Ecol. Env. & Cons. 17 (3) : 2011; pp. (589-591)

Occurance and abundance of parasitic copepods in marine fish *Lates calcarifer* from bay of Bengal-Visakhapatnam

M. Ratnakala, P. Ragava Kumari and K. Sree Ramulu

Department of Zoology, Andhra University, Visakhapatnam 530 003, Andhra Pradesh, India

(Received 20 November, 2010; accepted 17 March, 2011)

ABSTRACT

A survey of parasitic copepods in marine fish *Lates calcarifer* was carried out for a period of one year i.e, August 2009 to July 2010.A total number of 75 fishes was examined. Out of 75, 40 were male and 35 were female fish .The total number of parasitic copepods collected were 177. The infection was more in male fishes than female.

Key words: Lates calcarifer, Copepods, Bay of Bengal, Visakhapatnam.

Introduction

Copepods have come under intense scrutiny with the development of rearing fish in sea cages, due to the most notorious pests affecting wild and cultured marine fish spices (Chinabut, 1996; Lester and Hyward 2006). The gills are favorite site for the attachment of several parasitic copepods. They damage the gills by feeding on the delicate tissue of the gill lamellae , leading to a loss of respiratory surface area (Pillai ,1985) .The Presence of parasitic copepods cause stress to fish (Seivers *et al.*1996; Ho ,2000). More than 2,000 species of copepods are Parasites can cause Pathogenic effects resulting to an important economic incidences (Kabata , 1958 ; 1984 ; Faliex and Morand 1994 ; Sasal *et al.* 1996; Athanassopoulou *et al.* 1999 ; Company *et al.* 1999 and Ramdane ,2009). The copepods occupy a Privileged place in the world map of parasitism, because of their extraordinary adaptive capacity.

Materials and Methods

Fishes were collected from local fish market and also fishing harbour of Visakhapatnam and were brought to the laboratory .The fish were cut opened and gill racks were observed for parasitic copepods. Identification was made based on taxonomical key. To study the prevalence and intensity of infestation, the following records were made for each fish, the date of collection, length and sexes of fish, the number of parasitic copepods in each fish.

Results and Discussion

The marine fish Lates calcarifer collected from Visakhapatnam coast was found infested by *Lernanthropus* sps and *Diplectanum* sps of copepod

Corresponding author - E-mail:

INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH & DEVELOPMENT

ISSN: 2278 – 0211 (Online)

A Study On Trematodes, Nematodes, Acanthocephalan And Copepod Parasites Of Lates Calcalifer In West Godavari And Krishna Districts Of Andhra Pradesh

M.Ratnakala
Department of Zoology, Andhra University, Visakhapatnam, Andhra Pradesh, India
M. Phani Kumar
Department of Zoology, Andhra University, Visakhapatnam, Andhra Pradesh, India
K. Sree Ramulu
Department of Zoology, Andhra University, Visakhapatnam, Andhra Pradesh, India

Abstract:
The paper deals with identification of trematode, Nematodes, Acanthocephalan and Copepod parasites of Lates calcalifer collected from west Godavari and Krishna districts of Andhra Pradesh during 2009-2011. Totally one digenean, two nematodes, three acanthocephalans and two copepods were collected and identified.

Key words: *Lates calcalifer, Erilepturus hamati , Raphidascaris sp. Protorhadinorhynchus sp, Rhadinorhynchus africanus, Serrasentis, Lernanthropus latis , Caligus*

INTERNATIONAL JOURNAL OF SCIENTIFIC & TECHNOLOGY RESEARCH VOLUME 2, ISSUE 7, JULY 2013 ISSN 2277-8616

The Length-Weight Relationship And Condition Factor Of *Lates Calcalifer* In West Godavari And Krishna Districts Of Andhra Pradesh

M.Ratnakala, M. Phani Kumar, K. Sree Ramulu

ABSTRACT: The paper deals with the length-weight relationship and condition factor of Lates calcalifer collected from west Godavari and Krishna districts of Andhra Pradesh during 2009-2011. The length of the sampled specimens of Lates calcarifer varied from 11 cm to 70 cm. The total length ranged between 14 cm and 64 cm with a mean varies from 16.58 to 64, and weight ranged between 280g and 3000 g and corresponding mean varied between 324.34 and 2940 in 2009 - 2010 While the total length ranged between 14 cm and 65 cm with a mean varies from17.14 and 63.9, and weight ranged between 280g and 3700 g and corresponding mean varied between 339.38 and 3400 in 2010 - 2011.

