

Diptera Syrphidae caught by Malaise trap in Bologna province and new record of *Neoascia interrupta* in Italy

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Abstract

A faunistic list of Syrphidae caught by hand net and by Malaise trap in a farm in Bologna province is presented. A total of 31 species were found, 19 of which caught by Malaise and 20 by hand net. *Neoascia interrupta* (Meigen) is new record for Italian fauna. Among the species collected we note the occurrence of *Lejogaster tarsata* (Megerle in Meigen), collected by Malaise, and *Chalcosyrphus nemorum* (F.), collected by hand net. A comparison between the two techniques is debated.

Key words: Diptera Syrphidae, *Neoascia interrupta*, faunistic list, Malaise trap, hand net.

Introduction

Diptera Syrphidae comprise one of the largest families of Diptera and their use as potential bioindicator has been underlined (Speight, 1986; Sommaggio, 1999; Speight and Castella, 2001). Syrphidae possess features that would make them potentially good indicators (Sommaggio, 1999), moreover Syrphidae can be helpful

to predict the intrinsic quality and/or to study the biodiversity of agroecosystems. In Italy the knowledge of this group is reduced; also the number of recent faunistic list is in great need of improvement: table 1 illustrates the faunistic studies about this family from 1960. Thus there is the need to improve the knowledge of this group to develop species lists for the investigated target sites (Speight, 2001).

Table 1. Faunistic researches of Syrphidae in Italy.

Author	Year	Environment	Number of species sampled	Sampling method
Setti	1972	Orchard (Bologna)	9	Eggs and larvae collection, hand net
Daccordi	1979	Orchard (Verona)	33	Hand net, yellow trap
Daccordi <i>et al.</i>	1981	Forest (Monti Lessini, Trento)	66	Hand net, yellow trap
Chemini <i>et al.</i>	1985	Orchard, marsh, forest (Trento, Verona)	45	Hand net, yellow trap
Chemini <i>et al.</i>	1986	Forest (Monti Lessini, Trento)	46	Hand net, yellow trap
Daccordi <i>et al.</i>	1988	Orchard (Verona)	36	Yellow trap
Pluchino	1988	Urban park (Verona)	24-27	Yellow trap
Daccordi and Marogna	1989	Marsh (Verona, Mantova)	31	Hand net, yellow trap
Biondi <i>et al.</i>	1991	Marsh (Circeo Nat. Park, Lazio)	28	Yellow trap
Burgio and Daccordi	1997	Castiglione dei Pepoli Forest (Bologna)	73	Hand net
Burgio <i>et al.</i>	1997	Farms (Bologna)	36	Hand net
Burgio <i>et al.</i>	2000	Campagna Forest (Forlì)	92	Hand net
Birtele <i>et al.</i>	2002	Fontana Forest (Mantova)	66	Malaise trap, hand net
Quaranta <i>et al.</i>	2002	Farms (Friuli, Piemonte, Emilia-Romagna, Toscana, Sardegna, Umbria, Lazio, Sicilia)	Not reported	Hand net
Sommaggio	In press	Pastello Mountain (Verona)	71	Malaise trap, hand net
Sommaggio	In press	Summano Mountain (Vicenza)	85	Malaise trap, hand net
Burgio and Sommaggio	In press	Farm (Bologna)	31	Malaise trap, hand net
Delmastro and Sommaggio	In press	Mountain pasture (Cuneo, Torino)	90	Hand net

The aim of our research was to study the species of Syrphidae in an organic farm characterized by high floristic diversity due to hedgerows and grassy margin, to complete the regional faunistic lists of these insects. Both Malaise and hand net has been used in order to better assess the local Syrphidae population. A comparison between the two techniques will be debate in this paper; a stronger discussion about the two different techniques will be the main topic of another paper (Sommaggio and Burgio, in prep.).

Materials and methods

One Malaise trap was placed in the organic farm «Maieutica» (S. Giovanni in Persiceto, Bologna province, Northern Italy) along a hedgerow at field boundary. The plant species of the hedgerow were: cherry-tree (*Prunus avium* L.), hawthorn (*Crataegus monogyna* Jacq.), blackthorn (*Prunus spinosa* L.), maple (*Acer campestre* L.), elder (*Sambucus nigra* L.), dogrose (*Rosa canina* L.), *Cornus sanguinea* L., poplar (*Populus alba* L.).



