

**STATUS OF SCALE INSECTS (Coccoidea), FAMILY Coccidae, ON GRAPES IN 2006. IN CROATIA WITH EMPHASIS ON RARITY OF SECOND GENERATION OF *Parthenolecanium corni* (Bouche) AND *Parthenolecanium persicae* (Fabricius)**

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**ABSTRACT**

During monitoring of Coccoidea on grapes in 2006. we noticed mass outbreaks of *Parthenolecanium corni* (Bouche), *Parthenolecanium persicae* (Fabricius), *Pulvinaria vitis* (Linnaeus) and *Neopulvinaria innumerabilis* (Rathvon). *Neopulvinaria innumerabilis* is a new insect species in Croatia. *P. corni* and *P. vitis* were present in many vineyards in continental part of Croatia in very high population, but mass outbreaks of *P. persicae* and *N. innumerabilis* was in Istria. Different varieties of grape vine weren't equally subservient to different species of scales of family Coccidae. In 2006. we recorded 2 generations of *P. corni* and *P. persicae* even though our literature has data only about 1 generation of this species.

**Key words:** Croatia, distribution, family Coccidae, grape vine, second generation

**IZVLEČEK**

**STATUS KAPARJEV (Coccoidea) IZ DRUŽINE Coccidae NA VINSKI TRTI NA HRVAŠKEM V LETU 2006, S Poudarkom na posebnosti drugEGA rodu vrst *Parthenolecanium corni* (Bouche) IN *Parthenolecanium persicae* (Fabricius)**

Med monitoringom kaparjev (Coccoidea) na vinski trti v letu 2006 smo ugotovili množične izbruhe *Parthenolecanium corni* (Bouche), *Parthenolecanium persicae* (Fabricius), *Pulvinaria vitis* (Linnaeus) in *Neopulvinaria innumerabilis* Rathvon). *Neopulvinaria innumerabilis* je nova vrsta kaparjev na Hrvaškem. *P. corni* in *P. vitis* sta zastopani v številnih vinogradih v celinskem delu Hrvaške. *P. corni* je zelo polifagna vrsta in njene izbruhe ugotavljajo v 10-11 letnih presledkih od 1880. *P. vitis* se šteje kot vrsta brez gospodarskega pomena. V nasprotju s tem pa je množični pojav v letu 2006 pokazal, da ima lahko prav precejšen gospodarski pomen. *P. corni*, *P. vitis* in *N. innumerabilis* lahko prenašajo viruse, kar povečuje njihov pomen. Množični izbruhi *P. persicae* so bili ugotovljeni v številnih vinogradih v Istri. *N. innumerabilis* so našli v Škodelinu, na meji s Slovenijo. V nasprotju z mnenji v hrvaški strokovni literaturi, da imata *P. corni* in *P. persicae* na Hrvaškem le eno generacijo na leto, je bilo očitno da sta bili v letu 2006 dve generaciji. To je bilo razvidno iz našega zbranega materiala kaparjev v obdobju od maja do oktobra.

**Ključne besede:** Hrvaška, razširjenost, družina Coccidae, vinska trta, drugi rod

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## 1 INTRODUCTION

Mass outbreaks of *P. corni* (Bouche), *P. persicae* (Fabricius), *P. vitis* (Linnaeus) and *N. innumerabilis* (Rathvon) in 2006. were very big problem in Croatian vineyards (Masten, 2007). *N. innumerabilis* was found in vineyard in Škudelin in Istria on the border with Slovenia. It was the first record of these species in Croatia (Masten & Seljak, 2006).

*P. corni* is very polyphagus species and mass outbreaks have been reported in 10-11 year intervals since 1880. (Kostarab & Kozar, 1988). *P. vitis* is considered as species of non economic importance. On the contrary, it's mass outbreak in 2006. showed that it can have pretty big economic importance. *P. corni*, *P. vitis* and *N. innumerabilis* can transmit viruses what increase their importance. *P. corni* transmits GLRaV-1 virus, *P. vitis* trasmits GLRaV-3 virus and *N. innumerabilis* transmits GLRaV-1, GLRaV-3 and GVA (Martelli,, 2004).

Croatian literature says that *P. corni* and *P. persicae* have only 1 generation per year in our country (Schmidt, 1976; Maceljiski, 1999; 2005).

## 2 MATERIALS AND METHODS

Survey of species from family Coccidae on grapevine in 2006. was made in all 21 counties of Croatia. Infested plant material with scale insects was collected in the period from May to November.

Where heavy infestation existed, we associated species of scale insect and variety of grape vine as host plants.

Survey was carried out by following methods:

- 2.1. occasionally visually inspection of grape vine plant material in all 21 counties with the help of magnification (10x),
- 2.2. regular visual inspection of grape vine plant material and monitoring of stages of scale insects every 2 weeks on 2 localities in Istria and 2 localities in Bjelovarsko bilogorska county,
- 2.3. sampling of host plant material infested with scale insects (leaves, stems and fruits) in plastic bags and labeling clearly and the collection data for each was noted (data about country, locality details, host plant, any damage symptoms, collectors name, samples number, and date). One sample consists of 10 leaves or 1 15 cm stem or 1 fruit (Williams & Watson, 1990),
- 2.4. slide mounting was carried out according to methods of Williams & Watson, (1990),
- 2.5. microscopic identification on the base of morphological characteristics according to keys by: Gill, Nakahara & Williams (1977); Gill (1988); Hamon & Williams (1984); Hodgson & Henderson (2000) and Williams & Watson (1990),
- 2.6. microscopic slide labeling with all data (data about country, locality details, host plant, collectors name, date and identifier name).

