

THE ANTS OF ASHTABULA COUNTY, OHIO (HYMENOPTERA, FORMICIDAE)

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This list of ants collected in Ashtabula county and vicinity was compiled with two purposes in mind. First, to give some aid in determining the number of species of ants found in Ohio. Second, to record any interesting observations on ant behavior and ecological factors determining their distribution.

Collections were made for the most part during the spring, summer and late fall of 1938. A few collections were made during the fall months of 1937 and the spring of 1939. A record of each nest was made as to its location, habitat, general structure and environment, the date taken and interesting occurrences in the nest. The types of ants collected; whether they were workers, winged forms, queens, pupae, etc., were noted. The ants collected were placed in one dram vials with seventy per cent alcohol acting as a preservative.

DESCRIPTION OF THE REGION

The collecting area has been separated into three regions that seem to be distinct as to soil features and general topography. First, a lake plain strip about five miles in width south of the present shore of Lake Erie. Two parallel sand ridges mark the ancient beach lines at former lake levels—North Ridge and South Ridge. The soil of this region is mostly sand, with some gravel and sandy loam. Second, the gulf and ravines of the Grand River along the western side of the county; also a small part of Geauga county bordering Ashtabula on the west. This second region is all well drained and has a clay soil. The third area is south of the lake plain region, where the land is poorly drained and the topography is flat, rolling ground. This section has an impervious shale base with heavy clays from the glacial drift. (Read, '73).

The forests in these areas differ. In the lake plain region the forests east of Ashtabula city contain considerable hemlock with Beech-Sugar Maple-Tulip subtype occurring. (Hicks, '34). Toward the western side of the lake plain section are found Beech-Maple forests with scatterings of white elm, oaks, common locusts and hemlock.

The better drained section along the ravines of the Grand River is an Oak-Hickory association with scatterings of sugar maple, beech, white ash, tulip, hop hornbeam, wild cherry, and trembling aspen. Hemlock is found along the sides and bottoms of the ravines. The forests of the Geauga area are Oak-Hickory with sugar maple, beech, white ash, and white elm.

In the poorly drained section south of the lake plain region are found sugar maple, beech, white elm, walnut, tulip swamp white oak, some linden and trembling aspen.

ECOLOGICAL FACTORS

Dr. Shelford states: "Since the environment is a complex of many factors, every animal, while in its normal environmental complex, lives surrounded by and responds to a complex of factors in its normal activity." (Shelford, '13). Thus it is

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impossible to study any group of organisms without taking into consideration their environmental surroundings.

Certain species of ants establish their nests where the sun can shine directly on them. Such species as *F. pallide-fulva* varieties, *F. fusca* var. *subsericea*, *F. sanguinea* varieties, *Lasius niger* var. *neoniger*, *F. exsectoides* and *Crematogaster lineolata* are found in fields and the borders of woods or open sunny places in woods.

Other ants are constantly associated with woods. In this region there can be distinguished no ants limited to a particular type of forest, the same species being found in oak-hickory or beech-maple climax woods. There are fewer ants not only in numbers but also species in a predominately hemlock area due possible to the covering of the ground with hemlock needles.

For log inhabiting ants the amount of deterioration of the logs determines what species are established in them. *Ponora coarctata pennsylvanica*, *Proceratium silaceum*, *Stigmatomma pallipes*, *Lasius claviger*, *Lasius umbratus*, *mixtus* var. *aphidicola*, and *Camponotus herculeanus ferrugineus* are found in logs rotted inside to a substance that can be dug out with the hand. This material is damp and fine enough so that the actual nest and galleries are often destroyed before the ants are seen. It is noted that ants do not occur in beech logs with stringy fibers. Wood inhabiting ants are seldom if ever found in logs that are moldy throughout.

The following species: *Camponotus herculeanus pennsylvanicus*, *Aphaenogaster tennesseensis* and *Creamtogaster lineolata* require solid logs or tree trunks with less moisture.

