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Wilson Bull., 100(4), 1988, pp. 670–672

Sequential polyandry by a female Killdeer.—The Killdeer (*Charadrius vociferus*) is considered to be monogamous (Bunni 1959, Lenington 1980), with males taking a greater role in parental care than females (Mundahl 1982; Brunton 1987, 1988a, b). Female desertion of mate and nesting attempt has been observed in some populations, especially late in the breeding season or after a second clutch (Bunni 1959, Lenington 1980), but apparently is rare or absent in others (Brunton 1987). Reproductive success of deserted males generally is lower than that of pairs, but few data exist for comparisons (Lenington 1980, Brunton 1988a). Also, the subsequent behavior of deserting females rarely has been observed because of the difficulties of following these birds over a large area. Here I report the first documented case of a sequentially polyandrous female Killdeer.

I studied Killdeer in the Houghton Lake region of Michigan from April through August 1984 and 1985. Nesting attempts of 41 pairs of Killdeer were monitored, and 37 males and 27 females were captured and color banded. During the study, 66% (27/41) of all nesting pairs remained monogamous and stayed on the same territory throughout the breeding season. Pairs that failed in consecutive nesting attempts in a single year were more likely to change territories than those having a successful nesting ($\chi^2 = 16.2$, $P < 0.001$). During 1985, a pair color banded in 1984 was first observed on their territory on 11 April and their nest containing two eggs was discovered on 21 April. Incubation began on 25 April, and chicks hatched on 17 May. The female was last observed foraging in the territory on 20 May. The male (M1) continued to care for the chicks and successfully raised one chick to fledging. M1 remained on the territory but did not remate in 1985. On 18 May 1985, the female was observed copulating with an unmated male (M2) on a territory approximately 0.5 km away from where M1 was still caring for their offspring. M2 was banded during 1984 on the same territory. He returned alone and remained unpaired during 1985 up until the appearance of the female. On 22 May a nest containing three eggs was discovered. Both

members of this new pair incubated. The clutch, however, was depredated after ten days. The pair remained in the area performing nest building and territory defense until early August. It is possible that two other females also were polyandrous; they disappeared during brooding late in the breeding season, and their mates attempted to raise the offspring alone.

In sequential polyandry, the female forms a monogamous pairbond with a male, abandons him and their offspring, and then renests with a new male within one breeding season. The system is similar to sequential monogamy, except that female variance in reproductive success probably is larger than male variance (Daly and Wilson 1978). This is because males do not remate immediately but provide extensive parental care. Mating systems with greater female than male variance in reproductive success are rare (Emlen and Oring 1977, Lenington 1980), and, among higher vertebrates, occur only among birds (Jenni 1974) and humans (Daly and Wilson 1978). Sequential polyandry has been reported or suspected to occur in a number of shorebird species, including Spotted Sandpipers (*Actitis macularia*, Oring and Knudson 1972), Black-bellied Plovers (*Pluvialis squatarola*, Hessel and Page 1976), Wilson's Phalaropes (*Phalaropus tricolor*, Höhn 1967), and Willets (*Catoptrophorus semipalmatus*, Howe 1982). Theories explaining the evolution of sequential polyandry include factors such as predation rates (Graul et al. 1977), energetic costs of egg production and food availability (Oring and Knudson 1972, Faaborg and Patterson 1981), and biased sex ratio (Erckmann 1983). As with other forms of polyandry, sequential polyandry is suggested to have evolved from monogamy, through increasing male parental care and female desertion (Erckmann 1983, Oring 1985). The advantages of switching mates needs to be considered when explaining the evolution of sequential polyandry. Females may benefit from energy and time savings and be able to raise more offspring in a given period of time. They may also be in better condition for migration at the end of the breeding season (Oring and Knudson 1972; Maxson and Oring 1980; Brunton 1988a, b). The major disadvantage of abandoning a nest and mate is potentially lower offspring survival. This cost can be minimized by abandoning when offspring are more independent and less vulnerable (Brunton 1987). Female Killdeer have been observed to desert their mates and chicks (Bunni 1959, Lenington 1980). Male Killdeer perform a greater proportion of the parental activities than females, and this disparity between the sexes increases as the nesting cycle progresses (Brunton 1987, 1988a, b). Although only a single observation, the circumstances of the present case are consistent with the hypothesis that extensive male parental care and female desertion may be important factors in the evolution of polyandry.

Acknowledgments.—Financial support for this study was provided by the University of Michigan and Sigma Xi Grants-in-aid of Research. The Houghton Lake Waste-Water Treatment Authority, Roscommon County, gave permission to work on their land. The Department of Natural Resources of the State of Michigan provided lodging. For reviews of various drafts of this manuscript I thank S. Beissinger, C. Blem, J. Farley, B. Low, and an anonymous reviewer.

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Wilson Bull., 100(4), 1988, pp. 672–675

A hunting technique of the Black-and-white Hawk-Eagle (*Spizastur melanoleucus*).—The Black-and-white Hawk-Eagle ranges from Mexico to Argentina (Brown and Amadon 1968), but its hunting techniques have not been recorded. Wetmore (1965:265) noted that one collected at Chepo, Panama, “came with considerable force through high forest to strike at Araçari toucans that chattered and dashed about in the branches, much excited.” The Brazilian name, “gavião-pato” or “duck hawk,” suggests that it captures ducks. W. H. Partridge (*vide* Brown and Amadon 1968) reported it hunting Brazilian Mergansers (*Mergus octosetaceus*) and Olivaceous Cormorants (*Phalacrocorax olivaceus*) near Iguazu Falls, Argentina. Russell (1964) reported a collared Araçari (*Pteroglossus torquatus*) and a Scaled Pigeon (*Columba speciosa*) as prey for individuals collected in Belize. Alvarez del Toro (1980:43) added tinamous, chachalacas, guans and other large and wary animals. Sick (1985: 213) listed toads and oropendolas. How the species catches large and fast-moving prey seems to be unknown.