

NOTES

Foods of black bears in Florida.—Food habits descriptions are essential to understanding the role of an animal in its environment and in making management decisions to improve habitat quality or to predict the consequences of habitat alteration due to human disturbance. Black bears (*Ursus americanus floridanus*) are widely distributed in Florida (Brady and Maehr 1985), and utilize a wide range of habitats. Maehr and Brady (1982a, 1984) discussed the fall food habits of Florida bears in northeast Florida, and seasonal and geographic trends in the diet. Their conclusions were based on species accounting for 3% or more of the diet in any one season. Hence, many species eaten by black bears have not previously been reported. Further, 57 additional samples have been analyzed since Maehr and Brady's (1984) report. In this paper, therefore, we present a list of foods eaten by black bears in Florida.

Stomachs and scats were collected throughout the state from summer through winter 1978-1984. Details of data analysis can be found in Maehr and Brady (1984). In this paper we deleted the detailed volume measurements in order to combine stomach and scat data, as well as to simplify tabulation. We observed that the frequency of occurrence for each food item reflected its importance relative to volume eaten. Because of this, we also included data from the analysis of 13 stomachs collected in Ocala National Forest (Harlow 1961). Scientific names of species mentioned in the text appear in Table 1.

A list of Florida black bear foods is useful for a number of reasons. The use of distinctly different foods from a variety of plant and animal taxa emphasizes the extremely opportunistic and omnivorous habits of black bears. Further, although the most frequently eaten foods (saw palmetto, swamp tupelo, bessie bugs, etc.) can be considered extremely important, less common or unpreferred foods may serve as replacements during years of mast failures or otherwise low food availability. It may be the presence of these less commonly eaten foods that distinguishes occupied bear habitat from other apparently suitable forest land.

This list should not be viewed as complete. However, due to the sample size ($n = 244$) we feel that all consistently utilized foods are represented. It is likely that with continued examination of scats and stomachs, additional items would be included in the known diet of Florida bears. One food item does not appear on our list yet was apparently a staple in bear diets until the development of Florida's east coast. De Pourtales (1877) and Chapman (1894), both early Florida naturalists, reported that bears commonly fed on the eggs of sea turtles. Because of the virtual elimination of native east coast vegetation and isolation from mainland bear populations (i.e., road building and other development), bears can no longer rely on this traditional high protein and energy food source.

The majority of food items listed (93%) are native plants and animals. However, several introduced species appear to be important foods. Brazilian pepper is a common winter food in south Florida, providing bears with abundant fruits during a period usually characterized by a food shortage (see also Maehr 1984). The honey bee, introduced to Florida by early European settlers, is the most commonly eaten insect. Because honey bees are normally

TABLE 1. Foods eaten by Florida black bears based on 116 stomachs and 128 scats.

Food item	Type ¹	Frequency
PLANTS		394
Monocots		166
Saw palmetto (<i>Serenoa repens</i>)	s,l	82
Sabal palm (<i>Sabal palmetto</i>)	s,l	25
Alligator flag (<i>Thalia geniculata</i>)	l	7
Needle palm (<i>Rhapidophyllum virginica</i>)	l,s,st	2
Unidentified grass (Gramineae)	l	6
Bald cypress (<i>Taxodium distichum</i>)	l,st	4
Greenbriar (<i>Smilax</i> spp.)	s	3
Corn (<i>Zea mays</i>)	s	2
Green arum (<i>Peltandra virginica</i>)	l,s,st	2
Spoon flower (<i>Peltandra sagittifolia</i>)	s,l	1
Scrub palmetto (<i>Sabal etonia</i>)	s	1
Unidentified monocot	l,st,s	27
Dicots		200
Swamp tupelo (<i>Nyssa biflora</i>)	f,s	46
Oaks (<i>Quercus</i> spp.)	l,s	44
Blueberry (<i>Vaccinium</i> spp.)	f,s	29
Unidentified dicot	l,st,s	18
Gallberry (<i>Ilex glabra</i>)	f,s	13
Odorless bayberry (<i>Myrica inodora</i>)	f,s	8
Brazilian pepper (<i>Schinus terebinthifolius</i>)	s	7
Fetterbush (<i>Lyonia lucida</i>)	l,s	4
Red bay (<i>Persea palustris</i>)	f,s	4
Grape (<i>Vitis</i> spp.)	f,s	3
Raspberry (<i>Rubus</i> spp.)	f,s	3
Hickory (<i>Carya</i> spp.)	s	2
Pennywort (<i>Hydrocotyle</i> spp.)	l,st	1
Pokeweed (<i>Phytolacca rigida</i>)	l	1
Pond apple (<i>Annona glabra</i>)	f,s	1
Sugarberry (<i>Celtis laevigata</i>)	s	1
Sunflower (<i>Helianthus</i> spp.)	l,st	1
Sweetleaf (<i>Symplocos tinctoria</i>)	l	1
Wild coffee (<i>Psychotria lagustrifolia</i>)	s	1
Crab apple (<i>Malus angustifolia</i>)	f,s	1
Cultivated bean (<i>Phaseolus</i> spp.)	s	1
Dwarf huckleberry (<i>Gaylussacia mosieri</i>)	f,s	1
Swamp dogwood (<i>Cornus foemina</i>)	s	1
Fringe tree (<i>Chionanthus virginicus</i>)	s	1
Hawthorne (<i>Crataegus</i> spp.)	s	1
Scrub rosemary (<i>Ceratiola ericoides</i>)	s	1
American holly (<i>Ilex opaca</i>)	s	1
American beautyberry (<i>Callicarpa americana</i>)	s	1

