

Host plants and seasonal presence of *Dictyophara europaea* in the vineyard agro-ecosystem

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Abstract

Seasonal presence and host plants of *Dictyophara europaea* (L.), a candidate vector of phytoplasmas to grapevine, were studied in Piedmont during 2006 in different vine growing regions. Sampling consisted in net sweeping on different candidate host plants, and captures of adults with yellow sticky traps placed on grapevine.

D. europaea nymphs and adults were collected on many weeds, showing how this planthopper should be considered a polyphagous species, although *Amaranthus retroflexus* L. and *Urtica dioica* L. seem to be its preferred hosts, and may also bear phytoplasmas. Larvae of Dryinidae were observed on almost 5% of collected individuals. The peak of adult presence was recorded in the middle of August, but few adults were captured on sticky traps placed on grapevine. Molecular analyses will be performed to detect the presence of phytoplasmas in captured individuals; however, given its scarce presence on grapevine, *D. europaea* does not seem capable to play a major role in the transmission of phytoplasmas to grapevine even if its vector ability were proved.

Key words: *Dictyophara europaea*, vector, sweep net, *Amaranthus retroflexus*, grapevine.

Introduction

The genus *Dictyophara* Germar is represented in Italy with four species: *Dictyophara cyrnea* Spinola (only in Sardinia), *Dictyophara pannonica* (Germar) (doubtful), *Dictyophara multireticulata* Mulsant et Rey, and *Dictyophara europaea* (L.) (D'Urso, 1995), the latter being the most widespread. Although this genus was not considered of any economic importance, recently a specimen of *D. europaea* was found to be infected with phytoplasmas belonging to the 16Sr-V group, subgroup C, which is the agent of grapevine "flavescence dorée" (FD) (Angelini *et al.*, 2005).

To date, it is known that FD is transmitted only by *Scaphoideus titanus* Ball (Cicadellidae), which is monophagous on grapevine (Boudon-Padieu, 2003). However, although the mere detection of phytoplasmas in insects does not imply transmission ability (Weintraub and Beanland, 2006), the presence of other occasional vectors must be investigated, along with their biology and behaviour. This research is about the occurrence of *D. europaea* in vine growing areas, with a particular focus on its seasonal presence and host plants.

Materials and methods

Data were obtained during 2006-2007 in different vine growing locations of Piedmont, NW Italy. Field collection was made with a sweep-net on different herbaceous host plants close to vineyards; sampling was made weekly from the end of May to the middle of October. Adults of *Dictyophara* sp. were also found when captured on yellow sticky traps placed in the vineyards to detect *S. titanus*, from the end of June to the end of October. Captured insects were placed into glass vials and brought to the laboratory, where they were determined by observing them under a stereomicroscope, following

Holzinger *et al.* (2003). During 2007, collected nymphs and adults were put into a rearing cage made of plexiglas and insect-proof mesh, with a single plant of *Amaranthus retroflexus* L., to observe feeding behaviour and oviposition.

Results and discussion

Altogether, 91 *D. europaea* were captured by sweep net sampling: 29 nymphs and 62 adults. This species was particularly abundant on *A. retroflexus*, that hosted over 60% of the captured specimens; a few individuals were also captured on *Urtica dioica* L., and *Solidago canadensis* L.; some adults were also collected on American grapevine, *Vitis* spp. (table 1).

These data confirm how *D. europaea* is a polyphagous species, as theorized in other research (Nickel and Remane, 2002; Holtzinger *et al.*, 2003). Moreover, *A. retroflexus* and *U. dioica* can harbor Stolbur phytoplasmas (Battle *et al.*, 2000; Boudon-Padieu, 2003), whereas American grapevine and *Clematis vitalba* L. can host FD (Boudon-Padieu, 2003; Angelini *et al.*, 2004). Nymphs were found from the end of June to the end of July. Adults were captured until the middle of September, with a peak in the second half of August (figure 1). In vineyards, *D. europaea* was scarcely caught, with a maximum of 4 adults per trap. Larvae of dryinids (Hymenoptera Dryinidae) were found on 4 adults (4.7% of parasitization).

