Fall Food Habits of Black Bears in Baker and Columbia Counties, Florida

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Abstract: Stomachs from 36 hunter-harvested black bears were collected over a 5-year period from October through January in Baker and Columbia Counties, Florida. Saw palmetto (*Serenoa repens*) was the most important item in the diet. Other important foods included black gum (*Nyssa biflora*), gallberry (*Ilex glabra*), yellow jackets (*Vespula* spp.), and armadillo (*Dasypus novemcinctus*). The practice of winter burning may have artificially increased the importance of saw palmetto to bears in the study area.

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Food habits of Florida black bears (*Ursus americanus floridanus*) have been poorly documented. Stomachs from 13 fall collected Ocala National Forest bears were examined by Harlow (1961) and several notes exist from the 19th and early 20th centuries (De Pourtales 1877, Maynard 1883, Chapman 1894, Cory 1896, Harper 1927, and Moore 1953). Since nutrition, productivity, movements and bear-human interactions are all influenced by bear feeding ecology (Beeman and Pelton 1980), an accurate characterization of food habits is necessary before we understand Florida black bear ecology, physiology, and behavior.

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Methods

Baker and Columbia counties are located in northeast Florida within the Northern Highlands Physiographic Zone (U.S. Dep. Inter. 1978:II-1). A shared, predominant feature of these counties is the 63,628-ha Osceola National Forest. A mixture of slash pine (*Pinus elliottii*) flatwoods, hardwood and cypress (*Taxodium distichum*) swamps, and a variety of scrub oak uplands exists in an interspersed pattern, providing black bears with an adequate year-round diet.

Thirty-six bear stomachs were collected by Florida Game and Fresh Water Fish Commission personnel during the special 3-weekend fall and regular season hunts in and around Osceola National Forest from October 1977 through January 1982. The number of stomachs collected each season varied: 6 in 1977–78, 9 in 1978–79, 1 in 1979–80, 13 in 1980–81, and 7 in 1981–82. The majority of bears were harvested within the boundaries of the National Forest, although several each year were taken from vegetatively similar private lands to the north. Specimens were frozen shortly after collection or fixed in 10% formalin or alcohol. Stomach contents were washed thoroughly over a series of wire mesh screens before individual food items were segregated. Volume measurements by water displacement were made to the nearest cubic centimeter in graduated cylinders. Food items were identified as close to species as possible with the aid of field guides, reference collections and local experts. Data were analyzed using the aggregate volume and aggregate percent methods described by Martin et al. (1946).

Results

Plant foods occurred more often (66 times in 36 stomachs) and in greater volume than any other food type (Table 1). Saw palmetto berries (*Serenoa repens*) were the major food item both in volume and frequency (Table 1). Black gum berries (*Nyssa biflora*) and gallberries (*Ilex glabra*) were other important plant foods. As a group, insects were second in frequency, occurring 30 times in 36 stomachs. Yellow jackets (*Vespula* spp.) accounted for most of the insect occurrences and volume. On a volume basis, mammals and birds were second in importance. Birds were represented by feathers only while armadillos (*Dasypus novemcinctus*) occurred 7 times in varying volumes. Man-made debris and garbage (plastic bag, string, and tinfoil) comprised an insignificant portion of black bear foods. Items occurring

Table 1. Fall Foods of 36 Black Bears from Baker and Columbia Counties, Florida

Food Item	Aggregate Volume	Aggregate %	% Frequency	Frequency
Plants	84.20	82.36		66
Serenoa repens (saw palmetto)	72.37	60.87	77.8	28
Unknown monocot	1.14	0.66	19.4	7
Ilex glabra (gallberry)	4.71	7.80	16.7	6
Persea palustris (red bay)	0.01	0.01	5.6	2
Nyssa biflora (black gum)	5.68	11.95	30.6	11
Malus angustifolia (southern crab apple)	0.05	0.25	2.8	1
Wood	0.25	0.81	11.1	4
Other Plants	t[a]	t	19.4	7
Insects	7.65	6.79		30
Campanotus spp. (carpenter ant)	0.01	t	5.6	2
Odontotaenius disjunctus (bessie bug)	0.02	0.05	11.1	4
Vespula spp. (yellowjacket)	7.59	6.72	33.3	12
Other Insects	0.03	0.02	30.6	11
Vertebrates	7.73	7.52		12
Bird (feathers)	t	t	5.6	2
Dasypus novemcinctus (armadillo)	4.23	4.75	19.4	7
Sus scrofa (wild hog)	3.30	2.35	2.8	1
Unidentified animal tissue	0.20	0.42	5.6	2
Debris	0.42	0.52	19.4	7

[a] t = trace.

in only 1 stomach or in trace amounts included Spanish moss (*Tilandsia* spp.), bald cypress (*Taxodium distichum*) leaves, Greenbriar (*Simlax* spp.) berries, acorns (*Quercus* spp.), centipede (Chilopoda), walking stick (*Anisomorpha buprestoides*), ground beetle (Carabidae), weevil (Curculionidae), click beetle (Elateridae), aquatic burrowing bug (Naucoridae), backswimmer (Notonectidae), glow worm (Phengodes), carrion beetle (*Silpha inaequalis*), Scarab beetle (*Strategus anateus*), unidentified hair, and unidentified animal tissue.

