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Notes on Some Species of Encarsia (Hymenoptera: Aphelinidae) Attacking Whiteflies (Homoptera: Aleyrodidae) in Taiwan 【Research report】

臺灣產寄生粉蟲之恩蚜小蜂記要(膜翅目：蚜小蜂科)【研究報告】

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Abstract

New whitefly hosts of 23 Taiwanese species of Encarsia are recorded in this paper. Among the Encarsia species, *E. aseta* Hayat and Polaszek, *E. mohyuddini* Shafee and Rizvi, *E. strenua* (Silvestri), and *E. trivittata* Hayat are recorded from Taiwan for the first time.

摘要

恩蚜小蜂屬(*Encarsia*)隸屬膜翅目蚜小蜂科，目前全世界已知種類約有270種；臺灣已記錄者38種。本文除首次記錄臺灣產4種恩蚜小蜂(*Encarsia aseta* Hayat and Polaszek, *E. mohyuddini* Shafee and Rizvi, *E. strenua* (Silvestri)及*E. trivittata* Hayat)及其寄主外，也記錄臺灣產其它19種恩蚜小蜂新發現之粉蟲寄主。

Key words: Encarsia, Aphelinidae, Aleyrodidae, Taiwan.

關鍵詞: 恩蚜小蜂屬、蚜小蜂科、粉蟲科、臺灣

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Notes on Some Species of *Encarsia* (Hymenoptera: Aphelinidae) Attacking Whiteflies (Homoptera: Aleyrodidae) in Taiwan

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ABSTRACT

New whitefly hosts of 23 Taiwanese species of *Encarsia* are recorded in this paper. Among the *Encarsia* species, *E. aseta* Hayat and Polaszek, *E. mohyuddini* Shafee and Rizvi, *E. strenua* (Silvestri), and *E. trivittata* Hayat are recorded from Taiwan for the first time.

Key words: *Encarsia*, Aphelinidae, Aleyrodidae, Taiwan.

Introduction

The species of the genus *Encarsia* Foerster are parasitoids of whiteflies, scale insects, and aphids. It has about 270 species worldwide, including 38 species in Taiwan (Silvestri, 1931; Chien and Chiu, 1986; Chou and Lin, 1993; K. C. Chou *et al.*, 1996; L. Y. Chou *et al.*, 1996; Huang and Polaszek, 1998). Recent contributions to the Oriental *Encarsia* taxonomy have been made by Hayat (1989, 1998) and Huang and Polaszek (1998). A total of 23 species of *Encarsia* from Taiwan are treated in this paper. Among them, *E. aseta* Hayat and Polaszek, *E. mohyuddini* Shafee and Rizvi, *E. strenua* (Silvestri), and *E. trivittata* Hayat are recorded from Taiwan for the first time. Only the new whitefly hosts of each *Encarsia* species from Taiwan are presented in this paper. The material used in this study were collected by K. C. Chou and were deposited

in the Insect Collection of the Taiwan Agricultural Research Institute, Taichung, Taiwan, R.O.C.

Encarsia albiscutellum (Girault)

Prospaltella albiscutellum Girault, 1913. Australian Hymenoptera Chalcidoidea-IV. Mem. Queensland. Mus., 2: 188.

Coccophagus albiscutellum (Girault): Girault, 1915. Australian Hymenoptera Chalcidoidea-VII. Mem. Queensland. Mus., 4: 47.

Prospaltella albiscutellum Girault: Compere, 1931: 11.

Encarsia albiscutellum (Girault): Viggiani, 1985. Boll. Lab. Ent. Agr. "Filippo Silvestri" Portici, 42: 234. - Huang and Polaszek, 1998. J. Nat. Hist. 32: 1839.

Encarsia albiscutellum longipalpa Hayat, 1989. Oriental Ins. 23:34. - K. C. Chou

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et al., 1996. J. Agric. Res. China 45 (2): 196. - Hayat, 1998. Mem. Entomol. Intern. 13: 193.

Host: *Dialeurodes citri* (Ashmead).

Material examined: NANTOU: Lushan, 1 ♀, 14-IX-1995, ex *D. citri* on *Turpinia formosana*.

Distribution: Taiwan, Mainland China, and India (Huang and Polaszek, 1998).

Encarsia ancistrocera Huang and Polaszek

Encarsia ancistrocera Huang and Polaszek, 1998. J. Nat. Hist. 32: 1842.

Encarsia perflava Hayat (part): K. C. Chou et al., 1996. J. Agric. Res. China 45(2): 199 (misidentification).

Host: *Dialeurodes agalmae* Takahashi.

Material examined: TAIPEI: Mucha, 1 ♂, 9-XII-1994, ex *D. agalmae* on *Schefflera octophylla*.

Distribution: Taiwan.

Encarsisa aseta Hayat and Polaszek

Encarsia aseta Hayat and Polaszek, 1992. Oriental Ins. 26: 107. - Hayat, 1998. Mem. Entomol. Intern. 13: 191. - Huang and Polaszek, 1998. J. Nat. Hist. 32: 1844.

Hosts: *Aleurocanthus spiniferus* (Quaintance), *Aleurolobus rhododendri* Takahashi, *Aleuroplatus pectiniferus* Quaintance & Baker, *Aleurotrachelus micheliae* Takahashi, *A. rubi* Takahashi, *Aleurotuberculatus ficicola* Takahashi, *A. guayavae* Takahashi, *A. malloti* Takahashi, *Bemisia tabaci* (Gennadius), *Dialeurodes fici* (Takahashi), *D. formosensis* Takahashi, *Dialeuropora brideliae* (Takahashi), *D. decempuncta* (Quaintance & Baker), *Minutaleyrodes minutus* (Singh), *Singhius hibisci* (Kotinsky), *Taiwanaleyro-*

des carpini Takahashi.

