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LAUGHING GULLS (*Leucophaeus atricilla*) APPEAR TO "TREAD" FOR TINY CRUSTACEANS IN SARGASSUUM WEED (*Sargassum* sp.) WASHED ASHORE FROM THE GULF OF MEXICO

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Laughing Gulls (*Leucophaeus atricilla*) forage opportunistically along beaches, bays, and mudflats and in waste dumps, pastures, shopping malls, golf courses, and lawns. They feed on garbage, steal from other seabirds, cadge handouts from people, and even capture flying insects (Burger 1996). This adaptability carries over to the marine organisms that constitute their principal foods, which vary from fishes too large to be swallowed and must be picked apart to barely visible eggs, developing embryos, and minute interstitial invertebrates buried under several centimeters of intertidal sand. That they might also consume tiny crustaceans resident in seaweeds that float ashore has not, to my knowledge, been reported, nor is their apparent method of obtaining them ordinary.

On 14 August 2012 at 15:45, while walking the beach at Longboat Key on Florida's southwest coast, I noticed two Laughing Gulls in the low swash performing an unusual maneuver. They were stepping in place on small clumps of sargassum weed (*Sargassum* sp.) roughly 20 cm in diameter, as if treading wine grapes. The speed of their steps was moderate, slower than a Laughing Gull runs but faster than it walks. Periodically a gull lowered its head between its feet or beside one foot and seemed to pick up something in its beak. It then lifted its head and appeared to swallow. If the gull was indeed recovering objects, they were small. Both gulls were in adult plumage. They were widely separated, and any attempt to quantify the frequencies of this putative foraging behavior would have been inconclusive.

Several days of onshore winds had left thick windrows of sargassum weed in the beach wrack. Much of the seaweed deposited at the high-tide line was in a state of brown decay, but the clumps now washing ashore were alive, still turgid and supple. They were also populated by small crustaceans.

Earlier that day I had shaken clusters over my open palm and recovered several amphipods and natantian shrimps. I fixed the shrimps in 5% formalin-seawater and examined them under a dissecting microscope at low power. Some were transparent; others contained chromatophores matching the dull yellow of the living seaweed. Prominent were *Hippolyte nicholsoni* and *Periclimenes* sp., this last a member of the protean *P. iridescens* complex (Holthuis 1951, Lebour 1949). All these shrimps occupy diverse benthic habitats and are common commensals of seagrasses, seaweeds, octocoralians, and other sessile organisms in shallow waters of coastal Florida and the Caribbean Sea (Chace 1972; Heard and Spotte 1991, 1997; Spotte and Bubucis 1996; Spotte et al. 1995), often washing ashore still clinging to the host organism after it detaches from the substratum. In contrast, at least two species of *Sargassum* (*S. fluitans* and *S. natans*) are holopelagic and never attached. The shrimps I recovered were adults (several carried embryos under their abdomens) with carapace lengths of ~2.0-4.5 mm as measured from tip of the rostrum to posterior end of the carapace. They were easily seen with the unaided human eye, making them visible to a gull's eye too.

Crustaceans such as these, small and available only intermittently, are probably of little importance to a hungry gull, although perhaps attractive to satiated gulls simply loafing on the beach with no apparent urgency to forage, as these two appeared to be. This conjecture is based on two observations: the two birds I watched seemed disinclined to investigate

other clumps of seaweed nearby, and no other Laughing Gulls I observed that day behaved as these did. Still, foraging on tiny shrimps is reasonable considering that Laughing Gulls eat other small items, including the eggs of horseshoe crabs (*Limulus polyphemus*), which measure 2-3 mm diameter (see below). To seabirds like the Lesser Sheathbill (*Chionis minor*) that inhabit colder, more productive waters, the small crustaceans associated with exposed seaweeds are important dietary items (Huyser et al. 2000), although I found no reports that sheathbills employ similar "treading" behavior to obtain them.

At the time of my observation the surf zone was filled with sandpipers of various species foraging busily in the wet sand. A few Ring-billed Gulls (*Larus delawarensis*) stood among them. None except the laughing gulls showed any interest in the numerous clumps of vegetation drifting around their legs. The small size and cryptic coloration of the shrimps, combined with the sargassum weed's complex branching, could have made their detection difficult. "Treading" perhaps stimulated them to move and reveal their locations.

Sullivan (1984: 710) wrote of Laughing Gulls, "They uncover the eggs [of horseshoe crabs] by treading with both feet at the water's edge and then scooping up the eggs which float to the surface." Buckley (1966: 395) reported treading behavior in the shallows (which he called "paddling") by Bonaparte's Gulls (*Chroicocephalus philadelphia*), Ring-billed Gulls, a California Gull (*Larus californicus*), and Laughing Gulls, noting that Bonaparte's Gulls "agitated the water rapidly with their feet, by a deliberate up-and-down motion, the entire leg moving as if the bird were trying to slowly and deliberately mash something into the ground." He added that such movements had been reported in the literature and variously called dancing, foot-paddling, foot-patting, paddling, puddling, pumping, stamping, thumping, tramping, trampling, treading, and trembling.

Not every observer considers these terms synonyms; still others imply they might differ in unspecified ways or dismiss descriptions entirely. Burger (1988) mentioned "foot paddling" behavior in reference to Laughing Gulls, although without a definition. She omitted its use in foraging (p. 13, Table 3), but included it on the following page (p. 14, Table 4). Burger (1996: 6), citing Sullivan (1984), stated that the male Laughing Gull "foot paddles" to dislodge horseshoe crab eggs from the substratum, again without an accompanying description. Sullivan, however, specifically reported what she saw as "treading," implying a stepping motion in shallow water similar to what Buckley and I witnessed. However, in no instance did Buckley see a bird dip its head downward and appear to pick up an object, and he was unable to associate the behavior with ingestion.

Gulls in flight occasionally "paw" or "pat" surface objects, although those movements are not what I saw. Audubon was aboard a vessel in Galveston Bay on 4 May1837 when he watched Laughing Gulls feed on drifting garbage, writing (Audubon and MacGillivray 1838: 127): "These, as well as all other Gulls, pat the water with their feet, their legs being partially extended, whilst assisting themselves with the bill to pick up any floating food." The Laughing Gulls Audubon observed were evidently hovering just above the surface, not afloat or standing on the shore.

Floating phalaropes foot-paddle to stir the substratum (e.g., Michael 1938, DiGiacomo et al. 2002), relying afterward on the surface tension of water to ratchet up suspended prey while rapidly" tweezering" the beak (Prakash et al. 2008). Plovers use what has been termed "foot-patting" when foraging on loose sand or mud to chase small animals to the surface (Matthews and Schwan 1994), and Audubon and MacGillivray (1835: 624) wrote of American Golden-Plovers (*Pluvialis dominica*), "They are frequently observed to pat the moist earth with their feet, to force worms from their burrows." Such movements are analogous to the "treading" I saw, although applied on land and in a different context.

My report of presumed motive-directed "treading" is inferential even if correct. Observations of foraging based solely on behavior (e.g. Burger 1987, 1988) can be incomplete and therefore inconclusive, as this one is. For example, confirmation of a behavior-foraging association when the prey is invisible at a distance to human observers requires examining the gut contents of a random sample of gulls to assure ingestion, identifying

food items and their fragments to species, and comparing the results with densities and distributions of the same organisms taken from the habitat.

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