

First record of *Phaenoglyphis villosa* (Hartig, 1841) from Korea (Hymenoptera: Cynipoidea: Figitidae: Charipinae)

J. Pujade-Villar¹, D. Fülöp², J. Paretas-Martinez¹, G. Melika³

1. Universitat de Barcelona. Facultat de Biologia. Departament de Biologia Animal Avda. Diagonal, 645. E- 08028 Barcelona
jpujade@ub.edu | jordi.paretas.martinez@gmail.com
2. Biological Research Center. Institute of Genetics. Molecular Biodiversity Group H-6726 Szeged, Temesvári krt. 62
Szent István University. Faculty of Veterinary Science
Institute for Biology. Department of Ecology
H-1077 Budapest, Rottenbiller u. 50
ocypus@gmail.com
3. Systematic Parasitoid Laboratory
Plant Protection & Soil Conservation Service of County Vas
Ambrozy setany 2, Tanakajd, 9762 (Hungary)
melikageorge@gmail.com



Manuscript received in October 2010

Abstract

The first record of *Phaenoglyphis villosa* (Hartig, 1841) (Hymenoptera: Figitidae: Charipinae) from Korea is given herein, being the second record of this species from the continental Eastern Palaearctic. The examined material, distribution, host associations and some data on the morphology of the Korean specimens are detailed.

Key words: *Phaenoglyphis villosa*; Charipinae; secondary parasitoids; aphids; Korea.

Resum. *Primera cita de Phaenoglyphis villosa (Hartig, 1841) per a Corea (Hymenoptera: Cynipoidea: Figitidae: Charipinae)*

Phaenoglyphis villosa (Hartig, 1841) (Hymenoptera: Figitidae: Charipinae) es cita per primer cop a Corea y per segona vegada a la zona continental del Paleàrtic Oriental. Es menciona el material examinat, alguns aspectes referents a la distribució, els hostes associats i la morfologia dels espècimens col·lectats a Corea.

Paraules clau: *Phaenoglyphis villosa*; Charipinae; parasitoids secundaris; pugons; Corea.

Introduction

The taxonomy of the species of Charipinae is very complicated because they have: (i) a small size (0.9-1.5 mm); (ii) a very weak, indistinct surface sculpture and an apparent lack of interspecific variability; (iii) a single sex and/or many singleton species descriptions, with insufficient species diagnoses; and (iv) the original descriptions are old and incomplete often lacking important diagnostic characters. Until recently the taxonomy of the Charipinae was chaotic, but in the last years some revisions and redescrptions of new genera have dealt with many of the taxonomic problems of this subfamily (Paretas-Martínez *et al.*, 2007, 2008, 2009; Paretas-Martínez & Pujade-Villar, 2006). Many authors have tried to clarify the status of some species of *Phaenoglyphis* (Hellén, 1963; Evenhuis, 1973, 1978; Quinlan, 1974; Evenhuis & Barbotin, 1977, 1987; Andrews, 1978; Quinlan & Evenhuis, 1980; Fergusson, 1986; Menke & Evenhuis, 1991; Pujade-Villar *et al.*, 2002; Pujade-Villar & Paretas-Martínez, 2006), but the taxonomy of this genus remains problematic and in need of a world revision.

Phaenoglyphis villosa is associated with numerous hosts. The trophic chain «*P. villosa* / primary parasitoid / aphid / food plant» uses different hosts and was discussed in detail in many papers (e.g. Evenhuis & Barbotin, 1977; Andrews, 1978; Carver, 1992).

Here we give the first record of *P. villosa* from Korea, which is also the second record of this species from the Continental Eastern Palaearctic; this contributes to the knowledge of a region poorly known on fauna of Charipinae and particularly on *Phaenoglyphis* species.

Material and methods

The specimens examined (8 ♂ and 19 ♀) come from the Hymenoptera collection of the National Institute of Agricultural Sciences and Technology (NIAST) in the Applied Entomology Division (Suwon, South Korea). After this study, some have been deposited in NIAST and some in the UB (University of Barcelona, JP-V collection), see depositaries in the material examined.

