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A REVISION OF THE GENUS SCOTINOPHARA STÅL  
(HEMIPTERA: PENTATOMIDAE) OF SOUTHEAST ASIA

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A REVISION OF THE GENUS SCOTINOPHARA STÅL (HEMIPTERA:  
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INTRODUCTION

Insects of the genus *Scotinophara* Stål (family Pentatomidae) have constantly been reported to be pests of considerable importance of rice plants in many parts of Asia. There have been numerous reports on the occurrence of the pest species, only a few examples of which are cited here.

The species *S. lurida* (Burmeister) has been reported to occur widely and to cause severe damage to rice crops by Hutson (1939) in Ceylon and Katsumata (1930) in Japan. Its occurrence as rice pest was also observed in India (Krishna, 1929), Formosa (Esaki, 1927), Indochina (Commun, 1930) and China (Fernando, 1960).

In Malaysia, Corbett and Yusope (1924) reported that the species *S. coarctata* (Fabricius) to be widespread and one of the more important enemies of rice plants. The species was also found to attack rice in Thailand by Ladell (1933).

The species *S. vermiculata* (Vollenhoven) is another that has been known to cause considerable damage to the rice crops in Sumatra and Dutch East Indies as reported by van Stetten (1922) and Rutgers (1920), respectively.

Since rice is the staple crop of practically all nations in Asia, a tremendous effort has been exerted in the attempt to meet the demand for rice of the rapidly growing populations. There is, therefore, a strong need for scientific information concerning all factors and conditions affecting the growth and production of rice. On the basis of this fact, the significance of an intensive study of the insects of the genus *Scotinophara* is obvious.

Despite the importance of the insects of the genus *Scotinophara* to the economy of several countries in Asia, it is rather unfortunate that little work has been done in that area, leaving some species undescribed and others with inadequate descriptions. Also, discrepancies exist as one goes from one system of description to another. Moreover, the confusion of this genus with the genus *Podops* Laporte de Castelnau and some other related genera seems endless. With the aim to add more detailed information to the existing descriptions of the genus and to examine and describe some species suspected to be new.

It should be emphasized at this point, however, that it is not the intention of this work to extend the scope of the area coverage over the whole continent of Asia. The author is concerned only with the more common species in Southeast Asia, including Ceylon, India, Japan and China.

#### TAXONOMIC HISTORY OF THE GENUS SCOTINOPHARA

Before the work of Stål in the year 1867 the insects that are presently known as *Scotinophara* were classified under several names, such as *Cimex*, *Tetyra*, and *Podops*. The establishment of *Podops* as distinct genus from *Cimex* and *Tetyra* by Laporte de Castelnau (1832) attracted many workers who had significant interest in the two genera. As a result of his detailed analyses and studies of *Podops*, Stål was able to subdivide the members of the genus into several groups and to establish many new genera among which *Scotinophara* was included.

In his description of *Scotinophara*, Stål use *S. fibulata* Germar as the type species of the genus. Several revisions were made after this first attempt, including that of Stål himself in 1876, that of Horvath in 1883, that of Distant (who was of the opinion that *Scotinophara* and *Podops* were synonymous) in 1902, and those of Schouteden in 1903 and 1905.

#### BIOLOGY

The genus *Scotinophara* includes a large number of poorly known species. Comparatively little work has been conducted in the areas where the species are known to be abundant. This, coupled with the characteristic behavior and nature of life of each individual species, makes it extraordinarily difficult, if not impossible, to generalize about the biology of the genus as a whole. Since *S. lurida* and *S. coarctata* are the two species that have received recognition as important pests in the regions covered in this study, substantial amounts of work have been done on them. Thus, they will be the only species considered in the following discussion.

##### *Scotinophara lurida* (Burmeister)

De Alwis (1941) reported that in Ceylon *S. lurida* breeds chiefly on rice plants and is also found on related grasses. Only one generation exists in a year. The development from egg to adult lasts nearly two months. The nymphs and adults feed on the stems of rice and usually are active during the evening and early morning, spending the day at the base of the plants. The adults remains inactive from harvest time until the new crop is available next season, sheltering in the soil of the rice field and in neighboring patches of high land and jungle.

Fernando (1960) found in Ceylon, where two crops of rice are grown annually, that *S. lurida* estivates in the adults or late nymphal stages in cracks in the bunds in the rice fields or on neighboring higher ground. The adults leave the estivation sites in April and May and settle in the first crop when it is 2-3 weeks old, and a subsequent estivating population behaves

similarly in November and December for the second crop. After the bugs have fed for about a week on the rice seedlings, pairing takes place, and oviposition begins about 10 days later. Egg masses in the field usually consist of 2 rows, each containing 7 eggs. At 75 per cent relative humidity and 25–28°C in the laboratory, the average duration of the egg stage and 5 nymphal instars was 6, 5, 9, 7, 9 and 12 days, respectively. The eggs are parasitized by *Telenomus triptus* Nixon.

The species was found by Katsumata (1930) to have one generation per year in Japan. Katsumata also stated that the eggs are laid on the leaves and leaf sheaths of the host plants between 6 and 8 p.m., mostly about the end of July. They usually occur in 2 or sometimes 3 compact rows, 14 in each row, and hatch in early morning 4 days after deposition. The adult stage is reached in 27–46 days and the adults, which are strongly attracted to light at night, usually live about 10 months. Hibernation takes place under leaves and among grasses near the rice fields in the adult stage and covers a period of approximately 8 months. Oviposition begins 2–3 weeks after migration from the hibernating places.

In the publication cited above, Katsumata reported *Telenomus* sp. as a parasite of the eggs of *S. lurida*. The Carabids, *Pterostichus microcephalus* Motschulsky, *Anchomenus (Agonum) daimio* Bates, and *Chlaenius pallipes* Gebler, feed on eggs and nymphs; and *Anisolabis maritima* Gene attacks the bugs in captivity. They are also destroyed by frogs and ducks. The fungus, *Metarrhizium anisopliae* (*Oospora destructor*), causes considerable mortality among adults and nymphs.

Okajima (1929) stated that in Japan *S. lurida* has one generation a year, but it is said to have three in Formosa. The adults are active on cloudy days and in the evening or early part of the night. The food plants are chiefly grasses, particularly rice. The bugs occur in areas where the average annual temperature is above 12°C, and prefer moist places.

According to Liu (1934), 75 percent of the eggs of *S. lurida* are found below a point 4 inches from the ground surface on the sheaths and stems of rice plants.

Hu and Tse (1936) reported that *S. lurida* is one of the natural predacious enemies of the rice cut-worm (*Cirphis unipuncta* Haworth).

#### *Scotinophara coarctata* (Fabricius)

Detailed reports on this species are from Malaysia by Yusope (1921), Corbett (1923), and Corbett and Yusope (1924).

Yusope (1921) stated that the number of eggs laid by each female of *S. coarctata* varies from 30 to 40. The eggs are laid on any part of the plant or in cracks in the soil. Hatching takes place in 4 to 5 days after egg laying. The nymphs begin to feed in the second instar and continue for about 50 days during which they undergo 5 molts. The larvae and adults prefer cool places, but in moist weather they live under the leaves.

Corbett (1923) presented a report stating that *S. coarctata* lays eggs in a group at the base of the rice stem. The eggs, however, may also be deposited in the soil. They hatch in about 4 days and are parasitized to a large extent by a Chalcid. The nymphal stage covers a minimum period of 29 days. The bugs thrive best where there is stagnant water.

Corbett and Yusope (1924) reported that the eggs of *S. coarctata* are laid in groups, generally about 40, at the base of the plant or in cracks of soil or on the roots under dry conditions, and on the lower leaves or further up the stem in flooded areas. The number of eggs laid by one female may be as high as 684. Under dry conditions the nymphs and adults are forced to descend to the roots below the ground to obtain moisture. Both nymphs and adults seem to be free of natural enemies, but the eggs are parasitized by a Chalcid. On the average it takes 32 days from the time of egg hatching to the appearance of adult. The eggs hatch in 4 to 5 days after they are laid and the preoviposition period varies from 9 to 22 days. The maximum age of the adult is 214 days.

