

Behavior, wild diets and weight gains of supplementally-fed black bears in northeastern Minnesota

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Introduction

People are increasingly moving into black bear (*Ursus americanus*) habitat, seeing more bears, and often feeding them intentionally or unintentionally. There are many untested beliefs about the effects this supplemental feeding has on bear behavior, food preferences, natural foraging activities, relations with humans, and longevity. This study compares bears receiving supplemental food with those in a nearby study area where bears were not supplementally fed (Rogers 1987; Rogers, unpublished data).

This ongoing study explores effects of supplemental feeding on:

- Territoriality and social organization
- Wild foraging patterns
- Preference for natural versus human foods
- Seasonal changes in use of supplemental foods
- Weight gain
- Habituation and reactions to people
- Mortality

Methods

Study Area

- A rural community of over 300 households within a 200 km² area where approximately 3% of those households regularly feed bears (Fig. 1)

Study Population

- 18 related bears up to 14 years old plus 12 unrelated bears

Territories

- Ten radio-collared primary study bears located 597 times between 28 May and 1 September 2004
- Territories estimated by 100% minimum convex polygons, 95% kernel density, and by using behavioral data in addition to locations as in Rogers (1987)

Diet

- Diet determined by scat analysis and 41 hours observing foraging behavior
- Scat markers fed to observed bears to determine passage rates and obtain scats of known composition to assess biases in scat analysis

Activity Patterns

- Activity patterns recorded by remote telemetry and by recording activities of closely observed bears using a hand-held computer and CyberTracker software

Weights

- 411 weights recorded from 22 bears that entered a baited 900-lb capacity Toledo Platform Scale Model 2181 (Fig. 3)



Fig. 1. Yearling black bear checking out backyard bear feeder.

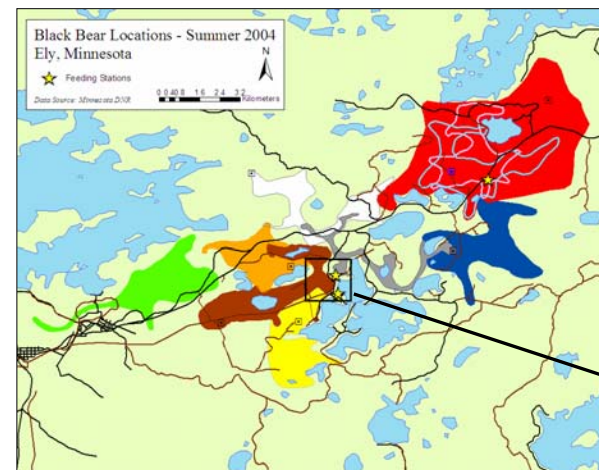


Fig. 2. Summer 2004 territories of 10 female black bears.



Fig. 2a. Individual bedding sites maintained near feeding stations.

Table 1. Territory calculations for 10 female black bears during the summer of 2004 in northeastern Minnesota (km²)

Status	N	100% Min Convex Hull	95% Kernel Density	Subjective	Rogers 1987
Adult	8	26.3 ± 4.7 SE	28.8 ± 6.8 SE	8.0 ± 2.6 SE	9.6 ± 0.5 SE
Yearling	2	10.2 ± 1.5 SE	9.3 ± 0.6 SE	6.1 ± 0.6 SE	6.7 ± 0.6 SE



Fig. 3. Young black bear weighing in on the platform scale at field station.

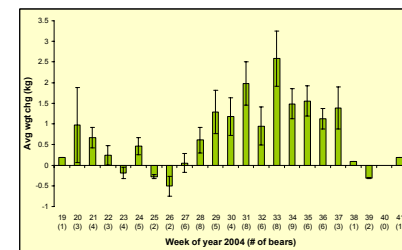


Fig. 4. Average daily weight gain of adult black bears.

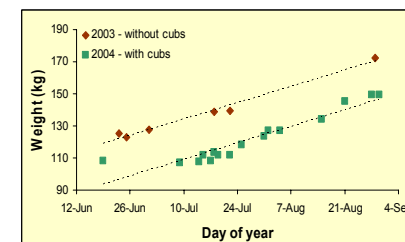


Fig. 5a. Summer weight gains of 7-year-old (2004) female black bear in consecutive years.

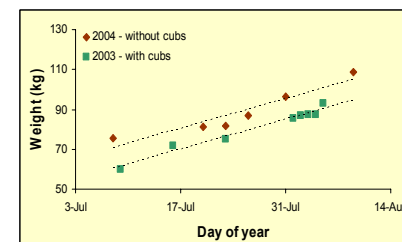


Fig. 5b. Summer weight gains of 4-year-old (2004) female black bear in consecutive years.

