SHORT COMMUNICATIONS

The Condor 88:520–521

YEARLING-BIASED FEMALE MORTALITY IN TREE SWALLOWS[1]

MICHAEL P. LOMBARDO
Department of Biological Sciences, Rutgers University, Nelson Biological Laboratory, P.O. Box 1059, Piscataway, NJ 08854

Key words: Migration; age-biased mortality; sex-biased mortality; Tree Swallow.

Tree Swallows (*Tachycineta bicolor*) are among the first species of Hirundinidae to arrive on breeding grounds in the spring (Tyler, in Bent 1942) possibly enabling them to begin nest site selection before most of their interspecific nest-site competitors (Hersey 1933; Kuerzi 1941; Tyler, in Bent 1942; Chapman 1955; Erskine 1964; Zeleny 1976). However, this early arrival has potential costs because Tree Swallows must often encounter cold, unseasonable weather that lowers aerial insect abundance (Taylor 1963) and places birds under food stress. Although Tree Swallows can feed on plant foods (e.g., bayberry fruit, *Myrica pennsylvanicus,* Eliott 1939; Tyler, in Bent 1942; pers. observ.) during periods of low insect abundance, mortality after a period of adverse weather is not uncommon (Dence 1946, Whitmore et al. 1977, Weatherhead et al. 1985). In this note I report significant yearling-biased female mortality in Tree Swallows early in the breeding season.

From 1980 to 1983, I studied Tree Swallow social behavior at a breeding area on the salt marshes of the J. F. Kennedy Memorial Wildlife Refuge located at Tobay Beach on the south shore of Long Island, New York (see Schaeffer 1972 for a description of the site). By 1983, 72 nest boxes were available for breeding; 40 with entrance holes 3.8 cm (1.5 in) in diameter and 32 with 3.2 cm (1.25 in) holes. Boxes were the same in all other dimensions including the distance from the floor to the entrance hole (10.8 cm).

During April and May of each year, I found dead Tree Swallows in boxes often before nest building had begun at the study site. All dead birds ($n = 20$) were found alone (but see Weatherhead et al. 1985). Their tail feathers were covered with white, opaque excrement (see Christy 1940, Weber 1940) indicating that they may have been either (i) alive and unable to exit the box for a prolonged period, or (ii) on the bottom of a communal roost, crushed, and defecated on (see Weatherhead et al. 1985).

Four of the dead birds were known to be males according to banding records ($n = 2$) or the presence of a cloacal protuberance ($n = 2$). Based on banding records, one male was yearling and the other an After Second Year (ASY) individual. Of the other 16, 14 were in brown plumage with little iridescence, indicating that they were yearling females (Cohen 1980, Hussell 1983). The two remaining birds were in full iridescent blue-green plumage and were found to be ASY females by necropsy.

Mortality of known sex birds ($n = 20$) was significantly biased in favor of females ($\chi^2 = 7.20$, df = 1, $P < 0.01$). Females spend much more time than males inside nest boxes during nest-box selection (R. R. Cohen, pers. comm.) and therefore, are more likely to die there. Fourteen of the 16 females (87.5%) were yearlings; a proportion significantly greater than expected ($\chi^2 = 9.32$, df = 1, $P < 0.005$) given the number of yearling ($n = 57$) and older ($n = 64$) females that laid at least one egg for first brood attempts during the study. The proportion of yearling females ($\bar{x} = 0.489$) in the breeding population remained unchanged each year ($\chi^2 = 1.92$, df = 1, $P > 0.50$).

Seventy-five percent of all dead birds were known to be yearlings (females, $n = 14$; males, $n = 1$). There are many factors that could contribute to yearling mortality including inexperience in (i) using plant food as a supplemental food during periods of low insect abundance, (ii) finding and capturing insects (DeSteven 1978, R. R. Cohen, pers. comm.), and (iii) finding safe refuge during periods of adverse weather (R. R. Cohen, pers. comm.). Whitmore et al. (1977) found that Tree Swallows dying during unseasonably cold weather in Utah were physiologically less able to withstand the metabolic stress of cold weather than those that survived based on measurements of dry weight, % dry lipid weight, and nonfat dry weight. Greater susceptibility to unseasonable weather may help explain why yearling females (Kuerzi 1941; Tyler, in Bent 1942; Chapman 1955; Cohen 1978; Leffelaar and Robertson 1984), and yearling males (R. R. Cohen, pers. comm.) usually return to breeding areas up to one month later than older birds.

