

V NOTES ON THE COLLECTION OF
COCCIDAE IN THE INDIAN MUSEUM
(CALCUTTA)

I.—THE GENUS *MARGARODES*.

By E. E. GREEN, F.E.S., F.Z.S.

(Plates ii, iii.)

Margarodes Guilding, *Trans. Linn. Soc. Lond.*, xvi, p. 115 (1828).

Porphyrophora Brandt, *Mediz. Zool.*, ii, p. 355 (1833).

Sphaeraspis Giard, *Compt. Rend. Soc. Biol.*, Paris (10), No. 25, p. 683 (1897).

The genus *Margarodes*, originally erected to contain the single species *formicarum* and, for a long time, restricted to that species, is now justly considered to include *Porphyrophora* of Brandt. *Sphaeraspis* was suggested, by Giard, as a subgeneric name to contain the species *vitium* and *capensis*, but there seems no good reason to separate these from the other typical species.

At the present date eleven reputed species are recognized, of which the recorded distribution is as follows:—

Europe:—*gallica*, *polonicus*, *perrisii* and *mediterraneus*.

Turkey in Asia (Armenia):—*hamelii*.

Africa:—*capensis*, *trimeni*.

United States and West Indian Islands:—*formicarum*, *rileyi*, *hiemalis*.

Chili:—*vitium*.

Dr. Giard, in a manuscript note to a paper on the geographical distribution of *Margarodes*, mentions the receipt of a species (allied to *formicarum*, *trimeni*, etc.) from Madagascar. In the same paper he states, on the authority of Trimen, that there are certain indications of the existence of the genus *Margarodes* in Australia.

In addition to the above localities, Mrs. Fernald—in her Catalogue—attributes *capensis*, *rileyi* and *hamelii* to Europe, *polonicus* to Central America, and *formicarum* to the East Indies; but I can find no authority for these records, and am inclined to believe that they have been inserted in error, or owing to faulty identification. The species *capensis* is certainly confined to South Africa: *rileyi* is similarly peculiar to Central America, unless—as suggested by Giard—it is identical with *hiemalis* of Cockerell. I am uncertain about *polonicus*, but it seems extremely doubtful that it should occur in such widely separated countries as Europe and Mexico. It is equally doubtful if *formicarum* (or any other species of *Margarodes*) has ever been found in the East Indies.

This being so, there has hitherto (with the exception of my short note in the *Journal of the Bombay Natural History Society*, vol. xix, No. 3, p. 761) been no satisfactory record of a *Margarodes* from the Indian Region. The insect presently described under the name of *M. indicus* at least supplies the first indubitable record from India proper.

Before proceeding to describe the Indian representative of *Margarodes*, a brief account of the life history and development of the remarkable insects of this genus will be necessary.

According to Giard, who observed the process in living examples, the eggs are deposited underground, in a mass of waxy filaments secreted by the adult female. From these emerge larvae of a more or less typical form. They are normally hexapod, but Silvestri has described a species (*mediterraneus*) in which the larvae have a single (anterior) pair of legs. The larval antenna appears to be normally 6-jointed, but the abnormal larva of *mediterraneus* exhibits only three antennal joints. The larvae, according to Mayet, attach themselves to the roots of plants and increase in size. Whilst growing (again according to Mayet) they secrete the envelope of the cyst that subsequently encloses the nymph.

