Rizvi College of Arts, Science & Commerce

Department of Zoology
TYBSc SemVI
Fishery Biology

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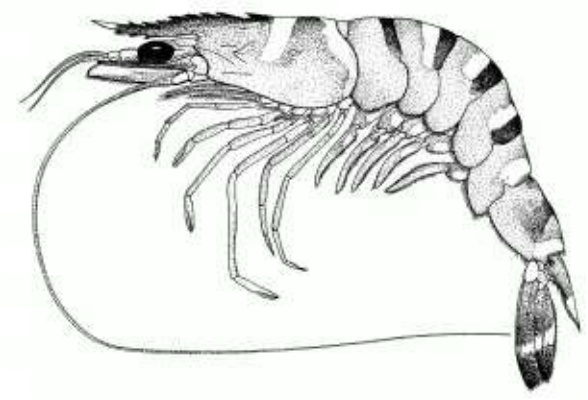
Unit 2: Marine shell fish of India

2.1 Crustacean fisheries

Crustaceans form a large, diverse arthropod taxon which includes such familiar animals as crabs, lobsters, crayfish, shrimps, prawns, krill, woodlice, and barnacles. They are distinguished from other groups of arthropods, such as insects, myriapods and chelicerates, by the possession of biramous (two-parted) limbs, and by their larval forms, such as the nauplius stage of branchiopods and copepods.

1. *Penaeus monodon (Giant tiger prawn)*

Penaeus monodon, commonly known as the giant tiger prawn or Asian tiger shrimp (and also known by other common names), is a marine crustacean that is widely reared for food.



Characteristics

Females can reach about 33 cm (13 in) long, but are typically 25–30 cm long and weigh 200–320 g; males are slightly smaller at 20–25 cm long and weighing 100–170 g . Similar to all penaeid shrimp, the rostrum is well developed and toothed dorsally and ventrally. The carapace and abdomen are transversely banded with alternative red and white. The antennae are grayish brown. Brown pereiopods (each of the eight walking limbs of a crustacean, growing from the thorax.)and pleopods (a forked swimming limb of a crustacean, five pairs of which are typically attached to the abdomen.)are present with fringing setae in red.

Distribution

Its natural distribution is the Indo-Pacific, ranging from the eastern coast of Africa and the Arabian Peninsula, as far as Southeast Asia, the Pacific Ocean, and northern Australia.It is an invasive species in the northern waters of the Gulf of Mexico[4] and the Atlantic Ocean off the southern US.

Habitat

Penaeus monodon mature and breed only in tropical marine habitats and spend their larval, juvenile, adolescent and sub-adult stages in coastal estuaries, lagoons or mangrove areas. In the wild, they show marked nocturnal activity, burrowing into bottom substratum during the day and emerging at night to search for food as benthic feeders. Under natural conditions, the giant tiger prawn is more of a predator than an omnivorous scavenger or detritus feeder than other penaeid shrimp. After moulting, the new shell is still soft which causes prawns to become vulnerable and they may subsequently be eaten by their predators or companions. Adults are often found over muddy sand or sandy bottoms at 20-50 m depth in offshore waters. Wild males posses spermatozoa from around 35 g body weight and females becomes gravid from 70 g. Mating occurs at night, shortly after moulting while the cuticle is still soft, and sperm are subsequently kept in a spermatophore (sac) inserted inside the closed thelycum of the female. There are five stages in ovarian maturation; undeveloped, developing; nearly ripe; ripe; and spent. P. monodon females are highly fecund with gravid females producing as many as 500 000 to 750 000 eggs. Spawning occurs at night and fertilization is external with females suddenly extruding sperm from the thelycum as eggs are laid in offshore waters. Hatching occurs 12-15 hours after fertilization. The larvae, termed nauplii, are free swimming and resemble tiny aquatic spiders. This first stage in larval development does not feed but lives on its yolk reserve and passes rapidly through six moults. The next larval stages [protozoea, mysis and early postlarvae (PL) respectively] remain planktonic for some time and are carried towards the shore by tidal currents. Protozoea, which have feathery appendages and elongated bodies, moult three times and then metamorphose into the mysis stage. Mysis, which have segmented bodies, eyestalk and tails characteristic of adult shrimp, also moult three times before metamorphosing into PL with similar characteristics to adult shrimp. The PL subsequently change their habit to feed on benthic detritus, polychaete worms and small crustaceans after PL 6. Juvenile and adolescent stages can tolerate salinity conditions as low as 1-2‰.

