Whitefly (Hemiptera: Aleyrodidae) Species Infesting *Myrica rubra* in China[1]

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Abstract To determine the species of whiteflies infesting Chinese bayberry, *Myrica rubra* Sieb. et Zucc. (Fagales: Myricaceae), in China, we collected samples from eight provinces (Zhejiang, Jiangsu, Shanghai, Anhui, Hubei, Fujian, Guizhou, and Yunnan) from 2014 through 2017. Six species representing six genera of the subfamily Aleyrodinae were identified, namely *Aleurocanthus spiniferus* (Quaintance), *Aleurolobus szechwanensis* Young, *Aleuroplatus pectiniferus* Quaintance & Baker, *Cohicaleyrodes caerulescens* (Singh), *Dialeuropora brideliae* (Takahashi), and *Parabemisia myricae* (Kuwana). Information on the pest status, illustrations, distribution worldwide, and hosts of each of these six species is provided.

Key Words Aleyrodidae, *Myrica rubra*, taxonomy, China

Chinese bayberry, *Myrica rubra* Sieb. et Zucc. (Fagales: Myricaceae), is an economically important subtropical fruit crop native to southern China and other Asian countries (Chen et al. 2004). The fruit is popular for its appealing color, delicious taste, essential nutrients, and bioactive constituents such as antioxidants (Zhang et al. 2011) and antitumor properties (Sun et al. 2012). Chinese bayberry is widely planted not only as a fruit crop but also in forestry stands (Chen et al. 2004). Whiteflies are an economically important group of insects infesting a range of host plants (Mound and Halsey 1978). Four species, namely *Aleuroplatus plumosus* (Quaintance), *Crenidorsum caerulescens* (Singh), *Parabemisia myricae* (Kuwana), and *Tetraleurodes ursorum* (Cockerell), are recorded from Chinese bayberry (Evans 2008; Mound and Halsey 1978). We conducted a survey of whitefly species infesting Chinese bayberry in China from 2014 through 2017 in regions where Chinese bayberry is grown.

Materials and Methods

Specimens were collected in Chinese bayberry groves in eight provinces of China (Zhejiang, Jiangsu, Shanghai, Anhui, Hubei, Fujian, Guizhou, and Yunnan)

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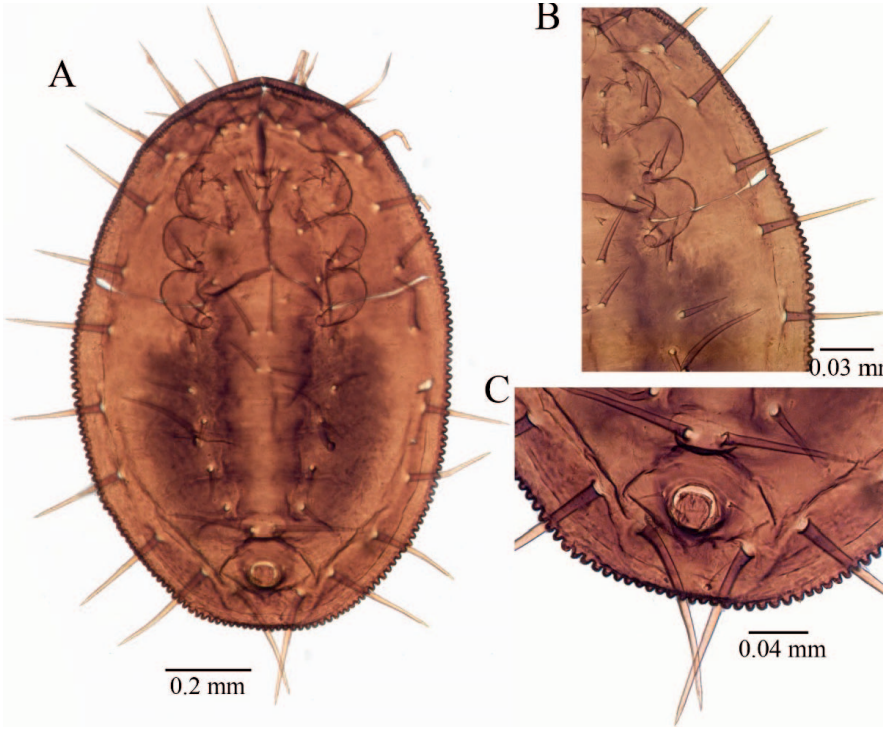

Fig. 1. Microscopic photographs of slide-mounted puparium of *Aleurocanthus spiniferus*. (A) Puparium, dorsal view; (B) lateral margin and the spines; (C) vasiform orifice.

by J.-R.W. Puparia were mounted using the method of Martin (1987) and Dubey and David (2012). All the specimens are deposited in the Insect Collection of Zhejiang Agriculture and Forestry University (ZAFU). Terminology used for morphological structures follows Bink-Moenen (1983), Martin (1985), and Gill (1990). The habitus images were taken using a LEICA M125 stereo-microscope (Leica, Wetzlar, Germany) equipped with a LEICA DFC290 (Leica) from the Insect Collection of ZAFU, Lin'an, China. Puparial measurements and microphotographs were taken using a Zeiss stereomicroscope (Carl Zeiss, Gottingen, Germany) at the ZAFU. Scanning electron microscope (SEM) images were taken using a Philips XL30-Environmental Scanning Electron Microscope (Philips, United Kingdom) at the Testing Center of Yangzhou University, Yangzhou, China at 20 kV/EHT and 80 Pa between 128× to 800× magnification. Adobe Photoshop software was used to make small adjustments and to assemble the plates.

