

Collection of *Orius* species in horticultural areas of northwestern Italy

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Abstract

The species of the genus *Orius* Wolff are well-known as generalist predators able to control thrips outbreaks worldwide. In 2005 *Orius* species were collected on different crops (bean, sweet pepper in greenhouses and in the open field, strawberry, sweet leek), located in typical horticultural areas of Piedmont (NW Italy). During the growing season *Orius* species were also sampled on the wild flora in the surroundings of pepper greenhouses, to assess the natural host plants alternative to the crop in the investigated area. The adult anthocorids were then identified examining the genital clasper in males and the copulatory tube in females. During field surveys, three *Orius* species were sampled on crops and wild flora: *Orius majusculus* (Reuter), *Orius minutus* (L.), and *Orius niger* (Wolff). *O. niger* occurred on almost all the sampled plant species, while *O. majusculus* prevailed on vegetables even if it was rarely collected on wild flora. Both of them seem to be good candidates for thrips control in horticultural areas of northwestern Italy. On the contrary *O. minutus* was generally observed in a scarce quantity, except on bean.

Key words: minute pirate bug, generalist predator, horticultural crops, wild flora, Piedmont.

Introduction

The species of the genus *Orius* Wolff 1811 (Heteroptera Anthocoridae) are well-known as generalist predators able to control pest outbreaks on different crops; in particular some species have been investigated a lot because of their efficiency in controlling thrips worldwide. After the accidental introduction of *Frankliniella occidentalis* (Per-gande) (Thysanoptera Thripidae) into Italy, some palearctic species revealed very effective predators of this thrips on horticultural crops (Riudavets, 1995; Tavella *et al.*, 1996), so to be produced by biofactories and released in IPM crops. Anyway the most important role in preying thrips has been carried out by the wild *Orius* species, not because they are more effective predators, but obviously better adapted to local climatic conditions considering protected crops too (van de Veire and Degheele, 1992; Tavella *et al.*, 2000; Tavella *et al.*, 2003). Thus the present research was focused on the distribution and abundance of indigenous *Orius* species in Piedmont, an internal region of northwestern Italy, on vegetable crops usually infested by thrips, and on neighbouring wild plants.

Materials and methods

In summer 2005 *Orius* species were collected on different crops (bean; sweet pepper under greenhouse and in the open field; strawberry; sweet leek), located in some typical horticultural areas of Piedmont (northwestern Italy). During the growing season *Orius* spp. were also sampled fortnightly on the wild flora in the surroundings of pepper greenhouses, to assess the natural host plants alternative to the crop in the investigated area. The sampling on crops and wild flora was carried out by beating flowers, when present, or terminal buds onto a white plastic board; *Orius* adults and nymphs were then collected with an aspirator and taken back to the laboratory. Here the adult anthocorids were dissected to ex-

tract the genital clasper in males and the copulatory tube in females, and identified to the species level according to Péricart (1972). All plant species sampled in the hedgerows and wastelands were brought to the laboratory and determined according to Pignatti (1997).

Results and discussion

During field surveys, three *Orius* species were sampled on crops and wild flora: *Orius majusculus* (Reuter), *Orius minutus* (L.), and *Orius niger* (Wolff). On the surveyed crops, *O. majusculus* prevailed, except than on strawberry where *O. niger* was the most abundant species (figure 1). Overall, 67% of adults totally collected on crops belonged to *O. majusculus*, 26% to *O. niger*, and 7% to *O. minutus*. This result is in contrast with what

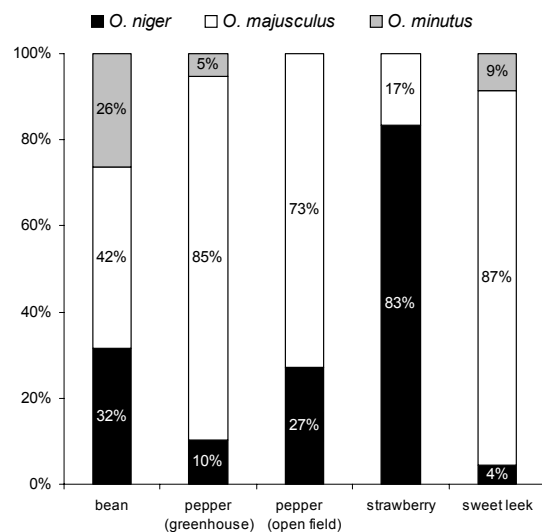


Figure 1. Composition of *Orius* species assessed on crops surveyed in NW Italy in summer 2005.

what was previously observed in sweet pepper greenhouses of the same area, in which *O. niger* prevailed with 55% of totally collected adults in summer 2002 (Tavella *et al.*, 2003); however, the climate conditions in the two years were different (in 2002 temperatures were higher than in 2005), and played probably an important role in determining composition and relative abundance of *Orius* species.

