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Aleurocybotus (Homoptera：Aleyrodidae) of Taiwan【Research report】

臺灣產之狹粉蝨屬(同翅目：粉蝨科)【研究報告】

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Abstract

Aleurocybotus Quaintance & Bader of Taiwan including 3 species is reviewed in this paper: 1 named species, A. setiferus Quaintance & Baker, and 2 new species, A. concursus Ko, n. sp., and A. miscanthus Ko, n. sp. A key to Taiwanese species of this genus based on pupal cases is provided with accompanying illustrations and SEM photographs.

摘要

本文記錄台灣產狹粉蝨屬 - 舊記錄種，剛毛狹粉蝨Aleyrocybotus setiferus Quaintance & Baker，及描述二新種，聚集狹粉蝨 Aleyrocybotus concursus Ko, n. sp. 及五節芒狹粉蝨 A. miscanthus Ko, n. sp.。文中並附檢索表、繪圖及掃描電子顯微照片。

Key words: Taxonomy, Aleyrodieae, Aleurocybotus, new species, Taiwan.
關鍵詞: 分類、粉蝨科、狹粉蝨屬、新種、台灣

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Aleurocybotus (Homoptera: Aleyrodidae) of Taiwan

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ABSTRACT

Aleurocybotus Quaintance & Baker of Taiwan including 3 species is reviewed in this paper: 1 named species, *A. setiferus* Quaintance & Baker, and 2 new species, *A. concursus* Ko, n. sp., and *A. miscanthus* Ko, n. sp. A key to Taiwanese species of this genus based on pupal cases is provided with accompanying illustrations and SEM photographs.

Key words: Taxonomy, Aleyrodidae, *Aleurocybotus*, new species, Taiwan.

Introduction

Aleurocybotus Quaintance & Baker is unusual among aleyrodid genera in being mostly associated with grasses. No evident signs of damage have been noted apart from 1 Old World species, *A. indicus* David & Subramaniam, which being native to India, has spread to Chad, Mauritania, Nigeria, Senegal, Burkina, Faso, and Zambia (Martin, 1996). This species has attacked rice plants from seedling to flowering stages in Africa since 1977. During the hot, dry season, especially in February, March, and April, it has become a serious problem in irrigated rice. When infestation is high, black sooty mold that develops on rice leaves can cause withering and plant death (Alam, 1989). The type species, *Aleurocybotus graminicolus* (Quaintance), and 1 other species were described from the Nearctic Region (Arizona, California, and Florida). Three species assigned to the genus were described from the Old World (Martin, 1988). Bink-Moenen (1983) assumed that the Old World species of *A. setiferus* Quaintance & Baker could be a different genus although resembling the type-species in general outline and collected from related host plants. In our opinion, it is advisable to assign them into the same genus by the character of the prominent submedian depressions. Whereas, *A. millettiae* Cohic does not appear to be congeneric with the type-species by the lack of submedian depressions, more oval outline, and unrelated host plant data. Silvestri (1927) recorded an aleyrodid under the name of *A. setiferus* from Manila, and this species may be a distinct species differing from Taiwanese specimens in having a shorter and stouter setae along the margin of the pupal case (Takahashi, 1931), but no material is available for this study. The *Aleurocybotus* species can be divided into 2 groups: the "*graminicolus* group" with

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long antennae, lateral to prothoracic legs, and male antennae longer than that of the female which consists of the Nearctic species *A. graminicolus* (Quaintance) and *A. occiduus* Russell; and the "*setiferus* group" with short antennae, mesal to legs, antennae of both sexes subequal in length which consists of the Oriental species *A. setiferus* and *A. indicus*, and Ethiopian species *A. millettiae*. A detailed survey in Taiwan has revealed 1 named and 2 new species assignable to the "*setiferus* group". Presently, there are 5 described species of *Aleurocybotus* recorded in the world (Quaintance, 1899; Quaintance and Baker, 1914; Russell, 1964; Cohic, 1968; David and Subramaniam, 1976).