Results

Six species representing six genera of the subfamily Aleyrodinae were identified from our collections. These were *Aleurocanthus spiniferus* (Quaintance), *Aleur-*

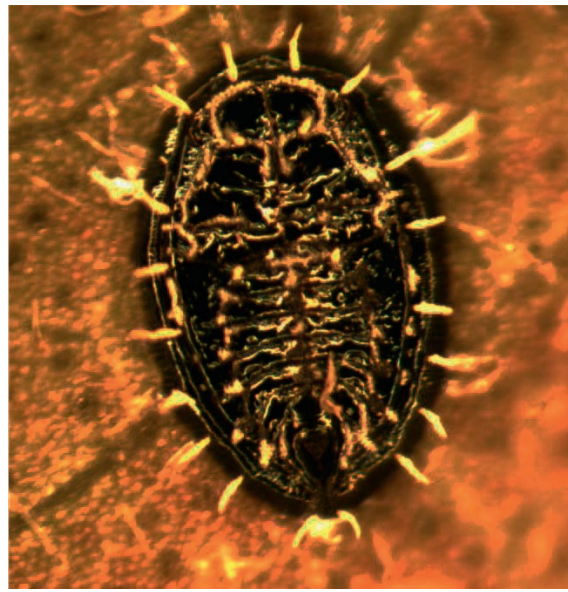

Fig. 2. Live images of *Aleurolobus szechwanensis*, puparium, dorsal view.

olobus szechwanensis Young, *Aleuroplatus pectiniferus* Quaintance and Baker, *Cohicaleyrodes caerulescens* (Singh), *Parabemisia myricae* (Kuwana), and *Dialeuropora brideliae* (Takahashi). Pest status, worldwide distribution, and host plants of each are listed. Illustrations also serve as an additional tool for the identification of the species.

***Aleurocanthus spiniferus* (Quaintance)** (Fig.1)

Aleurodes spinifera: Quaintance, 1903: 63–64.

Aleurocanthus spiniferus: Quaintance and Baker, 1914: 102.

Material examined. 3 puparia, CHINA, Guiyang (26.64°N, 106.81°E), Guizhou Province, from *Myrica rubra*, 19.vi.2016, Coll. J. R. Wang, deposited in ZAFU.

Distribution. China, Andaman Islands, Caroline Islands, Greece, Hawaii, India, Iran, Jamaica, Japan, Java, Kenya, Malaysia, Mauritius, New Caledonia, New Guinea, Nicobar Islands, Philippines, Sri Lanka, Sumatra, Tanzania, Thailand (Evans 2008), Italy (Porcelli 2008).

Host plants. *Myrica rubra*; see Evans (2008) for other hosts.

Comment. *Aleurocanthus spiniferus*, widely known as the citrus spiny whitefly, is native to Southeast Asia and has spread to Africa, Australia, Europe, and the Pacific Islands (Porcelli 2008). *Citrus* spp. are the main hosts of economic importance, but *A. spiniferus* is a polyphagous pest and has been recorded from more than 30 plant families. Cioffi et al. (2013) provided a comprehensive list of its host plants. Serious outbreaks of whiteflies infesting tea plants *Camellia sinensis* (L.) in China and Japan have been attributed to this species over the last 20 yr

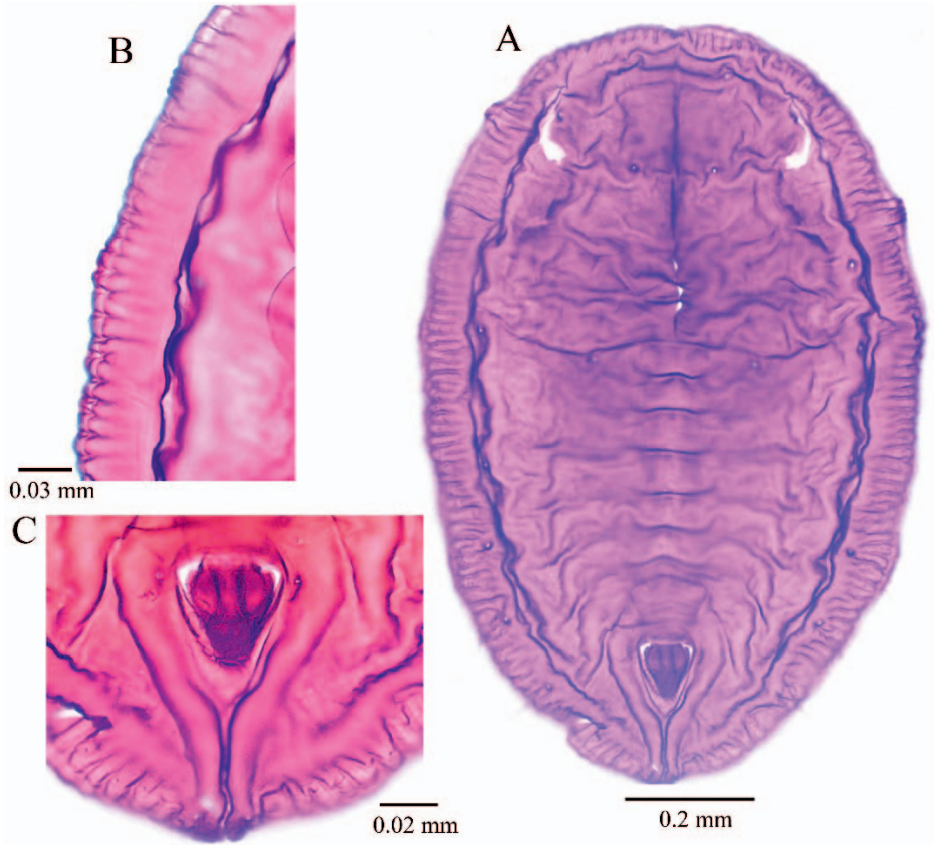

Fig. 3. Microscopic photographs of slide-mounted puparium of *A. szechwanensis*. (A) Puparium, dorsal view; (B) lateral margin and the tracheal combs; (C) vasiform orifice and caudal furrow.

Fig. 4. Live images of *Aleuroplatus pectiniferus* puparium. *Aleuroplatus pectiniferus* infesting the leaves of *Myrica rubra* (left); Puparium dorsal view (right), showing the transparent gelatinous wax around the case and the waxy secretion arising from the end of thoracic and caudal tracheal pores.

