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## HOST PLANTS OF THE CITRUS FLATID PLANTHOPPER IN THE ARBORETUM NAMED AFTER B. F. OSTAPENKO (UKRAINE)

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**Abstract.** The article is devoted to the study of host plants of the invasive phytophage *Metcalfa pruinosa* (Say, 1830), within the territory of the arboretum named after B.F. Ostapenko. The Citrus Flatid Planthopper is a dangerous adventive species that actively expands its range in Europe and Ukraine, inhabiting hundreds of plant species. This poses a threat to ornamental plantings, gardens, and urban green zones. Its host plants in Ukraine have been insufficiently studied, which underlines the relevance of local research. The study aimed to determine the spectrum of host plants for this species in the research region. As a result of two years of observations, 19 host plant species belonging to 10 families were identified. The interrelation of autochthonous and introduced plants was 52.6 % and 47.4 %, respectively, indicating a lack of selectivity in feeding. The phytophage population density remained low, and colonization was focal, characteristic of an early stage of invasion. The obtained results confirm the polyphagous nature of *M. pruinosa* and indicate the potential capacity of the population for further expansion within the arboretum, which requires regular monitoring.

**Keywords:** *Metcalfa pruinosa*, invasive species, feeding behavior, arboretum.

### Introduction.

The citrus flatid planthopper — *Metcalfa pruinosa* (Say, 1830) (Hemiptera: Fulgoromorpha: Flatidae) is an invasive insect species that has been actively spreading in European countries, including Ukraine, in recent decades. Its native range is considered to be North America, from which the leafhopper first reached Italy and then spread to other European countries [18]. The citrus flatid planthopper is capable of colonizing over 200 plant species from various botanical families, which causes its high ecological plasticity and potential danger to gardens, ornamental, and urban plantings [1; 10; 14].

Both adults and larvae damage plants, since they suck cell sap from various plant organs. As a result of such feeding, the growth of hosts slows down, individual branches dry out, fruit development deteriorates, or some of them fall off. Additionally, puncture sites resulting from insect feeding allow fungal and bacterial pathogens to



penetrate plant tissues. Of particular danger is the ability of *M. pruinosa* to transmit viruses and mycoplasmas. The ornamental value of plants is also significantly reduced because the larvae secrete an abundant, white, waxy, sticky substance that covers the shoots, giving them an unappealing appearance [11].

Arboretums and botanical gardens are characterized by high plant species diversity and are potential sites for forming new trophic relationships with adventitious insects. *M. pruinosa* may exhibit a limited range of host plants or fragmentary feeding at low abundance, while the range of hosts expands as abundance increases [15]. Currently, data on the feeding behavior of *M. pruinosa* in Ukraine is limited, making local studies relevant.

The study aimed to determine the host plants of the citrus flatid planthopper in the arboretum named after B. F. Ostapenko.

### **Main text.**

### **Methodology.**

The study was conducted in 2024–2025 on the territory of the arboretum named after B. F. Ostapenko of the State Biotechnological University (Kharkiv, Ukraine) (49°90' N, 36°45' E). The inspection was carried out during the growing season using the route method. Pest registration was carried out through a visual inspection of branches, leaves, and young shoots. The presence of insects, traces of feeding, and wax secretions was recorded. The plant was identified as the host because characteristic traces of this species were noted on it. Additionally, the adults were caught with a sweep net.

