

Alien Invasive Arthropods of Malta and Sicily



**David Mifsud, Simone Cutajar, Thomas Cassar,
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L-Università ta' Malta
Malta University Press

2023

Published by
Malta University Press
Room 10, Library basement
University of Malta
Msida MSD 2080, Malta
mup@um.edu.mt
+356 2340 6126
www.um.edu.mt/mup
Publishing Rights – Malta University Press

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Cover photograph: *Colaphellus palaestinus* (refer to page 113)

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Printed by Best Print Ltd.

Cataloguing in Publication

Mifsud D., Cutajar S., Cassar T., D’Urso V., Sabella G., Kazerani F., Puglisi A., Brunetti S., Bella S., Schlick-Steiner I. & Lamoliere A. (2023) *Alien Invasive Arthropods of Malta and Sicily*. Malta University Press, viii + 405 pgs

ISBN 978-9918-0-0733-2

This project is part-financed by the European Union European Regional Development Fund (ERDF), through the INTERREG V-A Italy-Malta Programme. Co-Financing rate 85% EU Funds, 15% National Funds.

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Acknowledgements

We would like to acknowledge the following people/online resources for the photographs included in this book. Not credited photographs are originals of the authors of this publication:

Simon Oliver for *Acizzia jamatonica*; Alex Bairstow for *Acizzia uncatoides*; James Gathany for *Aedes albopictus*; University of Florida for *Aethina tumida*; Francesco Porcelli and Marilisa Cioffi for *Aleurocanthus spiniferus*; Chris Malumphy for *Aleuroclava jasmini*; Roberto Battaglia, Chris Malumphy, Sanja Radonji, Snežana Hrni and Milord Raievi for *Aleurothrixus floccosus*; Udo Schmidt for *Alphitobius laevigatus*; Donald Hobern for *Anatrachyntis badia*; Udo Schmidt for *Anthrenus flavipes*; Gene H for *Aonidiella aurantii*; David Urry for *Aphis illinoisensis*; Marco De Haas for *Aphis spiraeicola*; Udo Schmidt for *Araecerus fasciculatus*; Michel Kettner for *Ascalenia acaciella*; Raymond J. Gill for *Bambusaspis bambusae*; David Riley and Wietse den Hartog for *Bemisia tabaci*; Tiziana Dinolfo for *Bifascioides leucomelanella*; Udo Schmidt for *Bitoma siccana*; Chris Mallory for *Blastopsylla occidentalis*; Pier Luigi Scaramozzino for *Carpophilus zeaphilus*; Pier Francesco Murgia for *Cathayia insularum*; Marc Schweizer for *Ceroplastes floridensis*; E. P. Mallory for *Chrysomphalus aonidum*; Nicky Bay for *Corythauma ayyari*; Rodney Start and Oleksandr Kovalchuk for *Daktulosphaira vitifoliae*; Ulrich Drabiniok for *Daphnia parvula*; Lyle Buss and Florida Division of Plant Industry for *Dialeurodes citri*; John A. Davidson for *Diaspis boisduvalii*; Katja Schulz for *Drosophila suzukii*; Carol Mapes, Gregor P. Setliff, Richard Courtney and Kelly Bothur for *Dryocosmus kuriphilus*; Josef Jelínek, Paolo Audisio, Jiří Hájek, Cosimo Baviera, Bernard Moncoutier, Thomas Barnouin, Hervé Brustel, Hanife Genç and Richard A. B. Leschen for *Eपुरaea imperialis*; Udo Schmidt for *Eपुरaea luteola*; Udo Schmidt for *Eपुरaea ocularis*; Lorraine Graney for *Essigella californica*; Chris Malumphy for *Frankliniella occidentalis*; Jose Jamon Pato for *Gonipterus scutellatus* complex; Nicky Bay for *Gynaikothrips ficorum*; Hectonichus for *Halyomorpha halys*; Udo Schmidt for *Harmonia axyridis*; ozthrips.org for *Heliothrips haemorrhoidalis*; Francisco Rodriguez for *Hemiberlesia cyanophylli*; Lucarelli for *Icerya purchasi*; Tyus Ma for *Icerya seychellarum*; Tircis for *Isodontia mexicana*; Scot Nelson for *Josephiella microcarpae*; Aucklandnaturalist for *Lantanophaga pusillidactyla*; Udo Schmidt for *Leptinotarsa decemlineata*; Paul Langlois for *Leptocybe invasa*; Didier Descouens for *Leptoglossus occidentalis*; Alex Wild for

