



SEAFDEC/UNEP/GEF Project on Establishment and Operation of a Regional System of Fisheries *Refugia* in the South China Sea and Gulf of Thailand

Penaeus monodon

Giant Tiger Prawn



Scientific classification

Kingdom: [Animalia](#)
 Phylum: [Arthropoda](#)
 Subphylum: [Crustacea](#)
 Class: [Malacostraca](#)
 Order: [Decapoda](#)
 Suborder: [Dendrobranchiata](#)
 Family: [Penaeidae](#)
 Genus: [Penaeus](#)
 Species: ***P. monodon***

Binomial name

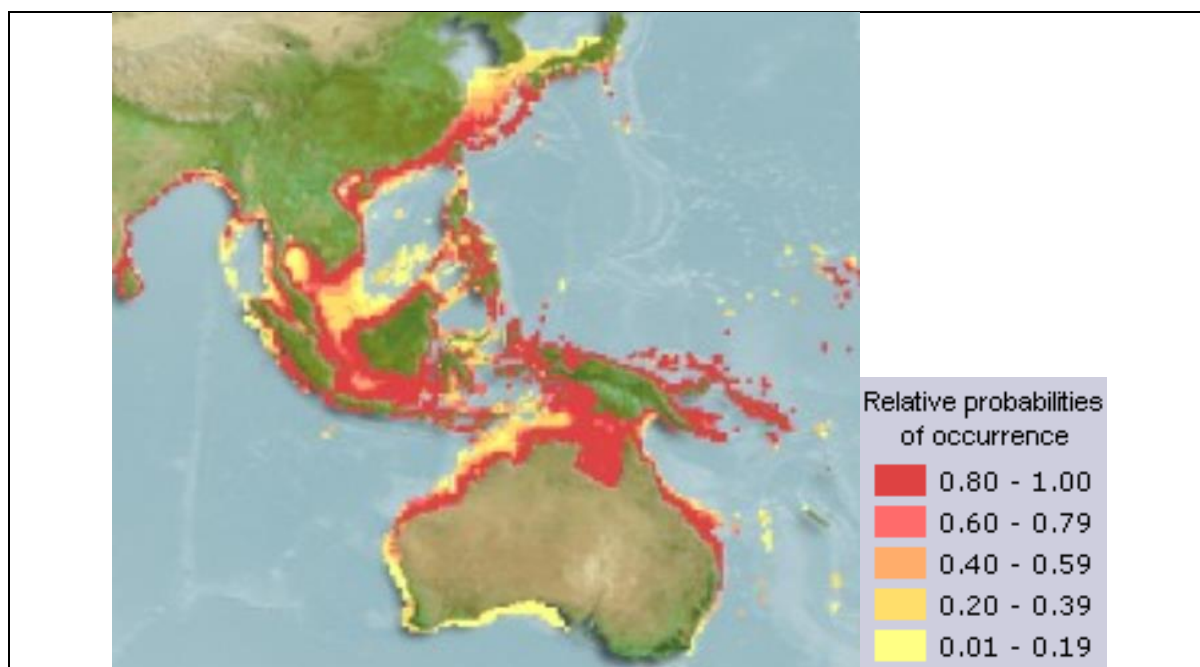
Penaeus monodon
[Fabricius](#), 1798

<u>Synonyms</u> ^[1]
<ul style="list-style-type: none"> • <i>Penaeus carinatus</i> Dana, 1852 • <i>Penaeus tahitensis</i> Heller, 1862 • <i>Penaeus coeruleus</i> Stebbing, 1905 • <i>Penaeus bubulus</i> Kubo, 1949

A. Environment/Ecology:

Benthic; depth range 0 - 150 m (Ref. [10](#)), usually ? - 60 m (Ref. [10](#)). Tropical; 17°C - 38°C (Ref. [72772](#)), preferred 24°C (Ref. [107945](#)); 36°N - 33°S, 55°E - 154°E

B. Distribution:



Note: Distribution range colours indicate degree of suitability of habitat which can be interpreted as probabilities of occurrence.

Indo-Pacific: From Pakistan to Japan, the Malay Archipelago and Australia. Introduced in the Atlantic Ocean (Africa and USA). Tropical to temperate.

