

KLEPTOPARASITISM BY BALD EAGLES WINTERING IN SOUTH-CENTRAL NEBRASKA

DENNIS G. JORDE¹ AND GARY R. LINGLE²

*U.S. Fish and Wildlife Service
Northern Prairie Wildlife Research Center
Jamestown, North Dakota 58401 USA*

Abstract.—Kleptoparasitism on other raptors was one means by which Bald Eagles (*Haliaeetus leucocephalus*) secured food along the North Platte and Platte rivers during the winters of 1978–1980. Species kleptoparasitized were Ferruginous Hawk (*Buteo regalis*), Red-tailed Hawk (*B. jamaicensis*), Rough-legged Hawk (*B. lagopus*), Golden Eagle (*Aquila chrysaetos*), and Bald Eagle. Stealing of prey occurred more often during the severe winter of 1978–1979 when ice cover restricted eagles from feeding on fish than during the milder winter of 1979–1980. Kleptoparasitism occurred principally in agricultural habitats where large numbers of Mallards (*Anas platyrhynchos*) were foraging. Subadults watched adults steal food and participated in food-stealing with adults, which indicated interspecific kleptoparasitism may be a learned behavior. We suggest factors that may favor interspecific kleptoparasitism as a foraging strategy of Bald Eagles in obtaining waterfowl during severe winters.

CLEPTOPARASITISMO POR AGUILAS CALVAS (*HALIAEETUS LEUCOCEPHALUS*) QUE PASAN EL INVIERNO EN NEBRASKA

Resumen.—El cleptoparasitismo a otras aves fué una de las formas en que aguilas calvas (*Haliaeetus leucocephalus*) pudieron obtener alimento a lo largo del Norte y rios del Platte durante los inviernos de 1978–1980. Víctimas de las aguilas calvas lo fueron *Buteo regalis*, *B. jamaicensis*, *B. lagopus*, *Aquila chrysaetos* y miembros de su propia especie. El robo de presas ocurrió más amenudo durante el invierno severo de 1978–1979, cuando el hielo sobre el agua restringió la pesca a las aguilas, que durante el invierno más cálido de 1979–1980. El cleptoparasitismo ocurrió principalmente en hábitats agrícolas, donde un gran número de patos (*Anas platyrhynchos*) se alimentaban. Aguilas subadultas que observaron a adultos robar alimento, luego participaban del cleptoparasitismo. Esto sugiere que esta forma de conseguir alimento es un patrón de conducta aprendido. En el trabajo se discuten factores que favorecen el cleptoparasitismo interespecífico como estrategia de forageo en aguilas calvas para obtener alimentos durante inviernos severos.

Kleptoparasitism occurs in many species of birds and is a common foraging strategy for some species (for review, see Brockmann and Barnard 1979). Intraspecific kleptoparasitism, scavenging, (e.g., Cooksey 1962, Southern 1963, Stalmaster and Gessaman 1984), and interspecific kleptoparasitism of fish from other birds (Fischer 1985, Knight and Knight 1983) are major methods of food gathering by Bald Eagles. In addition to fish, Bald Eagles often feed on dead waterfowl (Broley 1947, Griffin et al. 1982, Hancock 1964, Lingle and Krapu 1986) and occasionally capture live birds when dead prey are few (Servheen 1975). However,

¹ Current address: U.S. Fish and Wildlife Service, Patuxent Wildlife Research Center, Laurel, Maryland 20708 USA.

² Current address: The Platte River Whooping Crane Habitat Trust, 2550 North Diers Avenue, Suite H, Grand Island, Nebraska 68801 USA.

the scattered reports of interspecific kleptoparasitism by Bald Eagles (*Haliaeetus leucocephalus*) on hosts that capture live birds suggests that such behavior is not common. We describe kleptoparasitism on other raptors by Bald Eagles wintering in south-central Nebraska, and suggest factors that favor interspecific kleptoparasitism as a foraging strategy of Bald Eagles in obtaining waterfowl prey during severe winters.

