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Acetes, the preferred food of fishes along the northwest coast of India

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ABSTRACT

Acetes spp. form one of the primary food items of almost all predatory and carnivorous fishes along the northwest coast of India. *Acetes* production from India contributes to about 11.2 % of world production (130000 t) and *Acetes indicus*, the dominant species is exploited in the order of 30 to 50 thousand tonnes every year from the northwest coast of India. However, *Acetes* spp. being important for transfer of energy from one trophic level to next higher trophic level, deserve higher attention for conservation and protection. Overexploitation of *Acetes* may disturb the food chain and thus lead to depletion of food fishes in the area. This communication aims to focus on the importance, abundance and conservation of *Acetes* as food of fishes in order to support sustainable fishery in the northwest coast of India, particularly Mumbai coast.

Introduction

The epiplanktonic sergestid shrimps of the genus *Acetes* locally known as 'Javala' occur in great abundance and exploited from the coastal waters along the northwest coast of India. It is also landed as by catch in shrimp trawls besides bag nets (Dol and Bokshi). Dol net is operated upto 40m depth while Bokshi nets are operated in shallower regions mostly in creeks. Most of the time *Acetes* caught as by-catch during trawling is discarded back into the sea as low-grade and less preferred aquatic resource as compared to quality fin and shell fishes. However, it contains 15.55% moisture, 63.76% protein, 6.03% fat and 13.62% ash in dried samples (Sridhar, 1983).

Acetes occurs in surface waters (0-5m) in massive accumulation or swarms which is greatly influenced by the tidal current, precipitation and winds. Omori (1975) estimated the total average world landings of *Acetes* sp. as 13,0000 tons but Arvindakshan and Karbhari (1988) considered this estimate is much less than the actual landings. In India, it forms about 75% of the total non penaeid prawns landed annually (Nair *et al.*, 1983). Furthermore, *Acetes indicus* alone contributes about 20% of marine prawn landings and constitute seasonal fishery along the Maharashtra coast (Arvindakshan and Karbhari, 1988). Apart from its importance as food resource for costal fisher population, it also forms the most important food item of the fishes occurring along this coast.

But a large portion of the catch landed is not utilized properly due to lack of adequate storage facilities and immediate disposal system. The present work deals with the importance, need for conservation and rational exploitation of this resource.

Materials and methods

The investigation reports by various workers on food and feeding habits of different marine fishes along the Mumbai coast were referred and the percentage composition of *Acetes* in the food was noted for the present study. In addition, the fishes caught in trawl netting off Bombay during fishing operation of MFV *Narmada* (2002 & 2003) were dissected on board and the gut contents of all the fishes were analysed following volume displacement method and percentage of *Acetes* was recorded.

Results and discussion

The species of fishes analysed during

the present investigation were *Nemipterus japonicus*, *N. mesoprion*, *Protonibea diacanthus*, *Osteogeneiosus militaris*, *Otolithes cuvieri*, *Decapterus russelli*, *Megalaspis cordyla*, *Priacanthus hamrur*, *Coilia dussumieri*, *Harpodon nehereus*, *Saurida tumbil*, *Johnieus macrorhynus*, *J. sina*, *J. vogleri*, *Trichiurus lepturus* and *Lepturacanthus savala*. *Acetes* was encountered in the guts of all these fishes in varying percentage (Table 1). Among the species studied *D. russelli* (41-54%), *M. cordyla* (32-72%), *H. nehereus* (32-40%), *C. dussumieri* (45-65%), and *O. militaris* (40-41%) preferred *Acetes*.

Table 2 depicts the list of some fishes studied by other workers during different periods. The data indicates that though all these fishes consume *Acetes*, species such as *M. cordyla* (15.15-99.34%), *D. russelli* (3.44-100%), *J. macrorhynus* (2.30-64.71%) *Upeneus sulphureus* (11.51-75.87%), *Eupleurogrammus muticus* (6.79-76.68%),

TABLE 1: *Acetes* recorded in the diet of different fishes from Mumbai

Species	September (2002) (Av. percentage)	January (2003) (Av. percentage)
<i>Nemipterus japonicus</i>	30	25
<i>Nemipterus mesoprion</i>	34	38
<i>Protonibea diacanthus</i>	22	39
<i>Osteogeneiosus militaris</i>	41	40
<i>Otolithus cuvieri</i>	-	31
<i>Decapterus russelli</i>	54	41
<i>Megalaspis cordyla</i>	72	32
<i>Priacanthus hamrur</i>	15	42
<i>Coilia dussumieri</i>	65	45
<i>Harpodon nehereus</i>	40	32
<i>Saurida tumbil</i>	0.3	5
<i>Johnius macrorhynus</i>	32	18
<i>Johnieops sina</i>	35	-
<i>Johnieops vogleri</i>	15	-
<i>Trichiurus lepturus</i>	20	12
<i>Lepturacanthus savala</i>	7	30

TABLE 2. Percentage composition of Acetes in the diet of different fishes along the northwest coast of India

