ECOLOGY AND BEHAVIOR OF THE ANT *BELONOPELTA DELETRIX* MANN (HYMENOPTERA: FORMICIDAE)

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Belonopelta Mayr is a little-known genus of ponerine ants represented by two species, *B. attenuata* Mayr of Colombia and *B. deletrix* Mann, the latter hitherto recorded from Honduras and Chiapas (Wheeler, 1935; Brown, 1950). It is of more than usual interest because of the aberrant, presumably raptorial modification of the mandibles. To the present time only several specimens have been mentioned in the literature, and nothing has been recorded concerning its biology.

B. deletrix was recently encountered by the present author near the village of Pueblo Nuevo, Veracruz, in the Cosolapa Valley ten miles south of Cosolapa. This record represents a considerable northwestward extension of the range of the genus. The Cosolapa Valley, like most of this part of Mexico, is under heavy cultivation, and the native forest is limited to precarious sanctuaries on the steep slopes of numerous hills and mountains which rise from the valley floor. Pueblo Nuevo is located in the saddle of a pass through one of the lower hill ranges. To the northwest, and across the nearby Cosolapa River, there is a large tract of true rainforest, i.e., a forest in which the trees are several-storied, with a few "emergents" over 100 feet in height, and heavily festooned in the upper reaches by lianas and epiphytes. The upper stratum forms a closed canopy in the undisturbed portions, and herbaceous undergrowth is very sparse. The forest is being continuously high-graded by crude native lumbering methods, and as a result clearings and patches of scrubby second growth occur throughout. The prevalent ant genera in the leaf litter and soil, as indicated by repeated Berlese funnel samples, are *Wasmannia, Solenopsis* (*Diplorhoptrum*), *Pheidole, Prionopelta, Pyramicus, Neo-*

struma, Rogeria, Strumigenys, Paratrechina (*Nylanderia*), *Octostruma,* and *Odontomachus,* approximately in that order. *Apterostigma, Apsychomyrmex,* and *Glamyromyrmex* are among the less common but zoogeographically distinctive ground elements. *Wasmannia, Azteca, Pseudomyrmex,* and *Paracryptocerus* predominate in the arboreal fauna.

B. deletrix was found on two occasions during ten days' collecting in this forest. First, a single worker was discovered in a rotting, but still firm, section of tree branch, two inches in diameter, buried in deep leaf litter between the buttresses of a large tree. It was in a flat, rectangular, preformed cavity which opened to the soil below by a broad gallery. Six eggs, six larvae, and three worker cocoons were also present, but conscientious search in the immediate vicinity failed to reveal other adults. Later, a complete colony, undoubtedly independent of the first, was discovered nesting several hundred yards away in a rotting branch, of the same dimensions as the first and also buried in leaf litter between the buttresses of a large tree. This colony consisted of ten workers, a dealate queen, ten eggs, twenty larvae of various sizes, and eight cocoons. It occupied a small cavity the diameter of a pencil and six inches long in the center of the branch.

A third collection of the species was made to the east of Pueblo Nuevo in what might best be described as "tropical evergreen" forest (see Leopold, 1950). The soil was drier and rockier than in the rainforest, and the trees formed a single, often-broken canopy with few lianas and epiphytes. The ant fauna in general appeared to be little more than a depauperate extension of the rainforest fauna. A colony fragment of *Belonopelta deletrix,* consisting of three workers, four eggs, and several larvae, occupied a pencil-width cavity in a very rotten, crumbling tree branch three to four inches in diameter lying on the ground and partly covered by rather dry leaf litter. The surface soil and leaf litter in the immediate vicinity were collected in bags, sorted through manually, and then processed in Berlese funnels, but no more adults or brood could be found.

From the limited data given above it is evident that *Belonopelta deletrix*, like many other endemic Neotropical species, can live in more than one type of habitat, despite the fact that it is primarily a rainforest dweller. It is of interest also that groups of workers and brood can exist apart from a queen, although there is no way of knowing whether these groups are fragments of a larger colony or independent colonies founded by workers.

The queen of *Belonopelta deletrix* is a normal female (figs. 1, 3), a fact by itself of considerable significance, since Borgmeier (1950) has shown that the queen of the closely related genus *Simopelta* [*S. pergandei* (Forel)] is dichthadiiform. Not only does this add a large morphological difference between the two genera, but it may foreshadow a fundamental difference in behavior; i.e., *Belonopelta* leads a "typical" sedentary life, while *Simopelta* may be nomadic.

The rainforest colony and larger colony fragment were maintained in artificial nests during a month's period for studies on food habits and behavior. In the field, a worker had been found on the undersurface of a limb near the rainforest colony carrying a dead or paralyzed campodeid in its mandibles. In captivity, other campodeids, as well as a single japygid, were quickly captured by the workers and fed to the larvae. Small geophilid centipedes and a single small cicadellid were also accepted and eaten, but a larger lithobiid centipede was discarded after capture, and other larger centipedes were completely avoided. Termites of the genus *Nasutitermes* were generally avoided in the first weeks, at the most stung to death and then abandoned, but later, after a month's confinement and transfer to the United States, the rainforest colony accepted workers of *Reticulitermes*. Beetle larvae and adults, moth larvae, millipedes, and isopods were avoided. The general impression received is that only a few kinds of small arthropods are readily accepted, and of these, the

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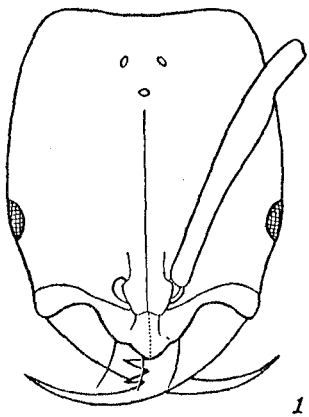
Explanation of Plate 9

Figs. 1-4, *Belonopelta deletrix* Mann. 1, head of queen. 2, head of worker. 3, queen, side view. 4, worker, side view.



