A new species in the genus *Diaonidia* Takahashi (Hemiptera: Coccomorpha: Diaspididae) from China

Can ZHANG[1], Ding'an SUN[2], Shaobin HUANG[1①]

1. *Center of Plant Pest Management and Bioenvironmental Health Application Technology, Guangdong Eco-Engineering Polytechnic, Guangzhou, Guangdong 510520, China*

2. *Sanya Dongtian Park Tourist Attraction, Sanya, Hainan 572000, China*

Abstract: A new armoured scale, *Diaonidia litsea* **sp. nov.**, is described and illustrated. It was found on *Litsea monopetala* (Roxb.) Pers. in Hainan, China. This new species can be easily distinguished by: the anterior spiracles each with 2–3 discoidal glands; pygidium with 2 pairs of well-developed lobes, and the area around mouthpart strongly sclerotized. An identification key to the adult females in the genus *Diaonidia* is also provided.

Key words: armoured scale insect; taxonomy; key

长宗囚盾蚧属一新种记述（半翅目：蚧次目：盾蚧科）

张灿[1]，孙定安[2]，黄少彬[1①]

1. 广东生态工程职业学院植物有害生物防控与生物环境健康应用技术协同创新中心，广东 广州 510520；2. 海南省三亚市崖州区大小洞天旅游区，海南 三亚 572000

摘要：记述盾蚧科长宗囚盾蚧属 1 新种：木姜子长宗囚蚧 *Diaonidia litsea* **sp. nov.**。该新种与同属其它种的主要区别是其前气门有盘状腺 2~3 个，臀叶 2 对；口器周围表皮高度硬化。文中提供了该新种的各龄照片和特征图，以及长宗盾蚧属已知种类雌成虫分种检索表。

关键词：盾蚧；分类；检索表

Introduction

The scale insect genus *Diaonidia* (Hemiptera: Coccomorpha: Diaspididae) was established by Takahashi (1956) for a single species, *Aonidia yabunikkei* Kuwana (Kuwana 1933), which was described from Tokyo, Japan on *Cinnamomum pedunculatum*. The genus *Diaonidia* is very close to *Aonidia* Targioni-Tozzetti, but differs from the latter in that the pygidial lobes and plates are well developed (Takagi 1969).

To date, two *Diaonidia* species have been described in the world: *D. cinnamomi* (Takahashi 1936) and *D. yabunikkei* (Kuwana 1933). *D. cinnamomi* has been reported from Taiwan, China. *D. yabunikkei* has been reported from Japan. The hosts of these species are on Lauraceae. In this paper, the new species *Diaonidia litsea* **sp. nov.** is described and illustrated from Hainan, China. An identification key to the adult females in the genus *Diaonidia* known in the world is also provided.

Accepted 16 April 2024. Published online 26 August 2024..

① Corresponding author, E-mail: h3602@126.com

Material and methods

The scale insect samples were collected on *Litsea monopetala* (Roxb.) Pers. from Nanshan Fairyland, Sanya City, Hainan Province, China, by Shaobin HUANG and Ding'an SUN. The dry samples were stored in brown paper bags. Slide specimens were stained with acid fuchsin and mounted with Canada balsam. Specimen observation, measurement, and photography were conducted using Leica DM750 and Leica DM4B microscopes. Terminology descriptions follow Takagi (1969). Measurement and statistical data were obtained from all available specimens. Scale length and width were measured in millimeters (mm). All other measurements were in micrometers (μm). Photographic documentation of slide specimens was performed using a microscopy imaging system, and drawings were created using a combination of hand drawing and Photoshop.

All types are deposited at the Insect Collection at the Guangdong Eco-Engineering Polytechnic (GDEP).

Taxonomy

***Diaonidia litsea* sp. nov.** (Figs 1–4)

Adult female (n = 12) (Figs 1, 2, 4B).

Pupillarial, the adult female entirely covered with the second exuvium. The scale (Fig. 1) nearly circular, 0.7–1.0 mm in diameter, with one exuvium at the center or near the center, light green, with a deep blue edge and a blue center.

Figure 1. Habitat photograph of *Diaonidia litsea* **sp. nov.**, showing scale of adult female.

