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# NEW RECORDS OF EPIBIONTS FROM LOGGERHEAD SEA TURTLES *CARETTA CARETTA* (L.)

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Epibiosis is a highly valuable strategy for the survival of small, sedentary and sessile organisms living in the estuarine environment, where sandy and muddy bottom habitats are common and hard substrata are generally scarce (Olabarria, 2000). Since loggerhead sea turtles, *Caretta caretta* (L.), frequently occupy estuarine habitats adjacent to rookery beaches in between nesting events, a variety of non-obligate estuarine forms occur as epibionts on nesting turtles (Frazier et al., 1985; Dodd, 1988; Frazier et al., 1991, 1992; Frick et al., 1998, 2000a,b). We sampled a total of 99 loggerheads nesting on Wassaw Island (31°53′N, 80°50′W) and Jekyll Island (31°4′N, 81°25′W), Georgia for epibionts during the 1998 and 2000 nesting seasons from May–August using protocols outlined in Frick et al. (1998). Here, we document the occurrence of five previously unreported epibiont species from *C. caretta* (Table 1).

The newly documented epibiont species reported in this study are also commonly observed within the coastal region of Georgia as free-living forms or as commensals of other estuarine residents. Thus, the associations presented herein do not appear to be obligate. However, since little is known of the life history of these epibiotic species when occurring in Georgia and nothing is known of their life history as epibionts of *C. caretta*, several characteristics of the newly reported epibiota are worthy of discussion.

Spotted porcelain crabs, *Porcellana sayana* were found from the posterior region of the turtle carapace, clinging with their walking legs. The first three pairs of walking legs possess strongly hooked dactyls, allowing porcelain crabs to cling tightly to the irregular surface of the loggerhead carapace. Larger *P. sayana* (≧8.0 mm) were very difficult to remove and frequently shed their walking legs instead of releasing their grip from the turtle.

Both male and female porcelain crabs were collected. Carapace morphometrics of male *P. sayana* (length: 4.0–9.0 mm; width: 3.0–8.7 mm; n = 2) were smaller than those of females (length: 10.5–12.6 mm; width: 9.0–10.4mm; n = 8). Three females were ovigerous. Ovigerous females were the largest specimens (length: 10.9–12.6 mm; width: 10.1–10.4 mm). No turtles were found to host more than one *P. sayana* at a time.

Spotted porcelain crabs commonly occur as symbionts of decorator crabs, *Stenocionops furcata* (A. Milne Edwards), queen conchs, *Strombus gigas* (L.), and hermit crabs, *Petrochirus diogenes* (L.), *Dardanus venosus* (Milne-Edwards), *Pagurus pollicaris* (Say), *Clibanarius vittatus* (Bosc) and *Paguristes grayi* (Benedict) (Hildebrand, 1954; Telford and Daxboeck, 1978; Brooks and Rittschof, 1995). To our knowledge, the occurrence of *P. sayana* on *C. caretta* is the first report of an anomuran as an epibiont of sea turtles. Ours is also the first report of *P. sayana* as an epibiont of a vertebrate.

All stone crabs, *Menippe mercenaria* collected from *C. caretta* (n = 12) were juveniles (≤30 mm carapace width; Williams, 1984). The number of *M. mercenaria* we collected from a single loggerhead turtle ranged from 1–4 individuals. Stone crabs that had the smallest carapace widths (5.0–9.9 mm, n = 8) were collected from turtles that hosted more than one *M. mercenaria* (n = 4). The largest crabs (14.7–29.8 mm, n = 4) were sampled from turtles that hosted only one *M. mercenaria*. Sex was determinable for stone

Table 1. Newly reported epibiont species (Arthropoda) from nesting loggerhead sea turtles (*Caretta caretta*) in Georgia. Data are the number of turtles upon which the epibiont was found with the percent occurrence in parentheses. W = Wassaw Island and J = Jekyll Island.

| Species | Locality | % |
|---|---|---|
| Pycnogonida | | |
| *Callipallene brevirostris* (Johnston) | W, J | 2 (2) |
| Amphipoda | | |
| *Colomastix halichondriae* (Bousfield) | W | 1 (1) |
| Decapoda (Brachyura) | | |
| *Menippe mercenaria* (Say) | W, J | 8 (8) |
| *Pinnotheres ostreum* (Say) | W | 1 (1) |
| Decapoda (Anomura) | | |
| *Porcellana sayana* (Leach) | W, J | 10 (10) |

crabs ≥14.7 mm long (n = 4). Carapace widths of males (18.8–29.8 mm; n = 3) were greater than that of a single female (14.7 mm; n = 1).