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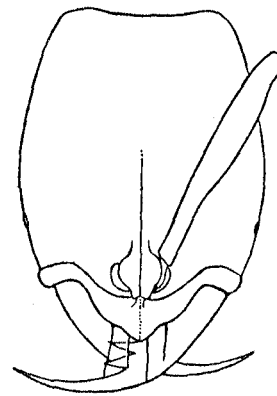

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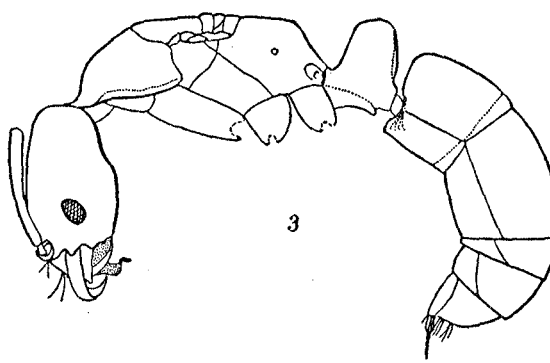

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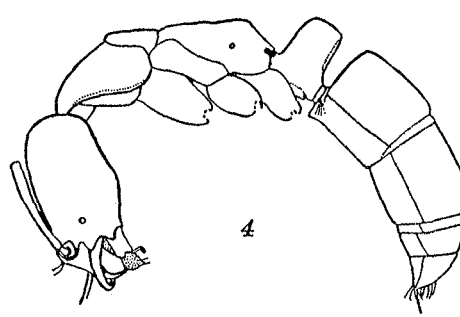

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entotrophan families Campodeidae and Japygidae are the preferred prey. In the Pueblo Nuevo forests, campodeids are abundant (many were on the limb housing the rain-forest colony), and they may well form the principal food supply. Honey was ignored by the workers, although available in the artificial nest for at least two weeks.

Despite the rather spectacular development of its mandibles, there does not appear to be anything really unusual about this species' method of catching prey, although it is admitted that the workers were never seen in the act of hunting uninjured entotrophans, the presumed usual prey. When a brood of newly hatched geophilid centipedes was placed in the food chamber, the ants rushed them immediately, seized them with their mandibles, and shook them back and forth with a forward bobbing motion of the head. Only one individual was stung, in addition, before being carried back to the brood. The *Belonopelta,* when hunting or fighting intruders, do not open their mandibles more than is usual for other Ponerini. Also, the mandibles are not handled like traps as in other long-jawed groups such as the Odontomachini and Dacetini, nor does their strike have the stunning effect sometimes observed in these groups. My own interpretation is that their peculiar shape is a special adaptation for pinning entotrophans, which insects are very active and agile, and difficult for most ants to hold and sting.

My *Belonopelta* were generally very timid, in most instances fleeing frantically from arthropods not sought as prey, including the docile *Nasutitermes* workers. Their mandibles crossed one another at rest as shown in figures 1 and 2 and were never opened to threaten intruders. When the workers transported larvae, they cradled them between the concave masticatory borders and avoided using the needle-like apical teeth.

The *Belonopelta* larvae were very active; when disturbed they thrashed violently back and forth in the manner of injured earthworms, but showed no capacity for directed locomotion. Insect prey were fed to them in typical ponerine fashion on their "laps", either entire or cut up into large pieces. The cicadellid mentioned above was placed entire across the laps of two large larvae lying side by side.

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NAME CHANGES IN COCCINELLIDAE. — Among the names proposed by E. Mulsant in his 1850 work on the family Coccinellidae several were preoccupied. Three of these, of interest to students of the neotropical fauna, seem not to have been corrected.

Neopalla new name

Pelina Mulsant, 1850, Species Trimères Sécuripalpes, p. 229, 271; not *Pelina* Curtis, 1838, Guide Brit. Ins., ed. 2, p. 291; not *Pelina* Haliday, 1839, Ann. Mag. Nat. Hist., (1), vol. 3, p. 407.

Palla Mulsant, 1850, loc. cit., p. 273; not *Palla* Hübner, 1819, Verz. bekannt. Schmett., (3), p. 47; not *Palla* Billberg, 1820, Enum. Ins. Mus. Billberg, p. 90.

Type of genus—*Pelina* (*Palla*) *hydropica* Muls.

The genus Pelina was set up by Mulsant for two species, *Pelina lebasi* n. sp. and *P. hydropica* n. sp. For the second of these he proposed a separate subgenus, under the name of *Palla*. Unfortunately, both of these names were preoccupied. The writer has studied the anatomy of both species and does not believe that they should be separated