

New archaeococcoids from Guyana and Malaysia, with
discussion of the tribes Llaveiini and Drosichini (Hemiptera,
Coccoomorpha, Monophlebidae)

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Résumé

Nouveaux Archaeococcoïdes du Guyana et de Malaisie, avec une discussion sur les tribus des Llaveiini et Drosichini (Hemiptera, Cocomorpha, Monophlebidae). Une discussion sur les tribus des Llaveiini et Drosichini et une clé des genres pour les femelles de la tribu des Llaveiini sont présentées. Deux nouvelles espèces sont décrites, une pour chacune des régions Néotropicale et Orientale. *Neohodgsonius splendens* n. sp., du Guyana, est décrit et illustré avec tous les stades de développement : adulte mâle et femelle, troisième, deuxième et premier stades larvaires. Chaque stade de la lignée femelle est caractérisé par de fortes soies spiniformes très particulières ; chaque soie présente trois parties : un collier basal lisse, une longue surface intermédiaire réticulo-alvéolaire, une portion apicale lisse. Une autre caractéristique majeure est la présence de deux zones transversales rougeâtres sans sécrétions situées sur la face dorsale à la jonction du thorax et de l'abdomen. De larges touffes de sécrétions sont présentes sur la marge de chaque segment du corps. La diagnose du genre est revue et une clé des espèces est proposée. *Drosicha malaysiensis* n. sp., de Malaisie, est également décrite et illustrée. La femelle adulte, piriforme, est dorsalement et ventralement couverte par des soies spiniformes en forte densité, certaines avec une base différenciée. Chaque segment du corps développe un lobe latéral particulièrement volumineux sur les segments abdominaux, avec une touffe de sécrétion cireuse à la limite entre chaque lobe.

Abstract

A discussion of the tribes Llaveiini and Drosichini and a key to the genera of Llaveiini for adult females are presented. Two new species are described, one from each of the Neotropical and Oriental Regions. *Neohodgsonius splendens* n. sp., from Guyana, is described and illustrated based on all stages of development : adult male and female, third-instar, second-instar and first-instar nymphs. All female instars have dense enlarged spiniform setae, each seta comprised of a smooth basal collar, a long intermediate surface with a reticulo-alveolate pattern, and a smooth apex ; these setae are noticeably most abundant on the dorsum. Other major characteristic is the presence of two dorsomedial, transverse reddish zones without any secretions situated at the junction of the thorax and abdomen. The female also has a wide tuft of secretions on each segmental margin. *Drosicha malaysiensis* n. sp. from Malaysia is similarly described and illustrated. The pear-shaped adult female is densely covered dorsally and ventrally by spiniform setae, many with diversified setal bases. Each segment of the body has a marginal lobe, particularly well-developed on the abdominal segments, and a thick waxy tuft on the margin in each indentation between the lobes.

New archaeococcoids from Guyana and Malaysia, with discussion of the tribes Llaveiini and Drosichini (Hemiptera, Coccoomorpha, Monophlebidae)

by Imre FOLDI

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<http://zoobank.org/BB5BCC0B-408F-4624-B2C9-243DDC42F4AA>

Abstract. – A discussion of the tribes Llaveiini and Drosichini and a key to the genera of Llaveiini for adult females are presented. Two new species are described, one from each of the Neotropical and Oriental Regions. *Neohodgsonius splendens* n. sp., from Guyana, is described and illustrated based on all stages of development: adult male and female, third-instar, second-instar and first-instar nymphs. All female instars have dense enlarged spiniform setae, each seta comprised of a smooth basal collar, a long intermediate surface with a reticulo-alveolate pattern, and a smooth apex; these setae are noticeably most abundant on the dorsum. Other major characteristic is the presence of two dorsomedial, transverse reddish zones without any secretions situated at the junction of the thorax and abdomen. The female also has a wide tuft of secretions on each segmental margin. *Drosicha malaysiensis* n. sp. from Malaysia is similarly described and illustrated. The pear-shaped adult female is densely covered dorsally and ventrally by spiniform setae, many with diversified setal bases. Each segment of the body has a marginal lobe, particularly well-developed on the abdominal segments, and a thick waxy tuft on the margin in each indentation between the lobes.

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Keywords. – Scale insects, Llaveiini, Drosichini, morphology, taxonomy, new species.

The genus *Hodgsonius* was introduced by FOLDI (1998) for the new species *Hodgsonius cassicola*, collected on October 18th, 1984, in Venezuela, around Pueblo Nuevo (Merida) on *Cassia siamea* Lam. (Caesalpinaceae). This new genus was named in honour of Dr Chris Hodgson (The National Museum of Wales, Cardiff, United Kingdom) in recognition of his considerable contribution to our knowledge of scale insects. Shortly after the description was published, the author discovered that this generic name was a junior homonym of *Hodgsonius* Bonaparte, 1851, in Aves and provided a replacement name *Neohodgsonius* in FOLDI (1999). This South American genus remained monotypic until Dr J. H. Martin collected (2006) an other species from Belize and Guyana, which is described herein as *Neohodgsonius splendens* n. sp. The distribution of this genus now includes Venezuela, Belize, Guyana and French Guiana.

Another remarkable scale insect collected by Dr J. H. Martin in 2013, from Malaysia on Euphorbiaceae, is described herein as *Drosicha malaysiensis* n. sp.

Both these species belong to the Monophlebidae within the archaeococcoid group of genera that were included in the Margarodidae *sensu lato* by MORRISON (1927), but this was subsequently divided into at least 15 distinct families (KOTEJA, 1974; FOLDI, 2005; GULLAN & COOK, 2007). The relationships of most archaeococcoid higher taxa are not resolved at present (FOLDI, 1997; HODGSON & FOLDI, 2005; GULLAN & COOK, 2007; HODGSON & HARDY, 2013) and affiliations of some archaeococcoid genera and even their family-level status are uncertain. Archaeococcoids share characters such as: (i) abdominal spiracles in 7 pairs, present in all stages, with some exceptions, e.g. *Crypticerya* Cockerell, 1895, and *Icerya* Signoret, 1875, species having 2 or 3 pairs of abdominal spiracles, and other few species 4 pairs; (ii) legs present in all stages of development; (iii) antennae mainly 11 (9-10) segmented in the adult female and with 10 segments in the adult male; (iv) body with dense pilosity (hairs, hair-like, flagellate or spiniform setae and spines); (v) cicatrices either numbering one or more on posterior of venter, or numerous and distributed more widely on abdomen; (vi) absence of a flat anal ring with pores; (vii) presence of compound eyes in the adult male; and (viii) an XX-XO sex determination system (FOLDI, 2009; FOLDI & GULLAN, 2014).

This work is a part of a review of the Monophlebidae of the world; several species in this family are highly destructive pests on agricultural crops such as citrus, avocado, sugarcane, grapevine and on numerous ornamental plants. This monograph will present diagnoses and an identification key to all the genera, description and illustration of the species, a list of host plants, and data on geographical distributions.

MATERIAL, METHODS AND TERMINOLOGY

Specimens were mounted on glass microscope slides at BMNH. The samples from Malaysia were very dry, so the quality of the slide-mounted material is very poor. Measurements of important morphological structures are all given as the largest dimension. Measurements of loculate pore diameter include the external rim, as do those of the spiracular peritreme.

The terminology used for the male descriptions is that of HODGSON & FOLDI (2006); that used for female descriptions is after FOLDI (2009) and FOLDI & GULLAN (2014). The term *cicatrix* refers to various-shaped and -sized structures, each with a membranous surface surrounded by a sclerotized rim. *Types of pores*: derm pores are named according the number of loculi, *i.e.* bi-, three-, quadri-, quinque-, or six-locular; those with more than six loculi are called multilocular pores with an indication of the number of central loculi and whether the outer loculi are arranged in one, two or three concentric rings; pores with no internal loculi are called simple pores. *Setal types*: *hairs* have a cone-like base fused to the seta; *hair-like* setae have a basal socket around the basal membrane; the setal base may vary considerably in width and height, particularly in those setae situated on the margin; *flagellate setae* have a rounded socket but an indistinct basal collar; *spiniform setae* have a spine-like appearance but have a basal socket fused to seta, and with a pointed apex; the setal base may vary in shape and size; *spines* lack a basal socket and are robust and sclerotized, appearing as an extension directly from the derm; they vary in shape and size, and the surface may be alveolate, reticulate, with longitudinal grooves, and there may be either a pointed or swollen apex.

Abbreviations. – On the drawings and in descriptions of adult males of *Neohodgsonius splendens*, abbreviations are as follows: **ads**, abdominal dorsal mostly hair-like setae; **aed**, aedeagus; **al**, alar lobe; **an**, anus; **avs**, abdominal ventral setae, hair-like and hairs; **bs**, bifurcate setae; **c**, claw; **cd**, claw digitule; **cde**, compound eye; **ce**, caudal extension of abdomen; **cp**, convex pore on head; **cox**, coxa; **cv**, cervical sclerite; **eph**, endophallus; **eps2**, mesoepisternum; **f**, furca; **fm**, femur; **hrs**, hairs; **hs**, hair-like seta; **lp**, loculate pore; **med**, media (wing vein); **mcr**, midcranial ridge; **mdr**, median ridge; **mo**, mouth; **mr**, marginal ridges; **o**, ocellus; **pcr**, precoxal ridges; **pdc**, pedicel; **phr1, 2**, pre and mesoprephragma; **plr 1, 2**, pro

and mesothoracic pleural ridges; **pn2**, mesopostnotum; **poc**, postocular ridge; **pos**, postoccipital suture; **pra**, prealare; **procr**, preocular ridge; **pror**, preoral ridge; **prsc**, prescutum; **prscs**, prescutal setae; **ps**, penial sheath; **pscr**, prescutal ridges; **psp**, penial sheath pores (sensilla); **pss**, penial sheath setae; **pt**, postergite; **rad**, radius (wing vein); **rd**, ridge along posterior margin of scutellum; **sats**, satellite seta; **scl**, scutellum; **selt**, subcostal thickening; **scp**, scape; **set**, scutum; **set**s, scutal setae; **sp 1, 2**, meso- and metathoracic spiracles; **stn1, 2**, pro and mesosternum; **ta**, tarsus 2 segmented (ta1 and ta2); **tcs**, tarsal campaniform sensillum; **td**, tarsal digitule; **teg**, tegula and tegular setae; **ti**, tibia; **tr**, trochanter; **vmcr**, ventral midcranial ridge.

