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NOTES ON THE ANT

LEPTOTHORAX PROVANCHERI EMERY

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The ant, *Leptothorax provancheri* Emery (= *L. emersoni* Wheeler, *L. e. glacialis* Wheeler, and *L. e. hirtipilis* Wheeler), is interesting because of its peculiar habits, rare occurrence, and unusual distribution. It has long been known as an inquiline in the nests of *Myrmica brevinodis* Emery, and, until recently, it was thought that this relationship was obligatory on the part of *provancheri*. Cole (1954, p. 241) indicates that this species is able to live independently (under stones), at least in the mountains of New Mexico. The habits of *provancheri* were first noted by Wheeler (1901). He had discovered that its nests were intimately connected with the galleries and chambers of *Myrmica brevinodis* nests. In this and a later paper (1903a) on *provancheri*, Wheeler presented an interesting and detailed analysis of the symbiotic relationship between *provancheri* and its host.

Wheeler stated that the nests of these two ants were found in the Litchfield Hills near Colebrook, Connecticut, "under some small stones that were rather deeply imbedded in the moss bordering the exposed glaciated rock of the hilltop" (1901, p. 432). The habitat of *provancheri* was later expanded by Wheeler (1903b, p. 231) to include nests with *M. brevinodis* "in the hummocks of moss (*Polypodium commune*), under stones, bits of wood, etc., in rather damp, grassy bogs."

The ants of three sphagnum bogs in Livingston and Washtenaw counties, Michigan, have been under study for the last four years. The occurrence of several species

of *Myrmica* in various plant communities of the bog sere has been noted, including *M. brevinodis* and *M. fracticornis* Emery. In spite of intensive observations on approximately 300 *Myrmica* colonies, no nests of *provancheri* have been found.

On the morning of July 22, 1955, several hours were spent in Mud Lake Bog, Section 7, Munro Township, Cheboygan County, Michigan, searching for nests of *M. fracticornis*. Colonies were found in an immature leatherleaf community, which was characterized by a continuous sphagnum surface and numerous small clumps of shrubs and small trees, composed largely of leatherleaf, highbush blueberry, black spruce, and tamarack. The remains of some dead coniferous trees indicate that this is probably a disclimax community produced by a fire sometime within the last twenty years.

The hummocks of moss at the base of the south edge of a clump of the trees and shrubs named above contained a populous colony of *fracticornis*. While this nest was being sampled, several workers of *provancheri* were discovered moving about the galleries and chambers of the nest. Seven *provancheri* workers were collected and kept alive with a small portion of the *fracticornis* colony. Other workers of *provancheri* were carefully watched in order to find the location of their nest. These workers were soon lost, and their nest was not located. Most likely it was somewhere on the periphery of the *fracticornis* nest, and it may have been destroyed or displaced during collecting.

Smith (1951, pp. 821-822) cites records for *provancheri* and its synonyms from four New England States, Colorado, and Alberta, Canada, and it also occurs in North Dakota (Kannowski, 1956). The present record is the first from Michigan and, together with the North Dakota locality, ties together a previously discontinuous distribution. Cole's record from New Mexico is the only extension to the geographic range of this ant given by Creighton (1950, pp. 279-280). The range of *provancheri* is blanketed by the ranges of both of its known host species (see Creighton, *op. cit.*, pp. 96 and 100). Therefore, *provancheri* could

have a much more extensive range than that which is presently known. The rarity and limited distribution of this species seem to be due to three factors: 1) very few areas within its hypothetical range have been studied intensively; 2) *provancheri* workers may easily be overlooked because of their small size and relatively few numbers (in comparison with the numbers of the host species); 3) because of environmental factors, its range is more restricted than that of its hosts.

