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in Galicia III:
Pentatomidae, Triozidae, Aphrophoridae,
Tinguidae, Aleyrodidae and Coreidae species
identified on woody ornamental crops*

Especies de hemipteros plaga de calidad de importancia ornamental en Galicia III: especies de Triozidae, Aphrophoridae, Tinguidae, Aleyrodidae y Coreidae identificadas en cultivos de especies leñosas ornamentales

Scientific paper – *Artículo científico*

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Abstract

In the present paper the author carries out a list with the *Hemiptera* species, belonging to *Pentatomidae*, *Triozidae*, *Aphrophoridae*, *Tingidae*, *Aleyrodidae* & *Coreidae* families identified on woody ornamental crops of Galicia, as part of his independent consultancy service, carried out from 1999 to 2020. A total number of 9 new different species were identified, 1 *Pentatomidae*, 1 *Triozidae*, 2 *Aphrophoridae*, 2 *Tingidae*, 2 *Aleyrodidae* and 1 *Coreidae*. Considering only crop pests, 5 from 9 were new references for woody ornamental crops in Galicia and 2 of them was new references for Spain

Key words: whiteflies, froghoppers, bugs and suckers, Galicia, woody ornamental crops

Resumen

En el presente trabajo el autor relaciona la totalidad de especies de hemípteros de las familias Pentatomidae, Triozidae, Aphrophoridae, Tingidae, Aleyrodidae y Coreidae identificadas en cultivos de especies leñosas ornamentales de Galicia, basándose en la información obtenida de su trabajo como consultor entomológico independiente, desde 1999 a 2020. Se identificaron un total de 9 especies diferentes, 1 pentatomido, 1 trioziado, 2 afroforidos, 2 tingidos, 2 aleyrodidos y 1 coreido. en condiciones de cultivo, 5 de las 9 especies relacionadas son nuevas citas, para Galicia y 2 de las mismas para España.

Palabras clave: Triozas, chinches, cercópidos y moscas blancas ornamentales, Galicia, cultivos de leñosas ornamentales.

1. Introduction

The Spanish entomologists point out the presence of a relatively limited number of *Hemiptera* species, belonging to the families *Pentatomidae*, *Triozidae*, *Aphrophoridae*, *Tingidae*, *Aleyrodidae* and *Coreidae* as specific pests of woody ornamental species in Spain. These are the following: *Corythucha ciliata*, *Trialeurodes vaporariorum*, *Bemisia tabaci*,

Stephanitis pyri, *Calocoris trivialis*, *Aphrophora salicina*, *Monosteira uncostata*, *Gargaphia lunulata*, *Trioza alacris*, *Aleurothixus floccosus*, *Aleurotuba jelinekii*, *Bemisia hancocki*, *Bemisia tabaci*, *Dialeurodes citri*, *Halymorpha halys*, *Leconoides floccosus*, *Parabemisia myrica*, *Iphonimus phillyrae* and *Leptoglossus occidentalis* (Villalva, 1996; De Liñán, 1998; Ribes, 2004; Durán et al., 1994; Ajmat et al., 2003; Dioli et al., 2016).

The number of species belonging to these families and referenced on woody ornamental crops in Galicia (NW Spain) is even shorter: *Corythucha ciliata*, *Monosteira unicastata*, *Stephanitis pyri*, *Leptoglossus occidentalis* –only photographic records– (Rodríguez Gracia *et al.*, 2016; Pérez Valcárcel & Prieto Piloña, 2010).

This type of ornamental pests, have recently increased in importance due to a specific matter: the presence of the quarantine pathogen *Xylella fastidiosa* in Europe. Some of these species are considered current and potential vectors of the disease: *Aphrophora alni*, *Aphrophora salicina*, *Philaenus spumarius*, *Cercopis vulnerata*, *Neophilaenus campestris* (Cavalieri & Porcelli, 2017).

The identification of the main species of these hemiptera families on woody ornamental crops is specially useful for the design of sustainable plant protection programs due to the problem of resistance to insecticides referenced, up to the present moment, on different whiteflies (IRAC, 2020 a; IRAC, 2020 b). Their exact determination is also necessary, at the present moment, due to the increasing quarantine problem of *Xylella fastidiosa*.

2. Material & methods

The study was carried out only in woody ornamental production centres of Galicia, intermittently from 1999 to 2020. The samples were obtained from 9 nurseries belonging to the following Galician provinces: 6 in Pontevedra and 3 in A Coruña. The entomological monitoring of the pests was carried out every 15 or 30 days, sampling periodically in order to identify the hemiptera species by means of classical entomological determination methods.