Figure 1. Map of Italy. The dot indicates the investigated site.

The sampling covered the period from the end of April to the beginning of September 1996. The trap was baited by alcohol (80%) and periodically the caught species were isolated and identified. Samplings by hand net were also carried out every week from beginning of May to mid September, collecting for 30 minutes the syrphid adults in a transept along the hedgerow and a grassy boundary.

For the identification of the species the following keys has been used: Goeldlin de Tiefenau (1976), Stubbs and Falk (1983), Barkemeyer and Claussen (1986), Bradescu (1990), Verlinden (1994), Verdinden (1999).

Results and discussion

The faunistic list of Syrphidae collected is presented in table 2; a total of 31 species were collected, including 19 species caught by Malaise trap and 20 species caught by hand net (table 3). The high percentage of predacious species is typical of several habitats and in particular of agricultural landscapes (Bankowska, 1980). The very low percentage of phytophagous species (only *Eumerus sogdianus* Stackelberg, 1952, sampled by Malaise, was collected) can indicate a relative reduction in weed diversity, probably due to the reduced size of the sampling site; but this inference is only a hypothesis because the sampling was carried out only one year.

Neoascia interrupta (Meigen), collected by Malaise trap, is new record for Italian fauna. The Italian fauna of *Neoascia* Williston now comprises six species: *Neoascia annexa* (O.F. Muller, 1776), *N. podagrica* (Fabricius, 1775.) and *N. tenur* (Harris, 1780) belonging to the subgenus *Neoascia*; *N. interrupta* (Meigen, 1822), *N. meticulousa* (Scopoli, 1763) and *N. obliqua* Coe, 1940, belonging to *Neoasciella* subgenus. Accordingly to Speight (2001) three other *Neoascia* species occur in Europe. *Neoascia subchalybea* Curran, 1925, is probably present only in the Scandinavia, Siberia and Canada and likely does not occur in Italy; the distribution of the other two species, *N. geniculata* (Meigen, 1822) and *N. unifasciata* (Strobl, 1898) is mainly in Central and North Europe, as *N. interrupta*. So their presence in Italy is possible, at least in the North.

Notes on the biology of *N. interrupta* are reported by Speight (2001); this species becomes increasingly coastal towards the northern edge of its range in western Europe, where it occurs primarily in association with coastal lagoons containing beds of reeds of *Typha*. Further South and in Central Europe the species occurs round the edge of permanent standing-water bodies from small ponds up to the scale of large lakes. The larval foods habits of *N. interrupta* is not described; larvae of *Neoascia* are found in wet manure in farmyards and from decaying vegetation round the margins of ponds (Rotheray, 1993). The present record is consistent with the known biology of the species.

The only species with phytophagous larvae found in this study is *E. sogdianus*. *Eumerus* is a genus with great taxonomic problems and is badly in need of revision. *E. sogdianus* has been actually recorded only for Sardinia (Belcari *et al.*, 1995; Daccordi and Sommaggio, 2002). This species is probably less rare than supposed; in fact it is easily confused with *E. strigatus* (Fallen, 1817), a supposed wide distributed species. Actually the females of the two species can no sufficiently be separated, while the males can easily be separated on the base of the 4th sternite (figure 2). Accordingly to Speight (2001), *E. sogdianus* is a species found in open ground; it is present in unimproved mountain pasture, in farmland, especially on sandy soils, in coastal dune system and alluvial floodplain. *E. sogdianus* has been collected also along hedgerows in the agricultural landscape near Breganze (VI); it is possible that this species is well distributed in all the Po river Valley.

Table 2. List of species caught by Malaise and hand net in organic farm «Maieutica» (S.Giovanni in Persiceto, Bo). The numbers indicate the total of sampled specimens. (*): new record in Italy. M = Malaise trap; Hn = hand net; Cat = general trophic category (P =predator; SA= aquatic saprophagous; ST= terrestrial saprophagous; F = phytophagous); (1): from Rotheray (1993) and Speight (2001).