C. Length at first maturity / Size / Weight / Age:

Maturity: L_m [?](#), range 4 - 4.22 cm **Max length** : 33.6 cm TL male/unsexed; (Ref. [8](#)); max. published weight: 250.00 g (Ref. [116487](#)) Maximum total length 336 mm. Weight 60 to 130 g. **Male : 37 mm Carapace length (CL), 35 g Body weight(BW), 10 months. Female : 47 mm CL, 67.7 BW, 10 months.(DOF Malaysia,2020)**

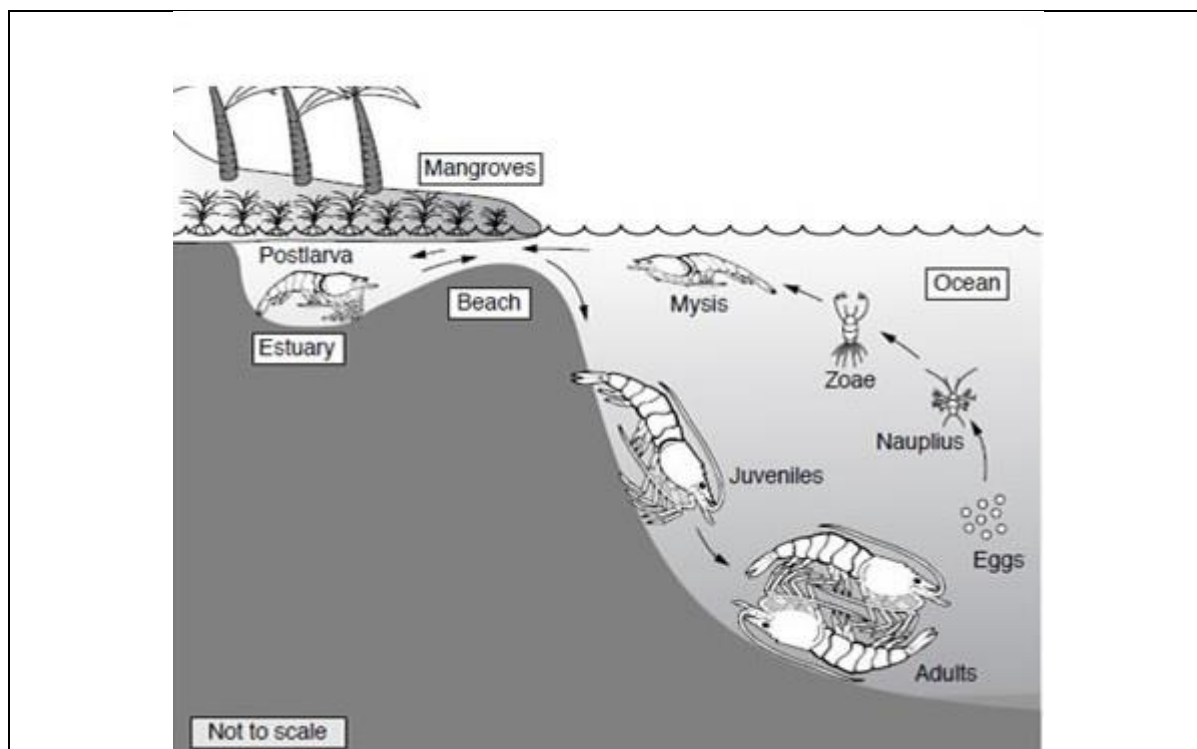
D. Short description

Uniformly glabrous body; carapace with well-developed antennal and hepatic spines. Horizontal and straight hepatic carina. Rostrum armed with 7 or 8 dorsal and 3 ventral teeth. Color: body is reddish with darker bands. Brown to blue pleopods and reddish fringing setae.

E. Biology

Caught by pond fishing and inshore fishing. Considered a delicacy in the Philippines that in 1980, retail price was Php60 to 80 (US\$8.6 to 11.5)/kg in Manila and Php50 to 70 in local areas (Ref. [10](#)). Juveniles are found in estuarine environments (Ref. [8](#)). Enters shallow brackish water or kept in ponds (Ref. [374](#)). Less of a scavenger; mainly a predator of slow moving benthic macroinvertebrates like small crabs and molluscs. Also capable of capturing more mobile forms like small penaeids and fishes (Ref. [102664](#)). Members of the order Decapoda are mostly gonochoric. Mating behavior: Precopulatory courtship ritual is common (through olfactory and tactile cues); usually indirect sperm transfer (Ref. [833](#)).