Key words: *Lates calcalifer*, condition factor, length-weight relationship, fish culture.

INTRODUCTION

Length-weight relationship is of great importance in fishery assessments. The relationship indicates the taxonomic differences and events in the life history, such as metamorphosis and the onset of maturity. It also denotes the fatness and general well-being of a fish or groups of fishes. To obtain the relationship between total length and other body weight are also very much essential for stabilizing the taxonomic characters of the species [1]. Length-weight relationships are important in fisheries science, notably to raise length frequency samples to total catch, to estimate biomass from underwater length observations, to evaluate fish growth and body condition *etc.* Length and weight data are a useful and standard result of fish sampling programs. [2] Observed that Culture of Asian sea bass *Lates calcarifer* (Bloch) in brackish water tide-fed ponds growth and condition factor based on length and weight under two feeding systems.

MATERIAL AND METHODS

All length-weight relationships presented here are the product of field studies conducted during 2009-2011 in and around Bhimavaram ponds in West Godavari district of Andhra Pradesh, and are consistent with the format suitable for inclusion in fish base. Measurement of the length and weight of the fish were resorted to immediately after the specimens were procured and brought to the laboratory. The fish were first wiped with a blotting paper to remove excess wetness. Then lengths of the fishes were taken on a measuring board with 0.1 cm gradation and weighed individually on a weighing scale of 0.5 gr sensitivity. Monthly length data were organized into various groups with 1.0 cm class intervals.

- *M.Ratnakala, M. Phani Kumar, K. Sree Ramulu*
- *Department of Zoology, Andhra University, Visakhepatnam- 530 003, Andhra Pradesh, India.*

Numbers of fish in each size group were expressed in terms of length as well as percentage, separately. Length and weight data of 102 specimens, 21 females measuring 34.3 cm to 65 cm in length and 81 males measuring 14 cm to 61.7 cm in length were made use of in the present study. Data on each sex was noted and analysed separately, following Peterson's frequency method. During the present investigations, length-weight relationship of either sex of the fish, *Lates calcarifer* was calculated separately using the formula:

$$W = aL^b \text{ or } W = aL^n$$

Where,

W - Weight of the fish

L-length of the fish

a - constant and

b or *n* - exponent

The expressions were later on transformed to logarithmic form using the expression

$$\text{Log } W = \log a + b \log L$$

Where, *a* - intercept of the line on Y- axis and

b - slope of the regression line

Subsequently, the identity of regressions between the males and females was found out from the Student's't' test. Coefficient of correlation (r) between the measures of length and weight were also determined. The regression coefficient of each group was tested for significance of difference from 'Cube' relation employing Students't' test .

t= B-b/standard error of 'b'

Where, B - cube value (3) and

b – regression coefficient

Research Inventy: International Journal Of Engineering And Science
Vol.4, Issue 9 (September 2014), PP 38-42
Issn (e): 2278-4721, Issn (p):2319-6483, www.researchinventy.com

Biochemical Compositions in Muscle and Liver of Normal and Infected Fish of *Lutjanus Johni* off Visakhapatnam Coast

*[1]Sowjanya Pilla, [2]Ratnakala M, [3]Vijaya Lakshmi M and [4]Sree Ramulu K

Department of Zoology, Andhra University, Visakhapatnam-530 003. A.P. India
Department of Zoology, Andhra University, Visakhapatnam-530 003, A.P. India
Department of Zoology, Andhra University, Visakhapatnam-530 003, A.P. India
Head of the Department, Department of Zoology, Andhra University, Visakhapatnam-530003

Abstract: Proteins, lipids and carbohydrates in muscle and liver tissues were studied with respect to different seasons in *Lutjanus johni*. Lipids are elevated in infected liver tissues, 10.27mg/g, (±0.58). Whereas decline of protein has been observed in infected muscle tissue 74.60mg/g, (±2.61) compared with normal fish 78.29mg/g. ±1.86. Some fluctuations have been observed in total carbohydrate content in infected fishes.