Materials examined: CHIAI: 1 ♀, 5-XI-1993, ex *A. rubi* on *Persea americana*; 2 ♀, 8-X-1993, ex *A. guayavae* on *Psidium guajava*; 1 ♀, 13-I-1995, ex *S. hibisci* on *Macaranga tanarius*. NANTOU: 1 ♀, 20-X-1994, ex *M. minutus* on *Ixora stricta*; Chitou: 2 ♀, 20-X-1994, ex *A. rhododendri* on *Rhododendron formosanum*; Chungshinghsintsun, 1 ♀, 12-XI-1994, ex *M. minutus* on *Gardenia jasminoides*; Kuohsing, 1 ♀, 21-X-1993, ex *A. micheliae* on *Osmanthus fragran*; Puli: 1 ♀, 12-VII-1995, ex *A. malloti* on *Ficus erecta*; 1 ♀, 8-XII-1995, ex *D. decempuncta* on *Rubus* sp.; Shuili, 1 ♀, 18-XI-1994, ex *A. rhododendri* on *R. formosanum*; Sunmoon-lake, 2 ♀, 18-XI-1993, ex *A. rhododendri* on *R. formosanum*; Tsaotun, 1 ♀, 24-XI-1993, ex *A. spiniferus* on *Citrus ponki*. PINTUNG: 3 ♀, 26-VIII-1993, ex *A. guayavae* on *P. guajava*; Fengkang, 1 ♀, 20-X-1995, ex *T. carpini* on *Vitex negundo*. TAICHUNG: Wufeng, 16 ♀, 15-III-1994, ex *A. guayavae* on *P. guajava*; 1 ♀, 10-I-1995, ex *A. rubi* on *Rubus taiwanianus*; 2 ♀, 29-XII-1994, ex *B. tabaci* on *R. taiwanianus* and *Dalichos lablab*; 4 ♀, 19-XII-1995, ex *D. brideliae* on *Akebia long-eracemosa*; 5 ♀, 5-V-1994, ex *D. decempuncta* on *Morus alba*; 1 ♀, 1-VIII-1994, ex *M. minutus* on *P. guajava*; 2 ♀, 9-IX-1994, ex *S. hibisci* on *M. tanarius*; TAIPEI: Fushan, 3 ♀, 17-VI-1994, ex *B. tabaci* on *F. erecta*; Kungkuan, 1 ♀ 2 ♂, 7-XI-1993, ex *D. fici* on *Bischofia javanica* and *Ficus virgata*; 1 ♀, 31-X-1995, ex *A. pectiniferus* on *F. virgata*; Mucha, 7 ♀ 9 ♂, 5-II-1995, ex *D. fici* on *Ficus irisana*, *F. virgata* and *Celtis formosana*, ex *A. ficicola* on *Maesa japonica*, ex *D. formosensis* on *Chionanthus retusus*; Wulai, 1 ♀, 31-XII-1994, ex *D. fici* on *Pozolzia elegans*; 1 ♀, 31-XII-1994, ex *T. carpini* on *M. japonica*; Yangmingshan, 1 ♀, 11-VI-1996, ex *A. rhododendri* on *R. formosanum*; 1 ♀, 6-II-1995, ex *D. fici* on *C. formosana*.

Distribution: Taiwan (new record), Mainland China, Hawaii, and India (Huang and Polaszek, 1998).

Encarsia azimi Hayat

Trichaporus indicus Azim and Shafee, 1980. J. Bombay Nat. Hist. Soc. 76: 335.

Encarsia azimi Hayat, 1986. Oriental Ins. 20: 160. - Hayat, 1989. Oriental Ins. 23: 62. - K. C. Chou *et al.*, 1996. J. Agric. Res. China 45(2): 196. - Hayat, 1998. Mem. Entomol. Intern. 13: 202. - Huang and Polaszek, 1998. J. Nat. Hist. 32: 1845.

Encarsia adrianae Lopez-Avila, 1987. Bull. Ent. Res., 77: 425. - Polaszek *et al.*, 1992. Bull. Ent. Res., 82: 381.

Hosts: *Aleurodicus machili* Takahashi, *Bemisia tabaci* (Gennadius).

Materials examined: NANTOU: Shilin, 1 ♀, 9-X-1995, ex *A. machili* on *Persea zuihoensis*. TAICHUNG: Wufeng, 1 ♀, 19-XII-1995, ex *B. tabaci* on *Blusea laciniata*.

Distribution: Taiwan, Mainland China, India, Italy, Japan, Pakistan and Spain (Huang and Polaszek, 1998).

Encarsia bennetti Hayat

Encarsia bennetti Hayat, 1984. Bull. Ent. Res. 74: 399. - Hayat, 1989. Oriental Ins. 23:39. - Hayat, 1998. Mem. Entomol. Intern. 13: 212. - Huang and Polaszek, 1998. J. Nat. Hist. 32: 1847.

Hosts: *Aleurocanthus spiniferus* (Quaintance), *Aleuroplatus pectiniferus* Quaintance & Baker, *Dialeurodes citri* (Ashmead).

