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## Biology of inshore shrimps

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Inshore shrimps support major commercial fishery in India, the penaeid shrimp production being nearly 2 lakh t and non penaeids 2.1 lakh t during 2013-14. Trawl is the major gear that catch shrimps, besides the minitrawl are prevalent along Kerala coast, thalluvalai along Tamil Nadu and trammel net along Vizhinjam-Manakudy coast. *Parapenaeopsis stylifera*, *Metapenaeus dobsoni*, *Metapenaeus monoceros*, *Fenneropenaeus indicus* are the major species landed along the south-west coast. Along the south-east coast, *Penaeus semisulcatus* dominate the fishery in Gulf of Mannar and Palk Bay and *M. dobsoni* supports commercial fishery along the Chennai coast with 15-16 other species including *Metapenaeopsis* spp. and *Trachypenaeus* spp. *M. monoceros* is the dominant species along the Andhra coast. Along the Malabar Coast *M. dobsoni*, *F. indicus* and *P. stylifera* are the important species in the fishery. In the inshore waters of Cochin *M. dobsoni* is dominant followed by *P. stylifera*. *P. monodon* is the largest of the inshore shrimps (maximum recorded size 350 mm). *Fenneropenaeus indicus*, *F. pencillatus* as well as *P. semisulcatus* also grow to large size. The penaeid shrimp species that form fishery at important landing centers of the maritime states of India are:

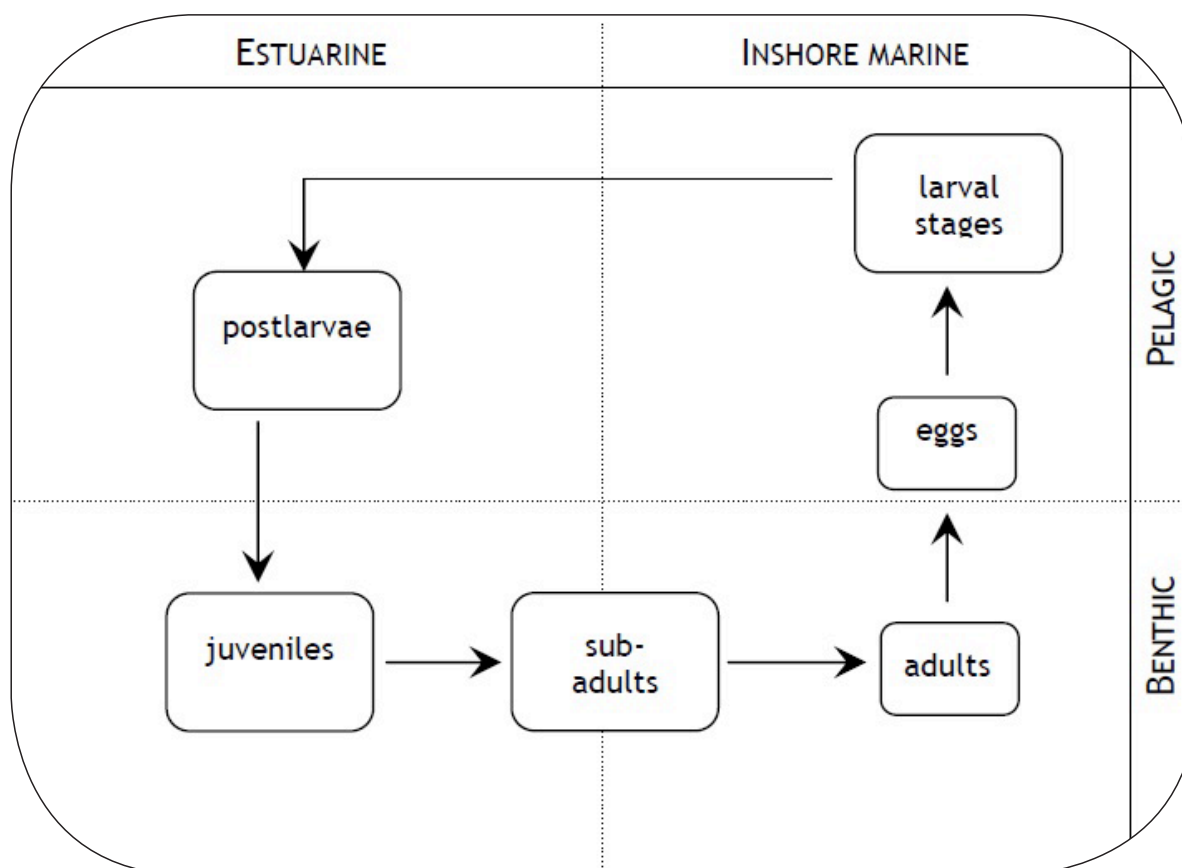
- Veraval (Gujarat) - *Parapenaeopsis hardwickii*, *Metapenaeus kutchensis*, *M. monoceros*, *M. affinis*, *Fenneropenaeus. pencillatus*, *Solenocera crassicornis*, *Fenneropenaeus merguensis*, *Parapenaeopsis stylifera*, *Parapenaeopsis sculptilis*, *Penaeus semisulcatus*, *Parapenaeus longipes*
- Mumbai (Maharashtra) - *Parapenaeopsis stylifera*, *Metapenaeopsis stridulans*, *Metapenaeus kutchensis*, *M. brevicornis*, *Fenneropenaeus merguensis*, *Metapenaeus affinis*, *Solenocera crassicornis*, *Parapenaeopsis sculptilis*, *M. monoceros*.
- Mangalore (Karnataka) - *Metapenaeus monoceros*, *Solenocera choprai*, *Metapenaeus dobsoni* and *Parapenaeopsis stylifera*
- Calicut (Kerala) - *P. stylifera*, *M. dobsoni*, *Fenneropenaeus indicus*, *Meliceratus canaliculatus*, *M.affinis*, *Penaeus*

