

## FIRST REPORT OF THE *APHIS NERII* SPECIES BOYER OF FONSCOLOMBES (INSECT: *HEMIPTERA: APHIDIDAE*) IN ROMANIA

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**Abstract.** The purpose of this paper is to report the presence of a new pest on the territory of Romania. The new species identified is *Aphis nerii* (Boyer de Fonscolombe, 1841), also known as oleander aphid or milkweed aphid, is included in the Order Hemiptera, Suborder Sternorrhyncha, Family Aphididae. The origin of the species is uncertain, although it is attributed as an area of origin the Mediterranean Basin, considered the area of origin of its main host plant (Oleander - *Nerium oleander*). *Aphis nerii* is a cosmopolitan species (Africa, Asia, Europe, North America, Australia-Oceania, South America. Milkweed aphids are also present on the European continent, being a relatively new species, most reports being recorded after 2013. The presence of milkweed aphid in Europe can be associated with the introduction of the invasive species *Asclepias syriaca*. *Aphis nerii* is a polyphagous species, attacking ornamental, cultivated and spontaneous plant species from 19 families (Apocynaceae, Fabaceae, Caricaceae, Crassulaceae, Euphorbiaceae, Solanaceae, Rutaceae, Compositae, Convolvulaceae, Vitaceae, etc.). The observations made on the Romanian territory, in 2020, highlighted the presence of the species *Aphis nerii* on the plants of *Asclepias syriaca* (common milkweed). The damage caused by aphid milkweed is expressed by the qualitative depreciation of the plants, delays of the plant growth, the production of honey dew and improving the occurrence of phytopathogenic fungi. The information presented, regarding polyphagism and damages caused by *Aphis nerii*, is enough to conclude that it is necessary to study this species in Romania, to establish the spread, host plants, damages caused and as well to investigate proper control methods.

**Keywords:** *Aphis nerii*, *Asclepias syriaca*, pest, first reporting

### INTRODUCTION

Approximately 5600 species of the infraorder *Aphidomorpha* (BLACKMAN AND EASTOP, 2020; FAVRET, 2020; FERICEAN L. and M. CORNEANU, 2017) have been described worldwide, including *milkweed aphid*. *Aphis nerii* Boyer de Fonscolombe is classified in the order *Hemiptera*: Suborder *Sternorrhyncha*; Infraorder: *Aphidomorpha*; Superfamily: *Aphidoidea*; Family: *Aphididae*; Genus: *Aphis*.

To the species *Aphis nerii* Boyer de Fonscolombe (*Hemiptera: Aphididae*) is attributed an Mediterranean origin. Milkweed aphid is present on the continents: *Africa, Asia, Europe, North America, Australia-Oceania, South America* (<https://www.cabi.org/isc/datasheet/6214#REF-DDB-183937>). The same source (<https://www.cabi.org/isc/datasheet/6214#REF-DDB-183937>) reports the presence of the species, *Aphis nerii*, in Europe, starting with 2013, in Austria (reported by PURKART et al., 2020), Bulgaria (reported by YOVKOVA et al., 2013), Czech Republic (reported by PURKART et al., 2020), Hungary (CABI Undated), Portugal (CABI Data Mining - Undated), Slovakia (reported by PURKART et al., 2020), Spain (CABI Data Mining - Undated). Existing references confirm the presence of *Aphis nerii* species in other countries on the European continent as well, such as: Greece (JOHN AT et al., 2007), Italy (STARÝ P., 1966 quoted by PURKART A. et al., 2020), Mediterranean France (STARÝ P., 1976 cited by PURKART A. et al., 2020, MOHL EK, 2014) Malta (MISFUD D. et al.,

2013, RAKHSHANI E. et al., 2015), The Netherlands (PIRON P., 2009). In Poland, *milkweed aphid* has been reported to be present in protected areas on *Nerium oleander* plants (OSIADACZ B. and R HAŁAJ, 2012). In 2020, scientists MATSIKHA I. and V. KRAMARETS report the presence of *milkweed aphid* in Ukraine, more precisely in the Zakarpatska area, on the plants of *Asclepias syriaca*.



