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Aphid population dynamics on highbush blueberry in relation to the spread of *Blueberry scorch virus* in Piedmont (NW Italy)

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Abstract

In 2004, infections of *Blueberry scorch virus* (BlScV) were detected for the first time outside North America on *Vaccinium corymbosum* L. (Ericaceae) in Piedmont (NW Italy). In its original area, this virus is transmitted by *Ericaphis scammelli* (Mason) (Homoptera Aphididae) in a nonpersistent way. In 2005-2006, field surveys were fortnightly carried out to monitor aphid populations in a seriously infected highbush blueberry crop in Costigliole Saluzzo (province of Cuneo). Moreover, to evaluate the aphid transmission ability, during each survey from 10 to 100 specimens were transferred from surely infected plants to virus-free potted plants. In both years, *E. scammelli* was the predominant aphid in the investigated highbush blueberry crop. Infestation levels fluctuated from 3% to 64% of infested buds in 2005, and from 0.3% to 35% in 2006. In transmission trials, *E. scammelli* proved not to be a very efficient vector of BlScV because only 2/55 plants infested with aphids field-collected on infected plants were positive with the ELISA test.

Key words: *Vaccinium corymbosum*, *Carlavirus*, *Ericaphis scammelli*, field survey, transmission ability, BlScV.

Introduction

Starting from 2004, the presence of *Blueberry scorch virus* (BlScV) has been reported for the first time outside North America on *Vaccinium corymbosum* L. (Ericaceae) in the province of Cuneo (Piedmont, NW Italy) (Ciuffo *et al.*, 2005). In its origin area, this virus, belonging to the family Flexiviridae, and to the genus *Carlavirus*, is transmitted by *Ericaphis fimbriata* (Richards) (Homoptera Aphididae) in a non-persistent way (Bristow *et al.*, 2000; Raworth, 2004). During field surveys carried out in Piedmont at the end of '90s, three species of aphids were found on highbush blueberry: *Ericaphis scammelli* (Mason), *Illinoia azaleae* (Mason) and *Aulacorthum* (*Neomyzus*) *circumflexum* (Buckton) (Barbagallo *et al.*, 1998; 1999). Concerning the taxonomy of *Ericaphis* spp., the aphids *E. fimbriata* s.s., described at first as *Fimbriaphis fimbriata* in Canada, *E. fimbriata* ssp. *pernettyae* (Prior), and *E. scammelli*, described in England and in USA, respectively, showed the same morphological features (Barbagallo *et al.*, 1998; 1999); therefore, according to Blackman and Eastop (1984) these species can be considered as the same species. To assess the vector responsible for the spread of BlScV in Piedmont, sampling of aphid populations was carried out on highbush blueberry crop in 2005-2006.

Materials and methods

Two-year field surveys were carried out in a seriously infected highbush blueberry crop in Costigliole Saluzzo, NW Italy (44° 32' N, 7° 28' E, 499 m a.s.l.), where nine different cultivars were grown. From May to September in 2005-2006, aphids were fortnightly sampled by visual inspections of five buds per plant (five plants per cultivar). In the laboratory, the field-collected material was examined and prepared for specific identification. Moreover, to evaluate the transmission ability of the aphids, during each survey from 10 to 100 specimens were transferred from surely infected plants to virus-free potted plants, which were singly caged in Plexiglas cylinders and kept in climatic chambers (T 25 ± 1 °C, RH 70 ± 5%). After five weeks, leaf samples were taken from each potted plant and analyzed by means of ELISA to assess the virus transmission. ELISA analysis was then repeated every six months.

