GENERAL NOTES

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Observations on wing molt of Florida Sandhill Cranes.—On the basis of examination of museum skins, observations on captives, and review of the literature, Lewis (1979) concluded that molt of the remiges in the Sandhill Crane (*Grus canadensis*) is highly variable. Some individuals molt only a portion of the primaries or secondaries each year, while others replace all of the primaries or secondaries in a single season. These variations in pattern of remigial molt occur in both captives and wild birds and do not appear to be related to sex or breeding status. Sandhills and other crane species may also lose the primaries and sometimes part of the secondaries simultaneously and become flightless for a period of time (Blaauw 1897 quoted by Walkinshaw 1949, Littlefield 1970, Drewien 1973).

Present knowledge of remigial molt in Sandhill Cranes is almost entirely restricted to the northern migratory subspecies *G. c. canadensis*, *G. c. rowani*, and *G. c. tabida*. Except for notes on two captives given by Lewis (1978), nothing appears to be known about wing molt in the nonmigratory Florida Sandhill Crane (*G. c. pratensis*). In the course of observations on several hundred individuals of this subspecies at various localities in south-central Florida during the period 1973-1979, I recorded the following 6 cases of remigial molt. All were from Highlands County except one in 1977 from Glades County.

26 March 1976—The smaller member (presumably the female) of an apparently non-breeding pair feeding in an improved pasture had 2 loose adjacent secondaries dangling from one wing.

21 May 1974—One of a pair in flight had a number of remiges missing.

12 June 1977—A single adult in flight had heavy molt in the primary and secondary regions of both wings.

30 June 1976—Two adults flying with a young approximately 108 days old had prominent gaps, apparently representing several missing feathers, in the outer primary region of both wings.

14 October 1975—One of a family group of 3 in flight had prominent gaps, apparently representing loss of 2 or more feathers, in the outer part of the secondary region of both wings.

3 November 1979—One of a pair in flight had missing feathers in the outer primary region of both wings.

Although these observations permit no inferences regarding the length of the remigial molt cycle (whether 1 season or 2-3 years) in wild Florida Sandhills, they do show that at least some members of this subspecies do not undergo simultaneous wing molt and become flightless. The occurrence of molting individuals over a 9-month period (March-November) appears to indicate considerable individual variability in the timing of remigial molt and also suggests that the molt may be prolonged. One of the 2 Florida Sandhill captives reported on by Lewis (1979) had primaries of 1 age and secondaries of 2 ages, while the other had primaries of 3 ages and secondaries of 2 ages. Both were breeders.

Bent (1926) stated that *G. c. canadensis* molted the flight feathers in August. Walkinshaw (1949) noted that the flight feathers were probably lost

in early summer. Littlefield (1970) observed flightless Greater Sandhills (*G. c. tabida*) in Oregon in late May and early June, and Drewien (1973) recorded flightless adults during June and July in Idaho. Aldrich (cited by Lewis 1979) examined specimens of 3 Greater Sandhills collected on the breeding grounds in the Upper Peninsula of Michigan and concluded that the molt was completed by late August. These sources indicate that wing molt in northern Sandhill populations is restricted to a 3- to 4-month period in late spring and summer. In contrast, remigial molt appears to be less synchronized in Florida Sandhills and also possibly more prolonged than in northern cranes. This suggests that there has been greater selection for a more rapid and precisely-timed wing molt in northern crane populations as a consequence of the more severe climatic restriction on length of the breeding season and demands of migration. In this connection, there is an indication in Lewis' (1979) data for the 3 northern Sandhill subspecies that the frequency of individuals molting all secondaries or primaries in the same season increases with latitude of the breeding grounds. The proportions of specimens of each race with same-age secondaries or primaries were, in order of latitude of breeding grounds from south to north: *tabida*—30%, *rowani*—39%, and *canadensis*—48%. Although the differences are not statistically significant, they suggest that the farther north a population breeds the more rapid its molt cycle. The young of more northerly breeding Sandhills also develop faster and begin flying at an earlier age (Baldwin 1977). In addition to climatic conditions *per se*, other environmental factors such as habitat characteristics, food resources, and predation intensity may have been involved in selection for different remigial molt patterns in crane populations in different geographic regions.

Although the limited data suggest a distinct difference in the remigial molt patterns of the sedentary Florida Sandhill and northern, migratory subspecies, a more detailed study of wing molt of Florida cranes is obviously needed before a definitive conclusion as to the existence of such a geographic trend can be reached. In this connection, data on remigial molt in the two other southern, nonmigratory Sandhill Crane subspecies—the Mississippi Sandhill (*G. c. pulla*) and Cuban Sandhill (*G. c. nesiotes*)—also would be of particular interest.

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