TABLE 1. (Continued)

Food item	Type ¹	Frequency
Other plants		25
Spanish moss (<i>Tillandsia usneoides</i>)	1	5
Fern	1	1
Lichen	1	1
Unidentified plant tissue	1, st, s	18
INSECTS		184
Bees and Wasps		74
Honey bee (<i>Apis mellifera</i>)		32
Yellow jacket (<i>Vespula squamosa</i>)		18
Paper wasp (<i>Polistes</i> spp.)		9
Yellow jacket (<i>Vespula maculifrons</i>)		6
Small social wasp (<i>Mischocyttarus cubensis</i>)		5
Parasitic wasp (<i>Apocrita</i>)		4
Bumble bee (<i>Bombus</i> spp.)		4
Bumble bee (<i>Bombus bimaculatus</i>)		3
Carpenter bee (<i>Xylocopa</i> spp.)		2
Bumble bee (<i>Bombus pennsylvanicus</i>)		1
Ants (Formicidae)		41
Florida carpenter ant (<i>Campanotus abdominalis floridanus</i>)		22
(<i>Campanotus</i> spp.)		7
(<i>Crematogaster</i> spp.)		2
Fire ant (Myrmicinae)		1
(<i>Neivamyrmex</i> spp.)		1
(<i>Tapinoma sessile</i>)		1
Unidentified ants		7
Beetles (Coleoptera)		39
Bessie bug (<i>Odontotaenius disjunctus</i>)		29
Ground beetle (<i>Carabidae</i>)		2
Acorn weevil (<i>Curculio</i> spp.)		3
Scarab beetle (<i>Strategus antaeus</i>)		1
Carrion beetle (<i>Silpha inaequalis</i>)		1
Click beetle (Elateridae)		1
(<i>Phengodes</i> spp.)		1
Unidentified beetle		1
(Orthoptera)		10
Walking stick (<i>Anisomorpha buprestoides</i>)		9
Short-horned grasshopper (Acrididae)		1

TABLE 1. (Continued)

Food item	Type ¹	Frequency
Flies (Diptera)		5
Blow fly (Calliphoridae)		3
Flesh fly (Sarcophagidae)		1
(<i>Phaenicia</i> spp.)		1
Other Insects		15
Giant water bug (Belostomatidae)		1
Cicada (Cicadidae)		1
Aquatic burrowing bug (Naucoridae)		1
Backswimmer (Notonectidae)		1
Leafhopper (<i>Coelidia</i> spp.)		1
Unidentified insects		10
OTHER ARTHROPODS		3
Crayfish (Astacidae)		1
Centipede (Chilopoda)		1
Tick (Acarina)		1
VERTEBRATES		40
Armadillo (<i>Dasypus novemcinctus</i>)		9
Bird (unidentified egg & feathers)		7
Deer (<i>Odocoileus virginianus</i>)		4
Feral hog (<i>Sus scrofa</i>)		3
Alligator (<i>Alligator mississippiensis</i>) (eggs)		1
Gopher tortoise (<i>Gopherus polyphemus</i>)		1
Water snake (<i>Nerodia</i> spp.)		1
Unidentified mammal		7
Unidentified bone		1
Unidentified animal tissue		6

¹f—fruit, s—seed, l—leaves, st—stem.

obtained at commercial apiaries (beeyards), a serious conflict between black bears and beekeepers has developed (Maehr and Brady 1982b). Armadillos are the most common vertebrate in Florida black bear diets. In as much as armadillos are "destroying the organization and productivity of the leaf-mold stratum of the forest" (Carr 1983), black bears might be important in regulating armadillo numbers in occupied bear range. Exotics account for 7% of the food items used by bears, and for 9% of the total frequency.

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- David S. Maehr, Florida Game and Fresh Water Fish Commission, Wildlife Research Laboratory, 4005 S. Main St., Gainesville, Florida 32601 and John T. DeFazio, Jr., University of Florida, School of Forest Resources and Conservation, 118 Newins-Ziegler Hall, Gainesville, Florida 32611. (Present address of JTD: School of Forest Resources, University of Georgia, Athens, Georgia 30601.)

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Red-tailed Hawk drowns Yellow-crowned Night Heron.—While walking along a dirt road near the San Pablo River in Duval County, Florida at approximately 1645 on 12 July, 1983, I flushed a juvenile Yellow-crowned Night Heron (*Nycticorax violaceus*) from a pool of rainwater. The bird flew around a bend where trees blocked my view. A few seconds later I heard a slapping sound, like a very loud punch, and the squawking of a heron.

When I rounded the bend I saw that an adult Red-tailed Hawk (*Buteo jamaicensis*) had pinned down a juvenile Yellow-crowned Night Heron in a small puddle (1m by 30cm by approximately 10cm deep) which had formed in a tire rut. I suspect that the slapping sound was the hawk hitting the same heron I had previously flushed.

I approached to within 5m of the two birds and remained there for twenty to thirty minutes photographing and watching the birds. The hawk had one foot on the heron's head and the other on its body. The heron occasionally flapped a wing or struggled to which the hawk responded by shifting in a way that appeared to hold the heron's head more firmly under water, and he often looked at the heron as if to see if it was dead yet (Fig. 1). He periodically looked up into a nearby stand of pines where another Red-tailed Hawk was calling. After nearly thirty minutes the heron appeared to be dead, but the hawk remained with it. Leaving the scene, I passed within two meters of the birds, but the hawk made no motion indicative of flying off.