Fig. 1 – Presence of *Aphis nerii* in Europe according CABI (<https://www.cabi.org/isc/datasheet/6214>)

Approximately 50 host plants are assigned to the species *Aphis nerii* (*Asclepias currasavica*, *Asclepias curassavica*, *Asclepias syriaca*, *Asclepias fruticosa*, *Apocynum* spp., *Araujia sericifera*, *Lagerstroemia indica*, *Cedrus libani*, *Calotropis procera*, *Citrus aurantium*, *Echinacea angustifolia*, *Euphorbia* sp., *Inula cuspidata*, *Nerium oleander*, *Nerium odorum*, *Phaseolus vulgaris*, *Phyllanthus miruri*, *Pergularia tomentosa*, *Periploca graeca*, *Platycodon* sp., *Tilia tomentosa*, *Vitis vinifera*, *Solanum tuberosum*, *Calliandra purpurea*, *Kalanchoe gastonis – bonnieri*, *Carica papaya*, *Sarcostemma clausum*, *Sarcostemma glaucum*, *Stephanotis floribunda*, *Vinca major*, *Vinca minor*, *Hoya carnosai*, *Gomphocarpus* sp., *Cucumis sativa*, *Metaplexis japonica*, *Oxypetalum coeruleum*, *Capsicum annum*, *Capsella bursa-pastoris* (RABEEA, A. A., 2021; CAZORLA PERFETTI D. and MORALES MORENO P., 2019; RAVINDER SINGH CHANDI et al., 2018; BORDES BRIANNA and ERIC LEE - MÄDER, 2014; HOBBS et al., 2000; KAGEZI et al., 1999; MURUAGA DE L' ARGENTIER and AGOSTINI DE MANERO, 1990), belonging to 19 botanical families (*Apocynaceae*, *Fabaceae*, *Caricaceae*, *Crassulaceae*, *Euphorbiaceae*, *Solanaceae*, *Rutaceae*, *Compositae*, *Cucurbitaceae*, *Convolvulaceae*, *Vitaceae*, *Phyllanthaceae*, *Lythraceae*, *Pinaceae*, *Cyperaceae*, *Asteraceae*, *Urticaceae*, *Campanulaceae*, *Malvaceae*).

*Aphis nerii* attacks wild (weeds), ornamental, forest and agricultural plants (CARRERA and CERMELI 2001, NARVÁEZ 2003, NIÑO et al., 2001, URTIAGA 2007, CAZORLA PERFETTI D. and MORALES MORENO P., 2019). Milkweed aphid is a polyphagous species, causing direct damage (by sucking sap from the phloem) and indirect damage (being a vector of viruses and helping the development of fungal pathogens). *Aphis nerii* transmits cucumoviruses (*Cucumber*



*mosaic virus - Physalis heterophylla*) (HOBBS H., 2000) and potyviruses (*Araujia mosaic virus*, *Leek yellow stripe virus*, *Moroccan watermelon mosaic virus*, *Tobacco vein banding mosaic virus*, *Zucchini mosaic virus*) (ELLIOT et al., 2009, GADHAVE, K.R. et al., 2020, KATIS N.I. et al., 2006).

The aim of this paper is to record the presence of a new pest on the territory of Romania.

#### MATERIAL AND METHODS

In August 2020, as a result of monitoring activities of the species *Asclepias syriaca*, we observed this new insect species. Monitoring studies of the invasive species *Asclepias syriaca* have been conducted in several counties. The establishment of geographical coordinates was done using GPS.

The climate of the areas where the observations were performed is temperate continental, with average annual rainfall ranging from 500 to 900 mm/year (Copșa Mică 900 mm; Târnava 600-700 mm; Căpâlna de Jos 688 mm; Resighea 500-700 mm) and average annual temperatures of 8 -10°C (Copșa Mică mean 8,6°C; Târnava 8,6°C; Căpâlna de Jos 9,8°C; Resighea 10°C).

The organs attacked by this hemipteran insect were collected and transported to the Laboratory of Diagnosis and Phytosanitary Expertise within the University of Agricultural Sciences and Veterinary Medicine of Banat "King Mihai I of Romania" in Timisoara. By studying the insect with a binocular magnifying glass based on existing data in the literature (TRUȘCĂ R. et al., 2013; GROZEA et al. 2011; GROZEA et al., 2016), we came to the conclusion that the species is *Aphis nerii* known as milkweed aphids.