Small ants such as the *Leptothorax* genus are found in the cracks and crevices of the bark of solid logs. *Leptothorax acervorum* subs. *canadensis* spread their nests over two or three feet of solid maple bark located in sunny openings of the woods. The species *Leptothorax fortinodis* also nest in fallen maple trees with firm bark found in sunny places in woods; but restrict their nests to small areas two or three inches in diameter.

The mound building ants, *F. exsectoides*, nest principally in clay soils. These ants were plentiful south of the lake plain in clay, but only three nests were collected in sandy regions. These nests in the sandy areas were low flat mounds, while in the clay soils the nests grew quite large and cone shaped. The *F. fusca* var. *subsericea* mounds were plentiful in clay, being larger and more substantial than those of sandy regions.

Slave making species of the *F. sanguinea* group can live only in the vicinity of their slaves, which in this region are *F. fusca* var. *subsericea*. Similarly *Harpagoxenus americanus* is found only where *Leptothorax longispinosus* or *curvispinosus* are abundant.

The great adaptability of ants to food conditions makes it difficult to say that certain types of ground flora are required.

Geographically speaking the area seems to be too far east for *Formica ulkei* and it has not been collected. Just what the limiting factors are can not be stated. *Leptothorax acervorum* supsp. *canadensis*, a northern ant, seems to reach its southern limit in this region having been collected along the lake plain area.

FAMILY FORMICIDAE

Subfamily PONERINAE

Genus *Stigmatomma* Roger

Stigmatomma pallipes (Haldeman).

Typhlopone pallipes Haldeman. 1844. Proc. Acad. Nat. Sc. Phila. 2: 54. Worker.

Three workers were collected. Two were found under rocks in damp clay soil located in Beech-Maple woods. The rocks extended from three to five inches under the surface of the ground where it was always dark and damp. A third worker was found in a wet maple log whose

rotted material could be combed through the fingers. This ant is a rare and primitive species which is subterranean in its habits.²

Genus *Proceratium* Roger

Proceratium silaceum Roger.

Proceratium silaceum, Roger. 1863. Die neu aufgeführten Gattungen und Arten meines Formiciden-Verzeichnisses. Berl. Ent. Zeitschr. 7: 131-172. Worker.

This primitive ant is as rare as the preceding species, one worker only having been taken. The specimen was found wandering along a large white oak log that had rotted inside to a very damp punk. The log lay in a moist Beech-Maple woods. Locality, Thompson, (Geauga Co.).

Genus *Ponera* Latreille

Ponera coarctata Latr. subsp. *pennsylvanica* Buckley.

Ponera pennsylvanica Buckley. 1866. Descriptions of new species of North American Formicidae. Proc. Ent. Soc. Philad. 6: 171. Worker.

A much more abundant species than the two previously described. Nests were found in rotting stumps or logs, under stones, and in acorns lying in moist places. Workers, larvae, pupae, winged forms and nest queens have been taken. Males and females were collected from the fifteenth of August to the eighth of October.

All the nests were small, some with irregular and apparently unfinished galleries. This ant moves slowly and does not rush out in the face of danger to retrieve the brood as would one of the *F. pallide-fulva* group. (Wheeler, '10, Ants, p. 238).

Subfamily MYRMICINAE

Genus *Myrmecina* Curtis

Myrmecina graminicola subsp. *americana* Emery.

Myrmecina latreillei subsp. *americana* Emery. 1895. Beiträge zur Kenntniss der nordamerikanischen Ameisen fauna. Zool. Jahrb. Syst. 8: 271. Worker.

One nest of this rare ant was collected from an acorn in a dense camp Beech-Maple climax forest. The ground had no vegetation other than moss. From this nest workers, pupae, one male and nest queen were taken.

Genus *Monomorium* Mayr

Monomorium Pharaonis (Linne).

Formica pharaonis Linne. 1758. Syst. Nat. Ed. 10: 580.