It is this second (encysted) form that has attracted the attention of many observers by the wonderful pearly lustre which has gained for the insects the popular name of "Ground Pearls"—as suggested in the generic name *Margarodes*. These pearl-like cysts are found in the soil and were originally supposed to be associated with ants (hence the name of the type species—*formicarum*), but this observation requires corroboration. There is, however, nothing improbable in such an association, very many Coccidae being attended by ants for the sake of their sugary excretions. Giard has determined a species of *Brachymyrmex* as attending *M. vitium*, in Chili. The cysts may occur in enormous numbers. Riley (*Insect Life*, vol. iv, p. 359) states that, in certain parts of Florida, they compose over half the soil. Long before the nature of the organism was recognized, the cysts were used for ornamental purposes, being strung into necklaces and manufactured into various fancy articles. The cysts, when fully developed (see pl. ii, fig. 8, and pl. iii, figs. 9, 16, 17, and 18), are of irregular form, and are composed of overlapping closely applied laminate brittle scales which give to the object somewhat the appearance of a miniature fir-cone or of the fruits of certain palms. They vary in colour from pale yellow to deep bronzy brown, these differences being apparently due to age rather than to species. The lustre also varies with age, and is brightest in individuals that have lost some of the superficial laminae. Any determination of species based solely upon the character of the cysts must be extremely unreliable.

The nymphal insect contained in these cysts may well have perplexed the earlier entomologists. It consists of a globular sac, without any superficial indications of structural characters. It shows neither eyes, limbs, nor any of the usual organs. By very

careful microscopical examination, minute rudiments of antennae may be distinguished, but of buccal apparatus there is practically no sign, though Giard asserts that it exists and is functional. He remarks:—"The suctorial filaments are completely retractile in the active larva, as also in the nymph. Consequently, the very small mouth is easily overlooked, especially in *M. vitium* where the buccal plates are completely rudimentary and where nothing in the general form of the insect reveals the position of the opening. The sucking tubes are shed at each moult, but the animal never becomes really astomatous until the last transformation." The mouth-parts are, however, so very much reduced, that it is difficult to believe that much nourishment can be taken in by the usual means during this stage. Mayet suggests that the insects may absorb liquid food (? by osmosis) through the skin.

Coccidae are peculiar amongst the natural order Rhynchota, in that the males normally undergo a complete metamorphosis, passing through an active larval and a passive pupal stage before appearing in the adult winged form. But, with the exception of *Margarodes* and its allies (included in the subfamily Margarodinae), the female Coccid, though undergoing certain changes of form, continues to feed and grow throughout its development. In the case of *Margarodes*, after remaining for a considerable period (possibly extending over years, in adverse conditions) in this resting stage, the female eventually breaks through the cyst and reappears as a normal hexapod insect (see fig. 15). The anterior limbs are specially adapted for digging. Their femora are greatly thickened: the tibia and tarsus are fused together for greater strength, and terminate in a stout horny claw (figs. 19 to 22). The antennae of the adult female are comparatively short and stout, gradually tapering to the extremity, of from 7 to 9 joints.

All observers agree that the adult female has no trace of a rostrum or buccal apparatus of any kind. It would appear, therefore, that the insect must take in a sufficient store of nutriment during the larval stage (which is probably prolonged for some time after the formation of the cyst) to sustain it during the succeeding nymphal and imaginal stages. We find a similar condition in certain Lepidoptera in which the adult insects take no food.

The early development of the male insect has apparently never been observed. Whether the male larva proceeds to secrete a cyst similar to that of the female, or whether it constructs a specialized puparium, is not known. The males are scarce, in collections, and have usually been captured on the wing, or running on the ground. If it were not for the characteristic front legs, there would be little reason to connect these males with the female *Margarodes*. Fortunately this connection has been actually established. Prof. Cockerell (*The American Naturalist*, vol. xxxiii, No. 389, p. 415) describes the discovery of "a couple of small winged insects, hurrying to and fro (on the ground) as if they had lost something. Presently, one of them began to dig into

the earth, and in a moment completely buried itself, leaving only the tips of its long abdominal filaments visible." Prof. Cockerell dug it out and discovered the object of its search, which proved to be an adult female *Margarodes*. The appearance of a male *Margarodes* may be gathered from fig. 1, and from the subsequent description of *M indicus*.

In my study of this interesting genus I have unfortunately not had access to the earlier authors: but Signoret, in his classical *Essai sur les Cochenilles*, has given a useful resumé of the previous work on the subject. I append a list of the publications that I have been able to consult.