Depositories. – **ANIC**, Australian National Insect Collection, CSIRO, Canberra, ACT, Australia; **BMNH**, The Natural History Museum, London, United Kingdom; **MNHN**, Muséum national d'Histoire naturelle, Paris, France. Specimens in the ANIC were also sent to Penny Gullan by the collectors.

RESULTS

Discussion of the tribe Llaveiini. – MORRISON (1927) created the tribe Llaveiini to accommodate three Neotropical genera: *Llaveia* Signoret, 1875, *Llaveiella* Morrison, 1927, and *Protortonia* Townsend, 1898. The addition of the genera *Laurencella* Foldi, 1995, and *Neohodgsonius* Foldi, 1999, has broadened the concept of the tribe (FOLDI, 1995, 1999). FOLDI (1998) discussed some morphological characteristics of Llaveiini, namely antennae each with 8-11 segments, abdominal spiracles in 7 pairs, atrial pores absent in thoracic and abdominal spiracles, anal tube often with inner sclerotised ring, cicatrices on venter present often numerous. He also proposed a key, based on adult females, for the genera *Hodgsonius* (now *Neohodgsonius*), *Llaveia*, *Llaveiella* and *Protortonia* using three features: the number of antennal segments, the presence or absence of conical spines and the number of cicatrices on venter. WILLIAMS & GULLAN (2008) completed the tribal characteristics based on adult females, as follows: antennae each with 8-11 segments; abdominal spiracles in 7 pairs, each without atrial pores; anal ring either with a simple sclerotised ring or a band of pores at inner end.

This current proposed concept allows inclusion of 19 species of the following five genera in Llaveiini. *Laurencella* with 5 species: *L. colombiana* Foldi & Watson, 2001, *L. jonmartini* Foldi & Williams, 2013, *L. marikana* Foldi, 1995, *L. taunayi* (Hempel, 1920), *L. uhleri* (Signoret, 1875); *Llaveia* with 5 taxa: *L. axin axin* (Llave, 1832), *L. axin dorsalis* Dugès, 1888, *L. championi* (Cockerell, 1902), *L. mexicanorum* (Cockerell, 1898), *L. oaxacoensis* Morrison, 1927; *Llaveiella* with 2 species: *L. dugmilleri* Foldi, 1995, *L. taenechina* Morrison, 1927; *Neohodgsonius* with 1 species: *N. cassicola* (Foldi, 1999); and *Protortonia* with 7 species: *P. azteca* (Ferris, 1925), *P. cacti* (Linnaeus, 1758), *P. crotonis* Reyne, 1964, *P. ecuadorensis* Foldi, 2006, *P. navesi* Fonseca, 1979, *P. primitiva* (Townsend, 1898), *P. querneae* Williams & Gullan, 2008.

Morphology-based classification has resulted in the placement of *Neohodgsonius* in the tribe Llaveiini of family Monophlebitidae (FOLDI, 1998; WILLIAMS & GULLAN, 2008). In addition, a recent molecular phylogenetic study (UNRUH & GULLAN, 2008) used two unidentified *Neohodgsonius* species from Belize and Guyana as part of the outgroup, and these two species grouped with an unidentified species of *Laurencella* (the only other member of the Llaveiini in the dataset) in the resulting phylogenetic trees.

Keys to the genera of Llaveiini were provided by MORRISON (1928), FOLDI (1998) and FOLDI & WATSON (2001). However, a recent important work on *Protortonia* by WILLIAMS & GULLAN (2008) provided a detailed new key to adult females of the five genera. That key has been augmented here by the addition of some new features (cribriform cicatrices, enlarged spiniform setae with vertical grooves, enlarged spiniform setae with tiny vertical grooves and bulbous apex).

Key to adult females of the genera in tribe Llaveiini

1. Ventral cicatrices numbering only 3, situated posterior to vulva. Mouthparts absent or vestigial. Multilocular pores mostly each with an oval, sunken centre Genus *Protortonia* Townsend
 – Ventral cicatrices numerous, always numbering more than 3; often 1 larger cicatrix situated immediately posterior to vulva. Mouthparts well-developed. Multilocular pores mostly each with 2-5 central loculi 2
2. Anal ring with 2-3 rows of wax pores at inner end. Abdominal spiracles each with many, densely clustered multilocular pores on derm outside atrium. Cribriform cicatrices numerous on dorsum and venter of abdomen, or a small number arranged in a U-shaped distribution on posterior segments of abdomen. Spiniform setae with tiny vertical grooves and bulbous apex densely present Genus *Laurencella* Foldi
 – Anal ring a simple sclerotized band without wax pores at inner end. Abdominal spiracles each usually without multilocular pores on derm outside atrium, if pores present then numbering only 2-4. Cribriform cicatrices absent, but other types present. Spiniform setae with tiny vertical grooves and bulbous apex absents 3
3. Cicatrices usually arranged in 2 irregular semicircles on venter of abdomen, each cicatrix with an outer and a smaller inner sclerotised rim, and with area between rims finely alveolate. Enlarged spiniform setae absent from around anal opening Genus *Llaveia* Signoret
 – Cicatrices arranged in 1 or 2 semicircles on venter of abdomen, each cicatrix with single sclerotized rim only, and with surface finely reticulate, alveolate or smooth. Enlarged spiniform setae present at least near anal opening 4
4. Enlarged spiniform setae (each seta with basal collar smooth, long middle section with a reticulo-alveolate pattern, and a smooth apex) present around anus or throughout dorsum and venter. Multilocular tubular pores present Genus *Neohodgsonius* Foldi
 – Enlarged spiniform setae (each seta with basal collar smooth, long middle section with a pattern of about 6 longitudinal grooves, and apex smooth) present around anus and in clusters on body margins. Multilocular tubular pores absent Genus *Llaveiella* Morrison

Key to species of *Neohodgsonius* adult females

1. Both dorsum and venter with enlarged spiniform setae (each seta with basal collar smooth, middle section reticulo-alveolate and apex smooth); presence of two dorsomedial, transverse reddish zones without any secretions situated at the junction of thorax and abdomen *Neohodgsonius splendens* n. sp.
 – Enlarged spiniform setae restricted to anal area (each seta with basal collar smooth, middle section reticulo-alveolate and apex smooth); absence of two dorsomedial, transverse reddish zones without any secretions situated at the junction of the thorax and abdomen *N. cassicola* Foldi

Family **Monophlebidae** Signoret, 1875Tribe **Llaveiini** Morrison, 1927Genus ***Neohodgsonius*** Foldi, 1999

Hodgsonius Foldi, 1998: 312. Type species: *Hodgsonius cassicola* Foldi, 1998, by monotypy and original designation; junior homonym: *Hodgsonius* Bonaparte, 1851, in Aves.

Neohodgsonius Foldi, 1999: 348. Replacement name for *Hodgsonius* Foldi, 1998.

Revised generic diagnosis.

Adult female. – Body elongate, ovoid, 5.00-8.00 mm long, 3.10-5.00 mm wide. Derm membranous with dense pilosity.

Antennae 11-segmented. Mouthparts present, labium short, 3 segmented. Thoracic and abdominal spiracles, each without pores either in atrium or on derm outside atrium. Abdominal spiracles numbering 7 pairs.

Legs well-developed, tarsi one segmented. A major diagnostic feature is the presence of enlarged spiniform setae, each with three parts: basal collar smooth, long middle section with reticulo-alveolate pattern, and apex smooth; densely present on dorsum, less so on venter in *Neohodgsonius splendens* n. sp.,

and restricted to anal area only in *N. cassicola*. The adult female of *N. splendens* also has a wide tuft of secretions on each segmental margin, and two dorsomedial, transverse reddish zones without any secretions situated at the junction of the thorax and abdomen. Hairs densely present throughout dorsum, mixed with fewer hair-like and flagellate setae in transverse rows across abdomen; longest setae present in clusters on margins of each body segment. Multilocular pores with oval, triangular, and quadrate centres and 9-12 outer loculi, numerous throughout dorsum and venter. Multilocular tubular pores with a wide central loculus and 6 outer loculi present along submargin; these represent an autapomorphy for *N. cassicola*, as do multilocular pores with a wide quadrate centre for *N. splendens*. Anal tube simple, membranous, without pores at inner end; anal ring simple, sclerotized. Each abdominal segment with circular cicatrices in 1 or 2 longitudinal lines, either on submargin of venter or on both dorsum and venter. A simple, large cicatrix present ventrally on mid-line near posterior end of abdomen.

Third-instar nymph female. – Similar in shape to adult female and may reach a length of about 5.00 mm.

Antennae each with 9 or 10 segments.

Legs well-developed, similar to those of adult female but shorter and with fewer setae. Each claw stout, without denticle, and claw digitules setose. Thoracic spiracles as those in adult female.

Abdominal spiracles in 7 pairs, similar to those of adult female but smaller. Anal tube with weakly discernible simple inner ring. Dorsal surface with multilocular pores, each often with three or four central loculi surrounded by a ring of outer loculi. Enlarged spiniform setae similar to those of adult female, but less abundant. Long setae present on margin, particularly on posterior abdominal segments. Ventral surface with multilocular pores and setae similar to those on dorsum. A single cicatrix on posterior end of abdomen. A single, circular cicatrix present on either side of each abdominal segment on each surface forming longitudinal lines on submargin of venter dorsum and venter.

Second-instar nymph female. – Body elongate-ovoid, may reach a length of over 3.60 mm, with dense pilosity.

Antennae 8-segmented. Mouthparts and legs well-developed. Enlarged spiniform setae similar to those of adult female, mostly each 22-30 μm long, very abundant on dorsum, much fewer on venter. Setal-type hairs frequent, forming dense bands across all segments, mixed with fewer hair-like setae (stouter than setal-type hairs), and flagellate setae; long hair-like setae present in clusters on body margin, longest on abdomen. Loculate sessile pores densely distributed throughout, divided according to size: (i) large pores, each mainly 12-14 μm wide with mostly triangular and quadrate centres, very numerous; (ii) smaller pores, each about 9-10 μm wide, mostly with 5 or 6 locular centres, rarely quadrilocular. Funnel shaped cicatrices present.

Abdominal spiracles numbering 7 pairs. Thoracic and abdominal spiracles each without atrial or pores around peritreme. Anal tube membranous, anal ring sclerotized. A single, circular cicatrix present on either side of each abdominal segment on each surface forming longitudinal lines on submargin of venter.

