

**XII. ECOLOGICAL SUCCESSION IN THE ARBUCKLE REGION\***

**Mrs. Audrey F. Shultz**

For a period of three days during the latter part of October in 1914, Dr. Allee and his Ecology class (of which I was a member) studied the animal life of certain portions of the Arbuckle Mountains. The observations on which this study is based were made during that time. We camped on Fall Creek about four miles from Rayford Switch. As we collected specimens during the day we put them in alcohol. As we collected specimens during vial in our notebooks together with the exact location in which we found the specimen. Then at night we identified those that we did not already know.

During this trip we studied the following:—

- I. The animal communities concerned in land succession.
- II. Those concerned in stream succession.

We sub-divided the land succession into four divisions; rocky plains, prairie or scanty forest, wooded hillside, and thick forest flood plain. We chose characteristic locations in each of these for study.

For the rocky plains study we chose the xerophytic Arbuckle steppe limestone association found about two miles northwest of camp. All over the surface were crooked rows of projecting limestone with the ground between these sparsely covered with tufts of grass, broomweed, and scattered sumac. The Capsid, *Lygus pratensis*, is the most characteristic and abundant.

In the study of the prairie or scanty forest we chose a limestone hill about a quarter of a mile northeast of camp. Large round weatherbeaten rocks were scattered on the surface with small trees and grass growing among them. Here were found beetles, cockroaches, millipeds and *Polygyra* shells.

A steep rock tree covered hillside just north of camp was chosen for our wooded hillside study. Small oak trees predominated. On the forest floor we found different kinds of animal life similar to that found on the floor of the Arbuckle limestone with the Arachnida predominating. In the trees we found numerous flies, beetles, wasps, spiders, centipeds, millipeds, camel crickets, and some snails. The most characteristic animals of the tree stages were carpenter ants and termites.

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We used the Washita flood plain for our thick forest flood plain study, where sycamores, cottonwoods, and willows predominate. Beetles were the characteristic order found. This was because the trees were of softer wood than on the hillside, and were therefore easier to bore in. There was more moisture and so fewer termites.

Summarizing the land succession we found the rocky plains to have very little animal life compared with the other stages studied. The prairie or scanty forest had a mixed animal population. Ants were characteristic of the wooded hillside while beetles were of the forest flood plain. We found a gradual increase in the number of species and their abundance as we went from the first to the last stages of our study, animal life on the forest flood plain being very prolific.

In our study of stream development we found representative stages in Honey Creek, Fall Creek, and the Washita River. We studied dry bottoms, shallow and deep pools, and running water.

Dry bottoms were studied in both Honey and Fall Creeks. We found numerous cockroaches, sow bugs, daddy long-legs, tumble bugs, ground spiders, millipeds, grouse locusts, and a few grasshoppers, capsids and muscid flies.

In the shallow muddy bottom pools of Honey Creek were a few Physa, several leopard and pickerel frogs, and numerous Hydrophilids, Dytiscids, and Hydrobatids. Most characteristic and abundant were the dragon, damsel and mayfly nymphs. In the deep sandy bottom pools of Fall Creek just above the rock dyke crayfish were numerous but no fish. This was because of the difficulty they would have in getting upstream over the rock dyke.

Life was very abundant in the slow running water of Fall Creek because there was more food and better breeding places. Johnny darter fish were numerous. In the ripples of the Washita we found the dobson fly larvae to be more numerous than anywhere else. The stone fly larvae were also numerous. In the rapids of Fall Creek Hydropsyche were by far the most abundant. Here at the top of each of these little series of rapids was a solid network of Hydropsyche nets. The rocks at the top of the falls were black with Simulium, the black fly larvae. Corydalis was numerous here, probably feeding on the fly larvae.

Summarizing the stream succession we found the animal life on the dry bottoms to be similar to the floor of the wooded

flood plain. In almost all water stages we found at least a few Hydrophilids, Hydrobatids, Dytiscids, and dragon, damsel, and mayfly nymphs. The dragon, damsel, and mayfly nymphs were more characteristic and abundant in the shallow pools, while crayfish were characteristic of the deep pools. The running water had fish, Hydropsyche, Simulium, Stone fly larvae and Corydalis or dobson fly larvae, as its most characteristic form of animal life.

In both land and stream development, we found that ecological succession depended upon the physiographic conditions present. Since this work was all done in the fall we had no opportunity to study seasonal succession.