The apparent absence of *provancheri* in bogs in southeastern Michigan indicates that the factors governing its distribution are different from those governing the distribution of the two host species. The bogs that have been studied in Livingston, Washtenaw, and Cheboygan counties are composed of similar plant communities, and the edaphic conditions are similar. Climatic conditions seem similar except for the extremes of temperature found in the two regions. Summer temperatures in southeastern Michigan are higher than those of Cheboygan County, and these high temperatures occur for longer periods of time. The temperatures in southeastern Michigan may be too high for the proper development of *provancheri* colonies, although this factor may not be critical in the case of the two species of *Myrmica*. The presently known range of *provancheri* strongly suggests an adaptation to regions of cool temperatures.

Myrmica fracticornis has not previously been recorded as the host of any inquiline ant, probably as the result of insufficient study of ants in the moist environments of northeastern North America. Additional records should turn up in the future. It also seems probable that other species of *Myrmica* may be found as hosts of *provancheri*.

Seven *provancheri* workers were kept for about two months in an artificial nest with a small fragment of the *fracticornis* colony, including one queen, four alate females, three males, about 50 workers, and a small quantity of larvae and pupae. Random observations of the mixed nest during this time showed that the *provancheri* workers were accepted by the *fracticornis* colony; no evidence of hostility between the two groups was ever observed. The two

groups utilized separate areas for nest sites, but each permitted the other within its own area. The *provancheri* workers were seen to "shampoo" the backs and heads of *fracticornis* workers and females and to receive regurgitated food in return just as Wheeler (1901) had observed to occur between *provancheri* and *brevinodis*. The *provancheri* and *fracticornis* workers were also observed feeding together on honey, syrup, and water that was placed in the chambers, but only the *fracticornis* workers were seen to feed upon the bodies of freshly killed insects (roaches, flies, lacewing-flies, and collembolans) that were also introduced into the nest.

From the above observations it seems evident that *provancheri* is in an early stage of social parasitism as indicated by its ability to live independently in part of its range, whereas in other parts it requires the presence of *Myrmica* nests. In those areas where it lives as an inquiline it is also probable that the colony-founding female seeks first a suitable environment (one that is both moist and cool), and, once there, seeks a *Myrmica* nest. In Michigan bogs the choice of *Myrmica* nests in the open mat zone is largely restricted to *brevinodis* and *fracticornis*.¹ In other areas (North Dakota, for instance) *Myrmica brevispinosa* Wheeler may occur in the same or similar environments as those occupied by *brevinodis* and *fracticornis*. The rarity of *provancheri* and *fracticornis* combinations may indicate that *fracticornis* tolerates the inquilines less frequently than *brevinodis* does. The similarity of the behavior of *fracticornis* and *brevinodis* in response to the "shampooing" by the *provancheri* workers suggests that this behavior pattern may be common to other more closely related species of *Myrmica*.

¹ A third species of *Myrmica* of uncertain identity is also present in southeastern Michigan bogs.

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THE ARMY ANT *AENICTUS EXIGUUS* CLARK A SYNONYM. The description and figure of *Aenictus exiguus* Clark, 1934, Mem. Nat. Mus. Vict., Melbourne, 8:21, pl. 2, fig. 1, worker (type loc.: Cairns district, northern Queensland) agree well enough with samples from Queensland, New South Wales, and New Guinea of *Aenictus turneri* Forel, 1900, Ann. Soc. Ent. Belg., 44: 75, worker (type loc.: Mackay, Queensland), except for the low measurement ("1.7 mm.") given by Clark for his types. This measurement, like others that have been checked from Clark's ant descriptions, appears to be excessively small, even for such a size-variable species as *turneri*. Particular similarities in the critical characters of head and mandible form, and shape of propodeum and ventral process of petiole, all indicate that *Ae. exiguus* must be considered a **new synonym** of *Ae. turneri*. Brown, 1952, Psyche, 58: 123, had already placed *Ae. deuqueti* Crawley as a synonym of *Ae. turneri* after examining type material. — W. L. BROWN, JR., Museum of Comparative Zoology.