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Macrolophus melanotoma (Heteroptera Miridae): New aspects to understand this little-known species

A. Bout^{1*}, I. Ruiz¹, C. Gaumetou¹, F. Sandoval¹, JC. Streito² and N. Ris¹.

¹ Institut Sophia Agrobiotech (Université Côte d'Azur, INRA, CNRS, ISA), 400 route des Chappes, BP 167, F – 06903 Sophia-Antipolis Cedex

² INRA-CBGP (Institut National de la Recherche Agronomique - Centre de Biologie pour la Gestion des Populations) 755 av. du campus Agropolis CS30016 34988 Montpellier-sur-Lez cedex, France

Introduction

Macrolophus melanotoma (Hemiptera: Miridae) was considered a real species since 2007 only, after the revision of the taxonomic status of *M. caliginosus* and the distinction of two different species (*M. melanotoma* and *M. pygmaeus*). While *M. pygmaeus* is quite well known and used as biological control, *M. melanotoma* has been poorly studied. In the Mediterranean basin, *M. melanotoma* appears closely associated to *Dittrichia viscosa*, a common ruderal plant. In order to understand whether *D. viscosa* and *M. melanotoma* could respectively act as a bank plant and a native biocontrol agent for neighboring horticultural crops, we investigated the relative attractivities of both *D. viscosa* and tomato plants for *M. melanotoma* as well as the feeding behaviour of the Miridae.

Could we use *M. melanotoma* as natural beneficial of vegetables productions?

Presentation of the genus *Macrolophus* (Miridae)

Miridae are small bugs with size between 1.5 et 11 mm. The form is variable. Their cuticle is thin and poorly sclerotized. Among this family, *Macrolophus* are skinny and often green. They present anatomical/behavioural features of predators. Facultative phytophagy cannot be excluded.



M. melanotoma ©JC. Streito – INRA CBGP



M. pygmaeus (droite) ©A. Bout – INRA ISA.

Morphological differentiation between *M. melanotoma* and *M. pygmaeus*



M. melanotoma (up) et *M. pygmaeus* (below): the dark bands behind the eyes discriminate between the two species. ©JC. Streito – INRA CBGP.

M. melanotoma in the wild : Focus on *Dittrichia viscosa*



Perennial, woody plant at the base, up to 150 cm.

Latin name: *Dittrichia viscosa* L. (W. Greuther).

Vernacular name: Inule visqueuse (French)

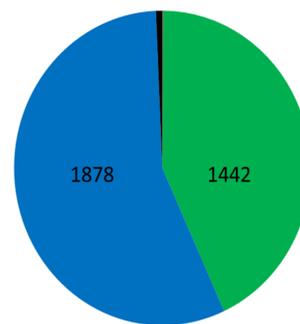
Family: Asteraceae.

Distribution: Mediterranean Basin

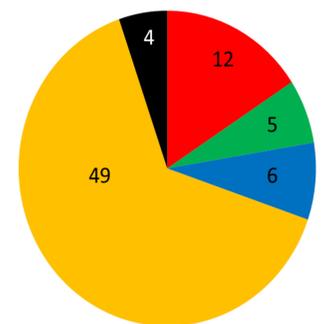
Altitude: <800 m.

Habitat: Crops, agricultural or urban wastelands, roadsides.

Dittrichia viscosa



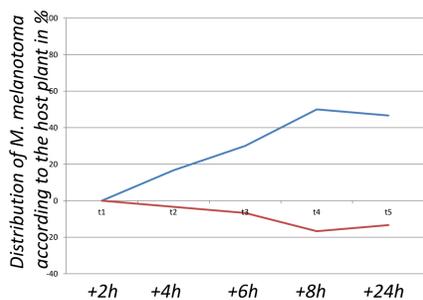
Horticultural crops



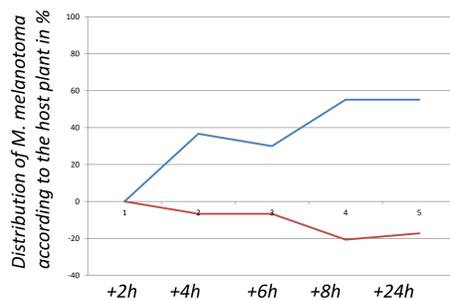
***M. melanotoma* is mostly present on *Dittrichia viscosa* L..**

Chemical attractivity by host plants

Tomato + extract of *D. viscosa* vs Tomato



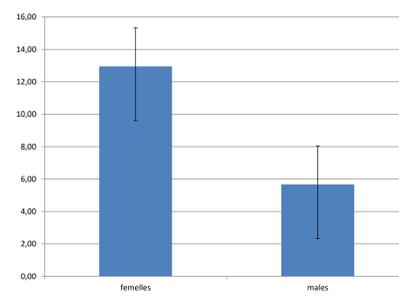
D. viscosa vs *D. viscosa* + Tomato's extract



In the laboratory, *M. melanotoma* is attracted by water extracts from *D. viscosa* and is repelled by water extracts from Tomato.

Predation

Number of Eggs of *Ephestia kuehniella* consumed over 24H per individual (n = 20)



In the laboratory, *M. melanotoma* behaves as a generalist predator but with less efficiency than *M. pygmaeus*.

CONCLUSION

Four specific results are highlighted:

- ✓ A high affinity of *M. melanotoma* towards *D. viscosa* was evidenced, this affinity being partly explained by easily extractable plant compounds.
- ✓ A close association between *M. melanotoma* and *D. viscosa* was found, *M. melanotoma* being able to complete its life cycle on *D. viscosa* without any prey.
- ✓ In non-choice conditions, *M. melanotoma* is however able to lay eggs on tomato plants and the offspring successfully develops.
- ✓ Complementarily, *M. melanotoma* also behaved as generalist and probably opportunistic predator as it is able to prey on various arthropods (*Tetranychus* eggs, Whiteflies, Aphids and *Ephestia kuehniella* eggs).

Taken as a whole, this study contributes to a better understanding of the *M. melanotoma* ecology. From an applied perspective in biological control, the *D. viscosa* – *M. melanotoma* association does not probably simply act as a plant bank towards neighbouring crops. Based on the exploitation of attractive an/or repellent natural compounds, new strategies may however be planned.