

## A new genus of armoured scale insect for a new scale-less species living inside nests of the ant *Rhopalomastix johorensis* in Singapore (Hemiptera, Coccoomorpha, Diaspididae)

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**Abstract.** – *Rhopalaspis peetersi* n. gen., n. sp., living inside nests of the arboreal colony of the ant *Rhopalomastix johorensis*, is described from Singapore. This armoured scale insect is scale-less, unlike all the other species of Diaspididae. Furthermore, armoured scale insects do not produce honeydew.

**Résumé.** – Un nouveau genre de cochenille diaspine pour une nouvelle espèce dépourvue de bouclier, vivant dans les nids de la fourmi *Rhopalomastix johorensis* à Singapour (Hemiptera, Coccoomorpha, Diaspididae). *Rhopalaspis peetersi* n. gen., n. sp., vivant dans le nid de la colonie arboricole de la fourmi *Rhopalomastix johorensis*, est décrite de Singapour. Cette diaspine est dépourvue de bouclier de cire protectrice, contrairement à toutes les autres espèces de Diaspididae. Par ailleurs, les diaspines ne produisent pas de miellat.

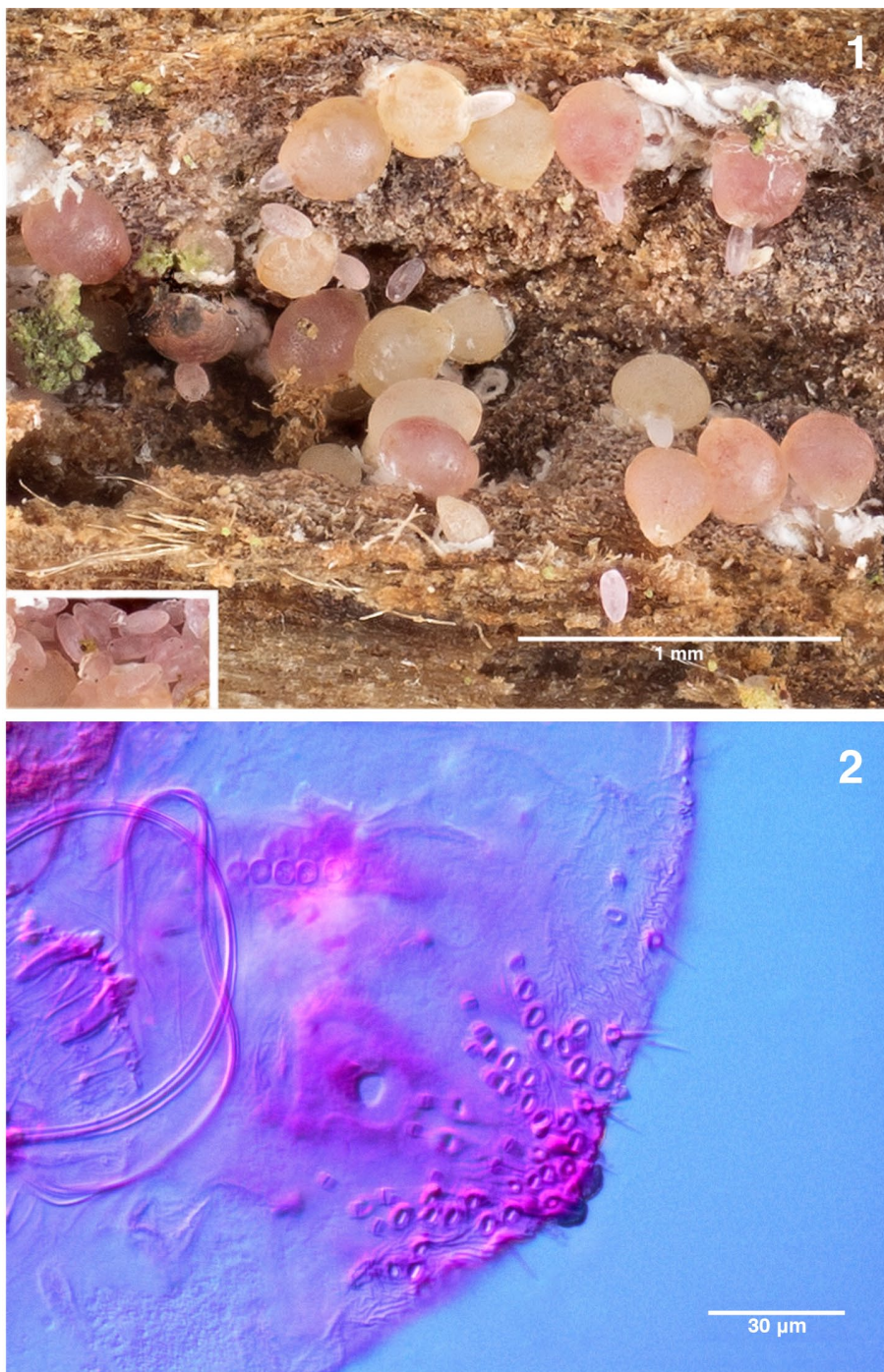
**Keywords.** – Aspidiotini, taxonomy, morphology, ant, mutualism, oriental region.

