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Molt sequence of captive Ruffed Grouse.—Wenstrom et al. (1972, Auk 89: 671) used the presence of dropped primary feathers at drumming logs to indicate the normal molt period of wild Ruffed Grouse (*Bonasa umbellus*). Studies of molt in captive Ruffed Grouse at the University of Guelph, Guelph, Ontario, substantiate these findings and give accurate dates for molt in some primaries, secondaries, rectrices, and body tracts.

During the summer of 1972 we watched the molt sequence of six captive male Ruffed Grouse. These birds, hatched in 1971, were raised and maintained at the University of Guelph. Each bird was housed outdoors in a 1.8 m × 3.0 m × 1.1 m pen for several months before the onset of the molt. The birds were fed a diet consisting of three measures each of wheat, shelled corn, and turkey developer pellets with 18% protein, and one measure of wild bird seed mixture. Small supplements of Vitamins A and D, and grit were added to the feed. All birds were exposed to normal weather conditions.

From 20 June to 19 September 1972 each bird was examined at weekly intervals, and detailed notes were made on the progress of the molt in the remiges, rectrices, and other feather tracts of the body. Before 20 June only casual examinations were made.

Ecdysis of the primaries progressed in an orderly fashion from P1 distally to P10. Primary molt had not started in late May. On 12 June P3 had been lost recently while P1 and P2 had been dropped earlier. All birds had lost P1 through P5 before 20 June, and two birds had already dropped P6. The timing and sequence of ecdysis of the remaining primaries is shown in Figure 1.

Endysis followed a similar sequence to ecdysis. No primaries had been completely regrown by 12 June, though P1 was nearly complete in most birds. The first three primaries were completely regrown by 20 June. The growth period for the remaining primaries is shown in Figure 1. Unfortunately, accurate completion dates for the growth of P9 could be ascertained for only four birds, and for none in P10 because of abrasion of the growing feathers.

Molt of the secondaries followed no regular, orderly sequence. Ecdysis usually

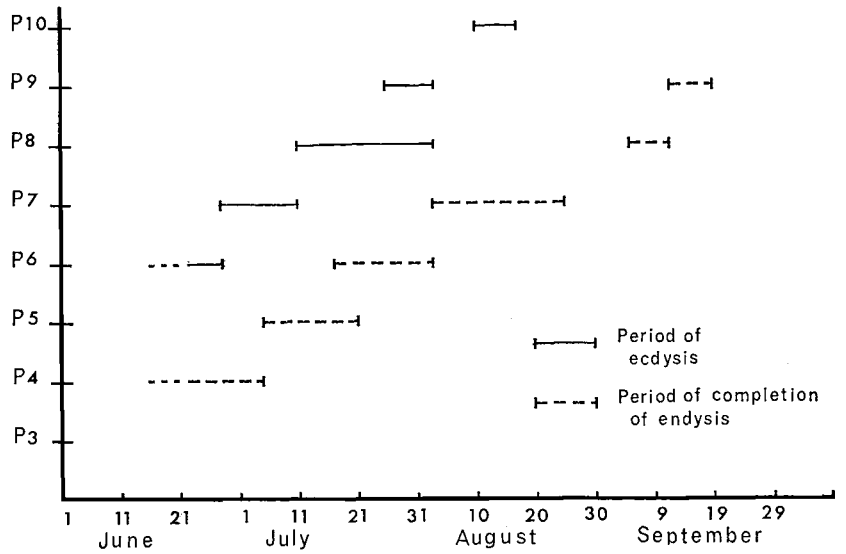

Figure 1. Period of molt in the primary feathers of six captive male Ruffed Grouse at Guelph, Ontario.

started from both proximal and distal ends of the feather tract and progressed towards its center, but some variations on this general pattern appeared in most birds. The first secondaries were lost between 28 June and 11 July. Regrowth of all secondaries was completed between 5 and 19 September.

Each bird shed all its rectrices in a 1-week period from 26 July to 3 August. Regrowth of the rectrices was completed by all birds between 5 and 19 September. All rectrices on a bird were at similar stages of regrowth at the same time. It appears that all rectrices were shed at approximately the same time.

