

DESCRIPTIONS OF TWO SPECIES OF EUCHARITIDAE DAMAGING
TEA, WITH COMPARATIVE NOTES ON OTHER SPECIES
(HYM., CHALCIDOIDEA).

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(PLATE IX.)

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The main rôles of the Hymenoptera parasitica in agriculture and forestry, as primary parasites or hyperparasites of noxious or beneficial insects, are extremely well known. It is also well known that a very much smaller number of species, in several groups, act as gall-causers or feed within and on the substance of seeds. A very little known and quite unexpected status is that of adult Eucharitidae of the genus *Orasema* causing damage to crop plants through their oviposition.

The first study of the biology of this genus was made by Parker (1942) who, working in Argentina, observed the oviposition of a species near *acnea* Gah. on leaves of *Muchlenbeckia* (fam. Polygonaceae), which is not a crop plant. The adult female lays a large number of eggs, mostly in rows, on the underside of the leaf (Parker's fig. 1), and the mechanical injury causes the leaves to turn light brown.

Since that time, *O. costaricensis* Wheeler & Wheeler has been observed ovipositing in young banana fruits "so industriously . . . that the fruit was unfit for market" (B. D. Burks, 1963, personal communication).

An affliction of tea known as 'sewing blight' was reported on by G. M. Das (1954), who found it to be due to the oviposition by a Chalcid wasp of rows of eggs in young leaves and buds. Only a few specimens of the adult Chalcid were preserved; these were submitted to the Commonwealth Institute of Entomology in 1955 and were referred to the genus *Orasema*.

A further outbreak occurred in Assam in 1962 and this time the biology of the causative agent was studied by Dr. Das (Das, 1963), and a larger number of specimens preserved. These also were referred to the genus *Orasema*, and Dr. Das requested that a name be made available for the species he had studied. Further investigation showed that the insect submitted in 1955 represented a different, though closely related, species, and this is here described in comparison with the 1962 species. For comparison with the latter, *O. minutissima* How. has been redescribed, and, so far as practicable, the unique type of *O. smithi* How. has been redescribed in comparison with that. It is found that *Semora* Cam. 1909 is a synonym of *Orasema*.

The ovipositor in this genus is a powerful weapon with teeth on the dorsal valves, and it is no wonder that the act of oviposition causes damage to the plant tissue. It is of interest that a similar affliction of the leaves of young tea plants has recently been observed in Ceylon by Mr. J. E. Cranham, of the Tea Research Institute of Ceylon, and he has very kindly agreed to the publication here of a photograph of the leaves thus affected (Pl. IX). It seems very probable that the causative agent was closely related to the species now described.

Genus *Orasema* Cameron 1884

- 1884 *Orasema* Cameron, *Biologia Centrali-Americana*. Insecta. Hymenoptera 1 pp. 101, 104.
 1909 *Semora* Cameron, *Trans. Amer. ent. Soc.* 35 pp. 432-433 (non Peckham 1892): syn. n.
 1946 *Semorella* Ghesquière, *Rev. Zool. Bot. afr.* 39 p. 368: syn. n.
 1947 *Semorata* Strand, *Folia zool. hydrobiol.* 11 p. 393: syn. n.

Cameron in 1884 based his genus *Orasema* on a single species from Panama. Prior to 1910, nine other species had been attributed to this genus and Howard (in Riley, Ashmead & Howard, 1894) had attributed three specimens from St. Vincent to the type species. The single specimen in the British Museum collection that bears both a printed label "St. Vincent" and a manuscript label in Howard's writing is a female that, however, belongs to quite another species.

In 1909, Cameron described a species, *xanthopus*, from the Argentine, which he placed in another new genus, *Semora*. He wrote that *Semora* came nearest to *Orasema* but differed in the more elongate antennal segments, more elongate abdominal petiole, and more elongate "second abdominal segment which envelops all the others".