- | | | |
|----|---------------------|--|
| 1. | Signoret, V | <i>Essai sur les Cochenilles</i> (1868—76). |
| 2. | Riley, C. V | " <i>Margarodes</i> in the United States," <i>Insect Life</i> , vol. vii, p. 359 (1895). |
| 3. | Mayet, V. | .. "La Cochenille des Vignes du Chili (<i>Margarodes vitium</i>)," <i>Rev Viticult.</i> (1895). |
| 4. | Silvestri, F. | "Descrizione di una nuova Specie di <i>Margarodes</i> ," <i>Bul. Soc. Ent. Ital.</i> , xxxviii, p. 140 (1906). |
| 5. | Giard, A. | "Sur les Transformations de <i>Margarodes vitium</i> ," <i>Compt. Rend. Soc. Biol.</i> , Paris (May 1894). |
| 6. | „ | "Troisième Note sur le Genre <i>Margarodes</i> ," <i>Compt. Rend. Soc. Biol.</i> , Paris (Nov. 1894). |
| 7. | „ | "Quatrième Note sur le Genre <i>Margarodes</i> ," <i>Compt. Rend. Soc. Biol.</i> , Paris (May 1895). |
| 8. | „ | "Sur le Distribution géographique des Cochenilles du Genre <i>Margarodes</i> et sur deux Espèces nouvelles de ce Genre," <i>Compt. Rend. Soc. Biol.</i> , Paris (July 1897). |
| 9. | Cockerell, T. D. A. | "On the Habits and Structure of the Coccid Genus <i>Margarodes</i> ," <i>American Naturalist</i> , vol. xxxiii, No. 389 (May 1899). |

Amongst a collection of Coccidae submitted to me by the Superintendent of the Indian Museum, I found three examples of a male Coccid that I at once recognized as belonging to this genus. The remarkable fossorial front limbs and the presence of long tufts of silky filaments on the abdomen permitted of no doubt as to the systematic position of the insect. Subsequently, several small parcels of empty nymphal cysts of a *Margarodes*, collected at various Indian localities, were received from the same source. From one of these cysts I extracted a fragmentary and decayed example of the adult female insect.

In the absence of complete examples of the adult females, it is impossible to say with certainty that the cysts are all of the same species, or that they are specifically connected with the males first examined. The probabilities, however, are in favour of their being so. With one exception (a single large nodular example, fig. 14), the cysts—though varying in size and form—are all of a similar structure.

From such meagre material it may, perhaps, be considered imprudent to describe the insect as a new species: but as it is equally impossible to assign it with certainty to any of the known species, and in consideration of its geographical position, I have ventured to do so,—principally in the hope that the publication may attract attention to the existence of the genus in India, and so lead to fresh discoveries and a better knowledge of the habits of this interesting insect.

Margarodes indicus, sp. nov.

Adult ♂ (pl. ii, figs. 1 to 7): described and figured from dried (pinned) examples, partially restored by boiling in caustic potash.

Colour dark brown. Details of body segments not absolutely determined.

Antenna with 13 subequal joints: 1st shortest, cylindrical, remainder obconical to oval, 3rd joint largest: all the joints (except 1st) with fine hairs, not arranged in whorls. The antennae spring from two broad plates which might, perhaps, be considered as basal joints, in which case the number of antennal joints would be taken as 14.

The normal number of antennal joints in male Coccidae, of all subfamilies and genera, is 10. A few abnormal species (usually apterous forms) have a less number, but in no other genus than *Margarodes* has a greater number than 10 been observed. In fact, this is the first indubitable record of a greater number. Signoret, in attributing 13 antennal joints to the male of *Margarodes* (*Porphyrophora*) *hamelii*, on the authority of Brandt, expresses a doubt as to the correctness of the observation. In the light, however, of this Indian species, it is quite probable that Brandt has given the correct number for his species.

Head almost entirely occupied by the large compound eyes, which meet below and are separated by a narrow channel above (fig. 2). A single ocellus, rather larger than one of the facets of the compound eye, can be distinguished on each side, impinging upon the margin of the compound eye.