First-instar nymph. – Body elongate ovoid, 3.30-3.50 mm long, rounded posteriorly, with dense pilosity.

Antennae 6-segmented. Mouthparts present. Thoracic and abdominal spiracles each without atrial or perispiracular pores; abdominal spiracles numbering 7 pairs.

Legs well-developed: each trochanter bearing 2 campaniform sensilla on each surface, and distally with a long trochanteral seta; femur, tibia and tarsus with short spine-like setae ventrally; claw without denticle but with a pair of setose digitules.

Dorsum with enlarged spiniform setae, same as in other instars, densely present on dorsum, fewer on venter where noticeably restricted to margin and submargin; most frequent hairs of setal type, forming dense bands across all segments, mixed with flagellate setae and hair-like setae, densely distributed throughout. Longest hair-like setae present in clusters on margin of all body segments. Large loculate sessile pores, each with a bilocular, trilocular or quadrilocular centre. A single, circular cicatrix present on either side of each abdominal segment on each surface, each about 30 μm wide, forming longitudinal lines on submargin of dorsum and venter. A single cicatrix situated between vulva and posterior end of abdomen. Anal tube membranous, anal opening situated within a wide circular area limited by a more and less sclerotised cuticle, with discontinuous rim surrounded by long setae.

Adult male. – Body elongate ovoid, 5.80-6.00 mm long, with numerous setae and pores.

Antennae 10-segmented.

Wings well-developed, dark brown, wing anterior to subcostal thickening well sclerotized; rest of wing membranous. Body setae hair-like; hairs present throughout on dorsum and venter. Convex loculate pores, mostly each with 4 loculi, abundant almost throughout on both surfaces wherever setae are present. Convex pores without loculi, restricted to lateral and ventral surfaces of head. Scutum with an elongate membranous area medially. Three-four strongly curved hamuli, each hooked, present on each hamulohaltere.

Legs well-developed and very setose, many setae spur-like and some bifurcate, particularly on pro-femora and distally on all tibiae; each tarsus 2 segmented; claw without a denticle but with setose digitules.

Abdomen characteristically with 3 pairs of long caudal extensions on segments VI, VII and VIII, varying in length. No tubular ducts. Penial sheath and anal structures all ventral; strongly setiferous, eversible endophallus retracted into body. Abdominal spiracles numbering 7 pairs.

Third-instar nymph male-prepupa. – Body ovoid, length 4.5 mm. *Antennae* 9-segmented.

Eyes conical, 100 μm wide, situated near base of scape. Mouthparts lacking, only some poorly sclerotized structures present. Mesothoracic spiracles each with opening 60 μm wide, metathoracic spiracles each 70 μm wide. Abdominal spiracles in 7 pairs, each with a sclerotized and a membranous part the atrium and about 14 μm wide.

Legs well-developed, weakly setose, ventrally tibiae and tarsi with spur-like setae, trochanters each with 2 campaniform sensilla and with a trochanteral long seta. Body covered by numerous setae of two types: hair-like setae with shallow sockets (length 65-150 μm) and hairs without basal socket (length 40-60 μm); margin of each abdominal segment with a group of three setae (length 200-500 μm). Enlarged spiniform setae only on dorsum, very few in number, located on submargin of abdominal segments. Multilocular pores distributed on dorsum and venter; large pores, 12-14 μm wide, with bilocular centre most frequent type, fewer pores with trilocular centre; smaller pores, 9-10 μm wide, with 5 or 6 loculi in centre. Penial structures absent.

***Neohodgsonius splendens* n. sp.**

<http://zoobank.org/4FF044C9-69D9-487C-BA3B-DB44714E58FD>

HOLOTYPE: adult female (specimen 5.80 mm long; arrowed), with 1 paratype female and with 1 paratype second-instar female on same slide (BMNH): Guyana, Mazaruni-Potaro, Kaieter Falls, resthouse area, 13.VI.2006, *J. H. Martin coll.*, JHM 8339, on indet. shrub.

PARATYPES: 20 adult females on 10 slides; other slides: 1 third-instar female with 3 adult females on same slide, 1 third-instar male with 2 adult female on same slide: 2 specimens of first-instar nymphs mounted with 2 adult females on one slide 2 adult males on 2 slides; all slides deposited in BMNH; 2 slides of paratypes containing 5 adult females deposited in MNHN; 8 slides of paratypes (6 adult females, 1 third-instar female and 1 second-instar) deposited in ANIC.

Description of adult female. – Fig. 1.

Unmounted material. Body elongate, ovoid; dorsum densely covered with white secretions except for two dorsomedial transverse reddish zones without any secretions situated at the junction of the thorax and abdomen (fig. 6-7). Wide segmental tufts of white secretions present on margins of body, these particularly wide on abdominal segments, and two wide tufts present on head. Adult females prior to mating raise their posterior abdomen to expose the ventral genital area for copulation (fig. 8).

Slide mounted specimens (n = 10). Body elongate ovoid, 5.70-6.80 mm long, 3.10-3.80 mm wide, posterior end rounded. Derm membranous. Entire body covered with numerous setae and pores.

Setae of five types: (i) enlarged spiniform setae (fig. 1E), each about 22-28 μm long; (ii) hair-like setae (fig. 1B) each 40-150 μm long, with shallow basal socket; stout hair-like setae, 220-440 μm long, with setal base enlarged in length and width, mostly situated on margin; (iii) flagellate setae (fig. 1C) each with rounded socket and basal collar indistinct; (iv) hairs about 25-40 μm long, shorter than hair-like setae, each without a basal socket, having a cone-like base fused to the seta. Loculate pores of various

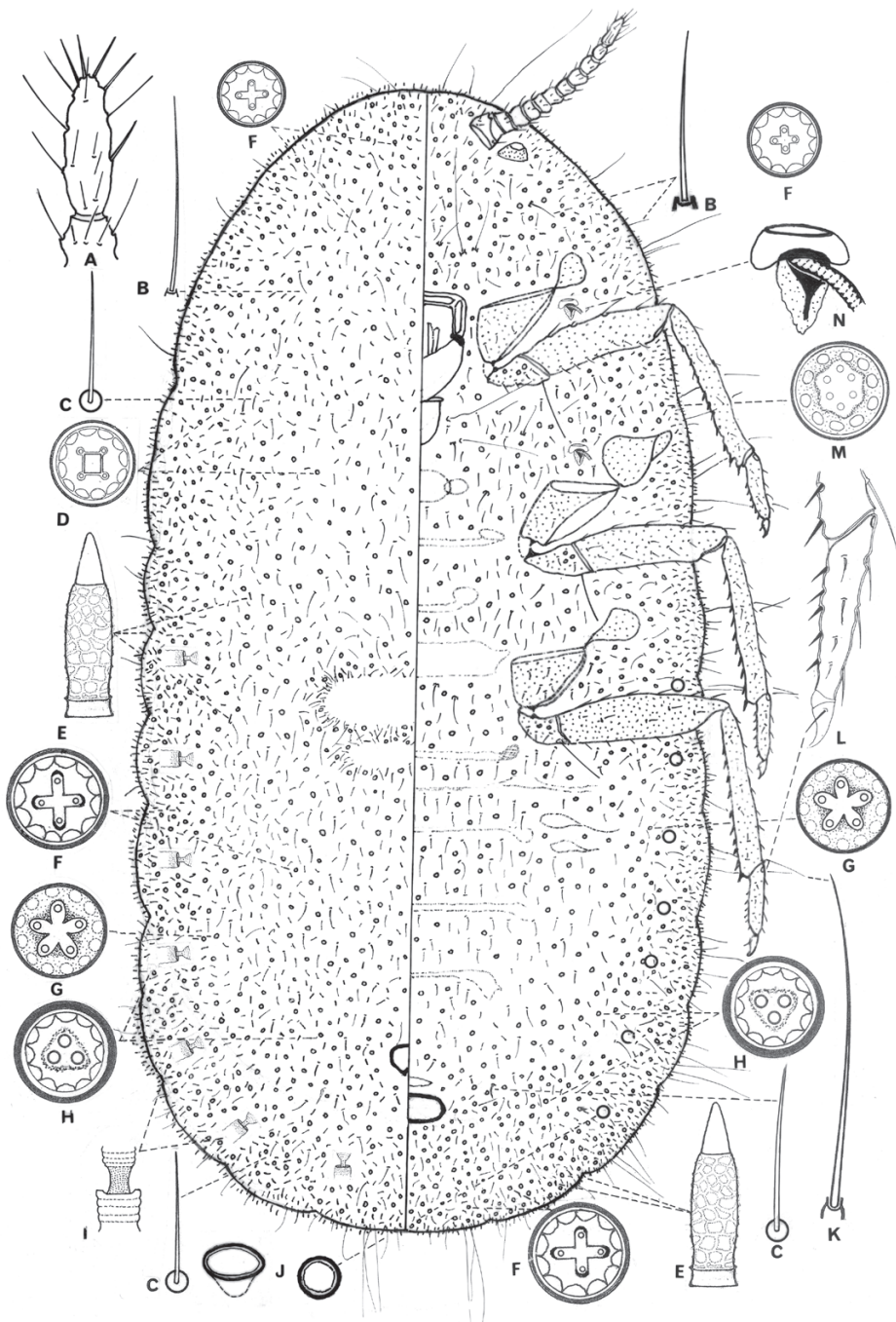


Fig. 1. – *Neohodgsonius splendens* n. sp., adult female. – A, apical segment of antenna; B, hair-like setae; C, flagellate setae; D, pore with trilocular centre; E, enlarged spiniform seta with a special reticulo-alveolate external surface; F, pore with quadrate-cruciform centre; G, five-locular pore; H, pore with a wide, squarish centre; I, abdominal spiracle; J, small circular, funnel-shaped cicatrices; K, hair-like seta with enlarged setal base; L, tarsus and claw of mesothoracic leg; M, pore with six-locular centre; N, thoracic spiracle.

types classified by their shape, size, number and shape of inner loculi and number of outer loculi, densely frequent throughout. Antennae 11-segmented, well-developed, 1050-1180 μm long; a campaniform sensillum present at membranous apex of pedicel; each antennal segment with numerous setae, shorter setae each about 40-60 μm long, some longer, each 85-100 μm long; apical segment (fig. 1A) 220 μm long, 70 μm wide, with about 6 setae 70-85 μm or less, stout setae each 40-50 μm long.

