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FOOD ITEMS AND FEEDING RATES FOR WILD WHOOPING CRANE COLTS IN WOOD BUFFALO NATIONAL PARK

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Abstract: Food habits of 5 whooping crane (*Grus americana*) colts in 4 nest ponds were recorded in the days following hatching in Wood Buffalo National Park (WBNP). In total, 93 hours of observations were made from blinds that were 60–80 m away from the nest. Spotting scopes and binoculars were used to identify food items. The adults were observed bringing the following items to the colts: adult dragonflies (*Libellula* sp., and *Aeshna* sp.), fish (*Culaea inconstans*), diving beetles (*Rhantus binotatus*, *Acilius semisulcatus*, *Graphoderus occidentalis*, and *Dytiscus alaskanus*), damselflies (*Enallagma* sp., and *Lestes* sp.), snails (*Lymnaea stagnalis*, and *Helisoma* sp.), a vole (*Clethrionomys gapperi*), a leech (unidentified), and a chorus frog (*Pseudacris maculata*). However, the food type most commonly consumed by the colts (88% of known items, $n = 156$) was dragonfly nymphs. Overall, females made most of the food deliveries (63% of deliveries for all nests, $n = 194$). Of the 4 nests, 2 hatched both eggs. Of these, 1 second hatched colt was preyed upon prior to being fed, and the other second hatched colt received fewer feedings than its older sibling when compared at equal ages. In addition, between 1998–99, 18 whooping crane colts had transmitters attached for a whooping crane colt mortality study. Five colt carcasses were located during the mortality study and necropsies revealed that 4 (1 was too decomposed) had only dragonfly nymphs in their digestive systems.

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Wetland marshes in and around Wood Buffalo National Park represent the only continually inhabited breeding grounds of the endangered whooping crane in the world. Whooping crane nesting sites were first observed in WBNP in 1954 (Fuller 1955 unpublished) when 5 pairs were located. The current population numbers close to 190 individuals.

There is little information on potential limiting factors on the population. The purpose of this study was to determine one such factor, the diet of young whooping crane colts. This information will aid resource managers in understanding and evaluating nesting habitat in relation to potential range expansion and future reintroduction efforts.

STUDY AREA

Wood Buffalo National Park, comprising 44,807 km², is located in the Subhumid Mid-Boreal ecoclimatic region of Canada (Ecoregions Working Group 1989). Bedrock underlying the nesting area consists of gypsum karst (McNaughton 1991 unpublished). The nesting grounds are a mosaic of shallow diatom ponds, bulrush (*Scirpus validus*) marshes, mixed marshes, and water sedge (*Carex* sp.) meadows

(Timoney et al. 1997). Upland areas within the nesting area consist of narrow ridges and islands of white spruce (*Picea glauca*), black spruce (*P. mariana*), tamarack (*Larix laricina*), willows (*Salix* sp.), and dwarf birch (*Betula glandulosa*) (Novakowski 1966).

METHODS

In May 1998, an enclosed plywood blind was placed 70 m from a whooping crane nest. The blind had viewing ports on 3 sides and was 120 cm by 120 cm by 195 cm in height. The blind was slung into place using a helicopter. At the same time, the eggs were floated to determine fertility and to estimate hatching date. We set up a small camp approximately 1 km away from the nest pond and began observations 9 days prior to hatching. Time spent observing from the blind varied from 2 to 8 hours. Information recorded included feeding attempts of each colt, items consumed by each colt, and which adult was feeding each colt. In 1999, 3 blinds were used for observations at 3 nest sites.

Sex of the adults were determined through banding status at nests 4 and 5, and by size at nests 14 and 16. Food items were examined from the stomachs of 5 dead colts that were located using radiotelemetry during the whooping crane colt mortality study in WBNP.

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RESULTS

Of the 4 nests, 2 hatched both eggs, and 2 hatched only 1 egg. Of the nests with 2 colts, in 1 the younger colt was preyed upon by a raven (*Corvus corax*) just 2.75 hours after observations began, so nest 16 is the only nest with feeding data for a 2-colt nest. A summary of the events and observation sessions are in Table 1.

Diet

In all nests, dragonfly nymphs were the predominant food of the colts (Table 2). The ratio of dragonfly nymphs to other food items was remarkably consistent among nests (Table 2) and between the old and young colt in nest 16. Overall, dragonfly nymphs made up 88% of known food items ($n = 156$). Dragonfly nymphs in the nesting ponds are primarily from 2 genera (*Aeshna* and *Libellula*). Of the unknown food items, at least 75% were of dragonfly nymph size or smaller.

Food Deliveries by Adults

In 3 of the 4 nests, the female made the majority of the food deliveries (Table 3). Overall, females made 66% of all food deliveries. If weighted by nest, females made 63% of all food deliveries. The observations for nest 5 were omitted from this analysis because the colt was often fed away from the nest and therefore out of sight of the observer. At nest 16, where it was possible to compare feeding deliveries between the siblings, the male made 90% of his deliveries to the older

Table 1. Chronology of events and hours of observation for each whooping crane nest, in Wood Buffalo National Park, 1998–99.