In the text, the following abbreviations are used for the depositories of material in this study: (ANIC) Australian National Insect Collection, Canberra; (CDFA) California Department of Food and Agriculture, Sacramento; (NHM) Natural History Museum, London; (NMNS) National Museum of Natural Science, Taichung; (NTU) National Taiwan University, Taipei; (SIE) Shanghai Institute of Entomology, Shanghai; (TARI) Taiwan Agricultural Research Institute, Taichung.

Genus *Aleurocybotus* Quaintance & Baker

Aleurocybotus Quaintance & Baker, 1914: 101. Type species: *Aleurodes graminicola*, by monotypy; Sampson, 1943: 217; David & Subramaniam, 1976: 157; Bink-Moenen, 1983: 39; Jesudasan & David, 1991: 266.

Pupal case medium in size, narrowly elongate. Margin with 1 row of teeth. Secretions usually present as a short rim of wax. Submargin not separated from dorsal disc; with a series of prominent submedian depressions. Tracheal openings not differentiated from margin. Tracheal folds not discernible. Vasiform orifice subcordate. Operculum trapezoidal, filling about half of orifice. Lingula exposed, with minute spinules, sometimes exserted, but its extremity with a pair of lingular setae, extending caudad almost to or beyond caudal margin of orifice.

Key to Taiwanese species of *Aleurocybotus* based on pupal cases

1. Submargin with 15 pairs of lanceolate setae, arranged in row ..... *A. setiferus* Quaintance & Baker
- Submargin setae not arranged in row ..2
2. Submarginal setae, 4 pairs, long, needle-like, 2 pairs anteriorly, 2 pairs posteriorly; anterior margin with a pair of setae; posterior margin without setae; abdominal segment VII shorter than other segments ..... *A. miscanthus* Ko n. sp.
- Submarginal setae absent; anterior margin without setae; posterior margin with a pair of setae; abdominal segment VII as long as other segments ..... *A. concursus* Ko n. sp.

Aleurocybotus concursus Ko, n. sp. (Figs. 1-10)

Pupal case: Pupal case medium in size, very narrow, elongate, nearly parallel on sides, more than twice as long as wide, 1.0 mm long, 0.45 mm wide, widest at about abdominal segment II. Margin crenulate. Light yellow in color, with a yellowish-tan stripe along median and submedian area, from cephalic region to vasiform orifice. Thoracic tracheal openings not differentiated from margin. Eye spots absent. Caudal tracheal openings not evident. A pair of well-developed caudal setae 0.019 mm long, extending caudad from caudal margin. Anterior marginal setae absent, but a pair of very minute posterior marginal setae 0.014 mm long, on caudo-lateral margin. Wax secretions prominent, usually present as a short rim of marginal fringe, produced by