Body on slide inverted apple-shaped (Figs 2A, 2B), 465–603 μm long and 518–681 μm wide. Mouthparts well-developed, and the area around the mouthparts slightly sclerotized in young (Fig. 2A) and strongly sclerotized in mature (Fig. 2B). Antennae each with 1 sclerotized projection and 1 seta (Fig. 2C). Anterior spiracles each with 2–3 trilocular pores,

each about 2.0 μm diameter, posterior spiracles without disc pore (Fig. 2D); 6–13 microtubular ducts, each about 9 μm long, present between anterior and posterior spiracles. Pygidium comparatively broad, sclerotized in abdominal segments V–VIII; with a pair of round scleroses on abdominal segments IV submedianly (Fig. 2E). Pygidial lobes in two pairs; the median lobes comparatively large, with 3 notches on outer side and 1–2 notches on inner side; the second lobes similar in shape to the first, but with 4 notches on outer side. Plates fimbriate, extending beyond the apex of lobe; two plates between the median lobes; two plates between the median and second lobes; two or three plates laterally to the second lobe. Dorsal macroducts of the pygidium slender and few, 17 μm long and 3 μm wide, one between the median lobes, two between the median and second lobes, and two between the sixth and seventh abdominal segments. Ventral macroducts present in abdominal segments I–V, distributed as follows: 0–1 on median, 0–1 on submedian, 4 on margin on abdominal segment I; 1 on median, 1 on submedian, 1–3 on submargin, 4–5 on margin on abdominal segment II; 0–1 on median, 2–3 on submedian, 1–3 on submargin, 0–1 on margin on abdominal segment III; 1 on submargin on abdominal segment IV; and 1 on submargin on abdominal segment V. Perivulvar pores absent. Vulva inverted funnel-shaped. Anal opening rounded, situated at the centre of the pygidium.

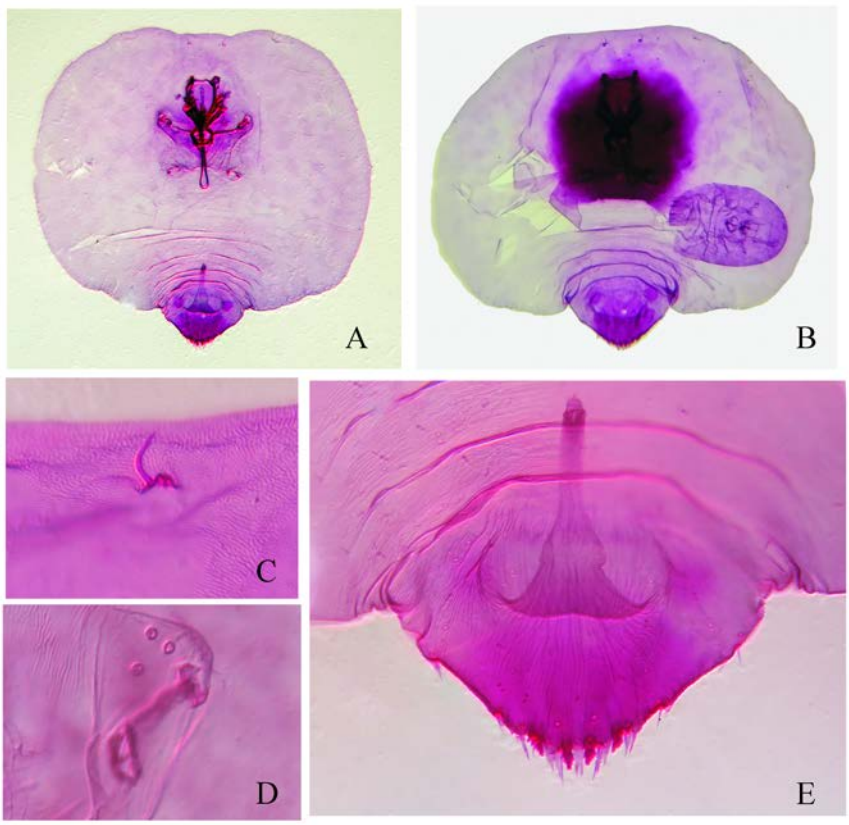

Figure 2. *Diaonidia litsea* **sp. nov.**, adult female. A. Young female adult; B. Adult female and first instar nymph; C. Antennae; D. Anterior spiracle and spiracular pore; E. Pygidium.

Second instar nymphs (n = 8) (Figs 3, 4C).

The exuvium inverted apple-shaped, 580–670 μm long and 614–756 μm wide. The area between mouthparts and thoracic spiracles has a winged flight suit-like perforations.

