

SEASONAL VARIATION IN SECONDARY VIBRIOSIS OF WILD P.MONODON ALONG THE SOUTH EAST COAST OF TAMIL NADU

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Abstract

The present study investigates the protection of shrimp *Penaeus monodon* against *Vibriosis* (bacterial infection) most serious pathogens affecting shrimp industry world- wide. Diseased *Penaeus monodon* collected from South East Coast of Tamil Nadu Ramesh waram to Chennai (9.17 N^o 79.22^o E, 28 13.04 N^o 80.17 ^oE) to study the seasonal variation in *Vibriosis* infection. The study revealed that during summer season vibriosis infection were recorded. The highest Percentage of infection were recorded in Nagapattinam (7.65%) followed by the least percentage at Karaikal have been recorded (1.62%). The autumn season study revealed no *Vibriosis* infection highest Percentage of infection were recorded in Portnova 4.95%. The least was observed Velankanni at 2.15% The Rainy season *Vibriosis* infection was recorded the highest rate of infection at Mallipattinam (98.54%) least was observed at Adirampattinam (55.30%). During winter season *Vibriosis* infection was recorded the highest rate of infection at Nagore (49.58%) followed by least was observed at Mallipattinam (12.00%). Analysis of presumptive *Vibrio* count (PVC) on TCBS in infected shrimps was estimated comparatively higher than 5×10^4 CFUg⁻¹) observed in uninfected shrimp samples.

Key Words: *P.monodon*, *Vibriosis*, TCBS, Bacterial infection, seasonal variation.

INTRODUCTION

The World's Oceans, which cover more than 70% of the earth's surface, has been considered as rich source of compounds possessing novel structures with rich biological activity, Asia has always led world production of cultivated shrimp with a market value of billions of US dollars per year. India is ranked among the top five shrimp farming countries globally. It is one of the largest producers of the black tiger shrimp *Penaeus monodon* in the world. However, *Penaeus monodon* is the only one species cultured and it constitutes about 95-99% of total farmed shrimp production of the country. There is no doubt about the suitability of *P.monodon* for farming as a candidate species with highest growth rate and high market value. Disease is one of the major constraints for aquaculture production. Have meant the bacterial disease caused by pathogens such as *Vibrio*. *Vibrio spp* is one of the major bacterial pathogens in *Penaeus monodon* (Fab) (Black tiger shrimp) and it affects the shrimp culture, hatcheries and pond ecosystem. Infection by *Vibrio spp* occur under conditions of injury, biotic and abiotic stress prawns and other fishes. *Vibrio sp* are aquatic bacteria that are widely distributed in fresh water and estuarine and marine environments. Some species are pathogens of aquatic animals including shrimp e.g (*Vibrio harveyi*, *Vibrio parahaemolyticus*, *Vibrio vulnificus*) *Vibrio sp* are commonly observed in shrimp hatcheries.

Vibrio harveyi is known as one of the most harmful bacteria infecting mainly tiger prawn at various stages. WSSV (white spot syndrome virus) alone or along with secondary bacterial infections, have inflicted severe

economic damage in many shrimp farms located in maritime's states in India and in other Asian countries. Among bacterial disease success full health management programme depends on prompt, efficient and accurate diagnosis of disease and pathogen Bacteria are associated with both epidemic and endemic diseases of shrimp *Penaeus monodon* and have caused large scale mortalities. The proliferations of this opportunistic pathogenic *Vibrio* are the major cause for the mortality of shrimps when the *Vibrio* load increased in the culture system it resulted in weakening of animal and ultimately facilitated the carrier of viruses. *Vibrio sp* are the most important bacterial pathogens of shrimp *Penaeus monodon*. *Vibriosis* are among the most abundant cultivable microbes in aquatic environments (Heidelberg *et al.*, 2002) and usually constitute a part of normal micro flora in farmed and *Penaeid* shrimps. Pathogenic *Vibriosis* usually invade the host through the hepatopancreas, the common target organ of most bacterial pathogen of shrimps. A comparison of *Vibriosis* in water, sediment and shrimp ponds from east and west coast of India has been made by (Gopal *et al.*, 2005). Elevated organic loading from shrimp farming activities can result in an increase in the abundance of heterotrophic bacteria as they are active degraders of organic matter. Generic composition of heterotrophic isolates in an aquaculture pond has shown the predominance of *Vibrio spp*, (Ganesh *et al.*,2010).

Vibrio harveyi is one of the most important etiologic agents and it can cause up to 100% mass mortality of larvae in the hatchery stage of *Penaeid shrimp* culture system. (Manfield *et al.*, 2000).

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Received: December 18, 2016 | Accepted: January 21, 2017 | Published Online: February 28, 2017

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Conflict of interest: None declared | Source of funding: Nil

Shrimp diseases have also been reported to be associated with the increase of vibrio population in culture pond waters (Sung *et al.*, 2001). Generally the prawns attacked by vibrio show clinically symptoms of reddish black and some of the outer organ seem red, particularly the gills and limbs. When the prawn looks lit a night, it will be followed by the occurrence. Vibrio infections appear to exert the most significant constraints on the growth and survival o crustaceans under culture conditions. Expansions of the aquaculture industry in light of this problem, new approaches are urgently required to enhance yield by improving brood stock and larval sourcing, and promoting best management practices to control disease problems. Hence objective of the present study was to determine Seasonal Variation in Secondary Vibriosis Of Wild *P.monodon* Along The South East Coast Of Tamil Nadu. By Thiosulphate Citrate bile Salt Sucrose Sugar (TCBS) understand the bacterial infection in *P.monodon*.