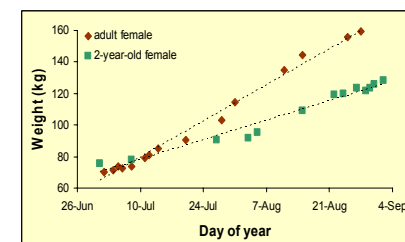


Fig. 6. Summer weight gains of 2-year-old sub-adult and adult female black bears.

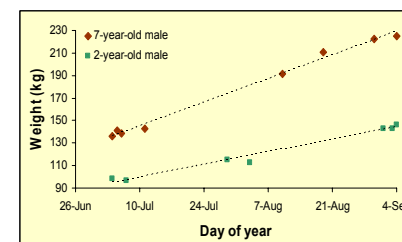


Fig. 7. Summer weight gains of 2-year-old sub-adult and 7-year-old adult male black bears.

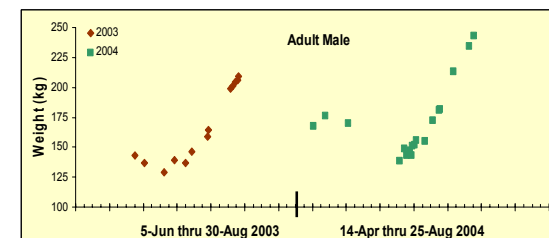


Fig. 8a. Weight gain over a two-year period for an adult male black bear.

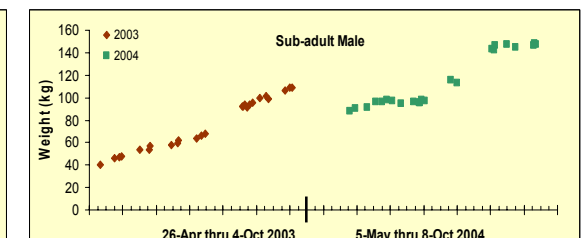


Fig. 8b. Weight gain over a two-year period for a sub-adult male black bear.

Results

Behavior

- Adult females defended individual territories (Fig. 2)
- Yearlings ranges were primarily within their mother's territory (Fig. 2)
- Territory sizes (Table 1) not significantly different from Rogers (1987)
- Adults maintained discrete bedding areas near feeding stations (Fig. 2a)

Wild Diets

- Closely-observed bears spent 81% of their active time foraging for wild foods despite the availability of human food sources nearby

Use of Supplemental Foods

- Use of supplemental foods increased as wild food became scarce in late summer.
- Supplementally-fed bears did not become nuisances at homes not actively feeding bears

Weight Gain

- Weight gains of adult bears began to increase the first week of July and tapered off significantly the second week of September 2004 (Fig. 4)
- Females gained at the same rate ($P=0.876$ and $P=0.974$) in years with cubs as years without but mean weights were 21.0 and 7.5 kg more without cubs (Fig. 5a, 5b)
- Rate of weight gain by two breeding-age females of differing ages was significantly different ($P<.0001$) (Fig. 6)
- Rate of weight gain by an adult and sub-adult male differed significantly ($P<.0001$) (Fig. 7)
- Adult males lost up to 37.6 kg during the mating season (Fig. 8a) while sub-adult males continued to gain (Fig. 8b)

Discussion

Several homeowners within the study area have been feeding black bears for over 25 years. While we do not recommend feeding bears, our studies indicate many beliefs about the negative consequences of feeding bears are unfounded.

While some bears seemed 'tame' at feeding stations, they did not approach people in other parts of their ranges. In the 16 years Minnesota DNR has kept records of nuisance bear activity, no complaints have been registered from the study area. In years of scarce natural food, the feeding stations may have functioned as buffers against nuisance activity.

At several feeding stations, unlimited supplemental foods were made available to bears throughout their active seasons. Nevertheless, bears gained little weight during May and June and adult males lost weight during this time. Rapid weight gains began in July as mating season ended and wild berries began to ripen.

Study bears established territories along matriarchal lines with yearlings occupying ranges within their mothers' territories as described in an earlier study of non-fed bears (Rogers 1987). Adult females crossed their mothers' territories to reach feeding stations and maintained discrete bedding areas near the stations.

Feeding on supplemental foods increased as wild foods became scarce. Bears appeared to use supplemental foods as they would a concentrated wild food source such as a beech, oak or hazelnut stand. Supplemental feeding did not prevent bears from hibernating. During September and October, all bears abandoned abundant supplemental food and settled down for the winter.

Literature Cited

Rogers, L. L., 1987, Effects of food supply and kinship on social behavior, movements, and population dynamics of black bears in northeastern Minnesota. Wildlife Monograph 97. 72 pp.

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