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Notes on egg laying and incubation in the Common Merganser.—Common Mergansers (*Mergus merganser*) are large, piscivorous, cavity-nesting ducks with a broad distribution in North America (Bellrose 1980). Their foraging habits (i.e., reliance on fish) and the sensitivity of their breeding habitat in eastern North America make them an ideal indicator species for studying the effects of environmental pollution on aquatic food webs (Haseltine et al. 1981, McNicol et al. 1990), but little is known about their nesting biology (Bellrose 1980, Afton and Paulus 1992). Here we describe egg laying, clutch size, incubation behavior, and mass loss of female Common Mergansers nesting in nest boxes in the Temagami region (47°N, 80°W) of northeastern Ontario, Canada.

Patterns of nest attentiveness and mass loss were recorded using load cell monitoring systems installed in nest boxes during egglaying (method described in Mallory and Weatherhead 1992). A "recess" was a period of time the female spent off the nest, and "nest attentiveness" was the amount of time the female spent on the nest each day, expressed as a percentage of 24 hr (Afton and Paulus 1992). Because these monitors recorded on strip charts, movements by the female while incubating are recorded as a spike along a continuous line. Thus while we were able to document the frequency of female movements during incubation, we were not able to distinguish between egg turning and comfort movements.

Clutch size was the maximum number of Common Merganser eggs in the nest box prior to incubation. We also recorded instances of nest parasitism by other cavity-nesting ducks. Nest box use by all species is described in Mallory et al. (1993).

Ten Common Mergansers used our nest boxes between 1975 and 1984. Mean clutch size was 9.1 ± 0.8 eggs (N = 10). Two nests were parasitized each by Common Goldeneyes (*Bucephala clangula*) and Hooded Mergansers (*Lophodytes cucullatus*), while Common Mergansers parasitized two nests of other species. In 1981, we installed three monitors in Common Merganser nests prior to clutch completion. We recorded eight egg-laying times for three females. The females spent an average of 373 ± 48 min (±SE, N = 6) on the nest as each egg was laid. However, on two other occasions, females laid eggs late in the afternoon and remained on the nest overnight (910 ± 26 min). Using the start of each egg-laying session as the egg-laying time, the mean interval between eggs was 1.3 ± 0.2 days (N = 7).

We defined the first day of incubation as the day following the first night that the female remained on the nest following clutch completion. One of the three females deserted her nest after this first night of incubation. The other females began incubation on 6 May and 19 May. Incubation was not always recorded on consecutive days but covered most of the incubation period (day one to 26). Twelve and seven days of incubation were recorded for these two females, respectively, and mean values were used for incubation days on which both females were recorded, yielding fifteen days of pooled incubation data. The females departed their nests at 09:31 ± 24 min for their morning (first) recess (N = 15 for all comparisons unless otherwise noted) and returned from their last recess at 18:45 ± 18 min to begin continuous night incubation. One recess was usually taken in the morning, while one or two shorter recesses where taken in the afternoon. Females spent 165 ± 12 min off the nest each day; consequently nest attentiveness averaged 88.5 ± 0.9%. Females took 1.9 ± 0.1 recesses each day, for an average duration of 88.4 ± 10.7 min (N = 24). Nest attentiveness declined as incubation proceeded ($r = -0.58$, N = 15, $P = 0.02$). Females adjusted nest attentiveness by varying the duration of recesses ($r = -0.66$, $P = 0.007$); the number of daily recesses was not correlated significantly with nest attentiveness ($r = 0.13$, $P = 0.6$). When females took longer recesses, they decreased the number of trips off the nest ($r = -0.79$, $P = 0.001$).

While on the nest, females adjusted their position on the eggs approximately three times each hour, but the frequency of movements differed according to the time of day. During morning incubation (after returning from the first recess), females moved in the nest every 18.2 ± 0.3 min (N = 213), while during the afternoon they moved at 26.2 ± 0.5 min intervals (N = 297) and at night they moved at 26.7 ± 0.4 min intervals (N = 322). These values differ significantly (ANOVA, $F = 106$, df = 1,829, $P < 0.001$), with morning intervals shorter than afternoon and evening intervals (Newman-Keuls test, $P < 0.05$).

One female began incubation weighing 1105 g and had lost 90 g (8.1% of her initial mass) seven days later. The other female began incubation weighing 1300 g and lost 175 g (13.5%) over 25 days. If mass loss continued at the same rate (0.87%/day) through incubation, we estimate that these females lost about 27% body mass while incubating (using mass loss equation in Afton and Paulus 1992).

Our measures of clutch size and female mass are similar to values reported previously (Bellrose 1980, Eriksson and Nittyla 1985). Moreover, our estimates of nest attentiveness and mass loss of incubating Common Mergansers are consistent with results for other members of the Tribe Mergini (see Afton and Paulus 1992) and with the general pattern among waterfowl that larger species have higher nest attentiveness (Afton and Paulus 1992). Also, Common Mergansers incubated continuously during the night, typical of other cavity-nesting waterfowl (e.g., Afton and Paulus 1992, Mallory et al. 1993). Finally, Common Mergansers

turned their eggs at approximately the same rate as the similarly-sized Mallard (*Anas platyrhynchos*) (Caldwell and Cornwell 1975). Thus, the nesting behavior of this species appears to conform to the general patterns established for waterfowl (Afton and Paulus 1992).

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Sleeping and vigilance in the White-faced Whistling-Duck.—Several hypotheses have been proposed to explain the function of sleep in birds (Amlaner and Ball 1983). Of particular interest is the trade-off between anti-predator vigilance and sleep. Short periods of eye opening, referred to as "peeks" (Lendrem 1983), regularly interrupt sleep in several species of birds. Birds have elevated arousal thresholds when peeking (Amlaner and McFarland 1981) and are able to move quickly if threatened by a predator (Lendrem 1983, 1984). Peeking behavior, therefore, has been considered to be an analogue to scanning behavior in active birds (Lendrem 1983). Like scanning, peeking has been reported to decrease with increasing group size of sleeping birds (Lendrem 1984). However, detailed field studies of sleeping-vigilance trade-off in birds are scarce. In this paper, we consider the effect of position in the group and time of day on vigilance during sleeping in the White-faced Whistling-Duck (*Dendrocygna viduata*).