This tiny yellow ant has been transported all over the world by means of ships. Workers were taken from an apartment house in Cleveland, Ohio. They were found from basement to top floor raiding kitchens and bath rooms. Two lines would be formed, ingoing and outgoing, traveling in single file. They would be found in the butter, meats (bacon particularly), soaps, cold creams, etc.

It was wrongly thought by Linnaeus that the Egyptians were plagued by ants as well as other insects during Biblical times. Thus he gave them the name "Pharoah's Ants." They are believed to have originated in India.

Genus *Solenopsis* Westwood

Solenopsis molesta (Say).

Myrmica molesta Say. 1836. Descriptions of new species of North American Hymenoptera and observations on some already described. Bost. Journ. Nat. Hist. 1: 293. Worker.

Nests are found in open grassy places, under logs, stones or bark of trees. The species frequently nests with other ants such as the *Formica fusca* group, the *F. pallide-fulva* group, *Tapinoma sessile*, *F. exsectoides*, *Myrmicas* or *Aphaenogasters* that are in mounds or in the ground.

²Unless otherwise stated each ant mentioned in this paper has been collected in Ashtabula County.

Living up to its name, the thief ant, it can be very annoying in the kitchen at times. Males and females were found from the fifteenth of July through August.

Genus *Crematogaster* Lund

Crematogaster lineolata (Say).

Myrmica lineolata Say. 1836. Descriptions of new species of North American Hymenoptera and observations on some already described. Bost. Journ. Nat. Hist. 1: 290. Worker, female, male.

The colonies are found in fields and open woods nesting in rotting but fairly solid stumps, or logs, under bark and stones or in old abandoned *F. fusca subsericea* mounds. There is a wide range and much variation in types of localities of nests. Some are in damp places, but most are in fairly dry habitats. If one jars a stump these ants will boil up out of cracks and crevices. In general the colonies are large. Males and females are present from early August to late September.

Crematogaster lineolata var. *cerasi* (Fitch).

Myrmica cerasi, Fitch. 1854. Trans. N. York State Agric. Soc. 14: 835. Worker.

This variety has the same general form as the previously described *Crematogaster*, but is lighter in color, the thorax having more red on it. It is difficult to distinguish between the varieties. Nest locations have the same environment as *Crematogaster lineolata*.

Genus *Aphaenogaster* Mayr

Aphaenogaster fulva Roger.

Aphaenogaster fulva Roger. 1863. Die neu aufgeführten Gattungen und Arten meines Formiciden-Verzeichnisses. Berl. Ent. Zeitschr. 7: 190. Worker.

Nests are in damp woods, under stones, in rotting wood, often under clumps of leaves in a careless fashion. The soil is generally a clay with some sand. Males and females were found from the fifteenth of July to the twenty-fifth of September.

Aphaenogaster fulva Roger subsp. *aquia* (Buckley).

Myrmica (Monomorium) *aquia* Buckley. 1867. Descriptions of new species of North American Formicidae. Proc. Ent. Soc. Philad. 6: 341. Worker, female.

This reddish brown ant differs in habitat from *Aphaenogaster fulva* in being found in more open places; in fields, by roadsides and openings in woods. Nests are found under stones, in logs, under grass and dead vegetation. The soil may be clay or sandy loam.

Aphaenogaster fulva subsp. *aquia* var. *picea* (Emery).

Stenamma (A.) *fulvum* subsp. *aquia* var. *piceum* Emery. 1895. Beiträge sur der Kenntniss der nordamerikanischen Ameisenfauna. Zool. Jahrb. Syst. 8: 305. Worker, female, male.

This ant has the same general outlines of the subspecies *aquia* but has a pitchy black color. It may be confused sometimes with *Aphaenogaster fulva*. The nesting sites are the same as those of the species *fulva*.

Aphaenogaster tennesseensis (Mayr.).

Atta tennesseensis Mayr. 1862. Verh. Zool.-bot. Ges Wien. 12:743. Worker.

