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DIMORPHISM IN THE AFRICAN OECOPHYLLA WORKER AND AN ANOMALY (HYM.: FORMICIDAE)

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The genus *Oecophylla* comprises the species of ants whose larvae produce silk and are used by the workers as shuttles in weaving their nests (fig. 1). Two species are recognized, *longinoda* (Latreille) of the Ethiopian Region and *smaragdina* (Fabricius) of the Indomalayan and Papuan Regions. Each has several described varieties and subspecies. The worker is formally characterized as slightly polymorphic.

While examining workers of a nest which I had collected in the Anglo-Egyptian Sudan I was impressed by their variation in size and had measured one hundred workers taken at random from each of three colonies (figs. 7-8). Two measurements were made of each, the total length, which is difficult to make precisely because of the variability in extension of the gastric segments, etc., and the thoracic length. Inasmuch as the coefficient of correlation between the body length and the thorax length was $+0.90$, only the body length was used for the graphs since graphs of thorax lengths were essentially duplicates.

The results of the measurements indicated a surprising dimorphism which has gone completely unrecognized and suggest that other ants which are "polymorphic" may prove to fall into several castes when examined statistically. The physiologic implications are significant. When the extremes of workers are obvious, as in the maxima and minima *Atta*, the rôle of each is similarly obvious. Perhaps there is a similar division of labor in *Oecophylla*, the smaller workers caring for the brood, the larger workers holding leaves together in nest making, defending the nest, etc.

The African species nests in trees and is polydomous. A tree with a large colony may be completely dominated by the ants, which are aggressive and swarm over an intruder, biting viciously. The African species and its forms were described and the literature summarized by Wheeler (1922). While known from numerous localities in tropical Africa, there were no records from the Anglo-Egyptian Sudan in this study or in later papers on the African fauna. Sudan records were briefly summarized recently (Weber, 1943) and, with other unpublished records, are given below:

At Kagelu, Equatoria, A.-E. Sudan, the late Dr. J. G. Myers took them March, 1939 (Nos. 10593, 10601, 10628) and I took them July 17 and August 12, 1939. I found them in gallery forest running on vines at four feet above the ground, tending coccids on leaves, and nesting at a height of six feet. Two leaves of a vine were closed with silk and on the upper surface of one leaf the ants were tending coccids. The ant brood was inside the leaves.

At Torit, Equatoria, A.-E. Sudan I found them nesting abundantly on mango trees July 21 and August 6, 1939. They were examined on

the later date. One mango, then in flower, had scattered nests over the entire crown and the ants clearly dominated the tree. Their bite was perceptible and their swarming aggressiveness made investigation difficult. In one nest an alate female, pieces of a bee, a grasshopper, a dipteran, ponerine ants and a larval myrmecophile were found. In addition to the anomaly described below there were 505 workers (305 maxima, 200 minima) and 70 larvae.

Another mango was the next in a row of trees and was 92 feet away. It was also controlled by the ants. Several nests at a height of seven feet were removed but contained only workers. 218 workers were collected (167 maxima, 51 minima). It appeared that when these nests naturally age, dry, and wither the ants abandon them. They then move to adjacent green leaves and make nests but when the sites on an entire branch are exhausted the colony moves away. As they appear to start from the proximal portion of a branch and move distally they eventually find themselves out on a barren limb. Evidence for this was the fact that proximal nests were abandoned, distal ones still green. A fresh green nest contained a number of males, an adult fly and a dipterous larva 12 mm. x 3.5 mm. when freshly chloroformed. There were no remains of food and no brood. Another nest from the same mango contained alate females, 50 larvae, 556 workers (298 maxima, 258 minima) and parts of a medium-sized beetle.

In life the workers would run to the typical *longinoda* in Wheeler's key (1922). The mandibles were of the same ferruginous color as the head, thorax and pedicel. The gaster, however, was distinctly a paler ferruginous. After being chloroformed for three hours the gaster became darker than the rest of the body and became distinctly ringed, the distal portion of each segment being paler than the remainder. After six years the dried workers are largely pale ferruginous and concolorous with the dorsal surface of the trunk slightly darker than the remainder of the body. The color is essentially like that of Accra, Gold Coast and Mafia I., Tanganyika specimens. According to the

EXPLANATION OF PLATE I

FIG. 1. Nest of *Oecophylla longinoda* of mango leaves. Leaves fastened together with silk fibers from the ant larvae. Single entrance below. Torit, Equatoria, Anglo-Egyptian Sudan (N. A. W.).

FIG. 2. Dorsal view of maxima worker showing normal thorax and petiole. Body length 8.0 mm., thorax 2.35 mm. From colony in mango tree, Torit, Sudan.

FIG. 3. Dorsal view of anomalous maxima worker from same colony as worker in Fig. 2 showing petiole fused to thorax and compression of segments. Thorax with petiole 2.99 mm.