The unique type of *S. xanthopus*, which is in the British Museum (Natural History), I believe to be male, not female. The funicle segments, except the basal one, are less than one and a half times as long as broad, and the petiolar segment is about 2.2 times as long as broad. I believe that Cameron failed to observe the hind margin of the first large tergite, which extends about five-sixths of the way back from the apex of the petiolar segment. I consider the species to come clearly within the limits of the genus *Orasema* as all other authors have understood it. It does not seem to agree with the description of any Argentinian species proposed by Gemignani. In the key of Gahan (1940) it would run with *coloradensis* Wheeler and *minuta* Ashm.: the petiole has a pair of dorsal keels which diverge anteriorly and a pair of lateral keels, the keels extending from in front less than half the length of the segment.

In consequence, the names proposed by Ghesquière and by Strand for *Semora* Cameron 1909 non Peckham 1892 also fall in synonymy.

Orasema minutissima How.

- 1884 *Orasema minutissima* Howard, *J. Linn. Soc. (Zool.)* 25 p. 84.
 1940 *Orasema minutissima*: Gahan, *Proc. U.S. nat. Mus.* 88 pp. 437-438, 446-447.

Gahan (1940) redescribed this species on the basis of four female paratypes in the U.S. National Museum. The following redescription is made from eight females and three males in the British Museum (Natural History), including the holotype.

Head, seen from above (fig. 1), not strongly transverse, with no sharp occipital margin and with ocelli remote from hind end of head; in facial view (fig. 2) of moderate length, and with a pair of longitudinal furrows a little nearer to eye margins than to toruli. Scrobal impression almost parallel-sided, not appreciably broadened to sides of toruli. Supra-clypeal area rather broader than high, delimited by more or less distinct furrows at sides and below. Sculpture on head finely reticulate: clypeus almost smooth.

Antennae relatively elongate, with funicle segments especially well-separated, the sixth and seventh each much longer than broad: club slightly expanded, about equal in length to the last three funicle segments, the first club segment almost as well-separated as the funicle segments.

Thorax with notauli sharp behind, broad and deep anteriorly. Reticulate

sculpture on mesepisterna, scutellum, propodeum and petiolar segment about as on frontovertex, on mid lobe of mesoscutum rather coarser, and on the shining scapulae and axillae much weaker: propodeum with distinct median keel, and the reticulate sculpture on sides almost as strong as on the upper face. Petiolar segment of female 2.2 to 2.8 times, of male about six and a half times, as long as broad, with median and lateral keels not strong but extending from base for much more than half the length of the segment.

Fore-wing with postmarginal vein about one-third length of marginal (the outer limit of postmarginal rather difficult to make out).

Legs more slender in male than in female: hind coxae very weakly reticulate above in female, much more strongly so in male.

Length little more than 1 mm.

Head, thorax, propodeum and petiolar segment bright blue-green, overspread to a greater or lesser extent with peacock-blue to red-violet. Gaster brown, overspread with blackish to bronzy. Antennae very pale testaceous, somewhat darkened above. Legs pale testaceous: coxae brown, with metallic coloration that is weak in female, quite strong in male.

***Orasema smithi* How.**

1897 *Orasema smithi* Howard, *J. Linn. Soc. (Zool.)* 26 p. 134.

1940 *Orasema smithi*: Gahan, *Proc. U.S. nat. Mus.* 88 pp. 437-438, 447.

Gahan (1940) classified this species as standing next to *minutissima* and made a comparison with that species, based on nine specimens identified as *smithi*. The following comparison is based on the female holotype.

The differences from *O. minutissima* are noted as follows. Head, seen from above, much more strongly convex than in *minutissima*; in facial view (fig. 3) with no trace of such longitudinal furrows. Head sculpture rather fine to moderate, weaker but very distinct on clypeus and on upper part and sides of supra-clypeal area, which do not appear smooth.

Antennae with scape about four times as long as broad (broken off beyond anellus).

Mesoscutum with reticulate sculpture much as on head: scutellum similar except in middle, where it is broadly alveolate and rather shining: axillae very finely reticulate, not shining: (remainder of thorax, propodeum and petiole obscured in the unique type). Petiolar segment (♀) about one and a half times as long as broad. (Legs largely obscured in the unique type.)

