

## MYRMECOLOGICAL TECHNIQUE

### II. IN COLLECTING ANTS, THE USE OF THE COLEOPTERIST, THE HEMIPTERIST AND THE ECONOMIC ENTOMOLOGIST WITH HIS LIGHT OR BAIT TRAP.<sup>1</sup>

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The writer has been much impressed with the quality of ants as regards new and rare species brought to him by friends who collect ants in unusual ways. The average collector of ants looks down on the ground. In many groups such as the *Formica rufa* group and the *sanguinea* group rare species will nest in the same area as that occupied by very abundant species but a collector cannot afford to sample all nests so too frequently he misses the occasional nest of a rare species which is sandwiched in with abundant nests of some similar-appearing common species. Unfortunately for the ground-examining collector, the ants least often captured are those which range over the foliage of trees and large bushes—a regularly neglected collecting area. The arboreal stratum is above the ground and too frequently requires skilled climbing for a thorough examination. Coleopterists and Homopterists find many of their rare things up trees and on bushes and have various means of collecting them—means which are not used commonly by ant collectors.

1. *Coleopterists*.—Common equipment with the Coleopterists is a canvas umbrella which can be opened in an inverted position under a bush or the limbs of a tree and then the bush or the limb jarred with a short club whereupon insects running on the foliage fall into the inverted *umbrella*. *Any ants* will usually be found to be all of one species or a mixture of seldom more than three. These, of course, are arboreal ants which are hunting Homoptera for honey dew. The difficulty with this method of collecting is that the Myrmecologist gets no idea of the nest, its location, or of other castes than the field worker ants. Too frequently the traveling ants are widely dispersed so that the collector gets but a few specimens of a species. We have been particularly impressed with the high quality of bush and tree ants collected in this manner by Professor and Mrs. Josef Knull.

2. *Homopterists*.—Common equipment with the Homopterist is a heavy-bagged beating net, a light weight tightly covered tin can of about one quart capacity which is charged with potassium or sodium cyanide and pill boxes to carry specimens to the lab.

The insects are swept up from bushes, low trees, weeds, grasses, etc. These are shaken into the bottom of the net and the net bag is then stuffed into the cyanide can, or the contents of the net are themselves shaken into the can when the lid is clapped on until death of the catch. Very enthusiastic homopterists may carry two such cans hung at their belt. Such collectors can be heard a long ways off as the cans bang against each other. A lighter net may be used for sweeping herbage.

This method of collecting is of only moderate interest for the ants swept up, as these are mostly ground species which can be collected directly from nests by the myrmecologist where notes on the nest may be collected also. It is not recommended for ants although a myrmecologist can learn much concerning the association of ants with certain species of the honey dew secreting Homoptera.

The Homopterist interested in aphids which are nearly always attended by ants usually collects these very slow moving insects with a pair of tweezers and stores

<sup>1</sup>I. The use of ether in collecting ants. Ohio Jour. Sci. XLVI (1): 10-12. 1946.

them in one dram vials of seventy per cent alcohol. Such collectors when interested in the association of aphid and ant bring in enough ants of one species to interest the ant student because the latter has to have a series of worker ants as a minimum for identification. Seldom are two or more species of ants associated with one close group of aphids. Ant property rights enter in. For first exploration in a new area such collections have considerable value as most ants can be identified from a fair series of a dozen workers. We have had such series from the inter-mountain area of Utah, Idaho and western Colorado, collected by George Knowlton, Clyde F. Smith and other western students of aphids. Unfortunately the area mentioned is of "island distribution" where an ant species with mountain and valley barriers may show many subspecies which are difficult to determine from workers only. Characters of male, queen and nest are lacking. We do recommend the next:

3. *The Hemipterist with cyanide dust (Cyanogas) and ground cloth.*—Cyanide dust used in a small hand dusting gun to blow a cloud into bushes and small trees 12-18 feet high brings down as miscellaneous a lot of insects as any collector might desire. With a large sheet or two spread on the ground to catch the dead and the stunned insects the collector has ample time to select specimens of the groups in which he is interested. This is one of the most satisfactory methods of which we know for collecting in the tops of small trees. It is not a rush operation. Few victims attempt to escape and have to be collected in a second stage of the process as is necessary in using a beating net or a club and umbrella. Doctor E. P. Breakey while a student at O. S. U. brought us several species of rare ants taken thus while collecting Hemiptera. He preferred the use of cyanide dust to any other method of collecting.