An ant with a cherry red color when seen in the field. It has epinotal spines longer than any other local *Aphaenogaster*. The typical nesting sites of this ant are found to be off the ground high up in stumps or in the top portion of logs or dead limbs, that do not touch the ground. The nests are located in places where sunshine can get to them. Winged forms were taken July 30, 1939. Nesting habits indicate that *tennesseensis* is aboreal rather than terrestrial.

Genus *Myrmica* Latreille

Myrmica punctiventris Roger.

Myrmica punctiventris Roger. 1863. Berl Ent. Zeitschr. 7: 190. Worker.

The nests for the most part were located in moist shady woods, with moss growing on the

ground and sides of trees. Several nests were collected from acorns that were damp inside and had considerable amounts of debris in them.

***Myrmica scabrinodis* subsp. *lobicornis* var. *fracticornis* Emery.**

Myrmica lovicornis Nyl. subsp. *fracticornis* Emery. 1894. Zool. Jahrb. Syst. 8: 313.

A nest of this variety was collected in an open sunny spot of a Beech-Maple woods. The soil was fairly dry, sandy, loam. Vegetation was grass, club moss, cinquefoil, green ash, hazel nut, bushes, maple and white oak trees. There was no mound, just an opening from which a gallery extended down eight inches.

***Myrmica scabrinodis* subsp. *schencki* var. *emeryana* Forel.**

Myrmica schencki Emery subsp. *emeryana* Forel. 1914. Deutsche Ent. Zeitschr. P. 617.

Four nests of this ant were collected in widely separated areas of the county. They were found in open fields or in sunny spots at the edges of woods. The soil consisted of clay or shale, generally dry and hard. Vegetation was predominantly grass, cinquefoil and berry vines. Surface structure of the nests varied. In some, openings were scattered over small domes of earth, in others they were flat at the surface, or under logs and stones.

***Myrmica sabuleti* subsp. *americana* Weber.**

Myrmica sabuleti Meinert subsp. *americana* Weber. 1939. Lloydia 2: 144-6.

Nests were found in open fields where the soil was dry clay and the vegetation was grass, cinquefoil and berry vines. One nest was found in sand. Openings could be traced down for about a foot below the surface.

Genus *Leptothorax* Mayr

***Leptothorax acervorum* subsp. *canadensis* Provancher.**

Leptothorax canadensis Provancher. 1887. Addit. Faun. Canada Hym, p. 245. Worker, female, male.

One nest was collected north of Geneva, Ohio. It was under the bark of the trunk and part of a branch of a fallen sugar-maple tree located in an open glade in a Beech-Maple woods. When the bark was lifted off the ants were captured as they came to the surface from their galleries that ran lengthwise of the solid wood. Workers only were collected from this nest. The ant is a northern form as the name indicated. The nest collected is the only record so far for Ohio.

***Leptothorax fortinodis* Mayr.**

Leptothorax fortinodis Mayr. 1886. Die Formiciden der Vereinigten Staaten von Nordamerika. Verh. Zool.-bot. Ges. Wien. 36: 451-452. Worker, female.

A single colony of this species was taken. It was found in the bark of a fallen maple tree located in an open sunny area of a dense Beech-Maple woods. The nest was small, not more than three inches in length. It is the exact opposite of the previous form which spreads out over a large area of a log. The collection was made July 28. Workers, pupae, nest queen and two males were taken.

***Leptothorax longispinosus* Roger.**

Leptothorax longispinosus Roger. 1863. Die neu aufgeführten Gattungen und Arten meines Formiciden Verzeichnisses. Berl. Ent. Zeitschr. 7: 180. Worker.

The nests of this small dark ant are found under the bark of dead and living trees, in acorns, snail shells, in hollow twigs and oak galls. Quite often one or two may be seen by a collector without his being able to locate the nest.