The pictures were obtained in a Leica 360 SEM at a low voltage (700V) and without any coating in order to preserve the specimens.

Results

All specimens (8 ♂ and 19 ♀) belong to the same species: *Phaenoglyphis villosa* (Hartig, 1841).

The material examined has the following labels:

2 ♀ and 1 ♂ “Korea, I.A.S., Suweon, 25.V.1970. J.C. Paik”; 1 ♂ (UB) “Korea, I.A.S., *Aphis rumicis*, 4.X.1974, J. C. Paik 4P-83”; 8 ♀ and 2 ♂ “Korea, I.A.S., Suweon, 27.IX.1975. J.C. Paik, ex. *Myzus persicae*”; 5 ♀ and 2 ♂ (1 ♀ UB) “Korea, *Urol. formosanus*, 14.X.1974, J. C. Paik, 4P-82”; 3 ♀ “Korea, I.A.S., Suweon, 24.V.1970. J.C. Paik, P189”; 2 ♂ “Korea, IAS, Suwon, 6.V.1994, J.Y. Choi”; 1 ♀ “Korea, NIAST, 30 May 1997, YPT, leg. J.Y. Choi”.

The specimens from Korea studied here were reared from *Aphis rumicis* Linnaeus, 1758, *Uroleucon formosanum* (Takahashi, 1921), and *Myzus (Nectarosiphon) persicae* Sulzer, 1776 (Hemiptera: Aphididae: Aphidinae: Aphidini and Macrosiphini); the primary parasitoids are unknown.

Discussion

The species of *Phaenoglyphis* are secondary solitary obligate endoparasitoids in Aphidiinae (Hymenoptera: Braconidae) and *Aphelinus* Dalman (Hymenoptera: Chalcidoidea: Aphelinidae), both primary endoparasitoids of aphids (Hemiptera: Aphididae) (Andrews, 1978; Carver, 1992, and others).

Phaenoglyphis can be easily distinguished from all other genera of Charipinae by the presence of a transverse mesopleural furrow (arrow in fig. 1) on the mesopleuron (Andrews, 1978; Fergusson, 1986; Pujade-Villar & Paretas-Martínez, 2006). *Phaenoglyphis villosa* is the only species of this genus with a partially open radial cell (arrow in fig. 2); in all other species the radial cell is entirely closed along the wing margin.

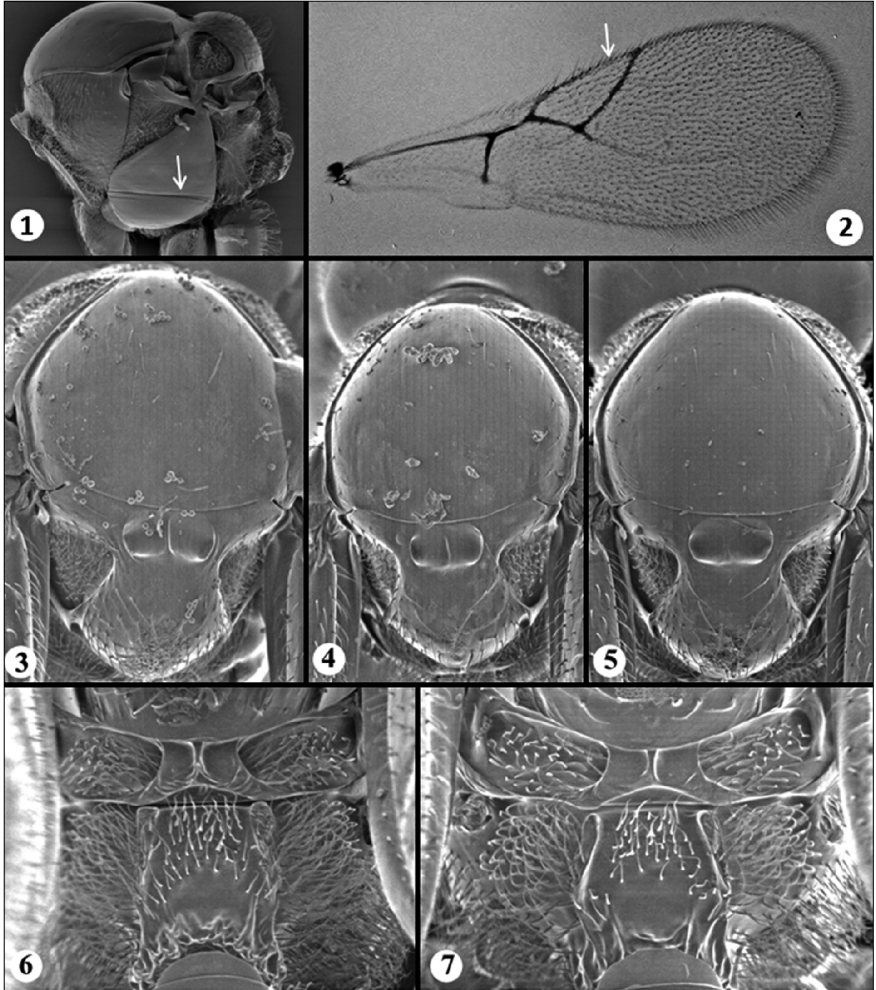
The list of synonyms and name combinations of *P. villosa* is very long and the diagnosis of the species established by previous authors was incorrect and incomplete. Evenhuis & Barbotin (1977) and Menke & Evenhuis (1991) were the first who partially resolved the taxonomic problems of this species. Recently Pujade-Villar *et al.* (2007) detailed the intraspecific variation of this species. Characters which earlier were referred as diagnostic, as flagellomeres' ratio, body colour, shape of scutellar foveae (Figs 3-5), length of radial cell and shape of propodeal carinae (Figs 6-7) have a strong variation and do not have any diagnostic value (Pujade-Villar *et al.*, 2007).

