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Occurrence in Northern Italy of the leek mining fly *Napomyza gymnostoma* (Loew) (Diptera, Agromyzidae)

Abstract - The most important morphological and biological characteristics of the leek mining fly *Napomyza gymnostoma* (Loew) (Diptera, Agromyzidae), new for northern Italy, are reported. Damage caused by this pest was first observed in autumn 1999 in Friuli-Venezia Giulia and during 2001 in Veneto. In northern Italy *N. gymnostoma* attacks onion, shallot, garlic but mostly leek, both in crops and vegetable gardens. Severe damage has also been observed in organic farms.

Riassunto - *Rinvenimento di* Napomyza gymnostoma *(Loew) (Diptera, Agromyzidae) in Italia settentrionale.*

Vengono illustrate le principali caratteristiche morfologiche e biologiche di *Napomyza gymnostoma* (Loew) (Diptera, Agromyzidae), specie nuova per l'Italia settentrionale. I primi danni causati dal fitofago sono stati rilevati nell'autunno 1999 in Friuli-Venezia Giulia e nel corso del 2001 in Veneto. Nell'Italia settentrionale *N. gymnostoma* è stata rilevata su cipolla, scalogno, aglio e soprattutto su porro, sia in colture industriali sia in orti familiari. Gravi danni sono stati osservati anche in aziende a conduzione biologica.

Key words: *Napomyza gymnostoma*, Diptera Agromyzidae, *Allium* species, damage.

INTRODUCTION

In Friuli-Venezia Giulia (north-eastern Italy) severe damage to leek, caused by larvae of Agromyzidae, was observed in autumn 1999 (Zandigiacomo & Barro, 2000). In 2001 serious outbreaks of Agromyzid larvae on leek, in crops and vegetable gardens, were reported from all over the region; Agromyzidae larvae were observed on onion and shallot too.

In Veneto (north-eastern Italy) outbreaks on cultivated *Allium* species (leek, onion and garlic) were observed in 2001. Probably the fly had been already present on onion and leek even during the previous years (1999, 2000), but had been confused with the better known mining fly *Delia antiqua* (Meigen). In some organic farms damage on leeks was very severe. In spring 2002 onion plants both in protected culture and in the open field were heavily infested; leek nurseries too were infested.

The pest was identified as *Napomyza gymnostoma* (Loew), a new species for northern Italy.

ELEMENTS FOR THE IDENTIFICATION

Cultivated *Allium* species can be injured by the larvae of several mining Diptera, such as the Anthomyiid fly *D. antiqua* and the Agromyzid flies *Chromatomyia horticola* (Goureau), *Liriomyza nietzkei* Spencer and *L. cepae* (Hering) (Spencer, 1973; Süss 1974; Seliak, 1998; Schrameyer, 2001). To correctly identify *N. gymnostoma* several morphological characters of the different stages have to be considered (Spencer, 1976).

The adult fly is approximately 3 mm long. The ground color of the thorax and abdomen is grayish, while the head is yellowish-orange. The first two antennal segments are short and yellowish, while the third article is elongated, rounded at the end, and black. The legs are black, while the knees are yellowish. The wings are 2.8 mm long in males and 3.5 mm in females; the second cross-vein is lacking.

The mature larva is approximately 8 mm long. The ground color is whitish. The mouth-hooks (larval mandibles) at the cephalic extremity are black.

The puparium is approximately 3.5-4 mm long, reddish-brown to dark brown in colour.

DISTRIBUTION

In the checklist of the species of the Italian fauna *N. gymnostoma*, included in the genus *Phytomyza* Fallén, is reported only for Sicily (Canzoneri *et al.*, 1995). Probably the old record of Hendel (1938) ("Sicilien (April)") was consulted in this case, but some caution is advisable.

The recent records of *N. gymnostoma* in Friuli-Venezia Giulia and Veneto indicate that the fly is actually widespread in north-eastern Italy. From the beginning of 2002 the species has been observed in several localities in the lowlands of Friuli-Venezia Giulia in the provinces of Udine (Colloredo di Prato, Blessano, Pozzuolo del Friuli, Castions di Strada, Varmo, Latisana, Fiumicello), Gorizia (Mariano del Friuli) and Pordenone (Arzene, Azzano X) and in the plain of Veneto in the provinces of Padua (Legnaro, Pernumia, Carrara S. Giorgio, Cittadella) and Venice (Mira, S. Maria di Sala, Eraclea, Caldana, Lova, Portogruaro).

In Austria and Slovenia the fly was first observed in 1994 (Kahrer, 1999; Seliak, 1998). In particular, in 1997 serious damage to onion and leek was reported in south-western Slovenia ("Görz und Küstenland") (Seliak, 1998), close to the border with north-eastern Italy. Thus it is likely that the pest came to northern Italy from these countries.

In recent years the pest has been reported as a new species in several countries of central-northern Europe (i.e. Germany, Austria, Slovakia) and the Balkans (i.e. Slovenia, Hungary, Serbia).

BIONOMICS

The larvae of *N. gymnostoma* can develop on several *Allium* species. Among cultivated plants the fly attacks onion (*Allium cepa* L.), shallot (*Allium cepa ascalonicum* Hort.), chive (*Allium schoenoprasum* L.), garlic (*Allium sativum* L.) but mostly leek (*Allium porrum* L.); the fly also attacks wild Alliaceae such as *Allium vineale* L.

In northern Italy, as in nearby countries, the pest should complete two generations per year, the first in spring and the second in autumn.

The first flight of the adults in the area of Nova Gorica (Slovenia), near the border with

Italy, lasts approximately one month from mid March to mid April (Seliak, 1998, 1999). In the Veneto region the first emergence of adults starts from mid March and finishes in the second half of April; the last adults were observed on 20 April. Oviposition in the leaves of the host plants begins a few days after mating. The larvae of the first generation complete their development in 3-4 weeks. Pupation takes place within the leaf at the end of the mine. The pupa apparently aestivates.

The new adults are present in autumn for a long period that stretches from mid September to mid October (Seliak, 1999). The larvae of the autumnal generation continue to develop until the end of November, then pupate. The species overwinters as a pupa within the mine in the host plant.

DAMAGE

Damage to *Allium* species is caused by the females and mainly by the larvae. The females make several feeding punctures with the ovipositor, normally in the upper parts of the leaves. Later they lay eggs in the leaves near the base of the plant.

The mine is under the leaf epidermis towards the low part of the plant. If the host is small in size (i.e. chives or young leek plants grown in nurseries for transplanting), they can penetrate into the "heart" of the plant, so killing it. In such cases pupation occurs outside the plants, in the soil or between the roots.

At times large populations of *N. gymnostoma* build and cause severe economic damage to *Allium* crops, especially leeks. The presence of mines, larvae or puparia in the leaves of the host plants make them unsuitable for the trade.

Moreover, plants damaged by feeding larvae can become infected by opportunistic fungi and bacteria thus becoming useless for marketing.

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