

CALIFORNIA GALATHEIDS

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10Dec97

According to Wicksten (1989) a total of 17 species of galatheid crabs occur in waters off California. These belong to three different genera, *Galathea*, *Munida*, and *Munidopsis*. A fourth genus, *Pleuroncodes*, also occurs but was not included by Wicksten. Both *Pleuroncodes* and *Galathea* are monotypic in our area, while there are two *Munida* and many *Munidopsis* known to range into Californian waters. The genera are adequately distinguished in the key provided by Schmitt (1921) which is modified below and combined with revised keys to species which occur at depths of less than 300m in the Southern California Bight

Key to Shelf and Upper Slope Galatheid Crabs from the Southern California Bight

1. Eyes unpigmented, opaque white, not faceted *Munidopsis* 5
Eyes darkly pigmented, faceted 2
2. Latero-inferior region of carapace greatly swollen and visible dorsally; rostrum dorsally keeled, continuing carapace carina *Pleuroncodes planipes*
Latero-inferior region of carapace forming the side of the carapace and visible in ventral or lateral view, but not dorsally; rostrum not keeled 3
3. Rostrum flattened, with prominent lateral spines (making it trispinose), and flanked by supra-orbital spines *Galathea californiensis*
Rostrum slender, rounded, spinelike, flanked by supraorbital spines *Munida* . . . 4
4. Posterior of carapace and anterior of abdominal segments 2-4 spinose . . *Munida hispida*
Posterior of carapace and abdominal segments without spines *Munida quadrispina*
5. Rostrum tapering evenly from base to tip 6
Rostrum tapering more strongly distally (i.e. sides concave beyond broadened base), ending in a finger-like continuation of the dorsal carina *Munidopsis latirostris*
6. Rostrum usually upturned, bearing ventro-lateral spines *Munidopsis depressus*
Rostrum usually not upturned, with lateral margins lacking spines 7
7. Anterior margin of carapace with a small, serrated lobe behind each ocular peduncle; lateral margins of carapace arcuate; chelipeds setose *Munidopsis aspera*
Anterior margin of carapace straight, not lobate; sides of carapace straight; chelipeds not setose *Munidopsis quadrata*

Galatheids are crab-like anomurans related to both the lithodids and the porcellanids. As such they have only four pair of walking legs, with the fifth leg reduced and carried along the edge of the carapace out of contact with the substrate. In many galatheids the shell is calcified, and rigid enough to crack and/or break if roughly handled. In others, such as *Pleuroncodes*, calcification is hardly evident, and the exoskeleton remains quite flexible, kept light for bouyancy.

Of the four genera known locally, three carry large numbers of small eggs. Only *Munidopsis* has large eggs, with each berried female carrying only a few tens. It is unclear if local *Munidopsis* species have lecithotrophic larvae with a long planktonic life, or if the large yolky eggs hatch late stage larvae that settle almost immediately. Either strategy might serve a sparsely distributed population which aggregates in isolated patches of appropriate habitat. In an anchialine species, *M. polymorphus*, from the Canary Islands there are several weeks of larval life, but the larvae are non-feeding, utilizing residual yolk for food (Wilkins et al 1990).

Pleuroncodes

The well known pelagic red crab or tuna crab, *Pleuroncodes planipes* Stimpson 1860, is the sole representative of its genus in the northeast Pacific. While it is generally similar to other local galatheids, its legs are relatively flat, and bear a setal fringe which aids in swimming and drifting. The appendages are also much less spinose than in other species in the family. It ranges from off west Mexico (off southern Sinaloa - Hendrickx 1996) well into boreal waters (at least during El Niño years) from the intertidal zone to depths of 500m. The biology of the species is complex, involving both benthic and pelagic phases, and has been examined by a number of authors (see Auriolles-Gamboa & Pérez-Flores 1997 for a recent literature summary). A second species, *P. monodon*, occurs in the southern hemisphere. Recent reports have placed this species as far north as Costa Rica (Vargas et al 1996, Castro & Vargas 1996, Jesse 1996), calling into question Haig's (1955) comments that reports of *P. monodon* from Acapulco and the Gulf of Panama (Faxon 1893, 1895) probably refer to *P. planipes*. The actual northern range limit of *P. monodon* remains uncertain, as does a possible overlap in distribution with *P. planipes* in southern Mexico or Central America. The two species are very similar in appearance, and misidentification in any overlap region is a distinct possibility. Alternatively, as suggested by Haig (1955), the two species may prove identical when examined comparatively. Should that be the case, *P. monodon* (H. Milne Edwards 1837) will have priority, and Stimpson's 1860 name will fall as a synonym.

