

UPDATED HOST PLANT RANGE FOR PHYTOPHAGOUS INSECT COREUS MARGINATUS (HEMIPTERA: COREIDAE) IN ROMANIA

Ioana GROZEA, L. MOLNAR, A. CARABET, Ramona STEF, Monica BUTNARIU, Snejana DAMIANOV, A. GROZEA, Ana Maria VIRTEIU

University of Life Sciences" King Mihai I" from Timisoara, Romania

Corresponding authors: ioana_entomol@yahoo.com; anamariavarteiu@usab-tm.ro

Abstract. In recent years, in the parks and gardens of urban and rural areas in Romania, the harmful species *Coreus marginatus* (Linnaeus, 1758) has been often observed. After analyzing the information set, we found that there is little information at the national and even international level about the phytophagous character and its host plants. Until recently, the species was not a problem. That's why we proposed that through the present work, we would see the causes that led to the increase in its population. Through our 2-year study, 2021-2022 in 4 places in western Romania, we noticed that the insect is present especially in areas with various plant species in warm springs and summers. From the findings, it is obvious that the species is frequent in great color variability, at a high and very high level/the analyzed plant (n=3; n=6) in the 2 urban localities compared to the rural localities, where it was present at a low and absent level (n= 1.0; n=0.0). The ornamental plants with host potential were identified as follows: *Chaenomeles japonica*, *Rosa l.*, *Lavandula sp.*, *Magnolia liliiflora*, *Convallaria majalis* but also spontaneous plants such as *Cirsium arvense*. Most specimens were found on *Chaenomeles* and *Rosa*, where both adults and nymphs were observed feeding on sap from leaves, stems, inflorescences or seeds from inflorescences. The warm sunny periods of the day are favorable for its activity. We can conclude that the species has harmful potential due to the population growth or widening of the range of host plants, but we suspect that it is also due to the high temperatures in the summer and the places protected from the wind in autumn.

Keywords: *Coreus marginatus*, polyphagous, host plants, favorable conditions.

INTRODUCTION

The hemipter *Coreus marginatus* (Linnaeus, 1758) is also known as *Cimex marginatus* (older name) or dock bug (WILDLIFE INSIGHT, 2012). It is a true bug from Coreidae family, belonging genus *Coreus* (ALDRICH, 1988). It is known that order Hemiptera are frequent in various areas (GROZEA, 2015), exceeding 42,000 species worldwide (HENRY, 2009). It originates from Europe, where it has a wide distribution, also in Asia, but also in Africa, where it has only been reported in Algeria until now.

As recognition, they are brown in color, 13-15 mm in length. The immature stage, as in all true bugs (GROZEA, 2006), goes through 5 developmental stages (HRUŠKOVÁ AND HONĚK 2001; KARAKAYA ET AL, 2012).

They also have glands with a characteristic secretion, imprinted on the plants they visit (DURAK AND KALENDER, 2007).

The presence of this insect was often associated with other bugs such as *Halyomorpha halys* (CICEOI ET AL., 2017; DE MICHELE AND GROZEA, 2018). It was also associated with other polyphagous stink bugs (LO MONTE AND GROZEA, 2018; MUNTEAN AND GROZEA, 2019) some microorganisms in animals (TSUBASA ET AL., 2019).

From what has been observed over time, the adult form can adapt to several plant species, usually wild Asteraceae and Polygonaceae. Among these, the ones from the genus *Rumex*, *Polygonum* spp., *Carduus*, *Cirsium*, *Arctium*, *Sonchus* and *Onopordum* are preferred (PUTSHKOV 1962).

Plants of *Rumex* spp. are preferred by the larvae, they consume the seeds and infructescence (HRUSKOVA ET AL., 2005).

More recent research has shown that this species has been observed feeding on almond plants in Turkey (TOLGA AND YOLDAŞ, 2019).

As host plants for *Coreus marginatus*, in Romania (more precisely in the South-East), corn and jujube have been identified by CICEOI ET AL. (2017) and STAVRESCU ET AL. (2018).

Partial research has shown that dock bugs use their sensory organs to select food, therefore it is not clear if certain plants on which it is observed (such as *Stellaria* sp.) enter the area of preferences (PEKAR AND HRUŠKOVA, 2006).

That is why it is not very clear which plants they feed on and how they choose them.

Considering the few references found in the specialized literature, but relying on the ability of bed bugs to easily adapt to new living environments, including host species, we chose to focus on what we observed at a given time in the conditions in the west of Romania.

MATERIAL AND METHODS

In order to identify the presence of the *Coreus marginatus* species, we chose 4 areas in Western Romania (west and south-west), actually representing 4 localities in 3 counties (Timis, Arad and Caras Severin). Each locality was located at a different altitude, from 95 m to 645 m in order to have an image of the favourable areas. Also, the type of space monitored was different, so the following were considered: mixed garden, park, green area and vegetable garden and fruit trees (table 1).