#### ✓ Genus SCOTINOPHARA Stål

- 1867. Scotinophara Stål, Öfv. Kongl. Vet. Akad. Förh. 24 (7) :502.
- 1876. Scotinophara Stål, Kongl. Svenska Vet. Akad. Handl. (4) 14 (4) : 29.
- 1883. Scotinophara, Horvath, Wein, Ent. Zeit. 2:165.
- 1902. Podops, Distant, Faun. Brit. Ind. Rh. 1:72.
- 1903. Scotinophara, Schouteden, Rh. Aeth. 1:120.
- 1905. Scotinophara, Schouteden, Gen. Insectorum, Fasc. 30:33.

Body oval and moderately convex. Head wider across eyes than long and shorter than pronotum; lateral margin of head tapering with basal part of preocular region sinuated; tylus commonly elevated at least from middle portion to posterior part of head; jugs never contiguous in front of the tylus, varying in length from longer to shorter than tylus; eyes prominent and pedunculate; from above, antenniferous tubercles conspicuous and pointed anteriorly or obliquely; five-segmented antenna, with a tendency for fusion of the second and third segments, first and second commonly subequal in length and always shorter than third, terminal segment longest. Position of apex of rostrum varying from near front end of hind coxae to abdomen.

Pronotum across prehumeral processes at least twice as wide as long; disk of pronotum varies from a sharply to a weakly visible transverse impression near or along the middle; cicatrices frequently with tuberclelike elevations. Anterolateral processes toothed, or elongately spinelike, with tip projecting in different directions.

Scutellum frequently as long as abdomen or slightly shorter and contracted before the middle, covering most of abdomen and membranous part of corium, leaving hemelytra free.

Odoriferous orifices situated closer to posterior coxae than to metapleura, surrounding surfaces wrinkled. Spiracles set closer to anterior than to lateral margin.

Ventral body darker than dorsal side with lateral margins paler than or concolorous with the body. Head always black. Body color varies from brownish-yellow, yellowish-brown, reddish-brown, dark brown to black.

Type species of genus: *S. fibulata* Germar.

#### KEY TO THE SPECIES

1. Tip of anterolateral spine of pronotum projected forward and extended beyond anterior angle of pronotum ..... (7)  
 Tip of anterolateral spine of pronotum not extended beyond anterior angle of pronotum ..... (2)
2. Tip of anterolateral spine of pronotum projected forward or laterad ..... (3)  
 Tip of anterolateral spine of pronotum projected posterad.  
 Moderate and reddish-brown species ---- 7.0-8.5 mm .....  
 ..... *S. coarctata* (Fabricius) ✓
3. Lateral margin of pronotum between spines serrate; apex of antenniferous tubercle distinctly bifid. Large, yellowish-brown species ---- 10.5-11.0 mm .....  
 ..... *S. serrata* (Vollenhoven) ✓  
 Lateral margin of pronotum between spines not serrate; apex of antenniferous tubercle not bifid or slightly bifid ..... (4)
4. Apex of head notched, tylus slightly shorter than juga. Pale species ..... (5)  
 Apex of head not notched, tylus and juga equally long or tylus a little longer than juga. Dark species ..... (6)
5. Lateral margin of pronotum between spines concave; disk of pronotum with strong transverse impression near the middle. Small, reddish-brown species ---- 6.0-6.5 mm..  
 ..... *S. sumatrensis* new species ✓  
 Lateral margin of pronotum between spines slightly sinuate; disk of pronotum with light transverse impression. Moderate, brownish-yellow species ---- 7.0-7.2 mm  
 ..... *S. ceylonica* (Distant) ✓
6. Rostrum extended only to middle point of hind coxae; scutellum about twice as long as width at narrowest point (7:6:12); apex of antenniferous tubercle slightly bifid. Large and dark species ---- 9.5-11.0 mm ..... *S. lurida* (Burmeister) ✓  
 Rostrum extended beyond hind coxae onto abdomen; scutellum nearly 1/3 times longer than width at narrowest point (7:6:10); apex of antenniferous tubercle blunt. Dark species ---- 8.5 mm ..... *S. obscura* (Dallas) ✓

7. Lateral margin of pronotum between spines strongly convex ..... (8)  
 Lateral margin of pronotum between spines concave or slightly sinuate ..... (9)
8. Tylus slightly shorter than juga; rostrum long, extending onto abdomen. Moderate, black species ---- 8.0-8.5 mm ..... *S. nigra* (Dallas) ✓  
 Juga evidently longer than tylus; rostrum shorter, reaching to hind coxae. Small, brown to dark brown species ---- 6.5-7.0 mm ..... *S. scotti* Horvath ✓
9. Anterolateral spine long, humeral spine at least one-tenth of the total width of pronotum; femur always dark approaching black. Moderate, yellowish-brown species — 7.0-7.5 mm ..... *S. bispinosa* (Fabricius) ✓  
 Anterolateral spine short, humeral spine less than one-tenth of total width of pronotum; femur always pale. Brownish-yellow species ---- 8.5 mm ..... *S. ochracea* (Distant) ✓

✓ *Scotinophara serrata* (Vollenhoven)  
 (Plate 1, Figures 1-4)

*Podops serratus* (Vollenhoven), 1863, Faun. Ind. Neerl 1:42 (Borneo and Celebes).

*Scotinophara serrata*, Stål, 1870, Öfv. Vet. Akad. Förh. 27:623.

*Podops serrata*, Distant, 1902, Faun. Brit. Ind. Rh. 1:75.

Length 10.5-11.0 mm. Width across prehumeral processes 6.5-7.0 mm. Yellowish-brown; anterior pronotum with black collar, lateral margin including anterolateral spines and prehumeral spines, and area within cicatrices except tubercles black; antennae dark brown with terminal segments paler than others; rostrum brownish-yellow; legs reddish-brown approaching black; ventral body almost black with lateral margin reddish-brown.

Head across eyes slightly wider than long with a little shorter length than pronotum. Tylus much shorter than juga. Antenniferous tubercle with apex strongly bifid and projected slightly obliquely to nearly middle part of preocular part of head. Antennae with basal segment incrassate and as long as second, second and third with tendency for fusion, third and fourth subequal, terminal longest. Rostrum reaching hind coxae.

Pronotum across prehumeral processes over twice as long; disk strongly transversely impressed a little before middle; cicatrices with elevated tubercles. Anterolateral spines moderately acute, projected laterad, prehumeral spines subacute. Lateral margin between spines strongly serrate. Outline of head and pronotum as in Figure 1.

Scutellum 9:7:11 (width across base: width at narrowest point: length), with apex a little shorter than abdomen in male and much shorter in female.

Male genitalia: Phallus and clasper as shown in Figures 2, 3 and 4.

Source of material: Fang, Northern Thailand; British North Borneo, Viet Nam.

✓ *Scotinophara coarctata* (Fabricius)  
(Plate 2, Figures 1-4)

*Cimex coarctatus* (Fabricius), 1798, Ent. Syst. Suppl., p.530 (Tranquebar, India).

*Tetyra bispinosa* Fabricius, 1803, Syst. Rh., P. 138 (Tranquebar, India).

*Podops spinosus* Walker, 1867, Cat. Het. Brit. Mus. 1:73 (Penang, Malaya).

*Podops nasalis* Walker, 1867, Cat. Het. Brit. Mus. 1:73 (Thailand).

*Podops exactus* Walker, 1867, Cat. Het. Brit. Mus. 1:74 (locality unknown).

*Scotinophara coarctata*, Stål, 1868, Kongl. Svenska Vet. Akad. Handl. (4) 7 (11) :21.

*Scotinophara coarctata*, Atkinson, 1887, Jour. Asiat. Soc. Beng. 56:195.

*Podops coarctata*, Distant, 1902, Faun. Brit. Ind. Rh. 1:73.