*monodon*, *Penaeus semisulcatus*, *Trachypenaeus curvirostris*

- Kochi (Kerala) - *Parapenaeopsis stylifera*, *Metapenaeus dobsoni*, *Fenneropenaeus indicus*, *Metapenaeus affinis*, *Meliceratus canaliculatus*, *Penaeus monodon*, *Penaeus semisulcatus*, *Trachypenaeus curvirostris*
- Vizhinjam(Kerala)- *Fenneropenaeus indicus*, *Penaeus monodon* *Penaeus semisulcatus*
- Chennai (Tamil Nadu) - *Metapenaeus dobsoni*, *Parapenaeopsis maxillipedo*, *Metapenaeopsis stridulans*, *Fenneropenaeus indicus*, *Metapenaeus monoceros*, *Penaeus monodon*, *Penaeus semisulcatus*, *Metapenaeus affinis*, *Metapenaeus moyebi*, *Trachypenaeus sedili*, *T. asper*, *T. curvirostris*
- Mandapam (Tamil Nadu) - *Parapenaeopsis semisulcatus*, *Metapenaeopsis stridulan*, *Fenneropenaeus indicus*.
- Tuticorin (Tamil Nadu) - *Penaeus semisulcatus*, *Fenneropenaeus indicus*, *Meliceratus latisulcatus*, *M. canaliculatus*, *Penaeus monodon*, *Parapenaeopsis maxillipedo*, *P. stylifera*, *Metapenaeus Monoceros*, *M. dobsoni*, *Trachypenaeus curvirostris*, *T. sedili*.
- Visakhapatnam (Andhra Pradesh) - *Metapenaeus dobsoni*, *Metapenaeus monoceros*, *Metapenaeopsis sp.*, *Fenneropenaeus indicus*, *Metapenaeopsis stridulans*, *M. barbata*, *Metapenaeus moyebi*

Most of the penaeid shrimps have an estuarine phase in their life cycle. The post larvae migrate to the estuary, grow there to juveniles/sub-adults and migrate back into the Sea. The eggs, larvae and post –larvae have pelagic existence and the juveniles/subadults and adults are benthic in nature.

Several species like *Penaeus monodon*, *Fenneropenaeus indicus*, *Metapenaeus dobsoni*, *Metapenaeus monoceros*, *Metapenaeus brevicornis* support important fishery in the estuarine systems (Hoogly-Matlah in West Bengal, Mahanadi & Chilka Lake in Odisha, Godavari & Krishna in AP, Vellar & Killai backwaters and Pulicat Lake in Tamil Nadu, Cochin



backwaters & Vembanad Lake in Kerala; Narmada-Tapthi and Little Rann of Kutch in Gujarat), in India.

