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단 보

A List of Mealybugs (Hemiptera: Pseudococcidae) Intercepted at the Republic of Korea Ports of Entry on Plants Imported from China

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중국산 수입 묘목류에서 검출된 가루깍지벌레과(노린재목)

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ABSTRACT: Thirteen species of mealybugs were intercepted in quarantine at Korean ports of entry on plant materials from China over the past 9 years (2000-2009). Of these, *Phenacoccus madeirensis* Green has been newly reported in China through this study. This list and key are provided to assist in identifying intercepted specimens of mealybugs from China.

Key words: Pseudococcidae, China, quarantine, intercepted, *Phenacoccus madeirensis*

초 록: 지난 9년 동안 (2000-2009) 우리나라 입항지로 수입된 중국산 묘목류에서13종의 가루깍지벌레과가 검출되었다. 이 중 *Phenacocus madeirensis* Green의 중국분포를 처음으로 보고하고, 중국산 수입 묘목류에서 검출된 가루깍지벌레과의 종 동정에 필요한 목록 및 검색표를 함께 기재하였다.

검색어: 가루깍지벌레과, 중국, 검역, 검출, *Phenacocus madeirensis*

The amount of plant material imported into Korea from its neighboring country China, has increased dramatically. A total of 33 million young trees such as *Ficus* and *Schefflera*, were imported in 2009 from China based upon data from the Pest Information System (PIS) database. As a result, the number of mealybugs (Pseudococcidae) intercepted at the various ports of entry in Korea has also increased. This may pose a threat to agricultural crops in Korea and presents a challenge for plant quarantine inspection officers in Korea. The long-range dispersal of mealybugs is usually through a human transport of infested plant material from one area to another. If a mealybug is accidentally introduced and established in Korea, the cost of controlling it could be exorbitant.

Mealybugs are serious pests particularly as invasive species. The pest species intercepted from Chinese young trees such as the pink hibiscus mealybug (*Maconellicoccus hirsutus* (Green)) and the oriental cacao mealybug (*Planococcus lilacinus* (Cockerell)) are polyphagous species and reports of damage they cause vary (Williams, 2005).

Reviewing records, re-examining specimens and providing an identification key to the mealybugs intercepted at ports of entry of Korea from imported plants from China over the past 9 years (2000-2009) will help plant inspection officers to quickly and accurately identify intercepted mealybugs on imported plant materials from China. One

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species, *Phenacoccus madeirensis* Green, was intercepted on *Ocimum* plants from China and represents the first record of this species in China. (Hua, 2000; Miller et al., 2009). In addition, this species was recently collected on *Hibiscus rosa-chinensis* from Sanya, Hainan of the mainland China (Wu, S.A., personal communication).

We have examined specimens of the following species of Chinese mealybugs taken in quarantine; *Atrococcus paludinus* (Green) (on *Codonopsis*), *Dysmicoccus brevipes* (Cockerell) (on *Ananas*, *Ficus*, and *Rhapis)*, *Dysmicoccus neobrevipes* Beardsley (on *Schefflera* and *Yucca*), *Maconellicoccus hirsutus* (Green) (on *Areca* and *Ficus*), *Neotrionymus monstatus* Borchsenius (on *Arundo*), *Paracoccus* sp. (on *Schefflera*), *Phenacoccus madeirensis* Green (on *Ocimum*), *Phenacoccus solenopsis* Tinsley (on *Echeveria* and *Ficus*), *Planococcus citri* (Risso) (on *Carmona*, *Codiaeum*, *Ficus*, *Philodendron*, and *Schefflera*), *Planococcus lilacinus* (Cockerell) (on *Dimocarpus*, *Ficus*, and *Philodendron*), *Pseudococcus cryptus* Hempel (on *Ficus*), *Pseudococcus longispinus* (Targioni-Tozzetti) (on *Alocasia*, *Dracaena*, *Ficus*, *Philodendron*, *Polyscias*, and *Rohdea*), and *Pseudococcus viburni* (Signoret) (on *Punica*) (Table 1).