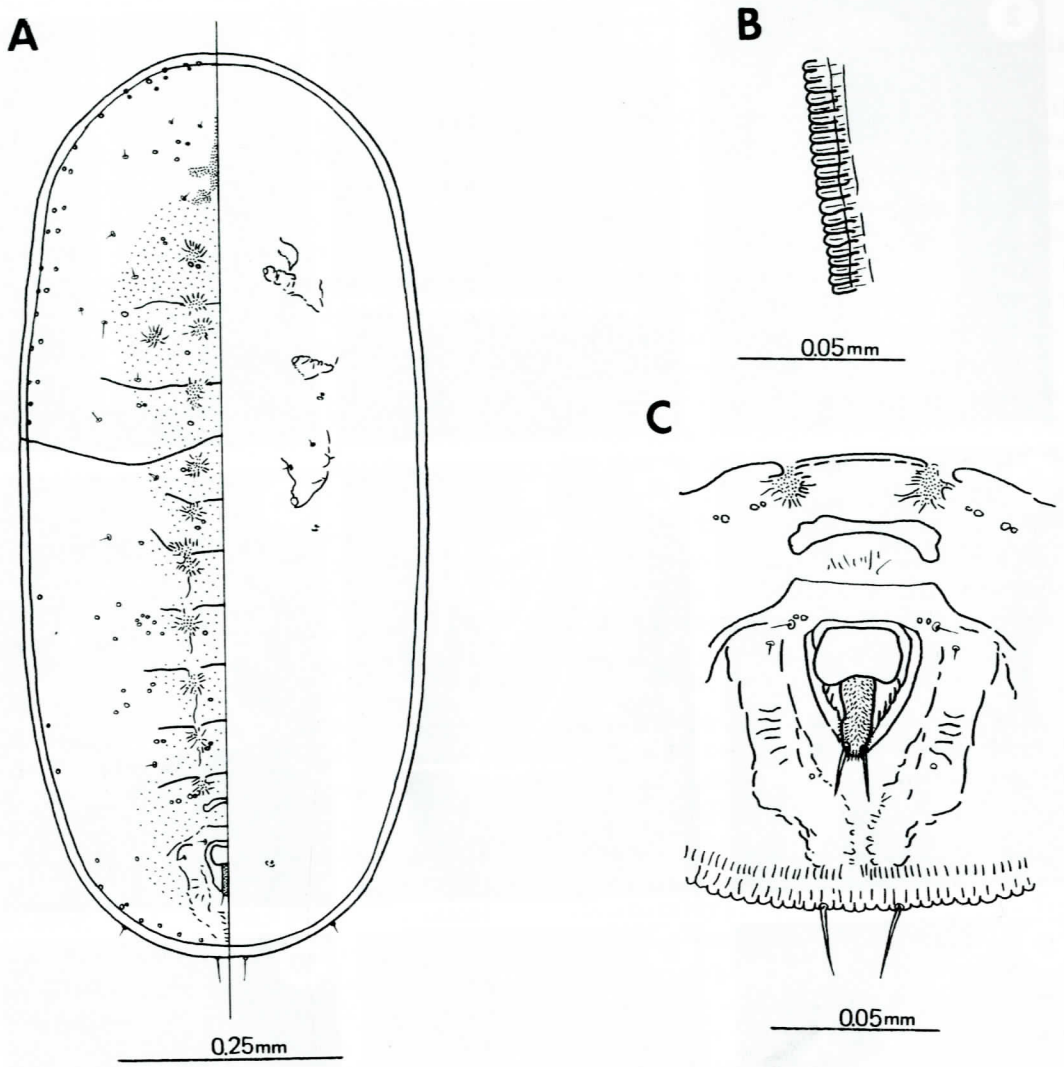
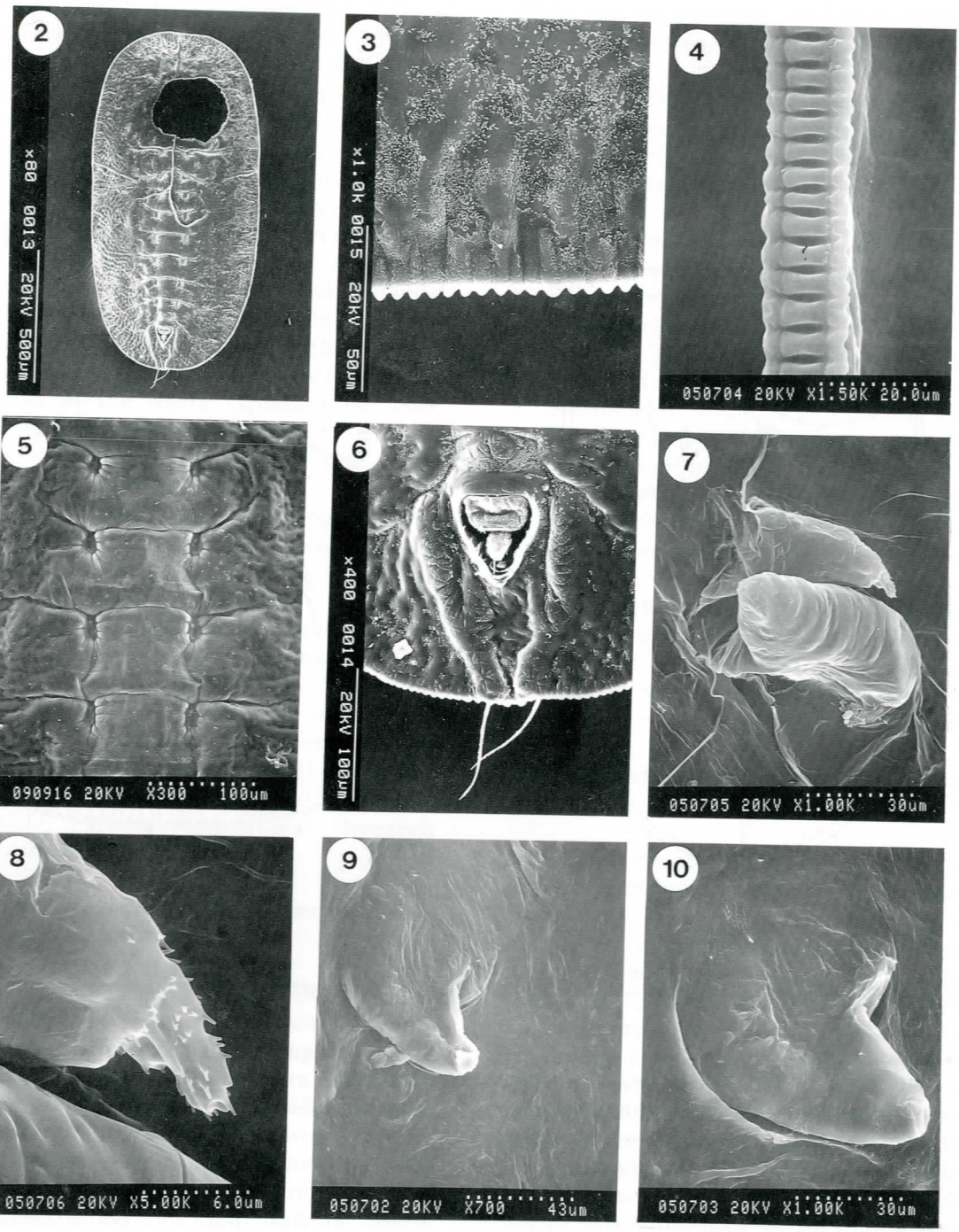