In the specimens examined herein, the mesosoma and head (partially) are amber, similar to material examined from China, Taiwan and Japan; the scutellar foveae are fused or partially fused as previously shown for specimens throughout the entire Holarctic region (Figs 3-5) (Pujade-Villar *et al.*, 2007).

Phaenoglyphis villosa is a cosmopolitan species collected on all continents. It has been introduced onto different continents together with aphids infected with primary parasitoids on their food plants. Carver (1992) suggested that *P. villosa* originated in the Palaearctic and accidentally was introduced from Europe to America and Australia. This species has been found in Algeria, Andorra, Argentina, Australia, Belgium, Canada, Chile, China, Finland, France, Germany, Great Britain, Greece, Hungary, Iran, Japan, Morocco, Moldova, Norway, the Netherlands, New Zealand, Romania, Russia, Spain, Sweden, Taiwan, Ukraine, and USA (Pujade-Villar *et al.*, 2007). The record from Korea given here is the second record from the continental Eastern Palaearctic, after the recent record from China (Pujade-Villar *et al.*, 2007).

Acknowledgements

We are very grateful to Gwan-Seok Lee (Applied Entomology Division, NIAST, Korea) for giving us the possibility to work in the Hymenoptera collection of NIAST, and to Palmira Ros-Farré (Barcelona University, Spain) for the SEM pictures. Part of this work was done with the help of a grant to George Melika from NIAST, named «Construction of surveillance system of disease, insect pests, and weeds for crops».



Figures 1-7. *Phaenoglyphis villosa*. **1:** mesopleuron, lateral view, arrow pointing mesopleural furrow; **2:** forewing, arrow pointing open margin of radial cell; **3-5:** scutum and scutellum, dorsal view (variation in shape of scutellar foveae is shown); **6-7:** propodeum, posterior view, (variation in shape of propodeal carinae is shown).