Table 1. A list of mealybugs intercepted on Chinese plants at ports of entry of Korea

Species	Host & Date of Interception
Atrococcus paludinus (Green)	*Codonopsis* (Campanulaceae), ix-8-2009.
Dysmicoccus brevipes (Cockerell)	*Ananas* (Bromeliaceae), iii-26-2007; iv-3-2007.
	Ficus (Moraceae), vii-30-2007.
	Rhapis (Arecaceae), ix-19-2007.
Dysmicoccus neobrevipes Beardsley	*Schefflera* (Araliaceae), v-27-2008; v-29-2008.
	Yucca (Agavaceae), iii-19-2008.
Maconellicoccus hirsutus (Green)	*Areca* (Arecaceae), x-2-2008.
	Ficus (Moraceae), i-2-2008.
Neotrionymus monstatus Borchsenius	*Arundo* (Poaceae), xi-3-2007.
Paracoccus sp.	*Schefflera* (Araliaceae), ii-1-2009.
Phenacoccus madeirensis Green*	*Ocimum* (Lamiaceae), i-16-2008.
Phenacoccus solenopsis Tinsley	*Echeveria* (Crassulaceae), iii-26-2008.
	Ficus (Moraceae), i-3-2007.
Planococcus citri (Risso)	*Carmona* (Boraginaceae), xii-22-2003.
	Codiaeum (Euphorbiaceae), ii-28-2007; xi-28-2007; v-14-2008.
	Ficus (Moraceae), v-31-2001; xi-21-2003; xii-23-2003; iii-3-2008.
	Philodendron (Araceae), vi-11-2008.
	Schefflera (Araliaceae), v-8-2006.
Planococcus lilacinus (Cockerell)	*Dimocarpus* (Sapindaceae), i-3-2007.
	Ficus (Moraceae), xii-16-2003; v-4-2004 vi-13-2007; xi-16-2007; v-29-2008.
	Philodendron (Araceae), v-11-2004; vi-11-2008.
Pseudococcus cryptus Hempel	*Ficus* (Moraceae), x-27-2001; iii-18-2002; iii-25-2003; iii-27-2003; vi-9-2003; ix-16-2003; iv-26-2004; v-29-2008; v-30-2008; ix-17-2008.
Pseudococcus longispinus (Targioni-Tozzetti)	Alocasia (Araceae), x-8-2008; x-26-2008.
	Dracaena (Ruscaceae), vii-25-2005.
	Ficus (Moraceae), v-31-2004.
	Philodendron (Araceae), v-14-2008.
	Polyscias (Araliaceae), viii-7-2002.
	Rohdea (Ruscaceae), viii-16-2006.
Pseudococcus viburni (Signoret)	*Punica* (Lythraceae), ?-?-2007.

Abbreviations: *, species newly recorded to Korean import plant quarantine; ?, unknown date.

This paper includes a list and key of 13 species of mealybugs in 8 genera intercepted on plants brought into Korea. The terminology for morphological structures used in this paper is that of Williams (2005). Illustrative photographs were taken using the Axion Vision Rel.4.8 Zeiss system.

Key to species of mealybugs intercepted from China (slide mounted adult female)

1. Oral rim tubular ducts present ····· 2
1b. Oral rim tubular ducts absent ····· 7
2(1). Cerarii numbering no more than 6 pairs ····· 3
2b. Cerarii numbering 9~18 pairs ····· 4
3(2). Circulus present (on *Areca* and *Ficus*) ····· ***Maconellicoccus hirsutus*** **(Green)**
3b. Circulus absent (on *Codonopsis*) ····· ***Atrococcus paludinus*** **(Green)**
4(2b). Venter of each anal lobe with anal lobe bar (on *Schefflera*) ····· ***Paracoccus*** **sp. (Fig. 1)**
4b. 3Venter of each anal lobe without anal lobe bar ····· 5
5(4b). Ventral multilocular disc pores present ····· anterior to abdominal segment VI ····· 6
5b. Ventral multilocular disc pores absent from anterior to abdominal segment VI (on *Alocasia*, *Dracaena, Ficus*, *Philodendron*, *Polyscias*, and *Rohdea*) ··· ····· ***Pseudococcus longispinus*** **(Targioni-Tozzetti) (Plate 1: C-D)**
6(5). Eye surrounded by one or more discoidal pores (on *Punica*) ····· ***Pseudococcus viburni*** **(Signoret)**
6b. Eye not surrounded by a discoidal pores (on *Ficus*) ····· ***Pseudococcus cryptus*** **Hempel**
7(1b). Cerarii numbering 18 pairs ····· 8
7b. Cerarii numbering 1~17 pairs ····· 11
8(7). Venter of each anal lobe with anal lobe bar; without denticle on claw ····· 9
8b. Venter of each anal lobe without anal lobe bar; with denticle on claw ····· 10
9(8). Multilocular disc pores present on margins or submarginal areas of abdominal segments (on *Carmona*, *Codiaeum*, *Ficus*, *Philodendron*, and *Schefflera*) ····· ***Planococcus citri*** **(Risso) (Plate 1: A)**
9b. Multilocular disc pores absent from margins or submarginal areas of abdominal segments (on *Dimocarpus*, *Ficus*, and *Philodendron*) ····· ***Planococcus lilacinus*** **(Cockerell)**
10(8b). Multilocular disc pores present on dorsum; quinquelocular pores present on venter (on *Ocimum*)