Length 7.0-8.5 mm. Width across prehumeral processes 4.0-4.5 mm. Reddish-brown or dark brown slightly tinged with yellow; head black; antennae, rostrum vary from reddish-brown to brownish-yellow; anterior pronotum always darker, collar and cicatrices nearly black or black; ventral side darker than dorsal side, varying from black to reddish-brown and paler along side; legs with trochanter and femur reddish-brown, tibia and tarsus paler.

Head across eyes nearly twice as wide as long, somewhat declivous. Tylus slightly longer than juga. Antenniferous tubercle incurved with apex pointed inside (Plate 2, Figure 1). Antennae with basal segment slightly incrassate and equal to second and third combined. Rostrum reaching hind coxae.

Pronotum across prehumeral processes a little bit over twice as wide as long. Tip of anterolateral process projected posterad to anterior angle of pronotum; prehumeral process short, subacute. Lateral margin between spines slightly concave. Anterior disk within cicatrices devoid of tubercles. Outline of head and pronotum as shown in Figure 1.

Scutellum 6:5:9 (width across base: width at narrowest point: length), with apex subequal or a little shorter than abdomen in male and much shorter in female.

Male genitalia: Phallus and clasper as shown in Figures 2,3 and 4.

Source of material: Thailand (Cholburi, Nakornsawan, Suratthani, Trang), Cambodia, Indonesia (Java, Sumatra), British North Borneo, Sarawak.

✓ *Scotinophara nigra* (Dallas)  
(Plate 3, Figures 1-4)

*Podops niger* Dallas, 1851, List. Hem. Brit. Mus. 1:53 (India).

*Scotinophara nigra*, Atkinson, 1887, Jour. Asiat. Soc. Beng. 56:196.



*Podops nigra*, Distant, 1902, Faun. Brit. Ind. Rh. 1:76.

Length 8.0-8.5 mm. Width across prehumeral processes 4.5 mm. Black; antennae, rostrum and tarsi reddish-brown.

Head across eyes about one-fourth wider than long, somewhat declivous. Antenniferous tubercle long with apex obtuse or subacute, extending obliquely forward to about middle part of preocular portion. Antennae with basal segment slightly incrassate, a little shorter than or nearly equal to second, third longer than second and subequal to fourth, terminal segment about one-fifth longer than fourth. Tylus very slightly shorter than juga, the difference being extremely small. Rostrum long, extending onto abdomen.

Pronotum across prehumeral processes about twice as wide as long. Anterolateral spine long with apex obtuse and projected obliquely forward well beyond outer margin of eyes, prehumeral spine short and subacute. Lateral margin between spines strongly convex and a little reflexed. Anterior pronotum more convex than posterior, cicatrices with small tubercles. Disk with strong transverse impression a little before the middle. Outline of head and pronotum as shown in Figure 1.

Scutellum almost about one-third longer than wide, 6.5 :6:9.5 (Width across base : width at narrowest point : length), reaching apex of abdomen in male and a little shorter in female.

Male genitalia: Phallus and clasper as shown in Figures 2,3 and 4.

Source of material : South India, (Coimbatore).

*Scotinophara ochracea* (Distant)  
(Plate 4, Figures 1-4)

*Podops ochracea* Distant, 1901, Ann. Mag. Nat. Hist. (7) 8:241.

*Podops ochracea* Distant, 1902, Faun. Brit. Ind. Rh. 1:76.

Length 8.5 mm. Width across prehumeral processes 5.0 mm. Yellow with slight tinge of brown. Head black, eyes reddish-brown. Antennae, rostrum and legs concolorous with body. Prothorax with black tinge within cicatrices. Ventral side black with tinge inclining to pale reddish-brown along side.

Head across eyes more than one-third wider than long, somewhat declivous. Tylus slightly shorter than juga. Antenniferous tubercle with apex slightly bifid, projected anteriorly to about one-third of preocular part. Antennae with basal segment slightly incrassate and subequal to second, third and fourth subequal, terminal equal to second and third combined. Apex of rostrum reaches hind coxae.

Pronotum across prehumeral processes about twice as wide as long; anterolateral spine short, acute, extending obliquely forward; prehumeral spines moderately acute; lateral margin between spines shallowly sinuate; disk before the middle with slightly transverse impression; cicatrices with small tubercles. Outline of head and pronotum as shown in Figure 1.

Scutellum 7:6:10 (Width across base : width at narrowest point : length), with apex reaching the end of abdomen in male and shorter in female.

Male genitalia: Phallus and clasper as shown in Figures 2,3 and 4.

Source of material: Thailand (Bangkok, Chiengrai, Cholburi), Burma (Rangoon), the Philippines (Luzon).

**✓*Scotinophara lurida* (Burmeister)**  
(Plate 5, Figures 1-4)

*Tetyra lurida* Burmeister, 1834, Nova Acta Acad. Leop. Carol. 16 (Suppl.): 288  
(Canton, China).

*Podops lurida*, Germar, 1839, Zeitschr. Ent. 1:64.

*Scotinophora lurida*, Stål, 1876, Kongl. Svenska Vet. Akad. Handl. (4) 14 (4): 33-34.

*Scotinophara lurida*, Distant, 1879, Ann. Mag. Nat. Hist. (5) 3:44.

*Scotinophara lurida*, Atkinson, 1887, Jour. Asiat. Soc. Beng. 56:194.

*Podops lurida*, Distant, 1902, Faun. Brit. Ind. Rh. 1:74.

Length 9.5-11.0 mm. Width across prehumeral processes 5.5-6.0 mm. Dark brown approaching black; head black; antennae, rostrum, tibiae and tarsi reddish-brown; ventral side including trochanters and femora concolorous with dorsal side or slightly darker.

Head across eyes about one-fourth wider than long; eyes rather stylated; tylus more or less equal to juga. Apex of antenniferous tubercle slightly bifid, extending anteriorly almost to middle part of preocular part of head. Antennae with basal segment incrassate, a little shorter than second, third and fourth subequal, terminal segment longest and about one-third longer than fourth. Rostrum extending to middle point of hind coxae.

Pronotum across prehumeral processes about twice as wide as long; anterolateral processes small and short, projected obliquely forward; prehumeral processes longer, acute or moderately acute; disk with weakly transverse impression before middle; lateral margin between spines shallowly sinuate. Outline of head and pronotum as shown in Figure 1.

Scutellum 7:6:12 (width across base : width at narrowest point : length), with apex reaching the end of abdomen in male and much shorter in female.

Male genitalia: Phallus and claspers in Figures 2, 3 and 4.

Source of material: Thailand (Prajinburi), Viet Nam, Hong Kong, China (Nanking, Soochow), Formosa, Japan, the Philippines (Mindanao), Netherlands New Guinea, South India (Coimbatore), Central East India (Orissa Jeypore).

✓ *Scotinophara obscura* (Dallas)  
(Plate 6, Figures 1-4)

*Podops obscura* Dallas, 1851, List. Hem. Brit. Mus. 1:52 (Tenasserim, Burma).

*Podops obscura*, Vollenhoven, 1863, Faun. Ent. Ind. Neerl. 1:41.

*Scotinophara obscura*, Atkinson, 1887, Jour. Asiat. Soc. Beng. 56:196.

*Podops obscura*, Distant, 1902, Faun. Brit. Ind. Rh. 1:74.

Length 8.5-9.0 mm. Width across prehumeral processes 5.0 mm. Body dark brown or almost totally black, only rostrum reddish-brown. Most closely related to *S. lurida* but smaller.

Head across eyes almost one-third wider than long. Eyes prominent. Antenniferous tubercle with apex blunt, extending to one-third of preocular portion of head. Antennae with basal segment slightly incrassate and subequal to second, but shorter than third, third and fourth subequal, terminal segment a little longer than fourth. Tylus more or less equal to or a little bit longer than juga. Rostrum long, extending a little beyond hind coxae onto abdomen.

