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Interpretation on the food and feeding habits of *Dascyllus trimaculatus* (Ruppell, 1829) from Gulf of Mannar, South East coast of India

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ABSTRACT

A study of the food and feeding habits are helpful in beneficial for fisheries management and conservation. Feed in relation to size of the fish was also studied by tabulating percentage composition of different food items against the size groups. Feeding habits were inferred from the nature of food organisms consumed by the fish of various sizes in different seasons. The study indicates the preference of both sexes D. trimaculatus for Crustaceans followed by Amphipods, Isopods, Polychaetes, Nematodes, Mollusca, Detritus, Mud and Miscellaneous, which constituted more than half of the stomach contents throughout the study period.

Key Words: Food, habits, different size, *D. trimaculatus.*

INTRODUCTION

Foods are among the most important exogenous factors is essential for the sustainability of every living organism throughout its life span and feeding is a continuous process to derive energy for their future activities[(1)]. It is one of the key factors that profoundly influence the distribution, growth, reproduction, migration rate and behaviour which are largely dependent on the availability of preferred prey organisms[(2)]. The feeding habits of marine fish, such as the predatory prey relationships are useful in order to assess the role of marine fish in the ecosystem. The previously studied different aspects of food and feeding habits of some fish species from marine waters [(3, 4, 5, 6, 7, 8, 9)]. The present study deals with food and feeding of the commercially important ornamental fish is also greatly beneficial for fisheries management and conservation and also the natural diets of fish species is very useful approach for understanding aspect of the species biology and ecology.

MATERIALS AND METHODS

The study was conducted along the Gulf of Mannar during January 2010 to December 2010. Seasonal sampling at different depths was carried out by means of an otter trawl in collecting different size of the ornamental fish (Threespot dascyllus) *Dascyllus trimaculatus* for using Fiberglass boat and 40– 50 mm size of the mesh. After collection, the fishes were stored in ice boxes and the stomachs were removed and fixed 10% buffered formalin. The stomach contents were later analyzed in the laboratory, gut contents of 7 different size groups as given in the Table - 1 & 2. Immediately after the collection the standard length of the fishes were recorded before removing the gut. After dissecting of the alimentary system, different components of the guts were recorded. They were split

open by a pair of scissors and emptied in a petri dish for examination with the help of zoom dissection binocular microscope. The food items were identified up to the family level wherever possible. During the analysis, regurgitated stomach was discarded [10]. Occurrence method is the simplest way of recording the food relating to the number of gut containing one or more individuals of each food item and the number were expressed as percentage of all guts those containing food. The frequency of various components in the food of the species was estimated by the occurrence method [11] and the same was expressed in percentages.

RESULTS

Table 1. Percentage of dietary composition of different food items in different size groups of male *D. trimaculatus* during January 2010-December 2010.

S.No	Size group (mm)	No. of animals	Crustaceans	Amphipods	Isopods	Polychaetes	Nematodes	Mollusca	Detritus	Mud	Miscellaneous
1	82-90	10	21.3	16.2	12.1	7.8	6.5	5.9	15.3	3.5	12
2	91-99	10	26.4	12.7	10.2	9.5	8.2	7.1	14.1	4.7	7.2
3	100-108	10	27.1	14.6	14.6	13	5.9	4.6	13.9	2.5	4
4	109-117	10	24.3	18.3	11.9	10	6.1	5.9	12.2	1.4	10
5	118-126	10	22.8	17.6	13.2	9.2	8.5	7.2	7.9	7.6	6.3
6	127-135	10	24.5	18.5	12	8.1	9.7	6.3	7.6	7.9	5.4
7	136-144	10	23.8	10.2	11.3	7.6	8.3	8.1	7.3	14.3	9.2
	Average	**10**	**24.3**	**15.4**	**12.2**	**9.3**	**7.6**	**6.4**	**11.2**	**5.99**	**7.7**