Table 1

Characterization of the study areas: altitude, place, category of analysed plants as possible host plants for *Coreus marginatus*

Area	County	Place	Altitude	Type of monitored space	Plant species
West	Timis	Dumbravita	95 m	Mixed Garden	Ornamental shrubs* Grassy ornamentals*
West	Arad	Arad	116 m	Park	Ornamental trees** Grassy vegetation**
South-West	Caras Severin	Bocsa	170 m	Green Area	Ornamental trees*** Ornamental shrubs*** Grassy vegetation***
South-West	Caras Severin	Anina	645 m	Vegetable garden and fruit trees	Vegetables**** Fruit trees****

* *Rosa* sp., *Magnolia liliiflora*, *Chaenomeles japonica*, *Convallaria majalis*, *Lavandula* sp.

** *Philadelphus* sp., *Acer platanoides*, *Rhus typhina*, *Rosa* sp., *Rumex* sp.

*** *Acer negundo*, *Tilia cordata*, *Chaenomeles japonica*, *Rosa* sp., *Lavandula* sp.

**** *Solanum lycopersicum*, *Phaseolus vulgaris*, *Lactuca sativa*, *Malus domestica*, *Prunus domestica*

About 2 plants from each plant species (5 plant species/area, 5x2=10 plants/area/locality) were monitored, bimonthly for 8 months, in 2021-2022.

The target stages were the hibernating adults from April to the end of May, the nymphs in the 5 stages, from June-August and the new adults from August-October. Those observed were analyzed and quantified at the Phytosanitary Diagnosis and Expertise Laboratory in USVT.

Also, the plants as potential hosts were analyzed in terms of the degree of damage.

RESULTS AND DISCUSSION

From the observations made during 2021-2022, we found that the species *Coreus marginatus* was present in all the specially chosen places at various altitudes (figure 1). Thus, at the lowest altitude (95 m) more individuals were observed (n=69), while at the highest altitude (645 m) there were only 6 individuals. Anyway, the evolution was a gradual decline, where at 116 m there were 21 ind. and at 170, only 9 ind.

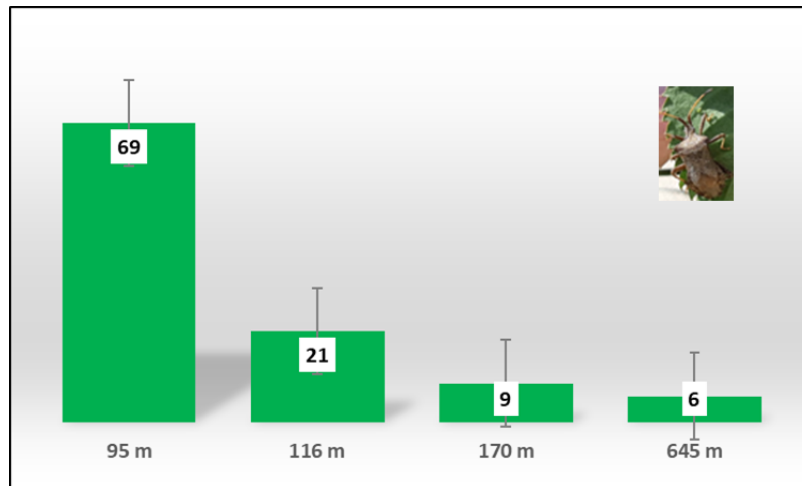


Figure 1. The evolution of *Coreus marginatus* at various altitudes

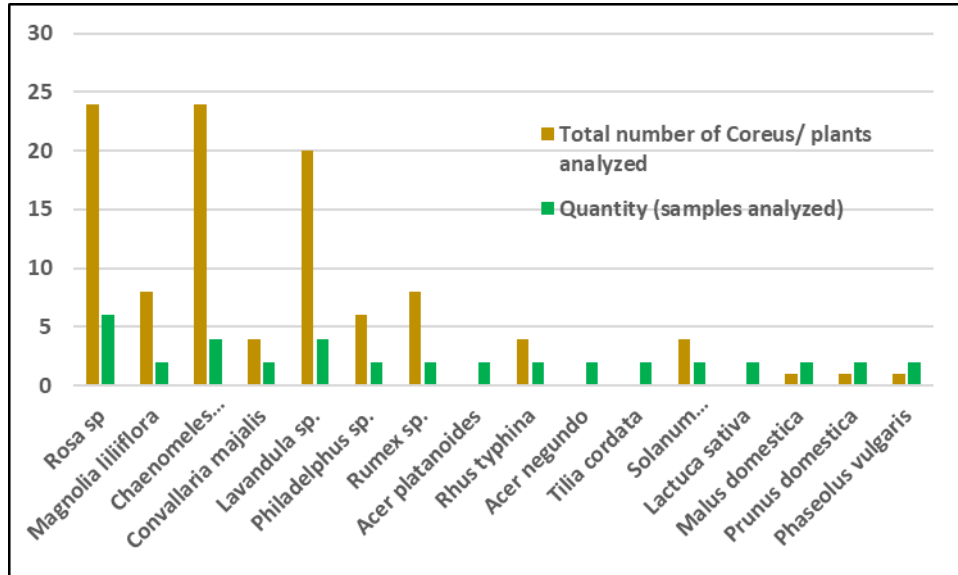


Figure 2. The population level of the *Coreus marginatus* species on the variety of plants analyzed