Pronotum across prehumeral processes about twice as wide as long. Tip of anterolateral spine subacute, short, and projected laterad. Prehumeral spine subacute. Lateral margin between spines very slightly sinuate. Disk with slightly transverse impression before middle. Cicatrices devoid of tubercles. Outline of head and pronotum as in Figure 1.

Scutellum nearly one-third longer than wide, 7:6:10 (width across base: width at narrowest point : length), with apex slightly longer than the end of abdomen in male and a little shorter in female.

Male genitalia: Phallus and clasper as shown in Figures 2, 3, and 4.

Source of material: South India (Coimbatore), Central East India (Orissa Jeypore).

✓ **Scotinophara scotti** Horvath  
(Plate 7, Figures 1-4)

*Scotinophara tarsalis* Scott, 1874, Ann. Mag. Nat. Hist. (4) 14:292 (Japan)

*Scotinophara scotti* Horvath, 1879, Term. Fuzet. 3:144 (Nagasaki, Japan).

Length 6.5-7.0 mm. Width across prehumeral processes 4.0 mm. Dark brown (nearly black), or yellowish-brown; head and anterior pronotum always black; posterior pronotum black or concolorous with body; scutellum usually gradually narrowly darkened or black from base to about middle; antennae, rostrum, and tarsi yellowish-brown or reddish-brown or antennae somewhat darker; ventral body and legs except tarsi nearly black or black.

Head across eyes a little wider than long. Tylus much shorter than juga. Antenniferous tubercle with apex bifid, extending forward to about one-fifth of preccular part of head. Antennae with basal segment incrassate and subequal to second, third about one-third longer than second and a little shorter than fourth, terminal segment moderately incrassate and a little shorter than or nearly equal to second and third combined. Rostrum reaching hind coxae or nearly so.

Pronotum across prehumeral spines about twice as wide as long. Anterior pronotum convex with small tubercles within cicatrices. Disk with strong transverse impression across the middle. Anterolateral spines horn-like, with apex obtuse or subacute, extending obliquely forward well beyond outer margin of eyes. Prehumeral processes subacute, projected beyond the rounded humeral margin. Lateral margin between spines convex and slightly serrate. Outline of head and pronotum as shown in Figure 1.

Scutellum 5.5:5:5.8 (width across base: width at narrowest point: length), with apex subequal to the end of abdomen in both male and female.

Male genitalia: Phallus and clasper as shown in Figures 2, 3 and 4.

Source of material: Hong Kong, Formosa (Takao), China (Nanking), Japan (Kyushu).

✓ **Scotinophara bispinosa** (Fabricius)  
(Plate 8, Figures 1-4)

*Cimex bispinosa* Fabricius, 1798, Ent. Syst. Suppl., p. 529 (Morocco?; Tranquebar, India).

*Tetyra bispinosa* Fabricius, 1803, Syst. Rh., P. 138 (Tranquebar, India).

*Scotinophara bispinosa*, Stål, 1868, Kongl. Svenska Vet. Akad. Handl. (4) 7(11):21.

*Scotinophara bispinosa*, Atkinson, 1887, Jour. Asiat. Soc. Beng. 56:194.

*Podops bispinosa*, Distant, 1902, Faun. Brit. Ind. Rh. 1:77.

Length 7.0 -8.0 mm. Width across prehumeral processes 5.0 mm. Yellowish-brown; head black; anterior pronotum darker than posterior, with collar, area within cicatrices, both anterolateral and prehumeral spines, and lateral margin between spines black; antennae yellowish-brown, rostrum paler; body nearly black or black underneath with reddish-brown lateral abdominal margin; legs with trochanters, femora, and basal tibiae concolorous with ventral side of body, the rest of tibiae and tarsi brownish-yellow.

Head across eyes twice as wide as long and about half of pronotum in length. Tylus slightly shorter than or subequal to juga. Antenniferous tubercle with apex subacute, extending obliquely to about one-fourth of preocular part of head. Antennae with basal segment moderately incrassate and subequal to second, third about twice as long as second and subequal to fourth, terminal segment longest and one-fifth longer than fourth. Rostrum extending to front end of hind coxae.

Pronotum across posterior lobe over twice as wide as long. Anterolateral spine acute and long, projected obliquely forward well beyond outer margin of eyes. Prehumeral spine acute and long, projected beyond the rounded humeral margin about one-tenth the total width of pronotum. Lateral margin between spines concave. Disk with transverse impression before the middle. Cicatrices with small tubercles. Outline of head and pronotum as shown in Figure 1.

Scutellum nearly twice as long as width at narrowest point, 6:5:9 (width across base : width at narrowest point: length), with apex reaching to end of abdomen in male and slightly shorter in female.

Male genitalia: Phallus and clasper as shown in Figures 2,3 and 4.

Source of material; South India (Karikal, Coimbatore).

✓ *Scotinophara ceylonica* (Distant)  
(Plate 9, Figures 1-4)

*Podops ceylonica* Distant, 1901, Ann. Mag. Nat. Hist. (4) 8:241 (Pemparipo, Ceylon).

*Podops ceylonica* Distant, 1902, Faun. Brit. Ind. Rh. 1:75.

Length 7.0-7.2 mm. Width across prehumeral processes 4.5 mm. Brownish-yellow; head black; antennae reddish-brown, most parts of rostrum reddish-brown. Almost the whole anterior pronotum, including anterolateral spines, humeral spines, and lateral margin between spines black. Ventral side of body black with reddish tinge, gradually grading into reddish-brown or yellowish-brown along sides. Legs with trochanters and femora reddish-brown, and pale ring near apex of femur, tibiae and tarsi of middle and hind legs almost pale brown except basal portion, tibiae of front legs darker.

Head much wider across eyes than long, nearly twice as wide as long. Antenniferous tubercle subacute, extending anteriorly to middle of preccular part of head. Antennae with basal segment short, incrassate and subequal to second, third about twice as long as second and subequal to fourth, terminal segment longest. Tylus slightly shorter than juga. Apex of rostrum reaching almost to hind coxae.

Pronotum across prehumeral processes about twice as wide as long. Disk with light impression along middle. Cicatrices devoid of tubercles. Anterolateral spine small, acute. Prehumeral processes small, subacute. Lateral margin between spines shallowly sinuate. Outline of head and pronotum as shown in Figure 1.

Scutellum with lateral margins nearly parallel, 6:5.5:9 (width across base: width at narrowest point: length), apex reaching the end of abdomen in male and slightly shorter in female.

Male genitalia: Phallus and clasper as shown in Figures 2, 3 and 4.

Source of material: South India (Coimbatore).

✓ *Scotinophara sumatrensis*, new species  
(Plate 10, Figures 1-4)

Length 6.0-6.5 mm. Width across prehumeral processes 4.0 mm. Reddish-brown; head and anterior pronotum black; terminal segments of antennae dark brown, other segments as well as most parts of rostrum yellowish-brown; legs with coxae, trochanters and femora dark brown, nearly black, tibiae and tarsi pale brownish-yellow; ventral side black, lateral sides pale with yellow spots near spiracles.

Head across eyes nearly twice as wide as long, somewhat declivous. Eyes pedunculate. Juga slightly expanded and a little bit longer than tylus. Tylus gradually tapering from middle to apex. Antenniferous tubercle with apex blunt or very slightly bifid, extending anteriorly almost to middle of preccular part of head. Antennae with basal segment moderately incrassate, as long as second and about one-third shorter than third, fourth slightly longer than third, terminal segment incrassate, longest, and a little shorter than second and third combined. Rostrum reaching to hind coxae.

Pronotum across prehumeral processes over twice as wide as long; disk strongly and transversely impressed just a little before middle; cicatrices with tubercles strongly elevated. Anterolateral spines small, acute, and projecting laterad. Prehumeral spines moderately acute. Lateral margin between spines concave. Outline of head and pronotum as in Figure 1.

Scutellum 5.5:4.5:7.5 (width across base: width at narrowest point: length), with apex reaching end of abdomen.

Male genitalia: Phallus and clasper as shown in Figures 2, 3 and 4.

