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HABITATS AND POPULATIONS OF THE ANT *STENAMMA DIECKI* EMERY IN SOUTHERN MICHIGAN

Mary Talbot¹

The four species of the genus *Stenamma* recognized for the northeastern United States are all found in the two square miles of the Edwin S. George Reserve, Livingston County, Michigan. They are *Stenamma diecki* Emery, *brevicorne* (Mayr), *impar* Forel and *schmitti* Wheeler. These ants are not abundant on the George Reserve as they are in certain habitats further north. Near Montreal, Québec all four are present and *diecki*, together with *Lasius alienus* Foerster and *L. pallitarsis* (Provancher), are the most abundant and widespread species of ants in the woods (Francoeur, 1966; Letendre and Pilon, 1972, 1973).

At the George Reserve *diecki* is also the most common and widespread of the four *Stenamma*. During the period between 1954 and 1975 forty-two colonies, or parts of colonies have been found, and individuals have been picked up at eight other places on the Reserve. *Stenamma brevicorne* was next in number of collections (25 colonies and seven individual ants) primarily because a restricted habitat in which they lived was studied intensely (Talbot, 1965). *S. impar* and *schmitti* were rare. The first was found eight times and the second only six times.

Stenamma diecki was characteristic of swamps and their edges and was also present in low places in oak-hickory woods. Most of the colonies were found in three locations. One was within the tamarack-poison sumac swamp (*Larix laricina* (DuRoi) K. Koch–*Rhus vernix* L.). In this place the large tamarack trees were spaced so that there was enough light for a thick, four or five foot high growth of shrubs and forbs such as dogwood (*Cornus* sp.), shrubby cinquefoil (*Potentilla fruticosa* L.), meadow-sweet (*Spiraea alba* DuRoi) and Joe-Pye-weed (*Eupatorium maculatum* L.). Under this was a dense layer of ferns, sedges and grasses. A variety of mosses covered the floor which was uneven, with many raised humps over loose, moist, black, muck soil.

A second favorable location was a thoroughly moist strip of wood-swamp ecotone just above the tall fern and shrub border of the swamp and where trees such as aspen (*Populus tremuloides* Michx.) and red maple (*Acer rubrum* L.) bordered the woods. The ground was loose and its surface was covered with a trashy layer of twigs and leaves. The ants took advantage of any place where the soil was firm and most of the colonies were on tree roots which were an inch or two below the surface. Often the soil above the nest was covered with a small moss. Other colonies were in little raised mounds of soil, with or without moss covering. Sometimes tangled fern or shrub roots made a firm base. Usually the nest sites were free of mold hyphae although hyphae were numerous in the looser soil.

Outside the swamp environment the most favorable location for *diecki* nests was in the kettle holes which occurred in the oak-hickory woods. These small, roughly circular, glacier-made depressions, with steep slopes, were moist habitats with large trees of black cherry (*Prunus serotina* Ehrh.), soft maple (*Acer saccharinum* L.), hickory (*Carya ovata* (Mill.) K. Koch), and white and black oaks (*Quercus alba* L. and *Q. velutina* Ehrh.). There was a definite shrub layer of young cherry, blueberry or hazelnut but few ground plants. The soil, which was loose and much tunneled, was covered by an accumulation of leaves and twigs, often riddled with mold hyphae. Colonies lived only in the small places where the ground was firm. As in the swamp, most were found in the inch or two of soil on roots near the bases of trees and a few were in small, moss covered mounds of soil. Sometimes an acorn, buried in leaves, was used for some or all of a colony. Only occasionally did the ants use wood. One colony lived in very soft wood under a rather solid log sunk into the soil and one was in an old stump, down below the soil level where it would not dry out.

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Nests were similar wherever found. They consisted of one, two or three small, smooth chambers. Most were very near the surface, often just beneath a covering of a small moss or within the first inch of soil, but some were two, three, four or five inches down in the ground. Two chambers of a nest might be at different levels, one almost under the other, or they might be side by side. Usually they were within two or three inches of each other but they could be as far away as a foot. Some chambers were rounded and some were irregular in shape. They ranged from one-half to one inch in diameter and from one-fourth to three fourths inch in height.

When a colony was disturbed the ants moved slowly but most would start down out of sight immediately. Queens were especially good at disappearing in this manner. Later, workers returned to pick up scattered brood. A good collecting technique, when trying to get a whole colony, was to return next day to see if any stray ants had reorganized near the disturbed area.

Other ants characteristic of the *diecki* environment, either deep woods or swamp, were: *Amblyopone pallipes* (Haldeman), *Myrmica punctiventris* Roger, *Myrmecina americana* Emery, *Leptothorax longispinosus* Roger and *Lasius alienus* (Foerster). Other characteristic ants, more or less restricted to the swamp environment, were: *Leptothorax muscorum* (Nylander), *Camponotus novaboracensis* (Fitch), *Lasius pallitarsis* (Provancher), *Lasius speculiventris* Emery and *Lasius minutus* Emery.

Eggs and larvae of *diecki* were present on June 10, the time of the earliest record and worker pupae were found by June 22. All three were present all summer. On September 16 (the latest collection) a great many to-be-overwintered larvae were in the nest, along with a few eggs and one worker pupa. Pupae of alates were found from July 1 to September 1. Adult alates were found from July 19 to September 8 but there were none in colonies collected September 10 and 16. It seems possible that flights had been taking place at about this time. M. R. Smith (1957) states that mating flights may take place from spring to fall with a tendency for older colonies to overwinter the alates. Letendre and Pilon (1972) report finding a fertile alate female alone on the ground on September 15.