Materials examined: CHIAI: Chunpo, 1 ♀, 15-VIII-1996, ex *A. spiniferus* on *Persea zuihoensis*. KAOHSIUNG: Liukuei, 1 ♀ 3 ♂, 23-V-1996, ex *A. spiniferus* on *Pueraria lobata*. NANTOU: Chushan, 1 ♀, 23-VIII-1996, ex *A. pectiniferus* on *Cinnamomum camphora*; Huisunlinchang, 5 ♀, 7-III-1996, ex *D. citri* on *Persea japonica*; Lienhuachih, 1 ♀, 27-V-1994, ex *A. pectiniferus* on *Liquidambar formosana*; Peishan-

keng, 1 ♀, 14-IV-1994, ex *A. spiniferus* on *Machilus japonica*; Shuili, 2 ♀, 6-IX-1995, ex *A. spiniferus* on *P. zuihoensis*; Sunmoon-lake, 3 ♀ 4 ♂, 18-XI-1993, ex *A. spiniferus* on *Syzygium samarangense*. PINTUNG: Kenting kunyen, 4 ♀ 2 ♂, 21-IV-1994, ex *A. spiniferus* on *P. japonica*.

Distribution: Taiwan, India, and Pakistan (Huang and Polaszek, 1998).

Encarsia bothrocera Huang and Polaszek

Encarsia bothrocera Huang and Polaszek, 1998. J. Nat. Hist. 32: 1850.

Encarsia perflava (part): K. C. Chou *et al.*, 1996. J. Agric. Res. China 45(2): 199 (misidentification).

Host: *Aleurotuberculatus murrayae* (Singh).

Material examined: TAIPEI: Shihing, 1 ♀, 28-X-1994, ex *A. murrayae* on *Elatostema lineolatum*.

Distribution: Taiwan.

Encarsia cibcensis Lopez-Avila

Encarsia cibcensis Lopez-Avila, 1987. Bull. Ent. Res. 77: 427. - Polaszek, Evans, and Bennett, 1992. Bull. Ent. Res. 82: 381. - Huang and Polaszek, 1998. J. Nat. Hist. 32: 1856.

Encarsia perflava (part): K. C. Chou *et al.*, 1996. J. Agric. Res. China 45(2): 199 (misidentification).

Hosts: *Aleurotuberculatus malloti* Takahashi, *Odontaleyrodes rhododendri* (Takahashi).

Materials examined: PINTUNG: Kenting kunyen, 1 ♀, 5-V-1995, ex *A. malloti* on *Koelreuteria formosana*. TAICHUNG: Wufeng, 1 ♀, 19-V-1994, ex *A. malloti* on *Ampelopsis brevipedunculata*; 1 ♀, 16-XII-1993, ex *O. rhododendri* on *Rhododendron formosanum*.

Distribution: Taiwan, and Pakistan (Huang and Polaszek, 1998).

Encarsia duorunga Hayat

Encarsia duorunga Hayat, 1989. Oriental Ins. 23: 40. - Hayat, 1998. Mem. Entomol. Intern. 13: 207. - Huang and Polaszek, 1998. J. Nat. Hist. 32: 1865.

Encarsia mohyuddini Shafee and Rizvi: K. C. Chou *et al.*, 1996. J. Agric. Res. China 45(2): 199 (misidentification).

Hosts: *Aleurotuberculatus melastomae* Takahashi, *Aleyrodes proletella* (Linnaeus), *Dialeurodes fici* (Takahashi), *Trialeurodes vaporariorum* (Westwood).

Materials examined: NANTOU: Lienhuachih, 1♂, 26-I-1996, ex *A. melastomae* on *Melastoma candidum*; Peishankeng, 1♂, 31-V-1994, ex *T. vaporariorum* on *Lycopersicon esculentum*. TAIPEI: Kungkuan, 1♂, 11-XI-1995, ex *A. proletella* on *Lactuca indica*; Mucha, 1♂, 4-IX-1994, ex *D. fici* on *Ficus virgata*.

Distribution: Taiwan, and India (Huang and Polaszek, 1998).

Encarsia inaron (Walker)

Aphelinus inaron Walker, 1839. Monographia Chalciditum 1: 10.

Aphelinus idaeus Walker, 1839, Monographia Chalciditum 1: 12.

Encarsia partenopea Masi, 1909. Boll. Lab. Zool. Gen. Agr. 4: 32.

Trychaporus aleyrodidis Mercet, 1930. Eos 6: 196.

Encarsia brassicae Shafee and Darvas, 1984. Indian J. Syst. Ent. 1: 29.

Encarsia inaron (Walker): Hayat, 1989. Oriental Ins. 23: 64. - Polaszek, Evans, and Bennett, 1992. Bull. Ent. Res. 82: 383. - Hayat, 1998. Mem. Entomol. Intern. 13: 199. - Huang and Polaszek, 1998. J. Nat. Hist. 32: 1891.

Host: *Trialeurodes vaporariorum* (Westwood).

Materials examined: NANTOU: Wushe, 1♀, 24-XI-1993, on *Lycopersicon esculentum*. TAICHUNG: Lishan, 1♀, 19-

VII-1994, on *Saponaria* sp. All reared from *T. vaporariorum*.

Distribution: Taiwan, Asia, Europe, and North Africa. Introduced into North America (Huang and Polaszek, 1998).

Encarsia ishii (Silvestri)

Prospaltella ishii Silvestri: Silvestri, 1928. Boll. Lab. Zool. R. Sc. Agr. Portici, 21: 25.

Encarsia ishii (Silvestri): Viggiani and Mazzone, 1979. Boll. Lab. Ent. Agr. "Filippo Silvestri" Portici, 36: 45. - Hayat, 1989. Oriental Insects 23: 13. - Huang and Polaszek, 1998. J. Nat. Hist. 32: 1896.

Hosts: *Aleurocanthus cinnamomi* Takahashi, *A. woglumi* Ashby, *Dialeuropora viburni* (Takahashi), *Trialeurodes vaporariorum* (Westwood).