Source of material: Sumatra.

Holotype: Male, and 2 male paratypes, Sumatra, 1937, E. Overstreet, Bernice P. Bishop Museum.

In comparison with any of the other 9 species, *S. sumatrensis* is smaller in size. The juga are more expanded and the tylus is more tapering with the middle part being more convex. The fourth segment of the antennae is a little longer than the third in *S. sumatrensis* while in the other 9 species the two segments are always subequal. *S. sumatrensis* also has very much smaller genitalia than the other 9 species, with the right clasper being narrower and rounded at tip.

#### DISCUSSION

As indicated earlier in this paper, most of the insects that are now known as Scotinophara were at least once classified under some other genus. It is evident, therefore, that *Scotinophara* must have several characteristics that it shares with those genera with which it is most often mistaken. Nevertheless, in order for a genus to stand as a distinct category, its members have to have certain recognizable characteristics which are significantly different from those of the others. To have a better appreciation of Scotinophara as an independent genus, a comparison of some of its important characters with those of the closely related genera is felt necessary.

It is beyond the scope of this paper, however, to deal with all the possible comparisons. The limited time and facilities have led to the consideration of only the cases that are most frequently confusing. On the basis of the information gathered from the available literature, the genera *Podops* and *Amaurochrous* are the ones for which the *Scotinophara* have been most commonly mistaken. The comparisons that will follow will, therefore, involve only these three closely related genera. It should also be emphasized that in the discussion to follow only the features that show marked differences will be mentioned and described and that those features which are not discussed are to be taken as being similar or showing no significant differences.

An examination of many of the descriptions of the three genera, particularly those given by Schouteden (1905) and those contributed by Barber and Sailer (1953), reveals close similarity among them. Nevertheless, there are distinct differences which are not obvious at first glance but which can be readily seen through a more detailed scrutiny.

The first difference that merits consideration is the nature of the Juga in relation to the tylus. In *Scotinophara* the juga vary in length from longer to shorter than tylus but in all cases examined, they are never contiguous in front of the tylus. The lateral margins of the head are of tapering nature. In *Podops*, the juga are contiguous, if not they are barely longer than the tylus; the lateral margins of the head being subparallel or slightly divergent (Schouteden,

1905). In *Amaurochrous*, the jugs are slightly longer than the tylus and contiguous in most cases; the lateral margins of head being divergent (Schouteden, 1905).

The second important difference is the shape of the anterolateral processes. In *Podops*, they are flattened and spatulate in *Amaurochrous* they are conical or tuberculate (Barber and Sailer, 1953). In *Scotinophara*, the processes are either toothed or elongately spine-like, projecting in different directions.

The male genitalia provide another feature that shows noticeable differences. According to Barber and Sailer (1953), with minor variations the claspers and phallus of all species of *Amaurochrous* conform to the pattern exhibited by the genotype *A. dubius* Palisot de Beauvois and are quite different from *Podops inunctus* Fabricius. The species *A. vanduzeei* Barber and Sailer and *P. inunctus* Fabricius were examined. The outline of head and pronotum and that of male genitalia of these two species are shown in Plates 11 and 12, respectively. Among the 10 species of *Scotinophara* described in the present paper, all but *S. coarctata* Fabricius and *S. sumatrensis* sp. n. have claspers that are similar in shape. All of them, however, show a close similarity in the shape of the phallus. A comparison of these similar claspers of *Scotinophara* with those of either *A. vanduzeei* or *P. inunctus* reveals distinct differences as shown in Plates 1-11 (Figure 4) and Plate 12 (Figure 3). Differences are also apparent when the shapes of the phallus are compared (Plates 1-11, Figures 2 and 3, and Plate 12, Figure 2). The distinct character of *P. inunctus* is the bilobed distal vesica of the phallus which is unlike the homologous structure of both *A. vanduzeei* and any of the species of *Scotinophara* described herein.

The final difference to be mentioned is the geographic distribution. According to Schouteden (1905), the genus *Amaurochrous* predominates in the United States in contrast to the *Podops* in Europe and the *Scotinophara* in Southern Asia and Ethiopia. Schouteden also stated that only two species of *Scotinophara* were known to exist in Europe. A similar view was held by Horvath (1883) and several other workers.



## SUMMARY

Ten species of the genus *Scotinophara* Stål from different parts of Southeast Asia, including Japan, China, India and Ceylon, were studied. Based on these investigations, a key to the species is presented, the genus is recharacterized, and the 9 previously described species are redescribed. These 9 species are *S. serrata* (Vollenhoven), *S. coarctata* (Fabricius), *S. nigra* (Dallas), *S. ochracea* (Distant), *S. lurida* (Burmeister), *S. obscura* (Dallas), *S. scotti* Horvath, *S. bispinosa* (Fabricius), and *S. ceylonica* (Distant). One new species, *S. sumatrensis*, is described. The biology of certain species under consideration is reviewed.

*Amaurochrous vanduzeei* Barber and Sailer and *Podops inunctus* Fabricius were chosen to represent the two closely related genera and compared with the species of *Scotinophara* described. Differences in geographic distribution, nature of the juga in relation to the tylus, shape of anterolateral processes, and male genitalia among the three genera are pointed out. Illustrations of all species examined are also given.

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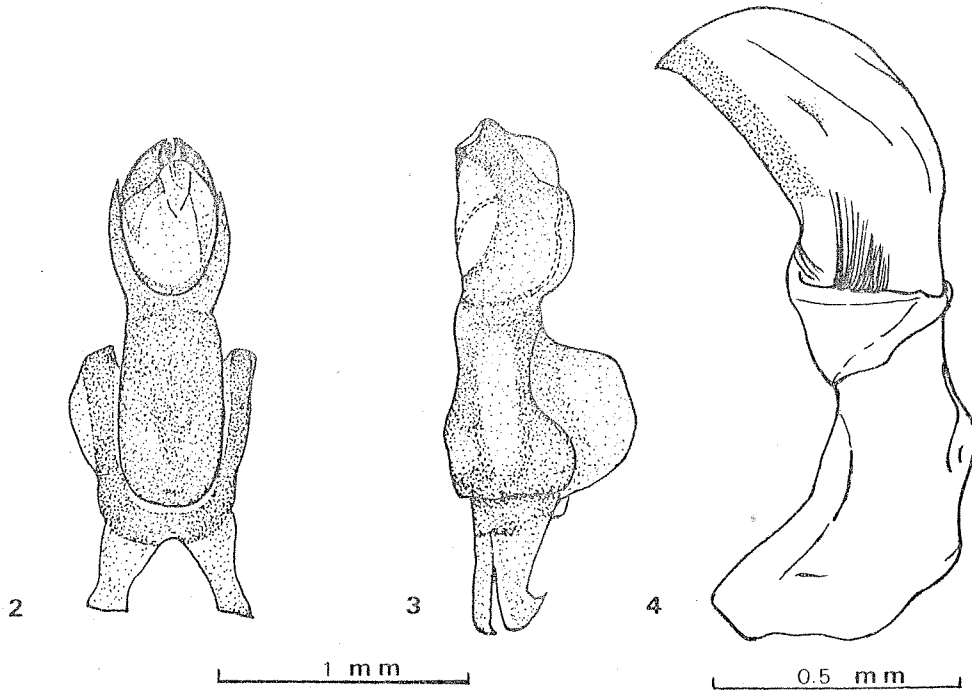
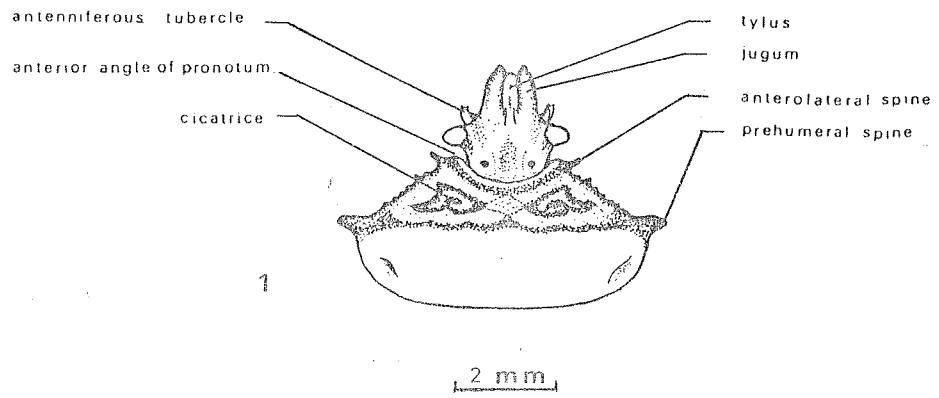


Plate 1

Scotinophara serrata (Vollenhoven)

Fig.1 Dorsal view of head and pronotum.

