

Hemiptera recently introduced into Italy

Costanza JUCKER¹, Ambra QUACCHIA², Mario COLOMBO¹, Alberto ALMA²

¹Istituto di Entomologia agraria, Università degli Studi di Milano, Italy

²Di.Va.P.R.A. - Entomologia e Zoologia applicate all'Ambiente "C. Vidano", Università di Torino, Italy

Abstract

The invasion of exotic species is one of the most important threats to biodiversity, causing economic costs in agriculture, forestry, other human enterprises as well as in human health. This is a growing worldwide phenomenon in the last years due to the increase of human trade, transports, and tourism across countries. In particular the importation of ornamental plants from other countries has led to the introduction of many exotic pests. In the last 10 years, more than 160 exotic arthropods have been introduced into Italy, and among them 50 belong to the order Hemiptera, representing 41% of all introductions. Some of the last introduced Hemiptera damaging both ornamental and herbaceous plants are here reported.

Key words: Italy, exotic species, introduction, woody plants, herbaceous plants.

Introduction

The introduction of exotic insects is a growing worldwide phenomenon, especially in countries with an intensive international exchange of goods and tourists. Italy is particularly at risk of introduction of exotic insects due to the broad range of its climatic parameters (allowing the settlement of these aliens) and its location in the middle of the Mediterranean Sea (making the country a commercial crossroad). More than 60% of the introductions concern native insects of the United States and Asia, countries with which Italy exchanges most of the goods. The order Hemiptera is the most accounted (50% of the imported species), mainly with scale-insects and aphids. In the last ten years more than 50 new introductions of Hemiptera were recorded in Italy (Colombo *et al.*, 2007). When an alien is introduced into a new area it can have very strong effects on the native flora and fauna, it can reproduce and spread fast. It often leaves behind the factors that have evolved with it and that control its population and spread. In such conditions the control strategies to adopt are of primary importance and in particular the biological ones with introduced or autochthonous species.

Materials and methods

In order to make a complete list of the Hemiptera recently introduced into Italy the available bibliography was checked and the attention was focused on the most worrying pests.

Results and discussion

Leptoglossus occidentalis Heidemann was firstly collected in Europe in 1999 in Lombardy and Venetia, northern Italy (Tescari, 2001). Later it spread to several other regions, in central Italy too. Known as the western conifer seed bug, this species is considered a serious pest of conifer seed production throughout western North America (Hedlin *et al.*, 1981). Host plants include many conifer trees, mostly Pinaceae, and *Pistacia vera* L. In the United States *L. occi-*

dentalis it is univoltine, while in Mexico it can accomplish three generations a year (Mitchell, 2000). Adults abandon overwintering sites in spring and they start feeding on cones and inflorescences of coniferous trees. Females lay eggs in rows on conifer needles, the nymphs feed on the needles and cone scales, then they pass to the developing seeds. New adults feed on ripening seeds until they seek overwintering sites, where they stay generally aggregated. They can also enter buildings to overwinter: the bug is considered an anthropic - urban pest, causing alarm when a lot of adults (up to 2,000) invading the houses. The economic damage consists in a reduction of the quantity and quality of seeds, due to the trophic activity of adults and juvenile instars sucking the seed's endosperm.

Acizzia jamatonica (Kuwayama), a psyllid pest originating from Asia, has been reported in 2001 in Piedmont and the Aosta Valley and is now reported from several European countries. It is a monophagous species feeding on *Albizia* species. The life cycle of *A. jamatonica* includes numerous overlapping generations. The psyllid overwinters in the adult stage. Leaves, flowers, pods, and young shoots can be completely colonised by juvenile and adult stages, leading to total or partial desiccation. Large amounts of honeydew are produced and can cause some inconvenience in urban environments. The control of this pest is likely to be difficult in practice. Insecticides can be used but several applications are necessary to control the overlapping generations. In addition, treatments are difficult to perform on ornamental trees in the urban environment where only a limited number of active substances are authorized. Several species of natural enemies (coccinellid and anthocorid predators) have been identified, and studies are being made on their possible release. In Europe serious damage (leaf yellowing, defoliation) is observed and *A. jamatonica* could present a risk to ornamental trees in urban environments and to nurseries (Alma *et al.*, 2002). Control trials against this pest performed with imidacloprid or abamectin gave satisfactory results with only one application while with aerial applications, among the active substances tested, only lambda-cyhalothrin and thiamethoxam gave good control results with two applications (Pellizzari *et al.*, 2005).

