

Note

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TWO INCUBATING MALLARDS MOVE EGGS TO DRIER NEST SITES—While studying waterfowl reproduction at Union Slough National Wildlife Refuge in northern Iowa (Fleskes, 1986, M.S. Thesis, Iowa State University, Ames), I found evidence of entire clutch transfer to new nests by two incubating mallards (*Anas platyrhynchos*). One hen also moved her down from the initial nest site.

On 9 May 1985, I flushed a mallard hen from a heavily down-lined nest with 11 eggs that had been incubated for 17 days (Weller, 1956, J. Wildl. Manage. 20:111-113). The nest was in bulrush (*Scirpus* sp.) at the edge of an impounded wetland. The down and nest bowl under the eggs were wet. During the next five days 3.5 cm of rain fell, raising the water level of the wetland. On 15 May, I found the nest bowl flooded and empty except for a small amount of water-soaked down in its bottom. The hen was incubating 11 eggs (incubated 23 days) in a new, heavily down-lined dry nest, 55 cm from the initial nest site. The slope of the site was 15°, and the new nest was 15 cm above the initial nest. The expected hatching date was 18 May. On 23 May, I found 11 membranes from hatched eggs in the new nest; by then an additional 1 cm of rain had fallen and the new nest was also flooded.

On 6 June 1985, after a week of rain totaling 3 cm, I flushed another mallard hen off a heavily down-lined nest with 10 eggs that had been incubated 20 days. The nest was in a low area of a smooth brome (*Bromus inermis*) field. The bottoms of the eggs were wet, and the soil substrate, the nest bowl, and the down were all water-soaked. The expected hatch date was 12 June. On 18 June, I found the nest bowl empty except for some nearly dry down. However, just 30 cm away at about the same level, I found a new nest bowl with eight membranes from hatched eggs, one unhatched egg with a dead embryo, and one infertile egg. The new nest bowl had very little down.

The adaptive reproductive advantage for an incubating bird to retrieve eggs displaced from her nest is obvious and all waterfowl do so by rolling the eggs with their bills (Poulsen, 1953, Vidensk. Medd. Dansk Naturh. Foren. 115:1-131; Sowls, 1955, Prairie ducks, Stackpole Co., Harrisburg, PA; Prevett and Prevett, 1973, Auk 90:202-204). However, incidents of ducks moving eggs to a new nest bowl have only been reported when man-made obstacles such as a nest-trap (Oring, 1964, Auk 81:88-89; Blohm, 1981, Wilson Bull. 93:276-277) or fence (Johnson and Kirsch, 1977, Wilson Bull. 89:331-332) seemingly disturbed the hen or prevented her from returning to her initial nest from the same direction. Natural circumstances that elicit egg-moving have not been reported.

Mallards commonly select nest sites in dense vegetation in or adjacent to wetlands (Krapu et al., 1979, *Wildl. Soc. Bull.* 7:104-110). However, these sites are also prone to periodic flooding, so by moving her eggs a hen can save her clutch from floodwaters or excessively high nest humidity (Baerends, 1959, *Ibis* 101:347-368).

Managers should consider egg-moving behavior when controlling water levels of wetlands. Hens can move their entire clutch in a day, will move it repeatedly (Johnson and Kirsch, 1977, *Wilson Bull.* 89:331-332), and some clutches may be saved if water levels are raised slowly. However, further research is needed to determine the prevalence of egg-moving and specific conditions that elicit egg-moving before managers can assume that most clutches will be saved if nesting habitats are flooded slowly.

I found that one hen saved her clutch from waters rising about 2 cm per day. However, the rate at which the water level in a wetland can be raised safely will depend upon the time until hatching for clutches in danger of flooding and the slopes of the wetland edges. For instance, early in the nesting season any clutch that is being incubated must survive many days before hatching. Also, all incomplete clutches in or adjacent to wetlands will flood because laying hens do not move eggs (Oring, 1964, *Auk* 81:88-89; Johnson and Kirsch, 1977, *Wilson Bull.* 89:331-332; Blohm, 1981, *Wilson Bull.* 93:276-277). Water levels can probably be increased faster in wetlands with steep edges than in wetlands with more gradually sloping edges, because clutches moved a short distance gain more elevation in a steep than on a gradual slope. However, a severe slope may prevent hens from rolling eggs uphill.

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