Materials examined: KAOHSIUNG: Liukuei, 2♀, 24-V-1996, ex *D. viburni* on *Turpini formosana*. NANTOU: Peishankeng, 1♀, 21-X-1993, ex *T. vaporariorum* on *Lycopersicon esculentum*. TAICHUNG: Wufeng, 1♀, 17-XI-1993, ex *A. cinnamomi* on *Cinnamomum camphora*; 4♀, 20-V-1994, ex *A. woglumi* on *Morus alba*.

Distribution: Taiwan, Hong Kong, and Mainland China (Huang and Polaszek, 1998).

Encarsia japonica Viggiani

Encarsia japonica Viggiani, 1981. Boll. Lab. Ent. Agr. "F. Silvestri" Portici 38: 61. - Polaszek, Evans, and Bennett, 1992. Bull. Entomol. Res. 82: 384. - Chou and Lin, 1993. Chinese J. Entomol. 13: 266. - Huang, 1994. Systematic studies on Aphelinidae of China: 205. - Huang and Polaszek, 1998. J. Nat. Hist. 32: 1898.

Host: *Aleyrodes proletella* (Linnaeus).

Materials examined: CHANGHUA:

Tienwei, 3♀, 20-IV-1995. NANTOU: Lienhuachih, 1♀, 12-VII-1996; Tungpu, 2♀2♂, 18-VII-1996. PINTUNG: Santimen, 2♀, 27-VIII-1993. TAIPEI: Kungkuan, 10♀10♂, 3-III-1996; Mucha, 11♀11♂, 9-VI-1993; Wulai, 10♀5♂, 28-VII-1995. All reared from *A. proletella* on *Lactuci indica*.

Distribution: Taiwan, Mainland China, and Japan (Huang and Polaszek, 1998).

Encarsia longicauda Hayat

Encarsia longicauda Hayat, 1989. Oriental Ins. 23: 33. - Hayat, 1998. Mem. Entomol. Intern. 13: 196. - Huang and Polaszek, 1998. J. Nat. Hist. 32: 1904.

Hosts: *Aleurolobus rhododendri* Takahashi, *Taiwanaleyrodes carpini* Takahashi.

Materials examined: NANTOU: Aowanta, 1♀, 14-II-1996, ex *A. rhododendri* on *Glochidion rubrum*. TAIPEI: Shihfenliao, 1♀, 22-VIII-1994, ex *T. carpini* on *Zanthoxylum nitidum*.

Distribution: Taiwan and India (Huang and Polaszek, 1998).

Encarsia longifasciata Subba Rao

Encarsia longifasciata Subba Rao, 1984. Proc. Indian Acad. Sci. (Anim. Sci.) 93: 260. - Hayat, 1989. Oriental Ins. 23: 29. - Polaszek, Evans, and Bennett, 1992. Bull. Entomol. Res. 82: 384. - K. C. Chou *et al.*, 1996. J. Agric. Res. China 45(2): 198. - Hayat, 1998. Mem. Entomol. Intern. 13: 192. - Huang and Polaszek, 1998. J. Nat. Hist. 32: 1906.

Host: *Aleurolobus osmanthi* Young.

Materials examined: TAIPEI: 4♂, 17-IV-1994, ex *A. osmanthi* on *Osmanthus fragrans*; Kungkuan, 1♀1♂, 5-IV-1996, ex *A. osmanthi* on *O. fragrans*.

Distribution: Taiwan, Mainland China, and India (Huang and Polaszek,

1998).

Encarsia longivalvula Viggiani

Encarsia longivalvula Viggiani, 1985. Boll. Lab. Ent. Agr. "Filippo Silvestri" Portici 42: 85. - Hayat, 1989. Oriental Ins. 23: 74. - Huang and Polaszek, 1998. J. Nat. Hist. 32: 1907.

Hosts: *Aleurocanthus spiniferus* (Quaintance), *A. spinosus* (Kuwana), *Aleurotrachelus caeruleus* Singh, *A. micheliae* Takahashi, *A. rubi* Takahashi, *Aleurotuberculatus malloti* Takahashi, *A. murrayae* Singh, *A. rhododendri* Takahashi, *Dialeurodes agalmae* Takahashi, *D. formosensis* Takahashi, *Pealius spina* (Singh), *Taiwanaleyrodes montanus* Takahashi.

Materials examined: CHIAI: Chunpo, 1♀1♂, 25-I-1996, ex *A. murrayae* on *Eucalyptus* sp.; Chushan, 1♂, 7-II-1996, ex *A. rubi* on *Persea americana*. NANTOU: 1♀4♂, 28-X-1993, ex *A. micheliae* on *Osmanthus fragrans*; Chungshing hsintsun, 20-I-1995, ex *P. spina* on *Ficus religiosa*; 1♀, 28-X-1993, ex *A. micheliae* on *O. fragrans*; Kuohsing, 3♀, 10-XI-1993, ex *A. rhododendri* on *Rhododendron formosanum*; Lienhuachih, 1♀, 30-VIII-1994, ex *A. caeruleus* on *Schefflera octophylla*; 1♀, 26-I-1996, ex *A. rubi* on *Rubus* sp.; 1♀, 30-VIII-1994, ex *D. formosensis* on *S. octophylla*; 1♂, 6-I-1995, ex *T. montanus* on *Cinnamomum camphora*; Shuili, 1♀1♂, 1-XII-1995, ex *A. spinosus* on *Piper kadsura*. TAI-CHUNG: Wufeng, 2♀2♂, 21-VI-1994, ex *A. spinosus* on *Citrus ponki*; 5♀2♂, 11-IV-1994, ex *A. micheliae* on *O. fragrans*. TAIPEI: Hsintein, 1♂, 23-VI-1995, ex *D. agalmae* on *S. octophylla*; Sanhsing, 1♀, 22-IX-1993, ex *A. spiniferus* on *Syzygium samarangense*.