STUDY AREA AND METHODS

We recorded the occurrence of kleptoparasitism by Bald Eagles while conducting studies of wintering waterfowl and raptors in south-central Nebraska from December through March of 1978–1979 and 1979–1980. Observations were made with 7 × 35 binoculars, 20× spotting scopes, and Questar 1300 mm scope from vehicles parked beside cornfields adjacent to the North Platte and Platte Rivers. The study area extended along 144 km of the river from Lewellan to Chapman, Nebraska and 18 km south of the Platte River to Holdrege, Nebraska. Observations of kleptoparasitism by Bald Eagles were recorded opportunistically in field notes during waterfowl and raptor studies in the area. Mallard (*Anas platyrhynchos*) remains collected at raptor kill and feeding sites were identified and sexed by external morphological characteristics. Weather data were obtained from the U.S. Environmental Data Service (1978–1980).

RESULTS AND DISCUSSION

Frequency of kleptoparasitism.—Seven incidents of interspecific kleptoparasitism by Bald Eagles on Ferruginous Hawk (*Buteo regalis*), Red-tailed Hawk (*B. jamaicensis*), Rough-legged Hawk (*B. lagopus*), and Golden Eagle (*Aquila chrysaetos*) and 9 incidents of Bald Eagle intraspecific kleptoparasitism were recorded during 1978–1980 (Table 1). Other incidents of piracy were observed but not recorded by D. Jorde, whose research was on the winter ecology of Mallards. Therefore, we believe that the 16 observations of piracy gleaned from our field notebooks represent only a small sample of a frequently occurring behavior.

Species known to be kleptoparasitized by Bald Eagles were listed by Fischer (1985). Kleptoparasitism from Ferruginous Hawks and Rough-legged Hawks has not previously been reported.

Prey and kleptoparasitic behavior.—Mallards formed 38% of 2057 pellets of Bald Eagles collected in Nebraska during the harsh 1978–1979 winter (Table 2), mostly during January and February when extensive ice restricted access to fish (Lingle and Krapu 1986). Cold weather and heavy snow accumulations on agricultural fields adjacent to the Platte River caused Mallards to forage up to 19 km from river roosts (Jorde et al. 1983), which resulted in kleptoparasitism by eagles at distant sites. Throughout the mild 1979–1980 winter, the river channels remained open, fish were generally available (Lingle and Krapu 1986), and Mallards foraged in cornfields close to the river (Jorde et al. 1983). However, 35% of 801 pellets of Bald Eagles collected during 1979–1980 contained

TABLE 1. Summary of interspecific and intraspecific piracy by Bald Eagles wintering in Nebraska during 1978–1980.

Species pirated	Bald Eagles involved		Period of interaction (min)	Prey	Kill observed
	Sub-adult	Adult			
Ferruginous Hawk	—	2	50	Unknown	Yes
Ferruginous Hawk	1	—	NA	Mallard	No
Ferruginous Hawk	—	3	70	Mallard	No
Red-tailed Hawk ^a	1	3	22	Mallard	Yes
Rough-legged Hawk	1	2	NA	Mallard	Yes
Raptor (unknown)	—	1	1	Mallard	No
Bald Eagle ^b	2	3	14	Mallard	No
Bald Eagle ^b	2	—	3	Mallard	No
Bald Eagle ^b	4	3	12	Black-tailed Jackrabbit ^c	No
Bald Eagle ^d	4	3	20	Mallard	No
Bald Eagle ^d	1	5	12	Mallard	No
Bald Eagle ^d	—	5	NA	Mallard	No
Bald Eagle ^d	1	1	1	Black-tailed Jackrabbit	No
Bald Eagle ^d	—	2	49	Fish	Yes
Bald Eagle	3	1	NA	Canada Goose ^e	No
Golden Eagle ^d	—	3	15	Mallard	No

^a *Buteo jamaicensis*.

^b Subadult.

^c *Lepus californicus*.

^d Adult.

^e *Branta canadensis*.

Mallard remains mostly during March (Lingle and Krapu 1986) when an outbreak of avian cholera killed 80,000 waterfowl in south-central Nebraska (Friend 1981).