I thank H. W. Power, E. W. Stiles, and B. G. Murray, Jr. for their discussions and E. H. Burtt, Jr., R. J. Robertson, P. D. MacArthur, and especially R. R. Cohen for their constructive criticisms of the manuscript. The Town of Oyster Bay, New York kindly allowed me to use the J. F. Kennedy Memorial Wildlife Refuge as a study site. My research was funded by a BRSG Grant from Rutgers University to H. W. Power, the F. M. Chapman Fund, the Northeastern Bird Banding Association, Sigma Xi, a J. Leatham Grant from the Zoology Program, and the Ecology Graduate Program at Rutgers.

LITERATURE CITED

CHAPMAN, L. B. 1955. Studies of a Tree Swallow colony. Bird-Banding 26:45–70.

CHRISTY, B. H. 1940. Mortality among Tree Swallows. Auk 57:404–405.

COHEN, R. R. 1978. Behavioral adaptations for cavity nesting in the Tree Swallow (*Iridoprocne bicolor*). J. Colo.-Wyo. Acad. Sci. 10:41.

COHEN, R. R. 1980. Color versus age in female Tree Swallows. J. Colo.-Wyo. Acad. Sci. 12:44.

DENCE, W. A. 1946. Tree Swallow mortality from exposure during unseasonable weather. Auk 63:440.

DESTEVEN, D. 1978. The influence of age on the breeding biology of the Tree Swallow (*Iridoprocne bicolor*). Ibis 120:516–520.

ELIOTT, J. J. 1939. Wintering Tree Swallows at Jones

[1] Received 21 August 1985. Final acceptance 19 February 1986.

Beach, fall and winter 1938 and 1939. Bird Lore 41: 11–16.
ERSKINE, A. J. 1964. Nest site competition between Bufflehead, Mountain Bluebird, and Tree Swallows. Can. Field-Nat. 93:202–203.
HERSEY, F. S. 1933. Notes on Tree Swallows and bluebirds. Auk 50:109–110.
HUSSELL, D. T. 1983. Age and plumage color in female Tree Swallows. J. Field Ornithol. 54:312–318.
KUERZI, R. G. 1941. Life history studies of the Tree Swallow. Proc. Linn. Soc. N. Y. 52-53:1–52.
LEFFELAAR, D. AND R. J. ROBERTSON. 1984. Do male Tree Swallows guard their mates? Behav. Ecol. Sociobiol. 16:73–79.
SCHAEFFER, F. S. 1972. Tree Swallow breeding biology at a coastal and inland area. EBBA News 34:216–222.
TAYLOR, L. R. 1963. Analysis of the effect of temperature of insects in flight. J. Anim. Ecol. 32:99–117.
TYLER, W. M. 1942. Tree Swallow, p. 384–400. *In* A. C. Bent. Life histories of North American flycatchers, larks, swallows, and their allies. U.S. Natl. Mus. Bull. No. 179.
WEATHERHEAD, P. J., S. G. SEALY, AND R.M.R. BARCLAY. 1985. Risks of clustering in thermally-stressed swallows. Condor 87:443–444.
WEBER, J. A. 1940. Destruction of Tree Swallows. Auk 57:405.
WHITMORE, R. C., J. A. MOSHER, AND H. H. FROST. 1977. Spring migrant mortality during unseasonable weather. Auk 94:778–781.
ZELENY, L. 1976. The bluebird. Indiana Univ. Press, Bloomington.

The Condor 88:521–522

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

[1] Received 17 September 1985. Final acceptance 3 February 1986.