Distribution: Taiwan and Pakistan (Huang and Polaszek, 1998).

Encarsia mohyuddini Shafee and Rizvi

Encarsia mohyuddini Shafee and Rizvi, 1983. J. Ent. Res. 6: 157. - Hayat, 1989. Oriental Ins. 23: 42. - Polaszek, Evans, and Bennett, 1992. Bull. Entomol. Res. 82: 386. - Huang and Polaszek, 1998. J. Nat. Hist. 32: 1918.

Hosts: *Aleurotuberculatus jasmini* Takahashi, *A. psidii* (Singh), *A. rhododendri* Takahashi, *Dialeurodes kirkaldyi* (Kotinsky).

Materials examined: **KAHOHSIUNG:** Fengshan, 1♂, 22-XI-1993, ex *A. psidii* on *Litchi chinensis*. **NANTOU:** Chunghsing hsintsun, 1♂, 23-VII-11995, ex *A. jasmini* on *Gardenia jasminoides*; Lienhuachih, 2♀, 2-V-1994, ex *A. rhododendri* on *Rhododendron formosanum*. **PINTUNG:** Santimen, 3♀, 25-IV-1996, ex *A. jasmini* on *Maesa japonica*. **TAICHUNG:** Wufeng, 7♀3♂, 21-III-1994, ex *A. jasmini* on *Jasminum sambac* and *M. japonica*; 1♂, 3-X-1994, ex *A. malloti* on *Malotus japonicus*; 1♀, 12-IV-1994, ex *Dialeurodes kirkaldyi* on *J. sambac*. **TAIPEI:** Fushan, 1♂, 22-XI-1993, ex *A. psidii* on *L. chinensis*; Kungkuan, 6♀2♂, 6-VIII-1995, ex *A. jasmini* on *J. sambac*. **TAITUNG:** Lanyu: 2♂, 5-V-1996, ex *A. jasmini* on *Ampelopsis brevipedunculata*.

Distribution: Taiwan (new record), Mainland China, and Pakistan (Huang and Polaszek, 1998).

Encarsia obtusiclava Hayat

Encarsia obtusiclava Hayat, 1989. Oriental Ins. 23: 55. - Huang, 1994. Systematic studies on Aphelinidae of China : 209. - Hayat, 1998. Mem. Entomol. Intern. 13: 225. - Huang and Polaszek, 1998. J. Nat. Hist. 32: 1927.

Host: *Aleurocanthus woglumi* Ashby.

Materials examined: **CHIAI:** Chunpo, 1♂, 15-VIII-1996, ex *A. woglumi* on *Citrus panadisi*.

Distribution: Taiwan, Mainland China, and India (Huang and Polaszek,

1998).

Encarsia perflava Hayat

Encarsia perflava Hayat, 1989. Oriental Ins. 23: 43. - K. C. Chou *et al.*, 1996. J. Agric. Res. China 45(2): 199. (part, part misidentified; see *E. ancistrocera*, *E. bothrocera*, and *E. cibcensis*). - Hayat, 1998. Mem. Entomol. Intern. 13: 231. - Huang and Polaszek, 1998. J. Nat. Hist. 32: 1930.

Host: *Parabemisia myricae* (Kuwana).

Material examined: **ILAN:** Fushan, 1♂, 3-VI-1994, ex *P. myricae* on *Engelhardtia roxburghiana*.

Distribution: Taiwan, Mainland China, and India (Huang and Polaszek, 1998).

Encarsia perplexa Huang and Polaszek

Encarsia perplexa Huang and Polaszek, 1998. J. Nat. Hist. 32: 1934.

Prospaltella opulenta: Flanders, 1969. Canad. Ent., 101: 467. - Grisell, 1979. Florida Dep. Agric. Con. Serv., Div. Pl. Industr., Ent. Circular, No. 203: 2 (misidentification).

Encarsia opulenta (Silvestri): Viggiani and Mazzone, 1979. Boll. Lab. Ent. Agr. "Filippo Silvestri" Portici, 36: 45. - Hayat, 1989. Oriental Ins 23: 31; Viggiani and Ren, 1993. Boll. Lab. Ent. Agr. "Filippo Silvestri" Portici, 48: 226; Schauff *et al.*, 1996. Proc. Ent. Soc. Wash., 98(1): 23 (misidentification).

Hosts: *Aleurocanthus cinnamomi* Takahashi, *A. spiniferus* (Quaintance), *Aleuroplatus fici* Takahashi, *Aleurolobus marlatti* (Quaintance), *Pealius liquidambari* (Takahashi).

Materials examined: **CHIAI:** 1♀, 14-I-1994, ex *A. fici* on *Ficus microcarpa*. **NANTOU:** Chitou, 1♂, 20-X-1994, ex *A. spiniferus*

ferus on *Citrus ponki*; Lienhuachih, 1♂, 27-V-1994, ex *P. liquidambari* on *Liquidambar formosana*; Lushan, 1♀, 1-XII-1994, ex *A. marlatti* on *Capparis sikkimensis*; **TAIPEI**: Kungkuan, 1♂, 13-XI-1993, ex *A. cinnamomi* on *Cinnamomum camphora*; 1♀, 22-II-1996, ex *A. spiniferus* on *Ficus wightiana*; Sanhsia, 1♂, 11-XI-1994, ex *A. spiniferus* on *Boehmera zollingeriana*.

Distribution: Taiwan, Mainland China, India, Mexico, and USA (Huang and Polaszek, 1998).

Encarsia protransvena Viggiani

Encarsia protransvena Viggiani, 1985. Boll. Lab. Ent. Agr. "F. Silvestri" Portici 42: 89. - Huang and Polaszek, 1998. J. Nat. Hist. 32: 1941.