Stone crabs were collected from any area of the turtle carapace that hosted dense aggregations of sessile epibiota. The smallest stone crabs (≤9.9 mm) occurred within mats of the green algae *Chaetomorpha* sp., a hydrozoan *Bougainvillia rugosa* (Clarke), and an eroded sponge *Haliclona loosanoffi* (Hartman). The juvenile stone crabs (n = 4) that were collected from *H. loosanoffi* were observed moving in and out of the sponge's exhalation apertures and external crevices and folds. It is possible that the sponge housed more *M. mercenaria* than the four observed individuals since *H. loosanoffi* covered more than 75% of the turtle carapace and the entire sponge mass was not scraped from the host turtle. Additional inhabitants of *H. loosanoffi* were amphipods *Colomastix halichondriae* and *Podocerus chelonophilus* (Chevereux and DeGueme). Fecal strings from crabs collected from *H. loosanoffi* contained diatoms, algal matter, amphipod *C. halichondriae* gnathopods, and *H. loosanoffi* spicules.

Stone crabs (n = 2) collected from *Chaetomorpha* sp. had fecal strings containing algal matter, presumably digested *Chaetomorpha*. Juvenile *M. mercenaria* that were collected from *B. rugosa* (n = 2) deposited fecal strings containing tentacles from hydroid polyps. Sea spiders, *Callipallene brevirostris*, were also found clinging to the *B. rugosa* that contained stone crabs but were not consumed by *M. mercenaria*.

Larger stone crabs (≥14.7 mm; n = 3) were collected amongst aggregations of barnacles (*Chelonibia testudinaria* (L.)) and within propeller scars. Amongst *C. testudinaria*, stone crabs inhabited the shells of dead barnacles and also the crevices between two or more overlapping barnacles. The stomach contents of these individuals contained *C. testudinaria* cirri and eggs.

One *M mercenaria* was found in a deep propeller scar (~ 2 cm deep) also containing amphipods (*P. chelonophilus*), anemones (*Diadumene leucolena* (Verrill)), and mussels (*Brachidontes exustus* (L.)). Six *B. exustus* removed from the aforementioned host turtle housed oyster pea crabs *Pinnotheres ostreum*. Four *P. ostreum* were collected (1 male and 3 females). Pea crab chelipeds and legs (male and female) were found in the stomach contents of the aforementioned *M. mercenaria*. It is possible that the stone crab was retrieving *P. ostreum* from the neighboring mussels, which, to our knowledge, is the first report of *P. ostreum* as a commensal of *B. exustus*. Additional stomach contents of the

stone crab included *P. chelonophilus* antennae and gnathopods, and unidentified animal matter.

Juvenile stone crabs commonly occur in deep riverine channels, on grass beds, under molluscan gravel, in crevices created by oysters and other fouling organisms, and even clinging to buoys (Hay and Shore, 1918; Lunz, 1937; Wass, 1955; Manning, 1961; Williams, 1984). Clark (1965) found a juvenile *M. mercenaria* residing on the carapace of a hawksbill turtle, *Eretmochelys imbricata* (L.). The crab was located on the postero-dorsal region and was situated inside a crevice that was apparently created by a shell injury or deformation. Clark (1965) suggested that the juvenile stone crab might have been parasitic on the hawksbill turtle, although no supporting data were provided. Our observations suggest that juvenile *M. mercenaria* occasionally use loggerhead turtles as a feeding platform by consuming carapace epibionts. Stone crabs, as well as other species of epibiotic crabs, may influence the health of their host turtle by ridding the turtle of potentially debilitating epibionts or by maintaining the hydrodynamic nature of the turtle's carapace (see Frick et al., 2000a). The extent to which this relationship benefits the host or the commensal needs further elucidation.

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