Linepithema humile; Central Science Laboratory, Harpenden for *Liriomyza huidobrensis*; Central Science Laboratory, Harpenden for *Liriomyza trifolii*; Didier Descouens for *Metcalfa pruinosa*; György Csóka and Stephen J. McWilliam for *Obolodiplosis robiniae*; Oscar Neto for *Oxidus gracilis*; Cesare Ancona for *Ozognathus cornutus*; Chris Malumphy for *Paraleyrodes minei*; Udo Schmidt for *Paraphloeostiba gayndahensis*; Mark Yokoyama for *Pectinophora gossypiella*; Cong Liu, Georg Fischer, Francisco Hita Garcia, Seiki Yamane, Qing Liu, Yan Qiong Peng, Evan P. Economo, Benoit Guénard and Naomi E. Pierce for *Pheidole indica*; Feng Zhenhao for *Phenacoccus peruvianus*; Alex and Natali Protasov for *Phenacoccus solenopsis*; Udo Schmidt for *Phenolia picta*; Wolfgang Walz Hillermann for *Phoracantha recurva*; Udo Schmidt for *Phoracantha semipunctata*; Esin Üstün for *Phryneta leprosa*; Georgiev and Jeffrey W. Lotz for *Phyllocnistis citrella*; Eran Finkle for *Pterochloroides persicae*; Steve Kerr for *Pycnoscelus surinamensis*; Katja Schulz for *Scaptomyza adusta*; Gubin Olexander for *Sceliphron curvatum*; John Schneider and Chris Malumphy for *Singhiella simplex*; April Nobile for *Solenopsis invicta*; Ionuț Iorgu for *Stelidota geminata*; Pedro Antonio Lazaro for *Takecallis taiwana*; Nicky Bay for *Tetramorium lanuginosum*; Paul Piron for *Tinocallis takachihoensis*; Patrick Clement for *Tuta absoluta*; Gilles San Martin for *Varroa destructor*; Jeff Eickwort for *Xylosandrus compactus*; Daniel Rydzi for *Xylotrechus stebbingi*; Jorge Almeida for *Zaprionus indianus*; Jean Martins for *Zaprionus tuberculatus* and Marcus Ng for *Zelus renardii*.

Introduction

Biological invasions have become a major global concern due to the potential economic and environmental ramifications they entail. Arthropods, which encompass insects, mites, spiders, millipedes, woodlice, crabs and other related organisms, are continuously being introduced into new territories. Introduced species evolve in their new environments, and this can aggravate impacts. In some cases, newly introduced genotypes can cause a harmless species to become invasive. Over the past century, this trend has surged, primarily driven by increased international trade in agricultural commodities, particularly plants, the rapid growth of the tourism industry and the ongoing effects of climate change.

Most invasive species, particularly those originating from subtropical regions, tend to follow a similar distributional pattern: they first establish themselves in the Mediterranean and/or Macaronesian regions before gradually expanding northward. Once they take root in a new territory, these biological invasions pose threats to native biodiversity and can jeopardise economically significant crops.