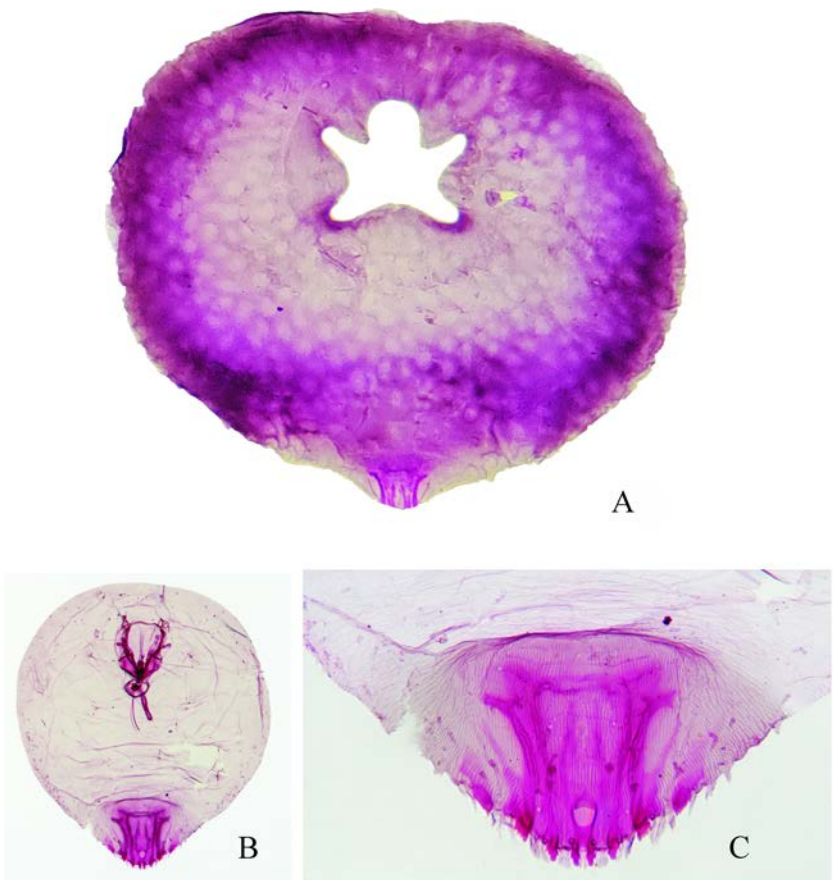

Figure 3. *Diaonidia litsea* **sp. nov.**, second instar nymph female. A. Second instar nymph scale; B. Second instar nymph; C. Pygidium.

On slide, body inverted pear-shaped, 268–410 μm long and 221–328 μm wide. Antennae each with one sclerotized projection and one seta. Anterior and posterior spiracles without disc pore, but with 0–4 small tubular ducts surrounding. Pygidium comparatively broad and slightly sclerotized. Lobes in 4 pairs; the median lobes comparatively large, with 1 notch on outer and 1 on inner side; the second lobes as large as the median one, with 2–3 notches on outer side and 1 notch on inner side; the third and fourth lobes similar in shape, rectangular, with 3–4 notches on outer side. Plates extending beyond the lobes in length and jagged on outer side; two plates between the median lobes; two plates between the median and second lobes; three between the third and fourth lobes, and two or three plates laterally to the fourth lobe. Dorsal macroducts 11 μm long and 2 μm wide, 0–1 between the median lobe; one between median and second lobe; one between second and third lobe; two laterally to the third lobe. Ventral macroducts numerous, forming mainly a longitudinal line along margin of venter, and two pairs in median area of abdominal segment V. Anal opening rounded, situated near the end of the pygidium.

First instar nymphs (n = 4) (Fig. 4).

Body wide ellipse, 170–199 μm long and 124–138 μm wide. Antenna 5-segmented, about 39 μm long; the basal 4 segments short, the terminal segment longest, about half of total antennal length; the terminal segment annulate, with two slender apical setae. Eyes present. Legs developed, tibia and tarsus separated by a faint septum, both tarsal and claw digitules present, knobbed apically. Both anterior and posterior spiracles without disc pore. Pygidium comparatively broad, with one pair of long setae at the end, about 1/10th of body length. Two pairs of lobes similar in shape, with 2–4 notches on outer side, but the median lobe a bit larger than the second one.