Looking at figure 2, it can be seen that most dock bugs (in adult form) (n=24) were quantified on *Rosa sp* plants. and *Chaenomeles japonica*. These were followed by *Lavandula sp.*, where also the presence of *Coreus m.* was considerable (n=20).

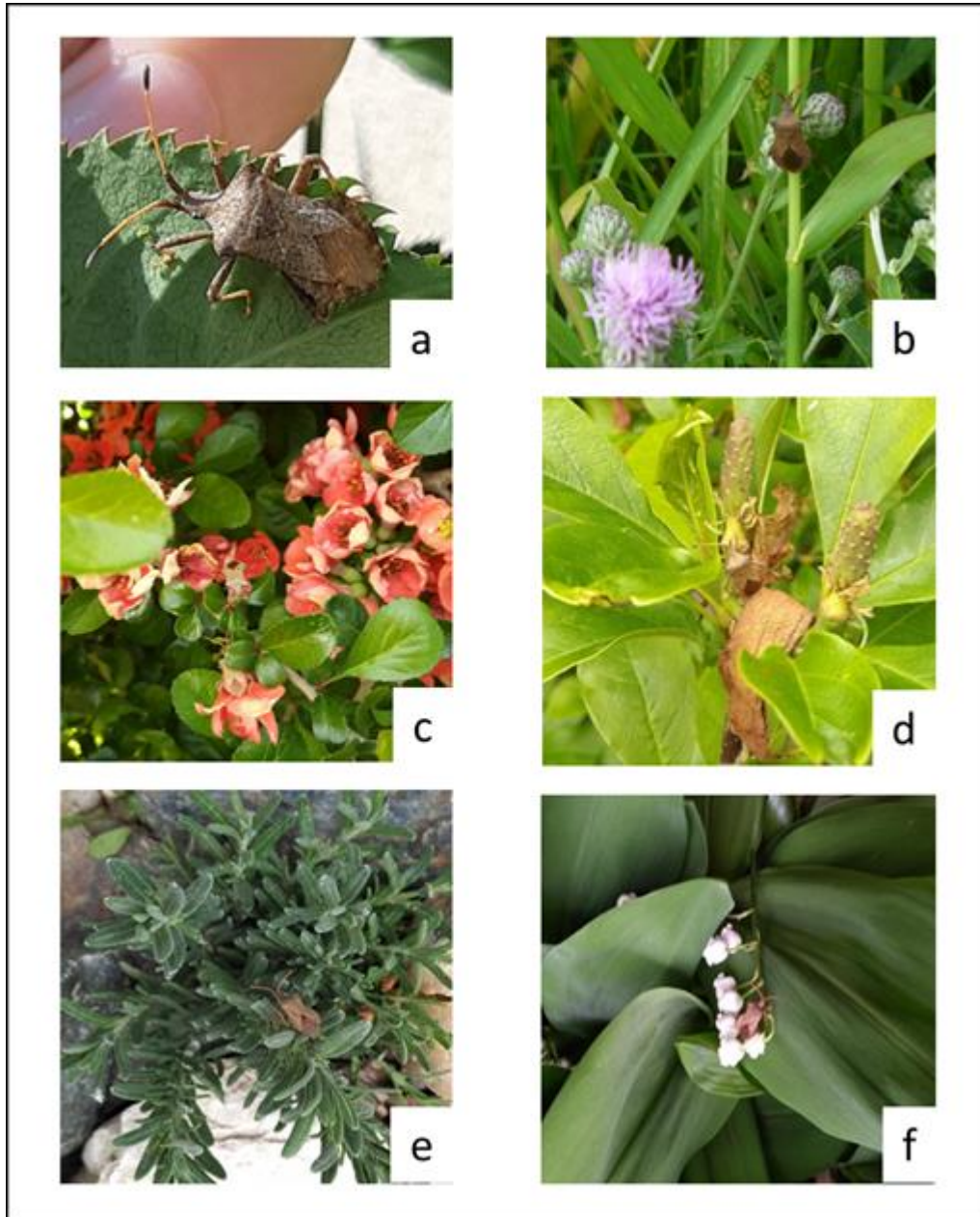


Figure 3. Plants on which nymphs and adults of *Coreus marginatum* L. were observed, namely: a. *Rosa sp.* b. *Cirsium arvense*; c. *Chaenomeles japonica*; d. *Magnolia liliiflora*; e. *Lavandula sp.* and f. *Convallaria majalis* (photos taken by Grozea during period of 2021-2022)

It was also observed on other plant species, but at a lower level, *Magnolia liliiflora*, *Rumex sp.* (n=8), *Philadelphus sp.* (n=6), *Convallaria majalis*, *Rhus typhina*, *Solanum lycopersicum* (n=4), *Phaseolus vulgaris*, *Malus domestica* and *Prunus domestica* (n=1) (figure 3).