(Kanmiya et al. 2011). Kanmiya et al. (2011) compared the morphological, acoustic, and genomic features of tea-infesting versus citrus-infesting populations and proposed a new scientific name, *Aleurocanthus camelliae* Kanmiya and Kasai, and a new common name, camellia spiny whitefly for the tea-infesting population. We collected *A. spiniferus* on *M. rubra* in the Guizhou Province, but no major infestations were observed.

***Aleurolobus szechwanensis* Young** (Figs. 2–3)

Aleurolobus szechwanensis: Young, 1942: 99.

Material examined. 2 puparia, Wuyishan, (27.63°N, 118.01°E), Fujian Province, from *Myrica rubra*, 17. ix.2012, Coll. J. R. Wang, deposited in ZAFU.

Distribution. China (Fujian, Sichuan, Chongqing, Shaanxi, Jiangxi, Yunnan).

Host plants. *Myrica rubra*, *Citrus reticulate* Blanco (Young 1942).

Comment. Earlier, Young (1942) described *A. szechwanensis* from citrus in China. In our study, a small infestation of this species was found on Chinese bayberry, which represents the first record of this species on this plant host. This species resembles *Aleurolobus taonabae* (Kuwana) and *Aleurolobus rhododendri* Takahashi but can be separated from the former by the different structure of the thoracic and caudal combs and from the latter by the shorter marginal teeth and the fewer basal marginal setae (Young 1942). Only one natural enemy, *Encarsia fujianensis* Huang and Polaszek (Hymenoptera: Aphelinidae), has been recorded from this species (Huang and Polaszek 1998).

***Aleuroplatus pectiniferus* Quaintance and Baker** (Figs. 4–5)

Aleuroplatus pectiniferus: Quaintance and Baker, 1917: 393.

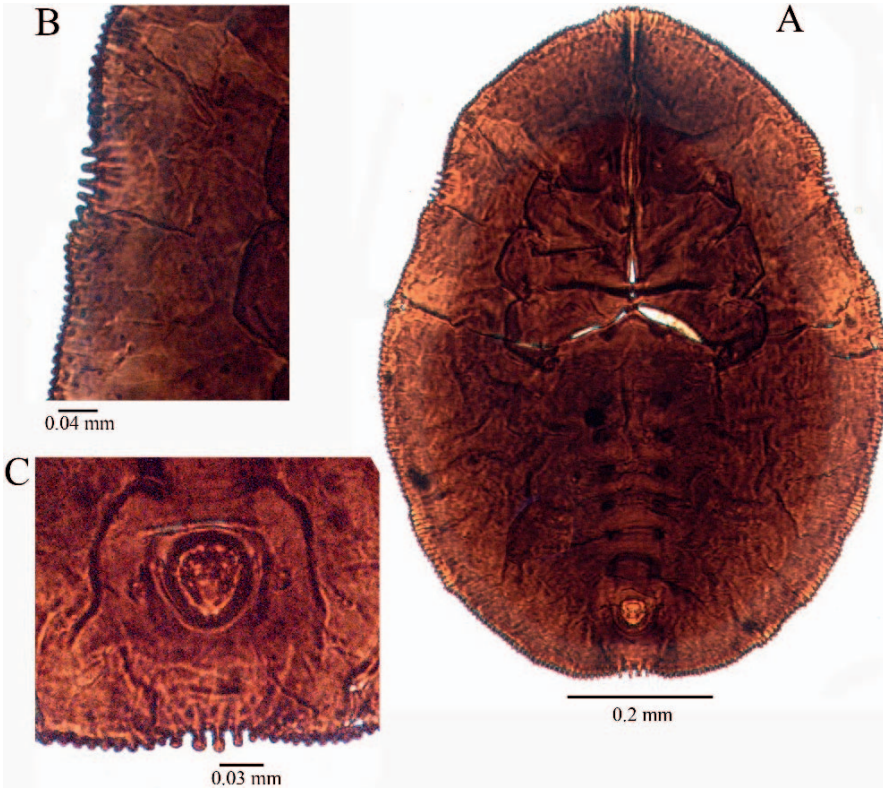

Fig. 5. Microscopic photographs of slide-mounted puparium of *Aleuroplatus pectiniferus*. (A) Puparium, dorsal view; (B) lateral margin and the tracheal combs; (C) vasiform orifice.

Aleuroplatus ficusgibbosae: Corbett, 1926: 271. [Synonymized by Martin, 1999: 48]

Aleuroplatus buchananiae: Jesudasan and David, 1991: 282. [Synonymized by Martin, 1999: 48]

Aleuroplatus distinctus: Jesudasan and David, 1991: 283. [Synonymized by Martin, 1999: 48]

Aleuroplatus pectenserratus: Singh, 1945: 76. [Synonymized by Martin, 1999: 48]

Aleuroplatus walayarensis: Jesudasan and David, 1991: 285. [Synonymized by Martin, 1999: 48]

Material examined. 15 puparia, Lin'an, (30.25°N, 119.72°E), Zhejiang Province, from *Myrica rubra*, 12.iv.2016, Coll. J. R. Wang, deposited in ZAFU; 10 puparia, Thousand Island Lake, (29.59°N, 119.01°E), Zhejiang Province, from *M. rubra*, 14.v.2016, Coll. J. R. Wang, deposited in ZAFU; 5 puparia, Cixi, (30.16°N, 121.26°E), Zhejiang Province, from *M. rubra*, 9.vi.2016, Coll. J. R.

Fig. 6. Live images of *Cohicaleyrodes caerulescens*, puparium, dorsal view.

Wang, deposited in ZAFU; six puparia, Zhoushan (29.98°N, 122.21°E), Zhejiang Province, from *M. rubra*, 6.viii.2016, Coll. J. R. Wang, deposited in ZAFU.

Distribution. China, Australia, India, Iran, Java, Malaya, Malaysia, Pakistan, Sri Lanka, Sulawesi (Evans 2008).