Hosts: *Aleurolobus marlatti* (Quaintance), *Aleurotrachelus micheliae* Takahashi, *A. rubi* Takahashi, *Aleurotuberculatus multipori* Takahashi, *A. rhododendri* Takahashi, *A. uraianus* Takahashi, *Aleyrodes prolella* (Linnaeus), *Apobemisia kuwanai* (Takahashi), *Bemisia tabaci* (Genadius), *Dialeurodes fici* (Takahashi), *Odontaleyrodes rhododendri* (Takahashi), *Parabemisia myricae* (Kuwana), *Pealius azaleae* (Baker & Moles), *P. liquidambari* (Takahashi), *P. spina* (Singh), *Singhius hibisci* (Kotinsky), *Taiwanaleyrodes carpini* Takahashi, *Tuberaleyrodes machili* Takahashi.

Materials examined: **CHIAI**: Fenchifu, 1♀, 11-IV-1995, ex *P. azaleae* on *Rhododendron formosanum*. **KAOHSIUNG**: Liukuei, 1♀, 23-V-1996, ex *S. hibisci* on *Breynia officinalis*. **NANTOU**: Chungshing hsintsun, 3♀, 20-XI-1995, ex *P. spina* on *Ficus religiosa*; Chushan, 1♀, 20-IX-1995, ex *A. micheliae* on *Osmanthus fragrans*; 1♀, 20-IX-1995, ex *D. fici* on *Bischofia javanica*; Huisunlinchang, 1♀, 7-III-1996, ex *A. rhododendri* on *R. formosanum*; 1♀, 7-III-1996, ex *O. rhododendri* on *R. formosanum*; 1♀, 7-III-1996, ex *P. myricae* on *Myrica rubra*; Pahsienshan,

1♀, 7-XII-1995, ex *A. rubi* on *Rubus* sp.; 1♀2♂, 7-XII-1995, ex *A. multipori* on *Polygonum chinense*; Sunmoon-lake, 1♀, 27-XII-1995, ex *A. uraianus* on *Clerodendrum trichotomum*; Tungpu, 1♀, 12-IV-1995, ex *A. kuwanai* on *Celtis formosana*; 2♀, 19-VII-1996, ex *P. liquidambari* on *Liquidambar formosana*; 1♀, 19-VII-1996, ex *T. carpini* on *P. chinense*. **TAICHUNG**: Wufeng, 2♀, 16-VI-1995, ex *T. machili* on *Persea japonica*. **TAIPEI**: Kungkuan, 1♀, 23-VI-1996, ex *A. marlatti* on *Sampium sebiferum*; 1♀, 14-IV-1996, ex *A. prolella* on *Lactuci indica*. **TAITUNG**: Lanyu: 1♀, 6-V-1996, ex *B. tabaci* on *Boehmeria nivea*.

Distribution: Taiwan, Mainland China, Puerto Rico, Spain, and USA (Huang and Polaszek, 1998).

Encarsia strenua (Silvestri)

Prospaltella strenua Silvestri, 1928. Boll. Lab. Zool. Gen. Agr. R. Ist. Sup. Agr. Portici 21: 34.

Prospaltella citri Ishii, 1938. Kontyu 12: 29.

Encarsia strenua (Silvestri): Polaszek, Evans, and Bennett, 1992. Bull. Ent. Res. 82: 388. - Huang and Polaszek, 1998. J. Nat. Hist. 32: 1951.

Hosts: *Dialeurodes agalmae* Takahashi, *D. citri* (Ashmead).

Materials examined: **TAICHUNG**: Chungkengping, 1♀, 17-VII-1995, ex *D. citri* on *Diospyros eriantha*; Wufeng, 1♀, 4-VII-1995, ex *Dialeurodes citri* on *Citrus grandis*. **TAIPEI**: Hsintien, 1♀, 23-VI-1995, ex *D. agalmae* on *Schefflera octophylla*.

Distribution: Taiwan (new record), Mainland China, Hong Kong, Macao, Syria, Turkey, USA (Huang and Polaszek, 1998).

Encarta synaptocera Huang and Polaszek

Encarta synaptocera Huang and Polaszek, 1998. J. Nat. Hist. 32: 1953.

Encarsia duorunga Hayat: K. C. Chou *et al.*, 1996. J. Agric. Res. China 45(2): 199 (misidentification).

Host: *Aleurotrachelus turpiniae* Takahashi.

Material examined: TAIPEI: Yangmingshan, 1♂, 11-VI-1996, ex *A. turpiniae* on *Solanum biflorum*.

Distribution: Taiwan.

Encarsia transvena (Timberlake)

Prospaltella transvena Timberlake, 1926. Proc. Hawaii Ent. Soc. 6: 312.

Prospaltella sublutea Silestri, 1931. Boll. Soc. Ent. Ital. 63: 20.

Prospaltella bemisiae Ishii, 1938. Kontyu 12: 30.

Prospaltella flava Shafee, 1973. Entomophaga 18: 254.

Encarsia shafeei Hayat, 1986. Oriental Ins. 20: 163.

Encarsia transvena (Timberlake): Viggiani, 1985. Boll. Lab. Ent. Agr. "F. Silvestri" Portici 42: 90. - Hayat, 1989. Oriental Ins. 23: 71. - Polaszek, Evans, and Bennett, 1992. Bull. Entomol. Res. 82: 388. - Chou and Lin, 1993. Chinese J. Entomol. 13: 266. - Huang, 1994. Systematic studies on Aphelinidae of China: 211. - Hayat, 1998. Mem. Entomol. Intern. 13: 205. - Huang and Polaszek, 1998. J. Nat. Hist. 32: 1954.

