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COMMON TERN EGG PREDATION BY RUDDY TURNSTONES[1]

ANNE FARRAWAY
540 Merton Street, Toronto, ON M4S 1B3, Canada

KATIE THOMAS
74 Chestnut Park Road, Toronto, ON M4W 1W9, Canada

HANS BLOKPOEL
Canadian Wildlife Service, 1725 Woodward Drive, Ottawa, ON K1A 0E7, Canada

Key words: *Ruddy Turnstones;* Arenaria interpres; *terns; egg predation.*

Ruddy Turnstones (*Arenaria interpres*) are opportunistic feeders with a varied diet (Beven and England 1977). Predation on eggs by Ruddy Turnstones has been reported for Grey-backed Terns (*Sterna lunata,* Bent 1929), Sooty Terns (*S. fuscata,* Crossin and Huber 1970), Royal Terns (*S. maxima,* Loftin and Sutton 1979), and Common Terns (*S. hirundo,* Parkes et al. 1971). The observations of Parkes et al. (1971) in 1970 on Great Gull Island (Long Island Sound, New York) involving a single turnstone, were the first reported cases of Common Tern egg predation by turnstones in North America. The authors wondered whether this, presumably new, behavior might spread in following years.

In this note, we report several cases involving many turnstones depredating Common Tern eggs at the Eastern Headland of the Toronto Outer Harbour. This landfill site extends ca. 5 km into Lake Ontario. At the time of our observations there were seven Common Tern colonies (A through G) on the Headland.

1983

During 24 May to 3 June, we saw 11 separate incidents of egg predation by Ruddy Turnstones. Although each incident will not be detailed here, behavioral characteristics common to all are highlighted.

On 28 May, we observed from a vehicle parked outside the colony, three cases of egg predation in Colony B. In the first case, approximately 12 m from the vehicle, a Common Tern watched from a distance of less than 1 m as a turnstone devoured the contents of its nest. The Common Tern removed the broken egg shells from the nest site and then returned to the empty nest. At no time did the tern attempt to chase the turnstone. In the second instance, about 5 m from the vehicle, a turnstone pecked vigorously at the eggs, devoured the contents, and ate any ground spillage before moving to the next nest. This behavior continued for a minimum of 13 min. Then there was a panic flight by the terns and an attempt to harass an intruding Ring-billed Gull (*Larus delawarensis*). The turnstone was subsequently chased by a tern upon its return to the nest area. In the third incident, the incubating Common Tern walked away from the nest without any attempt of nest defence. A second turnstone then joined the first and a conflict of "ownership" developed. The dominant turnstone then ate contents of all eggs at the undefended nest. Incubation at six Common Tern nests nearby continued undisturbed throughout this incident.

On 31 May, we found 20 depredated nests with a total of 33 eggs in Colony A. The numbers of Ruddy Turnstone peaked on 6 June, when a flock of 200 landed in Colony B. Numbers of them were observed depredating eggs in this colony. Although 40 Red Knots (*Calidris canutus*) and 10 Dunlins (*C. alpina*) were also part of that shorebird flock, they did not participate in egg predation.

1984

On six separate occasions during the first two weeks of July, egg predation was noted in Colony D. On 6 July, 10 Ruddy Turnstones landed in Colony D and depredated about 25 of the 30 nests. During 1 to 14 July destroyed eggs were noted in more than 20 nests in Colony B.

DISCUSSION

Our experience on the Eastern Headland agreed with the findings of Bent (1929), Parkes et al. (1971) and Loftin

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and Sutton (1979) in that the incubating terns failed to recognize the turnstone as a predator in most cases, no matter how closely they were approached by the turnstones. Mobbing behavior was elicited only when Canada Geese (*Branta canadensis*) and Ring-billed Gulls were passing. Turnstones in the area at this time would also be mobbed.

Contrary to Parkes et al. (1971), our observations were not confined to a single turnstone, rather they concur with Bent (1929) in that many were involved. The impact of turnstones was higher at the Headland than at the Common Tern colony on Great Gull Island (Parkes et al. 1971), yet it did not result in total destruction of the colony, as was reported for Royal Terns near Florida in 1978 (Loftin and Sutton 1979).

There have been no further reports of egg-eating by turnstones in well-studied Common Tern colonies since that of Parkes et al. (1971). Neither have there been any previous observations recorded at our study site since research began here in 1976. Similarly, at the Royal Tern colony studied by Loftin and Sutton (1979), the investigators did not notice egg predation by turnstones until the fourth year of their study. However, it is difficult to say whether this form of egg predation is a new, expanding, or just a hitherto unnoticed behavior. Further efforts should be made in other tern colonies being studied to document the frequency of occurrence and the impact of egg predation by Ruddy Turnstones.

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VARIATION IN SIZE SPECIFIC COMPOSITION OF BLACK-BILLED MAGPIE EGGS WITHIN AND AMONG CLUTCHES[1]

WESLEY M. HOCHACHKA[2]
Department of Zoology, University of Alberta, Edmonton, Alberta, Canada T6G 2E9

Key words: *Black-billed Magpie;* Pica pica; *egg composition.*

In recent years, descriptive data on egg composition of a number of altricial species have been published, e.g., Great Tit, *Parus major* and Pied Flycatcher, *Ficedula hypoleuca* (Ojanen 1983), European Starling, *Sturnus vulgaris* (Ricklefs 1984), and Boat-tailed Grackle, *Quiscalus major* (Bancroft 1985). One possible application of these data is to relate egg composition to life history characteristics of a species. For example, one could examine Howe's (1978) suggestion that variation in egg composition could influence brood reduction. As brood reduction is proximately the result of events within a single nest and appears to be related to intraclutch variation in egg size (e.g., Howe 1976), one needs to know how egg composition varies with egg size within nests. However, most detailed descriptions of variation in egg composition with egg size are comparisons among clutches (e.g., Bancroft 1985), or combine interclutch and intraclutch variation (e.g., Ricklefs 1984). Only Ankney and Johnson (1985) presented separate analyses of variation within and among clutches, although only one set of eggs was analyzed for intraclutch variation in Brown-headed Cowbirds (*Molothrus ater*). Thus, it is unclear whether size-dependent variation in egg composition follows the same pattern within a clutch as among clutches. The purpose of this note is to examine whether size-dependent variation in egg composition within a clutch can be predicted on the basis of patterns observed among clutches.

METHODS

As part of a study of Black-billed Magpie (*Pica pica*) reproductive ecology, eight complete clutches of eggs were collected in the city of Edmonton, Alberta, Canada, in 1984. Clutches were collected on the day on which the last egg was laid, or on the following day. Within 2 hr of collection, eggs were brought into the laboratory, weighed, and measured (length and breadth at largest diameter to 0.1 mm with dial calipers). Eggs were then separated into albumen, yolk, and shell plus membrane, and wet masses of all components determined. All components were dried to constant weight at 60°C in a drying oven, and dry masses were measured; water content was calculated as the difference between total wet and dry mass of eggs. Yolks were ground up and placed in Soxhlet apparatus, and neutral lipids were extracted for a 2-hr period with petroleum ether solvent. Mass of extracted lipids was found after evaporating the solvent over a steam bath; lean yolk mass was calculated as the difference between total dry yolk and yolk lipid masses. The above procedure did not apply to one clutch in which incubation had apparently begun before

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[2] Present address: Department of Zoology, University of British Columbia 6270 University Boulevard, Vancouver, British Columbia V6T 2A9, Canada.