Penaeid shrimps are carnivorous, females are usually larger than males and have high fecundity which depends on the species, size of the female and ovary weight. They spawn throughout the year, peak seasons varying between years. Their life span is usually 2 to 2.5 years. The maturity stages in penaeid shrimps are classified as immature (IM), early maturing (EM), late maturing (LM), mature (M) and spent (SP). Stages of maturity can be ascertained externally through the exoskeleton.

*Fenneropenaeus indicus* - Indian white shrimp: Distributed all along the Indian coast but occurrence is poor along Maharashtra & Gujarat. Along the east coast it is available in good quantities up to Andhra Pradesh and gets gradually replaced by *F. merguensis* and *F. pencillatus* along the Orissa-West Bengal coast. They are more abundant along Kerala, Tamil Nadu & Andhra Pradesh. It completes its life cycle in two phase, adults mature and spawn in the sea, fertilisation being external. Larvae moult in the sea and reach the coastal waters by wind and wave action by which time they become post larvae. Post larvae enter estuaries & backwaters and complete their nursery phase and then return to the Sea for further growth and maturation.

*Fenneropenaeus merguensis* - Banana shrimp: They are of commercial value. Maximum length attained by males is 193 mm and females 242 mm. Early juvenile phase occurs in the estuaries.

*Penaeus monodon* - Jumbo Tiger shrimp: *Penaeus monodon* is the largest species among the penaeids, distributed all along the Indian coast – supports commercial fishery mostly along the east coast between Cuddalore and the Sunderbans. It is cultured because of its large size, fast growth, hardiness and high market price. The post larvae, juveniles and the sub adults inhabit the backwaters and estuaries. Adults are found up to 160 m depth. Females attain sexual maturity at 196-200 mm TL and males at 166-170 mm TL.

*Penaeus semisulcatus*-Green Tiger shrimp: Most dominant species supporting commercial fishery along Gulf of Mannar & Palk Bay, south-east coast of India. Juveniles and adults prefer marine environment with limited existence in estuarine environment. Distributed up to a depth of 130 m. Adults are purely marine. As they grow they prefer different substrata – juveniles prefer grass beds, estuaries and shallow bays; adults move to muddy or sandy substratum. Size at maturity is 123 mm carapace length.

*Parapenaeopsis stylifera*-Kiddi shrimp : Medium sized shrimps of commercial value found at depth up to 90 m.