## 3 RESULTS AND DISCUSSION

During the survey we made 78 visual inspections of grapevine on 32 localities, collected 104 samples, slide mounted 102 specimens, identified 97 specimens and labeled 97 microscopic slides. *P. corni* was identified on 9 different localities, *P. vitis* on 5 different localities, *P. persicae* on 4 different localities and *N. innumerabilis* on 1 locality (table 1). Results of survey showed that main area of distribution of *P. corni* and *P. vitis* was the continental part of country, even though we found strong infestation of *P. corni* in Istria as well. *P. corni* and *P. vitis* were found very often on the same localities, even on the same vine tree. Main area of distribution of *P. persicae* and *N. innumerabilis* is Istria. According

to our results we concluded that varieties of grape vine such as chardonnay, pinot, malvazija and traminac are very subservient to *P. corni* and *P. vitis*. Variety such as malvazija is very subservient to *P. persicae* and *N. innumerabilis* (table 1).

Table 1: Intensity of infestation *P.corni*, *P.persicae*, *P.vitis* and *N. innumerabilis* on localities by comparison with grapevine variety

County	Locality	Variety of grapevine	Intensity of infestation
<b><i>Parthenolecanium corni</i></b>			
Bjelovarsko bilogorska	Daruvar	chardonnay	very strong
		graševina	very weak
		pinot crni	very strong
		traminac	strong
Istarska	Novigrad Salvela	malvazija	strong
Karlovačka	Vivodina	graševina	strong
Požeško slavonska	Vetovo	chardonnay	very strong
		muškati chardonnay	very strong
		pinot sivi	very strong
		traminac	weak
		rajnski rizling	weak
Vukovarsko srijemska	Ilok	graševina	strong
		traminac	strong
Attendance of <i>P.corni</i> was noticed sporadic as well in Splitsko dalmatinska county (Imotski), Osječko baranjska county (Bizovac), Dubrovačko neretvanska county (Konavle), and Zagrebačka county (Velika gorica).			
<b><i>Parthenolecanium persicae</i></b>			
Istarska	Novigrad	malvazija	very strong
	Salvela	malvazija	very strong
	Buje	malvazija	very strong
	Škudelin	malvazija	very strong
<b><i>Pulvinaria vitis</i></b>			
Bjelovarsko bilogorska	Daruvar	chardonnay	very strong
		traminac	strong
		pinot crni	strong
Požeško slavonska	Vetovo	chardonnay	strong
		pinot sivi	strong
Presence of <i>P.vitis</i> was noticed sporadic as well in Vukovarsko srijemsko county (Ilok), Karlovačka county (Vivodina) and Splitsko dalmatinska county (Imotski).			
<b><i>Neopulvinaria innumerabilis</i></b>			
Istarska	Novigrad	malvazija	very strong

Even though all Croatian literature says that *P. corni* and *P. persicae* have only 1 generation per year in our country, we confirmed, based on taxonomic characteristics of collected materials from May to November, that in 2006. this two species had 2 generations. In our survey, 1<sup>st</sup> instar of *P. corni* was present from the middle of June to the middle of July. In August we expected 2<sup>nd</sup> instar, but we noticed beside 2<sup>nd</sup> instars, mature adults ready to hatch the eggs, and some of them already started hatching. There was overlap of 1<sup>st</sup> and 2<sup>nd</sup> generation. In September, in the same time, 1<sup>st</sup> instars, 2<sup>nd</sup> instars and already dead adults of females were present. In October 2<sup>nd</sup> instars were preparing for

over wintering. We had the similar situation with *P. persicae*. At the beginning of August we noticed besides 2<sup>nd</sup> and 3<sup>rd</sup> instars, adult females which already started hatching eggs. In September 1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> instars were present. In 2006. there were overlaps of 1<sup>st</sup> and 2<sup>nd</sup> generation of *P. persicae*.

#### 4 CONCLUSIONS

Mass outbreaks of *P. corni* (Bouche), *P. persicae* (Fabricius), *P. vitis* (Linnaeus) and *N. innumerabilis* (Rathvon) in 2006. were very big problem in Croatian vineyards. *P. corni* and *P. vitis* were present in many vineyards in continental part of Croatia in very high population, while mass outbreaks of *P. persicae* and *N. innumerabilis* was in Istria.

Different varieties of grape vine weren't equally subservient to different species of scales of family Coccidae. Varieties of grape vine such as chardonnay, pinot, malvazija and traminac are very subservient to *P. corni* and *P. vitis*. Variety such as malvazija is very subservient to *P. persicae* and *N. innumerabilis*.

In 2006. *P. corni* and *P. persicae* had 2 generations even though our literature mentions only 1 generation of this species.

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