Length over 1.5 mm.

Gaster in part violaceous.

***Orasema assectator* sp.n.**

Head, seen from above, strongly transverse, with occipital margin sharply folded in middle and with ocelli almost touching that margin; in facial view (fig. 6) short and with such furrows as are found in *minutissima* either absent or less conspicuous. Scrobal impression broadened to a greater or less extent to sides of toruli. Shape of clypeus inconstant, more rounded in some specimens than others; supra-clypeal area normally convex, approximately quadrate, delimited by more or less distinct furrows at sides and below. Sculpture on head for the most part moderately reticulate, not notably coarser between lateral ocellus and eye, decidedly finer on genae, and extremely fine but quite distinct on supra-clypeal area and clypeus.

Antennae (fig. 9) with scape about four times length of its greatest breadth, about parallel-sided in basal half, thence narrowed to apex, with pedicellus almost globular; with anellus and postanellus together almost twice as long as broad,

the latter expanded to apical third; with remainder of funicle cylindrical; club slightly expanded, about equal in length to last three funicle segments, its segments separated by normal sutures.

Thorax, through weak sclerotization, liable to be thrown into irregular folds in death. Notauli broad and deep throughout. Mesonotum, mesepisterna, propodeum between spiracular sulci, and petiolar segment with moderate reticulate sculpture much as on frontovertex, though coarser on fore part of mesoscutum: mesepimera and sides of propodeum shining and with sculpture very much weaker. The propodeum is uniformly sculptured between the spiracular sulci, and has no trace of median keel. Petiolar segment not much longer than broad, sculptured like the propodeum, without dorsal or lateral keels.

Fore-wing with venation as figured (fig. 7).

Fore femora almost parallel-sided in female, distinctly expanded to near base in male.

Ovipositor as in fig. 10.

Length 1.5 to 1.9 mm.

Head, thorax, propodeum and petiolar segment dark steely blue to blue-green. Gaster brown, overspread with blackish to bronzy. Antennae pale testaceous, somewhat darkened in male. Legs in greater part stramineous: coxae in greater part, or at least at base, concolorous with thorax, merging to pale brown at apex: femora in greater part pale brown with weak but very distinct metallic reflection, and tibiae near base and tarsi above near apex slightly so darkened.

Described from the following material—INDIA, Assam, 16 ♀♀ (one the holotype), 4 ♂♂, ex *Pheidole* sp. nesting under tea plants, 1962 (*G. M. Das*). Holotype and paratypes in British Museum (Natural History); paratypes in U.S. National Museum and in collection of Zoological Survey of India.

Orasema initiator sp.n.

Differs from *O. assectator* as follows: head, seen from above (fig. 4), more deeply emarginate behind, and with reticulate sculpture notably coarser between lateral ocellus and eye; in facial view (fig. 5) with cheeks more buccate, and with supra-clypeal area and clypeus smooth and shining. Supra-clypeal area strongly and broadly raised in mid line, not distinctly delimited at sides or below.

