

# Fig wasps from Israeli *Ficus sycomorus* and related East African species (Hymenoptera, Chalcidoidea)

## 1. Agaonidae

by

J. T. WIEBES

*Rijksmuseum van Natuurlijke Historie, Leiden*

Dr. J. GALIL, of Tel-Aviv University, sent to me a sample of fig wasps from *Ficus sycomorus*, collected at Tel-Aviv, Israel. Some insects from the same locality were also received from Dr. H. BYTINSKY-SALZ. Later, Dr. GALIL sent more wasps from the same or a related species of *Ficus* collected in Ethiopia and Tanganyika. Dr. L. D. BRONGERSMA brought home to the Leiden Museum some galled figs of *Ficus* cf. *sycomorus* from Nubia.

There is no doubt that the wasps from Israel were collected from *Ficus sycomorus* L., but the identification of the other host *Ficus* remains uncertain. The botanical material of the Ethiopian sample consisted of figs only, and Mr. E. J. H. CORNER could not confirm the specific identity without leaves. The figs in the subgenus *Sycomorus* are very similar. The *Ficus* from Tanganyika were more adequately sampled, and I hope to be able to record the names in a later paper.

The following species of Agaonidae were found in the samples mentioned above, or were previously recorded from *Ficus sycomorus*.

### *Ceratosolen* Mayr

The material consists of several samples of *Ceratosolen*. None of the specimens agrees with *C. arabicus* Mayr, which seems to be the normal pollinating wasp of *Ficus sycomorus*. After having compared the material with the original description of *C. arabicus* Mayr (1906: 154; ♀: "... das sechste [Fühlerglied], das längste, mehr wie 3—4 mal so lang wie dick...", ♂: "... das vierte Fühlerglied (das vorletzte) ist sehr deutlich kürzer als das Endglied..."), and with the illustrations by GRANDI (1917: fig. iv, 2 and vi, 1—2), I am convinced that it represents a new species. It can at once be differentiated by the short sixth antennal segment of the female, and by the short third antennal segment of the male, next to the long sub-apical one.

Upon my request, Dr. GRANDI kindly sent some specimens of *C. arabicus* recorded by him (1917: 25) from Ghinda, Eritrea, for comparison with my specimens. Two females and one male correspond to the descriptions by MAYR and GRANDI. The other male, however, shows a short third antennal segment, and the fourth segment is distinctly longer than the fifth (fig. 14).

Dr. GRANDI (1964, in litt.) informed me that the sample from Ghinda was preserved as received from ROSSETTI; but it is not certain that all specimens were collected from one fig, or even from one tree. Except for the aberrant male, the sample from Ghinda, as well as that from Keren seem to belong to *C. arabicus*, although GRANDI evidently did not compare all specimens with the description.

It is difficult to arrive at a satisfactory conclusion as to the status of the new form

under discussion. Although the find of both *C. arabicus* and the new form in the same sample points to the contrary, the differences are supposed to be of specific value, pending the examination of more and better material with more exact host records.

### *Ceratosolen arabicus* Mayr

*Ceratosolen arabicus* Mayr, 1906: 154 [descr. ♀, ♂, ex *Ficus sycomorus* L., Gebel Bura (Yemen), leg. Hille, i—1889]; Grandi, 1916: 150, 152 [key ♀, ♂]; Grandi, 1917: 15—25, fig. iii—vii [descr. ♀, ♂, ex *Ficus sycomorus* L., Keren, and Ghinda (Eritrea), leg. G. Rossetti, 1914]; Grandi, 1928: 170—171 [type specimens studied]; ?Masi, 1951: 210 [ex *Ficus sycomorus*, Caschei (SW. Ethiopia)]; Grandi, 1963: 304 [Somalia].

Material. — Two ♀, 1 ♂, Ghinda (Eritrea), 1914, ex coll. GRANDI; coll. Museum Leiden, no. 693; ♀ antenna, legs I, III, slide no. 693b.

Remark. — *Ceratosolen arabicus* does not appear to occur in Israel or Egypt. CARMIN & SCHEINKIN (1931) refer to botanists who are of the opinion that *Ficus sycomorus* was introduced into Israel and Egypt; apparently without its pollinating symbiont, although with *Sycophaga sycomori* (L.) and *Aprocrypta longitarsus* Mayr.

### *Ceratosolen galili* spec. nov.

Material. — Series ♀, ♂, ex *Ficus* ? *sycomorus*, Addis Abeba (Ethiopia); coll. Museum Leiden, no. 692; holotype, ♂, slide no. 692a, allotype, ♀, slide 692c, paratypes, ♀, ♂, slides 692b, d.