Species	M	Hn	Cat	Larval food habits (1)
<i>Epistrophe nitidicollis</i> (Meigen, 1822)	1	0	P	Aphids on trees, but also occurring on shrubs and tall herbs
<i>Episyrrhus balteatus</i> (De Geer, 1776)	10	118	P	Wide range of ground layer and arboreal aphids
<i>Eupeodes corollae</i> (Fabricius, 1794)	9	1	P	Wide range of ground layer aphids
<i>Eupeodes latifasciatus</i> (Macquart, 1829)	10	0	P	Predator on root – aphids
<i>Maliscaeva auricollis</i> (Meigen, 1822)	0	4	P	Predator n wide range of aphids
<i>Scaeva selenitica</i> (Meigen, 1822)	0	1	P	Aphids feeding on shrubs and trees
<i>Sphaerophoria scripta</i> (Linnaeus, 1758)	69	13	P	Ground layer aphids
<i>Sphaerophoria rueppelli</i> (Wiedmann, 1830)	1	0	P	Ground layer aphids
<i>Syrphus ribesii</i> (Linnaeus, 1758)	0	2	P	Ground layer and arboreal aphids
<i>Syrphus vitripennis</i> Meigen, 1822	0	9	P	Ground layer and arboreal aphids
<i>Xanthogramma festivum</i> (Linnaeus, 1758)	0	1	P	The larvae live in <i>Lasius</i> - ant nests, where probably feed on root aphids associated with the ant colonies
<i>Chrysotoxum cautum</i> (Harris, 1776)	3	1	P	The larvae of this species is completely unknown; in the genus <i>Chrysotoxum</i> the larvae seem to be associated with ants, probably feeding on ant-attended root aphids.
<i>Melanostoma mellinum</i> (Linnaeus, 1758)	70	18	P	Aphids feeding on a wide range of aphids on low growing plants
<i>Melanostoma scalare</i> (Fabricius, 1794)	0	2	P	Predators on aphids
<i>Paragus haemorrhous</i> Meigen, 1822	4	1	P	Ground layer and arboreal aphids.
<i>Paragus majoranae</i> Rondani, 1857	6	0	P	Ground layer and arboreal aphids, also on many crops
<i>Paragus</i> sp. (females)	22	0	P	
<i>Pipizella maculipennis</i> (Meigen, 1822)	5	0	P	Larva unknown, probably aphid feeding as the other known larvae of <i>Pipizella</i> genus
<i>Pipizella viduata</i> (Linnaeus, 1758)	14	0	P	Root-feeding aphids on umbelliferous plants
<i>Pipizella</i> sp. (females)	49	0		
<i>Lejogaster tarsata</i> (Megerle in Meigen, 1822) (= <i>splendida</i> Meigen)	1	0	SA	Acquatic larvae, found in accumulations of decaying vegetation and mud in pools, ponds and slow-moving streams
<i>Neoascia interrupta</i> (Meigen, 1822) (*)	1	0	SA	Not described. Larvae of <i>Neoascia</i> are found in wet manure in farmyards and from decaying vegetation round the margins of ponds
<i>Eumerus sogdianus</i> Stackelberg, 1952	18	0	F	Larvae living in plant bulbs
<i>Eristalinus aeneus</i> (Scopoli, 1763)	0	4	SA	Larvae occurs along shorelines in rock pools containing large amounts of decaying seaweed
<i>Eristalis arbustorum</i> (Linnaeus, 1758)	3	10	SA	Larvae associated with wet decaying organic material
<i>Eristalis tenax</i> (Linnaeus, 1758)	0	4	SA	Larvae associated with wet decaying organic material
<i>Helophilus pendulus</i> (Linnaeus, 1758)	9	12	SA	Larvae associated with wet decaying organic material
<i>Helophilus trivittatus</i> (Fabricius, 1805)	0	1	SA	Larvae associated with wet decaying organic material
<i>Parhelophilus frutetorum</i> (Fabricius, 1794)	1	0	SA	Larvae associated with accumulations of decaying vegetation.
<i>Myathropa florea</i> (Linnaeus, 1758)	0	3	SA	Larvae associated with decaying vegetation in rot-holes and in decaying heartwood of a variety of trees
<i>Syritta pipiens</i> (Linnaeus, 1758)	0	1	ST	Larvae found in various kind of wet, decaying matter including compost, manure and silage
<i>Chalcosyrphus nemorum</i> (Fabricius, 1805)	0	1	ST	Larvae found in sap runs and under bark in accumulations of decaying sap
<i>Xylota segnis</i> (Linnaeus, 1758)	1	0	ST	Larvae found in various kind of wet, decaying matter

Table 3. Summary of the species caught by Malaise trap (M) and hand net (Hn) for the different larval food habits.