Discussion

The dominance of plant foods in black bear diets has been reported elsewhere (Bennett et al. 1943, Harlow 1961, Hatler 1972, Landers et al. 1979, Beeman and Pelton 1980), and, as with saw palmetto in Baker and Columbia counties, a dominant food species is usually characteristic in each geographic location. Whether the prevalence of saw palmetto berries reflects an actual food preference or is simply a function of its wide and abundant distribution within the study area is a subject for speculation. In the late 18th century saw palmetto was probably less abundant in the slash pine flatwoods of northeast Florida (Bartram 1928) than it is today. The understory predominance of palmetto today may be attributed to modern timber and fire

management practices. Apparently, the practice of winter burning encourages rapid regrowth of palmetto as well as gallberry (Hughes and Knox 1964, Hough 1965), resulting in a competitive advantage over other flatwoods mast producers such as runner oak (*Quercus pumila*) and blueberry (*Vaccinium* spp.) (A. Stockle, pers. commun.). It is likely, due to the higher nutrition and probably greater palatability of these species, that runner oak acorns and blueberries made up most of the fall black bear diet before the advent of intensive timber management in north Florida. With decreased availability of acorns and blueberires in Baker and Columbia Counties, bears may have, out of necessity, turned to saw palmetto as their major food source during fall. Since mast production directly affects reproduction in black bears (Rogers 1976), such a drastic, if not rapid, change in food habits may have had substantial physiological and behavioral consequences on black bears in north Florida.

Interestingly, acorns were found only once and in trace amounts. This contrasts the only other Florida black bear food habits study (Harlow 1961) in the Ocala National Forest where acorns accounted for nearly 50% of the volume and occurred in over 60% of the stomachs. Unfortunately, quantitative data on mast abundance in these areas was not available. However, since both studies examined stomachs collected over a number of years the effect of periodic mast failures of saw palmetto and oaks on both studies' results was negligible. Further, various oak species are widely distributed and abundant on the upland dominated Ocala National Forest, while oaks only occur sporadically or in small clusters in the Osceola National Forest. Therefore, the apparent difference between these latitudinally distinct regions is probably not an artifact of sampling bias but a true reflection of habitat and food habits differences.

The insects found represented a wide range of taxa (Table 1). However, only yellow jackets and bessbugs (*Odontotaenius disjunctus*) occurred in more than 2 stomachs. These species are found in subterranean nests (Grissell 1974) or within rotten logs (Borror and White 1970:192), respectively, indicating that bears make a special effort to obtain them for food. Therefore, a preference for yellow jackets and bessbugs may be indicated. Although black bears are known to be opportunistic feeders (Eagle and Pelton 1980), some of the insects found may have been taken accidentally on carrion or vegetation, or ingested secondarily with armadillos.

Although mammals and birds made up a small portion of the fall diet, this group may be important due to readily available, large amounts of protein contained in muscle tissue. Since protein covered by a seed coat (i.e., saw palmetto) is unavailable to bears (Eagle and Pelton 1981), the periodic consumption of bird or mammal tissue may help fill a nutritional void. Further, the combined volume of animal and insect material reported in this

study was much greater than reported by Harlow (1961). This may again reflect a poorer quality mast source in Osceola National Forest, causing these bears to utilize animal tissue as an alternate, more difficult to obtain protein source. Unfortunately, it was impossible to determine if mammal and bird food items were taken as prey or carrion.

Implications

The plant and animal species represented in the 36 bear stomachs from Baker and Columbia counties are characteristic of a variety of habitats from swamplands, to pine flatwoods. This finding supports the claim that black bears in Florida require a mixture of habitats for their survival (Harlow 1961). Further, with a year-round sample, habitat use may be shown to be much greater.

The effects of burning on black bear foods and food preferences should be investigated further to outline procedures for restoring bear habitats, especially pine flatwoods, to their apparent, historic productivity. A diverse autumn food supply in Osceola National Forest would reduce the possible deleterious impacts of a saw palmetto mast failure.

Finally, substantial differences in black bear food habits between Baker and Columbia counties, and Ocala National Forest were evidenced. Food habits studies in other regions of Florida should be initiated in order to fully characterize the Florida black bear diet, and to pinpoint habitats essential to the production of preferred or heavily utilized food sources. With this information, important food producing habitats may be acquired or otherwise protected and managed to benefit local black bear populations.

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