Twenty-four acorn nests were collected in an area twenty by twenty-five feet, located along the top of a ravine cut by the Grand River. The acorns were one-half inch in diameter, having fallen from red oak trees. The outside covering of each was solid except for a tiny opening next to the ground. The acorn centers were hollow and dry, some being exceedingly clean while others contained a small amount of debris. Since collections were from mid-September to the middle of October practically all of the nest inhabitants were procured. It would seem that a semi-hibernating condition existed. The largest nest contained one hundred and ten workers and a nest queen. The average sized nests contained forty to fifty workers together with the nest

queen and pupae. The smallest nests contained four to seven workers; however, they contained *Harpagoxenus* queens which would indicate that a number of workers had been killed in a raid.

The choice of acorns for nests is correlated with the fact that colonies are generally small. Small colonies are due possibly to the relatively small fecundity of the female since she is but little larger than the worker. Then, too, there is usually not more than one fertile female to a nest according to the records of this region. Only one nest contained two normal queens together with one aberrant female.

Leptothorax curvispinosus Mayr.

Leptothorax curvispinosus Mayr. 1866. Myrmecologische Beiträge. Sitz.-ber. Akad. Wiss. Wien. 53: 508, pl. f. 13. Worker.

This ant nests in hollow twigs, under bark of trees in acorns and oak galls. An occasional ant will be seen wandering about in the grass or on the twigs of bushes. To find the nest of such wanderers infinite patience is required.

Complete nests were taken from acorns lying on the ground. These acorn nests always had a good outside covering however thin they might be. The inside would be dry with small amounts of debris. The woods were open Beech-Maple with a scattering of red and white oak trees. The soil was dry clay with a shale base. The ground vegetation was mostly grape vine runners and some tufts of grass. Workers, nest queen, and pupae were collected.

Leptothorax curvispinosus subsp. *ambiguus* Emery.

Leptothorax curvispinosus subsp. *ambiguus* Emery. 1894. Beiträge zur Kenntniss der Nord-amerikanischen Ameisenfauna. Zool. Jahrb. Syst. 8: 317-320. Worker.

Ten nests were collected; four from soil at the edges of woods in open fields; six from acorns of red oaks scattered along the edges of Beech-Maple woods.

The ants from nests collected in open fields were light in color. The colonies were located in and among roots of cinquefoil (*Potentilla palustris*) and sheep sorrel (*Rumex acetosella*). The nest would spread out a foot in radius with galleries running underground from one group of roots to another; or around the roots of one plant. By carefully pulling up the cinquefoil the nests were encountered one or two inches under the surface of the ground. The soil was always dry, fairly hard clay. Nest locations were far enough out from tree trunks to get plenty of sunshine. The principal vegetation was cinquefoil, sheep sorrel, golden rod and plantain with oak trees along edge of woods. Workers, pupae and nest queens were collected.

Ants collected from acorns were of a darker hue. The acorns were one-half inch in diameter and were from red oak trees. The outside shell was in perfect condition with a small opening on the surface next to the ground. They were dry inside with little debris. There was some ground flora, grape vine runners and tufts of grass. These nests were located at the top of a ravine of the Grand River, at Harpersfield, Ohio.

Genus *Harpagoxenus* Forel

Harpagoxenus americanus (Emery).

Tomognathus americanus, Emery. 1895. Beiträge zur Kenntniss der nordamerikanischen Ameisenfauna. Zool. Jahrb. Syst. 8: 272. Worker.

A black ant recognized by the groove formed by the frontal carinae which extend back to the vertex, giving the antennal scapes a resting place.

This extremely rare ant enslaves species of *Leptothorax*. Three isolated queens were taken from small *L. longispinosus* in nests found in acorns. Another interesting nest was made up of both *L. longispinosus* and *L. curvispinosus* workers together with two *H. americanus* workers without a queen. An explanation of this unusual nest might be found in Dr. Creighton's article entitled "The slave raids of *Harpagoxenus americanus*." He explains an almost similar mixed colony found by Wheeler in this manner. "I would consider Dr. Wheeler's mixed *Leptothorax* colony as a remnant originally formed by dulosis from which the *Harpagoxenus* had migrated or been killed off while raiding."