Hosts: *Aleuroplatus fici* Takahashi, *Aleurotrachelus micheliae* Takahashi, *A. rubi* Takahashi, *Aleurotuberculatus ficicola* Takahashi, *A. longispinus* Takahashi, *A. malloti* Takahashi, *A. piperis* Takahashi, *A. psidii* (Singh), *Aleyrodes proletella* (Linnaeus), *Asialeyrodes maesae* (Takahashi), *Bemisia pongamiae* Takahashi, *Odontaleyrodes rhododendri* (Takahashi), *Pealius azaleae* (Baker & Moles), *P. liquidambari* (Takahashi), *P. polygoni* Takahashi, *P. psychotriae* Takahashi, *P. rubi* Takahashi, *P. spina* (Singh), *Pentaleyro-*

des cinnamomi (Takahashi), *Setaleyrodes mirabilis* Takahashi, *Singhius hibisci* (Kotinsky), *Trialeyrodes vaporariorum* (Westwood), *Tubaleyrodes machili* Takahashi.

Materials examined: CHIAI: 1♀, 14-I-1994, ex *A. fici* on *Ficus microcarpa*; 1♀, 4-XI-1994, ex *S. hibisci* on *Tecoma stans*; Fenchifu, 1♀, 28-VII-1994, ex *P. azaleae* on *Rhododendron formosanum*; 1♀, 28-VII-1994, ex *T. vaporariorum* on *Helichrysum bracteatum*. ILAN: Sanhsing, 3♀, 22-IX-1993, ex *B. pongamiae* on *Pongamia pinnata*; Fushan, 1♀, 15-VI-1994, ex *P. psychotriae* on *Maesa japonica*. KAOHSI-UNG: Fengshan, 2♀, 27-IX-1995, ex *A. proletella* on *Emilia sonchifolia*. NANTOU: Aowanta, 1♀, 28-XI-1994, ex *P. liquidambari* on *Liquidambar formosana*; Chichi, 2♀, 16-IV-1994, ex *A. ficicola* on *M. japonica*; Chitou, 1♀, 20-X-1994, ex *A. rubi* on *Boehmeria densiflora*; Chungshing hsintsun, 2♀, 5-I-1994, ex *O. rhododendri* on *R. formosanum*; 1♀1♂, 11-X-1994, ex *P. spina* on *Ficus religiosa*; Chushan, 1♂, 20-IX-1995, ex *A. rubi* on *Persea americana*; Lienhuachih, 1♀, 12-VII-1996, ex *A. longispinus* on *Clerodendrum cyrtophyllum*; 1♀, 10-I-1996, ex *P. rubi* on *Rubus* sp.; Puli, 1♀, 12-VII-1995, ex *P. cinnamomi* on *Actinodaphne pedicellata*; Shuli, 1♀, 6-IX-1995, ex *A. piperis* on *Piper kadsura*. TAICHUNG: Wufeng, 3♀, 3-X-1994, ex *A. malloti* on *Ampelopsis brevipedunculata* and *Mallotus japonicus*; 1♀, 12-VIII-1994, ex *A. micheliae* on *Pueraria lobata*; 9♀11♂, 1-VIII-1994, ex *A. psidii* on *Psidium guajava*; 1♀, 26-VIII-1994, ex *A. maesae* on *M. japonica*; 1♀, 24-V-1994, ex *S. mirabilis* on *Stephania japonica*. TAINAN: Kuantzuling, 1♀, 22-IX-1994, ex *T. machili* on *Sechium edule*. TAIPEI: Kungkuan, 1♀, 29-III-1995, ex *A. fici* on *F. microcarpa*; 5♀2♂, 2-VII-1995, ex *A. proletella* on *Lactuca indica*; 2♀, 5-VIII-1995, ex *B. pongamiae* on *P. pinnata*; 2♀, 30-VI-1995, ex *P. polygoni* on *Polygonum chinense*; TAITUNG: Lanyu: 3♀, 5-V-1996, ex *A. micheliae* on *Acalypha*

grandis and *Ficus septica*.

Distribution: Cosmopolitan (Huang and Polaszek, 1998).

Encarsia trivittata Hayat

Encarsia trivittata Hayat, 1989. Oriental Ins. 23: 59. - Hayat, 1998. Mem. Entomol. Intern. 13: 226.

Host: *Aleurolobus rhododendri* Takahashi.

Material examined: CHIAI: 1♀ 5-XI-1993, on *Averrhoa carambola*. KAOHSI-UNG: Fengshan, 1♀2♂, 22-XI-1993, on *A. carambola*. NANTOU: 2♀, 27-X-1993, on *Bauhinia variegata*; 1♀3♂, 23-XII-1993, on *B. variegata*; Chichi, 1♀3♂, 6-I-1994, on *A. carambola* and *B. variegata*. TAI-CHUNG: 5♀6♂, 2-16-II-1994, on *B. variegata*; Wufeng: 1♀1♂, 28-X-1993, on *B. variegata*; 1♀, 3-XI-1993, on *Duranta repens*; 3♀, 23-XII-1993, on *A. carambola*; 7♀7♂, 17-26-I-1994, on *B. variegata*. TAITUNG: 1♂, 3-XI-1993, on *B. variegata* (K. C. Chou). All reared from *A. rhododendri*.

Distribution: Taiwan (new record) and India (Hayat, 1998).