Nest No.	1998	1999		
	14	4	5	16
Hatch Day ^a	1 colt	1 colt	1 colt	1 colt
Hatch Day+1	1 colt	Depart Nest Pond	1 colt	1 colt
Hatch Day+2	Depart Nest Pond		2 colts, young colt taken by a Raven	2 colts
Hatch Day+3			Depart Nest Pond	2 colts
Hatch Day+4				Depart Nest Pond
Hours of observation	22 (3 days)	14 (2 days)	15 (last 2 days)	42 (5 days)

^aHatch day is the first sunrise to sunset period following hatching. Colts at the start of a hatch day could be anywhere from 0 to 12 hours old, since we only observed the final stages of the hatching of 1 colt; the others hatched while being brooded or between observation sessions.

colt ($n = 76$), and the female made 86% of her food deliveries to the older colt ($n = 141$). At nest 16, the older colt fed on parts of the egg membrane 7 times and caught and ate 1 fly.

Table 2. Diet items consumed by whooping crane colts in Wood Buffalo National Park, 1998–99.

Nest No.	1998			1999		
	14	4	5	16		
Colt				Older Colt	Younger Colt	Older or Younger Colt
Dragonfly nymphs	19	8	4	90	7	10
Adult dragonfly	1			2	1	4
Egg membrane				7		
Snail		1		1		
Fly				1		
Unknown	14	5	2	81	17	34
Total	34	14	6	182	25	48
% dragonfly nymphs (excluding unknowns)	95.00	88.80	100.00	89.11	87.50	71.43

Table 3. Number of food deliveries by each whooping crane parent in Wood Buffalo National Park, 1998–99.

Nest No.	1998		1999	
		14	4	5
Female	22	3	5	164
Male	9	6	1	84
Total	31	9	6	248
% Feedings by female	70.97	33.33	83.33	66.13

Feeding Rate

The younger colt at nest 16 received fewer food items than its sibling, when compared at similar ages (Fig. 1). The younger colt at nest 5 did not receive any food items prior to being abandoned by the family group. The abandoned colt was subsequently preyed upon by a raven.

In all nests, colts were fed exclusively in the nest on the first day after hatching. On the second day, most feedings were still in the nest, but the colts were starting to move out of the nest. On the third and later days, most feedings were away from the nests, because colts were following the parents during foraging.

Diet as Determined by Colt Necropsies

In 1998, 2 colt carcasses were located by radiotelemetry during a colt-mortality study. One colt carcass was too decomposed to identify food items in its digestive tract. However, necropsy results revealed that the other colt's digestive system was filled with parts of dragonfly nymphs. No other food items were present.

In 1999, 3 colt carcasses were located by radiotelemetry during the mortality study. Necropsies revealed that all 3 had various amounts of dragonfly nymphs in their digestive systems. No other food items were present.

DISCUSSION

At all 4 nest sites and in each of 4 colt carcasses examined in the mortality study, dragonfly nymphs were the predominant food item consumed by young whooping cranes. The only other nesting behavior observed from a blind in WBNP was in 1974. During that observation session, insect larvae were fed to the young colts (Muir 1976).

This is the first study of wild whooping cranes to report on the division of feeding duties by parents. Both parents are active in feeding the colts, with the females providing a

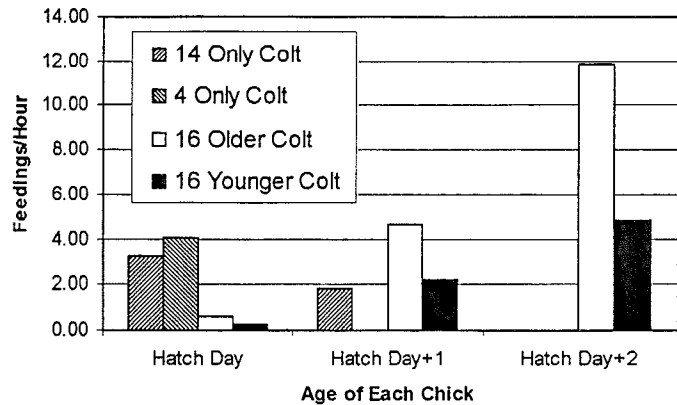


Fig. 1. Feeding rate of whooping crane colts at 3 nests (4, 14, and 16) in Wood Buffalo National Park, 1998–99. Data for nest 5 was omitted because of difficulty observing feedings.

slightly larger share. The males often adopted an alert posture while the females foraged and fed the young.

Feeding rates for the younger colt at nest 16 were lower than for its older sibling. The parents did not appear to focus on feeding any particular colt, but fed whichever colt was closest. Often this was the older colt because of its increased mobility. The older colt was able to intercept adults on their way back to the nest and thus received the food item.

The disparity in feeding rates for the older (and only) colts on Hatch Day may be due to a difference in ages. The older colt in nest 16 hatched out after observations began, whereas in nests 14 and 4, colts hatched sometime the previous evening. The colts in nests 14 and 4 may therefore have been as much as 14 hours older than the older colt at nest 16.

MANAGEMENT IMPLICATIONS

These data reveal the importance of abundant dragonfly nymphs (or easily captured aquatic invertebrates of a similar size) when evaluating potential wetlands for whooping crane reintroductions.

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