

First record of the non-pollinating fig wasp *Odontofroggattia galili* Wiebes, 1980 from Malta (Hymenoptera, Chalcidoidea, Agaonidae)

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ABSTRACT. The fig wasp *Odontofroggattia galili* is reported for the first time from Malta. *Odontofroggattia* is a non-pollinating fig wasp genus associated with a narrow range of host plant species, among them *Ficus microcarpa*, a widespread ornamental tree native to Asia.

KEY WORDS. alien organism, urban area, southern Europe.

INTRODUCTION

In the 19th century several species of *Ficus* trees were imported in Europe from Asia. Among them, *Ficus microcarpa* L., was successfully planted along urban roads and gardens in southern Italy and Malta. In these last twenty years, four species of Agaonidae were found in association with syconia of *F. microcarpa* in Italy, namely: *Eupristina verticillata* Waterston, 1921, *Odontofroggattia galili* Wiebes, 1980 (Sicily and Apulia: LO VERDE *et al.*, 1991; LO VERDE *et al.*, 2007), *Walkerella microcarpae* Bouček, 1933 and *Philotripes emeryi* Grandi, 1926 (Sicily: LO VERDE *et al.*, 2007), while another agaonid, *Josephiella microcarpae* Beardsley and Rasplus, 2001, a leaf gall-inducing species, was recorded in Sicily (LO VERDE, 2002). Following the discovery of *E. verticillata* in Italy, it became evident that fertile fruits (fig. 1a, b) were being produced inside syconia of *F. microcarpa* (DOMINA & MAZZOLA, 2002), and young plants were observed in fissures of walls, divaricating branches of ornamental trees and in crevices on palm stipes. This could be mainly due to the dissemination of the fertile seeds by birds (TRAVERSE, 1998). During a recent visit in the Maltese archipelago several syconia of *F. microcarpa* (fig. 1d) were collected in both Malta and Gozo, from which a species of Epichrysomallinae was bred (fig. 1e, f, g). The specimens were identified by the authors as *Odontofroggattia galili*.

Odontofroggattia galili Wiebes, 1980

Taxonomic notes: *Odontofroggattia* is a non-pollinating fig wasp genus which currently accomodates five described species. *Odontofroggattia* spp. are associated with a narrow range of host plant species, namely *Ficus microcarpa* L. and *F. prasinicarpa* Elmer (ISHII, 1934; WIEBES, 1980; BOUČEK, 1988; FENG & HUANG, 2010).

Both males and females of *O. galili* are winged and of a light brown coloration. Diagnostic characters include: antennal formula 11063 (11053 in *O. quinifuniculus* Feng & Huang), bidentate mandible (tridentate in *O. ishii* Wiebes and *O. gajimaru* Ishii), petiole slightly longer than wide without tooth on lateral side (wider than longer in *O. ishii*, and *O. gajimaru* and *O. quinifuniculus*; longer than wide but with a strong acute ventral hook in *O. corneri* Wiebes), hind coxa with dorsal teeth (unarmed in *O. corneri*).