	M	Hn	Total	%
Total specimens	307	207	514	-
Total species	19	20	31	-
Total predacious species	12	11	18	58.1
Total pytophagous species	1	0	1	3.2
Total aquatic saprophagous species	5	6	9	29.3
Total terrestrial saprophagous species	1	2	3	9.7
Sorenson	0.35			

A group of species [species belonging to *Pipizella* genus, *Lejogaster tarsata* (Megerle in Meigen), *Epistrophe nitidicollis* (Meigen), *Sphaerophoria rueppelli* (Wiedmann), *Paragus majoranae* Rondani, *Neoascia interrupta* (Meigen), *Eumerus sogdianus* Stackelberg, *Parhelophilus frutetorum* (Fabricius), *Xylota segnis* (Linnaeus)] were sampled only by Malaise. On the other side *Scaeva selenitica* (Meigen), *Syrphus ribesii* (Linnaeus), *Syrphus vitripennis* Meigen, *Xanthogramma festivum* (Linnaeus), *Melanostoma scalare* (Fabricius), *Eristalis tenax* (Linnaeus), *Myathropa florea* (Linnaeus), *Helophilus trivittatus* (Fabricius), *Eristalinus aeneus* (Scopoli), *Syrirta pipiens* (Linnaeus), *Chalcosyrphus nemorum* (Fabricius) were sampled by hand net. In general Malaise trap seems to be less effective to collect adults of saprophagous species, and this evidence will be analysed in another study (Sommaggio and Burgio, in prep.).

In conclusion our preliminary results seem to demonstrate that the two different methods are complementary to sample and collect adult hoverflies. Malaise trap is a very effective techniques to sample hoverflies and it is considered a standard method for faunistic studies of this group (Schmid *et al.*, 2001). Anyway this method is time consuming and seems to be less effective to sample some group (Sommaggio and Burgio, in prep.). Malaise trap could be baited with phenylacetaldehyde (PAA), a compound demonstrated to be attractive to insect species including Lepidoptera (Cantelo and Jacobson, 1979; Burgio and Maini, 1994) and Syrphidae (Burgio and Maini, 1994), to enhance the detection of hoverflies adults. Hand net is a very practical sampling technique but it is not considered a quantitative method and is affected by the ability of the collector and the meteorological conditions.

A faunistic list of Syrphidae sampled in a organic farm of Northern Italy by Malaise trap and hand net is presented. A total of 31 species were collected, including 19 species caught by Malaise trap and 20 species caught by hand net. *N. interrupta*, collected by Malaise trap, is new record for Italian fauna. Among the species collected we note the occurrence of *L. tarsata*, collected by Malaise, and *C. nemorum*, collected by hand net. The relative efficiency of the two sampling methods is discussed.

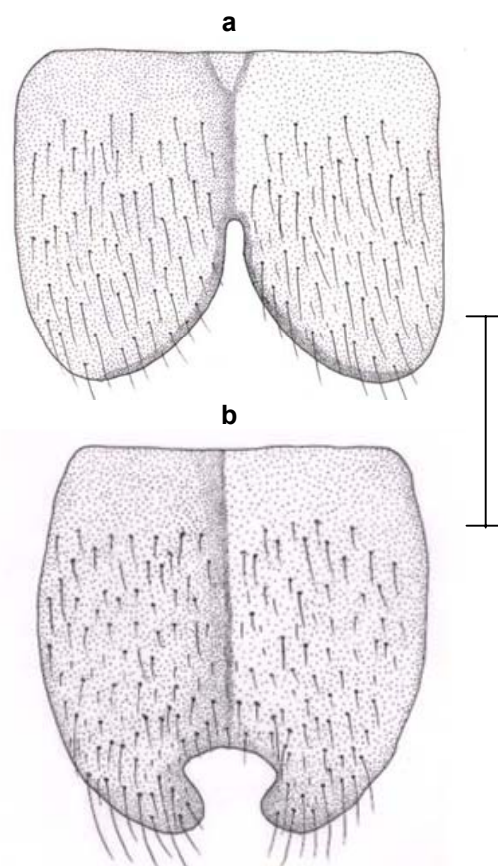


Figure 2. Male IV sternite (Scale = 0.5 mm):
a) *Eumerus strigatus*, b) *Eumerus sogdianus*.

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