THE ECOLOGICAL AND GEOGRAPHIC DISTRIBUTION OF
THE THYSANOPTERA OF THE GEENTON

By Geenton, we mean the material on the surface of the earth but not intimately incorporated into the soil. Such material as the leaves on the forest floor, lichens and mosses, dead grass and weeds, Spanish moss and other epiphytes and fungi, rotting wood and other material which has a relation to the soil similar to that of plankton to water. It has not been as much worked by students of thysanoptera as its importance justifies. The reason for this will appear when we take up the subject of geographical distribution of this fauna. In making the collections referred to here, Berlese funnels have been used. These are large funnels at least a foot across; made of tin, kept bright and polished, but with a wire screen inside on which is placed the material to be investigated. As this material dries the insects follow their natural positive geotropic reaction, which leads them to fall into the bottom of the funnel under which is placed a dish containing alcohol. The writer has found that the use of this funnel opens up a new world in the study of thysanoptera; a very rich fauna but a variable one, depending upon the material collected and the ecological situations in which it is collected. These thrips are probably all fungus feeders. Very few occur in the top layer of the leaves on the forest floor, the large Elaphrothrips flavipes Hood being most common. Under this top—more or less dry—layer is a layer of leaves which are being actively attacked by a large variety of fungi. It is in this layer that the vast majority of the thysanoptera are found. Underneath this is a layer composed of the residue of leaves which have been thoroughly broken down by the fungi. This is the “duff” layer and contains practically no thysanoptera. These thysanoptera are more abundant in leaves on the floor of our “climax forest” containing many broad-leaved evergreens such as magnolia, bay, holly, live-oak, and laurel-oak, with a liberal mixture of deciduous trees; basket-oak, sweet-gum, hop horn-beam and water beach. Leaves in these situations are the richest in species, from 30 to 40 species being common per square yard. In hammocks where the live-oak is almost the only tree found, there are usually more individuals of thysanoptera but it is not as rich in species. From this climax formation the number and variety of thysanoptera rapidly diminishes toward both the wetter and
the drier situations. Although the magnolia is a prominent member of this association the magnolia leaves themselves are not particularly rich in thysanoptera. The decaying deciduous leaves are more important as a source of food for the thrips which are mostly of the sub-order tubilifera, that is, thysanoptera that do not possess a sharp, saw-like ovipositor for piercing plant tissue but have the abdomen ending in a tube. In the more moist hammocks, such as the flood plains of streams or margins of swamps, where red maples, myrtles, willows, and sour gums are the dominant trees, there is but one genus of thrips that is at all abundant, Adraenothrips. It is evident that the material in these situations is too moist to support a rich and varied thysanopterous fauna. In somewhat drier situations where the box elder and the hackberries are the dominant trees, such as at Buzzard’s Roost, Adraenothrips decora is still the dominant form but other genera begin to appear, especially Hoplothrips, the most common of which in this situation is H. anomocerus Hood. In drier situations, but still moist, where the water beach, Carpinus is the dominant tree, a considerable richer fauna is found although the Adraenothrips is still the dominant form. A square yard of this material will yield up to 250 individuals, of which the vast majority are the Adraenothrips but in a typical location bordering Lake Alice, eight other species are found.

In a typical low hammock where oaks and sweet gum are the dominant trees, from 100 to 200 thrips will be found per square yard. There are about eight species of which the dominant one is Hoplothrips pergandei Hood. In the hammock in the bottom of Goldhead where Gordonia is a common species of tree, one collection consisted 80% of Eurythrips batesi (Watson). Hoplothrips pergandei was also present. In a collection of leaves underneath magnolias and red cedars and both the cabbage and saw palmetto (at Jenia) there were no Adraenothrips. The dominant species was Hoplothrips anomocerus with Trachythrips watsoni Hood as the second most abundant. In the dense climax forest where, as previously stated, the most species occur, a square yard of material will usually contain between 30 to 40 species. Hoplothrips pergandei is most abundant in Devil’s Mill-hopper and in a hammock at Astatula, but other collections at the Mill-hopper showed Hoplothrips anomocerus Hood as most abundant. In “Sugarfoot hammock” the most common species in this situation is Eurythrips batesi. It is the only species
present in one collection from Gulf Hammock. The closely related *Eurythrips reticulatus* was also common in the Hopper. *Allothrips flavus* was also common. Around the margin of the “Green Sink” on the Horticultural grounds of the Experiment Station, 81% were *Allothrips nubilicauda* Hood.

