

REDESCRIPTION AND BIOLOGICAL OBSERVATIONS ON *LEPTOTHORAX FLAVISPINUS* ANDRÉ (HYMENOPTERA: FORMICIDAE)

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ABSTRACT

The queen of *Leptothorax flavispinus* André is described for the first time, and the worker and male are redescribed. The distribution and nesting places are recorded, and reproduction and nutritive eggs are described and illustrated.

KEY WORDS: Formicidae, *Leptothorax flavispinus*, redescription, nutritive eggs, Israel.

INTRODUCTION

In 1881 André described *Leptothorax nigrata* Emery var. *curvispinosus* from 3 workers collected by M. Abeille de Perrin in Jaffa. He later found that the name was preoccupied by *Leptothorax curvispinosus* Mayr, 1866 and thus changed it to *L. nigrata* var. *flavispinus* (André, 1883).

In 1905 Forel raised *Leptothorax nigrata* var. *flavispinus* to a species and recorded it from Dramatar near Kairouan (Tunisia). In the same paper, Forel described a new subspecies, *Leptothorax flavispinus santschi*, from Dramatar, Kairouan and Aanni near Kairouan. In the following years Forel and Santschi described from Tunis, Algeria and Morocco, 7 additional forms of *L. flavispinus*: var. *rufescens* Forel, 1907; var. *crassispinus* Santschi, 1911; var. *amilcaris* Santschi, 1911; var. *boiteli* Santschi, 1929; var. *facetis* Santschi, 1939; var. *impurus* Santschi, 1939a; and var. *clivulus* Santschi, 1939b.

*Leptothorax flavispinus* was again recorded from the region of the type locality only after 52 years. Menozzi (1933) recorded workers and one male, collected in Jericho from beneath the bark of a sycamore tree. The specimens were sent to him for identification by Prof. F.S. Bodenheimer of the Hebrew University, Jerusalem. Menozzi described the male of the species. Additional specimens were found in Israel more recently, especially by the junior author during 1987–89, in conjunction with a work on ants in pine forests in Israel for an M.Sc. thesis (Soussan, 1990). Since the original descriptions of the worker and male of *L. flavispinus* are short, without illustrations and measurements, and the queen was not described at all, we found it worthwhile to describe the queen and redescribe the worker and the male. Some biological observations are reported, among them that the female lays eggs of different shapes, large reproductive and small nutritional ones.

*Leptothorax flavispinus* André, 1881  
(Figs. 1–11)

*Leptothorax nigrata* var. *curvispinosus* André, 1881:72 (name preoccupied by *Leptothorax curvispinosus* Mayr, 1866).

*Leptothorax nigrata* var. *flavispinus* André, 1883:301–302 (replacement name).

*Leptothorax flavispinus* André; Forel, 1905:172.

*Leptothorax flavispinus* André; Menozzi, 1933:67.

### Measurements and indices

The following abbreviations, measurements and indices are used in the descriptions: total length (TL); head length (HL); head width (HW); cephalic index (CI) =  $(HW \times 100)/HL$ ; eye length (EL); ocular index (OI) =  $(EL \times 100)/HW$ ; scape length (SL); scape index (SI) =  $(SL \times 100)/HW$ ; pronotal width (PW); alitrunk length (AL).

#### Worker (Fig. 1)

TL 2.32–3.2, HL 0.64–0.84, HW 0.44–0.72, CI 69–86, EL 0.12–0.2, OI 27–28, SL 0.42–0.64, SI 89–95, PW 0.32–0.44, AL 0.76–1.04 (57 specimens measured).

Color of head brownish-black, alitrunk dark reddish-brown, petiole and postpetiole dorsally brownish-black, ventrally brown, gaster shiny brownish-black, scapus and club brown, other funicular segments and mandibles brown, basal parts of legs dark brown, tibiae and tarsi light brown, propodeal spines yellow.

Head with strong longitudinal rugae, with fine reticulation between rugae; posterior margin of head straight, rounded at corners, lateral margins slightly converging from eyes to mandibles; eye oval, slightly closer to base of mandible than to hind margin of head, with 15 ommatidia in the longest row. Antenna with 12 segments, scapus not reaching hind margin of head, first funicular segment twice as long as wide, segments 2–9 as long as wide or wider than long, last 3 segments form a narrow club, first and second club segments only slightly longer than wide, and the last segment twice as long as wide.

