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FOOD AND FEEDING HABITS OF *ORATOSQUILLA NEPA* (CRUSTACEA-STOMATOPODA)

A. SREELATHA AND P. A. JOHN*

Department of Aquatic Biology and Fisheries, University of Kerala, Trivandrum - 695 007.

ABSTRACT

The seasonal fluctuations in the dietary components of *Oratosquilla nepa* have been studied on the basis of analyses of the gut contents over a period of one year from June 1984 to May 1985. Modified 'points' method was adopted for the quantitative estimation of the dietary items. A quantitative analysis of the diet when combined with a qualitative analysis reveals that *O. nepa* is a bottom feeding carnivore. This niche does not seem to alter either with size, sex or season. Under strict confinement in the laboratory, cannibalistic tendency was observed. Not much difference was noticed in the preference on the major items of food in the different length groups.

INTRODUCTION

THOUGH a fairly extensive study has been made on the taxonomy of stomatopods, very little attention has been devoted for biological studies such as food and feeding habits. Food and feeding habits often help in finding out the seasonal variation in the distribution of a species. Often the rate of feeding has a bearing on the spawning also. The nature of the food composition also throws light on the possible habitats the species frequents. Since stomatopods are not economically very important, no earnest attempt has hitherto been made to study the biology from the south west coast of Kerala. This has promped the present investigation and this paper deals with a detailed study on the qualitative and quantitative aspects of the food, seasonal variation in different size groups variation of diet according to sexes, food preferences, feeding intensity of different size groups and sexes of the species *O. nepa*.

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* Formerly Professor, Department of Aquatic Biology and Fisheries, Trivandrum.

MATERIAL AND METHODS

The study is based on regular monthly collection of *O. nepa* from Neendakara, a fishing harbour near Quilon in Kerala. A total of 600 specimens ranging in size from 41 mm to 115 mm were grouped into three length groups of 41 mm — 65 mm, 66 mm — 90 mm and 91 mm — 115 mm. After recording the relevant morphometric data, sex and stage of maturity of the gonad were recorded. Then the stomach was dissected out and preserved in 5% formalin for subsequent gut analysis. As the contents were in a finely digested state it was difficult for the identification of the different food items.

There is no method exclusively for crustaceans for the analysis of the stomach contents. Hence the qualitative and quantitative analysis of the stomach contents were made by following the 'modified points method' of Bhatnagar and Karamchandni (1970) adopted

for fish. In order to get an overall picture of food preference the method adopted by Natarajan and Jhingran (1961) was also carried out.

The gut contents were examined microscopically and recorded. Feeding intensity was calculated based on the method adopted by Know (1950). The intensity of feeding or the feeding index was recorded based on the state of distension of the gut and the amount of food contained in it. The stomachs were categorized into heavy, good, moderate, poor and empty by visual estimation of the stomach distension and the amount of food they contained.

'Per capita points' gained by the specimens for a particular month also gives an idea about the intensity. For this 50, 40, 20, 10 and 0 points were allotted to heavy, good, moderate, poor and empty stomach. The total points gained by the monthly samples when divided by the number of specimens in the sample gave the per capita points.

RESULTS

Quantitative and Qualitative Analysis of the Gut Contents

The analysis of the different food items was found difficult as the food items were found in a crushed manner due to the action of the mandibles. An examination of the gut contents of *O. nepa* revealed the presence of the following :

Crustacean remains seem to be the most important constituent of the food of this species and this was found during all the months. Crustacean remains included the different body parts of prawns or the same species under study. Amphipods were of rare occurrence and mainly represented by *Gammarus* species. Heavy concentration of detritus was found in the gut contents in almost all the months. Fish scales and skeleton were found during all the months. Semidigested flesh was found to occur in almost all the months. Foraminiferans were found to occur in all the months represented by *Anomalina* and *Diffucilina* spp. Bits of gastropod shells were of rare occurrence. Tiny eggs were found to occur in all months except September. Sand particles were of regular occurrence in all the months. It cannot however be ascertained whether minor items of food are being inadvertently included in the real diet of the species.

FOOD PREFERENCE OF DIFFERENT LENGTH GROUPS

The dietary composition of the three length groups, 41-65 mm 66-90 mm and 91-115 mm are given in the Table I.