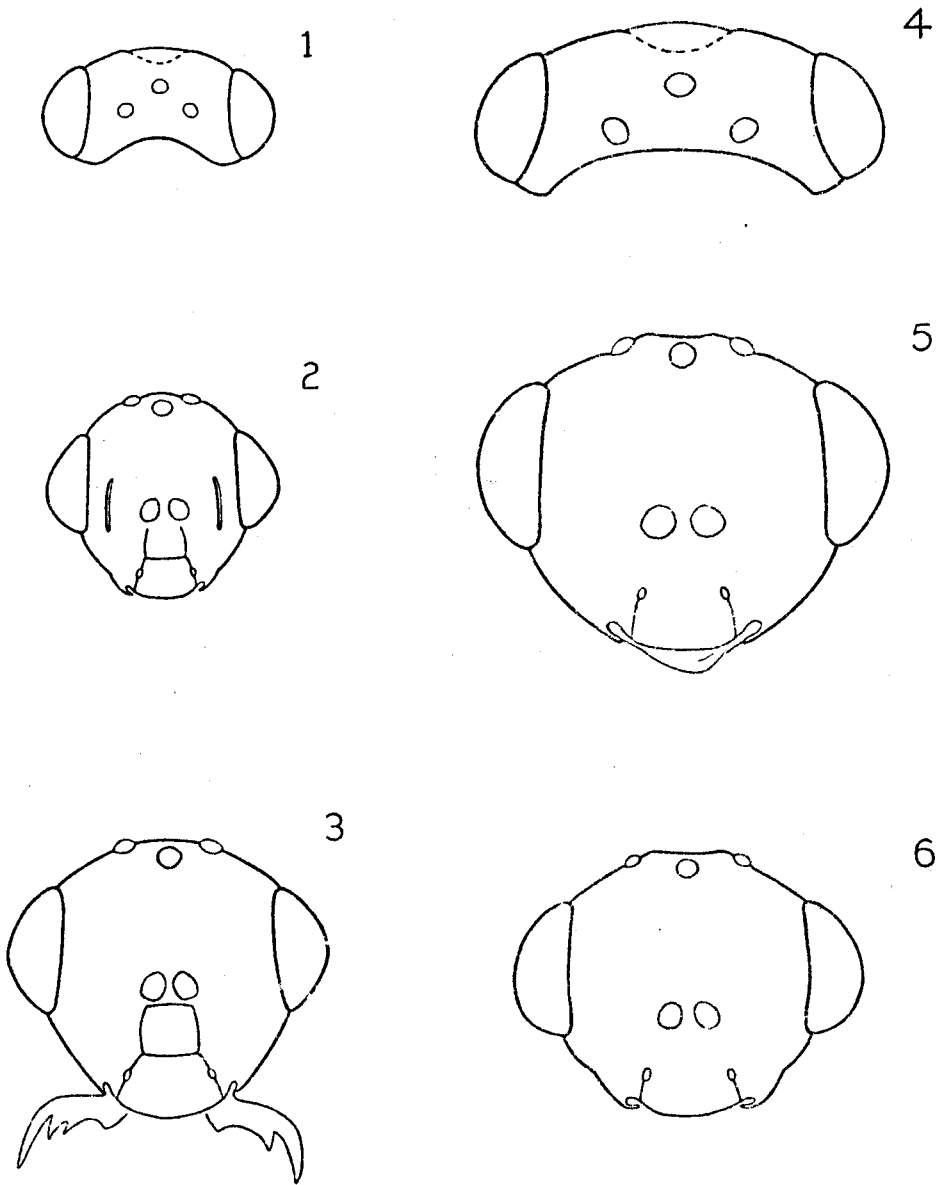
Antennae relatively a little longer, the anellus and postanellus together about two and a half times as long as broad, the sixth and seventh funicle segments each slightly longer than broad.

Thorax having mesepisterna and mid lobe of mesoscutum regularly reticulate as on frontovertex though a little finer: scapulae near notauli and axillae, like the mesepimera and sides of propodeum, shining and with sculpture very much weaker: scutellum irregularly rugulose-reticulate: propodeum between spiracular sulci broadly alveolate along fore margin and near mid line, with a more or less distinct median keel, behind and beside the alveoli more shining, with weak diagonal striae and fine microsculpture. Petiolar segment about one and a half times as long as broad, with rather coarse reticulate sculpture, with distinct median and sublateral keels.

Legs, like the antennae, relatively a little longer than in *assectator*. Forewings with venation as figured (fig. 8), the postmarginal relatively shorter than in *assectator*. Ovipositor of the same type as in *assectator*: (no study of possible interspecific differences has been made). Length about 2.4 mm.

Head, thorax, propodeum and petiolar segment dark steely blue. Antennae very pale testaceous, with slight darkening at base of pedicellus and on funicle.

Described from the following material—INDIA, Assam, 1 ♀ (holotype), 2 ♂♂, on tea plants, 1954 (*G. M. Das*). Holotype and paratypes in British Museum (Natural History).