Alitrunk, wider, anterior with only slightly rounded shoulders. Sculpture similar to that of head; meso-propodeal depression barely visible, yellow propodeal spines curved, pointed, much longer than distance between their bases.

Petiole in lateral view with long peduncle, petiolar node with blunt triangular dorsal margin; in dorsal view slightly longer than wide, and slightly narrower than postpetiole; petiole strongly rugose, postpetiole granulose.

Gaster with fine striae on first segment. Head, alitrunk, petiole, postpetiole and gaster with numerous stout, blunt, straight, yellowish hairs.

#### Female (Figs. 2, 3)

TL 4.4–5.36, HL 0.84–0.92, HW 0.46–0.80, CI 87–90, EL 0.2–0.24, OI 26–30, SL 0.6–0.68, SI 79–85, PW 0.83–0.85, AL 1.48–1.52 (15 specimens measured).

Color brownish-black, gaster black, mandibles and tarsi brown, propodeal spines dark yellow. Head, alitrunk, petiole and postpetiole strongly rugose, rugae on alitrunk finer than on head, anterior part of first gastral segment with fine striae. Eyes larger than in worker, with 22 ommatidia in the longest row, 3 well-developed ocelli; antenna similar to that of worker.

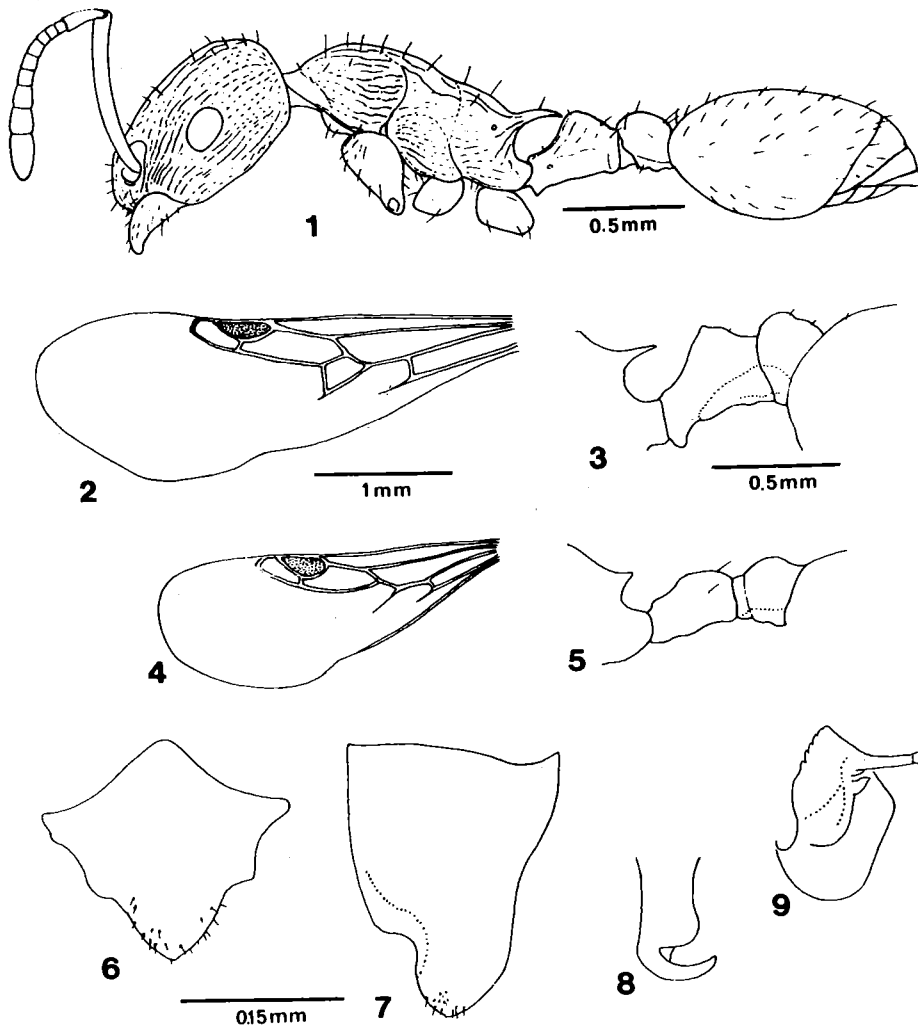
Mesoscutum of alitrunk flat, propodeal spines straight, thicker and shorter than in worker, shorter than distance between their bases.