F. Life cycle and mating behavior



The life history of *P. monodon* has an offshore planktonic larval phase of about 14 (Silas et al., 1978) to 20 days (Kenway and Hall, 2002); an estuarine, benthic postlarval and juvenile phase of over 6 months (33 g); a coastal subadult phase of 5 to 6 months (60 g); and an inshore and offshore ocean adult and spawning phase (60 to 261 g) (Dall et al., 1990, Kenway and Hall, 2002). Mating between a recently moulted (soft-shelled) female and a hard-shelled, smaller male occurs at night in the ocean (Hudinaga, 1942). Adult *P. monodon* are found in offshore waters on sandy bottom at depths of 20–40 m. The larvae move towards the coast, entering estuaries and mangrove swamps that serve as nursery grounds. They then migrate to deeper water when they become adolescent. *Penaeus monodon* has six nonfeeding naupliar stages, three protozoal stages and three mysis stages (FAO, 1985a).

Mating generally takes place at night, following molting of the female. The courtship and mating behavior may be observed in three distinct phases (Primavera, 1979). Female above-male below in parallel swimming. From a moving or stationary position on the tank bottom, the female swims upwards to a height of 20-40 cm. It moves in a slightly curved line over a distance of 50-80 cm, then changes course, either completely reversing direction or turning at a right angle. These swimming movements are interspersed with rests on the bottom lasting from seconds to a few minutes. While either swimming or resting, the female is approached by one to as many as three males after some kind of initial attraction, the males trailing behind the female as it swims. Eventually the male, or one particular male, in case of many initially attracted to the female, catches up with the female and positions its body directly below the latter. The pereopods of the female hold on to the carapace of the male and help to keep it in position while swimming continues; even later, the pereopods of both partners actively help to maintain the desired positions in the succeeding phases. This phase is the longest and can last up to 2 hours if the male is dislodged from its position below the female by another male or if lengthy rests on the tank bottom intersperse with the swimming activities.

Male turns ventral side up and attaches to female. Swimming in tandem with the female, the male turns abruptly to a ventral side up position, attempting to align the thoraco-abdominal junction with the posterior thorax of the female. Once the ventral-to-ventral position is achieved, it is difficult for other males to displace the first male and copulation is certain. If unsuccessful, the male immediately returns to the former upright position, still trying to swim parallel to the female, following the latter's every change in direction.

Male turns perpendicular to female. Once the male succeeds in attaching ventrally to the female, it turns perpendicular to the latter, rotating at the point of the posterior end of the thorax. At this junction, the pair may either maintain their position in the water or slowly settle to the bottom. Male arches body around female and flicks head and tail. Immediately after assuming a position perpendicular to the female, the male curves its body in a U-shape around the thorax of the female and flicks both head and tail simultaneously, as in a squeezing action, up to three times in quick succession. Soon after, the male separates from the female and moves or swims away. The female may also move away. Progress from ventral attachment to head- and tail-flicking is very quick, lasting a few seconds. The whole process from the initial upward swimming move.

Spawning generally takes place at night. While resting on the sandy bottom, the spawner suddenly becomes active, swimming in the water for about one minute, and then starts to spawn while swimming very slowly in the upper or middle part of the water. During spawning, the last three pairs of pereopods are held tightly together and flapped with an open and close movement, presumably to help discharge eggs and spermatozoa, while strongly moving the pleopods for swimming. The eggs are extruded from the paired genital pores located at the base of the 3rd pereopods at the same time as spermatozoa from the thelycum located at the base of the 5th pereopods, looking like greenish smoke and whitish smoke, respectively, blowing backward. It is believed that these discharged eggs are fertilized in the water owing to turbulence generated by the forward and backward movements of the pleopods. As a result, the movement of the pleopods seems to aid not only in swimming but also in fertilizing the eggs spawned. The fertilized eggs remain suspended in the water for a few minutes making the water turbid, and then gradually sink to the bottom. The time required for each spawning is approximately 2 minutes.

G. Fisheries

In S.E. and E. Africa (Natal to Somalia, including Madagascar) the species is of minor or moderate commercial importance, it is used for bait and food. In Pakistan it is likewise of minor importance. Jones (1967:1333) indicated that it is more common in prawn catches on the east coast of India than on the west coast. According to Chopra (1939:222) "This is the commonest largesized penaeid

