

MEALYBUGS (Hemiptera: Coccoomorpha) AS UNUSUAL PESTS ON VEGETABLES IN CROATIA

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ABSTRACT

Mealybugs, as well as other scale insects, are polyphagous pests that feed on and damage nut and fruit trees, greenhouse plants, forest vegetation, woody and perennial ornamentals and house plants, but are rarely found on annual vegetable and arable crops. They feed on nearly all parts on host plants, causing a variety of symptoms and decreasing quality and quantity of yield in cultivated host plants. Indirect damages are a result of virus transmission and excretion of honeydew. Fruits covered with honeydew, and subsequently with sooty mould, are of lower or non-marketability. Faunistic research on scale insects that has been in progress in Croatia since 2005, led to the discovery of two mealybug species harmful to vegetable crops. Those two species are *Peliococcus turanicus* (Kiritshenko, 1931), found on field peas on the island of Cres and *Planococcus citri* (Risso, 1813), found on several occasions on greenhouse vegetables. *P. turanicus* forms dense colonies on plant's root system, causing yellowing of the leaves and total plant decline. Finding of *P. turanicus* on pea was the first record of this species for Croatia, and first finding of this species on pea altogether. *P. citri* is a common and very polyphagous pest that feeds on hosts from more than 82 plant families, so its spread from greenhouse ornamentals to vegetables is not surprising. The species forms colonies on leaves, stems and fruits of host plants, causing their desiccation and total decline. Infested plants are often covered in honeydew and sooty mould. In Croatia *P. citri* has so far been registered on following vegetable hosts: tomato, chili peppers and sweet potato. Since both pests are polyphagous, their spread to new hosts, including vegetables, is to be expected.

Key words: mealybugs, *Peliococcus turanicus*, *Planococcus citri*, vegetables, Croatia

1 INTRODUCTION

Mealybugs, and other scale insects, are considered as one of the most important pests of perennial plants. They are mostly polyphagous pests, with a rare few monophagous

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species (Capinera, 2004). The adult females are sexually mature wingless nymphs, whereas males are mostly winged insects that usually live only for a day or even less and never feed. Adult females are sack-like with no clear segmentation in head, thorax and abdomen, and they may or may not have legs (Ben-Dov *et al.*, 2008). By feeding, they cause direct and indirect damages, with a variety of symptoms. Direct damages are caused by sucking of the pests on plant's sap and consequently decreasing quality and quantity of yield. Indirect damages are a result of virus transmission and excretion of honeydew. Plants covered with honeydew, and subsequently with sooty mould, look dark and dirty, their assimilation ability is decreased and fruits are of lower or non-marketability (Kosztarab, 1996; Capinera, 2004).

Despite their polyphagous nature, they are rarely found on annual vegetable and arable crops. Faunistic research on scale insects in Croatia led to the discovery of two mealybug species damaging vegetables and causing total decline of their host plants.

2 MATERIALS AND METHODS

Faunistic research on scale insects has been in progress in Croatia since 2005, with visual inspections of potential host plants in all 21 Croatian counties. Following materials and methods were used in conducted research: visual inspections of potential host plants using a 10x magnification lens, collecting of plant material in plastic bags and labelling of all samples with relevant details, analysis of samples under stereomicroscope Olympus SZ 51, photographing of samples using digital camera Olympus 510 UZ, preparation of microscopic slides according to the method by Watson & Chandler (1999), microscopic identification of the species based on morphological characteristics of adult females using the keys by Borchsenius (1949), Tereznikova (1975), Cox & Ben-Dov (1986), Kosztarab & Kozár (1988), Cox (1989), Marota (1990) and Danzig (2001) and labelling of slide mounts with all relevant faunistic data.

3 RESULTS AND DISCUSSION

Mealybug species *Peliococcus turanicus* (Kiritshenko, 1931) and *Planococcus citri* (Risso, 1813) were found damaging vegetable crops and causing total decline of their host plants. Malicious mealybug, *P. turanicus*, is a polyphagous species widely distributed in the Palaearctic region, with plant species from 17 families serving as its host (ScaleNet, accessed 27.03.2017). It feeds on root system of many perennial grasses and shrubs, as well as on some annual crops such as tobacco, wheat, potato and peas, on which it can cause economically significant damages. Adult females are oval, light green and up to 3 mm long and 1,8 mm wide (Borchsenius, 1949). Females found during our research were oval, pink and covered in grayish wax (Figure 1). *P. turanicus* was registered in Croatia for the first time in 2009 in pea field on the island of Cres (N 44°51'25.19" E 14°23'51,15") (yellow mark on Figure 2). Infested plants were plucked from the ground and dense colonies of mealybugs on plants' root system were discovered. Infestation led to the yellowing of the leaves and total

decline of the plants. Prior to this finding, pea has not been registered as a host of *P. turanicus*. Also, finding of *P. turanicus* is the first finding of species from genus *Peliococcus* in Croatia (Masten Milek & Šimala, 2013).