The infested plant material samples were analyzed in the entomological laboratory of the firm CONSULTORIAS NOROESTE. The species determinations, carried out by the author, were

performed based on the following taxonomical keys: *Aphrophoridae* –Hamilton, 1982; *Coreidae* –Mc Pherson *et al.*, 1990; *Pentatomidae*: Pericart 2010; *Tinguidae*: Pericart, 1983; *Triozidae*: Hodkinson & White, 1979; *Aleyrodidae* –Hodges & Evans, 2005

3. Results

List of identified species

FAMILY PENTATOMIDAE

1. *Graphosoma lineatum* (Linnaeus, 1758)
Hosts: *Phyllostachys nigra*, *P. aurea*.
Type of crop: container
Province: A Coruña

FAMILY TRIOZIDAE

2. *Trioza alacris* (Flor, 1861)
Hosts: *Clematis sp.*, *Laurus nobilis*.
Type of crop: soil.
Province: Pontevedra.

FAMILY APHROPHORIDAE

3. *Aphrophora salicina* (Goeze, 1778)
Hosts: *Grevillea robusta*, *Hebe spp.*, *Pyracantha sp.*, *Grevillea rosmarifolia*, *azalea*
Type of crop: container.
Province: Pontevedra.
4. *Aphrophora cribata* (Walker, 1851)
Hosts: *Pinus pinaster*.
Type of crop: container.
Province: Pontevedra.

FAMILY TINGUIDAE

5. *Stephanitis pyri* (Fabricius, 1775)
Hosts: *Pyrus domestica*.
Type of crop: soil.
Province: Pontevedra.

6. *Corythucha ciliate* (Say, 1832)

Hosts: *Platanus hispanica*, *Rosa canina*, *Sambucus nigra*, *Lavandula angustifolia*.

Type of crop: soil.

Province: Pontevedra.

FAMILY ALEYRODIDAE7. *Traleurodes vaporariorum* (Westwood, 1856)

Hosts: *Ceanothus repens*, *Stevia*, *Metrosideros robusta*, *Polygala myrtifolia*, azalea.

Type of crop: container.

Province: Pontevedra, A Coruña.

8. *Bemisia tabaci* (Gennadius, 1889)

Hosts: *Ruta graveolens*, *Hibiscus* sp.

Type of crop: container.

Province: Pontevedra,

FAMILY COREIDAE9. *Leptoglossus occidentalis* (Heidemann, 1810)

Hosts: *Cedrus atlantica*.

Type of crop: soil.

Province: Pontevedra.

4. Discusión

It is important to mention that *Graphosoma lineatum* was not referenced before on woody ornamental crops either in Galicia –NW Spain– or in Spain, having been reported before not as pests, only as part of a faunistic catalogue (Vivas & López-Gallego, 2013). A similar situation takes place with *Aphrophora cribata* being cited in Galicia and in Spain for the first time.

Three of the 9 species were recorded in woody ornamental hosts of Galicia for the first time, these are *Trioza alacris*, *Aphrophora salicina* as well as *Bemisia tabaci*. We have to mention *Leptoglossus*

occidentalis which was referenced before in Galicia but only as photographic records (Pérez Valcárcel & Prieto Piloña, 2010).

If we considered the hosts where these species were recorded we have to mention new world references: *Graphosoma lineatum* on *Phyllostachys aurea* and *Phyllostachys nigra*; *Aphrophora salicina* on *Grevillea robusta*, *Grevillea rosmarifolia* and azalea; *Corythucha ciliata* on *Rosa canina*, *Sambucus nigra* as well as on *Lavandula angustifolia* and *Trialeurodes vaporariorum* on *Ceanothus repens*, *Metrosideros robusta*, *Polygala myrtifolia* and azalea (De Liñán, 1998).

It is also important to mention that none of these species are considered potential vectors of the quarantine disease *Xylella fastidiosa* with the exception of the *Aphrophoridae* *Aphrophora salicina* (Cavaliere, 2017).

None of these species are quarantine pests in Spain but one of them –*Leptoglossus occidentalis*– is included on the list of exotic species and should be monitored by the official Plant Health Services (R.D. 630/2013). Some of these species are important quarantine pests on other parts of the world: *Bemisia tabaci* in Chile, Bahrain, Kazakhstan, Azerbaijan, Belarus, Georgia, Norway, Russia, Turkey, Ukraine and New Zealand (EPPO, 2020 a); *Corythucha ciliata* in Kazakhstan (EPPO, 2020 b); *Trioza alacris* in México (EPPO, 2020 c) and *Leptoglossus occidentalis* in Kazakhstan (EPPO, 2020 d).