Eyes circular, 140 μm wide, with lens 85 μm wide, situated laterad of scape, close to it. Tentoria each 500-525 μm long; labium short, widely triangular, 3-segmented, 240-250 μm long, located in recess, surrounded by raised lobes of derm; apical segment with about 14-16 setae on apex, longest hair-like setae anteriorly. Sternal apodemes present between meso- and metathoracic legs. Peritreme of thoracic spiracles shown in fig. 1N; mesothoracic peritreme 170-185 μm wide, metathoracic 205-220 μm wide, without atrial or perispiracular pores. Abdominal spiracles (fig. 1I) numbering 7 pairs, each with peritreme 25-30 μm wide and about 60 μm long, posterior spiracles smaller; each spiracle without atrial or perispiracular pores; basal half of atrium sclerotised, outer half membranous.

Legs well-developed, subequal in length: lengths of prothoracic legs (I) 2.10 mm; mesothoracic legs (II) 2.25 mm; metathoracic legs (III) 2.75 mm. Lengths of coxa (μm): I 320-340; II 350; III 340-350; trochanter + femur: I 750; II 830; III 1020-1090; tibia: I 570; II 670; III 910-950; tarsi: I 300; II 310; III 350; claws: I 85; II 85-88; III 87-90. Trochanter with 4-5 short setae and distally a long trochanteral seta, 250-290 μm long; tarsus (fig. 1L) with short, stout setae ventrally, and a campaniform sensilla on proximal part; claw with a pair of setose digitules.

Anal ring a simple sclerotised band without wax pores at inner end; anal tube simple, membranous, 37-42 μm in diameter. Vulva a transverse opening on ventromedial abdomen, 110-125 μm wide. Each abdominal segment with 1 small, circular cicatrix, 30-45 μm in diameter, on each submargin, forming a single longitudinal line on either side of abdomen; in transverse section, some cicatrices appear funnel shaped (fig. 1J). A single, larger, oval cicatrix, about 250-280 μm long, present close on posterior medial end of abdomen.

Dorsum. – Setae abundant, particularly enlarged spiniform setae (fig. 1E) (each 22-28 μm long, 7-8 μm at widest point, with a smooth basal collar, an reticulo-alveolate pattern on a long middle section, and a smooth apex) densely present throughout; flagellate setae and hairs (fig. 1C), each about 35-75 μm long, most frequent setal types, densely scattered amongst multilocular pores on all segments of body; hair-like setae (fig. 1B), each 80-120 μm long, a few up to 300-320 μm long (fig. 1K). Loculate pores densely distributed over dorsum, arranged in segmental bands on abdomen, densely scattered throughout on head and thorax. Multilocular pores unusual (fig. 1D), each with a wide rectangular centre where each angle exteriorly with one circular loculus, and about 10-14 outer loculi, mostly on head and thorax. Large multilocular pores (fig. 1F), 13-14 μm in diameter, mainly with wide quadrilocular-cruciform centre and with about 12 outer loculi, densely distributed. Multilocular pores, each with trilocular centre and with about 12 outer loculi (fig. 1H), frequent type on head and thorax, scattered on abdomen. Smaller pores (fig. 1G, 1M), each 10 μm wide, with 5 or 6 loculi in centre and about 10 outer loculi, sparsely distributed.

Margin. – Long, stout hair-like setae (fig. 1K), each 220-440 μm long, forming a cluster (each mostly containing 3 setae), on each side of each body segment.

Venter. – Setae abundant, similar in size those of dorsum. Enlarged spiniform setae, each 22-30 μm long, same as on dorsum but less numerous, almost entirely restricted to margins and submargins, only sparsely scattered on medial and submedial areas; hairs similar those of dorsum, forming dense bands across all segments. Few long hair-like setae (fig. 1K), mostly 4 on head, each 180-230 μm long, and also 4 setae on thorax, each 150-210 μm long; hair-like setae, 60-80 μm long, scattered. Dermal pores similar in size and structure to those on dorsum. Large multilocular pores (fig. 1F, 1H), each 13-14 μm wide with tri- or quadrilocular-cruciform centre and 12 outer loculi, scattered throughout; multilocular pores with a wide rectangular centre (fig. 1D) less frequent than on dorsum; smaller pores, each 10 μm wide, with 5 or 6-locular centres, sparsely distributed across entire venter; multilocular pores, each with an oval centre and 9 outer loculi, situated on submargin.

Description of third-instar nymph female (n= 2). – Similar in shape to adult female, 5.20 mm long.

Antennae each with 10 segments, each 1200-1260 μm long; apical segment 250 μm long, 70 μm wide, with long setae 100-150 μm . Eye 110 μm wide laterad of scape, close to it. Mouthparts well-developed.

Legs well-developed, similar to those adult female but with fewer setae. Metathoracic legs: trochanter + femur 940 μm long, distally one trochanteral seta about 230 μm long, and three campaniform sensilla on each side; tibia 720 μm long, ventrally with stout spiniform setae; tarsus 300 μm long; claw 100 μm long without denticle and claw digitules setose. Thoracic spiracles I 150 and II 180 μm wide.

Abdominal spiracles in seven pairs, similar to those of adult female but smaller, 24 μm long, 20 μm wide. Anal tube with weakly discernible simple inner ring. Dorsal surface with multilocular pores, each often with three or four central loculi surrounded by a ring of outer loculi. Enlarged spiniform setae similar to those of adult female, but less abundant. Long setae present on margin, 400–450 μm particularly on posterior abdominal segments. Ventral surface with multilocular pores and setae similar to those on dorsum. Large multilocular pores as in adult female, 13–16 μm in diameter, mainly with wide quadrilocular-cruciform centre and with about 12 outer loculi, most frequent, densely distributed. Multilocular pores, each with trilocular centre and with about 12 outer loculi on head and thorax, scattered on abdomen. Smaller pores, each 9–10 μm wide, with 5 or 6 loculi in centre and about 10 outer loculi, sparsely distributed. Small but strongly stout, 7–8 μm wide, 11–12 μm long, structures on median and submedian area on venter. A single cicatrix on posterior end of abdomen. A single, circular cicatrix present on either side of each abdominal segment on each surface forming longitudinal lines on submargin of venter.

Description of second-instar nymph female. – Fig. 2.

Slide-mounted specimen (n = 1). Body ovoid, 4.50 mm long, 2.40 mm wide, derm membranous, with dense pilosity and pores.

Antennae 8-segmented, each 740 μm long; segments bearing setae, each seta 80–130 μm long; pedicel at its membranous apex with one campaniform sensillum; segments III–VII each ring-like, bearing 8–10 setae; apical segment longest, 223 μm , 72 μm wide; apex with with 4 or 5 hair-like setae, each 170–230 μm long, and several shorter setae, probably fleshy; each antennal segment from pedicel to segment VI bearing one small sensory organ, about 3–4 μm wide.

Eyes conical, laterad, very close to antennal base, 115–130 μm wide, lens 52 μm wide. Tentorium 420 μm long; labium 3 segmented, 245 μm long, with well-developed stylets; apex of apical segment bearing about 12–14 robust sensorial setae. Mesothoracic and metathoracic spiracles, each 110–125 μm wide (including the sclerotised, wide peritreme's wall), without atrial or perispiracular pores. Abdominal spiracles small, numbering 7 pairs, each with a weakly sclerotised atrium 31–35 μm long and peritreme 18–20 μm wide, without atrial or perispiracular pores; atrium connected to trachea by a small, sclerotised tube.

Legs well-developed. Metathoracic legs: coxa 210 μm long, 250 μm wide; trochanter + femur 500 μm long with few setae, each seta 50–100 μm long; trochanter with trochanteral seta distally, 260 μm long; tibia 540 μm long, with few setae each 30–82 μm long; tarsus 2-segmented, 380 μm long, with setae each 30–55 μm long, proximal part with one campaniform sensillum; claw 55 μm long, with a pair of fine, setose digitules. Each abdominal segment (fig. 2K) with a circular cicatrix forming a longitudinal line on submargin on each side, as in adult female, each cicatrix 40–50 μm wide, some funnel shaped in transverse section. Ventromedial posterior end of abdomen with a single cicatrix, 210 μm long, 150 μm wide. Anal ring a simple sclerotized band, widest part 80 μm ; anal tube membranous, without pores at inner end.

Dorsum. – Membranous. Various setae present: spiniform, hairs, hair-like, flagellate setae and spines. Enlarged spiniform setae (fig. 2D), most frequent setal type, each 20–30 μm long, densely present on margin and submargin; less abundant on medial and submedial surface of abdomen; also these spiniform setae form a more-or-less circular, dense group on each abdominal segment on submedian, forming a longitudinal line. Stout, straight or curved spines (fig. 2H) scattered on abdomen. Dorsal surface with flagellate setae (fig. 2I) and hairs (fig. 2J), each 50–90 μm long, densely present all over dorsal surface, mixed with fewer hair-like setae, mostly slightly curved, each 75–155 μm long; longest hair-like setae, each 170–230 μm , sparsely scattered. Multilocular pores highly variable, mostly each 11–13 μm wide, with a bilocular (fig. 2G), triangular (fig. 2E) or quadrate centre (fig. 2B), and 6–10 outer loculi, scattered throughout; multilocular pores, each with quadrate-cruciform centre (fig. 2C) and with quadrate centre (fig. 2A), widespread. Some smaller pores (fig. 2O, 2P), each 8–9 μm wide, with 5–6 central and 6–10 outer loculi; pores each with a trilocular centre and only 3 outer loculi (fig. 2S), or with quadrate centre and 4 outer loculi (fig. 2N), sparsely scattered.