About 50 acorn nests of various species of *Leptothorax* were collected along the top of a ravine of the Grand River at Harpersfield in an attempt to locate more, and complete, *Harpagoxenus americanus* nests; they are yet to be found.

Subfamily DOLICHODERINAE

Genus *Tapinoma* Förster*Tapinoma sessile* (Say).

Formica sessilis Say. 1836. Descriptions of new species of North American Hymenoptera and observations on some already described. Bost. Journ. Nat. Hist. 1: 287-288. Worker, female.

A very common ant nesting under rocks, logs in old mounds of other ants, under bark of trees and clumps of dead leaves. The nests are in fields or open woods, where the sun can get to them. They often have an untidy appearance as if housekeeping had just started, nothing being in place. Pupae are often piled up in heaps or just under the bark of a log in a careless manner.

Subfamily CAMPONOTINAE

Genus *Prenolepis* Mayr*Brachymyrmex heeri* subsp. *depilis* Emery.

Brachymyrmex heeri Forel subsp. *depilis* Emery. 1895. Beiträge zur Kenntniss der nord-amerikanischen Ameisenfauna. Zool. Jahrb. Syst. 7: 635. Worker, female, male.

Nests are located under stones of open woods. The soil may be rather dry clay. Colonies are always small and do not go more than one or two inches down into the ground under the stones. Males and females make their appearance from the middle of August to late September.

Prenolepis imparis (Say).

Formica imparis Say. 1836. Descriptions of new species of North American hymenoptera, and observations on some already described. Bost. Journ. Nat. Hist. 1: 287. Female, male.

This interesting ant is found most readily in gardens, under grape arbors and fruit trees in sandy soil. They are the first ants to open their crater nests in the spring. At that time there will be a flight of males and females which have wintered over. During the hot summer months workers are not readily found but in the fall they open the nests again and are numerous on fallen fruit.

Prenolepis imparis imbibes fruit juices and secretions of flowers, loading their gasters until they are so distended that walking is difficult. Many workers winter over in this replete condition. In this respect they resemble the honey ants (*Myrmecocystus*) of southwestern United States and Mexico.

Genus *Camponotus* Mayr*Camponotus herculeanus* subsp. *pennsylvanicus* (DeGeer).

Formica pennsylvanica DeGeer. 1773. Mem. Serv. Hist. Insect. 3: 603. Pl. 31, figs. 9, 10. Worker, female, male.

A large black ant commonly called the "carpenter ant." The nests are in dead logs, stumps or decayed centers of living trees, or in the wooden foundations of houses. Galleries are formed all through their abode.

When a nest is opened in which a young queen and her brood are found the queen will stand over the brood attempting to guard it. This would indicate to a high degree the instinct of protection. It is certainly the opposite of the case found in the *Ponerinae* subfamily where workers move away from the brood when disturbed.

This ant will make trails an inch in width from one tree to another. The workers have been observed to lie down on their side and take a "nap" while traveling these trails. When disturbed these ants will run along a slab or bark and drop over as if dead, completely relaxed; when the danger is passed they will scurry along to a safe hiding place.

When a nest has been built in the timbers of a house much damage may be done before the occupants are aware of the fact.

Camponotus herculeanus subsp. **pennsylvanicus** var. **ferrugineus** Fabr.

Formica Ferruginea (Fabricus J. Chr.). 1798. Suppl. Ent. Syst. p. 279. Worker, female.

The only nest taken was found in a very damp maple log; the rotting material so fine it could be sifted through the fingers. This log lay in a Beech-Maple woods that was quite damp. Only the queen and her first brood were collected.

Camponotus herculeanus subsp. **ligniperdus** var. **noveboracensis** (Fitch).

Formica noveboracensis Fitch. 1854. N. York State Agric. Soc. 14:52. Worker.