***Key* Words:** Carbohydrates, Lipids, *Lutjanus johni* and Proteins.

I. INTRODUCTION

The snapper family, Lutjanidae, belongs to the order Perciformes, the largest order of vertebrates, with 148 families, 17 genera and nearly 9,300 species. *Lutjanus johni* (Bloch, 1792) are commercially important fish species distributed in tropical to temperate regions all over the world Allen[1], Polovina and Ralston [2]. The present study has been held for a period of wo years (2010-2012) aimed at conducting a detailed investigation on the biochemical constituents i.e., proteins, carbohydrates and lipids in muscle and liver tissues were studied with respect o different seasons.

II. MATERIAL AND METHODS

To find out the constituents of proteins, lipids and carbohydrates in *Lutjanus johni* samples were collected at regular seasonal intervals for two years from Visakhapatnam Coast. After recording the necessary morphmetric and meristic characters of the fish collected from the study area the specimens were dissected immediately to avoid decomposition. Muscle samples were removed without skin; liver was removed separately from fish samples.

The tissue was kept in hot air oven at 60° C for about a week to dry the material. After drying the tissue samples were pulverized and ground into a fine powder with the help of a porcelain mortar. The powder was preserved in desiccators for later use. Individually weighed powder samples were used for the quantitative estimation of proteins, lipids and carbohydrates in muscle and liver tissue. All the chemicals used were of analar grade.

The protein content of the muscle tissue was estimated by following Lowry's method (1951). The total lipids were extracted from the dry tissues, by following the method of Folsch *et al.*, (1957). Anthrone in sulphuric acid can be used for colorimetric determination of sugars, methylated sugars and polysaccharides Dubois *et al.*, (1956).

III. RESULTS

Analysis of biochemical composition was carried out in season wise samples of muscle and liver tissues of normal and infected fishes (infected with metazoan parasites) (Graph 1&2).

3.1 PROTEINS:

The maximum value of protein content in *Lutjanus johni* muscle occurred as 85.56 mg/g(±1.39) during the year of 2010-2011 in monsoon period and minimum values in post-monsoon season 75.01 mg/g (±1.95). In the year 2011-2012 also having maximum value 84.92 mg/g (±1.11) in monsoon and minimum value encountered as 73.99 mg/g (±3.51) in post-monsoon season. While the minimum values of protein content in infected *Lutjanus johni* muscle occurred as 74.60 mg/g (±2.61) and maximum value is 81.56 mg/g (±2.50) during the season of 2010-2011 and minimum value in post monsoon 72.8 mg/g (±2.53) and maximum value in monsoon 81.21mg/g (±2.42) during 2011-2012. During post-monsoon infected muscle encountered high value 75.71 mg/g (±2.58) than normal muscle value 75.01 mg/g (±1.95) of 2010-2011.

IOSR Journal of Pharmacy and Biological Sciences (IOSR-JPBS)
e-ISSN: 2278-3008, p-ISSN:2319-7676. Volume 9, Issue 3 Ver. IV (May -Jun. 2014), PP 36-40
www.iosrjournals.org

Histology and Histopathology of the *Lutjanus johni* (Bloch, 1792) and *Lutjanus russelli* (Bleeker, 1849) from Visakhapatnam Coast, India

Sowjanya Pilla*[1], Rajesh Konathala[2], Ratnakala M[1], Sree Ramulu K[1]
1Department of Zoology, Andhra University, Visakhapatnam-530 003. A.P. India
2 Department of Pharmacology, Andhra University, Visakhapatnam-530 003. A.P. India
**Author for Correspondence*