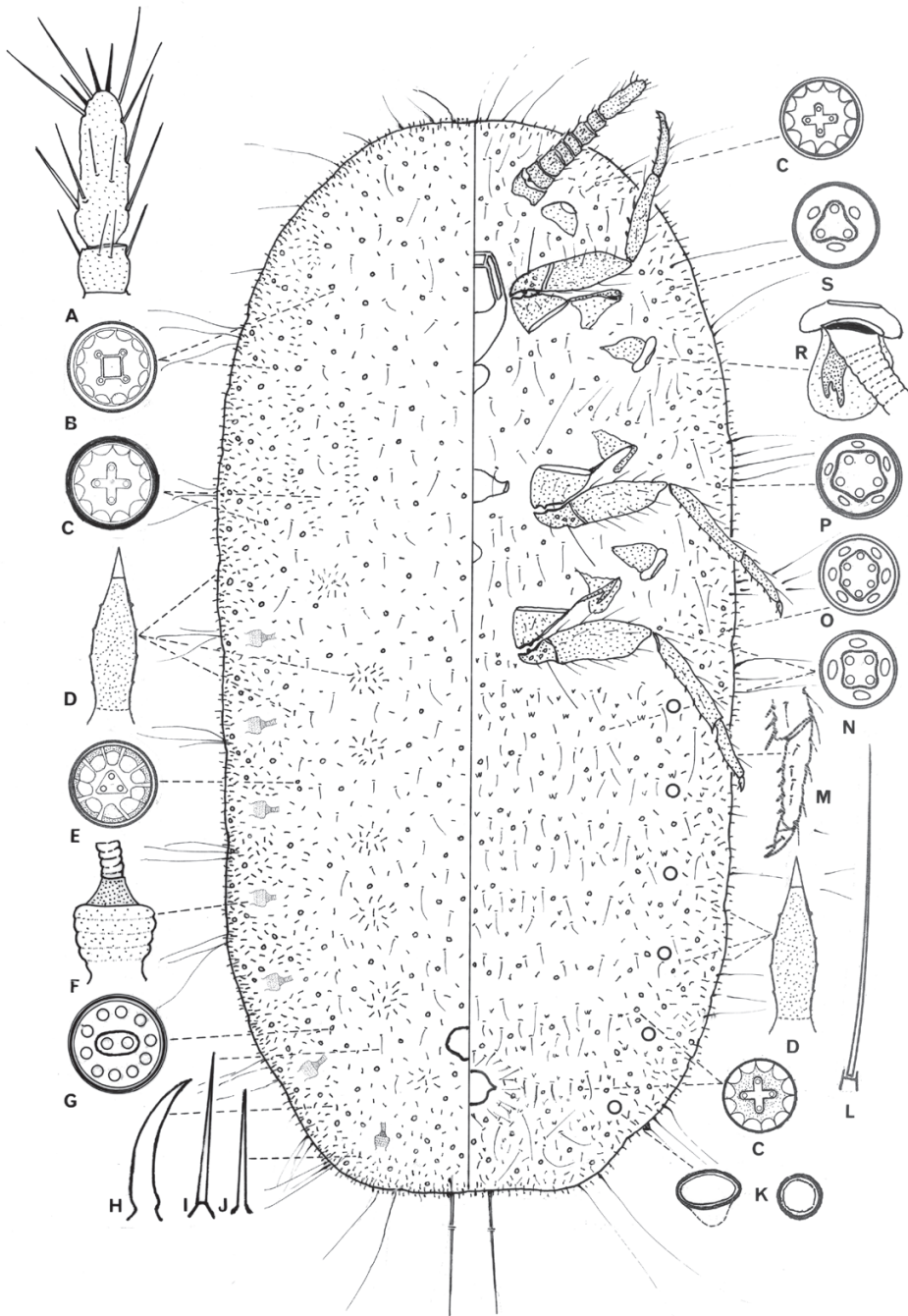


Fig. 2. – *Neohodgsonius splendens* n. sp., second-instar female. – A, apical segment of antenna; B, unusual pore with quadrate centre and 12 outer loculi; C, pore with cruciform centre and 12 outer loculi; D, enlarged spiniform seta; E, pore with trilocular centre; F, abdominal spiracle; G, pore with bilocular centre; H, spiniform curved seta; I, flagellate seta; J, hair; K, cicatrices, some funnel shaped; L, hair-like seta; M, tarsus of hind leg; N, pore with quadrate centre and four outer loculi; O, pore with 6-locular centre; P, pore with quinquelocular centre; R, mesothoracic spiracle; S, small pore with trilocular centre and 3 outer loculi.

Margin. – Each body segment with a cluster of 1-3 long hair-like setae on either side, each seta 300-720 μm long (fig. 2L). Anal lobe setae present as 2 pairs, each side with one 460 μm and another 700 μm long.

Venter. – Setae more or less as on dorsum but hairs less frequent. Enlarged spiniform setae, same than those on dorsum, mainly restricted to margin-submarginal area, very weakly present on medial and submedial areas. Hair-like setae, each 80-160 μm long, scattered. Flagellate setae, each 50-70 μm long, present in wide, dense bands across all segments. Medial and submedial areas of abdomen with fewer setae and pores but with numerous spinules. Multilocular pores, same than those on dorsum, each with a bilocular, trilocular or quadrate centre and 6-10 outer loculi, widespread, scattered throughout; smaller multilocular pores (fig. 2O, 2P), each with 5- or 6-locular centre, same than those on dorsum, sparsely scattered; pores with trilocular centre (fig. 2S) and 3, 5 or 6 outer loculi, scattered.

Description of first-instar nymph. – Fig. 3.

Slide-mounted specimens (n = 2). Body ovoid, 3.30-3.50 mm long, 2.25-2.30 mm wide; derm membranous with dense pilosity. Head, pro and mesothorax of the 2 specimens cut medio-longitudinally and the cuticle opened laterally, but the mouthparts lost.

Antennae 6-segmented, each 500-520 μm long; apical segment (fig. 3A) 210-220 μm long (nearly half length of antenna), 60 μm wide, with 6 or 7 long setae, each seta 180-200 μm long, and 3 or 4 stouter setae, each 70-80 μm long. Derm near to antennal base with a cluster of three sensory organs. Eye conical, 80-90 μm in diameter with lens 40 μm wide, situated laterad to scape. Mesothoracic (fig. 3P) and meta-thoracic spiracles each about 110-120 μm wide and 80-100 μm long (including wall of peritreme), with a wide apodeme, each spiracle without atrial or perispiracular pores. Abdominal spiracles (fig. 3K) numbering 7 pairs, each peritreme about 12-15 μm wide, each spiracle without atrial or perispiracular pores.

Legs well-developed: metathoracic legs: coxa 140-150 μm long, 160-165 μm wide with a few setae; trochanter + femur 480-500 μm long; trochanter with 2 campaniform sensilla on each surface, and distally with trochanteral seta 170-210 μm long; tibia 390-420 μm long, with few setae, each seta 40-60 μm long; tarsus (fig. 3N) 215-220 μm long, 48 μm at widest point, with a few setae, each seta 20-40 μm long, and a campaniform sensillum on proximal part; claw 50 μm long without denticle, but with a pair of setose digitules. Anal area a circular zone about 235 μm wide, bordered by a discontinuous sclerotised rim surrounded by 5 or 6 pairs of setae, each 80-100 μm long. Anal tube membranous, without inner sclerotised ring and pores. Each abdominal segment (fig. 3L) with one circular cicatrix on submargin on either side like adult female and preadult, each cicatrix 40-50 μm wide, some cicatrices funnel shaped in transverse section, forming a longitudinal line on each submargin. A larger single cicatrix, 100 μm long and 50 μm wide, present on posterior end of abdomen.

Dorsum. – Setae highly variable in types and lengths, as follows: (i) enlarged spiniform setae (fig. 3D), each mainly 22-30 μm long, densely distributed on head and thorax and on margin and submargin of abdomen, but sparsely scattered or almost absent on medial and submedial areas; (ii) flagellate setae (fig. 3H), mostly each 40-50 μm long but some up to 65 μm long, distributed throughout, increasing in numbers towards abdomen; (iii) hair-like setae (fig. 3G), each 50-150 μm long with a narrow basal socket, scattered throughout; (iv) hairs (fig. 3I) mostly each 40-50 μm long, sparsely scattered. Multilocular pores highly variable in size; some (fig. 3J) each 11-12 μm wide with bilocular centre and 10 outer loculi, and some (fig. 3F) with trilocular centre and 7-10 outer loculi, present throughout; multilocular pores (fig. 3E, 3R), each 8-10 μm in diameter, with 5- or 6-locular centres and 5-10 outer loculi sparsely distributed throughout, but more frequent on posterior segments of abdomen. Pores (fig. 3O) each with quadrate centre and 4 outer loculi, sparsely scattered. Multilocular pores (fig. 3B) each 13-14 μm wide with a wide rectangular centre, each angle with a circular-oval loculus and with 12-14 outer loculi, present on thorax. Multilocular pores (fig. 3C) each 8-9 μm wide, with quadrate cruciform-like centre, widespread. Rectangular pores (fig. 3M) each with quadrate centre and 4 outer loculi, sparsely scattered.

Margin. – Each body segment with a small cluster of long, hair-like setae (fig. 3G), each cluster usually containing 3 setae variable in length: longest seta 540-850 μm long, intermediate seta 400-620 μm long, and shortest seta always 150-370 μm long. Long anal lobe setae present in two groups, each group containing 3 setae, each seta about 370-880 μm long.

