

## Diet of Bullfrogs (*Rana catesbeiana*) in Central Oklahoma Farm Ponds

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Several recent studies of bullfrog diet (Korschgen and Moyle, 1955; Cohen and Howard, 1958; Korschgen and Baskett, 1963) have emphasized the opportunistic and unrestricted nature of bullfrog feeding. Korschgen and Moyle studied the diet of bullfrogs in farm ponds in central Missouri, and Korschgen and Baskett compared the food of stream-dwelling Missouri bullfrogs with that of bullfrogs in farm ponds. Cohen and Howard worked with bullfrog populations in ephemeral reservoirs on the San Joaquin Experimental Range, California. Bullfrogs in all of these areas consumed a wide variety of invertebrates and small vertebrates, and showed evidence of occasional gorging on seasonally or locally abundant food items. I have analyzed the food of bullfrogs in a series of turbid Oklahoma farm ponds, with significantly different results.

In April and May, 1958, 52 adult bullfrogs were collected by gigging at night around a series of ponds on the Reding Farm, two miles southeast of Stillwater, Payne County, Oklahoma. The Reding Farm ponds are small (less than one acre each), and receive only surface runoff water from a partly denuded watershed. The resulting impoundments are extremely turbid due to suspended silt and clay particles, which has a profound effect on the productivity of the water. Aquatic vegetation is absent, or limited to sparse filamentous algae. Pond bottoms are silt, and the margins are bare because of the seasonally fluctuating water levels. Bullfrogs collected around these ponds were brought to the laboratory in Stillwater where the stomachs were removed and preserved in formalin for later analysis.

Of the 52 frogs collected, 49 contained recently ingested and identifiable food. Forty-five of these yielded invertebrate prey of only two species; a water beetle (*Hydrophilus triangularis*), and a crayfish (*Procambarus simulans*). Thirty-three of the 45 frogs (73%) had eaten beetles, which contributed 48% of the total volume of food in these 45 stomachs. Parts of 12 beetles were found in one stomach, but the average number of beetles eaten was 3.9. One-third of the 45 frogs contained remains of crayfish, which constituted 52% of the total invertebrate food volume. The maximum number of crayfish found in a stomach was three. No other invertebrate animals were found in the 49 food-containing stomachs.

The other four frog stomachs contained the remains of vertebrate prey. One frog had eaten a 350-mm water snake (*Natrix taxispilota rhombifera*), and another had swallowed a box turtle (*Terrapene carolina triunguis*) 57 mm long. Two of the bullfrog stomachs contained anuran amphibians. One had eaten a 46-mm (body length) toad (*Bufo woodhousei*), and the second yielded remains of three adult treefrogs (*Hyla versicolor*). These four bullfrog stomachs contained no invertebrate food material.

Most reports on bullfrog diet have listed a variety of invertebrate prey taken by these voracious feeders, with insects and crayfish usually among the most important components of the diet. The absence of a broad spectrum of invertebrate prey in the Reding's ponds sample is unusual, and probably reflects the limited fauna of these turbid impoundments. Samples from other seasons of the year might produce a greater variety of prey species. Vertebrate animals form a regular part of bullfrog diet, and there is an extensive literature of reports of vertebrates of all classes found in bullfrog stomachs (summarized by Korschgen and Moyle, 1955). *Natrix taxispilota* is an abundant snake around Reding's ponds, and would be readily available as prey. Box turtles are not commonly found in these ponds, but may enter the water on extremely hot, dry days. The anurans found in the stomachs of the Reding's pond bullfrogs are terrestrial species, and were probably captured from breeding aggregations.

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