#### RESULTS AND DISCUSSIONS

The information about the presence of the pest *Aphis nerii* on the European continent, being uncertain and incomplete - led us to update the map of Europe (figure 2) based on the bibliographic study (<https://www.cabi.org/isc/datasheet/6214#REF-DDB-183937>; PURKART et

al., 2020; YOVKOVA et al., 2013; JOHN A.T. et al., 2007; STARÝ P.,1966; STARÝ P., 1976, MISFUD D. et al., 2013, RAKHSHANI E. et al., 2015; MATSIAXH and V. KRAMARETS, 2020).

Following the observations *in situ*, it was established that the species *Aphis nerii* is present in three counties in Romania (figure 3): Sibiu, Mureş and Satu-Mare. The sites where milkweed aphids have been reported have the following GPS coordinates: Sibiu – Târnava (46.121578°/24.282171°; 46.120037°/24.277772°; Copşa Mică 46.119319°/24.273427°); Mureş - Căpâlna de Jos (46.243007°/ 24.128583°); Satu Mare - Resighea (47.597443°/22.278754°).



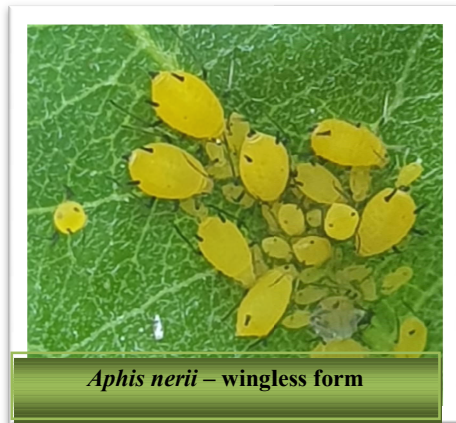
Fig. 2 – Presence (distribution) of *Aphis nerii* in Europe



Fig. 3 – Presence of *Aphis nerii* in Romania

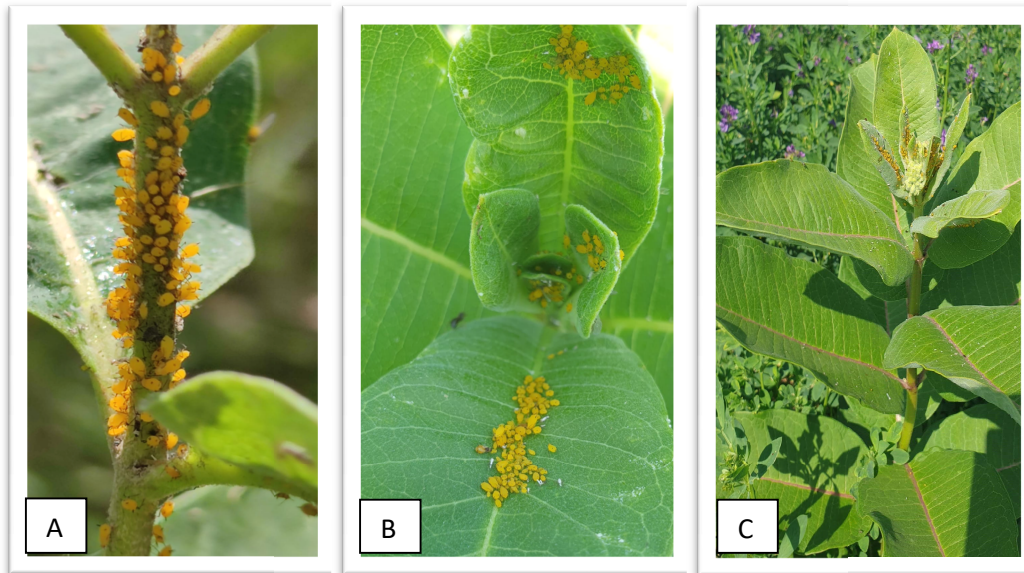
**Morphological characters:** *Wingless form:* The body has a bright yellow oval shape. The head is small, the thorax narrow and well developed abdomen. The body length is 1.5-2.6 mm (MCAUSLANE Heather J., 2017). The length of the antennae represents 2/3 of the length of the body. The antennae, legs, cornicles and cauda are black. The cornicles are long and cylindrical.

*Winged form:* body, oval elongated, narrower compared to the one present by wingless form. The body length is 2.1 - 2.6 mm (MCAUSLANE Heather J., 2017) yellow colored. The head, antennae, legs, cornicles, cauda and dorsal sclerit of the thorax are black. The wings are transparent, with dark nervures; the anterior wings are larger than the posterior wings.