Fig.2 Phallus, dorsal view;

Fig.3 same, lateral view.

Fig.4 Right clasper.

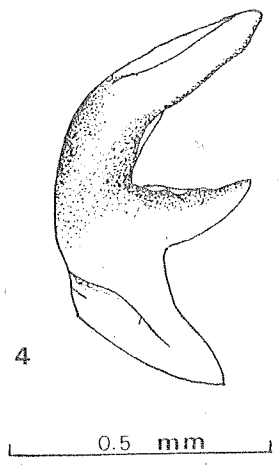
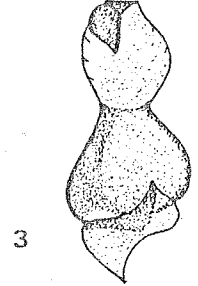
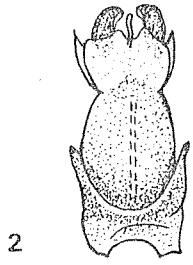
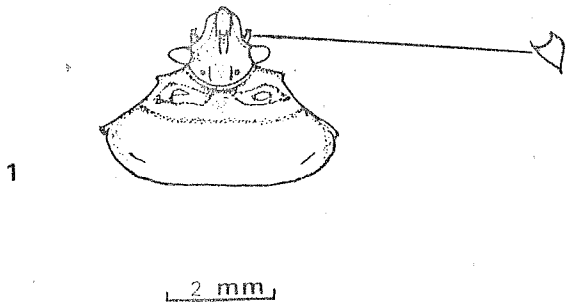


Plate 2

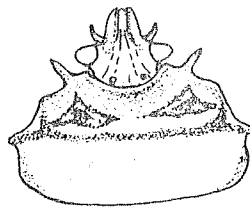
Scotinophara coarctata (Fabricius)

Fig. Dorsal view of head and pronotum.

Fig. Phallus, dorsal view;

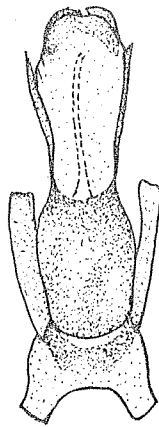
Fig. same, lateral view.

Fig. Right clasper.

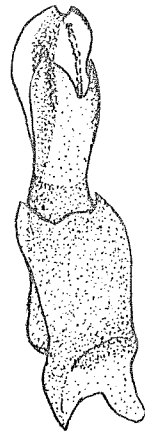


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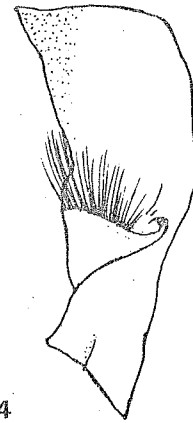
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Plate 3

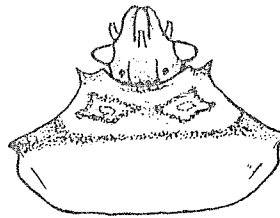
Scotinophara nigra (Dallas)

Fig. Dorsal view of head and pronotum.

Fig. Phallus, dorsal view;

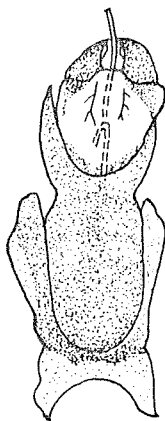
Fig. same, lateral view.

Fig. Right clasper.

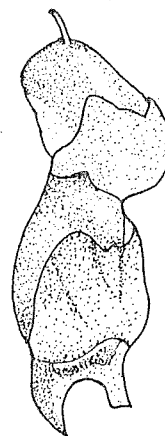


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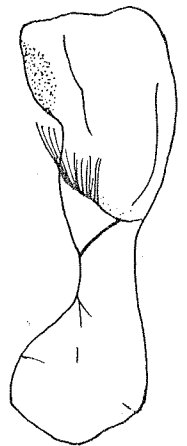
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Plate 4

Scotinophara ochracea (Distant)

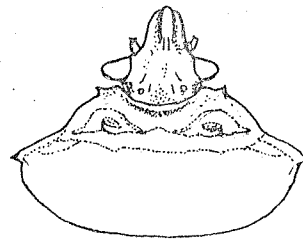
Fig. 1 Dorsal view of head and pronotum.

Fig. 2 Phallus, dorsal view;

Fig. 3 same, lateral view.

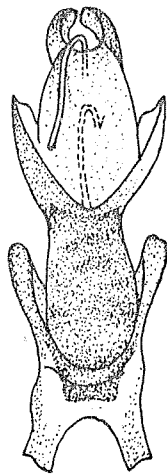
Fig. 4 Right clasper.



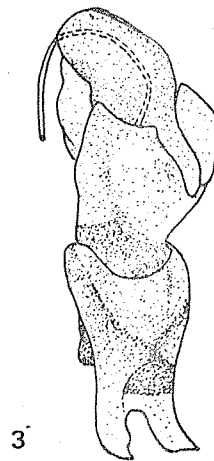


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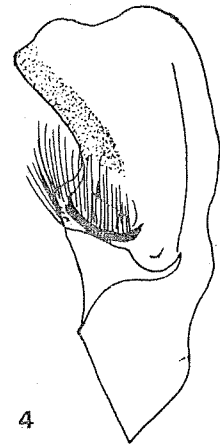


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Plate 5

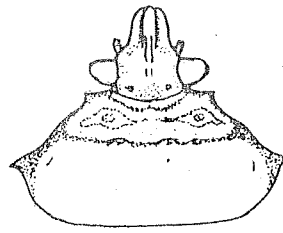
Scotinophara lurida (Burmeister)

Fig. 1 Dorsal view of head and pronotum.

Fig. 2 Phallus, dorsal view;

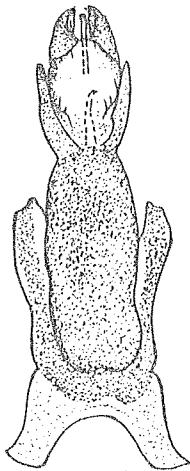
Fig. 3 same, lateral view.

Fig. 4 Right clasper.

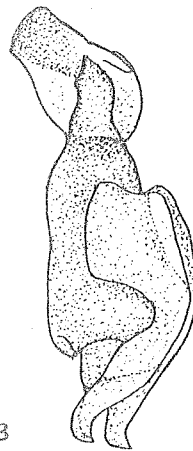


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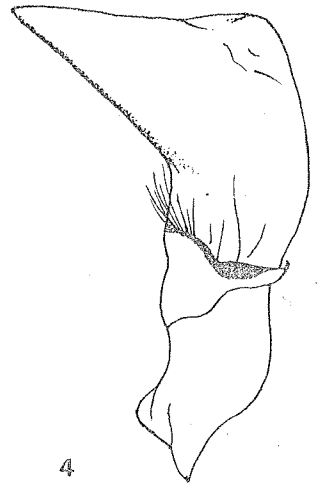


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Plate 6

Scotinophara obscura (Dallas)

Fig. 1 Dorsal view of head and pronotum.

Fig. 2 Phallus, dorsal view;

Fig. 3 same, lateral view.

Fig. 4 Right clasper.