One ♂, Ghinda (Eritrea), 1914; ex coll. GRANDI; coll. Museum Leiden, no. 693a (slide-mounted).

Series ♀ (immature), 2 ♂, ex *Ficus* ? *sycomorus*, near Lake Manyara (Tanganyika), X.1963; coll. Museum Leiden, no. 694; ♂, slide no. 694a, ♀, slide 694b.

? Series ♀, ♂, ex *Ficus* ? *sycomorus*, Arusha (Tanganyika), X.1963; coll. Museum Leiden, no. 695; ♂, slide no. 695a, ♀, slide 695b.

Description. — Male. Length of the head (fig. 10) nearly one and a half times the maximum width, and twice the anterior width. Epistomal ridge trilobate, the lateral lobes more prominent than the mid one. Antennal grooves nearly closed. Eyes absent. Pubescence short. Antenna (fig. 13) five-segmented; the scape (12 : 5) not quite twice as long as the pedicel (7 : 3); the first flagellar segment (3 : 2) annuliform, with a long dorsal hair and a stout, blunt spine at the ventro-apical side; second flagellar segment (10 : 3) but little shorter than the scape, with dorsal and lateral hairs as in figure; apical segment (9 : 3) nearly as long as the penultimate, with a dorso-lateral hair. Maxillae as in *C. arabicus*, but the lobes wider than figured by GRANDI (1917: fig. vi, 5); the labium not clearly visible in the specimens studied. Mandible, fig. 4.

Thorax, fig. 10. Pronotum about twice as long as wide anteriorly; the posterior width smaller than the length [17 : 22]. Mesonotum transverse, one-fifth wider than long, with rounded sides. Metanotum and propodeum narrowly fused, narrower than the other sclerites; the propodeum tapering caudad, but the sides more nearly parallel than is usual in the group. Fore leg, fig. 3. Tibia with three dorso-apical teeth and two ventrals; the tarsus consisting of two segments, which are

