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Courtship and mating behavior in *Penaeus monodon* Fabricius

Jurgenne H. Primavera

Although many studies have been done on the development and anatomy of the primary and secondary sexual characters of prawns belonging to the genus *Penaeus* (Andrews, 1911; Hudinaga, 1942; King, 1948; Eldred, 1958; Tuma, 1967; Liao and Chen, 1969; Perez Farfante, 1975), literature on their courtship and mating behavior is scarce, except for observations on *P. japonicus* (Hudinaga, 1942) and *P. stylirostris* (Aquacop, 1977). Aside from its purely biological value, information on mating behavior may be of practical use in aquaculture as in the determination of area and depth dimensions for prawn broodstock tanks. With the establishment of more prawn hatcheries to supply pond stock requirements, particularly in the tropics and subtropics, it is essential that the tanks for the maintenance of broodstock meet the minimum physical requirements for mating.

Courtship and/or mating behavior involving both unablated and unilaterally ablated females with unablated males was observed on seven occasions between November 1977 and February 1978. In two instances, molting of female prior to courtship-mating was also observed or deduced. Males attracted to females were hard-shelled.

After the process of molting (including distinct post-molt swimming movements) of the female, courtship and mating behavior may be observed in three distinct phases: (1) parallel swimming of male and female from the bottom to a height of 20-40 cm over distances of 50-80 cm; (2) male turns ventral side up to female; (c) and male turns perpendicular to female, arches body around the female and flicks head and tail (Figs. 1-3b). Soon the male separates from the female and moves or swims away. The female may move away. Progress from central attachment (Phase 2) to head and tail-flicking (Phase 3b) is very quick lasting a few seconds. The whole process from the initial upward swimming movements of the female to the separation of the pair after mating may last from half an hour to three hours. There was no difference in the observed sexual behavior between unablated and unilaterally ablated females.

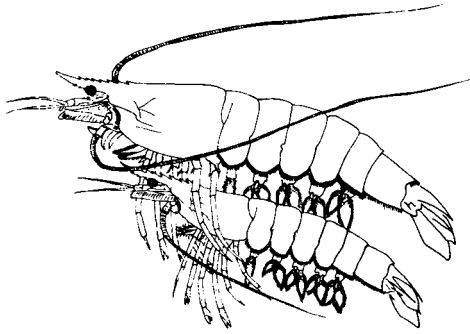


Fig. 1 *Penaeus monodon* Fab. Female above-male below in parallel swimming (Phase 1).

Fig. 2 *Penaeus monodon* Fab. Male turns ventral side up and attaches to female (Phase 2).

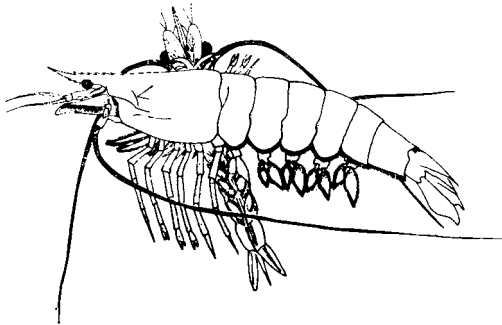
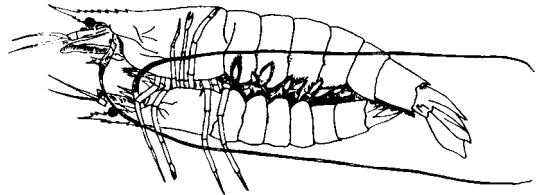
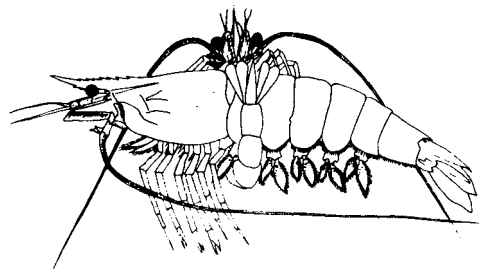


Fig. 3b Male curves body around female and flicks head and tail simultaneously (Phase 3b).

Fig. 3a *Penaeus monodon* Fab. Male turns perpendicular to female (Phase 3a).



Although most of the observations took place during the day, it is believed that copulation generally takes place at night, following molting of the female. Out of 452 molted shells of *P. monodon* females (mostly unablated) collected from broodstock tanks between Dec. 1977 to April 1978, 88.3% were recovered at 0600 hours, having molted at night and in the early morning between 1800 to 0600 hours.

On the basis of thelycum structure and mating pattern, penaeids may be divided into two groups – those with a closed thelycum in which mating follows molting as in *P. merguensis* and *P. monodon* and those with open thelycum wherein mating immediately precedes spawning as in *P. stylirostris* and *P. vannamei* (Tuma, 1967; Aquacop, 1977). Although the closed thelycum of *P. japonicus* requires that a female molts before she mates, pursuit of the female by the male is initiated sometime in the late premolt, shortly before the actual shedding of the exoskeleton (Hudinaga, 1942).

In *P. monodon*, female is followed by a male or males only after she has molted. Mating must involve contact of the ventral sides of both male and female for the spermatophores released from the terminal ampoules to be inserted into the thelycum between the bases of the last pair of pereopods. It is probable that in *P. monodon*, release and insertion of the spermatophores take place in rapid succession as the male turns perpendicular to the female, curves his body and flicks both head and tail.

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