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Commensal Foraging Between Double-crested Cormorants and a Southern Stingray

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ABSTRACT.—We describe a commensal relationship between Double-crested Cormorant, (*Phalacrocorax auritus*) and a southern stingray (*Dasyatis americana*). Three cormorants were observed closely following a large southern stingray in a shallow turtle grass (*Thalassia testudinum*) bed near Long Key, Florida and feeding upon a small fish disturbed by the stingray's benthic foraging. This represents an example of a commensal relationship in which one participant benefits while the other is unaffected. *Received 20 September 2008. Accepted 30 January 2009.*

The scientific literature is replete with examples of birds associating with unrelated species that function as 'beaters' to flush prey. For example, Cattle Egrets (*Bulbulcus ibis*) forage commensally with ungulates (Grubb 1976), Great Egrets (*Ardea alba*) with black-tailed deer (*Odocoileus hemionus*) (Herring and Herring 2007), and Fan-tailed Warblers (*Euthlypis lachrymosa*) with nine-banded armadillos (*Dasyus novemcinctus*) (Komar and Hanks 2002). Some seabird species in the marine environment follow surface swimming dolphins associated with predatory fish and use these large predatory marine animals as a means to obtain their prey (Au and Pitman 1986, Martin 1986). Predatory tunas, jacks, sharks, and dolphins often confine their baitfish prey near the surface to facilitate feeding; these baitfish aggregations commonly attract seabirds which dive

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under the surface to feed (Martin 1986, Camphuysen and Webb 1999, Clua and Grosvalet 2001).

The southern stingray (*Dasyatis americana*) is a large, subtropical, benthic elasmobranch that ranges from New Jersey throughout the Gulf of Mexico and the Caribbean to southern Brazil (McEachran and de Carvalho 1998). It is common throughout the Florida Keys where it is typically associated with reef and turtle grass (*Thalassia testudinum*) communities (Robins and Ray 1986). Its diet consists primarily of benthic molluscs and polychaetes, but also includes crustaceans and small teleosts (Gilliam and Sullivan 1993, McEachran and de Carvalho 1998). The southern stingray excavates its buried prey by a combination of water jetted from the mouth and the flapping action of the pectoral fins (Randall 1983). Predatory teleosts, such as snappers and grunts, often hover nearby during feeding events waiting to capture prey stirred up by the excavation.

The Florida subspecies of the Double-crested Cormorant (*Phalacrocorax auritus floridanus*) is a common coastal bird that ranges from North Carolina to the Gulf of Mexico (Hatch and Weseloh 1999). This bird paddles at the surface and dives to forage on teleost prey which it consumes whole. Smaller fish are consumed directly underwater whereas larger prey are brought to the surface where they are manipulated and swallowed headfirst (Hatch and Weseloh 1999). We describe an interaction between a large southern stingray and Double-crested Cormorants, which deliberately followed the stingray to facilitate foraging success.

OBSERVATIONS

On 19 April 2008, our boat was anchored southwest of the Channel #5 bridge within 100 m of a mangrove-fringed (*Rhizophora mangle*) island in Long Key Bight, Florida (24° 49' N, 80° 47' W). The water depth was <1 m and the bottom was dominated by turtle grass. The conditions were sunny and calm which provided excellent viewing through the clear water. Water temperature was 24° C and the tide was near slack (low tide 1712 hrs EDT). At ~1630 hrs EDT we observed an adult female southern stingray of ~1 m disc width swim parallel to the boat in a westerly heading. Three Double-crested Cormorants closely followed the stingray underwater, with two cormorants on the stingray's left side

and one on the right, and continued to follow when they were at the surface. The birds would repeatedly dive to swim behind the stingray underwater and spent more time underwater than at the surface. During underwater swimming, the birds stayed within ~50 cm of the posterior-lateral margin of the stingray's disc and swam at a depth slightly above the body of the stingray. The stingray did not appear to be disturbed by the presence of the cormorants as it exhibited normal swimming behavior. The stingray stopped once to excavate within the turtle grass bed during this encounter period, which lasted ~5 min. This was evident from the flapping action of the pectoral fins and the plume of silt that was generated. Taking advantage of this disturbance, the single cormorant on the right side of the stingray caught an unidentified silvery teleost, 5–10 cm in total length, and consumed it at the surface. The remaining two cormorants continued to follow the stingray as it swam out of view, and the third rejoined after consuming its prey. We could no longer see the stingray, but were able to watch the cormorants for several minutes when they appeared intermittently on the surface, presumably still following the stingray.

DISCUSSION

The described close following behavior is likely to be successful only in shallow, clear water where cormorants would be able to initially see the stingray against the turtle grass and initiate following. The large shadow and bow wave created by the stingray swimming just above the substratum, in addition to directly disturbing fishes by their foraging excavations, may agitate fish sheltering among the blades of turtle grass causing them to dart away. The birds were largely visually obscured from any teleosts beneath the stingray from their vantage point posterior-lateral to the stingray's broad disc. This could provide the cormorants with an advantage when preying upon fish that were swimming to avoid the stingray.

It is unlikely that small fish disturbed by the presence of the stingray and consumed by the cormorants represent any significant lost feeding opportunities for the stingray. The stingray was clearly excavating for a buried prey item and showed no interest in the small fish in this instance. The relationship we described, in which one participant benefits (cormorants) while the other is not affected (stingray), represents an

example of commensalism. To our knowledge, the described commensal relationship is the first documented example of a bird deliberately following a fish underwater and using it to facilitate foraging.

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