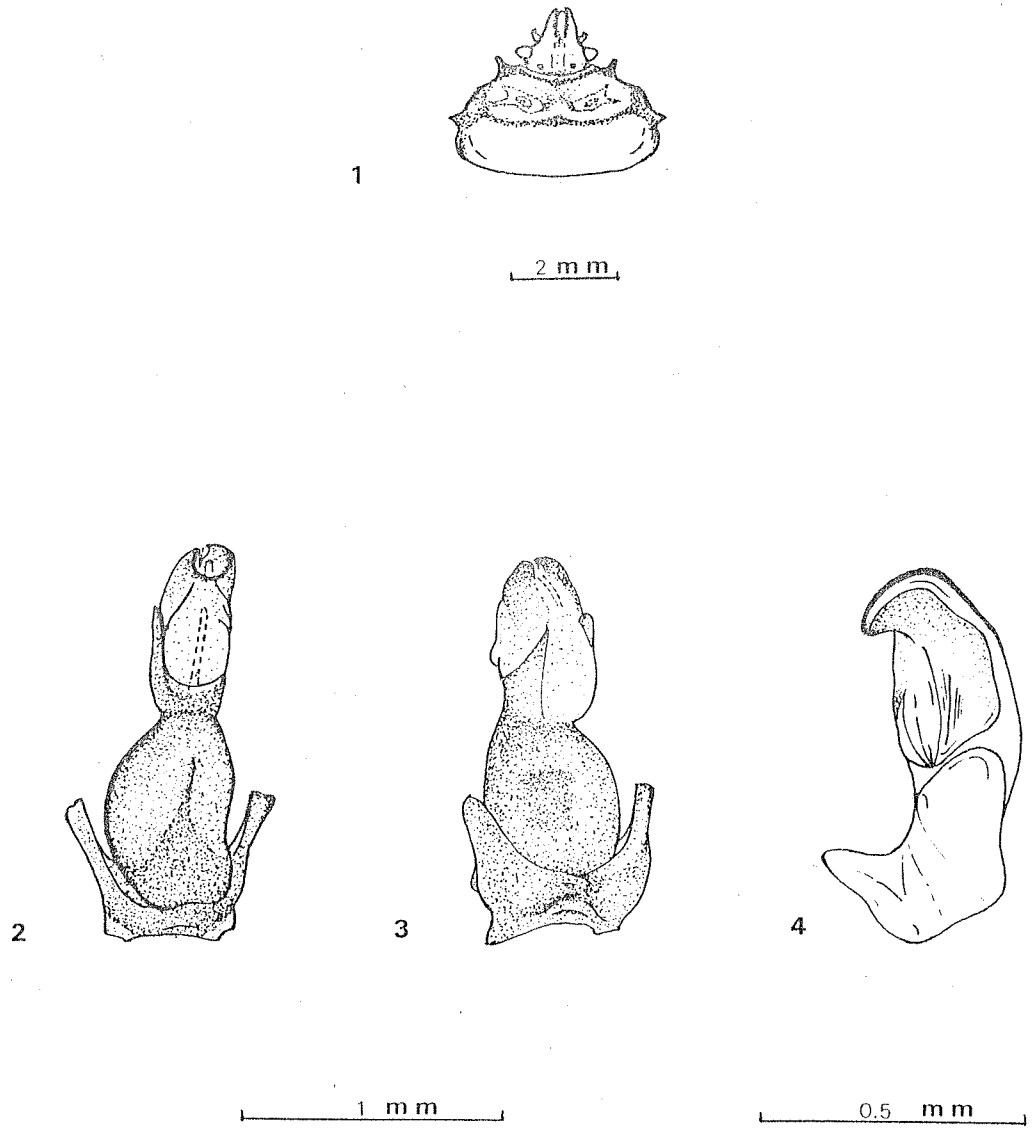


Plate 7

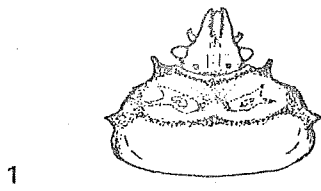
Scotinophara scotti Horvath

**Fig. 1** Dorsal view of head and pronotum.

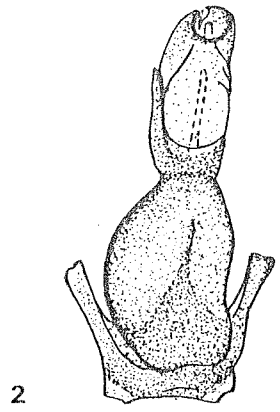
**Fig. 2** Phallus, dorsal view;

**Fig. 3** same, lateral view.

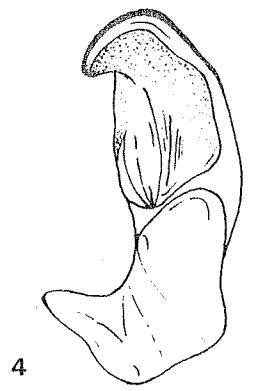
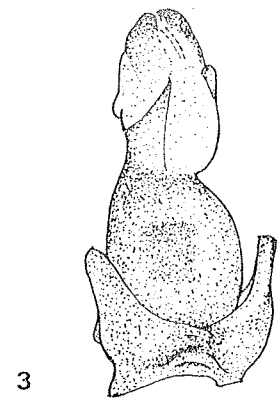
**Fig. 4** Right clasper.



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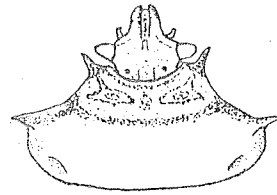


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Plate 7

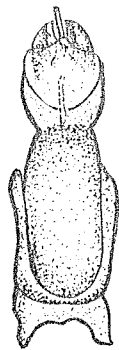
Scotinophara scotti Horvath

- Fig. 1** Dorsal view of head and pronotum.
- Fig. 2** Phallus, dorsal view;
- Fig. 3** same, lateral view.
- Fig. 4** Right clasper.



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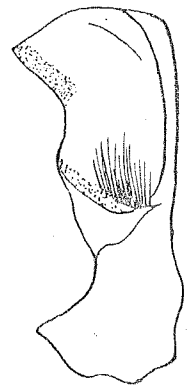
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Plate 8

Scotinophara bispinosa (Fabricius)

**Fig. 1** Dorsal view of head and pronotum.

**Fig. 2** Phallus, dorsal view;

**Fig. 3** same, lateral view.

**Fig. 4** Right clasper.

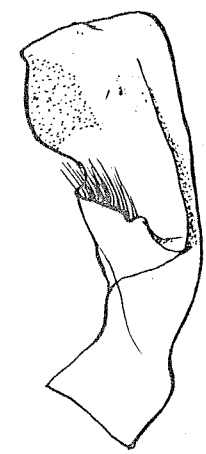
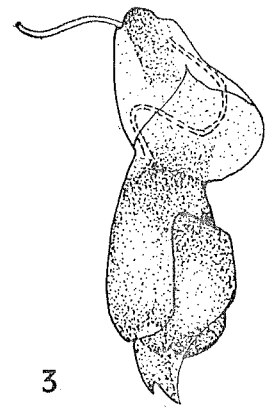
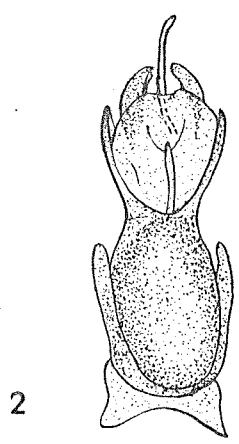
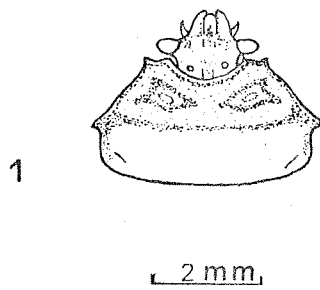


Plate 9

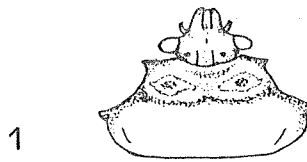
Scotinophara ceylonica (Distant)

**Fig.1** Dorsal view of head and pronotum.

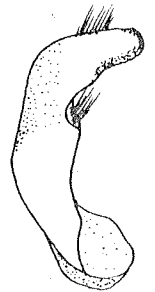
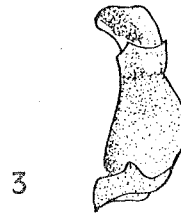
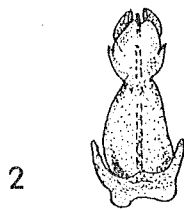
**Fig.2** Phallus, dorsal view;

**Fig.3** same, lateral view.

**Fig.4** Right clasper.



2 mm



1 mm

0.5 mm

Plate 10

Scotinophara sumatrensis, new species

Fig. Dorsal view of head and pronotum.