### **Results and discussion.**

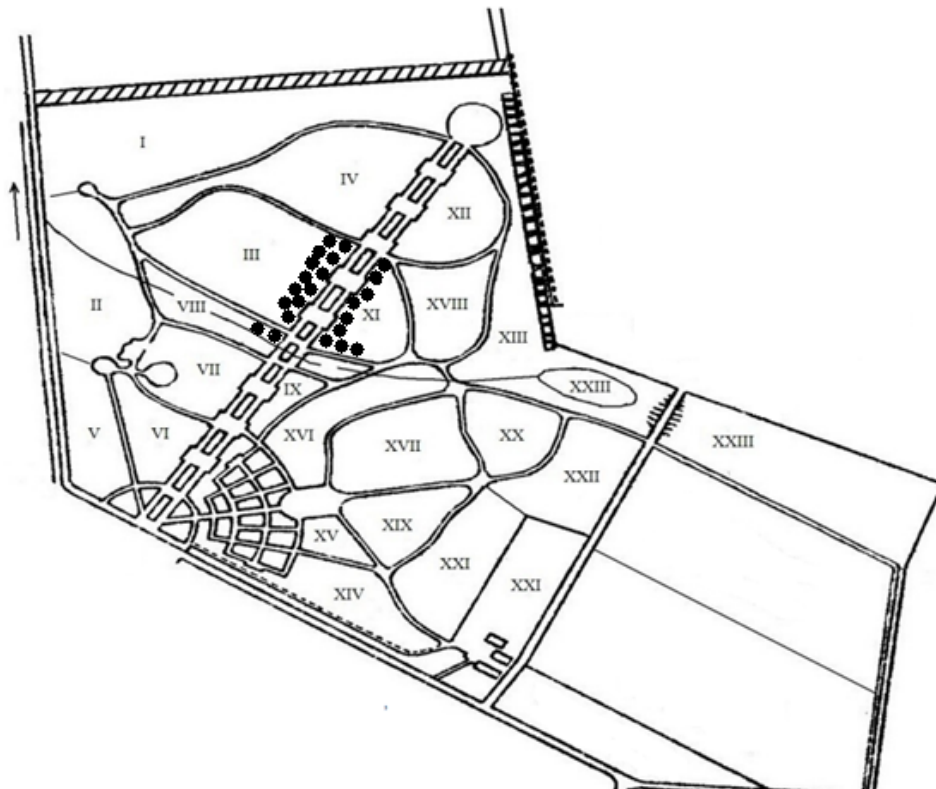
Monitoring of the citrus flatid planthopper showed that the population center is concentrated along the central road and near small side trails of this park (Figure 1).

Single adults of *M. pruinosa* (Figure 2) were recorded in July – August 2024 in the experimental field located near the arboretum.

The citrus flatid planthopper is native to North America. Its natural range includes eastern and southeastern regions of Canada and the United States, extending south to Florida and along certain western borders to Minnesota and Texas. In its native



habitats, the species is a local component of forest and adjacent agroecosystem entomofauna, feeding on numerous trees, bushes, and other plants.



**Figure 1 – Schematic map of the arboretum named after B. F. Ostapenko, with the location of *M. pruinosa* detection in 2024–2025**

*Authoring*



**Figure 2 – Adult *M. pruinosa* (photo by B. O. Kolomoyets)**

The earliest recorded instance of *M. pruinosa* occurring outside its natural range dates back to the late 1970s, when the species was first documented in northern Italy [18]. Subsequently, it established itself in Sicily and mainland Italy and began to actively expand its range across European countries [3; 8]. Some studies confirm that



the invasion of this species is not limited to Europe: in the 21st century, *M. pruinosa* was also recorded in some Asian countries (for example, a report of its detection in the Republic of Korea), which indicates the ability of the species to overcome intercontinental barriers largely due to human activities (movement of goods, plant material, seedlings and other trade) [7].

In Ukraine, the citrus flatid planthopper was first recorded in the south of the country (Odessa) in 2011 [16]. Later, reports were received from Kyiv and other regions [17]. In the Kharkiv region, it was found in 2018 [11]. According to biodiversity databases [3; 5], as of 2025, in Ukraine, *M. pruinosa* was found in the following regions: Kyiv, Kharkiv, Dnipropetrovsk, Odessa, Zakarpattia, Zaporizhia, Kirovohrad, Kherson, Mykolaiv, Poltava, Cherkasy, and the Autonomous Republic of Crimea.

Global climate change over the past decades is one of the main factors in the expansion of the citrus flatid planthopper range in Europe and Ukraine. For example, according to Copernicus (ERA5) data [2], the warming rate in Europe from 1995 to 2024 was approximately 0.53°C, while in Ukraine it was approximately 0.8°C, which is higher than the European average.

The citrus flatid planthopper overwinters in the egg stage; therefore, low temperatures and prolonged frost are the main limiting factors for its spread northward in Ukraine. As winters become shorter and milder due to global warming, the survival rate of phytophagous eggs increases significantly. This enables *M. pruinosa* to establish itself in regions where severe frosts previously prevented its existence, ensuring a larger initial population size in the spring [17].

During the spring development of *M. pruinosa*, the main indicator is the sum of effective temperatures (SET) at the lower developmental threshold of approximately 10.1°C. It is known that 50% of the larvae emerge at the SET of 360°C, and mass emergence of the first instar larvae requires the SET of approximately 452°C. Warm and dry periods accelerate the accumulation of SET, which can advance phenology and enable feeding on plants during critical growth phases. Thus, this may contribute to an increase in the harmful effects of *M. pruinosa* [6].