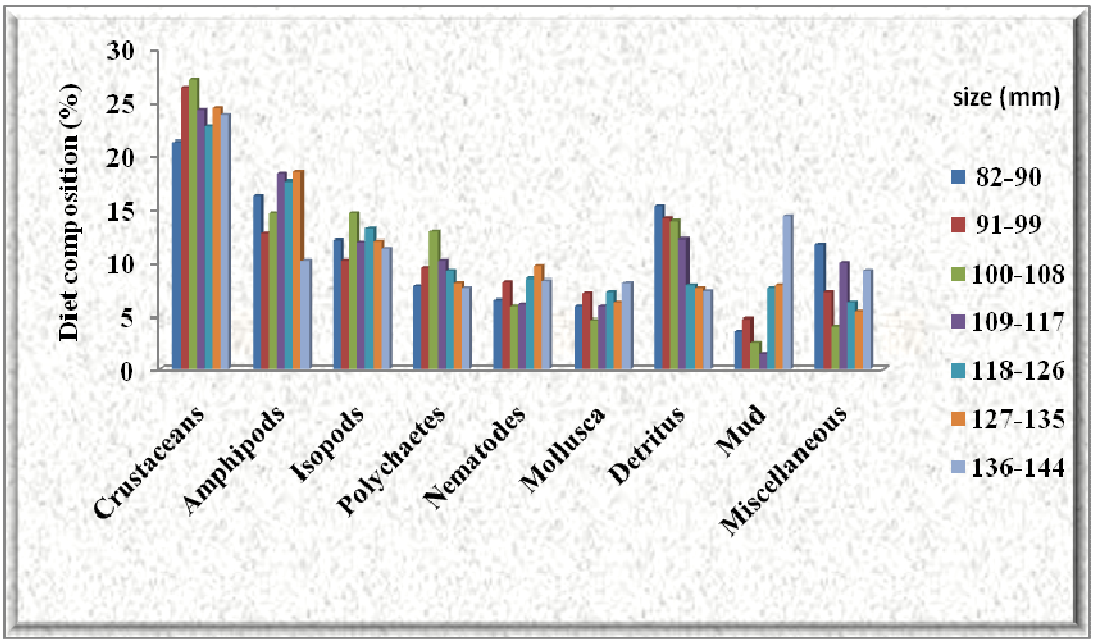

Fig1. Percentage of dietary composition of different food items in different size groups of male *D. trimaculatus* during January 2010-December 2010.

Table 2. Percentage of dietary composition of different food items in different size groups of female *D. trimaculatus* during January 2010-December 2010.

S.No	Size group (mm)	No. of animals	Crustaceans	Amphipods	Isopods	Polychaetes	Nematodes	Mollusca	Detritus	Mud	Miscellaneous
1	82-90	10	19.3	18.6	13.1	5.8	4.9	4.2	13.7	7.9	13
2	91-99	10	18.2	19.6	14.6	6.2	5.7	5.9	14.6	6.4	9.2
3	100-108	10	24.7	21.3	13.7	9.5	6.3	5.8	12	4.3	2.4
4	109-117	10	26.3	17.5	16.2	5.9	7.2	6.1	14.3	5.2	1.5
5	118-126	10	27.6	21.8	15.2	7.3	8.9	7.3	3.7	6.5	2.1
6	127-135	10	28.9	23.5	16.8	8.3	8.1	7.6	3.6	2.1	1.2
7	136-144	10	28.7	21.3	15.3	12	9.3	5.9	2.5	4	1.3
	Average	10	**24.8**	**20.5**	**15**	**7.9**	**7.2**	**6.1**	**9.2**	**5.2**	**4.4**