Host plants. *Myrica rubra*; see Evans (2008) for other host plants.

Comment. *Aleuroplatus pectiniferus* has caused very serious damage to Chinese bayberry in most Chinese bayberry planting regions in recent years, particularly in the Zhejiang Province. It is often misidentified as *Aleurotrachelus camelliae* (Kuwana) in the agricultural production areas because the puparia are very similar in appearance, with the transparent gelatinous covering on the case and white waxy secretions arising from the end of thoracic and caudal tracheal pores. It can be distinguished from *A. camelliae* by its thoracic and caudal combs composed of four or five long, prominent teeth while, in *A. camelliae*, the teeth are as long as the marginal teeth, as a major diagnostic characteristic of this species, and by the presence of submedian depressions along the suture of each abdominal segment (Wang et al. 2017). Chemical control of *A. pectiniferus* has not been effective because of the transparent gelatinous covering on the case. It has a very wide plant host range. Its known natural enemies include *Encarsia ishii* (Silverstri), *Encarsia lutea* (Masi), *Encarsia perplexa* Huang and Polaszek, and

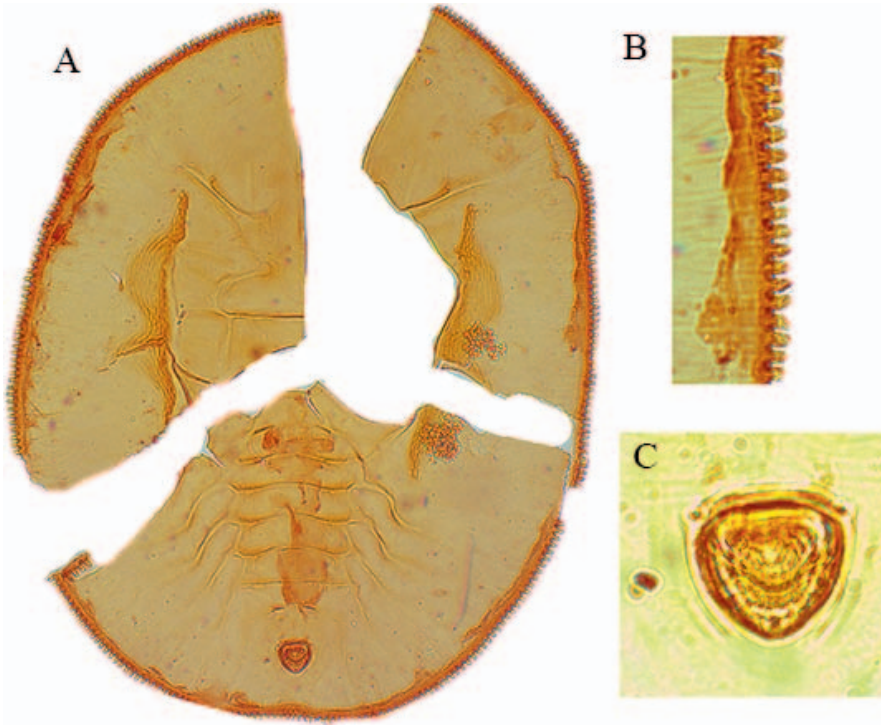

Fig. 7. Microscopic photographs of slide-mounted puparium of *Cohicaleyrodes caerulescens*. (A) Puparium, dorsal view; (B) lateral margin; (C) vasiform orifice.

Eretmocerus cadabae Viggiani (Hymenoptera: Aphelinidae) (Evans 2008), which may prove to be effective biological control agents.

***Cohicaleyrodes caerulescens* (Singh)** (Figs. 6–7)

Aleurotrachelus caerulescens: Singh, 1931. 12: 59.

Crenidorsum caerulescens: David et al., 2006. 13: 25.

Cohicaleyrodes caerulescens: Dubey and Ko, 2010. 2685: 12–13.

Material examined. 1 puparia, Tianmu Mountain (30.31°N, 119.45°E), Zhejiang Province, from *M. rubra*, 6.vii.2017, Coll. J. R. Wang, deposited in ZAFU.

Distribution. China, India.

Host plants. *Myrica rubra,* see Evans (2008) for other hosts.

Comment. *Cohicaleyrodes caerulescens* was recorded on *M. rubra* in Taiwan (Takahashi 1932). Dubey and Ko (2010) discussed the taxonomic status of this species in detail and placed this species in the genus *Cohicaleyrodes*. We collected *C. caerulescens* on *M. rubra* in Tianmu Mountain, but no serious damage to plants was observed.

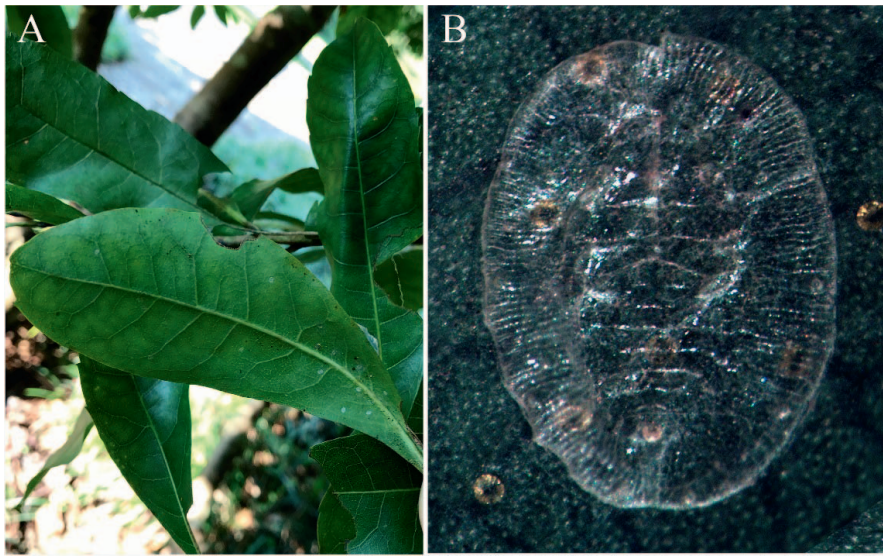

Fig. 8. Live images of *Dialeuropora brideliae*, puparium, dorsal view.