In the surroundings of the pepper greenhouses, 23 plant species of 14 plant families, flowering during the pepper growing season, were prospected (table 1). The adults of *Orius* spp. were collected in different amounts in the flowers of 14 plant species of 9 plant families; namely, 76% *O. niger*, 16% *O. majusculus*, and 8% *O. minutus* were totally sampled on wild flora. *O. niger* was found on 13 plant species, *O. majusculus* and *O. minutus* on 7 plant species each. Independently of the population abundance, only *Urtica dioica* L., *Sinapis arvensis* L., and *Matricaria chamomilla* L. hosted all the three *Orius* species. *Medicago sativa* L., *Sambucus ebulus* L., and *Vicia sativa* L. hosted the major numbers of *Orius*.

On the total of adults collected on vegetables and wild flora, *O. majusculus* reached 47%, *O. niger* 46% and *O. minutus* 7%. *O. niger* occurred on almost all the sampled plant species (table 1), with a marked preference for Fabaceae; this species was frequently found also on strawberry, as in other regions of northeastern Italy (Tommasini, 2004), whereas it was less abundant on the other investigated crops. On the contrary, *O. majusculus* was rarely collected on wild flora prevailing on vegetables. *O. minutus* was in general observed in a scarce quantity, except on bean.

Table 1. *Orius* species collected on wild flora growing around pepper greenhouses of NW Italy (+ = presence, - = absence of adults).

Families	Plant species	<i>Orius</i> spp. ni ma mi		
Urticaceae	<i>Urtica dioica</i> L.	+	+	+
Polygonaceae	<i>Polygonum persicaria</i> L.	+	+	-
Chenopodiaceae	<i>Chenopodium album</i> L.	-	-	-
Amarantaceae	<i>Amaranthus retroflexus</i> L.	+	+	+
Portulacaceae	<i>Portulaca oleracea</i> L.	-	-	-
Caryophyllaceae	<i>Stellaria media</i> (L.) Vill.	-	-	-
Papaveraceae	<i>Papaver rhoeas</i> L.	-	-	-
Brassicaceae	<i>Capsella bursa-pastoris</i> (L.) Med.	-	-	-
"	<i>Brassica napus</i> L.	-	-	-
"	<i>Sinapis arvensis</i> L.	+	+	+
Fabaceae	<i>Vicia sativa</i> L.	+	-	+
"	<i>Medicago sativa</i> L.	+	-	-
"	<i>Trifolium repens</i> L.	+	-	-
Hypericaceae	<i>Hypericum perforatum</i> L.	-	-	-
Solanaceae	<i>Solanum nigrum</i> L.	-	+	+
Caprifoliaceae	<i>Sambucus ebulus</i> L.	+	-	+
Asteraceae	<i>Erigeron annuus</i> (L.) Desf.	+	-	-
"	<i>Conyza canadensis</i> (L.) Cronq.	+	-	-
"	<i>Galinsoga ciliata</i> (Raf.) Blake	+	+	-
"	<i>Matricaria chamomilla</i> L.	+	+	+
"	<i>Sonchus oleraceus</i> L.	-	-	-
Poaceae	<i>Phleum pratense</i> L.	-	-	-
"	<i>Echinochloa crus-galli</i> (L.) Beauv.	+	-	-

ni = *O. niger*; ma = *O. majusculus*; mi = *O. minutus*.

During field surveys, *Orius laevigatus* (Fieber) was never found both on crops and wild flora, differently from what observed by Tommasini (2004); due to its biological traits and easier mass rearing (Tommasini *et al.*, 2004), this species is largely adopted for biocontrol throughout Italy. However, in horticultural areas of north-western Italy both *O. majusculus* and *O. niger* proved to be very efficient in thrips control. In fact, while *O. niger* occurs all over Italy, *O. majusculus* is present in the coldest areas (such as Piedmont), decreasing its relative abundance from northern to central Italy (Tommasini, 2004). Neighbouring wild flora may positively affect occurrence of natural enemies on the crop, and *O. niger* proved to colonize a large range of wild plants. On the other hand, the apparent preference for cultivated plants showed by *O. majusculus* is a positive parameter for natural enemies. Further research is needed to understand how plant/predator interactions, prey presence on plants, or local microclimate influence on the composition and abundance of *Orius* species.

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