Table 2

Frequency of the pest on the analyzed plants	
The analyzed plant	Frequency/plant
<i>Rosa sp</i>	5
<i>Magnolia liliiflora</i> ,	2
<i>Chaenomeles japonica</i>	6
<i>Convallaria majalis</i>	2
<i>Lavandula sp.</i>	5
<i>Philadelphus sp.</i>	3
<i>Rumex sp.</i>	4
<i>Acer platanoides</i>	0
<i>Rhus typhina</i>	2
<i>Acer negundo</i>	0
<i>Tilia cordata</i>	0
<i>Solanum lycopersicum</i>	2
<i>Lactuca sativa</i>	0
<i>Malus domestica</i>	0.5
<i>Prunus domestica</i>	0.5
n	15
X	2.13
s	2.06
Sx	0.53
CV	96.42

Analyzing the frequency on each analyzed plant shows an average of $\bar{x}=2.13$ individuals/plant. Which is quite worthy of attention considering the pest's mobility, size and ability to multiply (table 2).

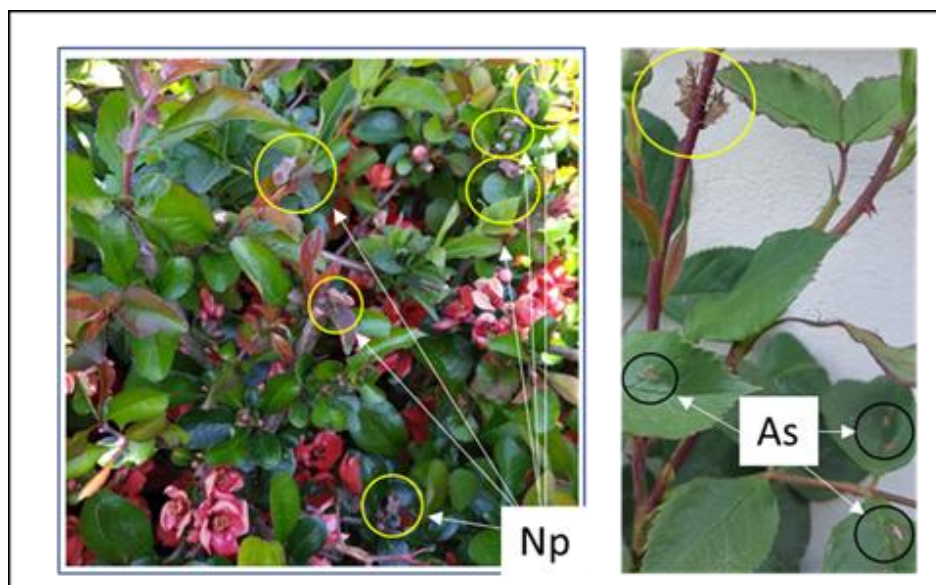


Figure 4. Levels of frequency and attack on plants: Np-number of individuals on plant; As- attack with symptom (photos taken by Grozea I. during period of 2021-2022)

Dock bugs were not observed on all the species (plants) under analysis (n=0.0) and related data can be found in table 2.

No individual was morphologically identical to another, with express reference to the background colour which varied from light to dark brown, but also to the positioning of the punctuation.

Leaf attack symptoms, characteristic of dock bugs, were identified only on the species of *Chaenomeles* (Np=6) and *Rosa* (Np=2) (figure 4), while no damage was observed on the other analysed plants.

However, we express our opinion related to the fact that the high frequency on a plant actually indicates an intense activity of the pest there and the plant can be considered a potential host plant.

CONCLUSIONS

Coreus marginatus is a potentially harmful species for various geographical areas, especially for warm ones, a fact demonstrated by its higher frequency at low altitudes where temperatures are higher. In temperate areas, sheltered places near houses (as gardens) can be favourable for passing the winter. Also, the variety of plants in an area can influence the adaptation to new species and implicitly the multiplication of the pest. Being relatively new for our country, it is obvious that in the coming years we will witness an expansion and major damages.

ACKNOWLEDGEMENT

We express our thanks to the owners of the gardens who allowed us to make the observations and to those who manage the parks and green spaces.

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