

# Potential leafhopper vectors of plant pathogens potato in the high plateaus Algerians (Hemiptera: Cicadomorpha: Auchenorrhyncha)

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## ABSTRACT

To know the fauna of leafhoppers in Algerian cultures, and identify the vector species of phytopathogens to crops. The several collections have been realized during 2011-2013, on the cultivation of potatoes, concerned several plots in two regions in the center of the country: Djelfa (Djelfa) and Boussaâda (M'Sila). Nineteen species of Hemiptera: cicadomorpha, have been collected, whose phytoplasma vector species and species cause direct damage to the potato, 100% of leafhopper species found are indicated thus vectors of virus or phytoplasma which cause serious illness or as direct crop pests..

**KEYWORDS:** *Cicadomorpha*, *Aphrodinae*, *Deltocephalinae*, *Typhlocybinae*, *Eurymelinae*, *Limotettigini* vectors, *phytoplasm*.

## INTRODUCTION

One of the major problems posed by leafhoppers or Auchenorrhynques, is their ability to transmit phytoplasma considered the most serious diseases of economically important crops (Stolbur, Florescence and golden yellows Aster (AYP) ... etc.), because they are incurable and irreversible. The economic significance of leafhoppers also arises from their direct crop damage induced by toxémiases contained in their saliva and the formation of egg laying scars. For the protection it is essentially to develop preventive strategies, requiring a knowledge of species in culture and biology. Few studies have were done about the fauna Hemiptera in Algeria. Order to better understand the fauna Hemiptera Cicadières, collections were programmed in different regions, to identify the species of leafhoppers in the cultivation of potatoes.

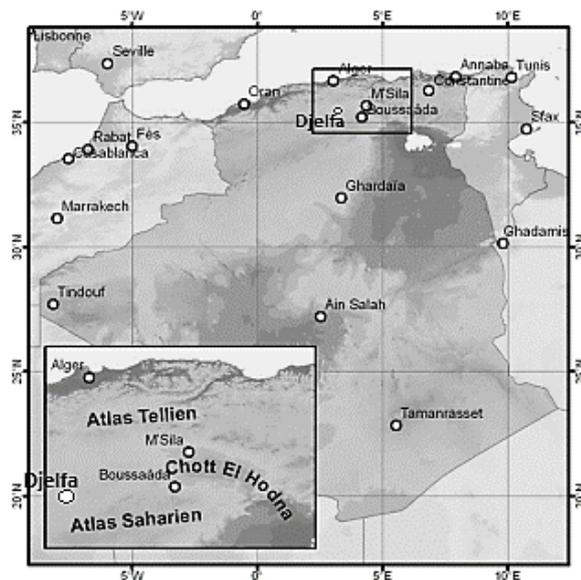
## MATERIAL AND METHODS

Order to characterize the main species of Hemiptera belonging to suborders leafhoppers including Cicadomorphes, potential vectors of phytoplasme. The surveys were carried out in the central regions and countries of East center (Fig. 1): the El Maâdher (Boussaâda, wilaya of M'Sila) and regions Maâlba and Ros Layoune wilaya of Djelfa.

Samples were collected using sticky boards on which there is spread a sticky substance, the yellow color of sticky plaques is to exclusively attracting plant pests, principally whiteflies, Diptera, aphids and leafhoppers [1]". In each two stations, their location was in deferent places in the plot. The Counting, identification and removal

of different forms of leafhoppers present on the yellow plates are determined later in the laboratory under a binocular lens, the catches have been taken during 2011 to 2013 on three potato plots and weeds around culture. Of weeds are composed mainly of bindweed, of goosefoot, of couch grass, cruciferous, euphorbias and grasses.

Classification and identification of the collected species were made through observation of external morphological criteria (ornamentation of the head, wings, genitalia ...) and particularly on the observation of the male genitalia after dissection [2]"; and use of dichotomous keys [3, 4, 5, 6,7]".



**Fig. 1:** Location prospecting

#### Results:

The identified Cicadomorpha belong to Cicadellidae, subdivided into three subfamilies Agallinae, Deltocephalinae and Typhlocybinae (Table 1). The total of Hemiptera sorted specimens reached 1959 individuals.

#### Discussion:

The results have identified 19 species of Hemiptera Cicadomorphes Auchénorrhynques that feed on sap *Liberia*: The different species recorded will be cited based on the importance of the frequency or carrier capacity phytoplasme. Among the 19 species of Cicadomorpha (Gallinae, Deltocephalinae and Typhlocybinae) identified, are directly harmful species to the potato. Other species of Cicadomorpha feed on the sap of sieve tubes of the phloem and are known as phytoplasma vectors, *Empoasca fabae* is the predominant species in all the trappings performed as well on the potato as weeds, of 1959 individuals collected, and 1748 individuals are *E. fabae*, a frequency of 89.23%. This species polyphage, long been regarded as a secondary pest, is responsible for damage increasingly important, causing by its salivary toxémiases, feeds on phloem tissue or mesophyll [8]". The results of curling, stunting and yellowing of the ends and edges of the V-shaped foliage on leaf tips.

