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ADULT HYMENOPTEROUS PARASITES ATTACHED TO THE BODY OF THEIR HOST

By C. T. Brues

BUSSEY INSTITUTION, HARVARD UNIVERSITY

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Entomophagous parasites exhibit many remarkable adaptations which enable them more easily to locate the hosts necessary for the development of their young. Most of them depend upon the acuteness of their senses and we find consequently that they are usually very active and commonly exhibit complicated instincts to aid them in their search. Many forms deposit their eggs directly within or upon the bodies of their host, seeking either the eggs or the larvæ of the host for this purpose. When oviposition in larvæ occurs, it is necessary of course that these be located by the parasites after they have attained the requisite size. When the eggs of the parasites are placed within the eggs of the host, the latter must be located soon after they have

been deposited. Among the parasitic Hymenoptera there are many species which oviposit in the eggs of the host insect. In such cases the adult female parasite usually discovers the eggs of the host after they have been left upon the foodplant, or wherever they are to develop. The location of the host eggs in this manner must involve great difficulties as they are frequently well concealed.

A unique method of eliminating some of these difficulties has recently come to my notice in connection with some small parasitic Hymenoptera of the family Scelionidæ. Some of the members of this group develop in the eggs of locusts, and occasionally the adults attach themselves to the body of the locust. They are thus carried about by the host, and when the locust deposits its eggs, they undoubtedly seize the opportunity and leave it to deposit their own in those freshly laid by the locust.

The accompanying photographs illustrate an example which recently came into my possession, where the parasites remain upon the body of the locust. There are four parasites, all females, each still firmly attached by the jaws to the abdomen of the locust, notwithstanding the fact that the latter was placed in alcohol and subsequently sent me by parcel post from India. The mandibles are imbedded in the body at the sutures between the abdominal plates, and in each case the posterior margin of the forward segment is pushed back distinctly at the point of attachment, affording a very secure hold for the mandibles. Quite possibly the insects may be able to cling more tightly by reason of a sharp tooth which projects from each cheek, although this tooth does not occur in related forms with similar habits.

I do not believe that this habit is very general among the Scelioids which have been bred from locust eggs, although it has already been noticed. Ashmead in his Monograph of the North American Proctotypidæ¹ having taken a female specimen of *Sceliomorpha bisulca* Ashm. "holding on to the elytron of a short winged locust," and he suggests that it is there for the purpose of locating the place where the eggs of the host will be deposited. In this case the observation was made in Florida, but the species of locust is not indicated.

The Indian example figured in the present note comes from Wala-janagar in South India, and is the common Jola or Deccan Grasshopper (*Colemania sphenarioides* Bolivar) which is a widely distributed species in India. Coleman who has studied this locust refers² to a small Hymenopterous parasite found in the eggs and it is probable that these parasites are the same species as the ones which I have received attached to the locust. As the species has not been described, a description is appended to the present note.

There seems to be no doubt that the behavior of these Hymenoptera in attaching themselves to the body of the locust is for the purpose of finding the eggs of the host more readily and it seems strange that the same method has not been adopted by other egg parasites. Possibly other large insects do not lend themselves so readily to this purpose, and it may be noted in this connection that both species of locusts which have been found with attached parasites are forms which do not have fully developed wings or tegmina in the female. Winged species might more easily disturb the parasites which cling only by the mandibles, and on account of their rapid movements might more easily evade the parasites.

In other groups of insects and also among Arachnids, there are familiar examples of small species which attach themselves to larger insects for the apparent purpose of transportation only. Thus certain mites are regularly found on the body of the housefly and similar flies, which presumably afford a convenient vehicle for migration, and also probably a source of food while in transit. In the case of certain mites of the genus *Greenia* which occur on large oriental bees (*Xylocopa*) a very peculiar relation exists between the two as the mites occupy a pocket in the basal segment of the bee's abdomen. Here, however, it has been assumed that the mites feed upon the pollen which adheres to the body of the bee.³ Certain myrmecophilous beetles (e.g. *Thorictus*) regularly travel attached to the antennæ of the ants, and similarly the remarkable myrmecophilous cockroaches of the genus *Attaphila* commonly travel on the bodies of the leaf-cutter ants with which they live.

The attachment by the mandibles of the small Scelionids described in the present note suggests strongly that they may secure nourishment by sucking the juices of the locust. If such be the case, the phenomenon is interesting in connection with the fact that many minute parasitic Hymenoptera regularly feed upon the drop of liquid which exudes from the puncture made by the ovipositor when they deposit their eggs in the eggs or larvæ of the host. In this case the feeding precedes the act of oviposition and bears no direct relation to it since Scelionids are parasitic upon the eggs and not the imagines of the locust.

It seems probable that the Scelionid belongs to the genus *Lepidoscelio* Kieffer⁴ which is based upon a species from Madagascar. As the type specimen of Kieffer's species had lost its antennæ and as the postscutellar scale appears to be less highly developed in the Indian species, I cannot feel sure that the two forms are congeneric.

? Lepidoscelio viatrix sp. nov.