Abstract: *Histopathologic changes caused by digeneans and nematodes in the liver of Lutjanus johni (Bloch, 1792) and Lutjanus russelli (Bleeker, 1849) were studied. For this purpose histological sections were prepared and stained by routine procedures with haematoxylin and eosin and mounted permanently in Canada balsam. Photographs of selected portions were prepared in support of the damage caused by the parasites. The histopathologic changes caused by the Paracryptogonimus hirastrictus Manter, 1963 (Digenea: Cryptogonimidae) and Raphidascaris lutiani Raillietet Henry, 1915 (Nematoda: Heterocheilidae) include severe destruction and necrosis liver tissue. Destruction of epithelial cells, inflammation and an increase in thickness of sub-mucosa, atrophy and aggregation of inflammatory cells between hepatocytes.*
Key Words: *Atrophy, Canada balsam, Digenea, Eosin, Haematoxylin, Hepatocytes, Necrosis, Nematoda, Paracryptogonimus hirastrictus and Raphidascaris lutiani.*

I. Introduction:

Lutjanus are commonly known as Snappers and belong to the family Lutjanidae. These are rocky fish and abundantly occur throughout the Indian coast. These fishes are commercially known for their delicacy as food fish and have good quality of proteins and other nutrients. They harbour a wide variety of parasitic fauna.

The aim of the present study is to evaluate histology and histopathological alterations caused by the metazoan parasitic fauna in gill and liver of the *Lutjanus johni* and *L.russelli*.

Fish liver is a very interesting model for the study of interactions between environmental factors and hepatic structures and functions (Brusle and Anadon 1996; Velvoka and Kostoski, 2005). Thus research on fish liver is important, especially in the field of problems induced by aquaculture conditions, aquatic pollution and diseases (Gochfeld, 2003; Bertolucci *et al*., 2008).

Many workers have made contributions to the histopathological diagnosis of liver. Rocha *et al*., (1997) described the liver of brown trout, *Salmo trutta* (Teleostei, Salmonidae). Rodrigues and Fanta, (1998) made investigation on liver hisopathology of the fish *Brachydanio rerio*). Moniruzzan (2000) made investigation on disease of some small indigenous fresh water fishes. Mohamed (2001) studied on the histological structures of the liver and intestine of *Oreochromis niloticus* and *Tilapia zilli*. Camargo and Martinez (2007) studied on histopathology of gills, kidney and liver of Neotropical fish caged in an urban stream. Marina *et al*., (2007) also defined histopathology of gills, kidney and liver of Neotropical fish. Fatma and Mohamed (2009) studied histopathological studies on *Tilapia zillii* and *Solea vulgaris*.

Many parasitologists studied histopathology caused by helminth parasites which cause damage to its habitat with the strong armed holdfast organs. The distribution of parasites within the fish liver is variable and they may damage the liver at the point of their attachment. Pathological consequences of parasitic diseases of fishes are well documented and serve as an evidence to support the view that parasites are one of the main causes of mortality in fish population (Paperna and Vanas, 1983 and Orecka-Grabda, 1991).

Pathological studies have been made earlier by several authors on the trematodes in fish which include that of Hoswell (1973), Gupta and Sharma (1974), Srivastava and Mukherjee (1976), Bose and Sinha (1979), Barbarna (1980), Muzzal (1980), Lester (1980), Chung Yui-tan (1981), Christina (1982), Bhargavi and Krishna (1983), Pike and Burt (1983), Sinha*et al*., (1988), Agarwal and Agarwal (1989), Zaman (1990), Watson *etal*., (1992), Coleman (1993), Sharadamma (1994), Ismail (1996), Nelson *et al*., (1997), Dezfuli*et al*., (1995, 2002, 2003), Laxma Reddy and Benarjee (2006) and Rio-Zaragoza *et al*., (2010).

