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Kin cannibalism in the Purple Gallinule.—Kin cannibalism, the killing and consumption of closely related conspecifics, is rare in birds. Among some species of raptors, an older chick may kill its younger sibling (Stinson, *Evolution* 33:1219–1225, 1979) and occasionally will consume the dead sibling (Ingram, *Auk* 76:218–226, 1959; Pilz and Siebert, *Auk* 95:584–585, 1978). There are few documented cases of parents cannibalizing their own young. Piñon Jays (*Gymnorhinus cyanocephalus*) sometimes kill and eat their chicks (Balda and Bateman, *Condor* 78:562–564, 1976), and Herring Gulls (*Larus argentatus*) may eat their eggs and chicks (Chardine and Morris, *Wilson Bull.* 95:477–478, 1983). Kin cannibalism is attributed to food deprivation (Ingram 1959; Balda and Bateman 1976; Bechard, *Wilson Bull.* 95:477–478, 1983), or unusual and aberrant chick behavior (Siegel-Causey, *Condor* 82:101, 1980).

During a 17-month study of Purple Gallinule (*Porphyryla martinica*) breeding behavior at the Centro Agronómico Tropical de Investigación y Enseñanza (CATIE) near Turrialba, Costa Rica, I color-banded 80 birds, observed 36 nests, and followed the development of 120 chicks. Members of mated pairs took turns incubating the eggs (usually 4), which hatched asynchronously over 3–4 days. Normally, chicks remained in the nest until all eggs hatched. After the chicks left the egg-nest they were brooded in a separate nursery-nest, which was within 5 m of the egg-nest.

The female of a marked pair finished laying a clutch of 4 eggs approximately 4 m from my observation blind on 3 August 1981. On the morning of 25 August at 07:35 the male was brooding a newly hatched chick in a nursery-nest less than one m from the egg nest. None of the other eggs had hatched. The female was not in sight. At 07:55 the female came to the male, fed him an insect and left. She returned at 08:25 to feed the male another insect and then settled on the egg-nest. The male left the nursery-nest at 08:30 and pulled the chick after him. Twice, the chick crawled back into the nursery nest and the male pulled it out. The male preened the chick and began pecking at it at 08:40. The chick grew limp within one min, and the male tore off pieces of its body and ate them. At 08:46, after consuming approximately five bites of the chick, the male walked 6 m to the northeast and began feeding. At 09:05 the female left the egg-nest and the male settled on the eggs.

The male was incubating when I departed at 09:40. I inspected the nursery-nest at 10:30 but could not find the remains of the chick. The egg-nest contained 3 eggs. Two chicks hatched over the next 2 days; one lived for one day and the other lived for one month. Both chicks disappeared, and the causes of death were unknown. Prior to this episode the pair had raised 2 broods (totaling 6 chicks) successfully. During the next nine months the pair raised 3 more broods, totaling 8 chicks. The pair did not exhibit any other unusual behavior throughout the study period. The events described constitute the only act of cannibalism that was seen during the study.

The male may have killed and eaten the chick for several reasons: (1) he was food deprived, (2) the chick was not his, (3) the chick was malformed, or (4) the chick behaved in an unusual manner. The evidence concerning these possibilities follows: First, the male did not appear to be hungry. The weather had been mild, food was abundant, and the male was fed by his mate at least twice just before his act of cannibalism. Second, all evidence suggests that the chick came from the pair's egg-nest. At the time no other gallinule family on the pond had young chicks or a clutch of eggs about to hatch. I did not observe another male copulating with the female, and I never saw cuckoldry among any of the gallinules during my study. I can not rule out, however, the possibility that the male was cuckolded without my witnessing the event. Third, the chick looked healthy and well-formed. Fourth, it was

unusual for the chick to leave the egg-nest when it did. No other chick had been observed outside the egg-nest before the majority of eggs (at least 3) had hatched. Nothing in the parents' behavior appeared to have forced the chick from the nest. Perhaps the male's physiological state at the time the chick left the nest was not conducive to responding appropriately (i.e., brooding) to the presence of chicks (Beer, *Behaviour* 26:190–214, 1966). He may have had conflicting tendencies to incubate the eggs and to brood the chick, or simply was not motivated to brood. Why he ate the chick is not known.

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Influence of various land uses on windbreak selection by nesting Mississippi Kites.—Contemporary land-use practices have dramatically altered breeding habitats of birds of prey (Cramp, pp. 9–11 in *World Conf. Birds of Prey*, R. D. Chancellor, ed., ICPB, London, England, 1977). Some land uses appear to influence strongly both the nesting activity (White, *Trans. North Am. Wildl. Nat. Resour. Conf.* 39:301–312, 1974) and abundance (Olendorff and Stoddart, pp. 44–48 in *Management of Raptors*, F. N. Hamerstrom, B. E. Harrel, and R. R. Olendorff, eds., *Proc. Conf. Raptor Conserv. Tech., Raptor Rep. 2*, Fort Collins, Colorado, 1974) of raptors.

The Mississippi Kite (*Ictinia mississippiensis*) is a locally common raptor of the south-central plains of North America. In the prairie grasslands of western Oklahoma and southwestern Kansas, kites commonly nest in tree plantings designed as windbreaks, irrespective of windbreak width, age, or tree species composition (Parker, Ph.D. Diss., Univ. Kansas, Lawrence, Kansas, 1974; Love and Knopf, *Proc. Ann. Meet. For. Comm. Great Plains Agric. Council* 30:69–77, 1978). Much of the potential nesting habitat within this region, however, is not used by kites (Parker and Ogden, *Am. Birds* 33:119–129, 1979). In this paper, we assess the potential influence of various land-use practices on windbreak selection by nesting Mississippi Kites.

Study area and methods.—The study areas were located in Clark and Meade counties, southwestern Kansas; and Ellis, Harper, and Roger Mills counties, northwestern Oklahoma. The region is classified as bluestem–grama prairie (*Andropogon–Bouteloua*) and grama–buffalo grass plains (*Bouteloua–Buchloe*) by Kuchler (*Potential Vegetation of the Conterminous United States*, *Am. Geogr. Soc.*, New York, New York, 1964). Agricultural lands frequently contained plantings of wheat, sorghum, and, occasionally, alfalfa. Native deciduous vegetation generally was limited to narrow belts of riparian woodland dominated by cottonwood (*Populus deltoides*), and aggregations of shinnery oak (*Quercus havardii*). Tree species commonly present in planted windbreaks were black locust (*Robinia pseudoacacia*), eastern red cedar (*Juniperus virginiana*), elm (*Ulmus* spp.), green ash (*Fraxinus pennsylvanica*), osage orange (*Maclura pomifera*), and Russian mulberry (*Morus alba*). Conifers usually comprised the sides of tree plantings that received the prevailing winds.

Systematic searches for kite nests were conducted at 89 windbreaks during June and July of 1977 and 1978. Windbreaks were classified as unused, with 1–2 kite nests, or with >2 nests.