Fig. 1. *Aleurocybotus concursus* Ko, n. sp. A, Fourth instar; B, marginal teeth; C, posterior area.

submarginal pores.

Dorsum: Submarginal area not separated from dorsal disk. Longitudinal and transverse moulting sutures reaching margin. Cephalothoracic suture indistinct. Promesothoracic suture slightly turning backward; mesometathoracic suture slightly turning forward, reaching subdorsum area. Cephalothorax with prominent depressions. A series of minute pores along submarginal area. Minute pores found sparsely scattered on dorsum. Abdominal segments distinct on median and submedian areas, each segment contains a pair of submedian depressions on each side of median area. First abdominal setae present. Dorsal microsetae sparsely scattered on submedian and subdorsum areas. Median part of 7th abdominal segment nearly as long as other segments. A pair of pockets extending from median part of 7th abdominal segment. Eighth abdominal microsetae present. Vasiform orifice subtriangular, with teeth, without



Figs. 2-10. *Aleurocybotus concursus* Ko, n. sp. 2, Fourth instar; 3, *do.*, marginal teeth; 4, *do.*, marginal teeth; 5, *do.*, submedian depressions; 6, *do.*, posterior area; 7, *do.*, prothoracic leg and antenna; 8, *do.*, antenna; 9, *do.*, mesothoracic leg; 10, *do.*, metathoracic leg.

rim and median tubercle. Operculum trapezoidal, wider than long, filling about half of orifice. Lingula exposed with minute spinules, its extremity with a pair of lingular setae, extending caudad beyond caudal margin of orifice. Caudal furrow present, markings not prominent. Caudal ridges present, with sculptures.