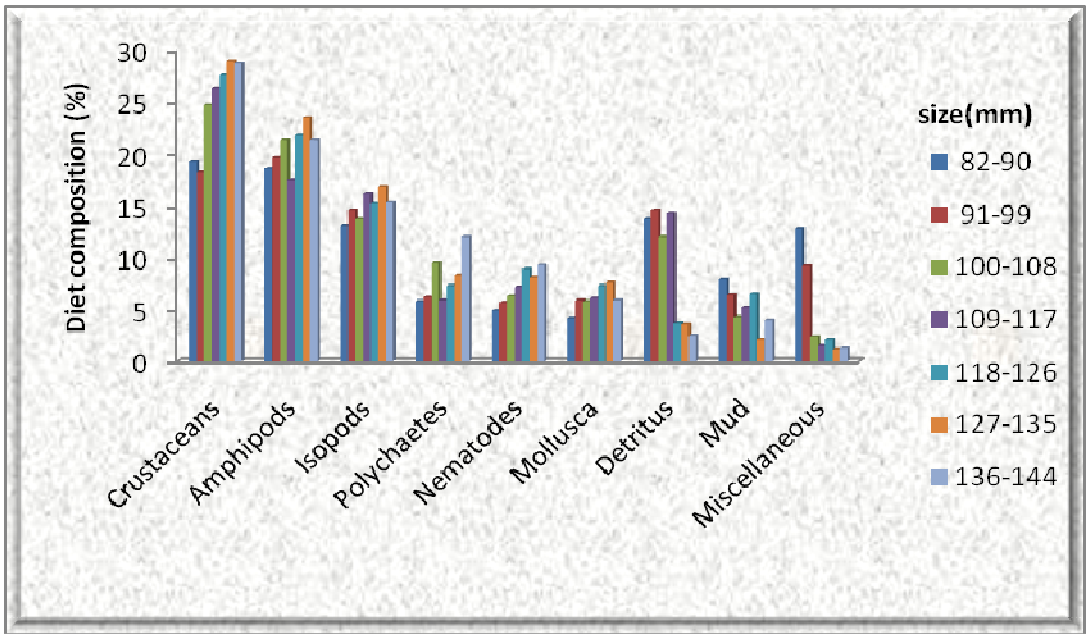

Fig2. Percentage of dietary composition of different food items in different size groups of female *D. trimaculatus* during January 2010-December 2010.

The different food items recorded from the stomach of male and female in *D. trimaculatus* during the study period are presented in Table1 and 2. The food items found in the examined stomachs prominent contribution was by crustaceans followed by Amphipods, Isopods, Polychaetes, Nematodes, Mollusca, Detritus, Mud and Miscellaneous. The total food compositions of the different male and female fishes stomach are crustacean forms the major food items in compare others (Fig 1 & 2). However, digested matter was also found in average quantities of different male fishes of crustaceans (24.3 %) followed by Amphipods (14.95 %), Isopods (12.1%), Detritus (11.1%), Polychaetes (9.3%), Nematodes (7.6%), Miscellaneous (7.6%), Mud (5.9%) and Mollusca (6.4 %) and also the different female fishes digested matter was also found in average quantities of crustaceans (24.3 %) followed by Amphipods (20.38 %), Isopods (14.9%), and Detritus (10.3%), Polychaetes (7.1%), Nematodes (6.8%), Mollusca (6.1 %), Mud (5.4%) and Miscellaneous (4.8%). This trend was same in both male and female of this fish group. But there was slight difference in feed composition in the males and females, when they are compared separately with each size groups studied.

DISCUSSION

Food and feeding habits are essential to gain information on the main preys and preference or dietary overlap between year classes [12, 13], to determine seasonal and geographical variations in dietary composition [14] to discern the dial rhythm in feeding behavior [15, 16], to estimate energy budget[15,17] and to help in modelling energy flow in a marine ecosystem [18]. The quality and quantity of food is one of the critical determinants influencing the timing of

reproduction, age at first maturity, fecundity and the survival of fish. The present study on the food and feeding habits of the *Dascyllus trimaculatus* (males and females) indicated that these species are exclusive carnivorous. There were sightings of certain fragments of crustacean appendages, broken shells of molluscs, and scales and rays of fishes in all the stomachs. The occurrence of these items in their guts throughout the year suggests food availability in fish habitat [19]. The earlier studies on the food and feeding of *D. trimaculatus* fish in red sea coast of Jordan pointed out that they feed on invertebrates such as amphipods, isopods and other crustaceans. Coral reefs are major source of feeding and refuge for fishes [20] and that the existence of certain food item in fish guts probably depends on its availability in the natural habitat [21]. The low variety of food items in food of three fish could be related to the fact that these fishes are also consuming benthic invertebrate and algae besides being plankton feeders [12].

