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The Condor 90:270-271
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RAVEN TOOL USE?

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Key words: Tool use; ravens; *Corvus corax*; starvation; nutcrackers; *Nucifraga columbiana*.

Tool use by birds is well known (E. O. Wilson, 1975 *Sociobiology*, p. 172, Harvard Univ. Press, Cambridge). Recently, D. Griffin (1984 *Animal Thinking*, p. 120-121, Harvard Univ. Press, Cambridge) cites an additional "enterprising use of rocks" by Northern Ravens, *Corvus corax*. The presumptive tool use by ravens refers to observations reported by Steward W. Janes (1976 *Condor* 78:409).

Janes and a companion were climbing up a crevasse to a raven cliff nest containing six feathered young. Both adults flew at the intruders repeatedly, calling loudly, landing on the cliff above, and loosening rocks (and later also sand) and dropping them down onto the

intruders. I here report other examples of possibly similar behavior of agitated Northern Ravens dislodging substrate.

On 9 May 1987, a companion (Dick Smyth) and I were in a grove of tall (ca. 30-m) white pines near Weld, Maine, to climb to a nest of ravens containing one feathered young. On this and three subsequent occasions one of the adults of the pair immediately left the area, silently. The second became very agitated and flew within 5 m of the climber when he was near the nest. It called loudly and landed on the tree above the climber as well as on neighboring trees. The bird pecked at and snipped off about six to eight tips (2 to 3 cm) of pine twigs. These twig tips with the attached needles drifted to the ground. The bird made no apparent attempt to position itself above us while pecking at or tearing the substrate at its feet. However, the trees next to the nest afforded numerous perches.

During the previous winter (early March) I had encountered a raven in the same area at a cleanly-picked deer carcass in the snow. (The carcass had been scented

¹ Received 6 July 1987. Final acceptance 10 August 1987.

with human urine, and was not eaten by coyotes.) The bird hopped away at my approach and reached the lower branches of a spruce, then hopped up ahead of me from branch to branch. It kept 2 to 3 m ahead of me as I followed. The bird occasionally stopped to peck vigorously at the branches at its feet and to twist off small twigs. Small chips and twigs sometimes fell down. Having gained altitude near the crown the bird flew off when I got close. It (or another bird) returned to the deer remains a day later and this time I ran it down on snowshoes. (The bird accepted meat within seconds of being caught. Its wing muscles were greatly atrophied, but it revived fully after being fed in an aviary for several weeks.) The bird, while captive, snipped all

loose twigs and bark from its perches, and it often hammered the perch in its cage when it saw me coming, first retreating into a corner of the cage away from me.

Perhaps corvids regularly hammer and/or dislodge objects near them as a displacement behavior when they are angry or frustrated. For example, captive Clark's Nutcrackers, *Nucifraga columbiana*, hammer their perches when they are not given food while birds in neighboring cages are being fed (J. Marzluff, pers. comm.). The dislodging of substrate onto intruders could be incidental and a matter of circumstance, rather than serving (consciously or unconsciously) to dissuade intruders.

The Condor 90:271-274
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AGGRESSIVENESS IN MIGRATING CAPE MAY WARBLERS: DEFENSE OF AN AQUATIC FOOD SOURCE¹

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Key words: Stopover sites; Cape May Warbler; *Dendroica tigrina*; Manitoba; territoriality; aggressive behavior.

How passerine birds cope with the challenges they face as they move along their migratory pathways has received increasing attention recently (e.g., Rappole and Warner 1976, Bibby and Green 1980, Cherry 1982, Graber and Graber 1983). Undoubtedly, food acquisition influences how these birds decide to use space, because getting enough food to store fat, or merely to survive, is probably the single most important constraint during this time (Hutto 1985). What complicates the decision-making process is that migrating birds sometimes must use resources whose availability fluctuates (Schneider and Harrington 1981, Terrill and Ohmart 1984), often because of unpredictable changes in weather (see Weatherhead et al. 1985, Hobson and Sealy 1987). Nonbreeding birds, including migrants, sometimes find it necessary and economically worthwhile to defend localized food sources, even for a few hours or days. However, the dynamics of this short-term territoriality are poorly known (but see Emlen 1973, Schemske 1975, Rappole and Warner 1976).

During mid-May each year a few migrating Cape May Warblers (*Dendroica tigrina*) stop over on the forested dune ridge (described by MacKenzie 1982) along the southern shore of Lake Manitoba, Manitoba. The number of individuals present during each spring

migration is usually small and only rarely are any captured during routine netting that is conducted daily during the warbler migrations. In some years, however, a few males have been observed defending nectar sources, sometimes over a period of several days (Sealy, unpubl. data). In the present paper I examine a previously undescribed defense of prey on the surface of water by migrating Cape May Warblers.

RESULTS

Transient individuals of the Cape May Warbler, influenced by a 3-day storm in 1982, suspended their usual arboreal foraging (i.e., foliage gleaning and aerial hawking) and defended fixed areas (territories, sensu Brown 1975) along a water-filled ditch bordered on one side by willows (*S. interior* and *S. amygdaloides*) and on the other by marsh habitat dominated by new shoots of *Phalaris arundinacea* L., about 20 to 25 cm in height. These territories (Fig. 1) were reminiscent of those held by Northern Waterthrushes (*Seiurus noveboracensis*) during migration (Rappole and Warner 1976) and in winter (Schwartz 1964).

The first Cape May Warbler, a male, was seen in 1982 on 10 May; it gleaned and aerially hawked prey from the outer edge of the canopy. Over the next several days more Cape May Warblers were seen, foraging as above. By 17 May the weather had turned inclement, and a severe storm, with high winds, rain, and below-normal temperatures, prevailed through 20 May. In the late afternoon of 17 May I found three males on the ground, each about 8 m apart at the edge of the water in the ditch; they fed on Collembola (Isotomidae) on the water's surface. By noon on 18 May six males were present. The birds walked along the shoreline and

¹ Received 2 September 1987. Final acceptance 2 October 1987.