Wings large and ample: semi-hyaline, very slightly fuscous. Venation obscure, but apparently more complex than in other Coccids. Costal area (from base to two-thirds of length) semi-opaque, brownish red; apparently enclosed by a distinct nervure which throws off a short branch from near its base, towards the costa. There appear to be four other nervures (see

fig. 1), but they are ill-defined and colourless and are demarked chiefly by ridges of the wing membrane.

Halteres narrow, each terminating in a single hooked bristle (fig. 6).

Legs stout, the femora very broad. Anterior limb (fig. 4) evidently fossorial: the tibia and tarsus short and stout, the strong claw firmly fused to the tarsus without any definite line of demarcation: tibia, tarsus and claw of approximately equal length. In the other limbs (fig. 5), the tibia and tarsus are normal and the claw articulated to the latter: tibia more than twice length of tarsus: a minute unguis on claw of mid and hind legs, none on claw of front leg.

Abdomen broad, with a strong fold on each side: 7th and 8th abdominal segments dorsally prominent, each with a dorsal tuft of long glassy filaments (equal in length to the whole body of the insect) which are directed upwards and backwards, arising from transverse bands of crowded polygonal cells (fig. 7): terminal segment shovel-shaped, the intromittent organ slender, forming a backward loop within the body before passing through the genital sheath (fig. 3).

Length 2.75 to 3.25 mm. Expanse of wings approximately 8 mm.

Locality: Jahada, Nepal, India, 14-ii-1908. Coll. Indian Museum.

When boiled in potash, the insect gave out a bright crimson stain.

Adult ♀ A fragmentary example of an adult female was extracted from one of the cysts from Bangalore (sample 2), described below. Judging from the dried remnants, the insect was probably yellow in life. Owing to the decayed and imperfect condition of the specimen, few details of the body can be made out; but there are many large and stout hairs (almost spines), both on the dorsum and venter, and numerous bluntly pointed conical spines (fig. 23) on the marginal area. Fortunately one of the anterior limbs remains intact. This leg (fig. 19) is of the typical fossorial form: the femur very broad and robust, with a few longish stout hairs on its inner area: the tibia small and triangular, with two long stout hairs on its inner margin: the tarsus and claw closely fused together, curved, tapering to a sharp point, with two stout lateral hairs near the base, and three or four stout curved hairs on the inner margin corresponding to the unguis digitules.

In the development and position of the hairs on this limb, *M. indicus* approaches *M. formicarum* (fig. 20), rather than the two African species (figs. 21 and 22): but differs in the greater number and size of the unguis hairs. It will be observed that it is very much smaller than the corresponding limb of the other species with which I have been able to compare it (*vide* figs. 19 to 22, all enlarged by 50 diameters). But the whole insect is proportionately small. The imperfect condition of my example

prevents an accurate determination of its dimensions, but I estimate that its total length cannot have been more than 2 mm., while *M. capensis* measures approximately 6 mm. in length, and *M. trimeni* 4.5 mm.: the length of *M. formicarum* is given, by Signoret, as 5 mm. Size, however, appears to be an unreliable character. Giard, in his "Third note on the genus *Margarodes*," remarks: "According to the conditions of nutrition in which the nymph finds itself, the latter is able to transform itself into an adult female of very different sizes. Certain adult females of *M. vitium* are no more than 2 mm., while others attain a length of 5 or even 8 mm. As a result one often finds adult females smaller than some of the larvae."

The Indian Museum collection contains several small gatherings of empty nymphal cysts of *Margarodes* which, in the absence of evidence to the contrary, may be considered to belong to this same species. They are described separately, according to the circumstances of their collection.

- (a) A small tube containing 4 cysts (immature examples).
Label:—6804/16, Bangalore, S. India, ca. 3000 ft., 12-X-1910. "Among weeds in Service Tank, Bangalore. N. Annandale."