This ant is not as abundant as *C. herculeanus pennsylvanicus* but has the same nesting habits as the other. Workers, pupae, winged males and females were collected. The winged forms were taken July 30.

Camponotus caryae (Fitch).

Formica caryae Fitch. 1855. Trans. N. York State Agric. Soc. 14: 855-859. Worker, female, male.

A black ant separated from the larger *Camponotus* group by a notch in the middle of the anterior border of the clypeus.

This is not an abundant species and only a few workers have been collected as they wandered about on the stems of blackberry canes and beech shoots in open fields.

Genus **Lasius** Fabricius**Lasius niger** var. **neoniger** Emery.

Lasius niger var. *neoniger* Emery. 1893. Beiträge zur Kenntniss der nordamerikanischen Ameisenfauna. Zool. Jahrb. Syst. 7: 639. Worker, female, male.

This ant and *Lasius niger americanus* are the only *Lasius* varieties that are not strictly hypogaecic. Workers are seen above ground in the foliage of trees attending aphids. *Lasius niger* var. *neoniger* has a preference for sandy soil in which habitat it replaces *L. niger* var. *americanus* in abundance. Occasionally it will nest in a log or stump but for the most part it is found in small crater shaped nests in sandy soil.

Lasius niger subsp. **alienus** var. **americanus** Emery.

Lasius niger alienus var. *americana* Emery. 1893. Beiträge zur Kenntniss der nordamerikanischen Ameisenfauna. Zool. Jahrb. Syst. 7: 639. Worker, female, male.

This is the most common ant in the region. Colonies are found nesting under stones, bark, in logs and stumps; they may be in ground that is damp or dry, in fields or woods, thus, showing great adaptability to the physical conditions which they encounter.

This ant is a pest in gardens and fields where it will place aphids on rose bushes, the roots of corn, etc. Winged forms were collected from late July to the middle of September.

Lasius flavus subsp. **nearcticus** Wheeler.

Lasius flavus var. *nearcticus* Wheeler. 1906. New ants from New England. Psyche. 13: 38-39.

One nest was collected and it did not conform to the usual nesting situation of other localities. Usually this ant is found in damp places under stones or leaf mold in well shaded woods. The nest collected was found under a flat stone eight by ten inches. The ground was hard, dry clay in an open Beech-Maple woods. There was no ground vegetation and the only trees were sugar-maples and white oaks. Workers and pupae were collected.

Lasius umbratus subsp. **mixtus** var. **aphidicola** (Walsh).

Formica aphidicola Walsh. 1862. On the genera of aphidae found in the United States. Proc. Ent. Soc. Philad. 1:310. Worker, male.

This ant is found nesting in the damp rotten wood of stumps or under rocks located in moist places. They most generally inhabit deep Beech-Maple woods; however, they will nest in a field if the moisture is sufficient. They are hypogaecic, attending white root aphids. Workers and one nest queen were collected.

***Lasius (Acanthomyops) claviger* Roger.**

Formica clavigera Roger, 1862. Einige neue exotische Ameisen-Gattungen und Arten. Berl. Ent. Zeitschr. 6: 241-242; 1, fig. 13. Female.

Two nests of this species were collected, both nests being in stumps of trees that had rotted to a condition almost beyond recognition. This rotted punk was damp enough to be molded in the hands. The main portion of the nests was found in the center of stumps with Virginia creeper growing up through it. On the roots of this plant the ants had placed white aphids. A lemon verbena odor is given off by these ants.

Genus *Formica* Latreille***Formica sanguinea* subsp. *subintegra* Emery.**

Formica sanguinea subsp. *rubicunda* Emery var. *subintegra* Emery. 1893. Beiträge zur Kenntniss der nordamerikanischen Ameisenfauna. Zool. Jahrb. Syst. 7: 648, pl. 22, fig. 3. Worker, female.

This ant enslaved *F. fusca* var. *subsericea* by making forays to capture the young, thus making mixed colonies of the two species. The soil is generally clay with sand mixed in with it. Workers only were collected.