Table 1. Populations of 15 colonies of *Stenamma diecki* Emery at the E. S. George Reserve, Livingston County, Michigan.

Date	Adult				Pupa			Larvae	Eggs	Total
	Queen	Worker	Male	Female	Male	Female	Worker			
6-10-75	1	33						254	73	361
6-10-75	1	42						279	60	382
7- 1-62	1	24					34	82	20	161
7- 3-62		46					24	87	57	304
7-19-54	1	43					103	17	53	217
7-19-54		20			35	30	30	33	2	150
7-19-54		28			42	37	72	30		209
7-19-54		18			44	61	106	43	54	326
7-19-54	1	25	1	22			31			80
8-12-73	1	57	45				22	19	1	145
8-21-74	4	25	25	22	2		13	1		92
8-25-74	3	102	9	8			12	55	37	226
9- 1-58	1	60	9	4	1	4	31	19	9	138
9- 8-74	1	96	54				23	77	64	315
9-16-70	1	221					1	174	16	413
Total	16	840	143	56	124	156	565	1173	446	3519
Mean	1.0	56.0	9.5	3.7	8.3	10.4	37.7	78.2	29.7	234.5

Colonies were small. The largest one collected was taken in the fall when worker and larva populations had been built up for the winter. A total of 413 were captured of which 221 were workers (Table 1). Females were elusive and colonies are considered to be monogynous. Thus some collections showed no nest queen. The two collections when there were four and three dealate females were taken when there were alates in the nest and the extra females may represent some of those which had lost their wings. Ten colonies which had alates (pupae or adults) averaged 47.9 alates of which 26.7 were males and 21.2 were females. Alates made up 24.13% of these colonies.

OTHER *STENAMMA* OF THE GEORGE RESERVE.

Stenamma brevicorne differs from *diecki* in several ways. Although it is known to live in woods, all the collections but one were made in a low field bordering a marsh (Talbot, 1965). This field, was only slightly higher than the marsh and had ground water very near the surface during spring rains, but could become quite dry in mid-summer. It was characterized by a great variety of flowering forbs mixed with grasses and there were a few scattered woody plants such as shrubby cinquefoil, meadow-sweet and trailing blackberry. The soil was clay-loam for four or five inches and then almost solid clay.

On this field *brevicorne* was a common ant, and was found 23 times on 40 yard square plots. It and *Lasius flavus* (Fabricius) were the characteristic ants of the habitat. Other common species were *Brachymyrmex depilis* Emery, *Ponera pennsylvanica* Buckley, *Myrmica* sp. and *Leptothorax ambiguus* Emery.

Nests of *brevicorne* seemed slightly larger than those of *diecke* (one to four chambers) and some extended deeper. Most were within the first six inches of soil but some went as deep as 13 inches. Chambers were larger, most over an inch in diameter and a half inch high. All were very smooth walled.

Larvae were present all summer and were overwintered. Worker pupae were recorded on June 23 (the first collection) and were still present on September 10 (the last collection). Alate pupae were found from July 9 through August 11, and adult alates from August 10 through September 10. Perhaps some fly in the fall on warm days. They may

Table 2. Populations of 15 colonies of *Stenamma brevicorne* (Mayr) at the Edwin S. George Reserve, Livingston County, Michigan.

Date	Adult				Pupa			Larva	Eggs	Total
	Queen	Worker	Male	Female	Male	Female	Worker			
6-14-62	2	43						112		157
6-21-62		56						57		113
6-23-59		36					17	88	7	148
7- 7-63	1	22					19	53	14	109
7- 9-63		59				8	52	171	41	331
7-19-63		24					58	151	11	244
7-22-63		20					21	88	52	181
7-23-63		49			60	18	89	34	7	257
7-25-63		48			13	12	79	45	17	214
8- 8-63	1	45				7	77	11		141
8-11-63	1	10			2		10	1	98	122
8-19-62		85	1	37			147	22	51	343
9- 3-63	1	144	10	39			5	44	20	263
9- 5-63	1	117					17	74	8	217
9-10-63	1	96	2				1	53	11	164
Total	8	854	13	76	75	45	592	1004	337	3004
Mean	.5	56.9	.9	5.1	5.0	3.0	39.5	66.9	22.5	200.3

be overwintered, to fly the next spring. Paul Kannowski (1958) reported a swarm of males on the afternoon of May 2 at about 70°F and he took a female in flight in the late afternoon of May 30.

Table 2 gives a record of populations of 15 colonies taken from the low field.

Stenamma impar and *schmitti* were rare but their distribution seemed similar to that of *diecki*—low, moist woods. Alates of *impar* were found on August 19 and alate pupae of *schmitti* on August 6. Winter records from a moist woods in Missouri (Talbot, 1957) give a better account of them. *Stenamma impar* was found on 10 of 40 yard square plots dug. Eight complete colonies averaged 108 individuals of which half were workers. Larvae were overwintered and a few eggs were still present in November. Winter chambers ranged from four to 16 inches deep with a mean of 10.1 inches. Usually there was only one chamber per colony. No alates were found between September 6 and April 28.

Stenamma diecki was collected seven times in this same Missouri woodland. Colonies might have one, two, three, or four chambers and their winter depth ranged from five to 15 inches with a mean of 10.5 inches. Larvae were overwintered and four complete colonies had a mean population of 227 of which 121 were workers. The largest colony (September 29) consisted of 310 workers, 67 larvae, 9 eggs, 35 males and 31 females. Males and females were found in September and October.

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