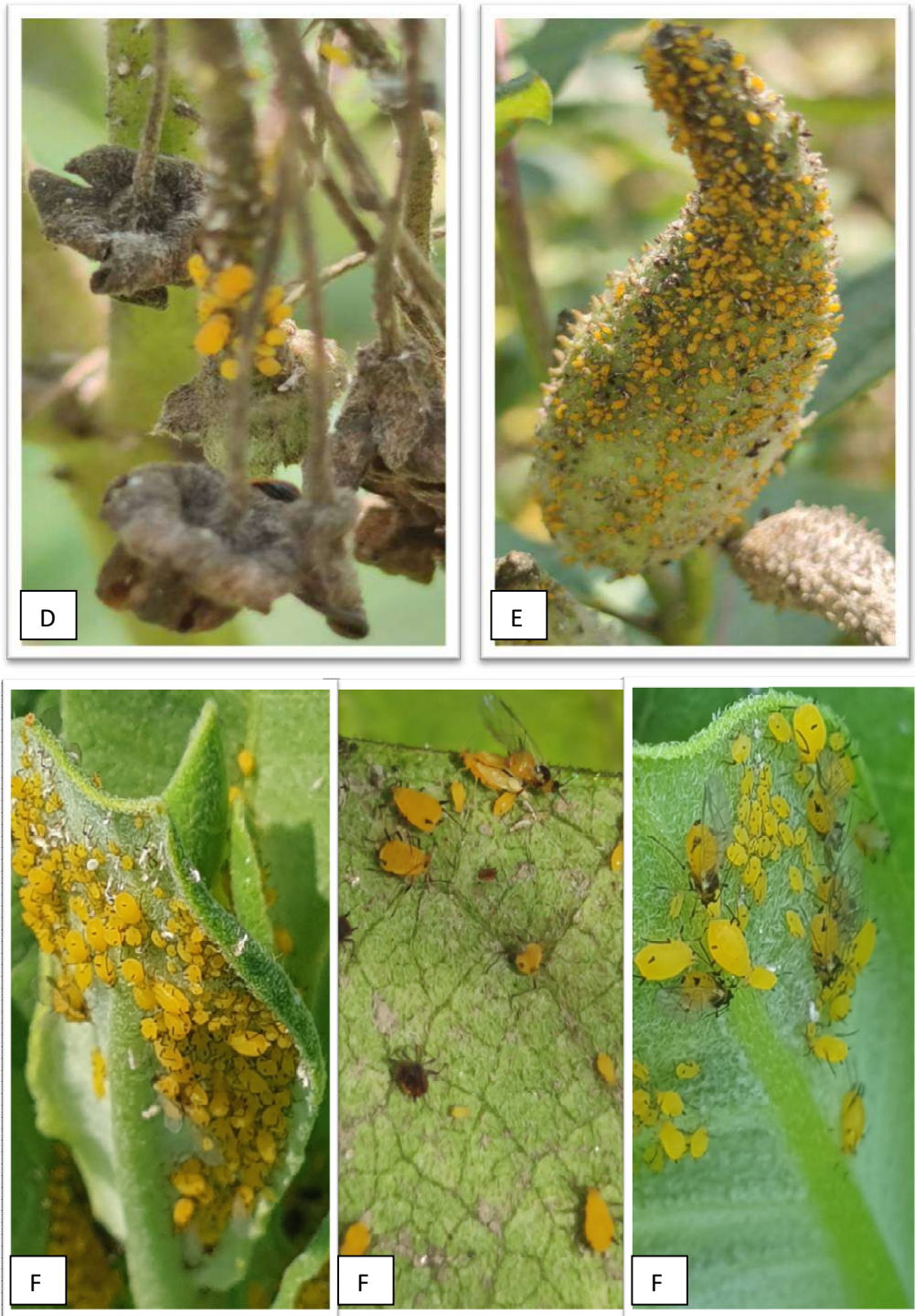


*Host plants:* *Aphis nerii*, although it is a polyphagous pest that attacks plant species from 19 botanical families, in Romania it has been reported only on *Asclepias syriaca* (Apocynaceae).

*Damaging mode:* The study found that milkweed aphid colonizes the young shoots, the stem, the lower and upper surface of the leaves, the flower stalk and the fruit (figure 4).









