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Nuisance alligator food habits in Florida.—Most food habits studies of American alligators (*Alligator mississippiensis*) have sampled hunter-harvested animals (Giles and Childs 1949, Valentine et al. 1972, McNease and Joanen 1977, Delany and Abercrombie 1986). Hence, samples are usually restricted to remote areas and available only during late summer-early autumn (i.e., post-nesting). Stomachs collected from nuisance alligators in Florida provide an opportunity to examine the food habits of alligators from more urban environments during other seasons. This paper describes the diet of nuisance alligators in Florida.

Individual alligators were deemed a nuisance following an investigation by the Florida Game and Fresh Water Fish Commission in response to a public complaint. An alligator was killed if greater than 1.2 m in total length (TL) and considered a threat to personal safety or property (Hines and Woodward 1980). Stomachs were collected from 113 alligators from Duval, St. Johns, Alachua, Marion, Citrus, and Lake counties between 18 March-1 November 1977. Alligators ranged in length from 1.3 to 3.7 m TL and included 69 males, 39 females, and 5 individuals of undetermined sex. Subadults (<1.8 m TL) comprised 23% of the sample. Stomachs were stored in plastic bags at -20°C. After thawing, contents were removed and individual food items were identified to species when possible. Contents were weighed to the nearest gram, and volumes determined by water displacement to the nearest milliliter. For seasonal comparisons, the grouping of samples approximates a change (increase) in average air temperature from spring (March-May, 21.3°C) to summer (June-September, 27.4°C) in north and northcentral Florida in 1977 (NOAA 1977).

One stomach was empty, one contained only rocks, and 111 contained food. Prey items consisted of fish, mammal, bird, reptile, amphibian, and invertebrate species (Table 1). Fish were the most important food group by weight (61%) and volume (60%). Other vertebrates constituted a smaller portion of the diet, accounting for 35% of the total food weight and volume. A juvenile alligator (estimated length < 50 cm) was found in the stomach of a 1.9 m female alligator collected from Lake County. Invertebrate remains occurred frequently (87.6%), but constituted less than 5% of the total food weight and volume. Nonfood items included plant material, rocks, and man-made objects. Parasitic worms (*Dujardinascaris waltoni*) were found in 73% of the stomachs.

Table 1. Contents (occurring in >1%) of 113 American alligator stomachs collected in Florida, 1977.

Item	N items	Percent frequency	Weight (g)	Percent weight food	Volume displaced (ml)	Percent volume food
Vertebrates (total)	210	87.6	16609	95.9	15842	95.0
Fish (total)	84	57.5	10597	61.2	9994	59.9
Shad (*Dorsoma spp.*)	15	10.6	4875	28.2	4468	26.8
Catfish (*Ictalurus spp.*)	14	8.8	2304	13.3	2074	12.4
Gar (*Lepisosteus spp.*)	4	3.5	867	5.0	830	4.9
Sunfish (*Lepomis spp.*)	16	3.5	809	4.7	806	4.8
Bowfin (*Amia calva*)	2	1.8	847	4.9	796	4.8
Largemouth bass (*Micropterus salmoides*)	2	1.8	453	2.6	485	2.9
Undetermined	27	23.9	424	2.4	519	3.1
Mammals (total)	13	11.5	2718	15.7	2670	16.0
Domestic cat (*Felis silvestris*)	3	2.7	1048	6.1	995	5.9
Undetermined	9	7.9	929	5.4	885	5.3
Birds (total)	19	16.8	1565	9.0	1545	9.3
American Coot (*Fulicia americana*)	3	2.7	1228	7.1	1195	7.2
Cattle Egret (*Bubulcus ibis*)	2	1.8	165	0.9	182	1.1
Common Moorhen (*Gallinula chloropus*)	2	1.8	39	0.2	40	0.2
Undetermined	10	8.8	108	0.6	101	0.6
Reptiles (total)	92	54.9	1479	8.5	1333	7.9
Florida red-bellied turtle (*Pseudemys nelsoni*)	2	1.8	475	2.7	395	2.4
Stinkpot (*Sternotherus odoratus*)	50	32.7	399	2.3	364	2.2
Peninsula cooter (*Pseudemys floridana*)	9	6.2	287	1.7	310	1.9
Striped mud turtle (*Kinosternon baurii*)	13	10.6	194	1.1	155	0.9

Table 1. Continued).