Venter: Antenna short, situated mesal to prothoracic legs. Antennae of both sexes subequal in length. Mesothoracic legs without basal microsetae, but metathoracic legs with 2 basal microsetae. Adhesive sacs not visible. Thoracic and caudal tracheal folds not discernible. Eighth abdominal segment setae present. All spiracles well developed.

Material examined: Holotype pupal case, TAIPEI CITY: on *Miscanthus floridulus* (Gramineae), 9-VIII-1997, C. C. Ko (NTU). Paratype pupal cases, KEELUNG CITY: Patu, 45 pupal cases on *M. floridulus*, 4-VI-1994, K. C. Chou (NHMS; NTU; TARI); TAIPEI CITY, 12 pupal cases on Gramineae, 10-XII-1989, T. C. Hsu (NTU); 80 pupalcases on Gramineae, 30-I-1994, K. C. Chou (NTU); 9 pupal cases on *M. floridulus*, 14-II-1994, K. C. Chou (NTU); 16 pupal cases on Gramineae, 20-III-1994, K. C. Chou (NTU); 20 pupal cases on *M. floridulus*, 29-III-1994, K. C. Chou (NTU); 14 pupal cases on *M. floridulus*, 5-IV-1994, K. C. Chou (NTU); 8 pupal cases on *M. floridulus*, 24-IV-1994, K. C. Chou (NTU); 12 pupal cases on Gramineae, 9-VIII-1994, K. C. Chou (NTU); 42 pupal cases on Gramineae, 18-XII-1994, K. C. Chou (NTU); 8 pupal cases on Gramineae, 1-XII-1995, K. C. Chou (NTU); 23 pupal cases on *M. floridulus*, 9-VIII-1997, C. C. Ko (ANIC; CDFA; NHM; NTU; SIE); TAIPEI HSIEN: Shihting, 1 pupal case on Gramineae, 29-I-1994, K. C. Chou; NANTOU: Puli, 42 pupal cases on Gramineae, 18-IV-1996, K. C. Chou; Wushe, 4 pupal cases on Gramineae, 18-III-1994, C. C. Ko; TAITUNG: Lanhsu, 61 pupal cases on Gramineae, 7-V-1996, K. C. Chou; 110 pupal cases on Gramineae, 8-V-1996, K.C. Chou (All in NTU).

Host plants: *Miscanthus floridulus* (Gramineae).

Biology: This species is apparently host specific. The puparia were collected in a dense colony found together infesting undersurfaces of leaf blades of grass. They were very easy to detect. No evident signs of damage have been noted up to now. Wax secretions were prominent. Four colonies of adults were obtained from cultures. It seems that adults were found through December to the next January in the northern part and in May in the southern part of Taiwan. *A. miscanthus* Ko, *Dialeurodes* sp., and *Neomaskellia bergii* (Signoret) are usually found together, intermingled, on the undersurfaces of the leaves of a single host plant. Parasitoids, including *Amitus* sp., *Encarsia japonica* Viggiani, *En. lutea* (Masi), *En. transvena* (Timberlake), and *Eretmocerus* sp., were obtained from cultures. One colony observed in Taipei City, on *M. floridulus*, was attended by ants.

Etymology: The specific name *concursus* is derived from "concourse", indicating pupal cases running together, in an assembly.

Distribution: Taiwan.

Remarks: This species answers the description of the "*setiferus* group". It differs from other members of the "*setiferus* group" in the absence of long submarginal setae and anterior marginal setae.

Aleurocybotus miscanthus Ko, n. sp.