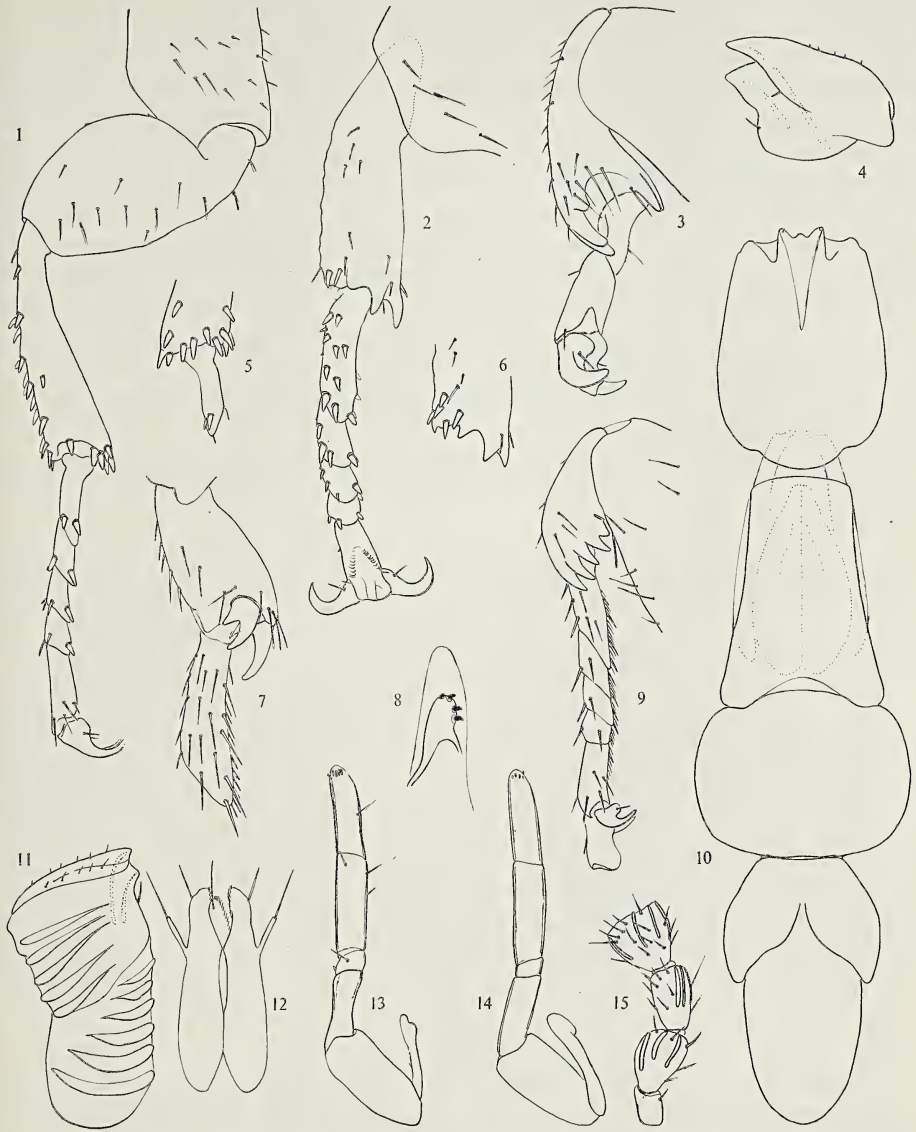


Fig. 1—15. *Cerasosolen galili* spec. nov. 1—5, male holotype; 1, mid leg, retrolateral aspect; 2, hind leg, prolateral aspect; 3, fore leg, retrolateral aspect; 4, mandible; 5, mid leg, prolateral aspect of tibia-apex and metatarsus; 6, male no. 693a, tip of hind tibia in prolateral view; 7, female allotype, tibia and metatarsus of hind leg, prolateral aspect; 8, male paratype, cercus of tenth urite and paramere; 9, female allotype, tibia and tarsus of fore leg, retrolateral aspect; 10, head and thorax of male holotype; 11, 12, female allotype, trophi; 13, male holotype, antenna, dorsal aspect; 14, male no. 693a, antenna, dorsal aspect; 15, female paratype, fourth to seventh antennal segments, axial aspect.

Fig. 1—7, 9, 11—15,  $\times 125$ ; 8,  $\times 200$ ; 10,  $\times 50$ .

subequal in length, the first segment narrow, with small excrescences at the plantar edge, the second segment much wider. Mid leg, fig. 1. The coxa is somewhat shorter than femur and trochanter combined, but its width is equal to the maximum width of the femur; both segments with long hairs. Tibia as long as the tarsus, with rows of spines along the dorsal margin and several spines near the apex, both axially and antaxially (fig. 5). Tarsus five-segmented, the segments with apical spines or hairs (the first segment with two spines, the second and fourth with three, the third with four, the apical segment with hairs only); the segments approximately in ratio 8 : 4 : 4 : 3 : 7. Hind leg, fig. 2. Relative proportions as in *C. arabicus* (GRANDI, 1917: fig. vi, 7), but the femur with rather long hairs; the tibia without spines, except apically; the tarsal segments approximately in ratio 13 : 5 : 4 : 2 : 6; the first to fourth segments with a decreasing number of spines, the apical segment with hairs only.

Gaster. Cerci of the tenth urite with four claws (cercus and paramere, fig. 8); the penis dilated apically.

Length (head + thorax + propodeum), 2.4 mm. Colour uniformly yellowish brown.

Female. Head about as long as wide across the compound eyes. Longitudinal diameter of the eye slightly larger than the cheek. Face moderately pubescent. Lateral expansions of the epistomal margin rounded. Antenna (fig. 15) pubescent; the scape two and a half times as long as the pedicel; the pedicel with approximately seventy spines on the axial surface; the third segment robust, the appendage rather blunt. The fourth segment small, about half as long as the fifth; the fifth segment wide, with seven large sensilla; the sixth narrower than the fifth, but about as long, with five sensilla; the seventh segment shorter than the fifth, with nine sensilla; the eighth shorter than the seventh, five-sevenths the length of the fifth, with six sensilla; the ninth segment as long as the seventh, shaped so as to form a club with the apical segments, with eight sensilla; the tenth and eleventh segments fused, with two rows of eight and three oblong sensilla, and some circular pits on the antaxial surface. The sensilla are situated in straight rows, and not alternating as in *C. arabicus* (GRANDI, 1917: fig. iv, 2). Labium and maxillae (fig. 12): the bacilliform processes not more than one-fifth the length of the maxilla. Mandible (fig. 11) with five ventral ridges, the appendage with six.