From the Table we can infer that detritus was preferred as the most favourite food item of all the length groups although in the first length group (41-65 mm) the percentage of crustacean remains stood slightly above that of detritus there being no significant difference in percentage between the two. It is evident that there does not exist much difference towards their preference on the major items in the different length groups. The order of preference is varied only in the case of minor items.

FEEDING ACCORDING TO SEX

From the Table I it can be inferred that in both males and females the order of preponderance is the same. The sex of the species does not influence the dietary composition. Both the males and females of *O. nepa* nourish on the same kind of food in varying amounts.

FEEDING INTENSITY

The data regarding the monthly variation in the feeding indices are presented in Table II.

A marked fluctuation in the feeding intensity was observed in different months. The feeding index ranged between 66% (January) to 10% (August).

With regard to sex there is no significant difference in the feeding intensity. Both the sexes follow a similar pattern and showed the same fluctuation in the rate of feeding in different months. In the females the actively fed ones ranged between 7.41% in August and 71.43% in January. The feeding indices fluctuated among the males between 13.04% in September.

Not much difference was noticed in the intensity of feeding in the different length groups.

The per capita points and feeding index almost showed a similar trend in fluctuation as seen from the Table.

DISCUSSION

Since the food and feeding habits of this species have never been previously studied other than casual general statements, a comparison of the diet of this species with earlier observations has become rather impossible.

TABLE I The nature of food items in the three length groups, Males, Females and the total Population of *O. nepa*

Foot Items in %	I Length group 41-65 mm	II Length group 66-90 mm	III Length group 91-115 mm	Total Population	Males	Females
Crustacean Remains	28.96	27.85	20.90	26.59	24.70	27.87
Detritus	28.86	29.63	32.69	29.26	28.60	29.37
Sand Particles	27.32	22.91	20.80	23.65	21.60	22.67
Fish Remains	10.29	5.17	9.67	5.49	6.75	6.34
Semidigested Flesh	8.87	5.84	9.30	5.84	8.18	6.42
Mollusc	9.72	5.36	3.14	3.00	3.87	4.28
Foraminiferans	6.62	5.21	6.47	4.41	5.95	4.73
Egg	5.08	4.82	9.89	4.69	5.46	4.90

TABLE II Per capita points and feeding index of *O. nepa* in total population and in the different sexes

Months	Per capita points	Feeding index (Total population)	Feeding index Females	Feeding index Males
June	22.6	32	42.86	18.18
July	22.4	30	27.27	35.70
August	13.8	10	7.41	13.04
September	32.6	64	68.18	60.71
October	20.2	30	20.59	50.00
November	20.2	28	25.00	30.00
December	18.2	24	22.22	26.09
January	37.2	66	71.43	59.09
February	25.2	38	37.04	39.13
March	23.8	38	37.50	38.46
April	29.4	54	62.86	33.33
May	19.6	24	24.00	24.00

A quantitative analysis of the diet when combined with a qualitative analysis reveals that *O. nepa* is a bottom feeding carnivore. This ecological niche does not seem to alter either with size, sex or season. According to Menon and Chacko (1956) fishes feeding on algae, mollusc, worms and whose gut contains sand particles in fair proportion are benthic feeders. If this characterisation is to be relied upon, *O. nepa* is also a benthic feeder.

It can be seen from the data that in the total population analysis the three length groups of *O. nepa* subsist mainly on detritus and crustacean remains. More preference for any one of the two items cannot be perceived taking the whole year into consideration, the intake is balanced by these two items. The order of preference is almost the same in the three length groups and in the total population. No shift in food item was noticed as *O. nepa* grows in size.

Sand particles conspicuously are not an edible item of food and do not have any nutritive value. It may be attributed to accidental intake of sand grains during feeding. When the quantity of detritus consumed was high there was relatively high percentage composition of sand particles. From this it is evident that sand particles are consumed along with the detritus. A similar observation has been made in *M. idella idella* by Jayachandran (1984). The ventrally placed mouth and the bottom feeding habits may account for the presence of large quantities of sand particles and detritus.

Sex based differences might be expected to develop, however, under some circumstances such as prior to spawning or when males and females of the fish select different habitats (Ringler 1976). In the present investigation, males and females seem to inhabit together as no difference in dietary composition is observed under laboratory conditions in close confinements the cannibalistic tendency of this species under starved condition was observed.

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