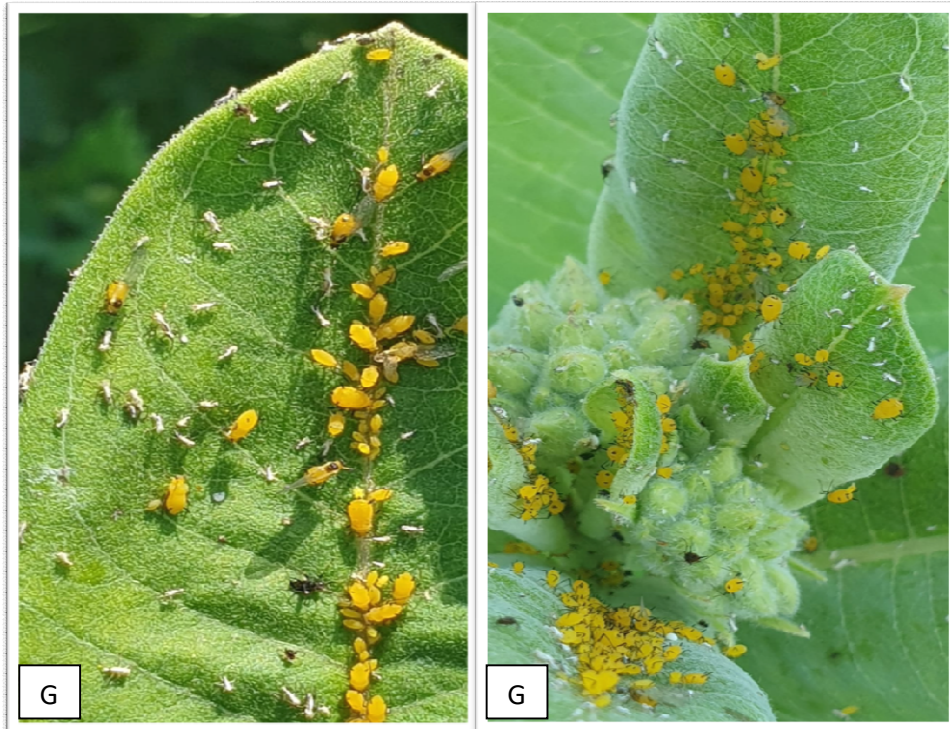
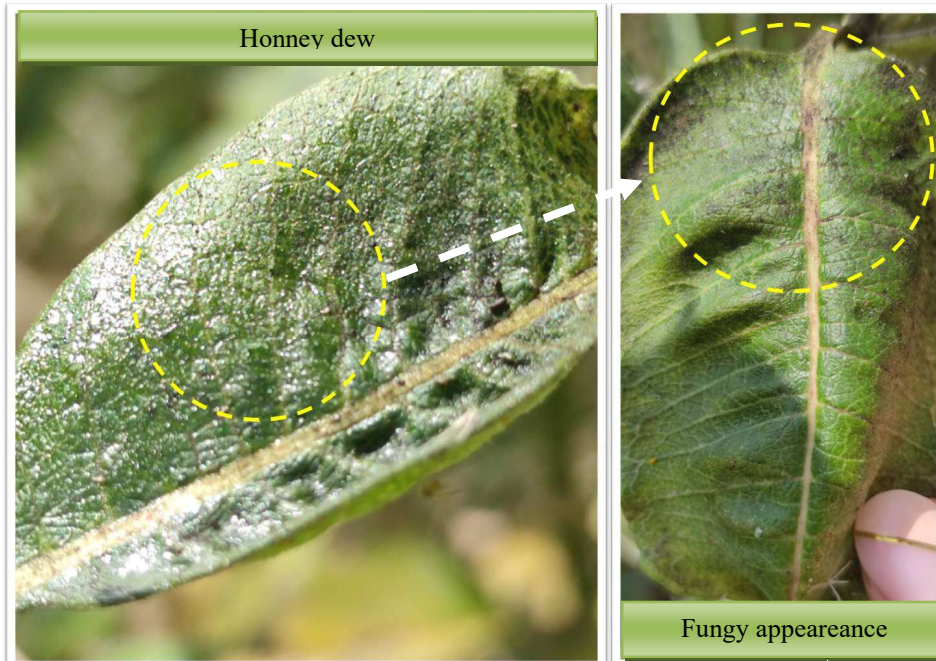


Fig. 4 - *Aphis nerii* colonies (a- on the stem; b, c - growth tip, d - peduncle, e - fruit; f - on the lower surface of the leaves; g - on the upper surface of the leaves)



The larvae and adults of *Aphis nerii* suck sap from the plant's tissues, causing: reduced growth rate, leaf spots (chromatic disorders), twisting and wilting of the leaves. Milkweed aphid causes indirect damage by honey dew, left on the leaves, favoring the installation of fungi, thus reducing photosynthetic activity, respiration and the process of perspiration (figure 5).