Climate change is also contributing to the northward shift of the range boundaries of many thermophilic plants. This provides the citrus flatid planthopper with new host plants and breeding habitats, facilitating its adaptation to new territories and further expansion. Thus, warming in recent years has affected the phenology and geographic distribution of species, particularly through warmer winters and faster accumulation of effective temperatures in the spring.

In addition to climate change, the spread of this species is facilitated by the import and movement of planting material, vehicles, and containers; the migration of phytophagous insects from neighboring regions. Due to the presence of numerous hosts in urban green spaces, the risk of naturalization is high throughout Ukraine [17].

With the appearance of *M. pruinosa* in Europe, its host plants are actively studied. It has been found to have a wide range of hosts. For example, in Greece, it develops on ornamental crops, fruit crops, vegetable crops, and weeds. A total of 62 species are listed [12]. In an orchard in Romania, *M. pruinosa* fed on apple, apricot, peach, and nectarine trees [4]. In Serbia, plants from the genera *Acer*, *Aesculus*, *Gleditsia*, *Robinia*, *Ailanthus*, *Populus*, *Platanus*, *Prunus*, *Pyrus*, *Ulmus*, *Tilia*, *Cornus*, *Fraxinus*, *Quercus* and *Thuja* are listed as host plants for the it [9].

From 2024 to 2025, a study of the host plants of the citrus flatid planthopper in the arboretum revealed that the phytophagous insect currently plays an insignificant role, with only a few larvae or small colonies of up to 20 individuals feeding on the plants (Figure 3). This suggests that the species is still in the early stages of local population formation.

In the arboretum, the citrus flatid planthopper fed on 19 species of trees and bushes from 10 families (Table 1).

The interrelation of native and introduced plants was 52.6% and 47.4%, respectively. This indicates that the citrus flatid planthopper does not clearly prefer one type of host plant over another based on its origin.

The uniform and weak presence of the citrus flatid planthopper on various host plants indicates a lack of selectivity. Similar data have been described for the early stages of species invasion in Italy and France [10]. Of particular interest were the



findings of traces of the citrus flatid planthopper feeding on *C. australis* and *A. altissima*, which are often host plants for this insect in Europe [13]. This may indicate the potential suitability of the park's dendroflora for further development of *M. pruinosa* population.



A



B



C



D

**Figure 3 — Traces of feeding of *M. pruinosa* on plants: A — exuvia of nymphs; B–D — waxy secretions of larvae on leaves (photo by Vasylieva Yu. V.)**



**Table 1 – Host plants of *M. pruinosa* in the arboretum  
named after B. F. Ostapenko, 2024–2025**

№	Botanical family	Plant species	Status
1	Adoxaceae	<i>Viburnum lantana</i>	Autochthonous
2	Berberidaceae	<i>Berberis vulgaris</i>	Autochthonous
3	Cannabaceae	<i>Celtis australis</i>	Introducer
4	Caprifoliaceae	<i>Lonicera maackii</i>	Invasive introducer
5		<i>Lonicera tatarica</i>	Introducer
6		<i>Lonicera xylosteum</i>	Autochthonous
7	Cornaceae	<i>Cornus</i> sp.	–
8	Moraceae	<i>Morus alba</i>	Introducer
9	Oleaceae	<i>Fraxinus</i> sp.	–
10		<i>Ligustrum vulgare</i>	Autochthonous
11	Rhamnaceae	<i>Frangula alnus</i>	Autochthonous
12	Rosaceae	<i>Crataegus monogyna</i>	Autochthonous
13		<i>Crataegus sanguinea</i>	Autochthonous
14		<i>Physocarpus opulifolius</i>	Introducer
15		<i>Prunus spinosa</i>	Autochthonous
16	Sapindaceae	<i>Acer campestre</i>	Autochthonous
17		<i>Acer pseudoplatanus</i>	Introducer/ naturalized
18		<i>Acer truncatum</i>	Introducer
19	Simaroubaceae	<i>Ailanthus altissima</i>	Invasive introducer

Authoring

### Conclusions.

In 2024–2025, the abundance of *M. pruinosa* within the park remained low, and the population was focal. The detected individuals were either solitary or in colonies of fewer than 20 individuals. This indicates that the species is in the early stages of consolidating its territory.



A total of 19 host plant species belonging to 10 families were identified for the citrus flatid planthopper. No preference was found between native and introduced species.

Despite low densities, the species demonstrated the use of a wide range of host plants, consistent with its known polyphagia.

Thus, the arboretum named after B. F. Ostapenko has the potential for further expansion of *M. pruinosa* trophic relationships, which requires monitoring in the coming years.

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