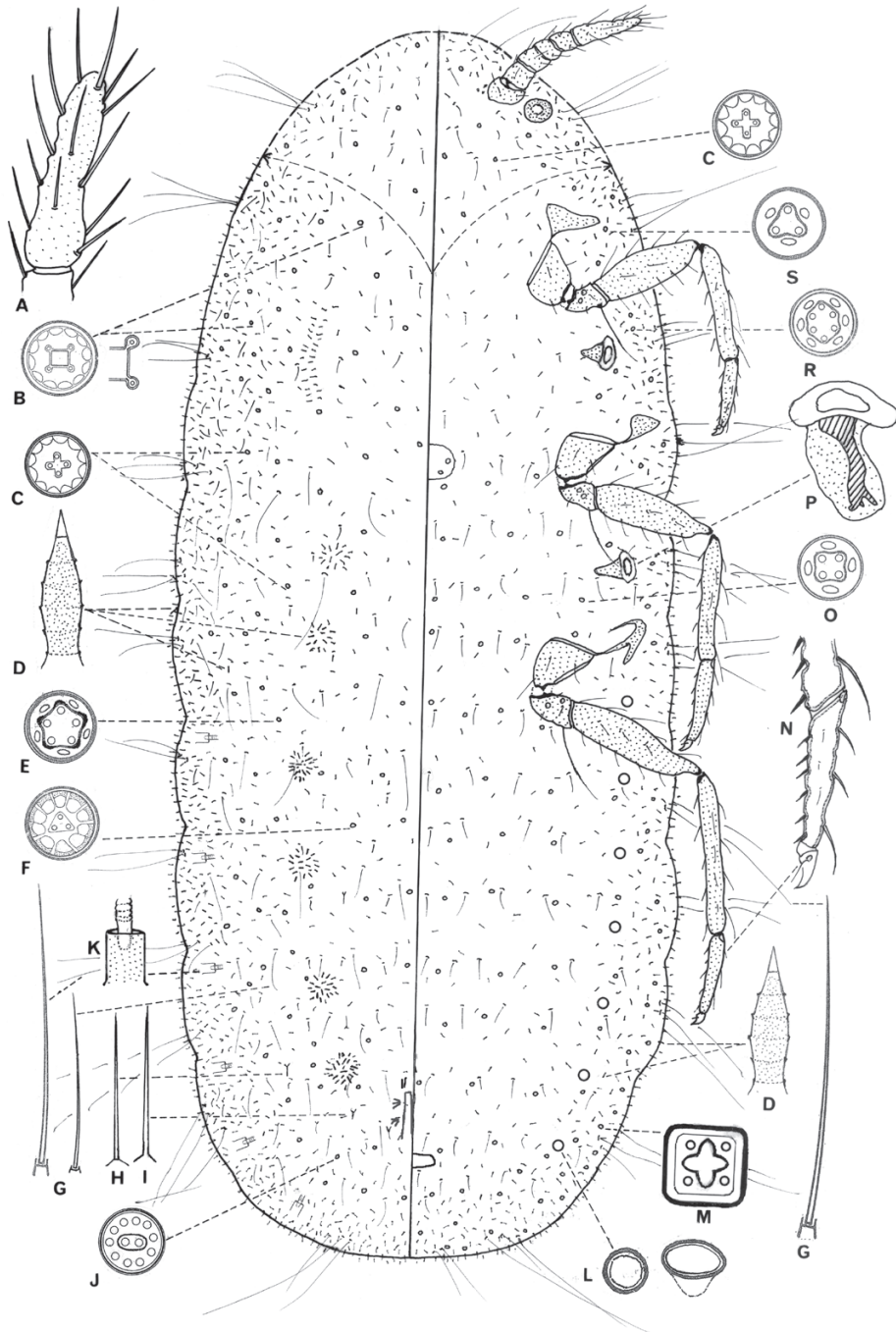


Fig. 3. – *Neohodgsonius splendens* n. sp., first-instar nymph. – A, apical segment of antenna; B, multilocular pore with quadrate centre; C, multilocular pore with cruciform centre; D, enlarged spiniform seta; E, pore with quinquelocular centre; F, pore with trilocular centre; G, hair-like seta; H, flagellate seta; I, hair; J, pore with bilocular centre; K, abdominal spiracle; L, circular cicatrices, some funnel-shaped; M, rectangular pore with four outer loculi; N, tarsus of metathoracic leg; O, pore with quadrate centre and four outer loculi; P, mesothoracic spiracle; R, pore with 6-locular centre; S, small pore with trilocular centre and three outer loculi.

Venter. – Enlarged spiniform setae (fig. 3D) abundant on margin and submargin, less frequent or absent medially. Hair-like setae (fig. 3G), mostly each 70-150 μm long; hairs (fig. 3I) and flagellate setae (fig. 3H), each 40-65 μm long, as on dorsum, distributed throughout. Loculate pores same as those on dorsum, mostly each 10-12 μm wide, with triangular, quadrate, quinquelocular or 6-locular centres and 5-16 outer loculi, scattered on venter, abundant on posterior abdominal segments; smaller pores (fig. 3E, 3R), mostly each 9-10 μm wide, with 5- or 6-locular centre and about 9 outer loculi, scattered throughout.

Description of adult male. – Fig. 4.

Slide mounted specimens (n = 2). Body 5.80-6.00 mm long and 1.20-1.30 mm wide across prealare. Body with numerous setae: hair-like setae (hs) and hairs (hrs) both present more or less throughout; numerous loculate pores (lp), with 3-4 loculi, abundant almost throughout and convex pores (cp) without loculi, restricted to lateral and ventral surface of head. Abdomen without tubular ducts and with spiracles numbering 7 pairs. Abdomen with characteristic 3 pairs of long caudal extensions on segments VI, VII and VIII.

Head triangular in dorsal view, length 540-550 μm , width across compound eyes 710-720 μm . Dorsally with a well-developed postoccipital suture (pos) extending across posterior part of epicranium, and with a narrow postocciput (poc) posteriorly. Dorsomedial part of epicranium membranous; midcranial ridge absent. Dorsal surface covered in numerous hair-like setae (hs), each 100-160 μm long, fewer hairs (hrs) each about 20-50 μm long and several loculate pores. Anterior of head with long hair-like setae, each 100-160 μm long, and with loculate pores, each 9-10 μm wide, mostly with 4 loculi, and a few convex pores (cp), each 7-8 μm wide, restricted to lateral areas and venter of head. Laterally with a pair of compound eyes (cde), each about 300-315 μm long. Compound eyes (cde) with a single ocellus (o) dorsally, close to postoccipital suture, width about 80 μm ; a longitudinal postocular ridge (pocr) close to dorsal margin, extending from near each ocellus around dorsal margin to posterior margin. Venter with a strongly sclerotised series of ridges forming a five-armed cross, composed of: (i) midcranial ridge (vmcr) anteriorly, extending posteriorly from between antennae on anterior margin of head to (ii) a pair of preocular ridges (procr), which originate from between each antenna and compound eye laterally, and (iii) a pair of posterior preoral ridges (pror) extending laterally to posterior margin of each compound eye. Ventral part of epicranium membranous. Setae present anteriorly between mid-cranial ridge (vmcr) and antenna, with many hair-like setae (hs) plus a few hairs (hrs); also several loculate pores (lp); lateral area between preocular and preoral ridges without pores; area posterior to preoral ridges with a group of hs, hrs and clp.

Antennae 10-segmented, 2.70-2.90 mm long; antennal segments trinodose with setae of two types distributed in whorls on most segments: (i) long setae, mostly each 240-800 μm long, many with 1-2 satellite setae; (ii) shorter hair-like setae, each about 60-140 μm long. Basal segments broadest: scape 130-140 μm long, 150 μm wide, with a basal articular process and a few short setae, each about 60-90 μm long; pedicel (pdc) 190-200 μm long, with about 10-15 setae and a strong articular process. Segments III-X of flagellum each 330-350 μm long, each segment trinodose, setae distributed in 3 whorls on each node, with about 20-24 long setae, some with satellite setae (sats); apical segment (X) 260 μm long, 50-60 μm wide, with long setae, some setae up to 320 μm long.

Prothorax dorsally with a pair of diagonal post-tergites (pt), each about 410-450 μm long, slightly broadened at each end. Laterally with a pair of strong cervical sclerites (cv) anteriorly articulated with posterior end of ocular sclerite (ocs) and preoral ridge (pror). Pleural ridge (plr1) short, extending dorsally from articulation with coxa. Ventrally, prosternum (stn1) with well-sclerotized median ridge, 420 μm long, broadening posteriorly with an obvious sternal apophysis at posterior end. Most membranous areas covered in short setae and loculate pores. A group of median pronotal setae and pores extending between post-tergites over anterior end of prescutum; a large group of lateral pronotal setae and pores present anteriorly on each side, and a large group of propleural setae present anteriorly and posteriorly on each side; anteprosternal and antemesospiracular setae and pores present, and a sparse group of prosternal setae and pores on each side of prosternum.

Mesothorax. Dorsally, prescutum (prsc) large and approximately triangular, 445-475 μm long, widest part 470-500 μm across; mesoprephragma (phr2) large; prescutal ridges along margin of prescutal suture but absent medially. Scutum (sct) with a membranous area medially just posterior to prescutum, 185-200 μm

long, 390-400 μm wide, with about 40 hs scutal setae but no loculate pores; sclerotized part of scutum with a group of hair-like setae and loculate pores on either side of scutellum, plus a few hair-like setae lateral to membranous area. Scutellum (scl) triangular; scutoscutellar sutures extending from membranous area of scutum anteriorly, postero-laterally to postalare, each outer angle with an approximately oval membranous area; with 6-8 hs scutellar setae on sclerotized area; without pores. Laterally, prealare (pra) elongate, about 330 μm long; tegula (teg) about 140 μm long, with setae but without pores. Mesopleural ridge well-developed, with a deep pleural apophysis. Mesepisternum (eps2) posteriorly with a few hs and lp. Ventrally, basisternum (stn2) large, 540-560 μm long, 850-870 μm wide; with a distinct, complete, sclerotized median ridge (mdr), bounded anteriorly by a marginal ridge (mr) and posteriorly by well-developed precoxal ridges; with a line of basisternal setae along mdr; furca (f) narrow posteriorly, with each arm about 150 μm long, arms strongly divergent. A dense band of postmesospiracular setae and lp present posterior to each mesothoracic spiracle; mesothoracic spiracles (sp1) large, width of each peritreme about 140 μm .

Metathorax. Dorsally, metapostnotum present as a pair of sclerites, with a group of metatergal setae extending across segment. Laterally, dorso-spiracular setae and loculate pores frequent. Suspensorial sclerites present. Pleural ridge well-developed; precoxal ridge (pcr3) well-developed and extending about 280 μm medio-ventrally; pleural apophysis moderately deep. Metepisternum not sclerotized; metepimeron represented by a strong sclerotization extending dorso-posteriorly around metacoxae. Ventrally, metasternum lightly sclerotized; a few lp, extending along posterior margin of basisternum, and across segment anterior to metasternum. Metathoracic spiracles (sp2) large: each peritreme about 165-170 μm wide.

Wings well-developed, each 3.50-3.60 mm long, about 1.5-1.6 mm wide. Subcostal thickening (sclt) well-developed; wing anterior to subcostal thickening well-sclerotized, rest of wing membranous. A line of circular sensoria and fine setae extending distally from where radius (rad) and medial (med) veins meet; radius and medial veins extending close to apex of wings; alar fold present. Alar lobe (al) well-developed and sclerotized. Hamulohalteres (fig. 4C) mainly sclerotized, about 300-325 μm long, widest point about 110 μm across, narrowing to the base; with 3 hamuli (fig. 4D), each strongly curved with apex hooked, and about 155-165 μm long.