Economic Importance:

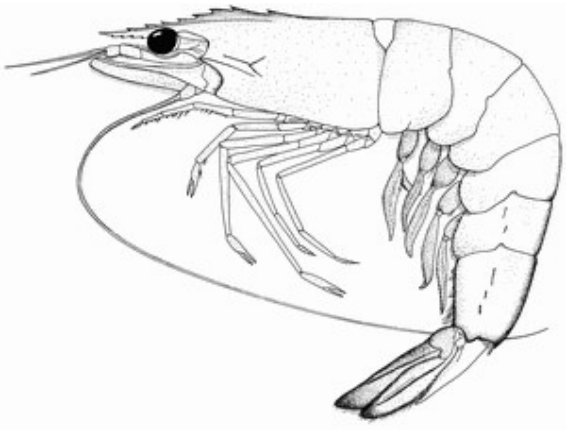
Penaeus monodon is the second-most widely cultured prawn species in the world.In 2009, 770,000 tonnes were produced, with a total value of US$3,650,000,000.[1] P. monodon makes up nearly fifty percent of cultured shrimp alone.The Tiger prawn is popular to culture because of its tolerance to salinity and very quick growth rate.

Diseases

They are very vulnerable to fungal, viral, and bacterial infections. Diseases such as white-spot baculovirus and yellow-head virus have led to a great economic impact in shrimp industries around the globe. They can receive transmitted diseases from other crustaceans such as the Australian red claw crayfish (Cherax quadricarinatus). The Red claw crayfish is susceptible to the yellow head virus and has shown to transmit it to the Black tiger prawn in places like Thailand.

Crafts and Gears

Bamboo traps are traditionally used for the partial harvest of selected large shrimp in extensive culture.A bag net is used for Semi-intensive ponds.. Due to its burrowing habit, a drag net is not practical unless it is installed with electric shock gear to stimulate the shrimp to jump.



2. *Penaeusn indicus (Indian prawn)*

The Indian prawn (Fenneropenaeus indicus, formerly Penaeus indicus), is one of the major commercial prawn species of the world.*P. indicus* is known by many common names around the world, including Indian white prawn, Tugela prawn, white prawn, banana prawn, Indian banana prawn and red leg banana prawn etc. The Indian prawn is used for human consumption and is the subject of a sea fishery

Characteristics

Shrimp have an exoskeleton (the "shell") that is periodically shed during moulting to allow further growth. The thorax has a spine called the rostrum, one pair of eyes, two pairs of antennae, three pairs of maxillipeds for feeding and five pairs of walking legs. Each abdominal segment except the telson has a pair of fins called pleopods on the ventral side. Shrimp use the pleopods for forward swimming and the telson and pleopods to propel backwards rapidly when the abdomen is flexed. The maximum carapace length is 56 mm.

The body is semi-translucent, with olive green to grey-blue speckles . The pereopods are generally the same colour as the body. Pleopods are pink or red and the distal part of the uropods green or red, with the fringe of setae usually red. Juveniles are whitish, with specks of the same colour as adults

The carapace is hairless. The rostrum is slender and long, with 7 to 9 teeth on the dorsal and 4 to 6 teeth on the ventral margin, with the blade of rostrum becoming moderately high in large specimens Males are identified by a petasma . Females have a closed thelycum.

Distribution

Penaeus indicus is found from the Indo-West Pacific: East and South East Africa to South China, Papua New Guinea and North Australia

Habitat

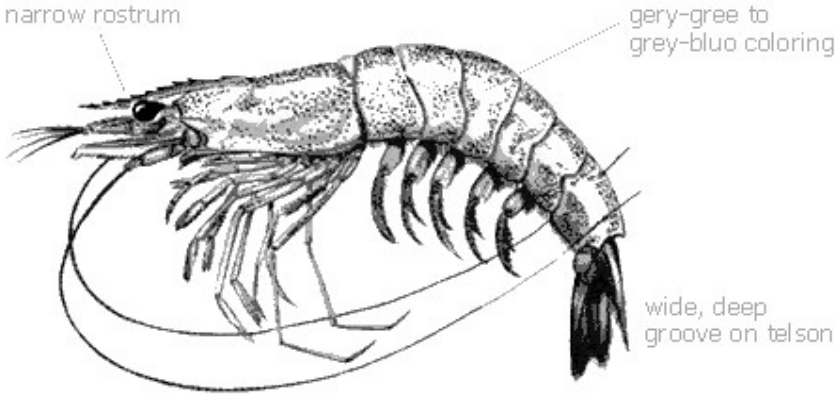
F. indicus is a marine decapod with estuarine juveniles. It prefers mud or sandy mud at depths of 2–90 metres It grows to 22.8 centimetres and has a life span of 18 months. After hatching, free-swimming nauplii are obtained, which further passes through protozoea, mysis and then to postlarval stage, which resembles the adult prawn. The postlarvae migrate to the estuaries, feed and grow until they attain a length of 110–120 mm, and these sub adults return to the sea and get recruited into fishery.It is also commonly used in shrimp farming.