As ants are in general ground nesting insects the myrmecologist hesitates to carry the extra equipment necessary. His interest is focused more than 90 per cent on the ground. Further, only a few ants are tree ants. However such as nest in the ground and from the ground hunt for honey dew producing Homoptera on the foliage of bushes and trees usually hunt within range of a dust gun. In the north Homoptera are usually distributed up to 15 or 20 feet on aspens which trees are more or less deserted by them when the trees have developed above this height. In the south the large, very vigorous Alleghany mound building ant *Formica rufa exsectoides* collects honey dew from the stinking scale of yellow poplar (*Lyriondendron*) on trees fifty or more feet high, while certain species of *Camponotus* on oak appear never to contact the ground. Such species are so high other means of collecting have to be used. An agile young assistant with a saw and a rope to let down all dead limbs is very effective. A dust gun for such trees and such ant species to sample the ants on lower limbs before climbing might be useful. We have not tried such sampling.

The dust gun with 10% DDT or better yet 10% benzene hexachloride should be tried out. The latter has been recommended to the author for general bush collecting where a sheet can be spread on the ground. We have not seen it tried. The latter two dusts can be used freely with little danger to the operator but cyanide dust *must* be used down the wind. With the latter the collector could get a dose that would give him a thumping headache which might carry over into eternity.

Dusting for ants has two limitations. From Tennessee to northern Ohio it is effective probably because of the many species of shrubs and trees. Some valleys in eastern Tennessee have a hundred or more species of trees. These are fed on by equally numerous species of Homoptera. It is ant territory. On the Canadian border species of shrubs and trees are less numerous and in larger areas of pure stands. Many more are conifers and for some reason ants are not numerous in species on conifers. Perhaps the latter do not carry many Homoptera. The resins and oils of conifers may be unpleasant to Homoptera or ants or to both. A possibility is that the more primitive genera of Homoptera usually associated with conifers do not produce as much honey dew as the more highly evolved Homoptera

on broadleaved trees. The digestive systems of the higher aphids and scales are much more complex and are apparently evolved to a stage where they can use a larger and faster flow of sap. Dusting for ants appears to be hardly worth while in coniferous areas in the north. However the natives of eastern Tennessee say that the earliest bee honey crop of the spring comes from the "little bugs on the pine trees". Our bee experts, Professor W. E. Dunham and R. R. Reese, confirm this. Aphid honey dew is very local, more often found in the Allegheny Mountains, but is a nuisance dark honey about the large Green Lawn Cemetery of Columbus, Ohio, which is a great area of lovely and cherished conifers. Bee-keepers near the cemetery have had to abandon bee-keeping or move their hives to a greater distance.

The second limitation is the fact that this type of collecting catches only field workers, and of these usually exclusively one caste of a species, minors or majors. The character of males and queens and the structure of the nest are not found. For three summers we collected a minute dark *rufa* working on low bushes, milkweed and other herbaceous flora, one we supposed was an undescribed *microgyna* and could not find a nest. Eventually we found its nest which on being opened proved to be the large *Formica rufa clivia* Creighton. We had been collecting the minors all the time in nests of the majors but had been identifying the nests by the large red majors and ignoring the minors which operated by themselves on honey dew in pure groups of the minor caste. Enough has been said to indicate the basic necessity of collecting ants in long series from known ants. Otherwise ant taxonomy develops headaches. However dusting for ants in trees does uncover species which appear seldom to contact the ground and should not be overlooked. Such collecting can be operated with the least over-all expense of time by a Hemipterist or other friend who by necessity does collect some type of tree insect. Ant faunas are at present so little known especially in areas unexplored for ants that the myrmecologist spends his time most profitably on ground and tree trunk forms.

4. *The Economic Entomologist and his light trap and bait.*—In Ohio we have added a genus and at least two species to the Ohio list from queens taken in light traps. Certain species of the *curvispinosus* group of *Leptothorax* have mating flights at night, when thousands of them will fly to a lighted sheet. In Ohio work was done with permanent light traps with a funnel and collecting bottle where ants were mixed with beetles and other trapped insects. We have forms of this group of *Leptothorax* and an undetermined species of *Colobopsis*, rare this far north, taken in such light traps by Doctor C. R. Neiswander of the Wooster Experiment Station who was scouting the state for pests. Unfortunately the weak males fly less often to light. The catches are almost one hundred per cent queens.

The use of collectors interested in bush and tree insects is obtained as a favor. No collector can collect effectively for any length of time outside of his own group. He overlooks his own group. According to authorities on human behavior, a favor freely given and accepted calls for an equal favor in return. The writer saves all beetles for the Coleopterist. These can be preserved in one drahm vials of 70 per cent alcohol along with the ants, sorted out later and presented with proper gracious words and gestures. Such a tie-up between two collectors is well worth while and becomes increasingly profitable to each.

For the collector of Hemiptera for some reason the tie-up is less effective. The ant collector too often brings back widely spread common species.