Legs well-developed, slender. Subequal in length, I 2.18 mm; II 2.38 mm; III 3.05 mm. Coxa (cx) lengths: I 250 μm ; II 300 μm ; III 340 μm , each with many setae. Trochanter (tr) + femur (fm) lengths: I 760 μm ; II 750 μm ; III 780 μm ; trochanter with several shortish setae, and 1 trochanteral seta about 300 μm long; trochanter (tr) with probably 2 round campaniform sensilla (camp) on each surface; femur (fm) with many setae, mostly each 70-105 μm long, but some along ventral and dorsal surfaces each up to 190 μm long; posterior margin of profemur with many bifurcate setae (bs). Tibia (ti) lengths: I 850 μm ; II 980 μm ; III 1570 μm ; distal area on each tibia with bifurcate setae (bs) laterally and ventrally, these replaced by long flagellate setae dorsally; with many tibial spurs (tibs) distally, longest each about 60 μm long. Tarsi (ta) 2 segmented (Fig. 4H), proximal segment (ta1) very short and triangular; length: I 350 μm ; II 360 μm ; III 380 μm long; with a tarsal campaniform sensillum (tcs); bifurcate setae (bs) along ventral margin and laterally; lateral setae all short but some dorsal setae slightly longer; tarsal spurs on distal end; tarsal digitules (tdgt) represented by 2 fine setae on dorsal margin near claw. Claws (c) quite long and thin, curved, without a denticle; claw lengths I 82 μm ; II 85 μm ; III 90 μm , each with 2 setose digitules shorter than claw.

Abdomen. Caudal extensions (fig. 4N, ce) present on segments VI, VII and VIII, length variable, each between 1.10-1.35 mm long; each extension with many hair-like setae throughout, mostly each 45-180 μm long but longer (up to 215 μm) towards extremities, loculate pores less numerous than setae. Ventral abdominal setae (hair-like setae and hairs) in broader bands than on dorsum; pleural setae not longer than elsewhere. Loculate pores (lp) frequent on dorsal surface, much fewer on ventral surface. Abdominal spiracles numbering 7 pairs (fig. 4F), each with peritreme 20-23 μm wide, situated on margins of abdominal segments.

Genital segment. Anus (an) located between caudal extensions of segment VIII, consisting of a sclerotized ring (60-70 μm in diameter) and connected to penial sheath ventrally by a sclerotized bar. Penial sheath (ps) 360-370 μm long, 310 μm wide at broadest point, heavily sclerotized, positioned ventrally and immediately below anus. Aedeagus (I, aed) mainly membranous, lying in a groove along venter of penial sheath, with a very long, 2.50-2.75 mm, strongly setiferous, eversible endophallus (eph) (fig. 4H) retracted into body.

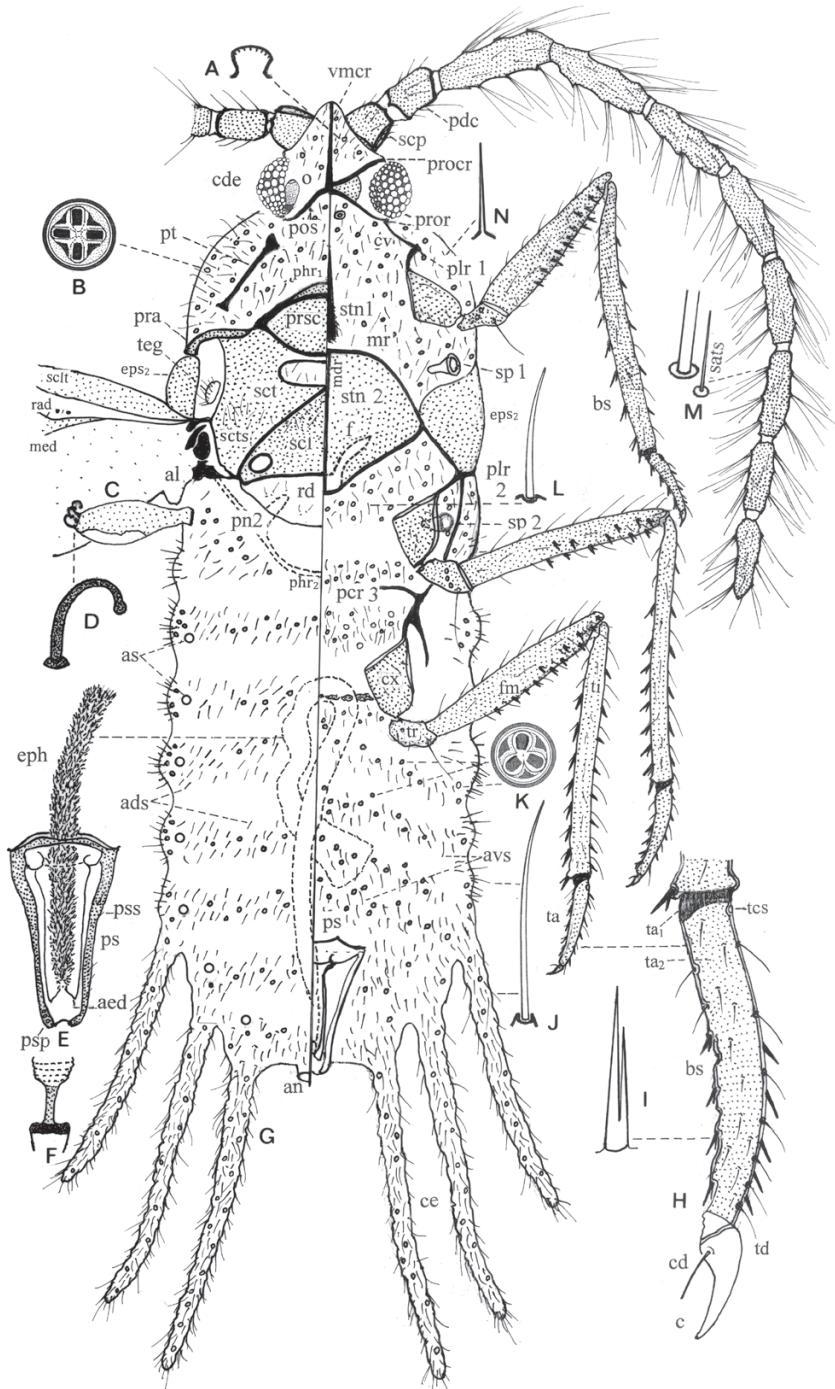


Fig. 4. – *Neohodgsonius splendens* n. sp., adult male. – A, small convex pores on epicranium; B, quadrilocular pores on dorsum and venter; C, hamulohaltere; D, hamuli; E, penial sheath with setiferous endophallus; F, abdominal spiracle; G, caudal extensions; H, metathoracic tarsus two segmented, t1 and t2; proximal part of ta2 with a campaniform sensillum; I, bifurcate seta; J, hair-like seta; K, trilocular pore on venter; L, flagellate seta; M, satellite setae around antennal seta; N, hair. See Material and methods section for explanation of other abbreviations.

Description of third-instar nymph male-prepupa (n = 1). Body ovoid, length 4.5 mm.

Antennae 9-segmented 730 µm long; apical segment 150 µm long, 75 µm wide, with setae 75-150 µm long and 2 fleshy setae. Eye conical, 100 µm wide, situated near base of scape. Mouthparts lacking, only some poorly sclerotized structures present. Mesothoracic spiracles each with peritreme (= opening) 60 µm wide, metathoracic spiracles each 70 µm wide. Abdominal spiracles in 7 pairs, each with a sclerotized and a membranous part to atrium and about 14 µm wide.

Legs well-developed, weakly setose, ventrally tibia and tarsi with spur-like setae trochanters each with 2 campaniform sensilla and with a trochanteral long seta. Prothoracic legs length (in µm): coxa 160, trochanter + femur 550, tibia 430, tarsus 240, claw 60. Mesothoracic legs length (in µm): coxa 160, trochanter + femur 610, tibia 440, tarsus 210, claw 65. Metathoracic legs length (in µm): coxa 160, trochanter + femur 600, tibia 490, tarsus 280, claw 60. Body covered in numerous setae of two types: hair-like setae with shallow sockets (length 65-150 µm) and hairs without basal socket (length 40-60 µm); margin of each abdominal segment with a group of three setae (length 200-500 µm). Enlarged spiniform setae only on dorsum, very few in number, located on submargin of abdominal segments. Multilocular pores distributed on dorsum and venter; large pores, 12-14 µm wide, with bilocular centre most frequent type, fewer pores with trilocular centre; smaller pores, 9-10 µm wide, with 5 and 6 loculi in centre. Penial structures absent.

Tribe **Drosichini** Morrison, 1928

The tribe Drosichini was established by MORRISON (1928) within the subfamily Monophlebinae. Currently the tribe includes two genera, *Drosicha* Walker, 1858, and *Drosichoides* Morrison, 1927. *Drosicha* with 23 species: 9 Palearctic species, *D. afganica* Jashenko 1994, *D. burmeisteri* (Westwood, 1841), *D. contrahens* (Walker, 1858), *D. corpulenta* (Kuwana, 1902), *D. howardi* (Kuwana, 1920), *D. koreiensis* Jashenko, 1994, *D. maskelli* (Cockerell, 1902), *D. pinicola* (Kuwana, 1922), *D. turkestanica* Archangelskaja, 1930, and 14 Oriental species, *D. dalbergiae* (Stebbing, 1902), *D. frauenfeldi* (Karsch, 1877), *D. jujubae* (Buckton, 1883), *D. leachii* (Westwood, 1845), *D. littorea* Beardsley, 1966, *D. mangiferae* (Stebbing, 1903), *D. minor* Reyne, 1965, *D. palavanica* Cockerell, 1916, *D. philippinensis* (Green, 1924), *D. quadricaudata* (Green, 1922), *D. saundersi* (Westwood, 1845), *D. stebbingi* (Stebbing, 1902), *D. sumatrensis* Green, 1930, and *D. variegata* (Green, 1922). *Drosichoides* with two species, *D. haematoptera* (Cockerell, 1919) and *D. sanguinea* (Cockerell, 1915) (JASHENKO, 1994; TANG & HAO, 1995; MARTIN & LAU CLIVE, 2011; GARCIA MORALES *et al.*, 2016).

Adult females are extremely large, may be up to 18-20 mm long. Dorsum and venter densely covered by setae and pores. Antennae 8 to 10-segmented. Thoracic spiracles large and stout, with or without pores at opening; abdominal spiracles in 7 pairs with or without atrial pores. Legs stout and setose. Pores simple with 3, 4, 5, 6 loculi throughout of body, multilocular pores mainly on thorax or near anal opening with 9-11 loculi. Anal tube short, strongly sclerotized, usually with a single row of polygonal wax pores. Three large, ovale or circular cicatrices at posterior part of vulva; medial cicatrix largest.