Sicily and Malta are no exceptions to the phenomenon of biological invasions and the combined count of terrestrial and freshwater alien arthropods in either of these regions exceeds 600 species. It's worth noting that this number is likely an underestimate because many arthropod groups remain inadequately studied. A significant portion of these organisms was inadvertently introduced during historical times and has since become nearly ubiquitous in distribution, establishing themselves as native to these territories (autochthonous). Examples include the sap beetle, *Carpophilus bifenestratus* and the cotton aphid, *Aphis gossypii*. The native origins of some of these species remain a subject of debate among scientists and their precise origins are often unknown. On the other hand, a relatively small number of alien species, though documented in the scientific literature from Malta and/or Sicily (such as the false powderpost beetle, *Sinoxylon unidentatum* and the longhorn beetle, *Callidiellum villosulum*, both recorded from Malta) have not yet established themselves within these territories and should not be considered as forming part of their respective faunas. However, it's important to acknowledge that the potential for some of these species to establish themselves in the future cannot be ruled out. This is particularly so when considering factors such as repeated introductions of a particular species and changing environmental parameters such as climate change.

Unfortunately, the native status of certain species, such as the flea beetle, *Altica ampelophaga* and the false powderpost beetle, *Apate monachus* for Malta, often remains uncertain. Their current distribution pattern strongly suggests they could be native, but the absence of historical reports in entomological literature, despite their relatively large size and evident damage to their host-plants, casts doubt on this hypothesis. Conversely, species like the painted bug, *Bagrada hilaris*, believed to be alien and invading new territories since 2008, have been given a native status for Malta, after historical records of its presence on the mentioned island were discovered in a work published in 1916.

The greatest threat arises from alien arthropods that successfully establish themselves in new territories, leading to rapid proliferation and invasiveness. Some of these species exhibit invasiveness once established in a new territory which is however followed by a significant reduction in population density (e.g., the American vine aphid, *Aphis illinoisensis*) in later years. However, this pattern is not universal, as many species remain invasive for much extended periods (e.g., the red swamp crayfish, *Procambarus clarkii*, the Asian tiger mosquito, *Aedes albopictus* and the peach black aphid, *Pterochloroides persicae*), often causing direct or indirect harm to native biodiversity or imposing economic burdens on agricultural commodities.

Throughout this work, new insights into alien invasive species found in either Malta, Sicily, or in both islands, were acquired. Whenever possible, data for each of the 101 selected alien invasive species discussed herein is included. You may wonder why 101 species were chosen instead of a round number like a 100. This decision was made because just before this book went to print, the alien invasive red fire ant, *Solenopsis invicta*, was recorded in Sicily. Consequently, this species was included to make available relevant information on this highly damaging and invasive species to the general public.

The order Hemiptera, which comprises insects like aphids, scale insects, whiteflies, jumping plant-lice, bugs and planthoppers, harbours the highest number of alien invasive species globally. Selecting 100 species solely from this order for the present book would have been easy to accomplish but the aim was to provide a diverse range of arthropod groups that either detrimentally affect our biodiversity or harm agricultural commodities. All the species featured herein were unintentionally introduced over the past 150 years. Alien arthropods that are strictly beneficial, including some deliberately introduced (such as the cardinal ladybird beetle, *Rodolia cardinalis*, as a predator on the cotton cushion scale, *Icerya purchasi*,

both native to Australasia) or accidentally introduced (such as the aphid parasitoid, *Lysiphlebus testaceipes*, native to the Nearctic Region) species, were excluded from this compilation.

For each species, data is provided on their native origins, global distribution and the dates of their introductions where available. Synonyms and common names are included where relevant and initial interceptions in Malta and Sicily are highlighted and referenced. Each organism is accompanied by photographs to aid field identification, along with a brief description, ecological information, preferred invading habitat and other relevant biological details. The invasive status and the potential threats that these organisms pose to biodiversity and agriculture are also discussed.

Acizzia jamatonica **(Kuwayama, 1908)**

(Arthropoda: Insecta: Hemiptera: Psyllidae)



Main synonym

Acizzia albizziae (Yang, 1984)

Common name

Albizia psyllid.