Species	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
<i>M. cordyla</i> Jaiswar & George (1986-88)	17.05	91.29	75.24	19.73	96.23	98.50	99.34	93.50	15.15	59.18	40.28	19.25
<i>D. russeli</i> Jaiswar <i>et al.</i> (1986-88)	32.00	3.44	5.18	51.65	58.87	24.22	40.00	100	73.99	39.90	16.75	0.00
<i>J. vogleri</i> Chakraborty (1978-82)	14.59	5.16	22.34	22.09	11.26	16.93	17.14	31.68	6.03	18.53	7.55	2.13
<i>O. cuvieri</i> Chakraborty (1978-82)	23.22	16.73	12.44	2.86	24.66	50.70	12.19	0.00	45.10	54.84	31.41	36.19
<i>J. macrorhynchus</i> Chakraborty (1978-82)	18.40	7.51	30.77	9.90	64.71	56.65	57.99	19.67	19.22	2.30	17.66	19.09
<i>T. maculatus</i> Roy (1976)	0.35	0.1	0.35	0.55	1.68	3.56	17.51	1.2	0.1	2.38	1.65	9.56
<i>L. savala</i> Ray (1996-97)	51.96	-	2.97	20.00	3.70	-	-	-	-	13.04	8.89	3.63
Rizvi (1997-99)	33.1	20.92	1.43	30.63	4.47	-	-	14.23	-	59.6	3.56	3.56
<i>T. muticus</i> Rizvi (1996-97)	24.47	66.15	68.49	48.63	57.86	-	-	-	6.79	30.38	63.88	76.68
<i>A. atropus</i> Kochar (1987-88)	27.6	31.0	35.0	14.0	-	-	67.0	89.5	63.5	60.0	67.0	47.0
<i>C. malabaricus</i> Kochar (1987-88)	55.5	65.5	80.0	-	-	-	45.0	33.5	36.0	-	42.0	51.0

Atropus atropus (14.0-89.5%) and *Carangoides malabaricus* (33.5-80.0%) feed exclusively on *Acetes* during certain months. According to Jaiswar and George (1991) *Megalaspis cordyla* and as per Jaiswar *et al.*, (1993) *Decapterus russelli* feed selectively on this food item. Apart from the data listed in Table 2, several workers have studied food and feeding habits of fishes from northwest coast and reported very high percentage of *Acetes* in the gut contents. Manojkumar (1988) recorded about 51.5% of *Acetes* sp. in the food of *Otolithoides biauritus* on an average during six months of study. Similarly,

Johnson (1989) found 94% *Acetes* in the diet of male and 80% in female of *Ilisha megalopectera*. Kamat (1989) reported annual percentage value as 50.82 and Index of preponderance as 72.46 for *Acetes indicus* in *Johnius glaucus*. The shark, *Scoliodon laticaudus* which normally feeds on larger prey by hunting had devoured a sizable quantity of *Acetes* sp. every month (Mathew Joseph, 1992). In coastal waters of Maharashtra *Acetes indicus* is the major food item of fishes, prawns and cephalopods (Deshmukh, 1988). The results of the present investigation as well as that of other workers on food and feeding habits of

fishes from Bombay revealed very high percentage of *Acetes* in the gut of these fishes. This is a direct indication of abundance of *Acetes* in the area which supports rich fishery along the north west coast.

Babenard *et al.* (1973) indicated that in shallow waters of the continental shelf off north west coast of India existed a good amount of detritus varying between 2 to 5 mg / m² and is higher than 5mg/ m² off Bombay. This large quantity of detritus in Mumbai waters supports the abundance of *Acetes indicus*, the dominant species in the region (Deshmukh, 2002). Nair *et al.* (1983) also reported high percentage of *Acetes* in the zooplankton off Versova. Omori (1975) suggested the spawning grounds of *Acetes* as neritic waters from where they are caught in abundance in various fishing gears. According to Deshmukh (1993), in Maharashtra the average annual catch of *Acetes indicus* was 24275 tonnes in 1980-82. It formed 74.4 % of the *Acetes* landings and 51.2% of total non penaeid prawn catch, while in Gujarat and Andhra, *Acetes* formed 41 and 48.74% of non penaeid prawn respectively. He reported that the MSY and mean biomass for the species to be 52000 tonnes and 636.7 tonnes respectively. To reach the MSY, efforts have to be increased by a factor of 24, which he suspects is not possible as *A. indicus* is a by-catch of Bombay duck fishing in the dol net. Since the Bombay duck is already overexploited, the increase in fishing efforts of dol net for exploitation of *A. indicus* will lead to further decline in Bombay duck fishery as both coexist in the same fishing ground in abundance. However, the idea of exploiting more *Acetes* may harm the fishery of the area as it is the primary food for about 80-90% of the fishes in coastal waters along the north west coast

and many fishes feed selectively on *Acetes* species viz. *Megalaspis cordyla*, *Decapterus russelli* and *Harpodon nehereus*. Over exploitation of *Acetes* will lead to scarcity of preferred food item of many fish species and this may compel the fishes to migrate in search of food leading to decline in the fish catch of the area. Bombay duck resorts to cannibalism in the absence of *Acetes* which forms its preferred food. This can affect the Bombay duck fishery as such by reducing the stock.

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