Going towards the drier associations, the red oak-hickory forest, *Hoplothrips pergandei* is usually the most common form, closely followed by *Eurythrips batesi*. In the dead leaves under laurel oaks six species are common, *Hoplothrips pergandei* being still dominant as it is in the next drier situation, in the turkey oak-pine woods. A square yard from this latter situation will average about 17 thysanoptera of four species. In collections where the needles of long-leaf pine were dominant, *Eurythrips batesi* was the most abundant species. Where mixed with gallberries, as in Goldhead State Park where 150 thrips per square yard was the average, the dominant thrips was *Hoplothrips pergandei*. Collections from under scrub pine yielded 64 per square yard with the common species *Eurythrips reticulata*. Ground fire running through this pine forest destroyed practically the entire thysanopterous fauna.

The woody fungi of the genera *Polypterus, Pleurotus, Polyporus, Polysticus, Ozonium, Lentinus* and *Aedalia* yielded on the average about six species, the common and perhaps the most consistent genus was *Mesothrips*, which was also very common in rotting sticks. Indian pipe blossoms on the forest floor yielded six species.

**Seasonal Variation:** Thrips in Geenton material become more abundant during the dry spring season, in early June. With the coming of the heavy rains of summer they decrease in numbers, reaching a low point in late August or early September. This, in connection with the fact that comparatively few thrips are found in a moist situation, practically none in areas ever flooded, shows that this fauna is particularly sensitive to excessive moisture.

**Geographical Distribution**

The geographical distribution of this fauna is very interesting. It reaches its climax in the southeastern states, rapidly diminishes if one goes west, and especially north. Collections from the Cherokee National Forest in northern Georgia produced 150 per square yard of six species. Collections from Petersburg, Virginia, 100 per square yard, also with six species.
Collections from southern New York produced very few but among them was *Trachythrips watsoni* Hood. Particularly interesting is the situation in the Great Smoky Mountain National Park. From the western slope of the main range—the Tennessee side—numerous collections produced not a single thysanopteron (again showing the sensitiveness of this fauna to excessive moisture), but a parallel, but much lower, range just west of the town of Gatlinburg was moderately rich in this fauna, as were several locations near Laurel Falls in the Park. Going west, a collection of oak leaves from 125 miles northeast of San Antonio, Texas, produced 70 per square yard of seven species, of which *Trychothrips pergandi* was the dominant one, again showing as in the case of the live oak hammock that this species is able to survive in relatively dry situations. A collection of oak leaves taken near Jonesboro, Arkansas, in late August produced but one species, *Hoplothrips angusticeps* Hood. A collection from the banks of the Missouri River at Omaha, Nebraska, also in late August produced but a single individual. A collection of leaves under the Piñon on the brink of the Grand Canyon in Arizona produced one species, an undescribed one. The redwood forest of California produced none, as did also collections of leaves from the Sandia mountains of New Mexico. These two failures, however, may have been due to the drying of the material before it could be placed in the funnels.

The data given here is the result of some hundreds of collections taken over a period of 15 years.

—J. R. Watson

**Effects of the Reflected Solar Radiation on Insects**

Orazio Querci and Lycaena Romei

(Continued from Vol. XXVIII, p. 21)

The intensity of the rays depends upon that of the rays reaching the ground from the sun, and varies in accordance with the geological nature, color and temperature of the reflecting surface. It depends also upon the difference of temperature between the air and ground. Both humidity and living vegetation absorb the radiations, attenuating their effects. The winds, when they are cold, have the single effect of reducing the temperature of the soil.