of Calcutta, and is sold in our markets in enormous quantities". Kurian & Sebastian (1976:100) cited it as an important commercial species in India, especially on the east coast (Bengal and Orissa); juveniles being caught in estuaries. Also in Bangladesh it is of considerable commercial importance. In Malaya and Thailand *Penaeus monodon* is fished in offshore waters. It is obtained both by pond fishing and inshore fishing in Malaya, Singapore, Indonesia, the Philippines and Taiwan; because of its large size the species is quite important economically. Domantay (1956:363) indicated that "among the commercially important prawns in the Philippines, *Penaeus monodon* Fabricius stands foremost". In Japan and Korea it seems to be of minor importance; Yoshida (1941) remarked that it was sold on the Fusan market in Korea. Also in Australia the species is of commercial interest: Harrison, Kesteven & Setter (1965:8) listed it among the commercial species of the Gulf of Carpentaria, while Racek (1957:12) mentioned it as the last of the six most important species of New South Wales, and as the fourth in importance of the species taken in offshore waters of Queensland. Rapson & McIntosh (1971:17) reported it as constituting about 7% of the commercial catches in New Guinea (mainly in the Gulf of Papua).

H. IUCN Red List Status

(NA)

I. More Information:

1) Stocks

- Spawners :23.00 metric tonnes
- Ovarian maturation stages starts from May until November yearly (I – V)
- Juvenile : Density : 0.025 – 6.8 g/m², Biomass : 11.73 to 20.77 kg (DOF Malaysia,2020)

2) Ecology

Ecology of *Penaeus monodon*

Main Ref.	Holthuis, L.B., 1980	
distribution	Marine - Neritic <ul style="list-style-type: none"> • littoral zone • sublittoral zone 	Brackishwater <ul style="list-style-type: none"> • estuaries/lagoons/brackish seas
	Highlighted items on the list are where <i>Penaeus monodon</i> may be found.	
Remarks	Juveniles are found in estuarine environments (Ref. 8). Enters shallow brackish water or kept in ponds (Ref. 374). Less of a scavenger; mainly a predator of slow moving benthic macroinvertebrates like small crabs and molluscs. Also capable of capturing more mobile forms like small penaeids and fishes (Ref. 102664).	

Substrate	
Substrate	Benthic: mobile; demersal; Soft Bottom: sand; mud;
Substrate Ref.	Holthuis, L.B., 1980
Associations	
Ref.	Holthuis, L.B., 1980

3) Diet

Feeding						
feeding type	plants/detritus+animals (troph. 2.2-2.79)					
feeding type ref	Marte, C.L., 1980					
feeding habit	hunting macrofauna (predator)					
feeding habit ref						
trophic level(s)		original sample		unfished population		Remark
	estimation method	Troph	s.e.	Troph	s.e.	
	From individual food items	3.36	0.35			Trophic level estimated from a number of food items using a randomized resampling routine.

4) Reproduction

Reproduction of <i>Penaeus monodon</i>	
Main Ref.	Ruppert, E.E., R.S. Fox and R.D. Barnes, 2004
Mode	dioecism
Fertilization	
Spawning Frequency	
Batch Spawner	No
Reproductive Guild	bearers External brooders
Description of life cycle and mating behavior	Members of the order Decapoda are mostly gonochoric. Mating behavior: Precopulatory courtship ritual is common (through olfactory and tactile cues); usually indirect sperm transfer.
Search for more references on reproduction	Scirus

5) Maturity

Maturity studies for <i>Penaeus monodon</i>										
n = 2										
Lm (cm)	Length (cm)			Age range (y)		tm (y)	Sex of fish	Country	Locality	
	3.6	-	4.2	-			female	Tanzania	Ruvu estuary, Bagamoyo/1988	
	3.1	-	3.5	-			male	Tanzania	Ruvu estuary, Bagamoyo/1988	

6) Spawning

(NA)

7) Spawning aggregation

(NA)

8) Fecundity

Fecundity for <i>Penaeus monodon</i>									
n = 2									
Country	Locality	Absolute Fecundity			Relative Fecundity			Fecundity/length relationship	
		Min	Max	Mean	Min	Max	Mean	a	b
India	Andhra Pradesh	323,007	1,072,174	0					
Tanzania	Bagamoyo	72,000	314,000	0					

9) Eggs

(NA)

10) Egg development

(NA)

11) Age/Size

List of Population Characteristics records for <i>Penaeus monodon</i>									
n = 6									

Sex	Wmax	Lmax (cm)	Tmax (y)	Country	Locality
unsexed	240.00 g			Philippines	Unspecified, Philippines
unsexed		25.8		India	Digha/ 2012-2013
male		26.8			Eastern Central Atlantic
unsexed		29.5		India	Andhra Pradesh/ 2011-2012
unsexed		33.6			Not specified
female		35			Eastern Central Atlantic