***Formica sanguinea* subsp. *subnuda* Emery.**

Formica sanguinea subsp. *rubicunda* Emery var. *subnuda* Emery. 1895. Beiträge zur Kenntniss der nordamerikanischen Ameisenfauna. Zool. Jahrb. Syst. 8: 335. Worker.

The nests are located at the edge of woods in sunny places. There may be a "bed" of openings a foot or more in diameter, level with the ground. The soil is generally sandy clay. Grass is allowed to grow over the mounds. The nests are generally mixed with *F. fusca subsericea* which the sanguinea's raid and enslave.

***Formica exsectoides* Forel.**

Formica exsectoides Forel. 1886. Espices nouvelles de Fourmis Americaines. Ann. Soc. Ent. Belg. 30 C. R. 38. Worker, female.

These mound builders have nests that may be three feet across and thirty to forty inches high. Some mounds in a more sandy soil are only nine inches to a foot in height but are much longer than the higher mounds. Openings into the nests are located along the side walls. The tops of the mounds are covered with debris of small sticks and vegetable matter. Grass grows on the mounds except at the summits. Mounds are built in sunny openings in woods or out in fields. The ants prefer a clay soil. Only three nests were located in the northern part of the county where the soil is more sandy and loose.

Workers from several colonies have been observed attending green aphids on the leaves of trees. The workers will attack when the mound is disturbed and are known to bite off the heads of other ants.

***Formica fusca* Linnaeus var. *subsericea* Say.**

Formica subsericea Say. 1836. Descriptions of new species of North American hymenoptera, and observations on some already described. Bost. Journ. Nat. Hist. 1: 289. Worker, female.

A very common ant, building mounds in clay soil in open sunny places. It is not uncommon to find fifteen to a hundred mounds in a half acre field. They may grow to be two feet in height and three feet in diameter at the base. The openings into the mounds are mostly along the sides with some on the top. The tops of the mounds are generally flat. Vegetation is very abundant about the mounds. These ants also nest under stones or have any number of openings in a "bed," level with the ground.

The ants not only attend aphids but also eat dead insects. *F. fusca subsericea* is a timid ant, allowing other ants such as *Tapinoma sessile* and *Solenopsis molesta* to nest with it. It is raided by *F. sanguinea* varieties which capture some workers, but take pupae mostly.

Formica neogagates Emery.

Formica fusca subsp. *subpolita* Mayr var. *neogagates* Emery. 1893. Beiträge zur Kenntniss der nordamerikanischen Ameisenfauna. Zool. Jahrb. Syst. 7: 661. Worker, female, male.

Two workers of this species were found traveling along the ground at a rapid rate of speed. The soil was dry, hard clay in a planted white pine forest. These ants were dodging rapidly from one hiding place to another making them difficult to capture. The trees were far enough apart to allow sun to shine on the ground. Grass and poison ivy were the principle vegetation.

Formica pallide-fulva subsp. *nitidiventris* var. *fuscata* Emery.

Formica pallide-fulva subsp. *fuscata* Emery. 1893. Beiträge zur Kenntniss der nordamerikanischen Ameisenfauna. Zool. Jahrb. Syst. 7: 656. Worker, female.

One nest of this species was collected. It was found out in a cut hayfield under an eight inch square rock. There was one gallery which went down about a foot and then branched in all directions. The soil was a sandy clay that was very dry. The vegetation was blue grass.

Formica pallide-fulva subsp. *schaufussi* var. *incerta* Emery.

Formica pallide-fulva Latreille subsp. *schaufussi* var. *incerta* Emery. 1893. Beiträge zur Kenntniss der nordamerikanischen Ameisenfauna. Zool. Jahrb. Syst. 7: 655-656. Worker, female, male.

These ants nest in open fields and at the edge of woods, under stones, or in small craters which are difficult to see. The nest has a single opening from which a shaft goes down about a foot or more, than branches out in all directions to form chambers deep in the ground.

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