Item	N items	Percent frequency	Weight (g)	Percent weight food	Volume displaced (ml)	Percent volume food
Undetermined turtle	8	7.1	17	tr[1]	18	0.1
Water snake (*Nerodia spp.*)	2	1.8	20	0.1	19	0.1
Undetermined snake	4	3.5	3	tr	2	tr
Amphibians (total)	2	1.8	250	1.4	300	1.8
Greater siren (*Siren lacertina*)	2	1.8	250	1.4	300	1.8
Invertebrates (total)	1664	87.6	704	4.1	828	4.9
Snails (total)	1562	71.7	586	3.4	728	4.4
Apple snail (*Pomacea paludosa*)	753	40.7	182	1.0	350	2.1
Freshwater snail (*Viviparus georgianus*)	191	10.6	39	0.2	33	0.2
Undetermined snail	565	26.5	340	1.9	328	1.9
Crustaceans (total)	34	22.1	82	0.5	67	0.4
Crayfish (*Procambarus spp.*)	30	20.4	80	0.5	64	0.4
Grass shrimp (*Palaemonetes intermedius*)	4	1.8	2	tr	3	tr
Insects (total)	68	23.9	36	0.2	35	0.2
Giant water bug (Belastomatidae)	9	3.5	16	tr	16	tr
Predaceous diving beetle (Dytiscidae)	20	5.3	5	tr	5	tr
Scarabaeidae	5	3.5	4	tr	4	tr
Long horn beetle (Cerambycidae)	5	3.5	2	tr	2	tr
Ground beetle (Carabidae)	2	1.8	1	tr	1	tr
Undetermined coleoptera	19	6.2	7	tr	6	tr
Undetermined insect	5	2.7	1	tr	1	tr

Table 1. Continued).

Item	N items	Percent frequency	Weight (g)	Percent weight food	Volume displaced (ml)	Percent volume food
Total food	1874	99.1	17313	100.0	16670	100.0
Plant material		84.1	3865		3642	
Rocks		53.1	1463		7530	
Man-made objects		36.3	348		263	
Empty		0.8				

[1]tr = <0.1% of total food weight and/or volume.

The relative importance of some food groups for nuisance alligators differed from those reported for non-nuisance alligators by Delany and Abercrombie (1986). Using similar methods, they reported the percent volume of mammals (5.0%), reptiles (23.3%), birds (6.7%), amphibians (6.9%), and invertebrates (0.8%) in the diet of hunter-harvested alligators in northcentral Florida. The diet of nuisance alligators was characterized by higher values for mammals, birds, and invertebrates, and lower values for reptiles and amphibians. The availability of some prey species may be different in a more urban environment. The percent volume, frequency, and species of fish in the diet of nuisance alligators were similar to those reported by Delany and Abercrombie (1986). Other alligator diets studies in Florida are limited to the examination of 36 juvenile alligators collected from a canal in the Everglades (Fogarty and Albury 1968) and a report on the stomach contents of an adult alligator found dead in Alachua County (Kinsella 1982). Alligators in other parts of their range consume more crustaceans (Giles and Childs 1949, Chabreck 1972, Valentine et al. 1972) and mammals (McIlhenny 1935, McNease and Joanen 1977, Wolfe et al. 1987). The occurrence of alligator remains in one stomach from this study may evince cannibalism.

Compared by season, some food groups were represented differently (Table 2). Birds were more frequent and constituted a larger portion of the diet for alligators collected during spring (17 March-24 May). Reptiles and invertebrates were more important in the diet of alligators collected during summer and early autumn (2 June-28 September). Fish were the most important food during both periods. Dietary differences also may denote a seasonal change in prey availability. Seasonal comparisons, however, may be biased because of different sex ratios represented in the two groups. Compared by sex, large (> 3.0 m TL) male alligators in Florida consume more turtles (Delany and Abercrombie 1986) and may account for some differences found in this study. Differential digestion rates of various food groups may further bias results (Jackson and Campbell 1974, Garnett 1985, Delany and Abercrombie 1986). In this study the stomach from an alligator collected in Alachua County on 1 November 1978 contained fish (204 ml), feathers (1 ml), and crayfish (3 ml). According to McIlhenny (1935) alligators at this latitude usually have stopped eating by this time.