Figure 1: Adult female of *P. turanicus* on pea root (photo: T. Masten Milek).

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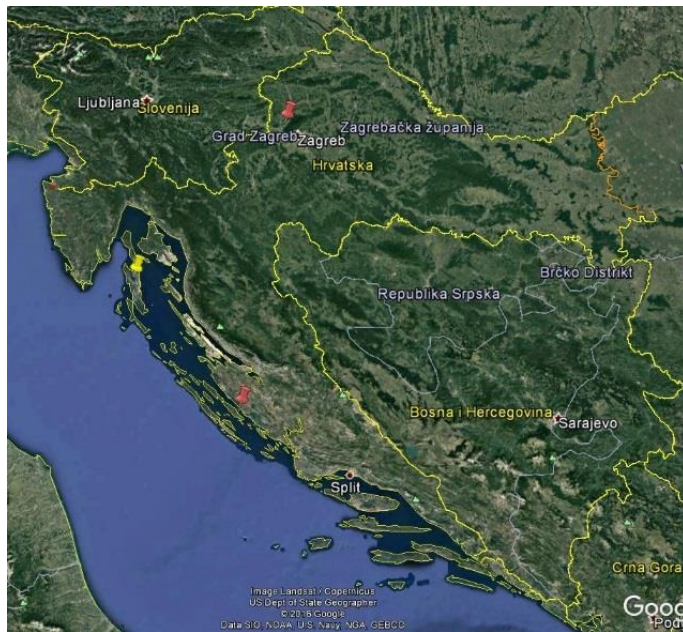


Figure 2: Localities with finding places of *P. turanicus* and *P. citri*.

Citrus mealybug, *P. citri*, is a commonly found polyphagous mealybug species originating from Asia that has so far been recorded from 114 countries worldwide

(ScaleNet, accessed 27.03.2017). It feeds on host plants from 82 plant families (ScaleNet, accessed 27.03.2017), forming colonies on leaves, stems and fruits of its host plants and causing their desiccation and total decline. Infested plants are often covered in honeydew and sooty mould. Females are oval, yellow in teneral specimens, pink or orange-brown when fully mature, covered with white mealy wax, which is not thick enough to completely hide the body colour (Figure 3) (Masten Milek *et. al.*, 2008).



Figure 3: Adult female of *P. citri* under stereomicroscope (photo: T. Masten Milek).



Figure 4: Desiccation of chili pepper plants caused by *P. citri* (Photo: A. Novak).

Body of slide-mounted adult female is 1.6-3.2 mm long and 1.2-2.0 mm wide (Cox, 1989). Next to *Pseudococcus longispinus* (Targioni Tozzetti, 1876), it is one of the

most common and important pests of greenhouse ornamentals, so it is presumable that this pest spreads easily from greenhouse ornamentals to vegetables. Although vegetables rarely serve as hosts for mealybugs, during faunistic research on scale insects in Croatia, high intensity infestations of *P. citri* were registered in 2014 in Turanj (N 43°58'6,47" E 15°24'27,92") (red mark on Figure 2) on greenhouse tomatoes and 2015 in Donja Bistra (N 45°54'10,72" E 15°51'13,27") (red mark on Figure 2) on greenhouse vegetables, including tomato, chili peppers and sweet potato. Infestation led to the desiccation of the host plants (Figure 4).

4 CONCLUSIONS

Faunistic research on scale insects in Croatia (2005-2017) led to the discovery of two mealybug species damaging vegetables and causing total decline of their host plants: *P. turanicus* and *P. citri*.

P. turanicus was found in pea field on the island of Cres, whereas *P. citri* was registered in Turanj on greenhouse tomatoes and Donja Bistra on greenhouse vegetables, including tomato, chili peppers and sweet potato.

Finding of *P. turanicus* on pea was the first record of this species for Croatia and first finding of this species on pea altogether, as well as first finding of species from genus *Peliococcus* in Croatia.

Since both species are polyphagous pests with a potential to cause economic damages and are present in Croatia, their spread to new hosts including vegetables, as well as new damages, is to be expected.

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