These examples vary in size from 1 to 1.75 mm. (long. diam.). They are irregularly ovoid: of a bright golden yellow colour to rich golden castaneous, with iridescent lustre. Shell thin: one with traces of overlapping scales on one side, the others without scales.

- (b) A tube containing about 45 cysts. Without a label, but believed to be part of the gathering from Service Tank, Bangalore.

Size ranging from 0.75 to 2 mm. Colour varying from very pale yellow to dark castaneous brown: intermediate forms with bright iridescent lustre. Many of the smaller and all the larger cysts with well-developed overlapping scales (fig. 9). The largest cyst (fig. 8) with the scales overlapping in opposite directions from the two extremities, possibly a composite cyst. Most (especially the smaller) have a short conical process on the lower surface, which probably marks the point of attachment to the root of some plant (fig. 10).

- (c) A small tube containing more or less fragmentary cysts
Label:—4319/4. "Madras, Editor of *Asian*."
Length of largest example 2.5 mm. Form elongate oval: with large overlapping scales (fig. 11). Colour golden bronzy yellow, with iridescent lustre.

- (d) Small bottle containing numerous decomposed cysts filled with earthy matter.

Label:—"Pearl-like globules. Received 12-XI-1891 through Dir. L.R. & A., Bombay, from the Collector

of Khandesh. They were found in the ground and are thought to be of similar origin to the 'Ground Pearls' of the West Indies." These examples are very old and decomposed and consist mostly of an earthy core slightly overlaid with nacreous matter. Average diameter 3 mm. Surface nacreous, whitish, opaque, rather furfureous (from decay), with slight lustre, covered with an intricate network of fine cracks: inner surface more distinctly lustrous. A few examples with traces of one or two large overlapping scales (fig. 12): others smooth (fig. 13). The loss of colour is evidently due to exposure and decay, and the opacity to the presence of air between the laminae.

- (e) Pill-box, containing 15 cysts (and some small seeds and shells of small molluscs).

Label:—4146/16. "Surface of flood-water, edge of the River Hoogley, at Tribeni (near Calcutta), 31-vii-1909." Size varying from 1 to 5 mm. There are a few only of the smaller size, the greater number ranging from 2 to 2.5 mm. Colour of average examples pale yellow to bright golden yellow, iridescent. Form and character of overlapping scales similar to the specimens described under (b).

A single large example of exceptional form (fig. 14). Size 5 mm.: colour dull castaneous, without lustre: of very irregular form, nodular, overlapping scales almost completely obscured. This example may be of compound origin, and is possibly of a distinct species.

Any attempt to differentiate the species by the form, size, colour or structure of the nymphal cysts is unsatisfactory. All these characters are inconstant and vary indefinitely in a single parcel. Such differences probably depend very largely upon the age and development of the individual. *M. mediterraneus* appears to be exceptional in being devoid of overlapping scales throughout its development. In *M. rileyi* (fig. 18) the scales are larger and somewhat looser than in *trimeni* (figs. 16, 17) and the West Indian forms. The Indian examples that I have seen are, on the average, considerably smaller than those from the African and American regions; but it would be possible to match individuals from India with particular examples of *formicarum*, *trimeni* or *rileyi*, in size, colour and structure.

The characters of the adult females, where known, are more reliable. There are slight differences in the pelage and other dermal characters, and in the size and proportions of the limbs. The enlarged front legs, in particular, afford useful characters. Thus, in *capensis* (fig. 21), the tibio-tarsus and claw are proportionately shorter and more robust than in *trimeni* (fig. 22). In the

few examples that I have had under observation I notice a marked difference in the pelage of the anterior femora. In *formicarum* (fig. 20) there are many long stout hairs on the inner area of this joint: in *trimeni* (fig. 22) there are a few short stout hairs: in *capensis* (fig. 21) these hairs are more numerous but very short and fine: while in *indicus* (fig. 19) there are five or six stout longish hairs. It is possible, however, that the greater development of the hairs, as shown in the figures of the anterior limb of *formicarum* and *indicus*, may be partly due to the fact that my examples of these species were extracted from unopened cysts, while those of *capensis* and *trimeni* had emerged naturally. It is conceivable that the hairs may be quickly worn down, in life, owing to the fossorial habits of the insects.