***Dialeuropora brideliae* (Takahashi)** (Figs. 8–9)

Dialeurodes (*Dialeuropora*) *brideliae:* Takahashi, 1932: 15.
Dialeurodes (*Dialeuropora*) *brideliae:* Takahashi, 1934: 46.

Material examined. 2 puparia, Thousand Island Lake (29.59°N, 119.01°E), Zhejiang Province, from *M. rubra*, 14.v.2016, Coll. J. R. Wang, deposited in ZAFU; 1 puparia, Zhoushan (29.98°N, 122.21°E), Zhejiang Province, from *M. rubra*, 6.viii.2016, Coll. J. R. Wang, deposited in ZAFU; 8 puparia, Gutian Mountain National Nature Reserve (29.25°N, 118.15°E), Zhejiang Province, from *Myrica rubra*, 24.viii.2017, Coll. J. R. Wang, deposited in ZAFU; 10 puparia, Kunming, (30.16°N, 121.26°E), Yunnan Province, from *M. rubra*, 16.x.2016, Coll. J. R. Wang, deposited in ZAFU.

Distribution. China, Japan.

Host plants. *Bridelia ovate*, *Machilus* sp., *Myrica rubra*, *Stauntonia* sp. (Evans 2008).

Comment. This represents the first record of this species on Chinese bayberry; it was collected in the Zhejiang and Yunnan Provinces. This species resembles *Dialeurodes decempuncta* (Quaintance & Baker) in having relatively small submarginal pores for the genus, lacking submarginal spines, and in possessing papillae. It is also resembles *Dialeurodes holboelliae* Young in shape but differs in the structure of the narrow marginal area, and *D. holboelliae* has numerous small papillae while *D. brideliae* is without small papillae.

***Parabemisia myricae* (Kuwana)** (Figs. 10–11)

Bemisia myricae: Kuwana, 1927: 249.
Parabemisia myricae: Takahashi, 1952: 24.

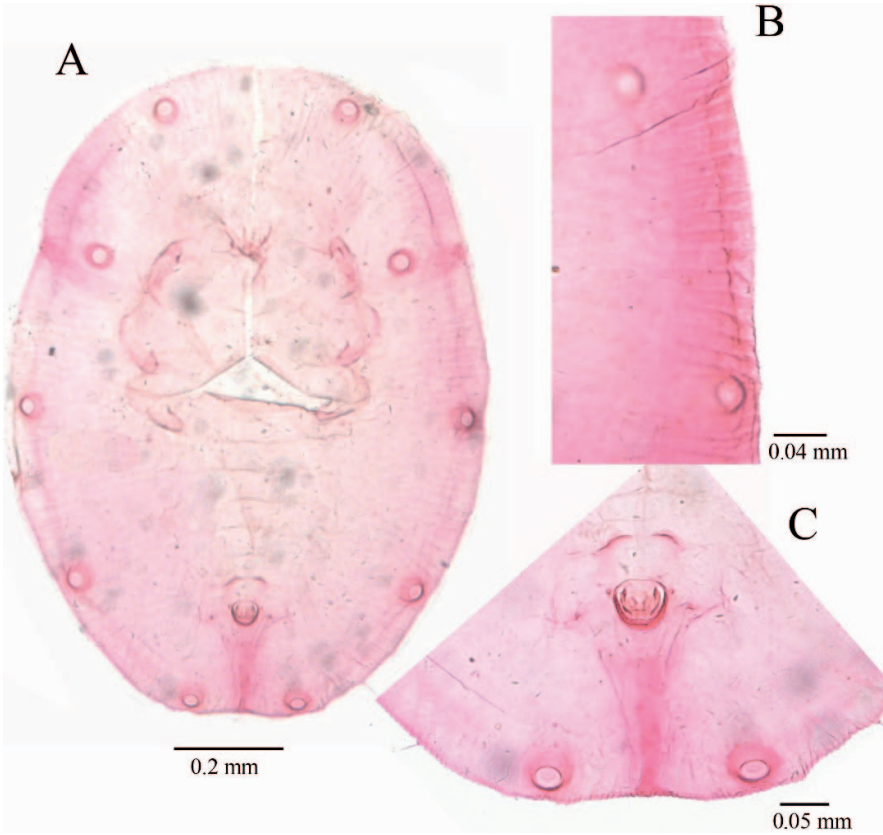

Fig. 9. Microscopic photographs of slide-mounted puparium of *Dialeuropora brideliae*. (A) Puparium, dorsal view; (B) lateral margin and the submarginal pores; (C) vasiform orifice.

Material examined. 6 puparia, Thousand Island Lake (29.59°N, 119.01°E), Zhejiang Province, from *M. rubra*, 14.v.2016, Coll. J. R. Wang, deposited in ZAFU; 8 puparia, Cixi (30.16°N, 121.26°E), Zhejiang Province, from *M. rubra*, 9.vi.2016, Coll. J. R. Wang, deposited in ZAFU; 9 puparia, Zhoushan (29.98°N, 122.21°E), Zhejiang Province, from *M. rubra*, 6.viii.2016, Coll. J. R. Wang, deposited in ZAFU.

Distribution. China, Egypt, India, Iran, Israel, Italy, Japan, Morocco, Spain, Turkey, United States, Venezuela (Evans 2008), Croatia (Šimala et al. 2016).

Host plants. *Myrica rubra*; refer to Evans (2008) for other hosts.

