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NAPHTHALENE MOTH BALLS DO NOT DETER MAMMALIAN PREDATORS AT RED-WINGED BLACKBIRD NEST

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Abstract.—Researchers often use predator repellents to deter mammalian predators from following their scent trails to nests. The effectiveness of repellents is largely unstudied. We tested naphthalene moth balls, a supposed repellent, and found them to be ineffective in deterring mammalian predators at unoccupied Red-winged Blackbird (*Agelaius phoeniceus*) nests that we supplemented with Northern Bobwhite (*Colinus virginianus*) eggs.

NAFTALENO NO DETIENE LA DEPREDACIÓN POR PARTE DE MAMÍFEROS EN NIDAS DE *AGELAIUS PHOENICEUS*

Resumen.—Comunmente los investigadores utilizan repelentes para evitar que mamíferos depredadores, puedan seguir rastros olfativos para predar en nidos de aves. En éste trabajo se pone a prueba naftaleno como repelente. Se encuentra que el mismo es inefectivo para detener la depredación por parte de mamíferos en nidos abandonados de *Agelaius phoeniceus* cebados con huevos de codorniz.

Ornithologists have long suspected that their visits to the nests of birds attracted predators and therefore biased the results of their studies (Götmark and Åhlund 1984, Lenington 1979, Snelling 1968). Although Gottfried and Thompson (1978) failed to detect any effect of human activity on the predation rates of experimentally placed nests of several species of passerines, both Snelling (1968) and Lenington (1979) reported increased predation on the Red-winged Blackbird (*Agelaius phoeniceus*) nests they visited during the course of their studies. Predators may find visited nests in several ways. Markers placed by researchers may attract predators, as may birds flushed from nests during visits. Predators may also learn to follow scent trails to nests. To reduce the effect of their visits, researchers frequently try to minimize disturbance around the nest, and they sometimes apply predator repellents, often without success. For

example, a fox repellent made of mustard oil and kerosene that was tested for this purpose, actually attracted foxes (Hammond and Forward 1956). Naphthalene moth balls are also used to discourage mammalian predators (Hamerstrom 1970), but the efficacy of their use is unknown. Moth balls are usually scattered within 2.0 m of the nest and in the observer's trail in an effort to deter mammalian predators from following the investigator's scent trail. Here we report on a test of the effectiveness of moth balls in reducing mammalian predation on unoccupied nests of Red-winged Blackbirds in coastal South Carolina. Major mammalian predators in the area include raccoons (*Procyon lotor*) and, possibly, opossums (*Didelphis marsupialis*).

From 20 to 22 Jul. 1986, after most Red-winged Blackbirds had nested, 40 unoccupied Red-winged Blackbird nests were located along the Bly Creek and Crab Haul Creek drainages, at North Inlet Marsh, Hobcaw Barony, near Georgetown, South Carolina. The marsh is a predominantly cord grass (*Spartina alterniflora*) salt marsh typical of the southeastern coast of the United States. We found nests by walking the outer edges of upland islands and visually checking all shrubs, most of which were southern red cedars (*Juniperus silicicola*) and marsh elder (*Iva frutescens*). Sixty-three percent of the 40 nests we found were in marsh elder, 30% were in southern red cedars, and 7% were in various shrubs. Mean nest height averaged 1.58 m (SD = 0.64). Two Northern Bobwhite (*Colinus virginianus*) eggs less than one week old were placed in each of the nests and covered with several leaves to reduce predation from avian predators (Götmark and Åhlund 1984, Sugden and Beyersbergen 1986). Twenty nests (every other nest found) were treated with six moth balls (100% naphthalene) scattered in a circular pattern within 2.0 m of the vegetation at the base of the nest and in the observer's trail. We placed 2 eggs each in 20 control nests, but did not treat them with moth balls. The first nest was treated with mothballs and subsequent nests were alternately treated or used as controls. We returned to visit each nest along the same initial trail every 4 d for 12 d.

Eggs in 43% of the 40 nests were preyed upon within 12 d. Ninety percent of the nests from which eggs were removed were dislodged or torn apart; 2 of the treated nests had eggs missing, but were otherwise undisturbed. Shipley (1979) considered torn and dislodged Red-winged Blackbird nests in Kansas a sign of raccoon predation. Raccoons were seen around nests several times during our study, and they actively foraged in the area throughout the day (Bildstein, pers. obs.). Eggs from 50% (10 of 20) of the treated nests were removed, as were eggs in 35% (7 of 20) of the control nests. Although slightly more treated nests than control nests lost eggs to predators, the difference was not significant ($G = 0.92$, $df = 1$, $P > 0.10$).

Predation appears to be the single most common cause of egg and nestling loss in Red-winged Blackbirds (cf., Robertson 1972, Smith 1943, Young 1963). For example, Caccamise (1976) reported that predators were responsible for 42% of the egg and nestling mortality at Red-winged

Blackbird nests in a New Jersey salt marsh. Our results indicate that at least for the nests of Red-winged Blackbirds in coastal South Carolina, moth balls, as we applied them, are an ineffective deterrent for mammalian predation. We suggest researchers spend as little time as possible in the vicinity of nests they are examining and that they not be lulled into thinking that spreading naphthalene moth balls in the vicinity of nests will reduce the vulnerability of those nests to mammalian predation.

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