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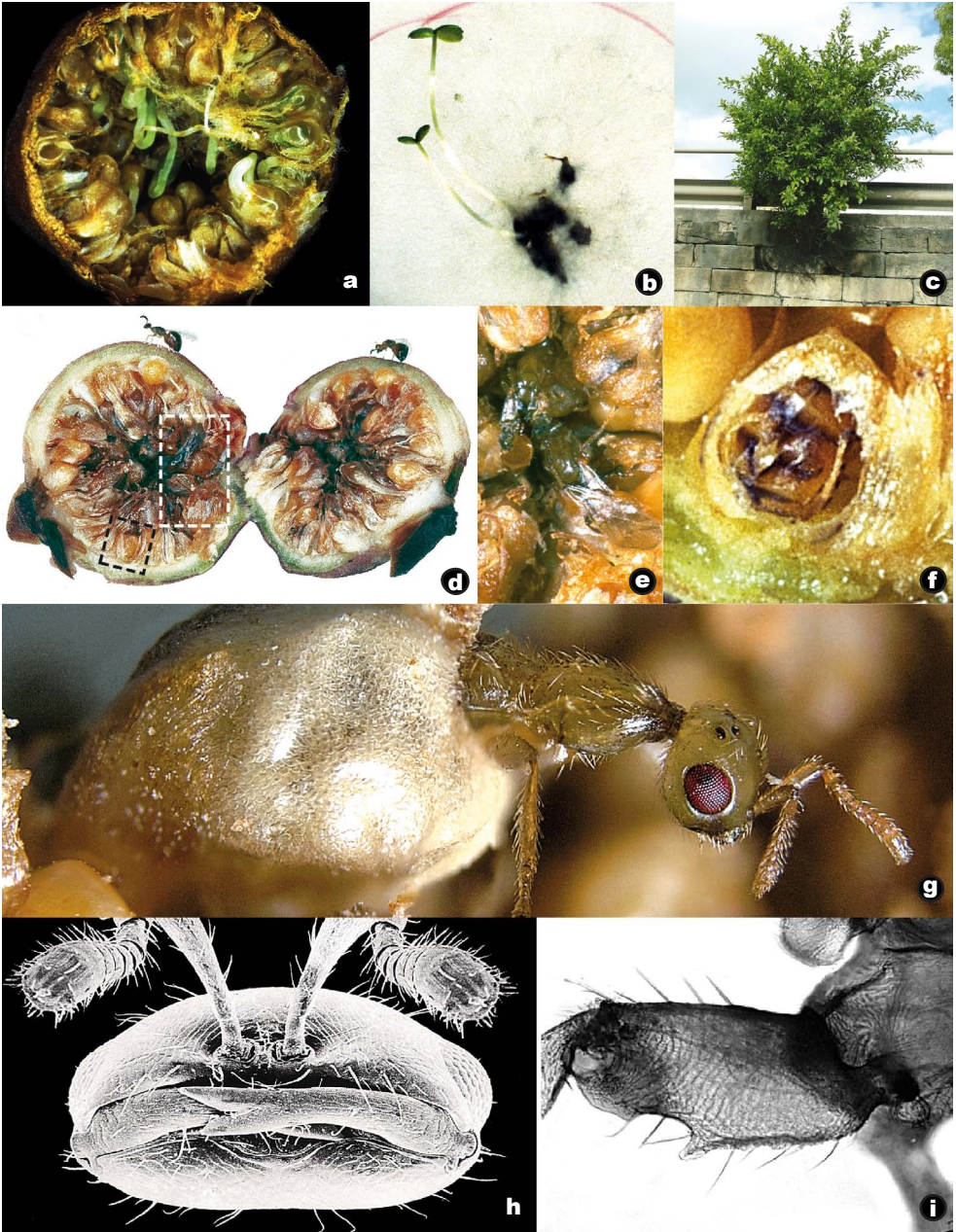


Figure 1: (a,b,c) *Ficus microcarpa* plantlets originating from fertilized flowers. Some sprout while still in syconia (a) but mostly grow alone (e.g. as observed under laboratory conditions in Petri dish) (b) or young plants which self-regenerate in remote areas (c). (d,e,f,g) Ripened but still hanging syconia hosting *Odontofroggattia galili* adults. Divided syconia inducing adults of *O. galili* to fly away (d), other individuals search for shelter among fruits (e) while others are still pupae inside fruits (f) until they eventually emerge (g). Male morphological details of *O. galili*: head from gnathal side (h) showing the long bidentate and overlapping mandibles and posterior femur (i).

Material examined. MALTA: Valletta, Mdina, Ta' Qali, Żejtun. GOZO: Fontana. 24 males and 32 females collected during February, May and August, 2009, *ex Ficus microcarpa* grown as ornamental.

Distribution. Australia, Bermuda, China (Hong Kong, Guangdong, Hainan, Taiwan), Israel, Japan, Malaya, Papua New Guinea, Southeast Asia, USA (California, Florida, Hawaii), Israel, Tunisia (BOUČEK 1988; KOBBI *et al.*, 1996; BEARDSLEY, 1998; YOKOYAMA & IWATSUKI, 1998; CHEN *et al.*, 1999). Introduced also in Europe: Greece (COMPTON, 1989), Italy (LO VERDE *et al.*, 1991; LO VERDE *et al.*, 2007).

Ecology. *O. galili* is strictly associated with *F. microcarpa*. Nevertheless, *O. galili* is not considered a true pollinator, as its presence alone does not guarantee the production of fertile seeds of the mentioned host plant. In some cases, the presence of non-pollinating fig wasps may be recorded prior to the arrival of the true pollinating species, as was the case in Brazil (NEVES & ISAIAS, 1987; RAMÍREZ & MONTERO 1988; DE FIGUEIREDO & MOTTA, 1993; DE FIGUEIREDO *et al.*, 1995). Taking into account the diversity of fig wasps associated with *F. microcarpa* and the events which occurred in Italy in the last twenty years, it is likely that the true pollinator, *E. verticillata* is already present in Malta, as shown by the self-regeneration of young fig trees (Fig. 1c) in remote areas.