Short description

Adults of *Acizzia jamatonica* are 1.3-2.3 mm long, with a colour variation ranging from green or yellow to dark brown. The abdomen is green to greenish-orange or orange-brown with transverse greyish bands. The forewings are hyaline with indistinct brown or grey patches. The eggs are long, light orange and oval with the apical end narrower and more pointed than the basal end. They are laid singularly or in groups on the buds and undersides of the foliage. The first instar nymphs are generally light orange coloured with reddish eyes. The last (fifth) instar nymphs are light orange or greenish, with lateral patches of the head and wing pads dark brown, the caudal plate of abdomen is light brown with long marginal capitate setae. The dorsal surface of the thorax and abdomen has paired brown spots and transverse bands.

Place of origin and global distribution

Acizzia jamatonica is a psyllid originating from southern and eastern Asia introduced into North America in 2007 and was placed on the European and Mediterranean Plant Protection Organisation (EPPO) Alert List for

Europe. *Acizzia jamatonica* was accidentally introduced into Europe some 20 years ago. It was first recorded in Italy in 2001 and in 2002 it had already colonised most of northern Italy, reaching Switzerland and the south-west of Slovenia and Croatia. In 2003 the species was intercepted once in the United Kingdom on *Albizia julibrissin* in containers originating from Italy. Its presence in France was first reported in 2004 and was then found in Hungary, the Iberian Peninsula, Greece and other Mediterranean bordering countries. Recently also reported from Iran, Russia and Taiwan.

Distribution, frequency and first record for Sicily

In Sicily, *Acizzia jamatonica* was detected on *Albizia julibrissin* in urban areas (Bella & Rapisarda, 2014) often in high infestations.

Distribution, frequency and first record for Malta

Acizzia jamatonica is not yet recorded from the Maltese Islands.

Habitat or preferred invading habitat

Acizzia jamatonica develops exclusively on *Albizia* species, mainly on *Albizia julibrissin*. This tree, commonly known as the Persian Silk tree is a legume belonging to the subfamily Mimosoideae native to southern and eastern Asia, from Iran East to China and Korea and introduced into Europe in the mid-eighteenth century as an ornamental. In the Mediterranean Region, this psyllid is mainly associated with urban areas where *Albizia julibrissin* is cultivated.

Introduction source

Acizzia jamatonica was introduced via international trade of its host-plant.

Ecology

Acizzia jamatonica lives on different species of the genus *Albizia*. In Europe, this psyllid has been collected only on the Persian silk tree, *Albizia julibrissin*. This species goes through numerous overlapping generations. Leaves, flowers and shoots can be completely colonised by juvenile and adult stages with serious damage (leaf yellowing and defoliation). The eggs are laid on veins and leaf margins and less frequently on the lower surface of leaves. Both larvae and adults feed on the phloem contents of the host-plant and excrete large quantities of honeydew, which is coated with waxy secretions and deposited on the plants' surface.

Possible control methods

The control of this pest is difficult in practice because its host-plant is used as an ornamental tree in the urban environment where only a limited number of active substances are authorised and several applications of insecticides would be necessary to control the overlapping generations.

The anthocorid, *Anthocoris nemoralis* and ladybird beetles of the genus *Scymnus*, are known to be predatory on *Acizzia jamatonica*, but their impact on this pest is marginal.

Invasive category/local potential threat

Acizzia jamatonica is moderately invasive but of low threat to native biodiversity. Since it is mainly found on the Persian silk tree, *Albizia julibrissin*, it is unlikely to pose a risk to native plants. However, with respect to the economic and aesthetic values of *Albizia julibrissin*, *Acizzia jamatonica* might be viewed as a harmful pest species.

Remarks

Acizzia jamatonica is one of four alien *Acizzia* species known to occur in Europe; the other three being *Acizzia uncatoides*, *Acizzia acaciae-baileyanae* and *Acizzia hollisi*.

Literature

Bella S. & Rapisarda C. (2014) New findings in Italy of the recently introduced alien psyllid *Macrohomonotoma gladiata* and additional distributional records of *Acizzia jamatonica* and *Cacopsylla fulguralis* (Hemiptera, Psylloidea). *Redia*, 97: 151–155.
