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SOME SPECIES OF NONDIASPINE SCALE INSECTS FROM THE MALAY PENINSULA

By RYOICHI TAKAHASHI

As shown in the accompanying list of literature the scale insects or Coccoidea of the Malay Peninsula have been studied by a number of students, but they have not been thoroughly explored.

I collected these insects in Malaya, chiefly in Selangor, during the years from 1942 to 1945 and found at least 113 species of the Nondiaspine groups occurring there. In the present paper are recorded 25 species of these insects for the first time from the Malay Peninsula, of which 5 are new to science, and supplementary notes are given of 2 known species. The type specimens were deposited in the Selangor Museum, Kuala Lumpur, Malaya.

My sincere thanks are due to Messrs. Y. TAKEDA and K. TAKEDA of Japan Shellac Industries, Ltd., for their generous support, through which it has been possible to continue my work in Japan. I must also express my appreciations to Mr. K. ASANUMA of Research Institute for Natural Resources, Tokyo, for his help in preparing this report.

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***Icerya purchasi* MASKELL**

Cameron Highlands, many on a leguminous tree (XI. 1943), common on Citrus (XI. 1943, X. 1944). Not found in lowlands in Malaya.

***Icerya jacobsoni* GREEN**

Singapore, many on *Ficus kristina* and an undetermined tree (III. 1944).

***Eriococcus araucariae* MASKELL**

Fraser's Hills, Pahang, very common on *Araucaria* sp. (VI. 1943, IX. 1943).

***Asterolecanium pseudomiliaris* GREEN**

Kuala Lumpur, abundant on bamboo.

The species recorded under the name of *Asterolecanium exiguum* GREEN? by MILLER (1932) may be this species. *A. bambusae* BOISDUVAL was not detected in Malaya, but at least 4 other species of *Asterolecanium* were found on bamboo there, which have not been identified.

***Lecaniodiaspis malaboda* GREEN**

Kuala Lumpur, some on *Artocarpus gomezianus* (III. 1943), a few on a tree of Fagaceae (VII. 1944).

Lecaniodiaspis duriana n. sp.

(Adult female) Test grayish brown, hard, moderately convex dorsally, wide, a little narrowed anteriorly, with 5 longitudinal series of wax on the dorsum, about 2.8—3.0 mm. long, 2.1—2.5 mm. wide. Body subcircular, without dorsal setae. Antennae short, as long as the spiracle, 5-segmented; the 1st segment very short; the 2nd the longest, about 1.5 times as long as wide, somewhat longer than the 3rd, 4th and 5th taken together, with a trace of division near the base, a little rounded on one side; the 3rd, 4th and 5th much wider than long, subequal in length, or the 3rd somewhat longer; the 5th with about 5 apical stiff setae. Stigmatic clefts with many circular pores in a large circular group, sclerotized at the group, with 2 spines in the anterior pair, but only a spine in the posterior; the spines short, stout, a little widened towards the base, pointed at the apex, slightly curved shorter than the diameter of group of pores in the cleft, as long as, or somewhat shorter than the 2nd antennal segment, shorter than the width of spiracle, longer than the dermal tubular duct, distinctly apart from the group of pores. Spiracles stout, longer than wide, very slightly constricted at the middle, larger than the group of pores at the cleft; space between the spiracle and the cleft short, as long as, or shorter than, the spiracle, with many pores scattered, which are smaller than those of the cleft. Marginal setae very few, minute, thin, stiff. Anal cleft short, with 2 long simple setae on each side at the hind margin, one of which is much smaller. Anal ring with 10—12 very long flattened setae which are much narrowed and thin on the distal part, and scarcely or slightly narrowed basally. Dorsal median plate encircling the anterior half of the anal ring. Anal plate as usual in shape, strongly sclerotized, with 2 simple bristles near each lateral margin. Legs can not be detected. Cribriform plates in a pair of longitudinal series, 4—7 in each series. Many minute 8-shaped pores in some groups on the venter; numerous tubular ducts and minute 8-shaped pores over the dorsum, the ducts much fewer and smaller on the venter; many rather large circular pores with a thick border on the posterior part of body. A few minute simple stiff setae on the venter. Body about 2—2.3 mm. long.

Ulu Gombak, Selangor, abundant on the lower side of the branch of *durian* (XI.—XII. 1944). Protected with shelters by *Crematogaster* or attended by *Oecophylla smaragdina* FAB.

