Short Communications

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Confirmation of diving and swimming behavior in the Sora (*Porzana carolina*)

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ABSTRACT—We first observed Sora (*Porzana carolina*) swimming and diving under water while capturing them with hand nets at night. Since that time, we have observed the behavior several times and documented it with photos and video. Rails are among the most elusive birds. Despite living in wetlands, water depth has often been discussed as a factor limiting habitat use by rails, with the assumption that when water levels are too deep, rails walk on top of floating or emergent vegetation. Here we present new photo and video evidence that confirms previous observations that Sora are adept at swimming and diving in deep water wetland environments, which should alter how we think about their ability to avoid predators and use deeper water habitats. *Received 24 March 2017. Accepted 4 May 2017.*

Key words: diving, Rallidae, Sora, swimming.

Confirmación del comportamiento de buceo y nado en *Porzana carolina*

RESUMEN (Spanish)—Mientras capturábamos individuos de *Porzana carolina* con redes de mano, por la noche, las observamos nadando y buceando bajo el agua por primera vez. Desde aquella ocasión, observamos el comportamiento varias veces, y lo documentamos con foto y video. Los rascones están entre las aves más elusivas. Aunque los rascones viven en humedales, la profundidad del agua ha sido discutida con frecuencia como un factor limitante para ellos, con la suposición de que las aves caminan encima de la vegetación flotante o emergente cuando los niveles del agua son muy profundos. Aquí presentamos nueva evidencia en foto y video que confirma las observaciones previas de que *Porzana carolina* es adepta a nadar y bucear en aguas profundas de ambientes de humedales, lo que debería cambiar la manera en que pensamos en su capacidad para evitar depredadores y usar hábitats de aguas más profundas.

Palabras clave: Buceo, nado, *Porzana carolina*, Rallidae.

We first observed Sora (*Porzana carolina*) diving under water while capturing them with hand nets in a shallow (<1 m) emergent wetland. A hand net was placed over a Sora at night after it had been located with a spotlight. Before we were able to grasp the bird under the net, the bird dove completely under the water surface. The Sora then popped up 1 m away and swam into nearby vegetation. Since that event, we have observed Sora many times (>20) making similar dives under the water surface, each time in response our attempts to capture them with hand nets. During these events, we have observed the Sora swimming underwater propelled by their wings. We first recorded video of Sora diving after releasing a leg-banded bird (Supplemental Video 1). The Sora was released in vegetation with shallow water (~20 cm deep), and it then swam a short distance (~1 m), paused, and when AMVF took a step toward the bird, dove under the water surface (Supplemental Video 1). On 6 occasions, we have observed Sora positioned with only their head above the water. These observations were made after a Sora dove under water, resurfaced with only its head above water, and remained motionless (Fig. 1; Supplemental Video 2). We frequently observed Sora swimming at the water surface, paddling with their feet like a duck, both when we approached on an ATV and on foot, and both diurnally and nocturnally. On one occasion, we observed a Sora swimming at night with just its head above the water across an area of deep (~3 m) open water.

While hunting, DGK observed on several occasions instances of Sora crippled after being shot, evading capture by diving. On one occasion, a crippled Sora landed in open water ~60 cm deep, and when approached, the Sora dove and was not seen again; the nearest vegetation was ~5 m away. On a second occasion, a crippled Sora landed in sparsely flooded vegetation, and when approached by DGK's Labrador retriever, the Sora dove underwater, and the retriever then completely submerged its head to capture the bird. On 2 other

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Figure 1. Sora (*Porzana carolina*) sitting with body fully submerged and only its head above the water surface after diving and swimming underwater several meters after being approached on foot by researchers. 20 Sep 2014, Nodaway Valley Conservation Area, Missouri, USA.

occasions, crippled Sora landed in sparsely flooded vegetation, and when approached each Sora dove and was observed swimming ~15 cm deep by propelling themselves with their wings, similar to petrels, auks, cormorants, shearwaters, and guillemots, which all "fly" underwater and in the air (Johnsgard 1987, Gill 2006).

Here we confirm what Ripley (1976) observed: that Sora should be included among the birds that swim with their wings, despite some sources stating that wing-propelled diving is found solely in marine and pelagic birds (Storer 1960). Sora and other inland wetland birds are thought not to fly underwater because subsurface vegetation in freshwater systems would impede wing-propelled locomotion by these birds (Storer 1960), despite observations by Ripley (1976) who said "when hard pressed," rails would swim underwater. Diving by crippled Sora when approached by sportsmen was first described by Audubon (1840: p. 149), who reported that crippled Sora would dive "at the approach of the sportsman, and sometimes cling to the roots of the grasses for a few moments, but more usually rise under the cover of the floating leaves."

The behavior and habitat requirements of animals define their ecological niche and are therefore critical for both ecological study and effective conservation. Yet for elusive species, such characteristics are difficult to observe, limiting our ability to understand their needs. Rails are among the most elusive birds, spending their time in densely vegetated wetlands, rarely flying, and having highly cryptic coloration. Despite living in wetlands, water depth has been discussed as a factor limiting habitat use by rails, with the assumption that when water levels are too deep, rails walk on top of floating or emergent vegetation (Weller and Spatcher 1965). Several sources have observed swimming and diving behavior in rails (Audubon 1840; Maynard 1896; Terrill 1943; Pospichal and Marshall 1954; Ripley 1976, 1977; Meanley 1985; Kaufman 1987; Taylor 1998), but only one has previously observed swimming underwater (Ripley 1976). Here, we confirm these previous observations and provide new photo and video evidence that Sora are adept at diving and swimming underwater in deep water wetland environments, which should alter how we think about their ability to avoid predators and use deeper water habitats.

Our confirmation here of swimming and diving by Sora has important implications for how Sora are able to use underwater habitats. Sora are well camouflaged, and their other cryptic behaviors, such as rarely flying, already assist in avoiding predators. Escaping underwater from a predator, as they did when we approached, represents a potentially valuable strategy. Because Sora can readily dive and swim underwater, they could potentially forage while underwater, and their morphology could be less important in explaining niche separation among cohabiting Rallidae (Weller and Spatcher 1965). Sora feed on a variety of seeds and invertebrate prey items (Rundle and Sayre 1983, Melvin and Gibbs 2012). We hypothesize the ability to swim, dive, and suspend under water would be advantageous by expanding the array of food items available within a wetland ecosystem (e.g., aquatic invertebrates, plant seeds in deeper water). Other members of Rallidae, coots and gallinules, dive for food and are even known to tip up when feeding (Taylor 1998). The ability

to dive and suspend underwater would also assist in escaping from or avoiding predators.

Understanding Sora behavior informs how we think about their ecology as well as how we study and conserve them. We hope this confirmation of Sora's ability to dive and swim underwater will inform the growing body of literature on these secretive wetland birds. These behaviors indicate that Sora can take advantage of a broader ecological niche than previously recognized (Melvin and Gibbs 2012), yet may also raise conservation concerns, such as the need to conserve and manage for a wider array of habitat types.

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