The results obtained from the present study cannot simply be generalized due to large difference in the variation of the habitat in which they occur. They may also vary with the varying environmental conditions. The same species occupy different habitat may feed on different types of food or even in the same habitat the diet may vary at different times. The diets of most fish species changes with age and growth [22]. The time and extent of changes in food and feeding habits varies from species to species and often with changes in the life style and habitat. Most of the fishes undergo an antigenic shift in diet; this may be due to an interaction of changes in external factors such as habitat, food supply and risk of predation and internal conditions like changes in anatomical structure, behaviour and physiological demand [23]. In many species changes in diet are associated with habitat shifts [24, 25]. Changes in the size of the mouth and the oral anatomy may also correspond with ontogeny dietary shifts [26]. The past 10 years have seen significant advances in the commercial aqua cultural production of ornamental fish such as *D. trimaculatus*. However, the crustacean aquaculture industry is presently in its infancy in India and therefore it would benefit from fundamental research that seeks to examine how the growth and food conversion efficiency of candidate species can be maximized. The efficient culture of species can be compared to a length of chain. It is as strong as its weakest link. It is dependent on knowledge of nutritional requirements of the species in order to develop and deliver suitable diets to the growing animals to minimise food wastage, to promote efficient corresponding of their body weight. The information drawn in the present study on the food and feeding of *D. trimaculatus* will be of immense help for choosing correct feed for the appropriate stages during mass scale culture.

REFERENCES

[1] GV Nilkolsky; *Academic press*, New York **1963**; p. 352.
[2] S Hajisamae; LM Chou; S Ibrahim; *Coast Shelf sci* **2003**; 58:89-98.
[3] HBN Hynes; *J Anim Ecol* **1950**; 19: 36-58.
[4] SZ Qasim; *Indian J Fish* **1972**; 19: 11 – 28.
[5] MA Serajuddin; A Khan; S Mustafa; *Asian fish Sci* **1998**; 271-278.
[6] LM Rao; P Sankara rao; *Indian J Fish* **2002**; 49(1): 35-40.
[7] N Cabral; A Murta; *J Applied Ichth* **2002**; 18(1): 14-13.
[8] JP Barreiros; T Morato; RS Santos; AE De borba; *Cybium* **2003**; 27: 37-40.
[9] M Serajuddin; Rustam Ali; *Indian J Fish* **2005**; 52(1): 81-86.
[10] N Dann; *J Seq Res* **1973**; 6(4): 479 – 517.
[11] A Natarajan; AG Jhinoran; *Indian J Fish* **1961;** 8(1): 54-59.
[12] M Legand; J Rivaton; *Ocbanog* **1969;** 7:29-45.
[13] TA Clarke; *Fish Bull* US **1980**; 78(3): 619 - 640.
[14] WE Frost; J *Fish Biol* **1977**; 11: 531 – 547.
[15] DJ Staples; *J Fish Biol* **1975;** 1-24.
[16] JDM Gordon; *J Fish Biol* **1977;** 10: 417 - 480.
[17] JE Thorpe; *J Fish Biol* **1977,** 11: 55-68.
[18] CA Simenstad; BS Miller; CF Nyblade; K Thornburgh; LJ Bledsoe; *FR Inst* Univer **1979.**
[19] AL Sarker; NK Al Daham; MN Bhatti; *J Fish Biol* **1980**; 17: 635 – 639.
[20] L Fishelson; *Environ Biol Fishes* **1977;** 50: 391 - 403.
[21] MA Khalaf; AM Disi; Marine Science Station-Aqaba **1997**; 252 p.
[22] GJ Piet; *Environ Biol Fishes* **1998;** 51: 67-86.
[23] JJ Luczkovich; SF North; R Grant Gilmore; *Environ Biol Fishes* **1995**; 44: 79 - 95.
[24] JE Bailey; BL Wing; CR Matson; *Fish Bull* **1975**; 73: 846 – 861
[25] J Manoharan; D Varadharajan; B Thilagavathi; S Priyadharsini; *Advan Appl Sci Res* **2011**;2 (6):554-562.

[26] PC Wainwright; BA Richard; Environ *Biol Fishes* **1995**; 44: 97-113.