The formation of the overlapping scales in the nymphal cysts is difficult to understand. Fissures, resulting from internal pressure, followed by the exudation of fresh liquid secretion from inside (as has been suggested by some authors) could not possibly result in this structure. Mayet explains the process as follows:—“All the time that they are growing, the larvae secrete the envelope of the cyst which, formed of juxtaposed lamellae, enables them to develop by the sliding of these lamellae one over the other.” But against this explanation is the fact that the smaller and presumably younger cysts are composed of a homogeneous envelope, devoid of overlapping scales which appear only at a later period. Having only dead and dried cysts at my disposal, I am unable to suggest any alternative explanation. The solution of the mystery can be resolved only by a close study of living examples, from the earliest stage of development.

It is greatly to be desired that *Margarodes indicus* should be traced to its actual habitat. The true origin of the examples that have hitherto been collected in India is obscure. One parcel was collected on flood-water and these examples may have been transported for many miles before coming to rest. Another gathering was made in the Service Tank, Bangalore, and had probably been carried there by the action of water. The most definite information is in connection with the sample “from the Collector of Khandesh.” These are said to have been “found in the ground.” But the examples show unmistakable evidence of exposure and decay. Nothing is known of the plant or plants upon the roots of which it lives. The subterranean habit of the insect makes its discovery more or less of an accident. The adult winged males are the most likely to be observed. The other stages of the insect should be searched for in the locality that gave birth to the males. Possibly the male insects themselves (as in the instance described by Prof. Cockerell) may afford a clue to the exact position of the females.

SUPPLEMENTARY NOTE.

Since the foregoing remarks on the genus *Margarodes* have been in the press, additional material has been received from Mr. L. C. Coleman, Entomologist to the Government of Mysore.

This material consists of two very distinct species, both of which appear to differ widely from typical *M. indicus* and cannot be identified with any previously known species. One of them may possibly represent fresh examples of the form (*d*) received from Bombay. The other (represented by nymphal cysts only) is totally unlike any recorded species of the genus.

Though the material to hand is not complete enough to permit of a full description, the characters are sufficiently distinct for a preliminary definition of the species.

Margarodes papillosus, sp. nov.

Nymphal cyst globular, smooth; the nacreous covering brittle, very thin, transparent and colourless, revealing the reddish yellow body of the enclosed nymph. Diameter 2 to 2.5 mm. Cuticle of nymph closely crowded with minute translucent dermal cells (text-fig. 1): when the tissue is torn, the fracture follows the contour of the cells. Rostrum distinct, but doubtfully functional. A minute tubercle bearing a single stout seta, on each side of the rostrum, probably represents rudimentary antennae. The four principal spiracles are situated on the venter of the thorax, far from the margin, and there is a supplementary series of smaller spiracles situated submarginally on each side of the abdomen.

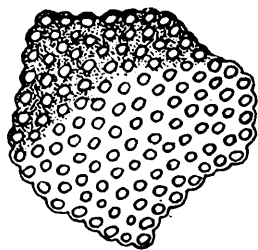


FIG. 1.—*M. papillosus*. Fragment of derm of nymph, $\times 450$.