II. Material and methods:

Specimens of the *Lutjanus* species were collected from the Visakhapatnam coast for pathological observations. After the dissection of the fish, the whole gill was removed from fish and examined for copepod parasites. Pieces of gill tissue with attached parasites were fixed in susa, dehydrated with alcohol and embedded

10.27: Ethnomedicinal remedies of *Bagatas* for curing stomachache

B. Sandhya Sri*, M. Ratna Kala and T.V.V. Seetharami Reddi
Department of Botany, Andhra University, Visakhapatnam 530 003
Email: sandhyasri9@gmail.com

The ethnobotanical data presented here is the outcome of a series of intensive field studies conducted during 2009-11. The paper provides information on the use of plant crude drugs for the treatment of stomachache used by *Bagata* tribe. They inhabit mostly in Visakhapatnam district in abundance and rarely in the neighbouring Vizianagaram and Srikakulam districts. As per 2001 census the total population of *Bagata* in the state is 1, 33,434 out of which 1, 30,301 present in Visakhapatnam district alone. They occupy highest social status in hierarchy. Agriculture is the major source of livelihood. The study area falls under 11 agency mandals of the former. It lies between 17°-34' 11"and 18°-32' 57" N latitude and 81°-51' 49"and 83°-16' 9" E longitude with altitudes varying between 900-1200 m covering an area of 6,298 km² i.e., 56.4% of the total geographical area of the district.

This paper enumerates the traditional uses of 46 plant species belonging to 43 genera under 30 families used to cure stomchache. Three new plants and 24 new practices were also reported. Enumeration is also reports the medicinal uses, details of part(s) used, methods of preparation, dosage and combination with other plants, if any.

Stomachache is a common problem in India. There is a need for conservation of these valuable plants because many of which are on the verge of extinction. The data collected can be possibly used as the potential source for making herbal or modern medicines against stomachache and can be treated as a document for preserving the ethnomedical knowledge for posterity.

International Journal of Pure and Applied Mathematics
Volume 119 No. 14 2018, 1448-1455
ISSN: 1314-3395 (on-line version)
url: http://www.acadpubl.eu/hub/
Special Issue

http://www.acadpubl.eu/hub/

APPLICATION OF FUZZY COMPREHENSIVE EVALUATION METHOD FOR HUMAN CAPITAL EVALUATION IN A SERVICE ORGANIZATION

*MSV. Prasad, **Dr. B. Sandhya Sri, &*** Dr.M. Ratna Kala
*Head –Department of Finance, GITAM Institute of Management – GITAM-Vizag-India
** Associate Professor, *** Associate Professor – Mrs. AVN College, Visakhapatnam – India

ABSTRACT

Purpose: The chief objective of this paper is to evaluate human capital of select Indian service organization through application of Fuzzy comprehensive evaluation method. Performance Evaluation of Human Resource Management is an uncertain concept; in the other world it is fuzzy, therefore, to judge it by precise mathematical knowledge is unrealistic. This paper applied fuzzy systems method to work out a comprehensive evaluation of human capital of a service organization with an objective of helping organizations like Port with their performance evaluation.

Design/Methodology/Approach: The study has used fuzzy comprehensive evaluation method for performance evaluation. It begins with identifying the parameters related to human capita and which is again categorized into sub categories. Since each indicator has different significance, relative weights were derived for each category by using fuzzy AHP approach. A total of 300 employees in Port has giving their impression on different indicators. Based on their rankings and relative weights, evaluation matrix was derived which was later used to form comprehensive evaluation metric.

Findings: The results show that the evaluation result of human capital of the Port is nearly good in the range of 5 to 6. Membership degree calculation shows that if an organization's full value is 100% then only 58.9% is fulfilled, due to comprehensive influence of the different factors.

Research Limitations/implications: Study is confined to single service organization and this study is concentrated on Human Capital rather than Intellectual Capital.

Practical Implications: This paper applied fuzzy systems method to work out a comprehensive evaluation of human capital of a service organization with an objective of helping organizations like Port with their performance evaluation.

Originality/Value: Adoption of fuzzy comprehensive evaluation method along with fuzzy Analytical Hierarchy Process (AHP) for evaluation of human capital is a new methodological approach among Indian companies. And further the paper shows how readily the human capital can be evaluated through fuzzy comprehensive evaluation method.

Key words: human capital evaluation – application of fuzzy AHP – fuzzy comprehensive evaluation method-case study -Indian Port.