(Figs. 11-15)

Pupal case: Pupal case medium in size, very narrow, elongate, nearly parallel on sides, more than twice as long as wide, 0.98 mm long, 0.41 mm wide, widest at about abdominal segment III. Margin crenate. Yellowish brown in color. Thoracic tracheal openings not differentiated from margin. Eye spots absent. Caudal tracheal openings not evident. A pair

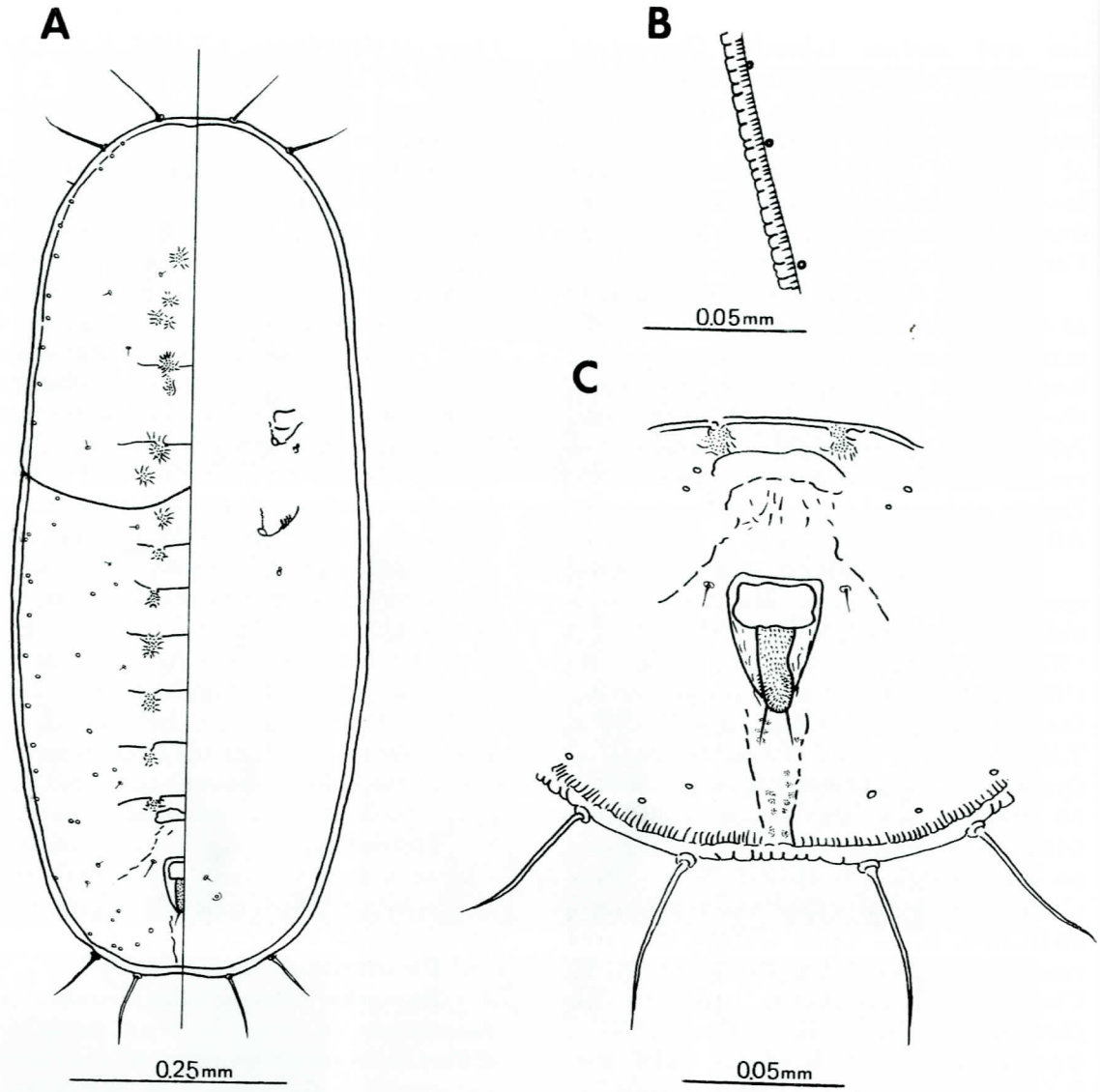
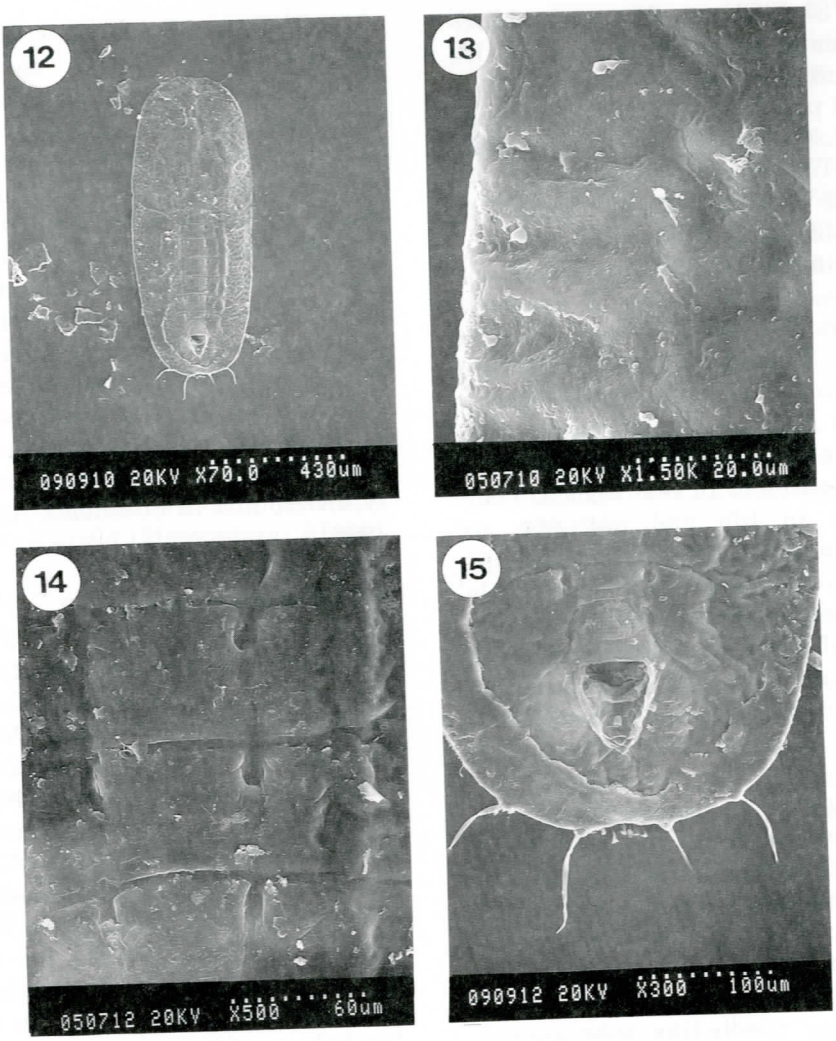