Galathea

Galathea californiensis Benedict 1902 is also the sole representative of its genus in local waters. Cheliped structure is sexually dimorphic in this species, with the adult male chelae having elongated meri and carpi, and with a pronounced gape in the chela itself. Juvenile males and females have linear palms, and lack the elongated segments of the adult male. Although they may co-occur with species of *Munida*, they can be easily separated on the basis of the trispinose flattened rostrum, and a more reddish coloration of the carapace. It has been taken between 104 and 3998m and from Monterey Bay to the Gulf of California (Wicksten 1989). One of the larger local species, it can reach a body length of at least 80mm (rostrum to telson).

Munida

Two species of *Munida* are taken off California: *Munida hispida* Benedict 1902 and *M. quadrispina* Benedict 1902. The two can be separated by the nature of the spination on the rear of the carapace (present in *hispida* and absent in *quadrispina*) and on the abdominal segments (present in *hispida* and absent in *quadrispina*). The rostrum is very similar in the two species: long, slender, spine-like, round, and flanked by large supraocular spines of up to ½ its length. Ranging from Monterey Bay to the Galapagos (Wicksten 1989), *M. hispida* has been taken in depths between 145m (new record off Palos Verdes) and 500m. Like *Galathea californiensis*, the adult males of *Munida hispida* have modified chelae, with more elongate carpi and meri, and with a basal gape in the palm. Once again, both juvenile males and females are similar. Sex can be determined without reference to either pleopods or presence of brood. Females have easily seen gonopores ventrally on the coxae of the third legs for extrusion of the eggs (this is true of all galatheids I have examined). Males lack any trace of an opening in the same position. This species reaches a slightly larger size than *Galathea californiensis*, up to at least 90mm rostrum to telson. When added to the length of the adult male chelae (about twice the body length), such animals seem large indeed. Coloration in *M. hispida* is a bit more somber than in *Galathea*, more brown than red. The generally deeper living *M. quadrispina* is pale ivory or light tan (at least in preservative). They are from a broad depth range (22-1463m), have been taken from Alaska to Baja California (Wicksten 1989), and reach a smaller maximum size (up to at least 60mm rostrum to telson) than *M. hispida*. They, too, exhibit sexual dimorphism in chela size, although not so strongly as in *M. hispida* or *Galathea* (elongation is predominantly in the propod/dactyl and merus, and is 25-30% over equivalently sized females).

Munidopsis

Fourteen species of the genus *Munidopsis* are recorded as occurring in Californian waters (Wicksten 1989), although few of these species are taken in depths which include (or even approach) those sampled in monitoring programs. A number of others are known from the Cascadia Abyssal Plain off Oregon or from eastern Pacific hydrothermal areas (Ambler 1980; Williams and Van Dover 1983). Four occur at depths shallower than 300m, an additional 3 between 500 and 1000m, and the remaining 7 at >1000m. Only the first four were included in the key, since it is unlikely that any of the deeper contingent (500-1000m) will actually occur as shallow as the deepest depths sampled by current monitoring programs - even in the vicinity of submarine canyons. The species are listed below, with distributional information from Wicksten (1989); those with an asterisk were included in the key.

Species of *Munidopsis* recorded from waters off California (from Wicksten 1989)

aculeata Henderson 1888 - Southern California to Chile @2519-3285m

antoni (A. Milne-Edwards 1884) - cosmopolitan @2519-3676m

**aspera* (Henderson 1885) - Catalina Island to the Straits of Magellan @104-2748m

bairdii (Smith 1884) - Oregon to Panama @1920-3292m

ciliata Wood-Mason 1891 - Oregon to Panama @2030-2875

**depressa* Faxon 1893 - Catalina Island to the Tres Marias Islands, Mexico @185-1255m

diomedea (Faxon 1893) - San Clemente Island to Chile @768-3790m
hystrix Faxon 1893 - Anacapa Island to Peru @552-1243m
**latirostris* Faxon 1893 - Oregon to Panama @280-3243m
**quadrata* Faxon 1893 - Queen Charlotte IIs., Canada to Tres Marias IIs., Mexico @ 245-1574
scabra Faxon 1893 - Oregon to Peru @567-1243m
subsquamosa Henderson 1885 - Oregon to Chile @1097-3000m
verrilli Benedict 1902 - Oregon to Cedros Island, Mexico @1253-1986
verrucosus Khodkina 1973 - Oregon to Chile @3942-4880

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