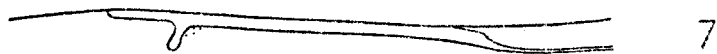


Figs. 1-6.— (1) *Orosema minutissima* How., head of ♀, seen from above; (2) the same, in facial view; (3) *O. smithi* How., head of ♀ in facial view; (4) *O. initiator* sp.n., head, seen from above; (5) the same, in facial view; (6) *O. assectator* sp.n., head in facial view.

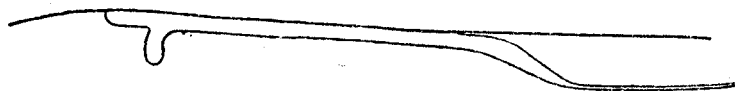
Comparisons of species.

As mentioned in the introduction, *O. assectator* is described in comparison with *O. minutissima*, the species in the British Museum collection with which it could best be compared though not closely related to it, and *initiator* is described

in comparison with *assectator*. Both the new species are obviously distinct from *minutissima* in that the ocelli are near the eye margin, whereas they are remote from it in *minutissima* (cf. figs. 4 and 1).



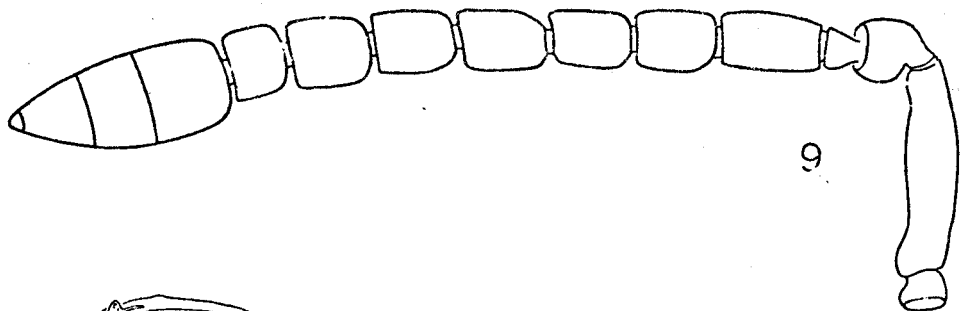
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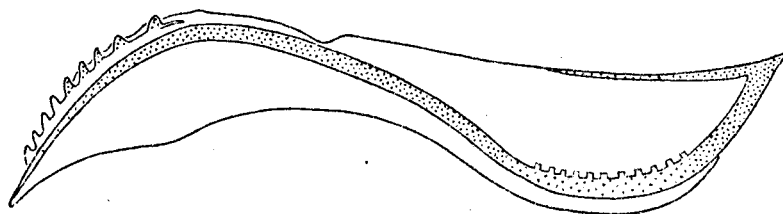
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Figs. 7-8.—Part of left fore-wing of: (7) *O. assectator* sp.n., (8) *O. initiator* sp.n

In the key to species given by Gahan (1940), *assectator* would differ from *bakeri* Gah. in that the female petiole is distinctly a little longer than broad, and from *cockerelli* Gah. in that the scapulae are not obviously more weakly sculptured and shining than the prescutum. *O. initiator* has the female petiole about one and a half times as long as broad, i.e., much longer than as described for *bakeri* and much shorter than as described for *viridis* Ashm., from which it differs also in colour.



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Figs. 9-10.—*O. assectator* sp.n.: (9) left antenna in sinistro-lateral view; (10) ovipositor in dextro-lateral view.

It was not convenient for the authorities of the U.S. National Museum to send specimens of *O. bakeri* on loan at the particular time at which the request was made, so a pair of paratypes of *assectator* was sent to Dr. B. D. Burks who very kindly sent a list of the most obvious differences he noted:

assectator sp.n.
 length less than 2 mm.
 thorax blackish
 antennae inserted above level of lower eye margins
 antennae with first funicle segment obviously longer than second
 fore femora of female almost parallel-sided
 hind coxae with relatively weak sculpture: petiole with stronger, larger sculpture
 male petiole shorter than hind coxa