Crafts and Gears

In traditional farming harvesting is done by fitting conical nets on the sluice gates and opening them during low tide. The shrimp are trapped in the net as the water recedes. The remaining shrimp are harvested by cast netting. In semi-intensive and intensive practices, harvesting is done by complete draining of the pond. The rest of the shrimp are collected by hand.

3. ***Metapenaeus affinis (Jinga shrimp)***

*M. affinis*locally known as the Jinga shrimp. It forms about 12% of all India marine prawn landing



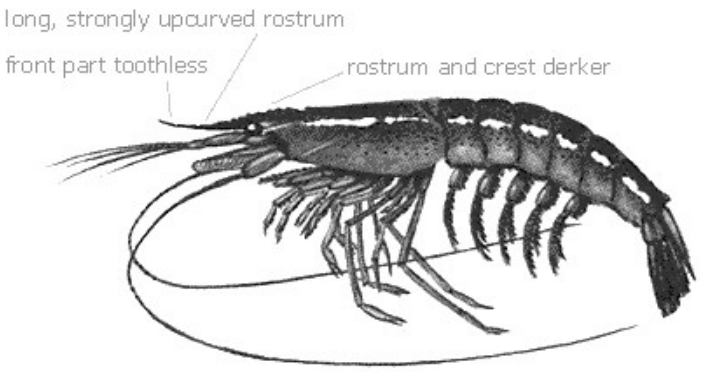
■ Metapenaeus Affinis

Characteristics

Narrow rostrum curved with nine or more dorsal teeth. Eyes very large. strong spines on bases of chelipods, no exopods on fifth pair of walking legs. Fecundity is 88,000 to 3,63,000 eggs

Colour:Bluish – green over a translucent body.

Size:At maturity time the length of the brown shrimp is estimated to be around 11.9 centimetres. Though in certain cases the length has been seen to reach a maximum level of



■ Parapenaeopsis Stylifera

22 centimetres. Common average lengths for both males and females are mentioned to be around 17 centimetres at the outset.

Distribution

Its general distribution is along Indian coasts, Malaysia, Indonesia, Hong Kong and Japan.

Habitat

Marine,from edge subtidal to depths of 5 to 92 m. Prefers mud and sandy-mud bottoms; juveniles found intertidally

Crafts and Gears

In Mumbai 'dot net' or bag net is used. Other regions drag nets and cast nets are employed. Powered boats use shrimps trawls of various sizes.

In inshore fishing dugout canoes and plakbuilt boats with out-rigger are used. Powered fishing vessel of 7-11 m Pablo boats are also used.

4. ***Parapenaeopsis stylifera (Kiddi shrimp)***

*Parapenaeopsis stylifera*commonly called as Kiddi shrimp. The species completes its life cycle in marine environment and the larvae prefer offshores waters.

Characteristics

Long sigmoid rostrum with a proximal crest bearing 5-6 teeth strongly upcurved. Latter part of the body greenish brown, sides and appendages scarlet.

The male is distinguished from the female by its smaller size and bright colour. Males attain maturity at 65 mm and female at 75 mm. *P. stylifera* is promiscus. Mating occur throughout the year. Fertilization is external, at the time of egg-laying. The species produces an average of 39,500 eggs at 70 mm and 2,36,000 eggs at 120 mm total length.

Distribution

On the west coast of India, the species is most abundant from Veraval to the Trivandrum, but moderately available in Sind, Mekran and Kutch areas. It occurs all round on west coast.

Habit and Habitat

Parapenaeopsis stylifera does not enter the estuaries and backwaters but in the sea it appears to perform migratory movements to and from the coast. The shoreward movement commence in October. Towards the end of May, after commencement of southwest monsoon, the prawns begin to move into deeper waters.

Crafts and Gears

In Mumbai, various sizes of bag net are used for catching prawns, these are made of either cotton yarn or hemp. On North Kanara coast, the prawns are caught by shore seine. On the southwest coast of India , various types of boat seines, shore seines, drag net is used. Although indigenous gear is still employed for prawn fishing, the main gear for catching prawns at present is trawl. Echo sounding is used in some of the bigger commercial and Government owned vessels for bottom fishes and prawns.

The indigenous gears are mainely operated by dug out canoes and plankbuilt boats with out-rigger. The mechanized fishing vessels are generally 7-11 m Pblo boats, having 10-30 b.h.p. engines. At present mechanized fishing vessels are widely used and there are about 5000 mechanized fishing boats in India.