Whitefly-Parasitoid List

Aleurocanthus cinnamomi Takahashi - *E. ishii*, *E. perplexa*
Aleurocanthus spiniferus (Quaintance) - *E. aseta*, *E. bennetti*, *E. longivalvula*
Aleurocanthus spinosus (Kuwana) - *E. longivalvula*
Aleurocanthus woglumi Ashby - *E. ishii*, *E. obtusiclava*
Aleurodicus machili Takahashi - *E. azimi*
Aleurolobus marlatti (Quaintance) - *E. perplexa*, *E. protransvena*
Aleurolobus osmanthi Young - *E. longifasciata*
Aleurolobus rhododendri Takahashi - *E. aseta*, *E. longicauda*, *E. trivittata*
Aleuroplatus fici Takahashi - *E. perplexa*, *E. transvena*

Aleuroplatus pectiniferus Quaintance & Baker - *E. aseta*, *E. bennetti*
Aleuroplatus spiniferus (Quaintance) - *E. perplexa*
Aleurotrachelus caerulescens Singh - *E. longivalvula*
Aleurotrachelus micheliae Takahashi - *E. aseta*, *E. longivalvula*, *E. protransvena*, *E. transvena*
Aleurotrachelus rubi Takahashi - *E. aseta*, *E. longivalvula*, *E. protransvena*, *E. transvena*
Aleurotrachelus turpiniae Takahashi - *E. synaptocera*
Aleurotuberculatus ficicola Takahashi - *E. aseta*, *E. transvena*
Aleurotuberculatus guyavae Takahashi - *E. aseta*
Aleurotuberculatus jasmini Takahashi - *E. mohyuddini*
Aleurotuberculatus longispinus Takahashi - *E. transvena*
Aleurotuberculatus malloti Takahashi - *E. aseta*, *E. cibensis*, *E. longivalvula*, *E. transvena*
Aleurotuberculatus melastomae Takahashi - *E. duorunga*
Aleurotuberculatus multipori Takahashi - *E. protransvena*
Aleurotuberculatus murrayae (Singh) - *E. bothrocera*, *E. longivalvula*
Aleurotuberculatus piperis Takahashi - *E. transvena*
Aleurotuberculatus psidii (Singh) - *E. mohyuddini*, *E. transvena*
Aleurotuberculatus rhododendri Takahashi - *E. longivalvula*, *E. mohyuddini*, *E. protransvena*
Aleurotuberculatus uraianus Takahashi - *E. protransvena*
Aleyrodes prolella (Linnaeus) - *E. duorunga*, *E. japonica*, *E. protransvena*, *E. transvena*
Apobemisia kuwanai (Takahashi) - *E. protransvena*
Asialeyrodes maesae (Takahashi) - *E. transvena*
Bemisia pongamiae Takahashi - *E. transvena*

Bemisia tabaci (Gennadius) — *E. aseta*,
E. azimi, *E. protransvena*
Dialeurodes agalmae Takahashi — *E.*
ancistrocera, *E. longivalvula*, *E. stre-*
nua
Dialeurodes citri (Ashmead) — *E. albi-*
scutellum, *E. bennetti*, *E. strenua*
Dialeurodes fici (Takahashi) — *E. aseta*,
E. duorunga, *E. protransvena*
Dialeurodes formosensis Takahashi — *E.*
aseta, *E. longivalvula*
Dialeurodes kirkaldyi (Kotinsky) — *E.*
mohyuddini
Dialeuropora brideliae (Takahashi) — *E.*
aseta
Dialeuropora decempuncta (Quaintance &
 Baker) — *E. aseta*
Dialeuropora viburni (Takahashi) — *E.*
ishii
Minutaleyrodes minutus (Singh) — *E.*
aseta
Odontaleyrodes rhododendri (Takahashi)
 — *E. cibcensis*, *E. protransvena*, *E.*
transvena
Parabemisia myricae (Kuwana) — *E. per-*
flava, *E. protransvena*
Pealius azaleae (Baker & Moles) — *E.*
protransvena, *E. transvena*
Pealius liquidambari (Takahashi) — *E.*
perplexa, *E. protransvena*, *E. trans-*
vena
Pealius polygoni Takahashi — *E. trans-*
vena
Pealius psychotriae Takahashi — *E. trans-*
vena
Pealius rubi Takahashi — *E. transvena*
Pealius spina (Singh) — *E. longivalvula*,
E. protransvena, *E. transvena*
Pentaleyrodes cinnamomi (Takahashi) —
E. transvena
Setaleyrodes mirabilis Takahashi — *E.*
transvena
Singhius hibisci (Kotinsky) — *E. aseta*,
E. protransvena, *E. transvena*
Taiwanaleyrodes carpini Takahashi — *E.*
aseta, *E. longicauda*, *E. protransvena*
Taiwanaleyrodes montanus Takahashi —
E. longivalvula
Trialeyrodes vaporariorum (Westwood) —

E. duorunga, *E. inaron*, *E. ishii*, *E.*
transvena
Tuberaleyrodes machili Takahashi — *E.*
protransvena, *E. transvena*

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Silvestri, F. 1931. Contributo alla conos-

cenza delle specie orientali del genere *Prospaltella* (Hym., Chalcididae). Boll. Lab. Zool. Portici 25: 49-68.

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臺灣產寄生粉蝨之恩蚜小蜂記要(膜翅目：蚜小蜂科)

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摘 要

恩蚜小蜂屬(*Encarsia*)隸屬膜翅目蚜小蜂科，目前全世界已知種類約有 270 種；臺灣已記錄者 38 種。本文除首次記錄臺灣產 4 種恩蚜小蜂(*Encarsia aseta* Hayat and Polaszek, *E. mohyuddini* Shafee and Rizvi, *E. strenua* (Silvestri) 及 *E. trivittata* Hayat)及其寄主外，也記錄臺灣產其它 19 種恩蚜小蜂新發現之粉蝨寄主。

關鍵詞：恩蚜小蜂屬、蚜小蜂科、粉蝨科、臺灣。