ADDITIONAL PORCELAIN CRAB FEEDING METHODS
(DECAPODA, PORCELLANIDAE)

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Porcelain crabs (Porcellanidae) are primarily filter feeders. The method by which they use their setose third maxillipeds to extract minute food particles from the water has been described by Nicol (1932), Wicksten (1973), and Caine (1975). This feeding method has also been noted in other studies (Knudsen, 1964; Kurup, 1964; Molenock, 1975, 1976; Hartman & Hartman, 1977; Gabaldon, 1979).

Porcellanids can also obtain food by other methods. Knudsen (1964) reported that Petrolisthes eriomerus Stimpson used its chelipeds to chop pieces of algae for consumption. Caine (1975) recorded direct deposit feeding in P. armatus (Gibbes). This species scraped the substrate with the ventral margin of its chelipeds which were then brought to the mouth and cleaned by the second maxillipeds. Gabaldon (1979) observed possible direct deposit feeding in P. cabrilloi Glassell. In this case the crabs used the patch of setae present at the gape of the claw to collect bits of detritus. The patch of setae was cleaned by the first and second maxillipeds.

This note reports observations that support Gabaldon’s contention that P. cabrilloi can feed directly on deposits and presents new methods for deposit feeding by this species.

About two dozen specimens of P. cabrilloi were collected from the rocky intertidal area at Bird Rock, La Jolla, California, U.S.A. (32°51′N 117°16′W). These crabs were taken from under small boulders at the base of the sea wall about 100 m south of the stairway which descends from the foot of Bird Rock Avenue to the intertidal area. The substrate from which crabs were collected consisted of very coarse sand grains, gastropod and bivalve shell bits, and small pieces of sea urchin spines.

The crabs were kept in a 98-l plexiglass aquarium, the bottom of which was covered with a commercially available gravel designed for use in saltwater aquariums. Two terra cotta bricks and two large rocks provided refuge for the crabs. Several species of algae including Sargassum and Codium fragile were placed in the aquarium. After a period of time, a short, filamentous green alga became established on the horizontal surface of each brick. Detritus also collected on these surfaces. The crabs were usually fed every two days on mashed fish muscle or newly hatched brine shrimp nauplii (Artemia).

The addition of one of the food substances to the water resulted in very active feeding as described by Nicol (1932), Wicksten (1973), and Caine.
(1975). Occasional exceptions were noted. In areas of relatively rapid water movement (caused by aeration devices) several crabs passively filtered the water by extending their third maxillipeds out into the current for a few seconds then returning them to the oral area where they were cleaned by the second maxillipeds. This has been reported previously for other species (Wicksten, 1973; Caine, 1975).

Specimens also demonstrated a capability for grasping particulate material with the chelipeds and transferring that material to the mouth parts. The chelipeds were used to seize pieces of fish that were presented directly to the crabs or that drifted to within their reach. Two crabs, that were sitting on a section of *Codium*, used their chelae to pick off pieces of material from the plant's surface and convey them to the oral area. The nature of the material was not determined.

*P. cabrilloi* was seen to obtain food directly both from horizontal and vertical surfaces in the aquarium. Additionally, two individuals were seen to employ similar movements to those described below while sitting on branches of *Codium*. Both the maxillipeds and the chelipeds were used in substrate feeding. All methods described below were often intermixed with one another or with filtration methods.

1. — Maxillipeds: Use of the third maxillipeds on the substrate was initiated with a lowering of the anterior portion of the crab's body. The maxilliped pair was then extended anteriorly and pronated so that the setal palms were directed toward the substrate. The third maxillipeds were then drawn alternately toward the mouth in such a fashion that the distal portion of each seta was in contact with the substrate. The tips of the setae were seen to bend away from the direction of retraction. Each retraction culminated with the cleaning of the third maxillipeds by the second maxillipeds. During this method of feeding the crabs usually walked forward although occasional backward and lateral movements were observed. With the crab's body lowered as before, occasionally the third maxillipeds were spread apart and the second maxillipeds were seen to scrape the substrate directly. This rasping action was more rapid than that of the third maxillipeds, and here again forward, backward, and lateral walking occurred.

2. — Chelipeds: A dense patch of plumose setae occurs at the ventromedial part of the junction of the propodus and dactylus of the chela in *P. cabrilloi*. Each segment contributes setae to the patch. The density of the pubescence does not appear to interfere with movement of the joint.

The following feeding pattern was used occasionally by crabs on the horizontal surfaces of the bricks. One cheliped was extended away from the mouth area. At maximum extension, the merus-carpus joint was raised slightly. This permitted contact between the chela tip and the brick and also caused the pubescence to be pushed onto the substrate and was accompanied by an opening and closing of the dactylus. The latter action, although resembling a