Adult males are large, external appearance often very beautiful with red coloured body and black wings (*i.e.* *Drosicha corpulenta* and other species).

Antennae 10-segmented, most segments trinodose each with 3 whorls of long setae and many with satellite setae. Convex loculate pores mainly with 4 loculi, rarely 3 loculi scattered throughout. Legs well-developed, very setose; tarsi 2-segmented; claws without a denticle. Abdomen with 2-4 pairs of long lateral caudal extensions on segments V, VI, VII and VIII. Setiferous, eversible endophallus retracted into body.

***Drosicha malaysiensis* n. sp.**

<http://zoobank.org/E760E93A-5C7A-44E2-B3D3-290411C58698>

HOLOTYPE: adult female, Malaysia, Pulau Tioman, on Euphorbiaceae *sp.*, 19.VI.2013, Dr J. H. Martin coll. (BMNH)

PARATYPE: 1 adult female, *idem* holotype (BMNH).

Description of adult female. – Fig. 5, 9. *Unmounted material.* Body piriform, dark red, dorsum and venter covered by a narrow coat of white wax. Body with well-developed marginal lobes.

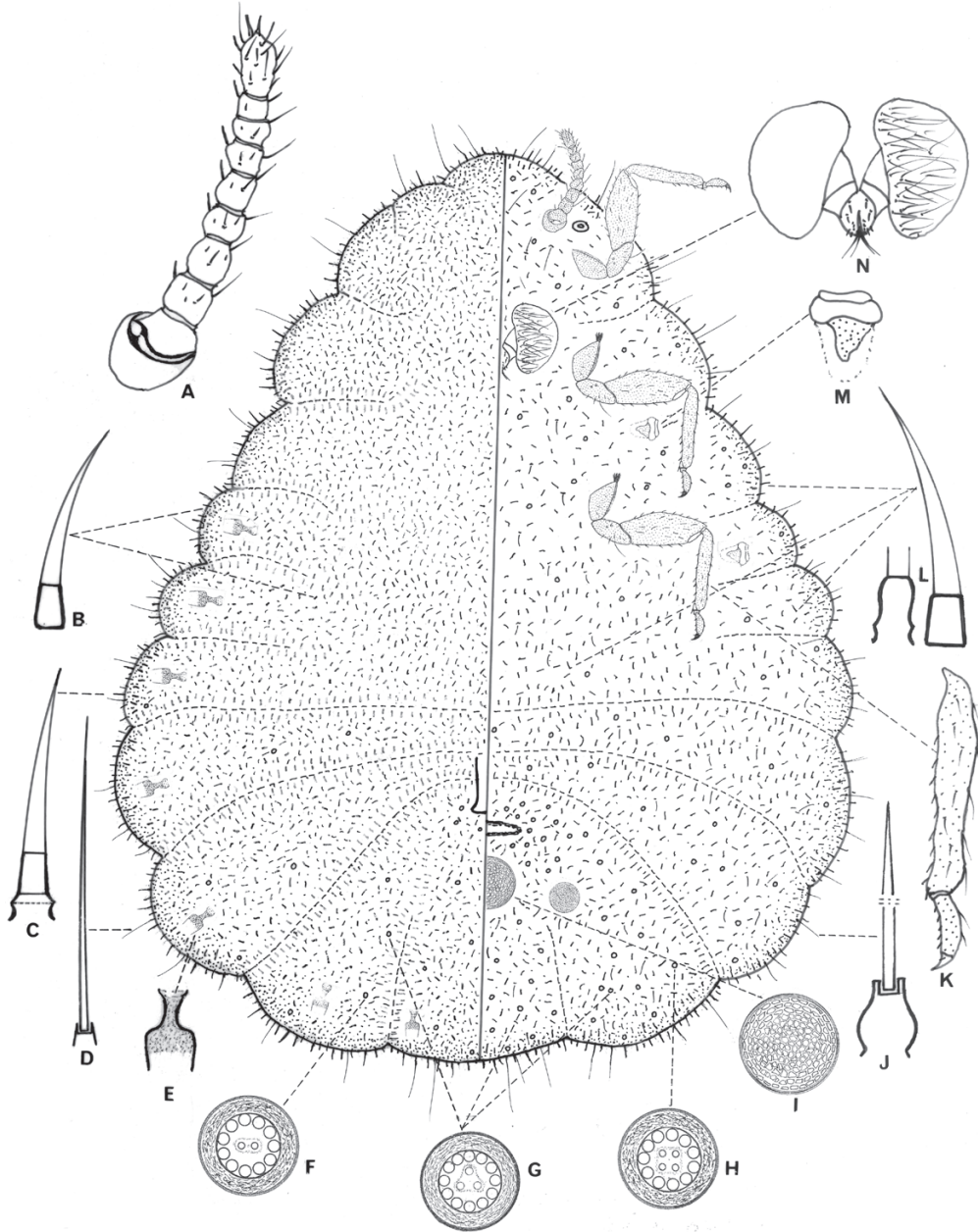


Fig. 5. – *Drosicha malaysiensis* n. sp., adult female. – A, antenna; B, dorsal spiniform curved seta; C, spiniform seta with modified setal base; D, dorsal hair-like seta; E, abdominal spiracle; F, G, H, multilocular pores with bilocular, trilocular and quadrilocular centres and 12-14 outer loculi; I, cribriform cicatrices; J, hair-like seta with unusual setal base; K, metathoracic tibia and tarsus; L, ventral spiniform setae with various setal base; M, thoracic spiracle; N, mouthparts surrounded by two raised lobes of derm bearing dense hair-like setae.

Slide-mounted specimens (n = 2) (specimens in very poor condition). Body strongly piriform, posterior end 8.00-8.55 mm wide, anterior end 1.90-2.30 mm wide, body 9.40-10.00 mm long. Derm membranous, densely covered by numerous setae and fewer pores. Body with strongly developed marginal lobes; in each indent between 2 lobes is apparently an opening-like structure about 100-120 μm wide, with a waxy tuft.



Fig. 6-9. – 6-7, *Neohodgsonius splendens* n. sp., adult females. – 8, adult female prior to mating raising its posterior abdomen, exposing the genital area for copulation. – 9, *Drosicha malaysiensis* n. sp., adult female. (Photos: A-C by Jon Martin, D by Imre Foldi).

Antennae (fig. 5A) 10-segmented, 910-920 μm long; each segment, except scape, with one or more stout, curved setae, mostly each 30-70 μm long, and 1 or 2 slender setae, each 60-130 μm long; apical segment 140-145 μm long, 75-90 μm wide; with 3-4 long setae, each seta 80-190 μm long; and 3 or 4 stout setae on apex, each 45-70 μm long. Eye dark, circular, 120-130 μm wide, situated laterad of scape. Labium (fig. 5N) located into a recess, surrounded by raised wide dermal lobe on each side; each lobe densely covered with hair-like setae, each seta 160-220 μm long; labium triangular, apparently 3-segmented, 330-350 μm long, apex with about 12-14 short setae, each with a weakly swollen apex; anterior segment with longest hair-like setae. Thoracic spiracles (fig. 5M), each 210-220 μm wide (including wide, sclerotized peritreme wall); abdominal spiracles (fig. 5E) small, numbering 7 pairs.

Legs stout, subequal in length: prothoracic leg I 2.53 mm; mesothoracic leg II 2.75 mm; metathoracic leg III 3.40 mm long. Coxa lengths: I 600 μm ; II 600 μm ; III 740 μm ; each coxa with few setae, each 70-145 μm long. Trochanter + femur lengths: I 1000 μm ; II 1100 μm ; III 1370 μm ; each trochanter with two placoid sensilla on each surface, several short setae, each 60-90 μm long, and distally with 1 trochanteral seta about 250 μm long. Dorsally, femur with long setae, each 80-90 μm , ventrally with stout setae, each 70-75 μm long. Tibia lengths (fig. 5K): I 710 μm ; II 750 μm , III 1000 μm ; widest part of tibia 75-80 μm wide; articulation with femur strong; tibial setae each 65-100 μm long. Tarsus (fig. 5K) curved: tarsus lengths I 220 μm ; II 280 μm ; III 290 μm ; tarsus about 125 μm wide, with setae, each seta 45-55 μm long; claw lengths 115-120 μm , each with a pair of setose digitules, and without denticle.

Vulva about 340 μm wide. Anal tube sclerotised, 680-715 μm long, 145-155 μm wide, with hirsute surface; anal opening about 320 μm wide, simple, without pores or setae.

Dorsum. Stout spiniform setae (fig. 5B, 5C, 5L) with various forms of setal base, each seta 40-70 μm long, straight or curved, these setae very densely covering entire dorsal surface. Hair-like setae (fig. 5D) sparsely scattered, mixed with spiniform setae, mostly each 70-140 μm long; shape and size of setal base of hair-like setae also variable. Margin of body with long, stout, hair-like setae (fig. 5J) each with enlarged setal base, mostly each 240-460 μm long, length increasing towards posterior end. Multilocular pores, characterised by an unusually wide rim, rare, each 12-14 μm wide, mostly each with trilocular, quadrilocular or rarely bilocular centre and 10-12 outer loculi, very sparsely distributed.

Venter. Stout spiniform setae, most frequent setal type, similar to those on dorsum, each 40-70 μm long, densely covering but less than dorsum head and thorax and forming dense bands across all segments of abdomen. Hair-like setae on head, thorax and on margin, each 120-250 μm long; and hair-like setae, each 60-80 μm long, scattered throughout. Posterior end of abdomen with four long hair-like setae, each 340-360 μm long, and shorter setae, each 70-150 μm long; most hair-like setae on margin and submargin with prominent setal collars (fig. 5J). Multilocular pores same as those on dorsum, each pore with particularly wide rim, 12-14 μm wide, with a trilocular centre (fig. 5G) and 10-12 outer loculi, densely scattered throughout; also multilocular pores (fig. 5F, 5H) each 12-14 μm wide, with a bilocular or quadrilocular centre and 10-12 outer loculi, sparsely scattered on abdomen. Three circular cribriform cicatrices (fig. 5I) at posterior of vulva; medial cicatrix at least 200 μm wide, outer cicatrices each about 100 μm wide.

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