

FOOD HABITS OF KANSAS LIZARDS AND BATRACHIANS.

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SINCE a large proportion of the residents of Kansas depend directly upon the products of the soil, any animals which help to preserve these products should be of general interest.

It is recognized that birds and animals which prey upon rodents are of great economic importance. Some of our birds give great assistance to the farmer in the destruction of vast numbers of insects. There are other animals which offer a large factor in this destruction of insects—the reptiles and batrachians. Among the reptiles, the snakes do a great deal of good by feeding on obnoxious rodents and some harm in the robbing of bird nests. The turtle lives upon animal matter, a small part of which consists of live insects; the gopher-turtle eats some vegetable matter. The lizards, of all reptiles, are strictly insectivorous, with a very few exceptions. Neither as loathsome as the snakes, nor as lazy, they are looked upon by most people as harmless. There are some people, however, who fear them as they would a poisonous serpent. One need not be alarmed at sight of any of the Kansas species, for they are all harmless. They are, moreover, very useful. The writer has collected data concerning a few of the more common species.

Holbrookia maculata, a squat, stubby-headed, little fellow, common in sandy regions, especially in the sand-hills sparsely covered with vegetation, lives upon grasshoppers and small beetles. The stomachs of three specimens collected in Graham county contained small beetles and a grasshopper nymph. Sixty of these little fellows were kept in captivity for a few months. They thrived on grasshopper nymphs. Grasshoppers which showed no signs of life when put into the lizard cage were never touched. But as soon as a grasshopper would move one of the lizards would creep quietly up to within an inch or two, turn his head quizzically then suddenly grab the unsuspecting victim and jerk his head from side to side in swallowing it.

There is a brown, medium-sized, sharp-scaled lizard (*Sceloporus undulatus*) that abounds in sandy regions which are covered with cactus, weeds, or scraggy brush. It is found especially along the banks of streams. The examination of five individuals showed that they had eaten grasshoppers (mostly nymphs), ground-beetles, and

leaf-hoppers. These lizards are often found climbing weeds or brush. One of this species was observed clinging to an old sunflower stalk three feet from the ground. In color the lizard mimicked the weed so perfectly that it would escape ordinary notice. It was, no doubt, lurking there for the purpose of catching insects.

The Horned toad (*Phrynosoma cornutum*) examined had eaten a great number of small beetles. This species is not as common in Kansas as it was formerly.

The Glass snake (*Ophisaurus ventralis*), on account of its size, eats as much as some of our snakes. A specimen collected at Lawrence contained three large grasshoppers, one cricket, and one large caterpillar.

The Long-tailed swift (*Cnemidophorus sexlineatus*) can run with such speed that no insect can escape it, except by flight. Even the wary tiger-beetle does not escape. This lizard is very long and slender and runs as quick as a flash. It abounds in grassy, sandy regions. It lives upon grasshoppers, cockroaches, tiger-beetles, and other beetles.

Eumeces obsoletus, the common scink, a large, powerful, smooth-scaled lizard, will tackle animals as large as itself. One of these, kept in captivity with some snakes, attempted to kill a Spreading adder by seizing it by the neck and shaking it. The adder was a foot long. The two were separated after the process had gone on for a time. This specimen was put in a cage with a young Collared lizard (*Crotaphytus collaris*) about three inches long. In a few days the cage was opened and nothing but a few mutilated bones of the smaller lizard were to be found. The scinc had evidently devoured the little fellow and ejected the bones. This species is found under rocks on rocky hillsides. The stomach examined contained large grasshoppers and crickets. One specimen, in addition to this menu, had eaten a large ground-spider.

Eumeces guttulatus, the Blue-tailed scink, in form very much as the above but hardly more than three inches long and of a bluish-black color; hides under rocks. A pretty little fellow, not so repulsive as his close relative, *obsoletus*, he darts among the rocks with such agility that he is caught with great difficulty. The stomach of a single specimen contained a fly, a spider, two leaf-hoppers, and a cricket. Two specimens kept in captivity ate flies and grasshoppers with avidity. Five specimens of *Sceloporus undulatus* were placed in the same cage with them. Three of these were young, varying in size from three-fourths of an inch to an inch and one-half in length. In a few days no trace of the young

ones could be found. A little later one of the old ones was observed to be crawling about merely by the use of his front legs, his hind legs apparently useless from some injury. A few days later a Blue-tailed scink was caught in the act of shaking a *Sceloporus* by the back of the neck. The *Sceloporus* was fully as large as the scink. On examining his hind legs they were found to have been chewed and the bones broken. This shows how aggressive and warlike these little scinks are.

So we find that lizards live upon grasshoppers, crickets, and beetles, all harmful insects, with a possible exception of a few of the beetles.

Among the batrachians we find a greater range of diet, but on the whole it consists of insects.