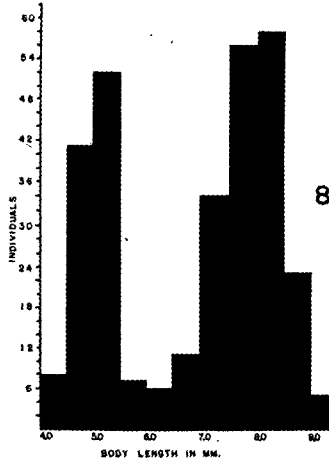
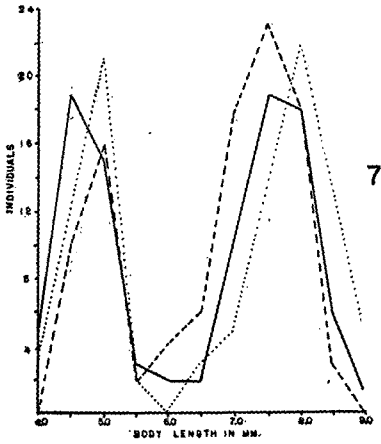
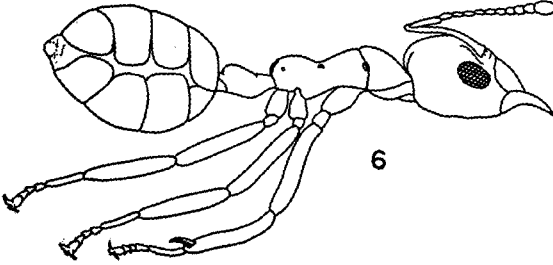
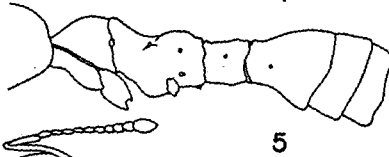
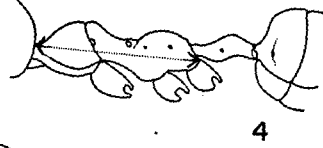
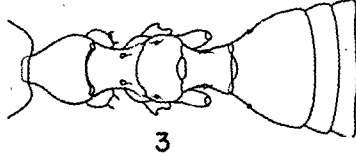
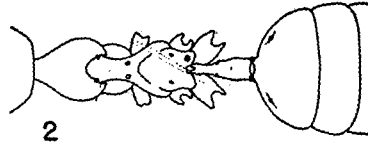
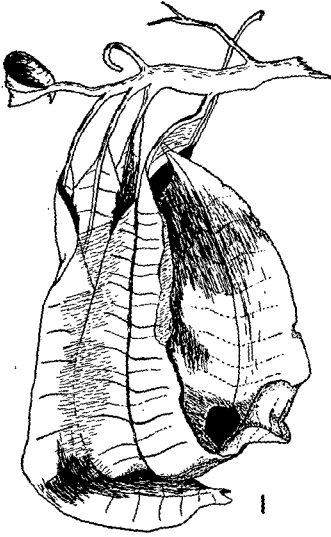
FIG. 4. Lateral view of maxima worker of Fig. 2 showing manner of measuring thorax length by arrows and habitus of normal thorax and petiole.

FIG. 5. Lateral view of anomalous maxima worker of Fig. 3.

FIG. 6. Lateral view of minima worker from colony of Figs. 2-5. Body length 4.5 mm., thorax 1.25 mm.

FIG. 7. Graph showing frequency distribution of body lengths of 100 ants from each of three colonies from mango trees at Torit, Sudan, including the colony from which came the ants of Figs. 2-6.

FIG. 8. Graph showing frequency distribution of the body lengths of the 300 ants from the three colonies of Fig. 7.



key the typical form is found in West Africa while a new variety, *anneciens*, was created for the darker workers from Belgian Congo localities close to my Sudan places. As the color may differ slightly according to preservation conditions, varieties based upon this character may not always be valid. There do, however, appear to be much darker forms (*rubriceps* Forel and *fusca* Emery), black or nearly black, which are found in West Africa.

Mr. D. Vesey-Fitzgerald sent me workers, supposedly belonging to the variety *textor* Santschi, from Tchole I., collected in July, 1936, and from Mafia I., both off the coast of Tanganyika. He reported it abundant on Mafia, making nests in trees, consisting of leaves spun together with silk, and to be a common attendant of coccids. In Zanzibar he stated it to be a menace, biting viciously and interfering with the clove pickers when they climb the trees.

So many of the Sudan ants were measured as to modify somewhat and make more complete the published sizes for the sexes, and in addition to make possible a characterization of worker maxima and minima castes for the first time. They may be summarized as follows:

Female.—Total length 15.5 mm. (14.5–16.5 mm.); thorax 5.3 mm. (5.0–5.5 mm.); anterior wing 15.0 mm.

Male.—Total length 6.5 mm. (6.0–7.0 mm.); thorax 2.76 mm. (2.64–2.79 mm.); anterior wing 6.8 mm.

Maxima worker.—(figs. 2, 4). Total length 6.5–9.4 mm. (average 7.8 mm.) thorax 2.2–3.1 mm. (average 2.6 mm.). Head convex behind, antennal scapes clavate distally and much more elongate than in minima, funicular segments 1–4 and terminal segment also more elongate; thorax more slender and anteriorly less convex than in minima, mesoepinotal impression deeper and longer than in minima, epinotum more convex than in minima; petiole more elongate and with less marked node than in minima.

Minima worker.—(fig. 6). Total length 4.0–6.4 mm. (average 4.8 mm.), thorax 1.24–2.1 mm. (average 1.5 mm.). Head less convex behind and body generally more compressed than in maxima. The petiole is dorsally grooved by a longitudinal furrow as in the maxima but this is so much deeper as to make the node bituberculate above.

The anomaly figured (figs. 3, 5) came from one of the Torit, Sudan nests. It is a worker whose petiole was telescoped into the epinotum, both being anterior abdominal segments primitively. This condition, of course, must have arisen in the pupal or an earlier stage. Since it had attained full adult coloration the ant had been able to live in this condition. I have a similar anomaly in a worker of *Myrmica brevinodis* Emery from Montana.

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