

Marine Turtle Newsletter

The Surf Crab (*Arenaeus cribrarius*): A Predator and Prey Item of Sea Turtles

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The portunid surf crab (*Arenaeus cribrarius*), also colloquially known as the speckled crab, is a common inhabitant of shallow water along ocean beaches from Vineyard Sound, Massachusetts, USA to Santa Catarina, Brazil where it is often found wholly or partially buried in sand (Dragovich & Kelly 1964). Hair-like setae line the anterior-lateral margin of the crab's carapace and dense tufts of similar setae are present on either side of the mouthparts - creating a respiration channel as the crab holds its chelipeds close to the body when buried (Gray 1957). Such morphological adaptations allow *A. cribrarius* to maintain an existence in the rather strenuous breaker zone of the near shore environment, where crabs must adapt to life in waves and shifting sand.

The functional significance of the burying habit of *A. cribrarius* has not been investigated and it is assumed that this species' behavior parallels that of two other, occasionally sympatric, burying portunid crabs, *Ovalipes ocellatus* and *O. stephensoni* (Williams 1984). That is, burying enables crabs to conceal themselves from predators but it does not necessarily lend itself to prey ambush. Both *O. ocellatus* and *O. stephensoni* are believed to be largely nocturnal foragers, remaining buried during daylight hours. Caine (1974) suggests that *O. stephensoni* (=guadulpenensis) detects prey while buried but captures prey via pursuit. Studies on *O. ocellatus* indicate that crabs forage actively and not while buried, most often during rising and falling tides (Pearse et al. 1942).

Here I report observations on the predation of hatchling loggerhead sea turtles (*Caretta caretta*) by *A. cribrarius*. I discuss the paucity of information on the factors which facilitate sand burying in *A. cribrarius* and how such behavior may relate to the occurrence of *A. cribrarius* in the diets of sea turtles. This is the first report of *A. cribrarius* as a predator of loggerhead turtles and the first to investigate the foraging ecology of surf crabs.

Observations on the feeding behavior of *A. cribrarius* were conducted on the southern end of Wassaw Island, Georgia, during the month of August 2002. Patrols for loggerhead sea turtle nesting activity are conducted annually on Wassaw Island from May-September (see Williams & Frick 2001 for patrol methodology and locality). Nests are covered with protective screening and checked daily for signs of disturbances and hatchling emergence. During the summer of 2000, hatchlings from selected nests were intercepted during emergence, and measured and weighed for a separate study. After hatchlings were examined, they were released and observed as they entered the surf zone. It was during this time that *A. cribrarius* feeding activity was observed.

On one occasion, approximately 70 loggerhead hatchlings were released at high tide and observed as they entered the ocean. The night was calm, with no discernable breeze, and the moonlight enabled observations of hatchlings entering the water. After approximately six hatchlings had entered the tidal

wash immediately in front of the surf zone (~ 5-7 cm deep) a hatchling appeared encumbered and had ceased forward progress, despite the tidal wash moving past and carrying other hatchlings towards the surf zone. Aid from a torch revealed one *A. cribrarius*, still partially buried, holding onto the small loggerhead with its chelipeds.

The crab fully emerged from the sand and fled when pursued by the author. The crab fled past the breaker zone, taking the hatchling with it to deeper water. Several more *A. cribrarius*, which had been buried in close proximity to the crab that was initially sighted, also emerged from the sand and fled when disturbed by the author. Two of the fleeing crabs also had captured loggerheads but were completely buried with their prey. One of these crabs released the hatchling it had captured as it fled.

The hatchling dropped by *A. cribrarius* was collected from the surf and examined for injuries. The hatchling was dead but bore no signs of external injury (i.e. no wounds or missing extremities). After the remaining hatchlings entered the water and there were no signs of the small turtles nearby, a torch was used to locate more *A. cribrarius* in the area where the turtles had entered the water. A total of 18 crabs were found in an area ~ 240 X 240 cm. All had been totally buried, six fled with loggerhead hatchlings, two carried unidentified surf minnows, ten did not appear to have any prey items. One of the crabs was captured for positive identification and measurements. The crab collected was an adult female *A. cribrarius*, which was 151 mm wide, including the lateral spines. All of the observed *A. cribrarius* appeared to be of similar size.

Upon releasing the female *A. cribrarius*, the author observed the crab reburying itself in the tidal wash area just proximal to breaker zone. Several unidentified surf minnows were attracted to the light of the torch. A single *A. cribrarius*, different from the released specimen, was observed seizing a surf minnow while buried and as the tidal wash carried the fish back towards the ocean and away from the beach. This crab was only noticed by the author because it had captured the minnow; prior to the incident the crab had been totally buried. Upon seizing the minnow, the crab reburied itself with the flailing prey item only to emerge several minutes later, carrying the minnow to deeper water past the breaker zone.

From the observations presented herein it is apparent that *A. cribrarius* catch prey items while buried and are capable of seizing prey as large as a hatchling loggerhead sea turtle (mean size of Wassaw Island loggerhead hatchlings (SCL = 44.5 mm (range = 40.4 - 47.1 mm); n = 110 turtles; unpublished data). Although crabs were observed after they had captured the hatchling turtles, it is possible they did so in a fashion similar to the observation presented herein of *A. cribrarius* capturing an unidentified surf minnow. Moreover, *A. cribrarius* that were buried and then disturbed fled with captured loggerheads as well as surf minnows - adding credence to the prior assumption since the *A. cribrarius* that captured the unidentified surf minnow reburied itself after prey capture. Perhaps by reburying after capturing swimming prey, *A. cribrarius* are using their burying substrate to asphyxiate or further subdue prey items. Additional studies would be necessary to prove this theory.

It is interesting that an undisturbed v was observed capturing a surf minnow, reburying with the minnow and soon thereafter was seen to take the prey item to deeper water. It is possible that *A. cribrarius* commonly utilize the breaker zone for foraging and then retreat to deeper water to consume prey. Surf crabs can be commonly found in depths of up to 68 m and are often caught in shrimp trawls, obviously away from the breaker zone (Siebenaler 1952). It is unknown if *A. cribrarius* buries when away from the breaker zone. Studies are needed that investigate habitat utilization and associated behavior in *A. cribrarius*. Additionally, it is unknown if *A. cribrarius* feeds diurnally and if *A. cribrarius* captures and consumes non-swimming or even infaunal prey items as does *O. ocellatus*, another sand burying portunid.

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