References

- Andrews, F.G. 1978. Taxonomy and host specificity of Nearctic Alloxystinae with a catalog of the world species (Hymenoptera, Cynipidae). Occasional Papers in Entomology, California 25: 1-128.
- Carver, M. 1992. Alloxystinae (Hymenoptera, Cynipoidea, Charipidae) in Australia. Invertebrate Taxonomy 6(3): 769-785.
- Evenhuis, H.H. 1973. Studies on Cynipidae Alloxystinae 3. The identity of *Phaenoglyphis ruficornis* (Förster, 1869) comb. n. Entomologische Berichten, Amsterdam 33: 218-219.
- Evenhuis, H.H. 1978. Studies on Cynipidae Alloxystinae 7. Remarks on Cameron's species and a discussion of *Phaenoglyphis* species with incomplete parapsidal furrows. Entomologische Berichten, Amsterdam 38: 169-175.
- Evenhuis, H.H.; Barbotin, F. 1977. Studies on Cynipidae Alloxystinae 6. *Phaenoglyphis villosa* (Hartig) and *Alloxysta arcuata* (Kieffer). Entomologische Berichten, Amsterdam 37: 184-190.
- Evenhuis, H.H.; Barbotin, F. 1987. Types of the Alloxystidae species (Hymenoptera, Cynipoidea) in the Carpentier collection described by J.J. Kieffer with new synonyms and a new name. Bulletin Annual de la Société Royal de Belge Entomologie 123(7-9): 211-224.
- Fergusson, N.D.M. 1986. *Hymenoptera Cynipoidea. Charipidae, Ibalidae & Figitidae*. 55 pp. Handbooks for Identification of British Insects 8(1c). Royal Entomological Society, London.
- Hellén, W. 1963. Die Alloxystinen Finnlands. (Hymenoptera: Cynipidae). Fauna Fennica 15: 1-23.
- Menke, A.S.; Evenhuis, H.H. 1991. North American Charipidae, key to genera, nomenclature, species checklist and a new species of *Dilyta* Förster (Hymenoptera, Cynipoidea). Proceedings of the Entomological Society of Washington 93(1): 136-158.
- Paretas-Martínez, J.; Arnedo, M.A.; Melika, G.; Selfa, J.; Seco-Fernández, M.V.; Fülöp, D.; Pujade-Villar, J. 2007. Phylogeny of the parasitic wasp subfamily Charipinae (Hymenoptera, Cynipoidea, Figitidae). Zoologica Scripta 36: 153-172.
- Paretas-Martínez, J.; Melika, G.; Pujade-Villar, J. 2008. Description of *Loboptercharips arreplegata* gen. n. & sp. n. (Hymenoptera: Figitidae: Charipinae) from Nepal, with notes on its phylogenetic position. Insect Systematics and Evolution 38: 473-479.
- Paretas-Martínez, J.; Melika, G.; Pujade-Villar, J. 2009. Description of four new species of *Dilyta* Förster (Hymenoptera: Figitidae: Charipinae) from the Afrotropical region. African Entomology 17(2): 207-214.
- Paretas-Martínez, J.; Pujade-Villar, J. 2006. Two genera of Charipinae (Hymenoptera: Figitidae) from Australia: revision of the genus *Thoreauana* Girault, 1930 and description of *Dilapothor* n. gen. Australian Journal of Entomology 45: 219-226.
- Pujade-Villar, J.; Paretas-Martínez, J. 2006. *Phaenoglyphis* «versus» *Hemicrisis*, and the description of a new sculptured species of Charipinae (Hymenoptera: Figitidae). European Journal of Entomology 103: 477-481.
- Pujade-Villar, J.; Díaz, N.; Evenhuis, H.H.; Ros-Farré, P. 2002. South American Charipinae: Review and description of two new species (Hymenoptera: Cynipoidea: Figitidae). Annals of the Entomological Society of America 95(5): 541-546.
- Pujade-Villar, J.; Paretas-Martínez, J.; Selfa, J.; Seco-Fernández, M.V.; Fülöp, D.; Melika, G. 2007. *Phaenoglyphis villosa* (Hartig, 1841) (Hymenoptera: Figitidae: Charipinae):

a complex of species or a single but very variable species? *Annales de la Société Entomologique de France* (n.s.) 43(2) : 169-179.

Quinlan, J. 1974. The British Cynipoidea (Hymenoptera) described by P. Cameron. *Bulletin of the British Museum (Natural History) (Entomology)* 31: 1-21.

Quinlan, J.; Evenhuis, H.H. 1980 Status of the subfamily names Charipinae and Alloxystinae (Hymenoptera: Cynipidae). *Systematic Entomology* 5: 427-430.