Fig. Phallus, dorsal view:

Fig. same, lateral view

Fig. Right clasper.

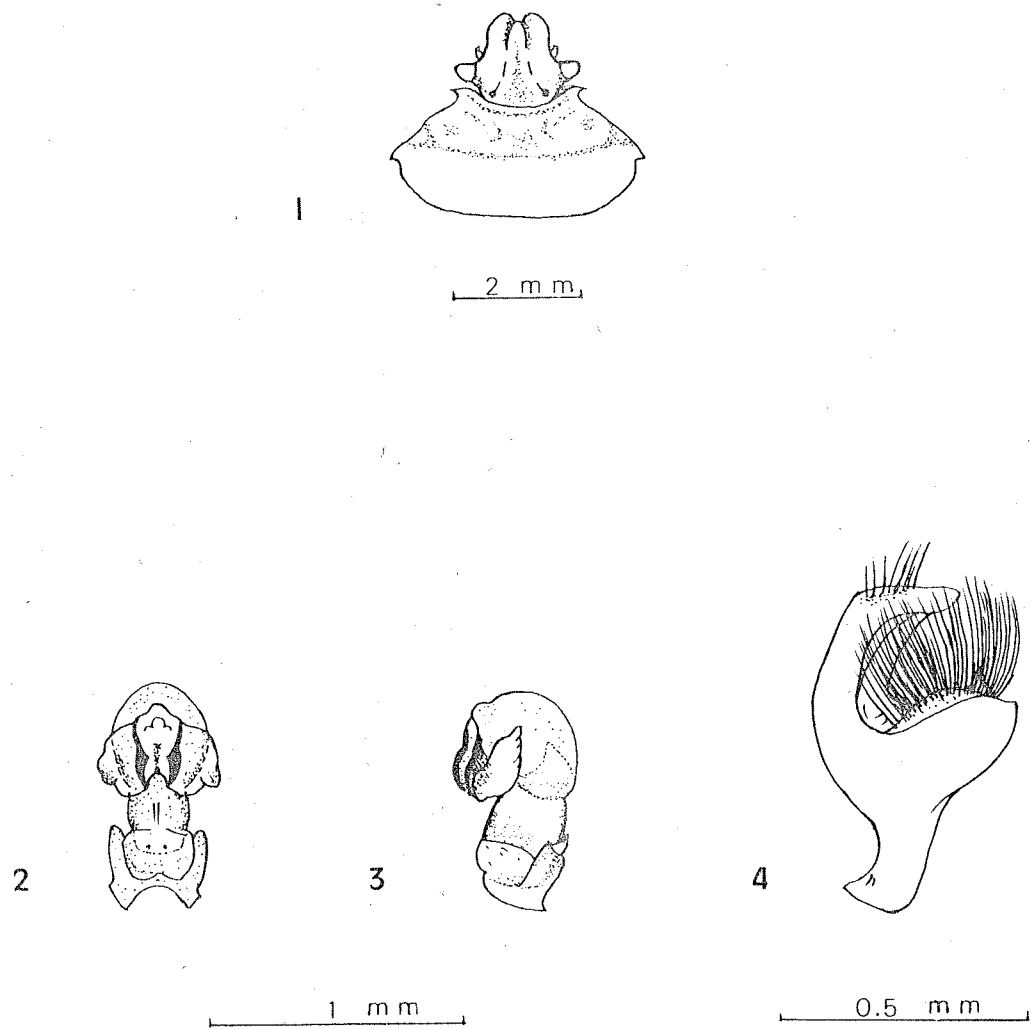


Plate 11

Amaurochrous vanduzeei Barber and Sailer

Fig. 1 Dorsal view of head and pronotum.

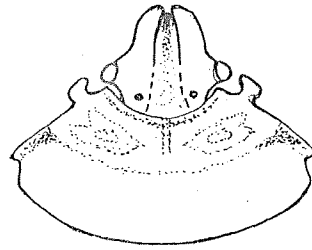
Fig. 2 Phallus, dorsal view;

Fig. 3 same, lateral view.

Fig. 4 Right clasper.

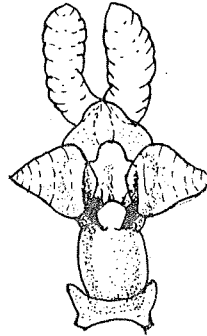


1



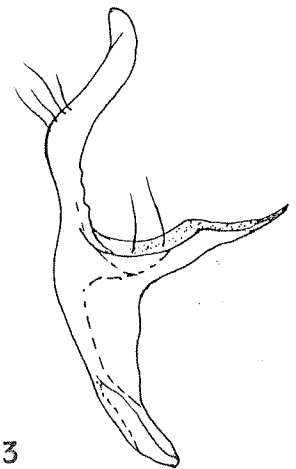
2 m m

2



1 m m

3



0.5 m m

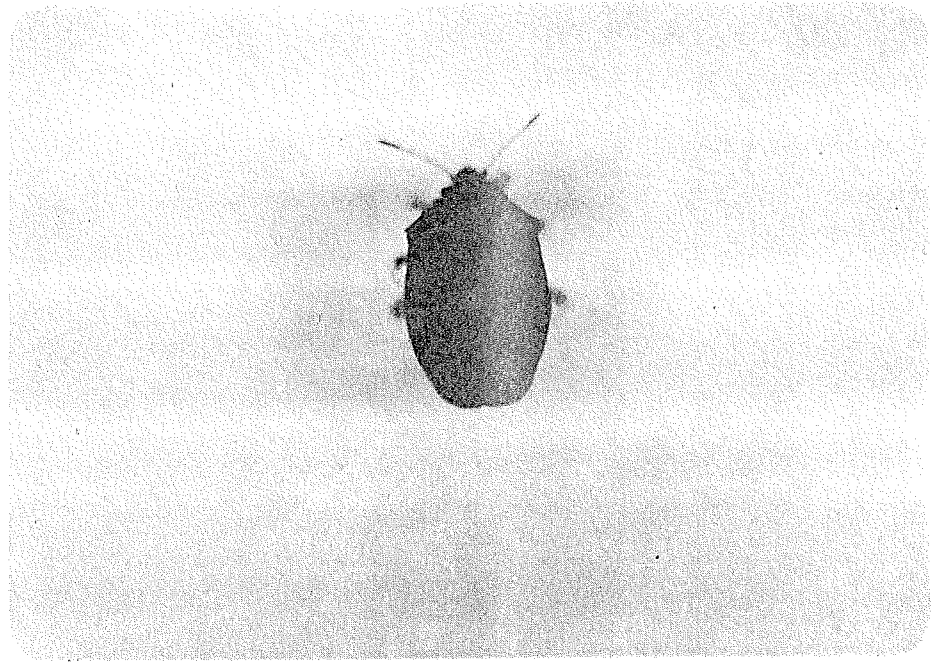
Plate 12

Podops inunctus Fabricius

**Fig.** Dorsal view of head and pronotum.

**Fig.** Phallus, dorsal view.

**Fig.** Right clasper.



**Plate 13**

Adult of *Scotinophara coarctata* (Fabricius)