MATERIALS AND METHODS

The diseased *Penaeus monodon* showed necrosis and black spots were collected from the South East Coast of Tamil Nadu from Rameshwaram to Chennai (9.17 N ° 79.22°E, 79. 22°E , 28 13.04 N ° 80. 17 °E) The samples were aseptically collected from the coast culture of stool or rectal swab samples on TCBS agar and other selective and nonselective media and the morphology were observed. The samples were subjected to bacterial analysis.

Isolation of Virbio: (Aneja, 1994)

The infected samples showed block spots and melanisation were selected for the analysis. The samples were placed on Thiosulphate Citrate Bile Salt Sucrose (TCBS-Himedia, Mumbai pH 8.5± 0.2) agar plates. After incubation the colour morphology of colony were observed. The isolates were subjected to series o biochemical batteries. The isolates were characterized (Holt *et al.*, 1994. Alsina and Blanch 1994).

RESULTS

The survey on the seasonal variation in Vibriosis infection study sites revealed the following observation (Table1).

During summer season Vibriosis infection were recorded. The highest Percentage of infection were recorded in Nagapattinam (7.65%) followed by the least percentage at Karaikal have been recorded (1.62%). The autumn season study revealed no Vibriosis infection highest Percentage of infection were recorded in Portnova 4.95%. The least was observed Velankanni at 2.15% The Rainy season Vibriosis infection was recorded the highest rate of infection at Mallipattinam (98.54%) least was observed at Adirampattinam (55.30%). During winter season Vibriosis infection was recorded The highest rate of infection at Nagore (49.58%) followed by least was observed at Mallipattinam (12.00%). Analysis of presumptive Vibrio count (PVC) on TCBS in infected shrimps was estimated comparatively higher than 5×10⁴ CFUg-1) observed in uninfected shrimp samples.

DISCUSSION

In the present study the different areas in Tamil Nadu, Wild *P.monodon* investigated for the Vibriosis infection. Among the study sites Cuddalore, Adirampattinam, Nagapattinam, Karaikal, Portnova, Poombukar, Mallipattinam, Tharangampadi, Nagore, Velankanni. were shown to be affected severely by The Vibriosis infection could be due to the location of shrimp farms near vicinity of infected ponds or the adjacent farms cultivating species *P.monodon* which is more susceptible to Vibriosis (Chakaraborty *et al.*, 2002). Comparable differences in seasonal changes affected the bacterial infection. (Badhul Haq *et al* 2014) observed changes on appearances Vibriosis on the carapace top of the exoskeleton of whitish spots was intensively noticed on the lateral region of the carapace and cuticle which were seen with the size of 20 µm and 10 µm in diam.

Temperature fluctuation and low temperature and identified as risk factors for Vibriosis infection, while an increase in temperature can be a risk factor for an outbreak in pond-cultured *P.monodon* (Tendenica,*et al.*,2010). Salinity had been another factor having significant association with Vibriosis outbreak. As the temperature raises high to 33-35°C in summer season infected farms also increased (Rakhibul Islam, 2014) studied on the occurrence of Vibriosis revealed that seasonal variation occurred to Vibriosis infection in the

Table I Seasonal variation of Vibriosis infection along the South East Coast of Tamil Nadu.

Places	SUMMER			AUTUMN			RAINY			WINTER		
	Total	Vibriosis	%	Total	Vibriosis	%	Total	Vibriosis	%	Total	Vibriosis	%
1 Cuddalore	360	12	3.33%	372	10	2.68%	185	59.29%	93.58%	305	76	24.91%
2 Adirampattinam	270	12	4.44%	279	12	4.30%	198	55.30%	83.24%	346	79	22.83%
3 Nagapatinam	235	18	7.65%	312	13	4.16%	176	65.67%	86.56%	296	66	22.29%
4 Karaikal	432	7	1.62%	316	07	2.21%	168	61.31%	68.97%	287	92	42.79%
5 Portnova	372	20	5.37%	323	16	4.95%	150	57.69%	66.15%	269	32	19.39%
6 Poombukar	369	21	5.69%	316	21	6.64%	255	73.69%	61.84%	340	29	20.71%
7 Mallipattinam	237	16	6.75%	343	16	4.66%	270	98.54%	67.15%	310	15	12.00%
8 Tharangampadi	197	13	6.59%	410	13	3.17%	280	94.59%	83.10%	279	12	11.42%
9 Nagore	210	12	5.71%	322	12	3.72%	210	80.76%	80.53%	179	60	49.58%
10 Velankanni	275	18		279	06	2.15%	206	78.62%	85.49%	125	29	28.71%

wild *P.monodon* reported that the rapid changes in salinity and temperature at seasonal variation to change the water depth minimizing the abrupt changes in due to sudden rainfall proper liming and feeding can be maintained to ensure good health condition of shrimp *P.monodon* sludge removed from the pond should be disposed of in a place where washing back into the system is prevented. The effect of seasonal variation in *Vibriosis* infection can be mitigated by the implementation of the identified protective factors (Mahmudul Alam, 2014).

CONCLUSION

However, in recent years, the production of cultured shrimp *P.monodon* has markedly decreased because of serious *Vibriosis* bacterial disease outbreaks. Especially block spots,) infection, several studies to control the disease have been done, In this study, initiative taken to find out the seasonal changes occurs associated with *Vibriosis* infection in the shrimp *P.monodon*.

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