Amblystoma tigrinum or Mud puppy, the common salamander, is found in ponds, and naturally lives on water insects, although occasional land forms are eaten. Of three larvæ, the stomachs contained, respectively, four, seven and two water-boatmen; in an adult form one ground-beetle was found. In another the stomach was distended with mud.

To the common toad (*Bufo lentiginosus americanus*) we owe a great deal for its vast destruction of insects. They begin their useful work as soon as they leave the tadpole stage, and have no choice in the kind of insects or vermin they eat. They are, in addition, great gormands. Toads eat mostly at night or in the twilight. Street lights are their favorite rendezvous. Great numbers often congregate in these places. In Kansas City fifty toads were counted under one light at one time. They will run in numbers from two to as many dozen under a single light. The young ones are to be found in swampy places or near ponds. Three young specimens collected in Graham county, about three-fourths of an inch in length, contained as follows: Twelve ants and twelve small beetles, twenty-eight ants and three small beetles, twenty ants and one beetle. A specimen seven-sixteenths of an inch long contained nine snapping-beetles. A specimen one and four-tenths inches long contained four medium-sized ground-beetles. Two adults had eaten as follows: The first, one large *Scolopendra*, four snout-beetles, one moth, and one ground-beetle; the second, ten May-beetles, three snout-beetles, and two ground-beetles. Spiders and phasmids have also been found in the stomach of this species.

A number of toads were collected from three lights at Kansas City at nine o'clock P. M. on June 9. The toads had not been away from their retreats more than an hour or two. From among this

number eleven were taken at random, and the contents of their stomachs examined. The following kinds of insects were found: Cincindelidæ, ground-beetles, crickets, snapping-beetles, leaf-hoppers, ants, *Belostoma*, *Lachnosterna*, grasshoppers, tumblebugs, Lampyridæ, and carrion beetles. The specimen that had had the largest meal contained sixty beetles, three leaf-hoppers, and three ants. No telling how much would have been eaten in a few more hours.

Bufo cognatus, a smaller species, colored with a brighter pattern, and having diverging occipital crests, has practically the same food habits. The specimens examined contained snout-beetles and dung-beetles.

Among the tailless batrachians one of the most interesting is the little cricket-frog, *Acris gryllus*. They abound in swamp streams and roadside pools. They are of a dark color, and many of them are marked on the back by a rusty-red triangle. Out of seven specimens examined from different parts of the state, the following were taken: Ants, a caterpillar, lady-bugs, snapping-beetles, a spider, one small crayfish, and small beetles unidentified. For their size, they eat a fair quantity of insects, and, on account of their number, in some localities, they help considerably in insect destruction. Several specimens of *Hyla versicolor*, the common tree-frog, failed to show any evidence of a meal. A specimen collected by Mr. Crevecoeur at Onaga contained one small cricket. It may be that some of these specimens had not had a chance to eat, because they were collected in the spring, before insects were very active. These small frogs live amongst vegetation, and undoubtedly do some good.

Belonging to the family Hylidæ is another rather common frog, the Striped bush-frog, *Chorophilus triseriatus*, seldom seen in the summer, but common about pools of water in the spawning season. This is a small frog, about the size of a cricket-frog, and has three prominent stripes running down the back. Four very young specimens had eaten, as shown by their stomach contents, algæ and ants. Out of four adults collected in the spawning season, two had eaten nothing, while the other two had eaten a spider apiece. These frogs during the summer probably live upon the same kind of food as their kin, the *Hyla*, because they live in the same habitats.

The large Green bullfrog (*Rana catesbiana*) is quite an eater at times. From the stomach of one of these a full-grown sparrow was taken. Young specimens of these species contained remains of water-beetles and ground-beetles. A single specimen of *Rana*

areolata circulosa, collected on the Wakarusa bottoms near Lawrence, contained two good-sized crayfish. These bottoms afford a place for a good many crayfish to dig their burrows. Evidently this frog had been living at their expense. When caught he had taken refuge in a crayfish hole. The markings are very striking, and distinguish it easily from the common spotted frog. It is covered with large, black, circular blotches. It seems to be quite rare in Kansas.

The commonest of all frogs, *Rana virescens brachycephala*, is probably very useful as an insect destroyer. However it does not equal the common toad. The stomachs of this species which were examined yielded the following miscellaneous food materials: Beetles, grasshoppers, crickets, a worm, water-snails, myriapods, and one solpugid. Both the young and adults were examined. In quantity of material they fall far below the toad. The tadpoles of both toads and frogs live upon vegetable matter.

Among the lizards and batrachians the toad stands far above any other member in the number and quantity of insects destroyed. On the other hand, taking the groups as a whole, the batrachians are outclassed by the lizards as insect destroyers. Vast numbers are destroyed by them every summer. One cannot really estimate the value of these small animals.