toxicity of vibrio *harveyi* to cultivated *penaeus mondon* induced by a bacteriophage. *Dis. Aquat. Org.* 35: 195 – 201.
  26. **Vaseeharan, B. and D. Ramasamy 2003**: Control of pathogenic vibrio spp. By *Bacillus subtilis* BT 23, a possible probiotic treatment for black tiger shrimp *penaeus mondon*. *Lett. Applied Microbiol.*, 36: 83 – 87 .
  27. **Vandenbergh, J., L. Verdonch, R. Robles – Arzarena and G. Rivera, 1999** : Vibrios associated with *Litopenaeus vannamei* larvae, postlarvae, broodstock and hatchery probionts. *Applied Environ. Microbiol.*, 56: 2592 – 2597 .
  28. **Phatarpekar, P.V., V.D. Kenkre, R.A. Sreepada, U.M. Desai and C.T. Achuthankutty, 2002** : Bacterial flora associated with larval rearing of giant freshwater prawn *Macrobrachium rosenbergii* *Aquaculture*, 203: 279 – 291 .
  29. **Thompson, F.L., Y. Li, B.G. Gil, C.C. Thompson and B. Hoste et al., 2003** : *Vibrio neptunius* sp. nov., *vibrio brasiliensis* sp. nov., isolated from the marine aquaculture environment (bivalves, fish, rotifers and shrimps) *Int. J. Syst. Evol. Microbiol.*, 53: 245-252.
  30. **Lightner, D.Y., 1993**: Diseases of cultured penaeid shrimp in: *Handbook of marine culture*, vol. 1, crustacean *Aquaculture*. Mcvey, J.P. CRC Press, Boca Raton, FL. USA., ISBN: 0849302552 pp: 393 – 486.
  31. **Frappalo, P.J. Guset, G.B., 1986**: Regulatory status of tetracyclines, penicillin and other antimicrobial microbials drugs in animal feeds. *Journal of Animal Sciences* 62, 86 – 92.