Thorax as in *C. arabicus* (GRANDI, fig. iv, 1); nearly glabrous. A few hairs occur above the propodeal spiracle; more hairs are situated next to and below the spiracle, though not as much as drawn in GRANDI's figure. Fore wing (2 : 1), 2.0 mm long; the submarginal, marginal, stigmal, and postmarginal veins in ratio 24 : 11 : 7 : 13; the submarginal vein with three pustules, the stigma with four pustules in a straight row. Hind wing (4 : 1), 1.2 mm long. Both wings are pubescent, except for the proximal fifth of the fore wing; they bear no darker veins as indicated by GRANDI (1917: fig. iii, 6) for *C. arabicus*. Fore leg, fig. 9. The femur is one and a half times as long as the coxa, and more than twice the length of the tibia. The tibia bears five apical teeth, the ventralmost of which is blunt. The tarsus has fimbriated ventral edges; hairs and spines as in the figure; the segments approximately in ratio 15 : 6 : 5 : 4 : 9. Mid leg slender; the tibia nearly as long as femur and tro-

chanter combined, with a ventro-apical spur; the tarsal segments with spines at the apices, the first moreover with a pair of spines at one- and two-thirds of the length; the segments approximately in ratio 12 : 7 : 6 : 4 : 5. Hind leg, fig. 7. The femur but little longer than coxa and trochanter combined, with long pubescence. The tibia more than half as long as the femur, with two bidentate, ventro-apical teeth, and with a hyaline ridge along the dorso-apical edge. The tarsus rather wide, with hairs and spines; the ventral edge fimbriated; the segments approximately in ratio 17 : 9 : 8 : 6 : 8.

Gaster. Ovipositor one-quarter longer than the gaster.

Length (head + thorax + gaster), 2.0 mm. Colour dark brown, the extremities lighter.

Remarks. — The antennal characters of the male no. 693a were already mentioned. In the chaetotaxy of the legs, the male from Ghinda is somewhat different from the type-lot of *C. galili*, but this difference is bridged by the specimens from Tanganyika (no. 694). The variation exists in the number of ventro-apical spines of the mid tibia (where there may occur more than drawn in fig. 5), in the dorso-marginal spines of the mid femur (the spines may be larger and more in number than in fig. 1), and in the dorso-apical spines of the hind tibia (stouter than drawn in fig. 2, e.g., in coll. no. 694a, or more in number: no. 693a, fig. 6). The length of the hind tarsus is somewhat variable.

The females of coll. no. 694, not fully mature and therefore not studied in the usual detail, correspond to the description of *C. galili*.

The specimens of coll. no. 695 are aberrant in several respects. The males are slightly larger than those of no. 692, and the relative proportions of the antennal segments are different: especially the pedicel is notably shorter than in the other samples. The head bears small eyes. The female head is rather short, the antennal segments bear more complete rows of sensilla, the bacilliform processes are about one-quarter of the length of the maxilla, and the fore tibia bears only four dorso-apical teeth. These differences may fall within the normal variation of the species. I recall that for *C. arabicus* too, the apical dentation of the fore tibia was described by GRANDI (1917: 19) as "4—5 dentata". Tentatively, the sample is referred to *C. galili* spec. nov.

#### References

- CARMIN, J. & D. SCHEINKIN, 1931. The fauna of Palestinian plants. 2. *Ficus sycomorus* Linn. — *Bull. Soc. Ent. Egypte* (N.S.) 15 : 164—187, fig. 1—178, diagr. 1—2.
- GRANDI, G., 1916. Gli Agaonini (Hymenoptera Chalcididae) raccolti nell' Africa occidentale dal Prof. F. Silvestri. — *Boll. Lab. Zool. Portici* 10 : 121—286, fig. i—lii.
- , 1917. Contributo alla conoscenza degli Agaonini (Hymenoptera Chalcididae) dell' Eritrea e dell' Uganda. — *Bull. Soc. Ent. Ital.* 48 : 3—42, fig. i—xii.
- , 1928. Revisione critica degli Agaonidi descritti da Gustavo Mayr e catalogo ragionato delle specie fino ad oggi descritte di tutto il mondo. — *Boll. Lab. Ent. Bologna* 1 : 107—235, fig. i—xlv.
- , 1963. Catalogo ragionato degli Agaonidi del mondo descritti fino a oggi (6a edizione). — *Boll. Ist. Ent. Univ. Bologna* 26 : 319—373.
- MASI, L., 1951. Missione biologica Sagan-Omo diretta dal Prof. Edoardo Zavattari (1939). Hymenoptera Chalcidoidea. — *Ann. Mus. Civ. Stor. Nat. Genova* 65 : 173—210, fig. 1—10.
- MAYR, G., 1906. Neue Feigen-Insecten. — *Wien. Ent. Ztg.* 25 : 153—187.