In the laboratory, *D. europaea* was observed to feed mainly on the stems and on the midribs of *A. retroflexus*. Nymphs moulted successfully, since many exuviae were observed on the leaves. The observation of the offspring will be taken during 2008, along with molecular analyses of some captured individuals to determine the presence of FD phytoplasmas.

Table 1. Catches of *D. europaea* (I-V: nymphs from first to fifth instar; A: adults) on different host plants in the surroundings of Piedmontese vineyards, during 2006-2007.

Host plant family	Host plant species	I	II	III	IV	V	A
Ranunculaceae	<i>Clematis vitalba</i> L.	0	0	0	0	0	1
Amaranthaceae	<i>Amaranthus retroflexus</i> L.	0	1	4	12	5	33
Polygonaceae	<i>Polygonum persicaria</i> L.	0	0	0	0	0	1
"	<i>Rumex acetosa</i> L.	0	0	0	1	0	0
Ulmaceae	<i>Ulmus minor</i> L.	0	0	0	1	0	2
Urticaceae	<i>Urtica dioica</i> L.	0	2	3	0	0	14
Vitaceae	<i>Vitis</i> spp.	0	0	0	0	0	5
Asteraceae	<i>Solidago canadensis</i> L.	0	0	0	0	0	5

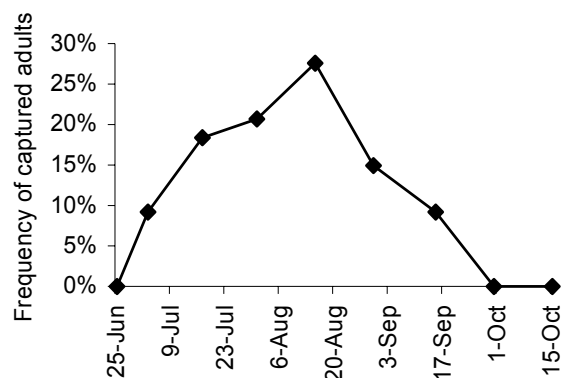


Figure 1. Seasonal presence of adults of *D. europaea* caught with sweep-net on weeds and shrubs.

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References

ANGELINI E., SQUZZATO F., LUCCHETTA G., BORGIO M., 2004.- Detection of a phytoplasma associated with grapevine Flavescence dorée in *Clematis vitalba*.- *European Journal of Plant Pathology*, 110: 193-201.

ANGELINI E., BORGIO M., SQUZZATO F., FILIPPIN L., LUCCHETTA G., FORTE V., TAGLIETTI F., VANIN S., 2005.- La flavescenza dorata su clematide.- *Vignevini*, 6: 64-69.

BATTLE A., ANGELES MARTINEZ M., LAVIÑA A., 2000.- Occurrence, distribution and epidemiology of Grapevine Yellows in Spain.- *European Journal of Plant Pathology*, 106: 811-816.

BOUDON-PADIEU E., 2003.- The situation of grapevine yellows and current research directions: distribution, diversity, vectors, diffusion and control, pp. 47-53. In: *Proceedings of XV International Conference of Virus and Virus-like diseases of Grapevine*, (MARTELLI G. P., Ed.) Locorotondo (Italy), 12-17 September. DPPMA, Bari, Italy.

D'URSO V., 1995.- Homoptera Auchenorrhyncha. In: *Checklist delle specie della fauna Italiana*, 42 (MINELLI A., RUFFO S., LA POSTA S., Eds).- Calderini, Bologna, Italy.

HOLZINGER W. E., KAMMERLANDER I., NICKEL H., 2003.- *The Auchenorrhyncha of Central Europe, vol. I (Fulgoromorpha, Cicadomorpha excl. Cicadellidae)*.- Koninklijke Brill NV, Leiden, The Netherlands.

NICKEL H., REMANE R., 2002.- Artenliste der Zikaden Deutschlands, mit Angabe von Nährpflanzen, Nahrungsbreite, Lebenszyklus, Areal und Gefährdung (Hemiptera, Fulgoromorpha et Cicadomorpha).- *Beiträge zur Zikadenkunde*, 5: 27-64.

WEINTRAUB P. J., BEANLAND L. A., 2006.- Insect vectors of phytoplasmas.- *Annual Review of Entomology*, 51: 91-111.

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