INTRODUCTION

Human capital has aroused widespread concern with the development of the knowledge-based economy, in recent years. Human capital is organic synthesis of all kinds of human that acquires over value in the proceeds, which in turn warrants an organization to achieve sustainable competitive advantage. Human capital is relatively independent and the first capital of intellectual-based economy. Human capital is the inevitable outcome in a knowledge-based economy where knowledge has become a determinant capital for enterprise to retain and improve competitive advantage. Contrast to the traditional capital can be measured in accordance with financial reports. It is a new challenge for the organizations to evaluate the performance of human capital.

On the other hand a huge body of literature demonstrates a positive linkage between the development of human capital and organisational performance. The emphasis on human capital in organisations reflects the view that market value depends less on tangible resources, but rather on intangible ones, particularly human resources. Recruiting and retaining the best employees, however, is only part of the equation. The organisation also has to leverage the skills and capabilities of its employees by encouraging individual and organizational learning and creating a supportive environment in which knowledge can be created, shared and applied.

SCOPUS

Jour of Adv Research in Dynamical & Control Systems, Vol 10, 04-Special Issue, 2018

Assessing Community Capacity towards Climate Induced Water Shortages: Bridging Institutional players and Local Actors in Rural India

[1]Dr. B.Sandhya Sri, [2]Dr. M. Ratna Kala, [3]Dr. MSV. Prasad
[1] Reader, Dept. of Botany, Mrs. AVN College, Visakhapatnam, India
[2]Reader,, Dept. of Zoology, Mrs. AVN College, Visakhapatnam, India
[3]Head, Dept. of Finance, GITAM Institute of Management, GITAM, Visakhapatnam, India

Abstract- Growing concern for capacity of rural communities to manage current water shortages & to prepare for shortages may accompany predicted changes in climate. Concepts of climate adaptation & particularly "capacity building" used to elucidate several determinants of community level capacity for water management. Concepts & criteria then used to interpret empirically derived insights relating to local management of water shortages in Rural Visakhapatnam in India. General determinants of water-related community capacity relate to upper tier political &institutional arrangements; characteristics of, & relationships among, pertinent agencies, groups, or individuals involved in water management. Case analysis illustrates how general factors play out in local experience. Findings point to specific factors influence effectiveness of management. Key factors include collaboration between Punchayts/Communities, clarification of Community roles & responsibilities, & participation of rural stakeholders.

There are opportunities for water management and climate adaptation research communities to contribute knowledge for improving the capacity of local agencies to manage water resources. One practical way forward is through empirical work that identifies adaptation approaches currently used and documents factors that facilitate or impede successes at the local level.

This paper presents empirical analysis of local capacity for water shortage management in Visakhapatnam District whose population is 50 lakhs a fastest growing city in India. The paper combines conceptual notions of climate adaptation and capacity with empirically derived findings relating to a local experience in water management in order to document and interpret local strategies, identify conditions influencing past successes (or failures) resident in either the local community or institutional realm, and draw out implications for understanding better those factors that enhance or limit community capacity.

Study has presented a summary of selected factors thought to be influential in the capacity of communities to adapt to water shortages, expressed as indicator questions.

Keywords: Rural community, water shortages, water resources, empirical analysis

1. Introduction

The poor conservation outcomes that followed decades of intrusive resource management strategies and planned development have forced policy makers and scholars to reconsider the role of community in resource use and conservation. In a break from previous work on development which considered communities to hinder progressive social change, current writing champions the role of community in bringing about decentralization, meaningful participation, cultural autonomy, and conservation (Chambers and McBeth, 1992; Chitere, 1994; Etzioni, 1996). But despite its recent popularity, the concept of community rarely receives the attention or analysis it needs from those concerned with resource use and management.

We seek to redress this omission by investigating "community" in work concerning resource conservation and management. We begin by exploring the conceptual origins of the community, especially as it relates to writings on resource use. The ensuing analysis reveals that three aspects of community are most important to those who advocate a positive role for communities in water resource management - community as a small spatial unit, as a homogenous social structure, and as shared norms.