Related to *Lecaniodiaspis malaboda* GREEN, but differs in the shorter pointed stigmatic spines, the antennae shorter and 5-segmented, the stigmatic clefts sclerotized, with many pores in a large circular group, and in other characters. This species is characterized by the presence of many pores in a large circular group in the stigmatic cleft which is sclerotized, and by the stigmatic spines pointed apically.

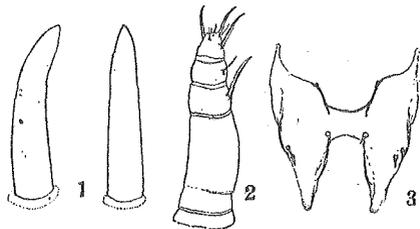


Fig. 1 *Lecaniodiaspis duriana* n. sp.
(Adult female)

- (1) Stigmatic spines. (2) Antenna.
(3) Anal plate.

Coccus tuberculatus KOTINSKY

(Adult female) Body elongate, similar in shape to *C. elongatus* SIGNT. Antennae 7-segmented, reaching the lateral margin of body, nearly as long as the space between themselves, with a few long setae; the 3rd segment longer than the 4th, 5th or 6th,

somewhat shorter than the 7th. Legs normal; tarsi as long as, or somewhat shorter than, the tibia, tapering, with no sclerotized part at the base, with long thin knobbed digitules; unguinal digitules stout, widely capitate. Stigmatic clefts indistinct, with 3 spines, the middle one of which is longer than marginal setae; the other 2 very short, pointed. Marginal setae moderately long, curved, simple, sparsely in a row, much shorter than the distances between themselves. Dorsum wanting reticulations, with about 30 small, but prominent stout tubercles in a row on the whole submarginal area, densely with many faint areolations except on the median area. Anal cleft closed. Anal plates normal in shape, bluntly pointed, with a long apical seta; the latero-posterior margin a little longer than the latero-anterior. Venter with some slender tubular ducts present on the submarginal area mostly in a row outside of the series of tubercles. Body 2.25-4 mm. long.

Singapore many females on the leaf of *Brassica actinophylla* (26. V. 1944). Kuala Lumpur, some on *Gardenia* sp. ? (3. IV. 1943).

Previously briefly described from an unknown plant from Singapore. Different from the original description* in lacking dorsal reticulations and in the 7-segmented antennae; the reticulations mentioned in the original description may be due to the condition of specimens.

***Coccus lumpurensis* n. sp.**

(Adult female) Dark yellowish brown. Body subdeltoid, narrowed anteriorly, flattened, nearly similar in shape to *C. bicruciatatus* GREEN. Antennae very long, slender, much longer than the space between themselves, a little longer than the fore leg, extending beyond the body margin, 7-segmented; the 1st segment a little longer than wide; the 2nd long, widened gradually towards the base, about twice as long as the 1st, over twice as long as wide, with a very long subapical seta which is nearly as long as the segment; the 3rd slender, about 1.3 times as long as the 2nd, with a few short setae; the 4th as long as the 2nd, nearly as long as the 5th and 6th together; nearly as long as the tarsus; the 5th somewhat longer than the 6th, with a very long subapical seta which is longer than the segment, and with a shorter one; the 6th about thrice as long as wide; the 7th as the 5th, with some long bristles, one of which is very long. Legs long; coxae longer than wide, with a long subapical seta which is much shorter than the apical seta of trochanter; femora not swollen; tibiae long, slender, a little longer than the femur and trochanter, as stout as the 3rd antennal segment, about thrice as long as the tarsus, with some short setae, tarsi a little curved, with long thin digitules a little capitate; unguinal digitules long, stout, much expanded at the tip, a little shorter than the tarsal ones. Stigmatic clefts distinct, as in *C. bicruciatatus* GREEN, with 3 spines, the median one of which is about twice as long as the other 2. Marginal setae rather long, fine, simple, but regularly much curved, arranged in a row, mostly longer than the spaces between them. Spiracles much widened at the apex and base, longer than wide, rather narrow at the middle of stalk; many pores between the spiracle and the marginal cleft. Dorsum with many small oval or circular areolations, about 15 submarginal tubercles on each side, and some very small, circular, not translucent pores in a longitudinal group on the median area of abdomen; the areolations sparsely scattered or arranged so as to form irregular lines; the submarginal tubercles rather long, truncate apically, much longer than wide, widened

* Proc. Hawaii. Ent. Soc., I. p. 168 (1908).

basally. Anal cleft closed. Anal plates pointed at the apex, the latero-posterior margin a little longer than the latero-anterior. Anal ring anterior to the plates. Venter with many minute tubular ducts, widely sclerotized around the anal plates, which area is not well defined, with many small translucent pores; 3 pairs of very long setae present behind the antennae; abdominal segments discernible, each with a pair of setae on the median area, the 2 posterior pairs very long. Body 5 mm. long, 3 mm. wide, antenna 1 mm., hind tibia and tarsus 0.8 mm.