Comment. *Parabemisia myricae* is commonly known as the "bayberry whitefly" due to its frequent and heavy infestations on bayberry worldwide. It is a polyphagous species recorded on 14 families of woody, broad-leaved angiosperm hosts (Mound and Halsey 1978), including many other economic plants such as tea plants and mulberry trees, which are very common in China (Luo and Zhou 1997; Wang et al. 2014). Kuwana (1927) described this species from Japan in 1927 and it has since become an invasive pest, particularly on citrus crops and

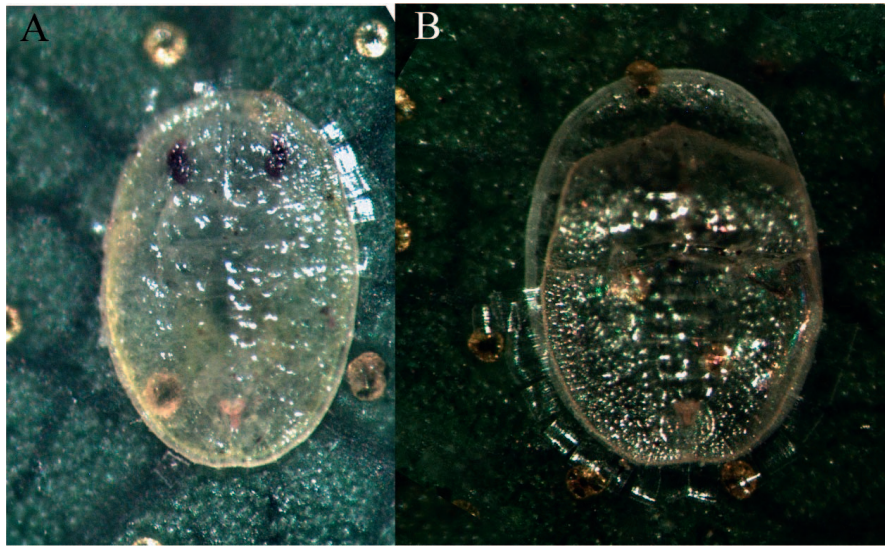

Fig. 10. Live images of *Parabemisia myricae*. (A) Puparium, dorsal view; (B) empty pupal case.

avocados in several parts of the world (Benfatto 2015; Martin 1999; Šimala et al. 2016; Uygun et al. 1990). New host plant associations are common for some species of whiteflies, indicating their high potential to adapt and expand their geographic and plant host range effectively and cause problems on many plants (Martin 1996; Martin et al. 2000). Therefore, measures should be taken to prevent its further expansion in the region accompanied with effective control methods. This whitefly species is sometimes responsible for serious crop damage when it first arrives in a new geographical area, but usually soon falls below economic injury levels as natural enemies become established (Hernández-Suárez et al. 2012). Numerous parasitoid and predatory species are known to be associated with *P. myricae* (Evans 2008).

Discussion

Few publications have dealt with whitefly species that infest specific economic crops. Quaintance (1907) published a list of a number of economic plants and the whiteflies then known to colonize them (Martin 1987). Quaintance and Baker (1916) recorded 16 species including 3 new species of whiteflies feeding on *Citrus*. Twenty species of whiteflies belonging to seven genera have been recorded from *Citrus* in China (Lin 1960a, 1960b; Luo and Zhou 2000, 2001; Tang 1956; Young 1942). Patti and Rapisarda (1981) provided a discussion on the morphology and biology of whiteflies injurious to economic plants. Martin (1987) presented a key to aid in the identification of puparia (pupal cases) of 46 species of whitefly often found infesting economic plants worldwide. Worldwide, there are 24 species of whiteflies known to infest mulberry trees, *Morus alba* L. (Rosales: Moraceae) (David and Ragupathy

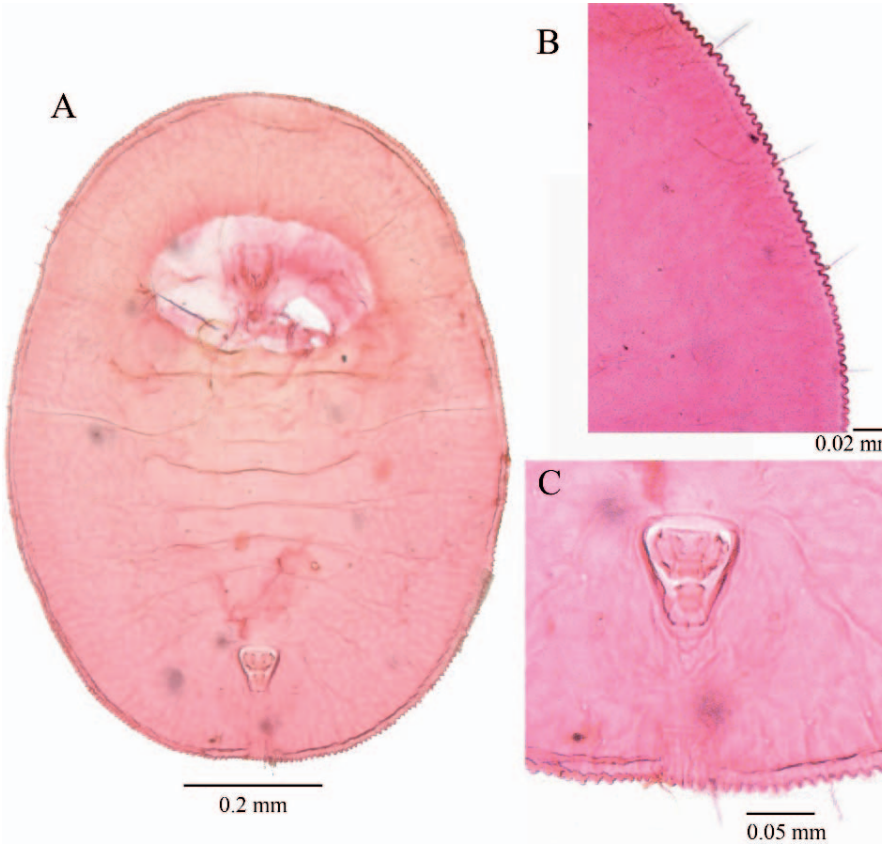

Fig. 11. Microscopic photographs of slide-mounted puparium of *P. myricae*. (A) Habitus, dorsal view (parasitoid emerged); (B) lateral margin and the submarginal setae; (C) vasiform orifice and caudal furrow.