Some of these species are referenced to have populations with resistance to certain groups of insecticides and acaricides. *Bemisia tabaci* has been referenced as resistant to carbamates, organophosphates, pyrethroids, neonicotinoids, pymnetrozine, pyriproxyfen, ciclodien organochlorines and phenylpyrazones (IRAC, 2020 a). *Trialeurodes vaporariorum* has also been referenced to have resistant populations to Neonicotinoids, pyrethroids and ketenols (IRAC, 2020 b). All this situation described in this paper has an important influence on the design of effective and sustainable plant protection as well as integrated pest management programs.

TABLE 1. HEMIPTERA SPECIES OF THE FAMILIES PENTATOMIDAE, TRIOZIDAE, APHROPHORIDAE, TINGIDAE, ALEYRODIDAE, & COREIDAE IDENTIFIED ON WOODY ORNAMENTAL CROPS IN GALICIA FROM 1999 TO 2020 AND ITS REFERENCES WORLDWIDE (I)

Identified species	Cited in Galicia on ornamental crops	Cited in Spain on ornamental crops	Present in Spain as a polyphagous pest **	Observations
<i>Graphosoma lineatum</i>	No reference	No reference	Vivas & López-Gallego, 2013	Cited in virtual biodiversity
<i>Trioza alacris</i>	No reference	Hodkinson, 1990	No reference	Observed on the Canary Islands
<i>Aphrophora salicina</i>	No reference	Ledesma, 1979	No reference	Cited on <i>Salix americana</i>
<i>Aphrophora cribrata</i>	No reference	No reference	No reference	First report in Galicia and Spain
<i>Stephanitis pyri</i>	Rodríguez Gracia, et al., 2016	De Liñán, 1998	No reference	Cited on <i>Pyrus domestica</i>
<i>Corythucha ciliata</i>	Rodríguez Gracia, et al., 2016	De Liñán, 1998	No reference	Cited on <i>Platanus hispanica</i>
<i>Trialeurodes vaporariorum</i>	Andrés & Rivera, 2017	De Liñán, 1998	De Liñán, 1998	Polyphagous
<i>Bemisia tabaci</i>	No reference	De Liñán, 1998	De Liñán, 1998	Polyphagous
<i>Leptoglossus occidentalis</i>	Pérez Valcárcel & Prieto Piloña, 2010 ***	Ribes, 2004	Ribes, 2004	Included on list of exotic pests

* Referenced on *Cedrus atlantica* either as forest crop or ornamental crop.

** The reference does not specify if it is an ornamental pest or an arthropod infesting other type of crops.

*** Photographic record.

TABLE 2. HOSTS AND STATUS OF THE HEMIPTERA SPECIES BELONGING TO THE FAMILIES PENTATOMIDAE, TRIOZIDAE, APHROPHORIDAE, TINGIDAE, ALEYRODIDAE, & COREIDAE IDENTIFIED ON WOODY ORNAMENTAL CROPS IN GALICIA FROM 1999 TO 2020 AND ITS REFERENCES WORLDWIDE (I)

Identified species	Ornamental hosts identified in this study in Galicia.	Referenced on such ornamental crops worldwide.
<i>Graphosoma lineatum</i>	<i>Phyllostachys aurea</i>	No reference
	<i>Phyllostachys nigra</i>	No reference
<i>Trioza alacris</i>	<i>Laurus nobilis</i>	De Liñán, 1998
	<i>Clematis</i> sp.	No reference
<i>Aphrophora salicina</i>	<i>Grevillea robusta</i>	No reference
	<i>Grevillea rosma rifolia</i>	No reference
	<i>Hebe</i> sp.	No reference
	<i>Pyracantha</i> sp.	No reference
	<i>Azalea</i>	No reference
<i>Aphrophora cribata</i>	<i>Pinus pinaster</i>	Hamilton, 1982
<i>Stephanitis pyri</i>	<i>Pyrus domestica</i>	De Liñán, 1998
<i>Corythucha ciliata</i>	<i>Platanus hispanica</i>	De Liñán, 1998
	<i>Rosa canina</i>	No reference
	<i>Sambucus nigra</i>	No reference
	<i>Lavandula angustifolia</i>	No reference
<i>Trialeurodes vaporariorum</i>	<i>Ceanothus repens</i>	No reference
	<i>Stevia</i> sp.	No reference
	<i>Metrosideros robusta</i>	No reference
	<i>Polygala myrtifolia</i>	No reference
	<i>Azalea</i>	No reference
<i>Bemisia tabaci</i>	<i>Ruta graveolens</i>	Cabi, 2020 (Rutaceae)
<i>Leptoglossus occidentalis</i>	<i>Hibiscus</i> sp.	Alford, 1995
	<i>Cedrus atlantica</i>	Simov, 2008

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