Fig. 11. *Aleurocybotus miscanthus* Ko, n. sp. A, Fourth instar; B, marginal teeth; C, posterior area.

of anterior marginal setae, 0.046 mm long, very minute, but posterior marginal setae absent. Submargin with 4 pairs of needle-like setae, 2 pairs anteriorly, 0.053-0.082 mm long; 2 pairs posteriorly, 0.068-0.092 mm long. Wax secretions not prominent.

Dorsum: Submarginal area not separated from dorsal disk. Longitudinal and transverse moulting sutures reaching margin. Cephalothoracic suture indistinct. Promesothoracic and mesometathoracic sutures not prominent, reaching subdorsum area. Cephalothorax with prominent depressions. A series of minute pores sparsely scattered along submarginal area. Minute pores found sparsely scattered on dorsum. Abdominal segments distinct on median and submedian areas, each segment contains a pair of submedian depressions on each side of median area. First abdominal setae present. Dorsal microsetae sparsely scattered on submedian and subdorsum areas. Median part of 7th abdominal segment apparently



Figs. 12-15. *Aleurocybotus miscanthus* Ko, n. sp. 12, Fourth instar; 13, *do.*, marginal teeth; 14, *do.*, submedian depressions; 15, *do.*, posterior area.

shorter than other segments. A pair of pockets extending from median part of 7th abdominal suture. Eighth abdominal microsetae present. Vasiform orifice subtriangular, with teeth, without rim or median tubercle. Operculum trapezoidal, wider than long, filling about half of orifice. Lingula exposed with minute spinules, its extremity with a pair of lingular setae, extending caudad beyond caudal margin of orifice. Caudal furrow present, with markings. Caudal ridges not prominent.