Crocodilians exhibit a varied diet, and most conspecific differences in prey have been attributed to size, sex, habitat, season, and prey availability (Giles and Childs 1949, Cott 1961, Fogarty and Albury 1968, Chabreck 1972, Valentine et al. 1972, McNease and Joanen 1977, Gorzula 1978, Taylor 1979, Webb et al. 1982, Delany and Abercrombie 1986). Nuisance alligators in Florida consumed a wide variety of prey, but fish were the most important food. Because alligators are opportunistic predators, other suitable prey are probably consumed in proportion to local and seasonal abundance. The relative proportion of some dietary components was different when compared by season and to food habits of alligators sampled from more remote areas. However, prey species availability and abundance needs to be sampled before local and seasonal differences in alligator food habits can be fully assessed. By definition, nuisance alligators are found in close proximity to humans, usually in an urban environment. The continued urbanization of Florida may alter species composition in some areas and directly affect local alligator food habits. Because food habits can influence alligator growth rates, condition, and reproduction (Chabreck 1972, McNease and Joanen 1981), information on diet may provide insight into alligator population dynamics. Additional information is needed on the nutritional requirements of wild alligators.

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Table 2. Nuisance alligator food habits compared by season.

Food group	Spring (17 March-24 May)[1]			Summer (2 June-28 September)[2]		
	Percent frequency	Percent weight	Percent volume	Percent frequency	Percent weight	Percent volume
Fish	55.9	64.2	63.3	52.2	69.1	69.1
Mammals	11.8	17.0	17.4	8.9	11.8	12.2
Birds	23.5	13.4	14.6	5.9	1.5	1.5
Reptiles	38.2	3.2	2.7	61.2	8.8	8.6
Invertebrates	67.6	2.2	1.9	94.0	8.8	8.6
Total food	97.1	100.0	100.0	97.0	100.0	100.0

[1]19 ♂, 15 ♀.
[2]40 ♂, 19 ♀, 1 unknown.

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Great Blue Herons trapped in algae.—On 5 November 1987 at 1900 hr, we observed two adult Great Blue Herons (*Ardea herodias*) on the southwest shore of Newnans Lake, Alachua County, Florida that appeared disabled. The birds were 50 m apart, standing 5 m from shore, in water 40 cm deep. When approached by boat, the herons struggled but did not run or fly. They were noticed again at 2300 hr exhibiting similar behavior. Upon investigation we found that the herons were tangled in filamentous, blue-green algae (*Lyngbya spp.*). Each bird had a large mass of plant material connecting both feet. One bird, apparently unable to fly, hobbled away and was not captured. The other heron was immobilized by a larger (970 g, wet weight) conglomeration of algae and bald cypress (*Taxodium distichum*) twigs and leaves. Algal filaments were tightly interwoven around the tarsometatarsus of each foot, just above the toes. The algae was cut away and the bird was released. Both birds appeared to be in good health and otherwise unhindered.

Lyngbya species occur as free floating trichomes or adhered to submerged objects (Tarver et al., 1978, Aquatic and wetland plants of Florida, Tallahassee, Florida: Bureau of aquatic plant research and control, Department of Natural Resources. 127 pp.). Recent low water levels and wave action on Newnans Lake may have dislodged and concentrated algae near the shoreline (D. Griffin, III, pers. comm.). The herons probably accumulated algae on their feet while foraging. We know of no other reference to Great Blue Herons trapped in algae.

Other herons (*Herodias nigripes* [sic]; Eastern Reef Heron *Egretta sacra*; and Nankeen Night Heron *Nycticorax caledonicus*) have been reported trapped in vegetation (seeds of *Pisonia spp.*) "that often prove(s) fatal" (sources cited in H. N. Ridley, 1930, The dispersal of plants throughout the world, Ashford, Kent: L. Reeve and Co., Lloyds Bank Bldgs., pp. 613-615). In Florida, birds incapacitated near the shoreline would be easy prey for American alligators (*Alligator mississippiensis*), but at this latitude alligators usually have stopped eating by November (McIlhenny, E. A., 1935, The alligator's life history. Boston, Massachusetts: The Christopher Publ. House. 117 pp.). Concentrations of algae may indirectly contribute to some wading bird mortality.

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