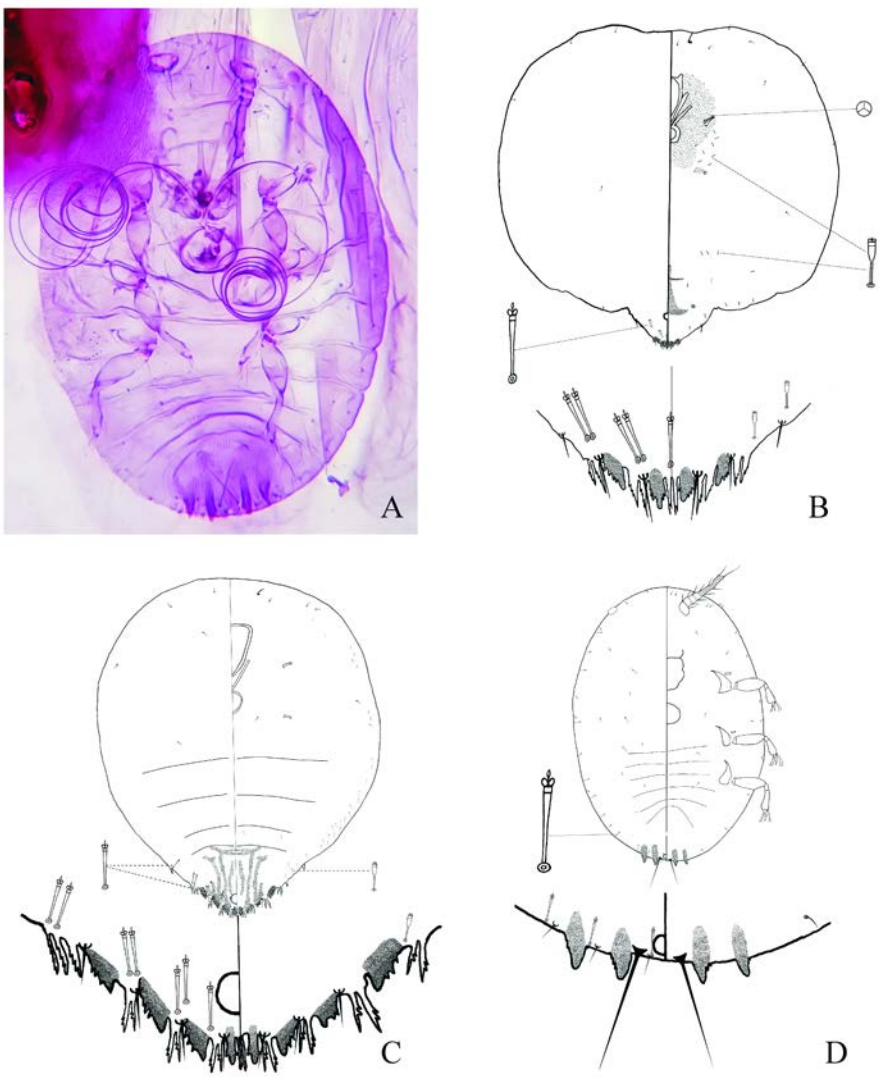

Figure 4. *Diaonidia litsea* **sp. nov.** A. First instar nymph slide; B. Adult female; C. Second instar nymph female; D. First instar nymph.

Holotype. ♀, **China**, Hainan, Sanya City, Nanshan Fairyland, 109°9′15.0372″E,

18°17′57.1776″N, on branches of *L. monopetala*, 26-II-2023, coll. Shaobin HUANG & Ding'an SUN. **Paratypes.** 11♀, 4 first instar nymphs and 8 second instar nymphs, same data as for holotype.

Etymology. This species epithet is derived from the host plant (genus *Litsea*) on which it was collected.

Remarks. This new species *Diaonidia litsea* **sp. nov.** differs from the other two species *D. cinnamomi* and *D. yabunikkei* in that pygidium has two pairs of well-developed lobes and anterior spiracle with disc pores.

Key to adult females of *Diaonidia*

1. Anterior spiracle with 2–3 disc pores, pygidium with 2 pairs of well-developed lobes ···· *D. litsea* **sp. nov.**
-. Anterior spiracle without disc pores, pygidium with 3 pairs of lobes ····· 2
2. Median lobes with a deep subapical notch on the inner side, and with two deep notches on the outer side; second lobes with no notch on the inner side, and with about three notches on the oblique outer margin ····· ····· *D. cinnamomi*
-. Median lobes with a deep subapical notch on the inner side, and with one deep notch on the outer side; second lobes with no notch on the inner side, and with no obvious absence notches on the oblique outer margin····· *D. yabunikkei*

Acknowledgements

We are thankful to Prof. San'an WU of Beijing Forestry University for reviewing the manuscript and giving some useful suggestions. This research was supported by Scientific Research Platforms and Projects in Universities in Guangdong, China (2022KCXTD050) and Natural Science Innovation Project of Education Department of Guangdong Province (2021KTSCX255).

References

Kuwana SI. 1933. The diaspine Coccidae of Japan, VII. *Scientific Bulletin* (*Ministry of Agriculture and Forestry*), 3: 1–42.

Takagi S. 1969. Diaspididae of Taiwan based on material collected in connection with the Japan-U.S. Co-operative Science Programme, 1965 (Homoptera: Coccoidea). Part I. *Insecta Matsumurana*, 32: 1–110.

Takahashi R. 1936. Two interesting scale insects attacking the Lauraceae in Formosa (Hemiptera). *Transactions of the Formosa Natural History Society*, 26: 80–83.

Takahashi R. 1956. Three new genera and a new species of Diaspididae from Japan. *Insecta Matsumurana*, 20: 23–28.