Venter: Antenna short, situated mesal to legs. Antennae of both sexes subequal in length. Outside of legs slightly curved, prothoracic legs reduced. Meso- and metathoracic legs without basal microsetae. Adhesive sacs not visible. Thoracic and caudal tracheal folds not discernible. Eighth abdominal segment setae present. All spiracles well developed.

Material examined: Holotype pupa-

lcase, TAIPEI CITY: on *Miscanthus floridulus* (Gramineae), 9-VIII-1997, C. C. Ko (NTU); Paratype pupal cases, KEELUNG: Patu: 3 pupal cases on *M. floridulus*, 4-VI-1994, C. C. Ko (NHM; NTU; TARI); TAIPEI CITY: 9 pupal cases on *M. floridulus*, 9-VIII-1997, C. C. Ko(ANIC; CDFA; NHMS; NTU; SIE).

Host plants: *Miscanthus floridulus* (Gramineae).

Biology: This species is apparently host specific. This species occurs in very low population densities on the grass, being of no economic importance. The puparia were collected singly, scattered on the undersurfaces of leaf blades. They were cryptic in life and not easy to detect. *A. concursus* Ko, *Dialeurodes* sp., and *N. bergii* (Signoret) were commonly found together, intermingled, on the undersurfaces of the same host plant. Wax secretions were not visible. No parasitoids nor adults were obtained from cultures. No ant attendance was observed.

Etymology: The specific name *miscanthus* is derived from the host plant from which the material was collected.

Distribution: Taiwan.

Remarks: This species answers the description of the "*setiferus* group". It differs from *A. indicus* in the presence of 4 pairs of long needle-like submarginal setae and a shortened 7th abdominal segment.

Aleurocybotus setiferus Quaintance & Baker

Aleurocybotus setiferus Quaintance & Baker, 1917: 357; Silvestri, 1927: 15; Takahashi, 1931: 207-208; Martin, 1985: 317; 1988: 65.

Material examined: TAIPEI CITY: 3 pupal cases on Gramineae, 29-IX-1930; R. Takahashi (TARI); 7 pupal cases on Gramineae, II-1932, R. Takahashi (NTU).

Host plants: *Imperata arundinacea*, *I. cylindrica* (Gramineae), *Pandanus* sp. (Pandanaceae), *Citrus* sp. (Rutaceae) (Mound and Halsey, 1978; Martin, 1988).

Distribution: Australia, Hong Kong, Java, Papua New Guinea, Philippines, Sri Lanka, Sulawesi, Taiwan, Thailand, West Malaysia (Martin, 1985; 1988).

Remarks: This species is characterized by pupal case with a row of 15 pairs of short, broad, lanceolate spines situated on tubercles. Cuticle of submedian area between the cephalic setae and vasiform orifice is brown, the remainder of cuticle is dusky. It feeds on blades of grasses; colonies are normally ant-attended. Widely distributed in Southeast Asia (Martin, 1996).

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臺灣產之狹粉蝨屬(同翅目：粉蝨科)

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摘　要

本文記錄台灣產狹粉蝨屬一舊記錄種，剛毛狹粉蝨*Aleyrocybotus setiferus* Quaintance & Baker，及描述二新種，聚集狹粉蝨 *Aleyrocybotus concursus* Ko, n. sp. 及五節芒狹粉蝨 *A. miscanthus* Ko, n. sp.。文中並附檢索表、繪圖及掃描電子顯微照片。

關鍵詞：分類、粉蝨科、狹粉蝨屬、新種、台灣。

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