Interspecific kleptoparasitism was a common food-gathering technique used by Bald Eagles during the 1978–1979 winter, whereas in 1979–1980 most Mallard prey were disease victims obtained by scavenging. Although we could not differentiate between pirated, killed, and diseased Mallard remains in Bald Eagle pellets, our conclusion is based on the (1) period of winter when Mallard remains occurred most frequently in Bald Eagle pellets, (2) presence of corn kernels in pellets from eagles having eaten foraging Mallards that contained corn in the esophagus and gizzard, (3) presence of Bald Eagles in cornfields before and during the time Mallards were present, and (4) lack of evidence of eagles preying directly on live Mallards during 360 h of observations at aquatic and Magricultural habitats. Most piracy occurred during the afternoon when Mallards were feeding in fields. Bald Eagles were observed returning from the fields to their communal roosts near the river channel at about the same time that Mallards returned to the river or irrigation canals for the night. It is unlikely that the eagles, which forage during the day,

TABLE 2. Percent of Mallard and corn in pellets of Bald Eagles during the winters of 1979 and 1980 along the Platte River in Nebraska.

Pellet status	1979 (2057) ^a	1980 (801)	1979-1980 (2858)
Without Mallard remains	62.1 (1277)	65.2 (522)	62.9 (1799)
With Mallard remains	37.9 (780)	34.8 (279)	37.1 (1059)
With Mallard remains and corn	8.7 (68)	3.9 (11)	7.5 (79)

^a Number of regurgitated pellets.

attempted to capture Mallards at night. Although Mallard remains without corn occurred in a greater number of eagle pellets than Mallard remains with corn (Table 2), the absence of corn was not conclusive evidence that Bald Eagles obtained more Mallards at sites other than cornfields or by foraging behavior other than kleptoparasitism.

On two occasions Bald Eagles responded quickly to kleptoparasitism opportunities by stealing prey from hosts 2-3 min after the prey was captured. These eagles were at the hosts foraging area before the prey was initially captured. However, during one observation when eagles were not at the hosts foraging area, 36 min elapsed before an eagle stole prey from a hawk. We observed hawks remain and leave foraging areas after being kleptoparasitized by eagles. On one occasion we observed a hawk capture a second Mallard on the same foraging area, but eagles quickly pirated that prey also. One to five Bald Eagles were associated with a single pirated food (Table 1), however, on one occasion we counted 15 eagles in one group feeding on unidentified prey at the edge of a cornfield. When several eagles were involved in intraspecific kleptoparasitism, we could not always determine with certainty if the eagle that first pirated the prey actually ended up with it. However, during several observations the first eagle that pirated prey left the foraging area after being kleptoparasitized by another eagle.

Ecological and behavioral aspects.—Conditions that increase the probability of kleptoparasitism include: (1) a shortage of primary food, (2) an abundance of secondary foods, (3) predictable primary and secondary food resources, and (4) a concentration of hosts and prey (see Brockmann and Barnard 1979:492-493). In addition, open habitats contribute to the occurrence of kleptoparasitism (Paulson 1985). All of these conditions existed on the study area at various times during 1978-1979. Fish were largely unavailable because of extensive ice cover (Lingle and Krapu 1986). Mallards were a large, visible alternate prey with predictable foraging behavior. They returned to the same fields for up to five consecutive days and usually foraged in groups of 2000-3000 birds. Hawks often perched on fence rows, power line poles, and trees along the border of cornfields. Hawk activity in the vicinity of cornfields used by Mallards seemed to release interspecific kleptoparasitism by Bald Eagles.

Interspecific associations permitting kleptoparasitism by Bald Eagles

seem complex and are probably the result of a combination of the phenomena including "beating" and "scavenging" described by Brockmann and Barnard (1979). Kleptoparasitism involved some or all of the following behavior: (1) Eagles either flew out to fields recently used by foraging Mallards, towards circling Mallard flocks, or towards crows. (2) If no active hawks were nearby, eagles were observed to occasionally fly or "swoop" over foraging Mallards thereby flushing them into chaotic flight, possibly to attract attention of other raptors (a modified form of "beating"). We noticed that unless disturbed, foraging Mallards remained on the ground and most likely were inconspicuous to hawks not in the immediate vicinity. Based on general observations, we do not believe that "swooping" by Bald Eagles over feeding Mallards represented capture behavior because eagles did not attempt to chase individual Mallards. (3) Eagles attempted to steal a Mallard shortly after the raptor had immobilized it. Because hawks can not lift or carry Mallard prey, they are vulnerable hosts to kleptoparasitism by eagles. (4) If more than one eagle was present they vied for the Mallard carcass, similar to behavior reported by Erskine (1968), Griffin (1981), and Stalmaster and Gessaman (1984). Such behavior is sometimes interpreted as intraspecific kleptoparasitism, which Bald Eagles might learn as nestlings.