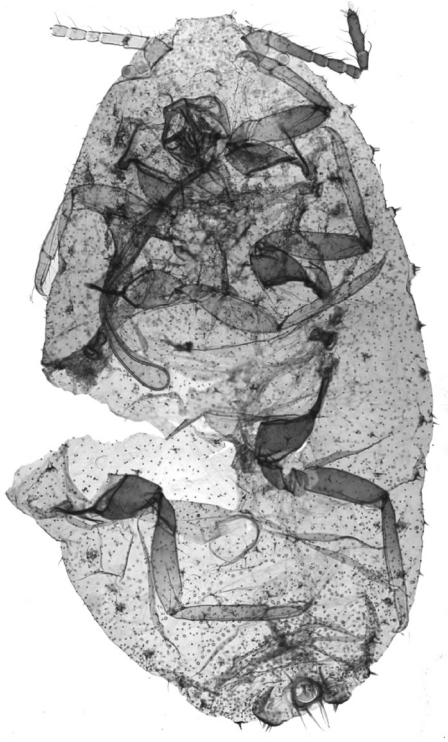

Fig. 1. ***Paracoccus*** **sp., intercepted at Incheon Seaport,** ***Schefflera*** **sp., ii-1-2009.**

Fig. 2. *Phenacoccus madeirensis* Green, intercepted at Incheon Seaport, *Ocimum* sp., i-16-2008.

····· ***Phenacoccus madeirensis*** **Green (Fig. 2)**

10b. Multilocular disc pores absent from dorsum; quinquelocular pores absent on venter (on *Echeveria* and *Ficus)* ····· ····· ***Phenacoccus solenopsis*** **Tinsley**

11(7b). Minute duct-like pores numerous on derm next to hind coxae; auxiliary setae present only in anal lobe cerarii (on *Arundo*) ····· ····· ***Neotrionymus monstatus*** **Borchsenius**

11b. Minute duct-like pores absent on derm next to hind coxae; auxiliary setae present in anal lobe cerarii and at least some of the other abdominal cerarii ····· ····· 12

12(11b). Doral setae on abdominal segment VIII, anterior to anal ring distinctly much longer than other dorsal setae (on *Ananas*, *Ficus*, and *Rhapis*) ····· ····· ***Dysmicoccus brevipes*** **(Cockerell) (Plate 1: B)**

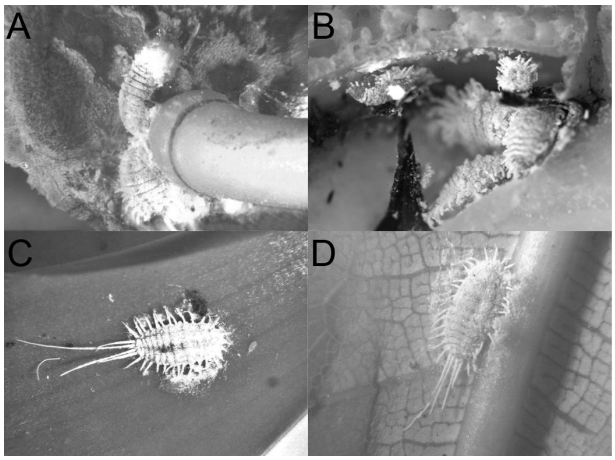

Plate 1. A. *Planococcus citri* (Risso); B. *Dysmicoccus brevipes* (Cockerell); C-D. *Pseudococcus longispinus* (T.-T.).

12b. Doral setae on abdominal segment VIII, anterior to anal ring shorter, or about same length as other dorsal setae (on *Schefflera* and *Yucca*) ····· ····· ***Dysmicoccus neobrevipes*** **Beardsley**

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