



# First Record of *Cacopsylla pulchella* (Hemiptera, Psyllidae) in Albania

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## ABSTRACT

The aim of this study is to identify plant lice *Cacopsylla pulchella* as a new alien insect in the fauna of Albania. In order to assess the potential of this insect as a pest causing damages on trees, infestation level assessment was used. In the first decade of June 2020 samples were collected at three locations in Albania, where *Cercis siliquastrum* is grown. Samples were collected and brought to the laboratory for further analysis. Field research was performed to assess distribution and infestation intensity across various localities. The intensity of infestation was assessed by visual examination and was categorized according to previously determined categories. *C. pulchella* was confirmed on *C. siliquastrum* in three localities in Albania. Most of the infested trees had a moderate or high intensity of infestation. Compared to the results of other countries, it seems that the Judas trees are under heavy attack in Albania. Librazhd and Elbansn districts had the highest recorded infestation level. Infested trees found in this study should be inspected in the following years and this alien insect should be further monitored in order to estimate its potential of becoming an invasive pest in this country.

**Keywords:** alien pest; *Cercis siliquastrum*; Judas tree; damage; infestation

## INTRODUCTION

The most important alien invasive species regarding their number and impact belong to the group of insects (Brockerhoff and Liebhold 2017). Out of them, around 400 species feed on woody plants in Europe (Roques et al. 2016) and new species are still being introduced (Seebens et al. 2017). In Albania, 267 insect and mite alien species have been recorded to date (Tomov et al. 2009, Papparisto et al. 2010).

*Cacopsylla pulchella* Low (Hemiptera, Psyllidae) is a jumping plant–lice that is considered to be an alien species in Europe (Mifsud et al. 2010) and was first recorded in 1964 in France (Hodkinson and White 1979). It was also confirmed in many European countries such as Austria, Great Britain, Greece, Switzerland (Zeidan-Gèze and Burckhardt 1998), Germany, Italy, Ukraine (Burckhardt 2010), Spain, Portugal (Sánchez 2011), Slovenia (Seljak 2006), Hungary (Ripka 2008), Serbia (Jerinić-Prodanović 2011), Russia (Balakhnina et al. 2015) and Croatia (Pernek et al. 2020). It was also found in Israel (Spodek et al. 2017) and Lebanon (Zeidan-

Gèze and Burckhardt 1998). The main hosts are Judas trees, *Cercis siliquastrum* L. (Burckhardt 1999, Onillon 2016) and *C. canadensis* L. (Balakhnina et al. 2015).

Judas tree is a valued ornamental plant in the Mediterranean regions of Albania. Attacks of *C. pulchella* could reduce the ornamental value of the trees by causing chlorosis and wilting of leaves (Rapisarda and Belcari 1997).

According to Fauna Europea, *C. pulchella* has been absent in Albania (de Jong 2016). This is the first record of this pest in this area. In this study, its potential as a pest causing damages on trees was also assessed.

## MATERIALS AND METHODS

Samples were collected at the beginning of June 2020 at three locations in Albania, mostly in the Mediterranean area, where Judas trees are grown in parks as well as in natural stands (Figure 1).

Adults and nymphs of *C. pulchella* were collected together with plant material and brought to the Entomo-



**Figure 1.** Collection sites of *Cacopsylla pulchella* in Albania.

logical laboratory in Plant Protection Department, Faculty of Agriculture and Environment of the Agricultural University of Tirana for further analysis. They were identified according to the keys by Hodkinson and White (1979), Loginova (1964) and Burckhardt (1999). All samples are kept in Plant Protection Department.

Additional field research was performed in order to assess distribution and infestation intensity across various localities in Albania (Figure 1). The intensity of infestation was assessed by visual examination and was categorized into four categories (Pernek et al. 2020): 0) no symptoms visible from distance or when observing single leaves, 1) low - symptoms are not visible when looking at the whole tree, only few specimens can be detected sporadically on single leaves, 2) moderate – symptoms are barely visible when looking at the whole tree, more than 5 specimens can be counted on 50% of the observed leaves; 3) high – symptoms are visible when looking at the whole tree from distance, more than 10 specimens can be counted on at least 50% of the observed leaves.

## RESULTS AND DISCUSSION

This is the first record of *C. pulchella* in Albania and its presence was confirmed in all inspected localities (Table 1).

Most of the trees (70%) had a moderate or high intensity of infestation (Table 1). When comparing this result with results from Croatia, where infested trees have had mostly a low or moderate intensity of infestation (Pernek et al. 2020), it seems that the Judas trees are under heavy attack in Albania. Librazhd and Elbasan districts had the highest recorded infestation level.

Introduction pathway of *C. pulchella* to Albania is unknown and these first records (in Mediterranean and a part of the continental area) may be independent from each other. Considering its wide distribution and high infestation level along the Albanian coast (Table 1), we can assume that this species has already been present in this area for several years or longer.

Adults of *C. pulchella* are olive-drab or brownish green with orange stripes on the thorax. The abdomen is dark brown and the intersegmental membranes are orange-red. On the forewings black-brown spots can be found. The genital plates of males are almost straight black-colored, while females' lower genital plates are yellow, long as the previous three segments and sharpened at the end, and the upper genital plates are brown or dark brown, not smaller than the lower. Nymphs have five stages of development, the first are yellow with red eyes which are very active, while the following instars are green, settle more or less without much moving on leaves and suck the sap (Figure 2). Eggs

**Table 1.** Locality, address, geographic coordinates, number of checked trees and intensity of infestation.

Locality	Address	Coordinates ( $\varphi$ , $\lambda$ )	Number of checked trees	Intensity of infestation in percentage
Librazhd	Togëz	41.205552, 20.297744	15	1- 15% 2- 75% 3- 10%
	Mirakë	41.179493, 20.244462	15	1- 5% 2- 55% 3- 40%
Elbasan	Xibrakë	41.166984, 20.204349	12	1- 7% 2- 33% 3- 60%
	Labinot	41.130419, 20.128399	10	1- 10% 2- 15% 3- 75%
Durrës	Rashbull	41.318485, 19.516289	5	1- 9% 2- 14% 3- 77%
	Katund i Ri	41.412821, 19.512002	10	1- 5% 2- 15% 3- 80%

are laid inside of the leaf buds, on stipules and very young leaves, as well as developing fruits. All life stages are being found on leaves of the host, mostly on their undersides. In general, *C. pulchella* produces three generations per year, but its population dynamics are dependent on the host plant growth dynamics (Onillon 2016). In this research, some leaves were heavily attacked and damages were visible in the form of necrotic spots (Figure 3).

In Albania, Judas trees are planted as ornamental solitary trees or in alleys, mostly in the Mediterranean area. So far, there have been no serious threats by harmful insects or diseases to these tree species, but *C. pulchella* could cause damages that can consequently even lead to the premature leaf fall. The main problem is the emission of honeydew, in a form of a small spherical drops covered with waxy secretion, which causes necrotic areas on leaves (Rapisarda and Belcari 1997) and represents a nuisance

to inhabitants as well. Infested trees found in this study should be inspected in the following years and this alien insect should be further monitored in order to estimate its potential of becoming an invasive pest (Lockwood et al. 2007).

#### Author Contributions

EÇ conceived and designed the research and carried out the field measurements, EÇ and MP performed laboratory analysis, EÇ supervised the research, MP and MK wrote the manuscript.

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#### Conflicts of Interest

The authors declare no conflict of interest.



**Figure 2.** *Cacopsylla pulchella* nymphs.



**Figure 3.** Damages on Judas tree leaves.

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