Kuala Lumpur, a specimen on *Ficus* sp. (12. III. 1943).

Closely related to *C. bicruciatatus* GREEN, differing, however, in the marginal setae not falcate, the presence of submarginal dorsal tubercles, the longer antennae and legs, the dorsal areolations sparsely scattered, and in other points.

Coccus cinnamomicolus n. sp.

(Adult female) Blackish brown. Elongate,

narrowed at each end, asymmetrical, resembling *Platylecanium asymmetricum* MORR. in shape, flattened, broadest at the basal part of abdomen, with a median carina and 2 pairs of transverse carinas on the dorsum. Antennae shorter than the space between themselves, not reaching the lateral margin, 6-segmented; the 3rd segment long, as long as, or slightly longer than, the distal 3 segments taken together; the 4th and 5th subequal in length, much longer than wide; the 6th slightly shorter than the 4th and 5th together. Eye spots pale, much separated from the margin. Coxae tapering; femora a little shorter than the tibia and tarsus together; tibiae and tarsi slender; tarsi longer than the tibia, with no sclerotized part at the base, tarsal digitules slightly capitate; unguinal digitules widened towards the apex. Stigmatic clefts small, but distinct, not completely closed, within the margin, circular, somewhat sclerotized widely on the margin, with 3 spines which are stout, not tapering, rounded at the apex, the middle one twice as long as the other 2, not reaching the margin; shorter spines a little shorter than, or as long as, the marginal setae. Spiracles slender on the shank, widened at the tip; over 10 pores scattered between the spiracle and the cleft. Margin not crenate, simple; marginal setae short, flattened, gradually widened towards the apex, prominently frayed at the distal part, in a regular row, dense, straight or somewhat curved, as long as, or shorter than, the distances between them. Dorsum not more sclerotized around the anal plates, lacking submarginal tubercles evident, with many minute circular transparent pores sparsely scattered, with numerous small oval or elongate areolations except on the median area, which are mostly in rows on the submarginal area, and spaces among them wider than their diameter; 22 small circular pale parts in a single row along the whole submarginal area, the row a little laterad of the eyes; these pale parts as large as the eyes including the pale marginal zone, minutely reticulate, with a small, moderately long, tubular duct at the center; no canal running mesad from the margin. Anal cleft closed. Anal plates elongate, over thrice as long as wide, rounded on the lateral side, broadly rounded at the lateral angle, bluntly pointed apically; the latero-posterior margin slightly sinuate. Anal opening

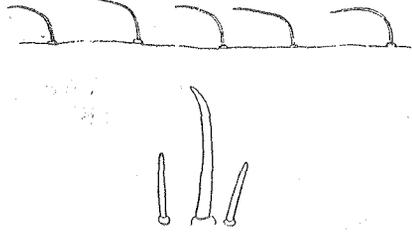


Fig. 2. *Coccus lumpurensis* n. sp.
(Adult female)
Margin and stigmatic spines.

in front of the anal plates, the setae reaching the middle of the plates. Venter without setae behind the antennae, with a pair of moderate setae in front of the anal opening,

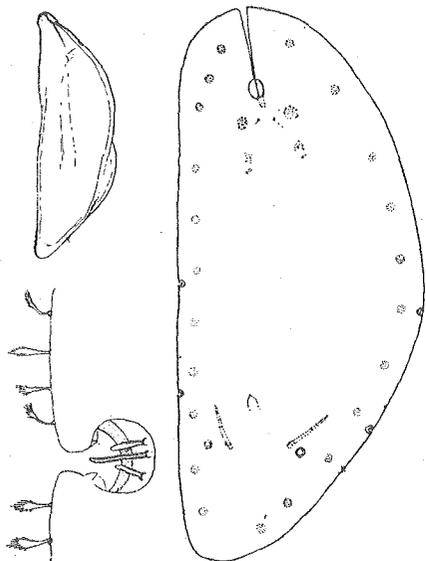


Fig. 3. *Coccus cinnamomicolus* n. sp.
(Adult female)

Body, margin and stigmatic cleft, and anal plate.

minute thin tubular ducts sparsely scattered, and with 2 pairs of small groups of small translucent pores latero-anterior to the anal opening. Abdominal segments not discernible. Body 4 mm. long, 1.25 mm. wide, anal cleft excluding plates 0.5 mm.