Acanalonia conica Say, the Nearctic planthopper, was reported for the first time in Europe in 2004 (D'Urso and

Uliana, 2004) and currently it is present only in northern Italy, in Venetia and Lombardy (Nicoli Aldini *et al.*, 2006). In the United States it is widespread. *A. conica* is a polyphagous species living on wild and cultivated trees, shrubs and grasses belonging to different families such as Rosaceae, Vitaceae, Ulmaceae, Juglandaceae, Oleaceae, and others (Wilson and McPherson, 1980). Some of its host plants have an economic importance (e.g. *Vitis* L. and some ornamentals). This species is known to be univoltine with overwintering eggs laid in summer and autumn. Adults are present from July to September and eggs are laid individually inside the woody tissue of the host plant. The nymphal stages are covered with long white waxy filaments and, like the adults, produce abundant honeydew (D'Urso and Uliana, 2006). The life cycle and behaviour of *A. conica*, resemble those of *Metcalfa pruinosa* (Say), and due to its extreme polyphagy, the lack of natural enemies, and the new habitat apparently suitable for a long-term establishment, it is possible that *A. conica* will also become a pest in Italy and elsewhere.

The leafhopper *Erasmoneura vulnerata* (Fitch) (= *Erythroneura vulnerata* Fitch), was recorded for the first time in Venetia, in north-eastern Italy, in 2004 (Duso *et al.*, 2005). *E. vulnerata* is widespread in the United States and Canada where it has been reported as a pest of wild and cultivated grapes, and other host plants. Nymphs and adults feed on the leaf mesophyll. Feeding sites appear as pale speckled areas. When large populations occur, feeding areas overlap and involve the entire leaf. The abundance of wild grapes in north-eastern Italy is a factor affecting the spread of *E. vulnerata*, positively. However, its occurrence in commercial vineyards is relatively unimportant probably because of insecticide applications carried out during summer to control other pests or because of its recent colonization. Nevertheless, the status of *E. vulnerata* as a pest in Italy could change as it sometimes occurs for exotic species introduced into new areas (Girolami *et al.*, 2006).

Other Hemiptera of ornamental plants recently found in Italy are *Illinoia liriodendri* (Monell), *Corythucha arcuata* (Say) and two species of *Stephanitis*. *I. liriodendri*, native of North America, is a pest of the tuliptree, *Liriodendron tulipifera* L., planted as shade trees in many city parkways. Its detection in northern Italy occurred in 2001 (Limonta, 2001). Attacked plants show leaf discoloration, sometimes premature defoliation and heavy honeydew accompanied by sooty moulds.

The American Oak lace bug, *C. arcuata*, has been found in northern Italy since 2000 (Bernardinelli and Zandigiacomo, 2000). Until now in Italy *C. arcuata* is spread between Lombardy and Piedmont where it has been observed on *Quercus* spp. Adults and nymphs feed on the lower leaf page causing the discoloration of the upper surface of the leaf. Extensive feeding can cause an anticipated leaf wilting. Given the wide distribution of its host plant, *C. arcuata* could spread to a large part of the Palaearctic region.

Stephanitis takeyai Drake et Maa, the andromeda lace bug, was detected in 2000 near Milan (north Italy) on *Pieris japonica* (Thunb.) D. Don (Colombo and Limonta, 2001), while the other species, *Stephanitis pyrioides* (Scott), the azalea lace bug, was first intercepted in 2004 in Lucca (Central Italy) on some specimens of *Rhododendron* spp. Both are native of Japan. Both adults and nymphs in-

jure the host by piercing the epidermis of the lower surface of leaves and sucking the cell contents. Severely damaged leaves become heavily discoloured and may dry or fall off. Generally, damages appear to be greater in sunny areas.

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Corresponding author: Costanza JUCKER (e-mail: costanza.jucker@unimi.it), Istituto di Entomologia agraria, Università degli Studi di Milano, via Celoria 2, 20133 Milan, Italy.