2004, Wang et al. 2014, 2016). In China, 10 species of whiteflies infest tea plants *C. sinensis* (Luo and Zhou 1997; Meng et al. 2017; Wang et al. 2016,). David (2012) presented details of the distribution and host plants and their influence on the morphological features of puparial cases, damage potential, and management practices of many economically important species of whiteflies which cause substantial damage to agricultural, horticultural, ornamental, and forest crops in India.

Large infestations of whiteflies may adversely affect their plant hosts by their direct feeding and loss of plant sap and by the formation of sooty mold on honeydew produced by the whiteflies, as well as by interfering with photosynthesis (Martin et al. 2000). Much work remains to be done on the whitefly pests that infest other economic crops.

Acknowledgments

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References Cited

Benfatto, D. 2015. Infestations of *Parabemisia myricae* Kuwana in citrus groves in Italy. Ann. Dellistituto Sperimentale Per Lagrumicoltura 23: 111–119.

Bink-Moenen, R.M. 1983. Revision of the African whiteflies (Aleyrodidae). Mon. Ned. Ent. Ver. 10: 1–211.

Chen, K., C. Xu, B. Zhang and I.B. Ferguson. 2004. Red bayberry: botany and horticulture. Hort. Rev. 30: 83–114.

Cioffi, M., D. Cornara, I. Corrado, M.G.M. Jansen and F. Porcelli. 2013. The status of *Aleurocanthus spiniferus* from its unwanted introduction in Italy to date. Bull. Insect. 66: 273–281.

Corbett, G.H. 1926. Contribution towards our knowledge of the Aleyrodidae of Ceylon. Bull. Entomol. Res. 16: 267–284.

David, B.V. 2012. The whiteflies or mealywing bugs: biology, host specificity and management. Lambert Academic Publishing, Germany.

David, B.V., R.W.A. Jesudasan and A. Phillips. 2006. A review of *Aleurotrachelus* Quaintance & Baker (Hemiptera: Aleyrodidae) and related genera in India, a description of two new species of the genus *Cohicaleyrodes* Bink-Moenen. Hexapoda 13: 16–27.

David, B.V. and E. Ragupathy. 2004. Whiteflies (Homoptera: Alyerodidae) of mulberry, *Morus alba* L., in India. Pestology 28: 24–33.

Dubey, A.K. and B.V. David. 2012. Collection, preservation and preparation of specimens for taxonomic study of whiteflies (Hemiptera: Aleyrodidae), Pp. 1–19. *In* David, B.V. (ed.), The Whiteflies or Mealywing Bugs: Biology, Host Specificity and Management. Lambert Academic Publishing, Germany.

Dubey, A.K. and C.C. Ko. 2010. *Aleurotrachelus* Quaintance & Baker (Hemiptera: Aleyrodidae) and allied genera from Taiwan. Zootaxa 2685: 1–29.

Evans, G.A. 2008. The whiteflies (Hemiptera: Aleyrodidae) of the world and their host plants and natural enemies. 21 May 2018. (http://keys.lucidcentral.org/keys/v3/whitefly/PDF_PwP%20ETC/world-whitefly-catalog-Evans.pdf [Version 070606]).

Gill, R.J. 1990. The morphology of whiteflies, Pp. 13–46. *In* Gerling, D. (ed.), Whiteflies: Their Bionomics, Pest Status and Management, Intercept. Andover, MA.

Hernandez-Suarez, E., J.H. Martin, R.J. Gill, I.D. Bedford, C.P. Malumphy, Reyes, J.A. Betancort, and A. Carnero. 2012. The Aleyrodidae (Hemiptera: Sternorrhyncha) of the Canary Islands with special reference to *Aleyrodes*, *Siphoninus*, and the challenges of puparial morphology in *Bemisia*. Zootaxa 3212: 1–76.

Huang, J. and A. Polaszek. 1998. A revision of the Chinese species of *Encarsia* Foerster (Hymenoptera: Aphelinidae): parasitoids of whiteflies, scale insects and aphids (Hemiptera). J. Nat. Hist. 32: 1825–1966.

Jesudasan, R.W.A. and B.V. David. 1991. Taxonomic studies of Indian Aleyrodidae (Insecta: Homoptera). Orient. Insects 25: 231–434.

Kanmiya, K., S. Ueda, A. Kasai, K. Yamashita, Y. Sato and Y. Yoshiyasu. 2011. Proposal of new specific status for tea-infesting populations of the nominal citrus spiny whitefly *Aleurocanthus spiniferus* (Homoptera: Aleyrodidae). Zootaxa 2797: 25–44.

Kuwana, I. 1927. On the genus *Bemisia* (Family Aleyrodidae) found in Japan, with description of a new species. Annot. Zool. Japonenses 11: 245–253.

Lin, G.K. 1960a. Whiteflies attacking citrus in Kiangxi. Chinese J. Appl. Entomol. 6: 10–12 (In Chinese).

Lin, G.K. 1960b. Whiteflies attacking citrus in Kiangxi. Chinese J. Appl. Entomol. 6: 88–91 (In Chinese).

Luo, Z.Y. and C.M. Zhou. 1997. Record of whitefly (Aleyrodidae) on tea plants. J. Tea Sci. 17(2): 201–206 (In Chinese).

Luo, Z.Y. and C.M. Zhou. 2000. The record of whiteflies infesting citrus in China. South China Fruits 29(6): 15–17 (In Chinese).

Luo, Z.Y. and C.M. Zhou. 2001. The record of whiteflies infesting citrus in China. South China Fruits 30(1): 14–16 (In Chinese).

Martin, J.H. 1985. The whitefly of New Guinea (Homoptera: Aleyrodidae). Bull. British Mus. Nat. Hist. (Entomol.) 50: 303–351.