Results and discussion

During the two-year sampling, aphids were collected on highbush blueberry throughout the growing season with infestation levels varying from 3% to 64% of buds in 2005, and from 0.3% to 35% in 2006. Aphid populations peaked once in early June in 2005, and twice in late May and in early July in 2006 (figure 1). The most abundant species was *E. scammelli*, according to previous field surveys (Barbagallo *et al.*, 1999). This species is closely associated with the plants of the families Ericaceae and, sometimes, Rosaceae; it overwinters as eggs

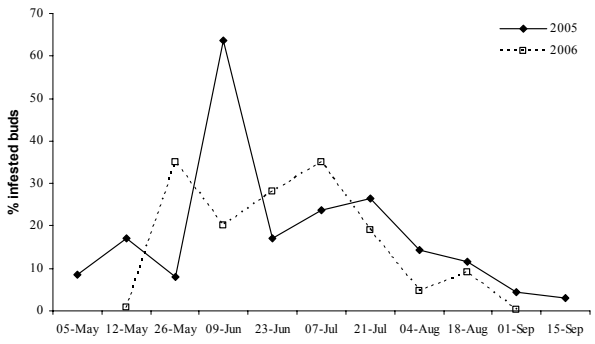

Figure 1. Aphid populations in the investigated highbush blueberry crop of Costigliole Saluzzo (NW Italy) in 2005-2006.

on the host plants and hatches in March starting from bud break (Barbagallo *et al.*, 1999). Moreover, *Aphis fabae* Scopoli and *Aphis spiraecola* Patch were occasionally found; both species are polyphagous and can migrate from herbaceous and shrubby host plants, growing in the orchard or in the neighbouring wastelands, to highbush blueberry (Barbagallo *et al.*, 1999). Population levels varied between the two years, and between the investigated cultivars. Independently of the presence of anti-hail nets, in both years higher infestations were observed on Brigitte, Duke, and Early blue; on the other cultivars (Blueray, Bluecrop, Blueship, Berkeley, Coville, Patriot) aphid infestations were medium-high in 2005, and very low in 2006.

In 2005, 48 virus-free potted plants were infested with aphids collected on infected plants in the field, in particular 46 with *E. scammelli*, one with *A. fabae*, and one with *A. spiraecola*; among these, only one plant infested with *E. scammelli* was positive at the first ELISA test performed after five weeks. In 2006, 16 virus-free plants were infested with aphids field-collected on infected plants, in particular 9 with *E. scammelli*, 4 with *A. fabae*, and 3 with *A. spiraecola*; also in the second year, only one plant infested with *E. scammelli* was positive with the first ELISA test.

In conclusion *E. scammelli* was the predominant aphid in the investigated highbush blueberry crop in both years. The highest infestation levels were observed between late May and early July, whereas with the passing of the summer aphid populations decreased until they disappeared, according to what reported by Barbagallo *et al.* (1999). In the transmission trials *E. scammelli* proved not to be a very efficient vector of BlScV. However, the epidemic risk remains low only if aphid infestations are not severe; on the contrary, the virus diffusion can be very rapid in the case of aphid outbreaks not controlled by insecticides (Raworth, 2004). The other two aphid species collected on highbush blueberry do not seem to be implicated in the virus transmission.

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References

BARBAGALLO S., BOSIO G., BRUSSINO G., SCARPELLI F., 1998.- Gli afidi infestanti le colture del mirtillo gigante americano in Italia.- *Informatore Fitopatologico*, 48 (10): 65-71.

BARBAGALLO S., BOSIO G., BRUSSINO G., PATTI I., SCARPELLI F., 1999.- Annotazioni morfo-biologiche sull'afide dei Mirtilli americani, *Ericaphis scammelli* (Mason) (Rhynchota Aphidoidea).- *Bollettino di Zoologia Agraria e Bachicoltura*, 31 (2): 207-227.

BLACKMAN R. L., EASTOP V. F., 1984.- Aphids on the world's crops: an identification guide.- J. Wiley & Sons, Chichester-New York, USA.

BRISTOW P. R., MARTIN R. R., WINDOM G. E., 2000.- Transmission, field spread, cultivar response, and impact on yield in highbush blueberry infected with *Blueberry scorch virus*.- *Phytopathology*, 90: 474-479.

CIUFFO M., PETTITI D., GALLO S., MASENGA V., TURINA M., 2005.- First report of *Blueberry scorch virus* in Europe.- *Plant Pathology*, 54: 565.

RAWORTH D. A., 2004.- Ecology and management of *Ericaphis fimbriata* (Hemiptera: Aphididae) in relation to the potential for spread of *Blueberry scorch virus*.- *Canadian Entomologist*, 136: 711-718.

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