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REFERENCES

- BEARDSLEY, J.W. (1998) Chalcid wasps (Hymenoptera: Chalcidoidea) associated with fruit of *Ficus microcarpa* in Hawaii. *Proceedings of the Hawaiian Entomological Society*, **33**: 19-34.
- BOUČEK, Z. (1988) *Australian Chalcidoidea (Hymenoptera): A Biosystematic Revision of Genera and Fourteen Families, with a Reclassification of Species*. CAB International Institute of Entomology, Wallingford, UK., 832 pp.
- CHEN, Y.R., CHUANG, W.C. & WU, W.J. (1999) Chalcid wasps on *Ficus microcarpa* L. in Taiwan (Hymenoptera: Chalcidoidea). *Journal of Taiwan Museum*, **52**(1): 39-79.
- COMPTON, S.G. (1989) The fig wasp *Odontofroggattia galili* (Hymenoptera: Pteromalidea) in the Greek isles. *Entomologist's Gazette*, **40**: 183-184.
- DE FIGUEIREDO, R.A. & MOTTA JR J.C. (1993) Biology of *Walkerella yashiroi* (Ishii) (Hymenoptera: Chalcidoidea). *Naturalia*, **18**: 27-32.
- DE FIGUEIREDO, R.A., MOTTA, J.C. JR & DA SILVA VASCONCELLOS, L.A.S. (1995) Pollination, seed dispersal, seed germination and establishment of seedlings of *Ficus microcarpa*, Moraceae, in southeastern Brazil. *Revista Brasileira de Biologia*, **55**(2): 233-239.
- DOMINA, G. & MAZZOLA, P. (2002) Note su alcune xenofite nuove o in espansione in Sicilia. *Naturalista siciliano*, **26**(3-4): 165-174.
- FENG, G. & HUANG, D.W. (2010) Description of a new species of *Odontofroggattia* (Chalcidoidea, Epichrysomallinae) associated with *Ficus microcarpa* (Moraceae) with a key to species of the genus. *Zootaxa*, **2335**: 40-48.

- GRANDI, G. (1927) Imenotteri sicofili raccolti dal prof. F. Silvestri nell'indocina, nella Cina, nella penisola Malacca e a Formosa. *Bollettino del Laboratorio di Zoologia generale e agraria Portici*, **20**: 169-188.
- KOBBI, M., CHAIEB, M., EFELIN, C. & MICHALOUD, G. (1996) Relationship between a mutualist and parasite of the laurel fig, *Ficus microcarpa*. *Canadian Journal of Zoology*, **74**(10): 1831-1833.
- ISHII, T. (1934) Fig chalcidoids of Japan. *Kontyû*, **8**: 84-100.
- LO VERDE, G., PORCELLI, F., BELLA, S. & RASPLUS, J.I. (2007) Imenotteri Agonidi nuovi per l'Europa e loro ruolo nella naturalizzazione di *Ficus* spp. in Italia. Atti XXI CNIE, Campobasso, 11-16 giugno 2007: 60.
- LO VERDE, G., PORCELLI, F. & SINACORI, A. (1991) Presenza di *Parapristina verticillata* (Waterst.) e *Odontofroggattia galili* Wiebes (Hymenoptera: Chalcidoidea Agaonidae) in Sicilia. Atti XVI CNIE, Bari-Martina Franca (TA): 139-143.
- NEVES, L.J. & ISAIAS, R.M.S. (1987) *Occerência de agente galthador em flores de Ficus microcarpa L. Bradea*, **4**: 327-330.
- RAMÍREZ, B.W. & MONTERO, S.J. (1988) *Ficus microcarpa* L., *F. benamina* L. and other species introduced in the New World, their pollinators (Agonidae) and other fig wasps. *Revista de Biología Tropical*, **36**: 441-446.
- SCHICCHI, R. (1999) Spontaneizzazione di *Ficus microcarpa* (Moraceae) e *Cardiospermum grandiflorum* (Sapindaceae) in Sicilia. *Naturalista siciliano*, **23**(1-2): 315-317.
- TRAVERSE, A. (1998) Effect of seed passage through vertebrate frugivores' guts on germination: a review. *Perspectives in Plant Ecology, Evolution and Systematics*, **1/2**: 151-190.
- WIEBES, J.T. (1980) The genus *Odontofroggattia* Ishii (Hymenoptera, Chalcidoidea, Pteromalidae, Epichrysomallinae). *Zoologische Mededelingen Leiden*, **56**(1): 1-6.
- YOKOYAMA, J. & IWATSUKI, K. (1998) A faunal survey of fig-wasps (Chalcidoidea: Hymenoptera) distributed in Japan and their associations with figs (*Ficus*: Moraceae). *Entomological Science*, **1**(1): 37-46.

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