Martin, J.H. 1987. An identification guide to common whitefly pest species of the world (Homoptera: Aleyrodidae). Trop. Pest Manag. 33: 298–322.

Martin, J. H. 1996. Neotropical whiteflies of the subfamily Aleurodicinae established in the western Palearctic (Homoptera: Aleyrodidae). J. Nat. Hist. 30: 1849–1859.

Martin, J.H. 1999. The whitefly fauna of Australia (Sternorrhyncha: Aleyrodidae), a taxonomic account and identification guide. Tech. Paper, Commonwealth Scientific and Industrial Research Organization Entomol. Canberra 38: 1–197.

Martin, J.H., D. Mifsud and C. Rapisarda. 2000. The whiteflies (Hemiptera: Aleyrodidae) of Europe and the Mediterranean Basin. Bull. Entomol. Res. 90: 407–448.

Meng, Z.H., J.R. Wang, X.G. Zhou, S. Li, W. Yang, H. Wang and Y.F. Zhou. 2017. A New insect pest *Crenidorsum turpiniae* (Takahashi, 1932) in tea plant (*Camellia sinensis*) and its biology. J. Tea Sci. 37(6):638–644 (In Chinese).

Mound, L.A. and S.H. Halsey. 1978. Whitefly of the world. British Museum (Natural History), John Wiley & Sons, Chichester, U.K.

Patti, I. and C. Rapisarda. 1981. Reperti morfo-biologici sugli aleirodidi nocivi alle piante coltivate in italia. Bollettino Di Zoologia Agraria E Di Bachicoltura (II) 16: 135–190.

Porcelli, F. 2008. First record of *Aleurocanthus spiniferus* (Homoptera: Aleyrodidae) in Apulia, Southern Italy. Bull. Oepp/eppo Bull. 38: 516–518.

Quaintance, A.L. 1903. New oriental Aleurodidae. Can. Entomol. 35: 61–64.

Quaintance, A.L. 1907. The more important Aleurodidae infesting economic plants with description of new species infesting the orange. U.S.D.A. Bur. Entomol. Tech. Ser. 12: 89–94.

Quaintance, A.L. and Baker, A.C. 1914. Classification of the Aleyrodidae Part II. U.S.D.A. Bur. Entomol. Tech. Ser. 27: 95–109.

Quaintance, A.L. and Baker, A.C. 1916. Aleurodidae or whiteflies attacking the orange with descriptions of three new species of economic importance. J. Agri. Res. 6: 459–472.

Šimala, M., M. Pintar, T.M. Milek and V. Markotić. 2016. First record of whitefly *Parabemisia myricae* (Kuwana 1927) (Hemiptera: Aleyrodidae) in Croatia. Glasilo Biljne Zaštite. 16: 307–317.

Singh, K. 1931. A contribution towards our knowledge of the Aleyrodidae (Whiteflies) of India. Mem. Dep. Agric. India 12: 1–98.

Singh, K. 1945. Notes on Aleurodidae (Rhynchota) from India III. Ind. J. Entomol. 6: 75–78.

Sun, C, Y. Zheng, Q. Chen, X. Tang, M. Jiang, J. Zhang, X. Li and K. Chen. 2012. Purification and anti-tumour activity of cyaniding-3-O-glucoside from Chinese bayberry fruit. Food Chem. 131:1287–1294.

Takahashi, R. 1932. Aleyrodidae of Formosa, Part I. Rep. Dep. Agric. Govt. Res. Inst. Formosa 59: 1–57.

Takahashi, R. 1934. Aleyrodidae of Formosa, Part III. Rep. Dep. Agric. Govt. Res. Inst. Formosa 63: 39–71.

Takahashi, R. 1952. *Aleurotuberculatus* and *Parabemisia* of Japan (Aleyrodidae, Homoptera). Misc. Eep. Res. In. Nat. Resour. Tokyo 25: 17–24.

Tang, F.D. 1956. Whiteflies attacking citrus in China. Chinese J. Appl. Entomol. 2(4): 155–161 (In Chinese).

Uygun, N., B. Ohnesorge and R. Ulusoy. 1990. Two species of whiteflies on citrus in eastern Mediterranean: *Parabemisia myricae* (Kuwana) and *Dialeurodes citri* (Ashmead). J. Appl. Entomol. 110: 471–482.

Wang, J.R., Y.Z. Du and Z.H. Xu. 2017. Revision of the common names and redescriptions of two important whiteflies (Hemiptera: Aleyrodidae). Acta Entomol. Sinica 60: 357–362 (In Chinese).

Wang, J.R., L.X. Mu, Y.Z. Du and Z.H. Xu. 2016. First discovery of whitefly, *Aleurocanthus inceratus* Silvestri (Hemiptera: Aleyrodidae) on tea plants in China. J. Tea Sci. 36: 427–431 (In Chinese).

Wang, J.R., D. Perdikis, C. Chalkia, H. Harizanis, A. Kalaitzaki, A. Tsagkarakis, Z.H. Xu and Y.Z. Du. 2016. The occurrence of *Pealius mori* (Takahashi), *Pealius machili* Takahashi and *Paraleyrodes minei iaccarino* (Hemiptera: Aleyrodidae) infesting *Morus alba* L. in Greece. Ann. Soc. Entomol. Fr. 52: 281–288.

Wang, J.R., Z.Q. Song and Y.Z. Du. 2014. Six new record species of whiteflies (Hemiptera: Aleyrodidae) infesting *Morus alba* in China. J. Insect Sci. 14: 274.

Young, B. 1942. Whiteflies attacking citrus in Szechwan. Sinensia Shanghai 13: 95.

Zhang, B., M. Kang, Q. Xie, B. Xu, C. Sun, K. Chen and Y. Wu. 2011. Anthocyanins from Chinese bayberry extract protect β cells from oxidative stress-mediated injury via HO-1 up-regulation. J. Agri. Food Chem. 59: 537–545.