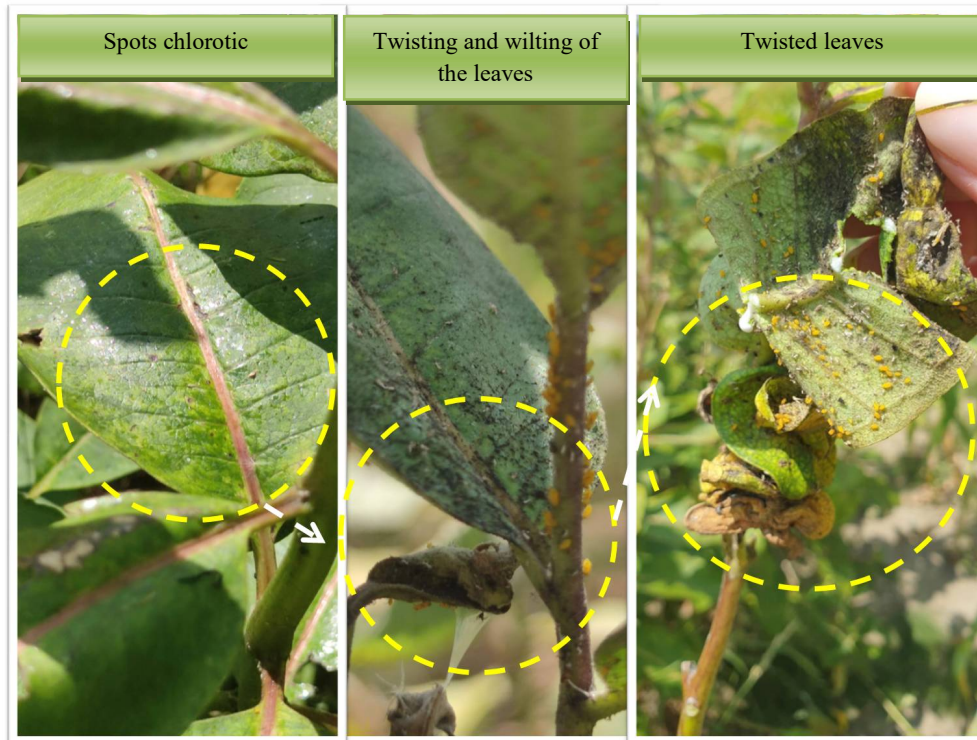


Fig. 5 - Aspects of direct and indirect attack of *Aphis nerii* on *Asclepias syriaca* plants

Up to now, there are few evidence that *Aphis nerii* is a significant pest in a habituated area. In Florida, the main impact of the pest has been described as unaesthetic, through the presence of colonies on the host plants, by occasional deformation of the growing organs and the promotion of fungal growth by the honey dew that it produces (MCAUSLANE, 2014).

Studies conducted by Misfud et al., 2013, in Malta, led them to state that *Aphis nerii* is not an economically important pest, being reported on *Nerium oleander* and *Stephanotis floribunda* plants. In Egypt, it has been described as a major pest of *Nerium oleander*, the economic impact was not detailed (EL-SHAZLY, 2002).

In Argentina, it has been described as one of the most damaging aphids in the fields of *Phaseolus vulgaris* (MURUAGA DE L' ARGENTIER & AGOSTINI DE MANERO, 1990).

The size of the damage is conditioned by population dynamics. The existence of adequate food and environmental conditions determines the appearance of substantial pest populations that can produce honey dew, favoring the growth of fungi. Such populations would be a problem for nurseries or gardeners. However, population dynamics may be disrupted by climatic conditions, host plant physiological characteristics, farming methods, and management practices (SEQUEIRA and DIXON, 1997).

## CONCLUSIONS

The information presented and in respect of polyphagism and damages caused by *Aphis nerii* is sufficient to conclude that it is necessary to study this species in Romania in order to establish the spread, the host plants, the damage caused and the investigation of control methods.

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