♀ Length 4 mm. Black; legs, including coxæ, and antennæ, except club, honey-yellow; tegulæ rufous, apical margin of first abdominal segment fuscous; wings hyaline, venation very pale. Head strongly narrowed below the eyes, as high as broad above, but only half as broad at the base of the clypeus. Eyes one-half the head-height, with a very few short hairs. Ocelli in a low triangle, the lateral ones removed by

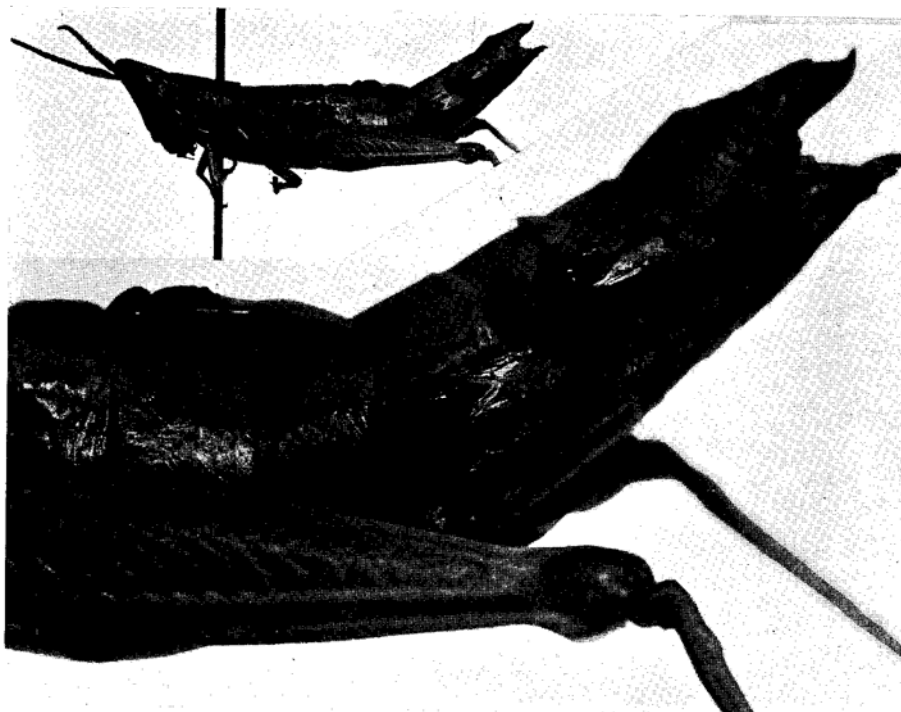


FIG. 1. SPECIMENS OF *LEPIDOSCELIO VIATRIX* SP. NOV. ATTACHED TO THE BODY OF THE DECCAN GRASSHOPPER (*COLEMANIA SPHENARIOIDES*).

less than their diameter from the eye-margin. Front on each side below the eyes with fine longitudinal aciculations, medially raised, the raised portion with sharp parallel sides anteriorly and projecting forward between the antennæ beyond the margin of the head; front between the eyes with somewhat irregular longitudinal striæ which run together above to form a smaller number above the median ocellus. Head behind with a carina extending from the occiput to the cheeks where it ends at the level of the lower eye-margin in a sharp tooth; just behind the eye is another weaker carina. Mandibles rather long,

acute at apex and with a single acute tooth inwardly before the apex; at the base they are attached at their inner angle so that when open the rectangular outer basal angle extends laterally beyond the head, but when closed the basal edge forms an extension of the sides of the head. Antennæ 12-jointed; scape half as long as the head height; pedicel half as thick as long; first three flagellar joints very small, the first triangular, the others transverse; club six-jointed widest at the base, club joints transverse except the last which is oval. Head deeply excavated behind on the occiput. Pronotum coarsely reticulate. Mesonotum without furrows, but with about nine somewhat irregular longitudinal carinæ. Scutellum convex, reticulate. Post-scutellum with a small vertical scale-like protuberance which is emarginate medially. Propodeum nearly flat above, emarginate at the middle on each side and with its posterior angles rounded; coarsely reticulate at the centre, very finely so at the sides. Pleuræ sparsely punctate. Abdomen broadly lanceolate, finely longitudinally aciculated, broadest at the apex of the third segment which is a little longer than the fourth; first shorter than the second, the two together as long as the third; fifth as long as the second, sixth very small. Wings extending to the tip of the abdomen; costal vein two-fifths as long as the wing; stigmal enlargement well developed, but very light yellow in color; stigmal vein very weak, oblique.

Described from four females received from Walajanagar, North Arcot District, South India.

The form of the mandibles and head is unusual, and may be associated with the peculiar habit of traveling on the body of the locust as described on a preceding page.

¹ Washington, *Smithsonian Inst., Nation. Mus. Bull.*, No. 45, 1893, (241).

² Madras, *Mysore State Dept. Agric. Entom. Bull.*, (Ser. 2), No. 2, 1911, (26).

³ Since this article was written Dr. Joseph Bequaert has called my attention to a most remarkable adaptation of the same kind exhibited by certain Eumenid wasps. In some species of *Odynerus* (e. g., *O. conformis* Sauss.) there is a space between the dorsal plates of the first and second segments of the abdomen which is regularly occupied by a large colony of small mites. This flattened pocket can be opened or closed by the flexion of the wasp's abdomen.

⁴ Bruxelles, *Ann. Soc. roy. Sci.*, 29, pt. 2, 1905, (129).