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During a recent survey in Singapore, our colleagues Christian Peeters and Gordon Yong, interested in the biology of species of *Rhopalomastix* Forel, 1900 (Hymenoptera, Formicidae), found several species of armoured scale insects associated with (Yong *et al.*, submitted). The association of ants with diaspidids has been known since the 1970s and only in Africa and Madagascar, associated with the ant genus *Melissotarsus* Emery, 1877 (DELAGE-DARCHEN *et al.*, 1972; BEN-DOV & FISHER, 2010; SCHNEIDER *et al.*, 2013; PEETERS *et al.*, 2017). Five genera of Aspidiotinae, *Affirmaspis* MacGillivray, 1921, *Andaspis* MacGillivray, 1921, *Melanaspis* Cockerell, 1897, *Melissoaspis* Ben-Dov, 2010, and *Morganella* Cockerell, 1897, and one Diaspidinae, the genus *Diaspis* Costa, 1828, are involved (key in SCHNEIDER *et al.*, 2013). It is a very unique association because diaspidids are the only scale insects which are not producing honeydew. We describe here a new genus and species of Diaspididae associated with the ant *Rhopalomastix johorensis* Wheeler, 1929.

### MATERIAL AND METHODS

The adult females of armoured scale insects are minute (about 1 mm) and are observed on slides, using a microscope at high magnifications. The slide-mounting method is here briefly summarized: specimens are cleared by placing overnight in cold 10% KOH and then gently heated to 40°C for several minutes, then cuticles are stained overnight in lactophenol solution with a few drops of acid fuchsin. Prior to mounting in Canada balsam on microscopic slides, the specimens are placed in acetic acid bath, then in xylene bath.



**Fig. 1-2.** – *Rhopalaspis peetersi* n. gen., n. sp. – **1**, Adult females in a gallery of *Rhopalomastix johorensis* Wheeler, general view in situ; note the eggs and some females hatching eggs. In the inset, embryos are shown with their eye-spots and antennae visible. (Photo by Gordon Yong, 22.XI.2016). – **2**, Dorsal view of the pygidium of the female paratype, adult. Note on the left, inside the body of the adult female, the last abdominal segments of the first instar and its stylets (slide MNHN 19955-2). (Phase contrast picture by Louis Deharveng).

## TAXONOMY

***Rhopalaspis* n. gen.**

<http://zoobank.org/FF3A9509-B956-4709-8DF9-EB7CC593F4BB>

Type-species: *Rhopalaspis peetersi* n. sp.

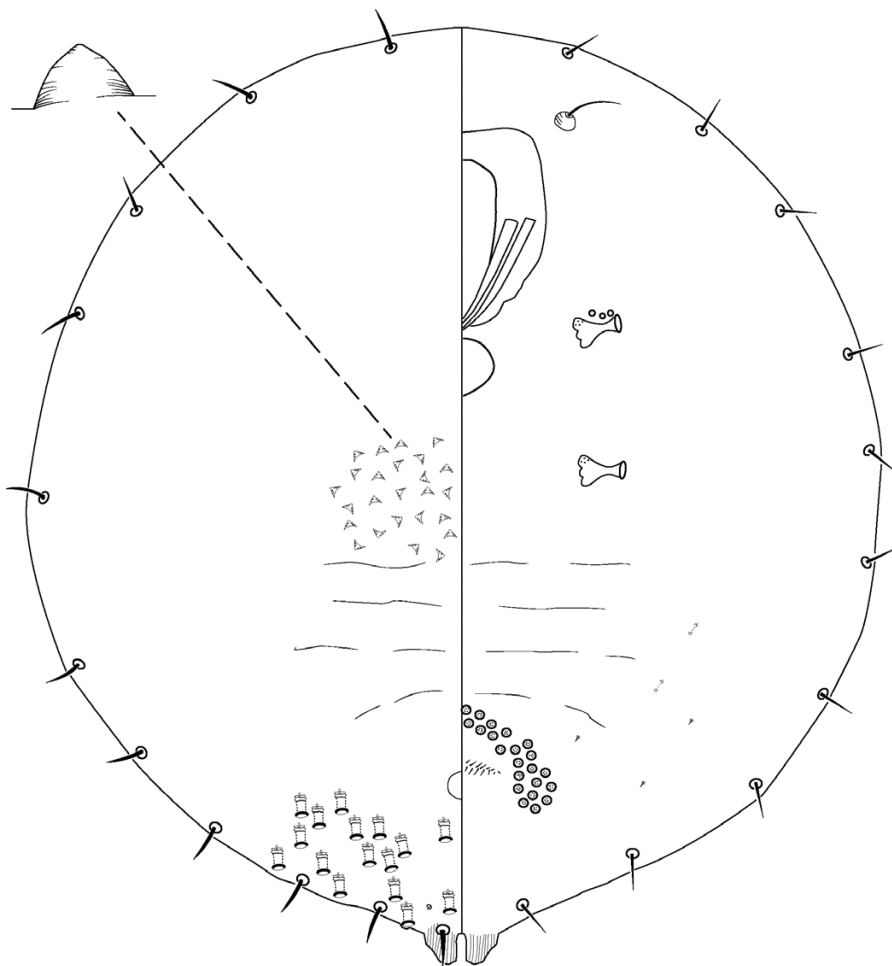
**Generic diagnosis.** – As the genus is currently monospecific, as for species.