*Macrosteles quadripunctata*, with this 5.15%, this species is a European vector yellows virus ter in Russia and the aster yellows in the United States.

*Psammotettix alienus* presents with 2.7% this species is a dwarfing virus vector wheat in Czechoslovakia. it passed on virus type semi persist as evidenced by the inability of insects keep for life. The maximum retention period is 80 days [3]".

*Typhlocyba pomaria*, is present in the culture of the potato with a frequency of 0.81% of the total identified, can be a pest of apple and pear [9]".

*Balclutha abdominalis*, whose frequency is 2.96%, is also cited as an effective vector of phytoplasma diseases of Aster Yellows group,.

*Limotettix sp.*, With 2.45%, is reported harmful to crops, is a vector of European virus of aster yellows. It was reported as a suspect vector mosaic sugar beet and delphinium jaundice in England [3]".

**Table 1:** cicadaires of species identified in the cultivation of the potato

Spices	Number of specimens	Plants	Place of capture
Agallinae, Agalliinae, Agalliini Dietrich 2005 <i>Agallia constricta</i> (Van. Duzee, 1894) <i>Agallia quadripunctata</i> (Provancher, 1872)	11 10	Potato Adventices	El Maàdher, Maâlba ,Ros Layoune Maâlba ,Ros Layoune
Deltocephalinae <i>Amplicephalus osborni</i> (Van Duzee, 1892) <i>Balclutha abdominalis</i> (Van. Duzee, 1892) <i>Endria. inimica</i> (Say, 1830) <i>Deltocephalus velus</i> <i>Deltocephalus flavocostatus</i> (Van. Duzee, 1892) <i>Limotettix</i> sp (Sahlberg, 1871) <i>Macrosteles</i> sp (Fiber, 1866) <i>Macrosteles quadrilianatus</i> (Frobes, 1885) <i>Macrosteles borealis</i> (Dorst, 1931) <i>Macrosteles variatus</i> (Fiber, 1866) <i>Scaphoideus</i> sp (Uhler, 1889) <i>Psammotettix</i> sp (Haupt, 1929) <i>Psammotettix alienus</i> (Dahlb, 1850)	30 58 03 08 02 48 10 101 06 02 02 01 53	Adventices Potato Adventices Potato, Adventices Potato Potato Potato Potato Adventices Potato, Adventices Potato Potato Potato, Adventices	Maâlba ,Ros Layoune El Maàdher, Maâlba ,Ros Layoune Maâlba ,Ros Layoune El Maàdher Maâlba ,Ros Layoune El Maàdher El Maàdher El Maàdher, Maâlba Ros Layoune El Maàdher El Maàdher El Maàdher, Ros Layoune El Maàdher, Maâlba ,Ros Layoune
Typhlocybinæ <i>Empoasca</i> sp <i>Empoasca faba</i> <i>Typhlocyba pomaria</i> (McAtee) <i>Zyginidia scutellaris</i> (Löw, 1885)	05 1742 14 03	Potato Potato Potato Potato, Adventices	El Maàdher El Maàdher, Maâlba ,Ros Layoune El Maàdher, Maâlba ,Ros Layoune El Maàdher

*Zyginidia scutellaris*, Gatherer stitcher in the parenchyma, representing 0.15% of the trappings, is reported as a vehicle of Tomato Stolbur. *Z. scutellaris* locally can become harmful if higher frequency [3].

*Amplicephalus osborni*, whose frequency is 1.53%, is also cited as an effective vector of phytoplasma diseases. This species is a vector stripe mosaic of wheat and other grains in the US and Canada.

*Endria. Inimica* whose frequency is 0.15%, is also cited as an effective vector of diseases of striated wheat mosaic in the United States and Canada.

*Agallia constricta*, with this 0.56%, is reported harmful to crops of potatoes. This species is a vector of the New Jersey strain of virus yellows potato dwarf virus and wound tumor clover in the eastern United States.

*Agallia quadripunctata*, with 0.51%, is also reported harmful to crops of potatoes.

*Deltocephalus hairy*, with a frequency of 0.40%, is also cited as an effective vector of phytoplasma diseases of Aster Yellows group.

Note that Cicadomorphes species are present both on the potato plants on wild plants.

#### Conclusion:

In conclusion, the inventory of Hemiptera Cicadomorphes in the Algerian potato culture, consists of 100% of species of leafhoppers mentioned as vectors of serious diseases or characterized as direct crop pests.

This first inventory in the potato will be complemented by more extended surveys and experiencing the vectorial capacity of phytoplasma diseases of each species. The presence of *faba*, which has great importance on the health of plants and the choice of the implementation period of this culture will also verify fluctuating populations of leafhoppers is possible, with an inventory tracking parasitoids remains desirable to list the potential predators. In Algeria, leafhopper fauna is not sufficiently known both in terms of biodiversity on the specific biology plan. It would be interesting in the future to put light on the ecological characteristics of the different species to observe the migration of leafhoppers in their natural habitats.

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