Molt of feathers in the various body tracts commenced before 20 June and continued into September. In all tracts except the capital tract, loss of feathers continued uninterrupted throughout the summer. During the period from 28 June until 10 August no signs of molt could be found in the head region, though pin-feathers were obvious before and after this period. When the study was terminated on 19 September, the molt appeared to be complete or nearly complete in all feather tracts.

As captivity often induces precocious behavior, the data reported above may not be truly indicative of the molt period of wild Ruffed Grouse in southwestern Ontario, but the results do substantiate the findings of Wenstrom et al. (op. cit.) that the primary molt is sequential, and that the first five primaries are shed rapidly, with the last five feathers being shed over a longer period of time. Our data also indicate the molt of the primary feathers is prolonged over the molt period of all other feathers. Thus assessment of molt in primary feathers alone gives an indication of the molt period for this species.

When compared with the data of Wenstrom et al. (op. cit.), Ruffed Grouse at Guelph apparently molt earlier than those at Cloquet. Apart from the captive conditions, an earlier molt in this region is supported by Cringan's (1970, J.

Wildl. Mgmt. 34: 756) data showing that incubation commences approximately 2 weeks earlier in southern Ontario than in Minnesota (Brander 1967, Wilson Bull. 79: 28; Gullion 1967, The Ruffed Grouse in northern Minnesota, Univ. Minnesota, Forest Wildl. Relations Project (multilith); Schladweiler 1968, J. Wildl. Mgmt. 32: 246). Thus, our data not only support Wenstrom et al.'s (op. cit.) findings, but suggest that molt in conjunction with other aspects of the annual cycle of Ruffed Grouse may occur earlier in southern Ontario than in the Cloquet area of Minnesota.—ALLAN GARBUTT and A. L. A. MIDDLETON, *Department of Zoology, University of Guelph, Guelph, Ontario N1G 2W1, Canada.* Accepted 5 Jun. 73.

Flight speed and wingflapping rate of Sacred Ibis.—Meinertzhagen (1955, Ibis 97: 81) gives flight speeds for several species of birds but none for ibises. I calculated flight speeds for adult Sacred Ibis (*Threskiornis aethiopica*) at the breeding colonies at Lake Shala, Ethiopia (7° 30′ N, 38° 30′ E, elevation 1,570 m). On 9 March 1969 at midday with little to no wind, 34 Sacred Ibis, flying 2–3 m above the water, took 150 seconds to fly 1.6 km from Pelican Island to Abdim Island (see Brown and Urban 1969, Ibis 111: 206 for map of Shala). These adults traveled at a speed of 38.4 kph (23.9 mph).

Meinertzhagen (loc. cit.), Blake (1947, Auk 64: 619; 1948, Condor 50: 148), and Kahl (1971, Auk 88: 428) also give wingflapping rates of several species of birds, but again none for ibises. I recorded wingflapping rates of Sacred Ibis breeding at Abdim Island on 4–10 April 1967; the birds averaged 4.2 flaps per second (range 3.6–4.8; 19 counts varying from 4.3–12.9 seconds in duration). Charles H. Blake (pers. comm.) reports mean wingflapping rates in the White Ibis (*Eudocimus albus*) of 3.3 ± 0.3 per second (range 2.9–3.6; 9 observations) and in the Glossy Ibis (*Plegadis falcinellus*) of 3.2 per second (range 2.8–3.8; 4 observations).

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Site attachment in the Northern Shoveler.—Territory typically refers to "any defended area" (Mayr 1935, Noble 1939, Tinbergen 1939, Nice 1941) that is thought to arise as the outcome of two distinct tendencies, site attachment and hostility (Tinbergen 1957). Although the concept has been considered to be generally valid for ducks (McKinney 1965), controversy exists over the use and validity of the concept in some species (Dzubin 1955, Bezzel 1959, Lebret 1961, Hori 1963). Although hostility of male ducks towards conspecifics has been shown to occur in several species, the question of the male's attachment to a site has remained unresolved and largely uninvestigated. The present study was designed to assess the possibility that such site attachment does occur in a manner consistent with the territory concept.

Demonstration of site attachment in ducks is rendered difficult under natural conditions because, as McKinney (1965) pointed out, the possibility cannot nor-