Petiole similar to that of the worker but in lateral view with more angular node and shorter peduncle. Postpetiole shorter than in worker, its length  $3/4$  of its width. Anterior wing with large brown pterostigma and closed marginal and discal cells.

#### Male (Figs. 4–9)

TL 3.2–4.1, HL 0.55–0.6, HW 0.48–0.52, CI 86–87, EL 0.2–0.24, OI 41–46, SL 0.20–0.24, SI 41–46, PW 0.60–0.68, AL 1.04–1.12 (25 specimens measured).

Color brownish-black, antennae, mandibula and legs brown. Head, alitrunk, petiole and postpetiole rugose, rugae finer than in worker and queen; gaster shiny. Head narrower anteriorly; eyes large, with 26 ommatidia in the longest row, placed anterior to the middle of head sides; antennae 13-segmented, scapus reaching only anterior ocellus, last 4 funicular segments much longer than wide, forming a narrow club; mandibula with 5 small teeth. Scutum in profile strongly



Figs. 1-9. *Leptothorax flavispinus* André. 1. ♀. 2. ♀, wing. 3. ♀, propodeal spine, petiole, postpetiole. 4. ♂, wing. 5. ♂, propodeal tooth, petiole, postpetiole. 6. ♂, subgenital plate. 7. ♂, squamula + stipes. 8. ♂, volsella. 9. ♂, sagitta.

convex, propodeum with a pair of short teeth, very wide at their base. Petiole with short peduncle, in lateral view petiolar node dorsally rounded, in dorsal view long with nearly parallel sides, postpetiole 1.4 times as wide as long. Wing similar to wing of queen but without discal cell; only one specimen with incomplete discal cell.

Genitalia as figured (Figs. 6-9).

#### DISTRIBUTION AND BIOLOGICAL OBSERVATIONS

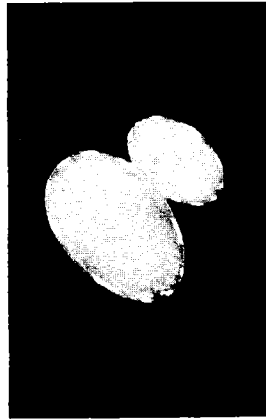
In Israel *Leptothorax flavispinus* is known from different parts of the country: Mikhmoret, Yafo, Ashqelon (Coastal Plain), Ofer (Carmel ridge), Eshta'ol (Foothills of Judea), Tomer (Jordan

Valley) and Jericho (Dead Sea area). The specimens from the different regions do not show clear differences in color or morphology. Conversely, specimens from the western part of North Africa (Tunis, Algeria and Morocco), named *Leptothorax flavispinus*, are variable in color and morphology, and were described as 8 different variations or subspecies. It is possible that the African forms belong to a different species. This also seems to be the opinion of Menozzi (1933) who wrote that the distribution of *L. flavispinus* sensu stricto is restricted to Palestine.

*Leptothorax flavispinus* lives in small colonies beneath the bark of trees (sycamore, pines) and in empty galls of *Amblypalpis olivierella* (Gelechiidae) on tamarisk trees. The nuptial flight takes place in June–July. In the laboratory, it was observed that the queen begins laying eggs about 2 weeks after mating. She lays 2 kinds of eggs (Figs. 10–11): large (length 0.5 mm) reproductive eggs and smaller (length 0.3 mm) nutritive eggs that serve to feed the larvae. A virgin queen was observed laying nutritive eggs only.



10



11

Fig. 10. *Leptothorax flavispinus*, queen, worker, reproductive and nutritive eggs.

Fig. 11. *Leptothorax flavispinus*, reproductive egg (left) and nutritive egg (right).

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