Kuala Lumpur, 2 specimens, on the leaf of *Cinnamomum* sp. (26. IV. 1944).

Related to *Coccus bicruciatu*s GREEN, but apparently different in the dorsal areolations distributed over the whole area except on the median part, the structure of marginal setae, and in other characters. Differs from *Coccus acuminatus* SIGNT. in the structure of marginal setae and in the stigmatic spines not pointed.

This species is placed in *Coccus*, but is doubtful in respect to its true generic relationships. It seems advisable to include it in the genus until many of the species of the genus and the related genera are carefully studied.

Coccus hesperidum LINNÉ

Malacca, a few on mangosteen (25. IV. 1943). Kuala Lumpur, many on a fern (X. 1943, III. 1944). Johore, abundant on an undetermined tree. (X. 1945).

Coccus punctuliferus GREEN

Kuala Lumpur, Serdang Kuala Selangor; Keruan, Perak; Johore, common, on mango, *Podocarpus*, *Areca catechu*, *Bruguiera cylindrica* (a mangrove tree). Protected by *Creमतogaster* or *Oecophylla*.

Coccus macarangicolus n. sp.

(Adult female) Yellow in life. Circular, a little convex dorsally, but oval and distinctly longer than wide when mounted on slides. Antennae short, shorter than the space between themselves, 7-segmented; the 1st segment a little wider than long; the 2nd slightly longer than wide; the 3rd almost as long as the 2nd, about 1.5 times as long as the 4th, a little longer than wide; the 4th, 5th and 6th subequal in length, slightly longer than wide; the 4th with a long fine seta; the 5th and 6th with a very stout curved seta; the 7th the longest, a little longer than the 5th and 6th together, with 2 very stout setae and some long bristles distally. Eyes absent. Legs short; coxae longer than wide; femora short, stout,

somewhat longer than the tibia; tibiae short, somewhat tapering; tarsi distinctly longer than the tibia, with 2 long thin digitules which are slightly capitate; claws strongly convex on the lower side of basal half, with no denticle; unguis stout, dilated apically. Spiracles comparatively large, laterad of the legs, slender on the stalk; the apex much more expanded than at the base, with the diameter nearly as long as the spiracle; the posterior pair slightly larger. Stigmatic clefts shallow, with 3 or 4 stout spines which are bluntly pointed, the median one about 1.5 times or twice as long as the others, the shorter spines as long as, or somewhat longer than, the marginal setae, conical. Margin not sclerotized; marginal setae short, slender, spine-like, sharply pointed, shorter than the longer diameter of dorsal areolations, in an irregular row, not numerous; distances between them much longer than the setae. Dorsum soft, very densely with large oval distinct areolations over the whole surface, which are variable in size and shape; a few minute stiff setae scattered, which are similar in shape to the marginal ones, or blunt apically. Anal cleft closed, about one-fourth the body length. Anal plates stout, rounded at the tip, as in *C. macarangae* MORRISON in shape, with 4 rather long stiff setae on the distal half of dorsum, the basal margin very slightly longer than the latero-posterior margin which is slightly rounded. Anal ring with 6 stout setae. Venter with some stiff setae scattered along the margin, which are much smaller than the marginal ones; a few similar, but longer setae on the median area of abdomen; long bristles absent; many long slender tubular ducts scattered on the submarginal area, which are longer than the marginal setae. Body 2.0 mm. long.

Kuala Lumpur, a few specimens, in the hollow of the stem of *Macaranga triloba* (26. III. 1944). Associated with *Crematogaster* inhabiting the host plant.

Differentiated from *C. penangensis* MORR. by the simple and longer spine-like marginal setae and by the anal plates with 4 longer dorsal setae on the distal part; from *C. secretus* MORR. by the anal plates being triangular, wider and with fewer setae, and by the dorsum with distinct large areolations; and from *C. circularis* MORR. by the simple marginal setae, the dorsum densely with distinct areolations over the whole surface, the anal ring with 6 setae, and by other characters. Most closely related to *C. macarangae* MORR., but the marginal setae simple, stiff, slender, spine-like and tapering; the dorsum densely with large distinct areolations over the whole surface; the anal ring with 6 setae; the dorsal setae distinctly shorter than the marginal setae; and the dorsum with no cluster of simple pores anterior to the anal plates.