One of the cysts contained a female imago, almost ready to emerge; but the limbs are not fully chitinized and are consequently

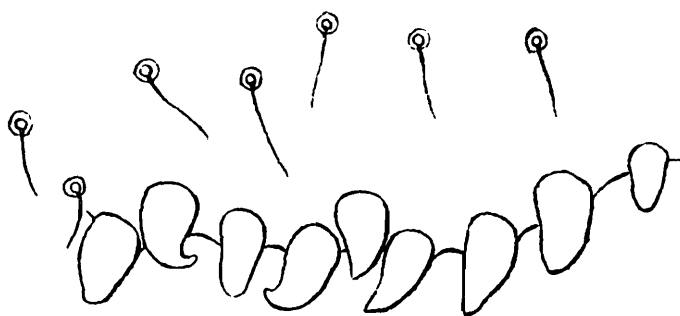


FIG. 2.—*M. papillosus*. Part of one of the median groups of papillae, adult female, $\times 450$.

unsuitable for accurate comparison with other species. Body broadly ovoid; strongly convex; lateral margins of abdominal segments slightly prominent. Antennae 7-jointed; broad at base,

tapering gradually to extremity, terminal joint subglobular: a few spiny hairs at apex of 7th and on anterior margins of 3rd to 6th joints. Front legs very stout and dense: tibio-tarsus terminating in a long curved claw. Intermediate and hind limbs smaller and more slender. Thoracic spiracles large and conspicuous, situated close to the coxae of the anterior and intermediate legs. Dorsum of abdomen with eight transverse series of bluntly pointed papillae which are disposed in three groups—one median and two lateral—on each segment. The median groups each consist of a single row of papillae (text-fig. 2): those of the lateral groups are crowded and spring from polygonal cells (text-fig. 3) which are less noticeable

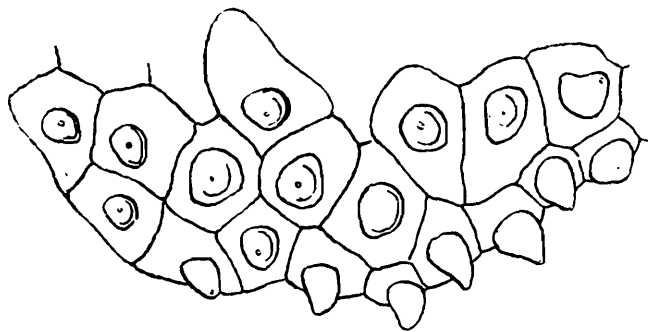


FIG. 3.—*M. papillosus*. Part of one of the lateral groups of papillae, adult female, $\times 450$.

in connection with the median groups. There are a few small hairs immediately anterior to each of the median groups of papillae, and a few ill-defined translucent areoles are scattered irregularly over the body. The submarginal area, on each side of the thorax, is roughened by minute prominent rounded dermal cells. Length 3 mm., breadth 2.25 mm.

Described from 3 nymphs and 1 female imago. Found "near egg-cocoons of Acridiid grasshoppers;" Bellary District, Madras, Others reported to have been found under rose trees; Bangalore, Mysore. The association with eggs of grasshoppers is probably accidental.

The nymphal cysts of this species resemble those of *M. mediterraneus*, Silvestri, from which species they differ by the coarser punctuation and the presence of conspicuous translucent dermal cells. The adult female is sufficiently characterized by the dorsal groups of papillae.

Margarodes niger, sp. nov.

Nymphal cyst practically naked, the usual nacreous envelope being represented only by a few whitish fragments closely adherent to the dense chitinous derm of the encysted nymph. Form globular: diameter 7.25 mm. Colour opaque dull black. The surface appears smooth to the naked eye, but under magnification is found to be minutely and regularly pustulate, the pustules of equal size and contiguous. The cyst contains a white creamy

liquid, permeated by numerous tracheae. Rostrum internal, the tentorium strongly chitinized. After boiling in caustic potash, the black derm becomes partially decolorized and separates into two layers. The outer layer swells and becomes rugulose but still retains its pustular structure. The inner layer is minutely granular.

Mr. Coleman informs me that he dissected fresh cysts of this form, and disclosed an insect with fossorial front limbs similar in every respect to those of *Margarodes*. Unfortunately these specimens were not preserved.

Described from 2 nymphal cysts. Found in soil, associated with egg-cocoons of grasshoppers; Bellary District, Madras.

The globular black cysts might easily be mistaken for the seeds of "Indian Shot" (*Canna indica*).