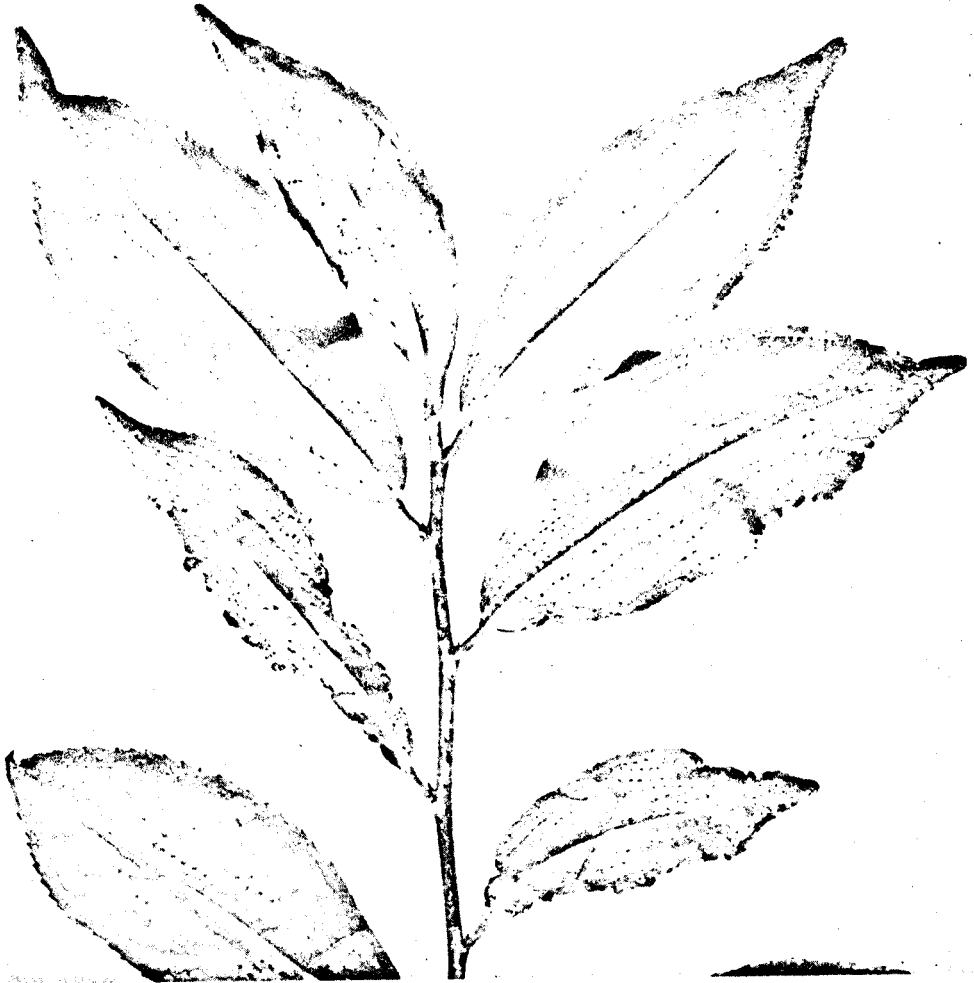
bakeri Gah.
 length of female more than 3 mm., of male more than 2½ mm.
 thorax decidedly green or blue-green
 antennae inserted at level of lower eye margins
 antennae with first funicle segment only slightly longer than second
 fore femora distinctly expanded in both sexes
 hind coxae strongly and closely sculptured: petiole with finer sculpture
 male petiole about twice as long as hind coxa

Summary.

Descriptions are given of *Orasema assectator* sp.n. and *O. initiator* sp.n. (Hym., Eucharitidae) from India, causing damage to the leaves of tea. For purpose of comparison, two species of the same genus are redescribed. The genus *Semora* Cameron is shown to be synonymous.

References.

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Tea foliage affected by 'sewing blight', Mount Vernon Estate, Ceylon.
(Photograph by Mr. D. J. Hettiarachi, reproduced by permission of Mr. J. E. Cranham,
Tea Research Institute, Talawakelle, Ceylon.)