Although our small sample of data does not provide conclusive evidence, we hypothesize that the interspecific kleptoparasitism of bird and mammal prey by Bald Eagles observed in south-central Nebraska could be an intentional foraging strategy rather than an opportunistic response and that such behavior occurs more frequently among Bald Eagles than previously thought.

Bald Eagles seemed to learn which cornfields Mallards used. Single eagles and groups of 2–4, often including at least one subadult, stood in cornfields waiting up to several hours before the Mallards and hawks arrived. Contrary to observations in South Dakota (Steenhof 1984), we did not observe hawks waiting with eagles in cornfields before Mallards arrived, but they could have been perched on trees near foraging areas.

The large numbers of subadults concentrated with adults on the wintering areas in Nebraska and the frequency with which they were observed taking part in kleptoparasitism with adults support this hypothesis. Research is needed to determine if some Bald Eagles kleptoparasitize from interspecific hosts more often than other Bald Eagles; and to determine if individuals known to kleptoparasitize food, particularly subadults, return to the same wintering area and continue to use this interspecific foraging strategy.

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LITERATURE CITED

- BROCKMANN, H. J. AND C. J. BARNARD. 1979. Kleptoparasitism in birds. *Anim. Behav.* 27:487-514.
- BROLEY, C. L. 1947. Migration and nesting of Florida Bald Eagles. *Wilson Bull.* 59: 3-20.
- COOKSEY, G. R., JR. 1962. A winter population of the Bald Eagle (*Haliaeetus leucocephalus*) in northeastern Oklahoma. M.S. thesis. Kansas State College, Pittsburg, Kansas.
- ERSKINE, A. J. 1968. Encounters between Bald Eagles and other birds in winter. *Auk* 85:681-683.
- FISCHER, D. L. 1985. Piracy behavior of wintering Bald Eagles. *Condor* 87:246-251.
- FRIEND, M. 1981. Waterfowl diseases—changing perspectives for the future. *Int. Waterfowl Symp.* 4:189-196.
- GRIFFIN, C. R. 1981. Interactive behavior among Bald Eagles wintering in north-central Missouri. *Wilson Bull.* 93:259-264.
- , T. S. BASKETT, AND R. D. SPARROWE. 1982. Ecology of Bald Eagles wintering near a waterfowl concentration. U.S. Fish and Wildl. Serv. Spec. Sci. Rep. No. 247.
- HANCOCK, D. 1964. Bald Eagles wintering in the Southern Gulf Islands, British Columbia. *Wilson Bull.* 76:111-120.
- JORDE, D. G., G. L. KRAPU, AND R. D. CRAWFORD. 1983. Feeding ecology of Mallards wintering in Nebraska. *J. Wildl. Manage.* 47:1044-1053.
- KNIGHT, S. K., AND R. L. KNIGHT. 1983. Aspects of food finding by wintering Bald Eagles. *Auk* 100:477-484.
- LINGLE, G. R., AND G. L. KRAPU. 1986. Winter ecology of Bald Eagles in south central Nebraska. *Prairie Nat.* 18:65-78.
- PAULSON, D. R. 1985. The importance of open habitat to the occurrence of kleptoparasitism. *Auk* 102:637-639.
- SERVHEEN, C. W. 1975. Ecology of the wintering Bald Eagles on the Skagit River, Washington. M.S. thesis. University of Washington, Seattle, Washington.
- SOUTHERN, W. E. 1963. Winter populations, behavior, and seasonal dispersal of Bald Eagles in northwestern Illinois. *Wilson Bull.* 75:186-187.
- STALMASTER, M. V., AND J. A. GESSAMAN. 1984. Ecological energetics and foraging behavior of overwintering Bald Eagles. *Ecol. Monogr.* 54:407-428.
- STEENHOF, K. 1984. Use of an interspecific communal roost by wintering Ferruginous Hawks. *Wilson Bull.* 95:137-138.
- U.S. ENVIRONMENTAL DATA SERVICE. 1978-1980. Climatological data, Nebraska. Vol. 83-85.

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