We suggest a more political approach. Community, we argue, must be examined in the context of conservation by focusing on the multiple interests and actors within communities, on how these actors influence decision making, and on the internal and external institutions that shape the decision-making process.

A focus on institutions rather than "community" is likely to be more fruitful for those interested in community-based adoption to water shortage caused due to climate change. We conclude by suggesting that research and policy move away from universalist claims either for or against community. Instead, community-

ISSN 1943-023X
Received: 5 Mar 2018/Accepted: 10 Apr 2018

CIBTech Journal of Zoology ISSN: 2319–3883
Online, International Journal, Available at http://www.cibtech.org/cjz.htm
2022 Vol.11, pp.63-67/Praveena and Ratnakala
***Research Article** (Open Access)*

EFFICACY OF PROBIOTICS ON WATER QUALITY AND *VIBRIO* LOADS IN COMMERCIAL SHRIMP FARMS OF *PENAEUS VANNAMEI* AT NAKKAPALLI, ANDHRA PRADESH, INDIA

***Praveena M. and M. Ratnakala**
Dept. of Zoology, College of Science and Technology, Andhra University,Visakhapatnam, A.P., India
**Author for Correspondence*

ABSTRACT
During the course of present study the significant reduction in *Vibrio* colonies in the experimental ponds in both summer and winter crops were recorded with the application of probioitcs. The study was conducted with the application of probiotics in culture ponds of Nakkapalli, Visakhapatnam, Andhra Pradesh, India. During the culture, application of feed probiotics in combination with the immunostimulants yielded better growth, survival rate and more successful crop free of diseases. Success rate and productions were high in the ponds where probiotics were applied when compared to the control ponds. The results of the present study during both crops shows that periodic and systematic application of probiotics in shrimp culture yields better, economical and successful crops in the commercial production of *Penaeus vannamei* in coastal Andhra Pradesh of India.

Keywords: *Probiotics, Vibrio, P. vannamei*

INTRODUCTION
According to Saulnier *et al.,* (2000) for shrimps *V. harveyi* and *V. penaeicida* are considered as true pathogens. In shrimp culture ponds of Tamil Nadu, India among the bacterial diseases of shrimp, infection caused by *V. harveyi* stood first place reported as by Felix (2000). According to Selvin and Lipton (2003) occurrence of *V. alginolyticus* was always together with the WSSV infected *P. monodon.* Vaseeharan and Ramasamy (2003) reported that the possible source of vibrio in hatcheries was infected post larvae and *Artemia* nauplii with *Monodon Baculo Virus* (MBV). As opportunistic pathogen, vibrio can infect the post larvae when the count level increases to $2x10^2$ cfu/ml, which leads to mass mortality. According to Abraham and Palaniappan (2004) *V. harveyi* (94.05%) and *Vibrio orientalis* (54.1%) were observed as dominant luminescent bacterial species in shrimp hatcheries located at Tamil Nadu, India. The chief source of these bacterial species in shrimp hatchery was the fecal matter of brood stock as observed the bacterial cells of 97.30% and 2.70% in the gut content of the shrimp. Thakur *et al.,* (2004) studied about the vibrio loads of shrimp ponds and the number of colonies observed and ranged from $1.8x10^1$ to $7.8x10^4$ cfu/ml. The number of colonies increased with the culture duration and highest number was noticed on 122^{nd} day of culture. Whereas infected shrimp showed more number of vibrio colonies of $8.3x10^6$ cfu/g of hepatopancreas. He also reported for the species of vibrios such as *V. parahaemolyticus*, *V. alginolyticus*, V. *anguillarum* and *V. vulnificus*. Gopal *et al.,* (2005) observed vibrio bacterial species that occurred in water, sediments and shrimps from culture ponds of East and West Coast of India. They reported that more vibrio population was in culture ponds from West Coast i.e. 104 cfu/ml when compared to the culture ponds from East Coast i.e. 102 cfu/ml.
According to Abraham and Sasmal (2009) abundance of the heterotrophic population is varies in different environmental conditions, therefore heterotrophic population is influenced by environmental factors. They observed number of heterotrophs in pond water and sediment ranged from 104-106/ml and 105-107/g respectively.