**Etymology.** – The generic name is derived from “*Rhopal*”, as an abbreviation of the ant genus name *Rhopalomastix*, and of the Greek name “*aspis*” (= scale), referring to the association of the new species here included in this genus with the ant *Rhopalomastix johorensis*.

***Rhopalaspis peetersi* n. sp. (fig. 1-3)**

<http://zoobank.org/6BE05470-57E0-46C4-A7AB-D12855832662>

**HOLOTYPE:** adult female, slide mounted; Singapore, Mandai Road, GPS 1.41318 103.79405, on *Aquilaria malaccensis* (Thymelaeaceae), living into the nest of *Rhopalomastix johorensis*, Yong G. W. & Chui S. X., 21.XI.2016, MNHN 19955-3. Deposited in Muséum national d’Histoire naturelle (MNHN), Paris.



**Fig. 3.** – *Rhopalaspis peetersi* n. gen., n. sp., adult female.

PARATYPES: 21 adult females, slide mounted, some with crawlers inside, MNHN 19955-1 to 11 (11 slides). Same data as holotype, deposited in MNHN.

**Description.** – Species scale-less. Living adult female spherical, purple (according to the collectors) but more yellowish when younger. Eggs, embryos and first instar nymphs observed (fig. 1-2). Male not observed.

**Adult female.** – Slide mounted adult female: 0,40-0,46 mm long; widest at metathorax, 0,35-0,45 mm wide. Body outline rounded, derm membranous (fig. 3).

*Margin* with submarginal row of setae on dorsum and submarginal row of setae on venter of same length.

*Pygidium* with one pair of lobes. Median lobes well-developed, parallel, separated by a narrow space, each lobe rounded, slightly notched laterally. Setae not present into the median space. Second lobes not recognizable except as marginal swellings more or less visible. Gland spines absent. Marginal spurs apparently absent.

*Dorsum* with a median thoracic cluster of numerous minute dermal membranous tubercles, not associated with pores, well observed on profile. Macroducts of one size, short, present only on segments VIII to VI, forming a cluster of about 19 to 31. Diameter of the opening: 5 µm, length about twice the diameter. On segment VIII, macroducts variable in number and position. Most often, two pairs are present, one basal and one apical (fig. 2-3). On the holotype, no basal submedian macroducts, like on 8 paratypes. In the other 13 paratypes, basal submedian macroducts present, sometimes only one macroduct (9 specimens), more rarely 2-3 macroducts (4 specimens). Dorsal submarginal and submedian ducts absent from all the abdominal segments V to I. Macroduct openings narrowly oval and thick.

*Ventral surface* of pygidium with numerous perivulvar pores in a continuous group. Anus basal. Few microducts and minute setae present. Antennae each with one seta. Anterior spiracles each usually with 3-5 disc pores.

**First instar nymph.** – General aspect as all diaspidid species. Antennae 6-segmented, last segment as long as 2-5 combined, not annulated. Legs developed. Enlarged dorsal duct absent on head. Median lobes well-developed, sclerotized, with three external notches and long inner sclerotized paraphysis (fig. 2). Median space wide as a single lobe, with two long setae.

**Etymology.** – The specific epithet is the Latin genitive of Christian Peeters who found initially this mutualism ant-diaspidid in Singapore.

**Comments.** – *Rhopalaspis peetersi* n. sp. lives in huge number in the galleries of the arboreal colony of *Rhopalomastix johorensis* (Hymenoptera, Formicidae, Myrmicinae, Crematogastrini) (fig. 1). It has been shown recently that multiple diaspidid lineages are involved in association with ants, but only with the genus *Melissotarsus* (SCHNEIDER *et al.*, 2018). The new genus belongs to the tribe Aspidiotini, comprising many pest species. It differs from other genera of the tribe in the absence of plates and dorsal macropores on the pre-pygidial segments VI to I. The adult female is scale-less, unlike all the other species of free-living Diaspididae. *R. peetersi* n. sp. has a spherical body and consequently is difficult to mount on slide in the usual dorso-ventral position. The pygidial margin is hardly observable. The medio-dorsal minute tubercles are observed for the first time among the Diaspididae. They are not associated with pores and their function is unknown. No colonies of this species were observed on the aerial parts of the tree.

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