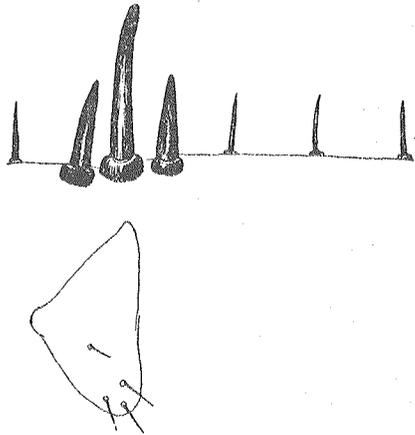


Fig. 4. *Coccus macarangicolus* n. sp.
(Adult female)
Margina and anal plate.

Coccus acutissimus GREEN

Si ngapore, Kuala Lumpur, Kuala Selangor, Kerian, Perak; rather common, on *Artocarpus*

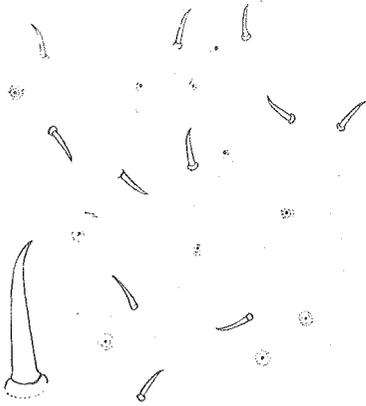


Fig. 5. *Coccus cameronensis* n. sp.
(Adult female)
Submedian dorsal spines, one
enlarged.

gomezianus, *Areca catechu*, *Michelia* sp., mango, *Pawotia wrightii*. Nipah palm. Sometimes protected by *Crematogaster*.

***Coccus cameronensis* n. sp.**

(Adult female) Closely related to *C. acutissimus* GREEN, but differs as follows: Body larger, 7 mm. long. Eyes smaller. Stigmatic spines 3, of which 2 are shorter, conical, pointed, slender, about half or one-third the length of the median one. Marginal setae at each end of body much longer than other setae. Dorsum with about 8 pairs of loose groups of spines on the submedian area, the spines conical, slender, pointed, a little bent at the apical part. Anal plates more rounded at the lateral angle, the basal margin being shorter. Antennae and legs can not be observed in the specimens.

Cameron Highlands; 2 specimens, on an undetermined tree (29. IX. 1944).

***Eucalymnatus tessellatus* SIGNORET**

Ulu Gombak, Kuala Lumpur, Cameron Highlands; not common, on *Eugenia* sp., *Aristonia* sp. and undetermined trees.

***Lecanium psidii* GREEN**

Sungei Buhlo, Kuala Lumpur; common, occurring usually in restricted numbers, on *Artocarpus*, *Aristonia* sp., mango, *Elaeocarpus*, *Ficus* sp., *Vitex pubescens*, *Plumiera* sp. and undetermined trees.

***Lecanium formicarii* GREEN**

Sungei Tua, Kepong, Penchala, Selangor; common on *Ficus* sp., and undetermined trees. Protected with shelters by *Crematogaster*.

***Protopulvinaria longivalvata* GREEN**

Kuala Lumpur; very scarce, on undetermined trees (5. III. 1943, 16. VII. 1944).

***Saissetia oleae* BERNARD**

Sungei Buhlo, Kuala Lumpur; usually very scarce, on *Ficus pumila*, *Eugenia* sp., *Delima sarmentosa*.

***Saissetia triangularum* MORRISON, var. *laos* TAKAHASHI**

Kuala Lumpur, a specimen without submarginal tubercles; on *Cinnamomum* sp. (4. IX. 1943). Singapore, a specimen on *Artocarpus* (2. III. 1944).

Ceroplastes ceriferus ANDERSON

Kuala Lumpur, Cameron Highlands; scarce, on undetermined trees.

Ceroplastes rubens MASKELL

Kepong, a specimen on an unknown tree (9. I. 1944).

Ceroplastodes cajani MASKELL

Sungei Buhlo, many on an undetermined tree (14. IV. 1944).

Ceroplastodes chiton GREEN

Sungei Tua, Segambut near Kuala Lumpur; many on *Ficus* sp. and a tree of Euphorbiaceae (VII. 1944). Attended or protected with shelters by *Crematogaster*.

Vinsonia stellifera WESTWOOD

Kuala Selangor, a specimen, on Nipah palm (18. VIII. 1943).

Alecanium hirsutum MORRISON

Kuala Lumpur, common on *Mesua* sp., *Anona squamosa*, *Alsodeia echinocarpa*, *Dialium laurinum*, *Eugenia aquea*.

Previously known only from Singapore.

Aclerda takahashii KUWANA

Kuala Lumpur, many on *Saccharum arundinaceum* (16. VII. 1943).