

BLACK BEAR FOOD HABITS IN THE LOWER WEKIVA RIVER BASIN OF CENTRAL FLORIDA

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Abstract.—Food habits of black bears (*Ursus americanus floridanus*) in the Lower Wekiva River Basin in Central Florida were determined by analysis of 676 scats collected from October 1993 through December 1995. Acorns (*Quercus* spp.), saw palmetto (*Serenoa repens*) hearts and fruit, sabal palm (*Sabal palmetto*) hearts and fruit, walking sticks (*Anisomorpha buprestoides*), blueberries (*Vaccinium* spp.), tupelo (*Nyssa biflora*) fruit, bessie bugs (*Odontotaenius disjunctus*) and carpenter ants (*Campanotus floridanus*) were among the most frequently eaten foods. Food habits were affected by seasonal and annual variation in food availability. Land management for bears should enhance or preserve habitat diversity that promotes production of preferred foods.

The black bear has been eliminated from about 83% of its historical range in Florida (Wooding 1993). It is listed as a threatened species by the Florida Game and Fresh Water Fish Commission (Maehr and Wooding 1992) and is a candidate for federal listing as a threatened species (Bentzien 1991). The central Florida bear population, which includes the Lower Wekiva River Basin, is one of the largest of the eight extant populations in the state (Wooding 1993). The only information available on food habits of bears in this population are from 13 stomachs examined by Harlow (1961) and a small number of scats reported by Maehr (1984). This paper describes black bear food habits in the Lower Wekiva River Basin for land managers to consider the impacts of habitat manipulation and land use practices on important bear foods.

STUDY AREA AND METHODS

The study was conducted in the Lower Wekiva River Basin located in Orange, Lake, and Seminole counties. The diverse habitats of this area, including hardwood swamps, pine (*Pinus* spp.) flatwoods, sandpine (*P. clausa*) scrubs, bay swamps, hardwood hammocks, creeks, ponds, sabal palm hammocks, and sandhills, are described by Hartman (1978).

Fresh bear scats, identified by size, shape, or the presence of nearby bear tracks, were collected during routine field work October 1993 through December 1995 and stored in plastic bags until analyzed. Freshness was determined by moisture content and sharpness of features, and only scats that were considered to be less than one week old were collected. Each scat was processed by rinsing each one individually with water through a 1 mm mesh sieve. Food items were identified to species if possible using field guides and reference collections.

Relative frequency of foods was calculated by year and season (spring-summer: April-August, fall: September-January, winter: February-March). The seasons chosen reflected distinct shifts in diet and habitat use (Roof and Wooding 1996).

RESULTS AND DISCUSSION

A total of 676 bear scats was collected and analyzed. At least 36 different food items occurred a total of 1158 times (Table 1) for an average of 1.7 food items per scat. The most frequently eaten food items were acorns, saw palmetto hearts and fruit, sabal palm hearts and fruit, walking sticks, blueberries, tupelo fruit, carpenter ants, and bessie bugs.

Seasonal variation was observed in both the foods eaten and the number of scats found. During the spring-summer season, important foods were saw palmetto hearts, blueberries, carpenter ants, and sabal palm hearts (Table 1). White-tailed deer (*Odocoileus virginianus*) remains were found most frequently during this season and may be a reflection of an increase in availability due to fawning (Ozoga and Verme 1982). The most frequently occurring foods in bear scats in fall were acorns, walking sticks, and the fruits of palms and tupelo (Table 1). Acorns, a universally preferred fall food (Harlow 1961, Maehr and Brady 1984a), were available from live oak (*Quercus virginiana*), sand live oak (*Q. geminata*), myrtle oak (*Q. myrtifolia*), laurel oak (*Q. hemisphaerica*), water oak (*Q. nigra*), swamp laurel oak (*Q. laurifolia*), and turkey oak (*Q. laevis*). Acorns, various aquatic plants, and sabal palm hearts were important winter foods.

These findings are consistent with other studies in the southeastern U.S. where seasonal shifts in food utilization were reported (Landers et. al. 1979, Maehr and Brady 1984a, Hellgren et al. 1989). In general, the diet is dominated by herbaceous matter in the spring, soft mast in the summer, and hard mast in the fall. Diet shifts generally corresponded to fruiting chronology and food availability.