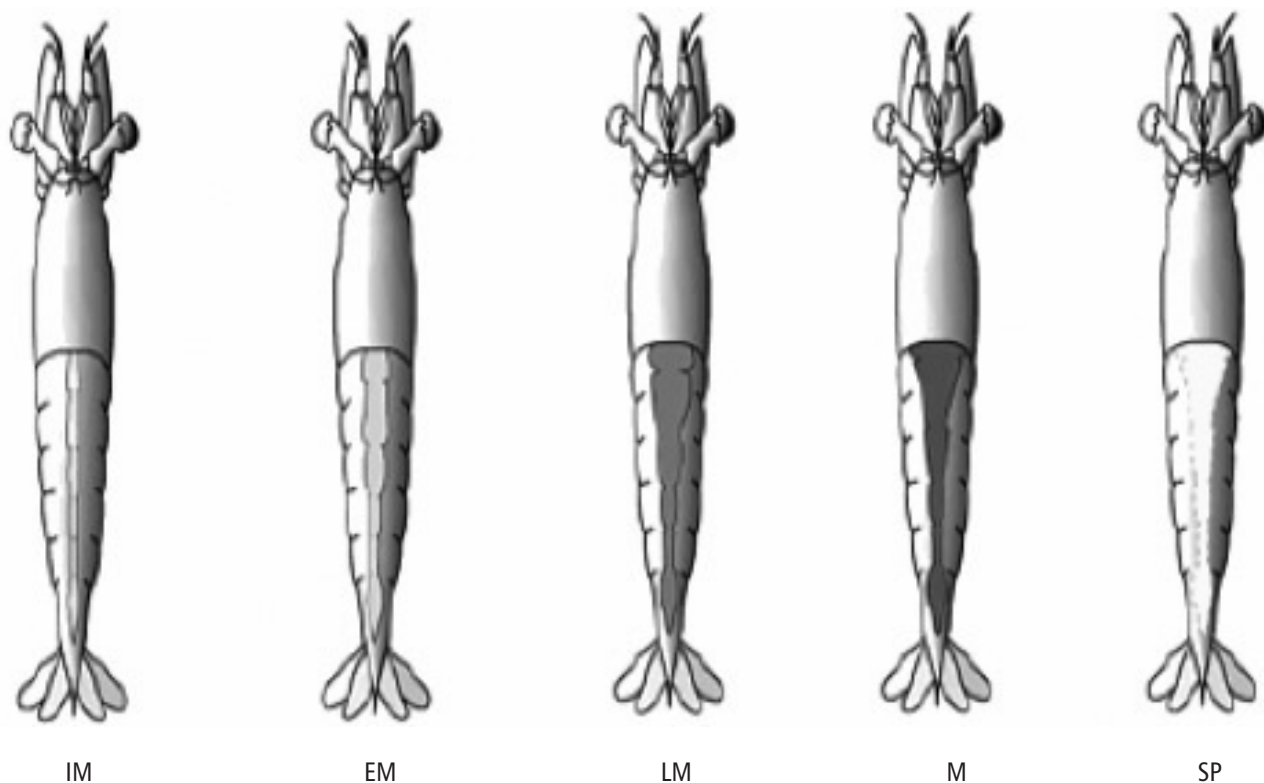


Fig. Maturity stages in penaeid shrimps

Of the 11 species recorded all are marine, except *P. cornuta* which is found usually in estuaries. They are distributed all along the coast, maximum abundance along Kerala coast. During non-monsoon months they are distributed at a depth of 20 m, with onset of monsoon the shrimps move to 20 to 40 m depth (June) and during July to September move to 40 to 60 m depth zone. They don't have an estuarine phase in their life cycle. Size at maturity recorded is 70 mm (Kochi); 109 mm in males and 144 mm in females (Mumbai).

*Metapenaeus monoceros*- Speckled shrimp: Found up to a depth of 100 m in Sea mostly at 25 to 40 m, juveniles found in most of the estuaries and backwaters. They mature at 98 mm TL (males); 119 mm TL (females).

*Metapenaeus affinis*- Jhinga shrimp: They are found below 40 m depth. Besides local consumption they are also exported as 'medium' shrimps. They are at times found in creeks but do not have much of an estuarine phase.

*Metapenaeus dobsoni*-Kadal shrimp: Adults found at a depth of 30 to 40 m in Sea. Juveniles inhabit estuaries & backwaters, post larvae migrate into estuaries and grow into juveniles contributing to a good fishery. They mature by 64 to 68 mm total length.

*Metapenaeus kutchensis*-Ginger shrimp: Endemic to Gujarat coast. Found at a depth range 3 to 12 m. Juveniles support seasonal fishery within the Rann of Kutch and adults are found in the trawling grounds in the Gulf of Kutch and Saurashtra

coast.

Non-Penaeids: Bulk of the non penaeid shrimps are landed along Maharashtra and Gujarat followed by West Bengal. They are caught by trawl nets along Gujarat with reduced cod end (12-15 mm). *Nematopalaemon tenuipes* is obtained in trawl along Maharashtra. *Acetes* spp and other small shrimps are caught in 'dol net' or bag nets. From inshore creeks they are caught using smaller bag nets called 'Bokshi'. North-west Coast is the major contributor of non penaeids with 87%, Gujarat with 47.7% and Maharashtra with 39.3%. West Bengal contributes around 6.2%. The species landed are *Acetes* spp (Paste shrimp), *Nematopalaemon tenuipes* (Spider prawn) and *Exhippolysmata ensirostris* (Hunter shrimp) the last being the largest among the coastal non penaeids. Five species of *Acetes*, namely *A. indicus*, *A. johni*, *A. sibogae*, *A. erythraeus* and *A. japonicus* form important fishery. They usually occur throughout the year with peak seasons of occurrence. Though they form a good fishery in NW coast of India, they are not of much commercial value. They indirectly play an important role in the trophic food chain as they form the prey of the majority of the pelagic and demersal fishes, cephalopods and crustaceans. *Acetes indicus* is the largest among the Indian *Acetes* species reaching 40 mm in total length. Sexes are separate with males having the petasma and large clasping spines on the outer antennular flagella. In *Nematopalaemon*, sexes are differentiated by the presence of appendix masculina on the 2nd pair of pleopods in male. Females carry eggs, attached to the ovigerous setae.