12) Growth

Growth parameters for <i>Penaeus monodon</i>												
Maximum Length 33.5999984741211cm TL												
n = 5 Note that studies where Loo is very different (+/- 1/3) from Lmax are doubtful.												
Auximetric graph		[n = 4]										
M vs K graph		[n = 5]										
M vs Linf graph		[n = 5]										
$\phi = 3.20$ $L_{inf} = 30.5$ cm TL $K = 1.7$ Median record no. Ref. 7676												
Loo (cm)	Length Type	K (1/y)	Sex	M (1/y)	Temp° C	Lm	ϕ'	Country	Locality	Questionable	Captive	
28.80	TL	1.200	M	2.03			3.00	Bangladesh	Unspecified	No	No	
30.00	TL	0.940	M	1.72			2.93	Bangladesh	Unspecified	No	No	
30.50	TL	1.700	F	2.51			3.20	Bangladesh	Unspecified	No	No	
32.10	TL	0.970	F	1.72			3.00	Bangladesh	Unspecified	No	No	
35.00	TL	0.350		0.90			2.63	Philippines				

13) Length-weight

Length-Weight Parameters for <i>Penaeus monodon</i>		
Length-Weight Parameters for <i>Penaeus monodon</i>		
Length-weight (a vs b) graph	[n=24]	Median Record No. 13 a = 0.0186 cm BL b = 2.9107 Ref. 117291

a	b	Doubtful?	Sex	Length (cm)	Length type	No.	Country	Locality
0.0055	2.102	Yes	male		TL	11	Nigeria	Iko River estuary / 2011-2012
0.7510	2.299	No	female	6.5 - 17.7	TL	327	Tanzania	Ruvu estuary, Bagamoyo / 1998-1998
0.0418	2.432	No	female	9.5 - 16.0	TL	497	India	Pichavaram mangroves / 2007-2007
0.0360	2.485	No	mixed	9.2 - 16.0	TL	985	India	Pichavaram mangroves / 2007-2007
0.0292	2.568	No	male	9.2 - 16.0	TL	488	India	Pichavaram mangroves / 2007-2007
0.0037	2.597	No	mixed		TL	16	Nigeria	Iko River estuary / 2011-2012
0.0237	2.675	No	male		TL	117	USA	western Atlantic and Gulf of Mexico / 2009-2012
0.0256	2.764	No	female	6.1 - 12.6	BL	202	China	Sanya coast
0.0239	2.789	No	mixed	6.1 - 12.6	BL	412	China	Sanya coast
0.0234	2.795	No	female	4.2 - 12.2	BL	168	Mozambique	Mozambique Channel
0.0230	2.803	No	male	6.1 - 12.0	BL	210	China	Sanya coast
0.0506	2.851	No	mixed	4.2 - 12.2	BL	358	Mozambique	Mozambique Channel
0.0186	2.911	No	male	4.2 - 11.9	BL	190	Mozambique	Mozambique Channel
0.0523	2.940	No	juvenile		TL		India	Cultured pond
0.0080	3.000	No	unsexed		TL			Unspecified
0.0062	3.016	No	female	11.1 - 18.9	TL		Sri Lanka	Kakkaithivu, Jaffna estuary / 2010-2011
0.0077	3.040	No	mixed	15.0 - 25.0	TL		USA	western Atlantic and Gulf of Mexico / 2009-2012
0.0054	3.075	No	male	9.6 - 16.4	TL		Sri Lanka	Kakkaithivu, Jaffna estuary / 2010-2011

0.0063	3.093	No	female		TL	5	Nigeria	Iko River estuary / 2011-2012
0.9150	3.106	No	male	7.5 - 16.8	TL	302	Tanzania	Ruvu estuary, Bagamoyo / 1998-1998
0.0056	3.147	No	female		TL	80	USA	western Atlantic and Gulf of Mexico / 2009-2012
0.0620	3.190	No	female		TL		India	Kakinada / 1980-1983
0.0039	3.218	No	mixed	9.6 - 18.9	TL		Sri Lanka	Kakkaithivu, Jaffna estuary / 2010-2011
0.0107	3.250	No	male		TL		India	Kakinada / 1980-1983

14) Length-length

(NA)

15) Length-frequencies

(NA)

16) Morphometrics

(NA)

17) Morphology

(NA)

18) Larvae

(NA)

19) Recruitment

(NA)

20) Abundance

(NA)

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