Food habits also varied annually. Small sample sizes precluded meaningful year-to-year comparisons for spring-summer and winter, however the relative frequency of some major fall food items varied considerably (Table 1). For example, acorns were found in 94% of scats collected in fall 1993, 33% of scats collected in fall 1994, and 91% of scats collected in fall 1995. A chi-square analysis of frequencies of fall acorn consumption showed no significant difference between 1993 and 1995 ($\chi^2=0.250$, $df=1$, $P=0.617$), but indicated a difference between 1993 and 1994 ($\chi^2=143.774$, $df=1$, $P=0.001$), and, between 1994 and 1995 ($\chi^2=75.946$, $df=1$, $P=0.001$). This mirrored my observations of lower acorn abundance in 1994 than in 1993 or 1995, although no quantitative measure was taken.

Other researchers have found significant annual variation in black bear food use and availability. Landers et. al. (1979) found annual fall

Table 1. Relative frequency (%) of foods in bear scats by season and year in the Lower Wekiva River Basin from October 1993 to December 1995.

	Spring-Summer ¹		Fall ²		Winter ³	
	1994 n ⁴ =72	1995 n=35	1993 n=251	1994 n=177	1994 n=35	1995 n=2
FRUIT						
Acorn (<i>Quercus</i> spp.)	6		94	33	74	
Saw palmetto (<i>Serenoa repens</i>)	7		1	53		
Sabal palm (<i>Sabal palmetto</i>)			1	33		50
Tupelo (<i>Nyssa biflora</i>)			8	12	8	
Blueberry (<i>Vaccinium</i> spp.)	21	37				
Blackberry (<i>Rubus</i> spp.)		11				
Gallberry (<i>Ilex glabra</i>)			3	4	2	
Persimmon (<i>Diospyros virginiana</i>)	3		1	3		
Grape (<i>Vitis</i> spp.)	4			1		
Red mulberry (<i>Morus rubra</i>)		6				
Pepper vine (<i>Amelopsis arborea</i>)	4					
Swamp dogwood (<i>Cornus foemina</i>)	1			1		
Beautyberry (<i>Callicarpa americana</i>)			1			
Unknown fruit						
PLANT FIBER						
Saw palmetto	58	54	1	2		
Sabal palm	7	14	1	6	6	
Pickeralweed (<i>Pontederia cordata</i>)		3		2		11
Arrow arum (<i>Peltandra virginica</i>)			1			1

¹April to August.

²September to January. For example, Fall 1993=September 1993 through January 1994.

³February to March.

⁴n=number of scats.

Table 1. (Continued) Relative frequency (%) of foods in bear scats by season and year in the Lower Wekiva River Basin from October 1993 to December 1995.

	Spring-Summer ¹		Fall ²		Winter ³	
	1994 n ⁴ =72	1995 n=35	1993 n=251	1994 n=177	1994 n=35	1995 n=2
<i>Thalia (Thalia geniculata)</i>				1		
Grass (<i>Graminae</i>)			1	1		
Unknown aquatic	6	3	2	1		
Unknown plant	3				17	50
INSECT						
Walking stick (<i>Anisomorpha buprestoides</i>)	7		27	21		13
Carpenter ant (<i>Campanotus floridanus</i>)	29	26	<1	5		1
Bessie bug (<i>Odontotaenius disjunctus</i>)	8	3	4	8		8
Yellow jacket (<i>Vespula squamosa</i>)	10	6	<1	1		1
Honey bee (<i>Apis mellifera</i>)	1					
VERTEBRATE						
Whitetail deer (<i>Odocoileus virginianus</i>)	3	9	3	3		2
Raccoon (<i>Procyon lotor</i>)			2			1
Unknown turtle			1			2
Armadillo (<i>Dasypus novemcinctus</i>)				1		2
Hog (<i>Sus scrofa</i>)			<1			1
Opossum (<i>Didelphis virginiana</i>)			<1			
OTHER						
Pine bark (<i>Pinus</i> spp.)			<1			
Plastic				1		

¹April to August.

²September to January. For example, Fall 1993=September 1993 through January 1994.

³February to March.

⁴n=number of scats.

food use varied greatly in eastern North Carolina. Noyce and Coy (1989) documented large fluctuations in abundance and productivity of bear foods in Minnesota. Maehr and Brady (1984a) found that Florida black bear food habits were positively correlated with food availability among years. Rogers (1976) found that such fluctuations affected subsequent reproductive performance.

Because bears exploit different foods depending on the season, year and location (Maehr and Brady 1982,1984b), they benefit from a diverse habitat that allows alternative foods to be utilized if primary foods are reduced or unavailable (Pelton 1985, Mollohan and LeCount 1989, Maehr and Wooding 1992). Land management for bears should enhance or preserve natural habitat diversity to promote the production of preferred and alternative foods.

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