

**MONITORING RESULTS FOR *SCAPHOIDEUS TITANUS* BALL (HEMIPTERA: CICADELLIDAE) IN GRAPE-GROWING REGION OF PODGORICA IN 2012**

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**Abstract**

After the first record of the leafhopper *Scaphoideus titanus* Ball (Hemiptera: Cicadellidae) presence in the vineyards of Montenegro in 2008, in the vicinity of the city of Podgorica, situated in the largest wine-growing region in Montenegro (Podgori ki subregion), during the following years it has mostly spreaded to new localities adjacent to the first detection site.

In the 2012, monitoring was conducted on three localities within the Podgori ki subregion (Šušunja, Lješkopolje and Beri). In all inspected vineyards dominant variety of grapevine was black variety Vranac and, in a lesser extent, black variety Kratošija.

In order to detect presence and the beginning of *S. titanus* nymph emergence, lower side of the oldest grapevine leaves were visually inspected from mid-May to mid-June, while adults were collected from the beginning of July to the end of August. In each locality 10 rows were checked per vineyard. For nymph presence, ten plants in each row were inspected and adults were collected by sweeping with entomological net (10 bits per row). Presence of *S. titanus* eggs were checked in two and three year-old grapevine shoots. In January 2013, in each locality, 50 shoots per vineyard were collected and examined in laboratory.

Results of monitoring showed presence of first nymphal instars during the end of May in localities Šušunja and Beri, and first adults in the second half of July. In both localities population density was low and resulted in 4-9 detected nymphs on the grapevine leaves per vineyard, and 1-10 captured adults. The number of *S. titanus* overwintering eggs, laid on the bark of two and three year-old grapevine wood, were also low in both localities.

Presence of *S. titanus* was not detected in locality Lješkopolje.

**Key words:** *Scaphoideus titanus*, monitoring, grape-growing region, Podgorica

**Introduction**

The leafhopper *Scaphoideus titanus* Ball (Hemiptera: Cicadellidae) is the principal vector for ‘Flavescence dorée’ (FD) phytoplasmas (16SrV subgroups C and D) (Boudon-Padieu, 2003). FD is the most serious phytoplasma disease of the grapevine (*Vitis vinifera* L.) in Europe, and is listed as a quarantine pathogen (Council Directive 2000/29/EC, Annex II/AII). The leafhopper *S. titanus* originates from North America where it lives on wild species of *Vitis* (Vidano, 1966; Maixner et al., 1993). It was introduced in Europe during the 1950s (Bonfils and Schvester 1960). After first introduction it spread from southwestern France over Italy to the Balkans, and to Spain and Portugal (Bertin et al., 2006). The *Scaphoideus titanus* is univoltine species, monophagous on grapevine and overwinters in the egg stage. Eggs are deposited into the bark of two or more years old grapevine branches (Vidano, 1964), rarely in one-year branches. Eggs are laid during the summer by mated females and hatch during the following spring.

The *Scaphoideus titanus* has been observed in countries neighbouring Montenegro: Serbia (Magud and Toševski, 2004), Croatia (Budinš ak et al., 2005), Bosnia and Hertzegovina (Delic et al., 2007).

Presence of *S. titanus* in Montenegrin vineyards was reported in 2008, in the vicinity of the city of Podgorica, in the largest wine-growing region in Montenegro (Podgori ki subregion). In the following years it has mostly spreaded to new localities adjacent to the first detection site (Radonjic et al., 2012).

In this paper we present results of monitoring for *S. titanus* in 2012 in grape-growing region of Podgorica.

### Materials and Methods

In the 2012, monitoring of *S. titanus* was conducted on three localities in the Podgori ki subregion (Šušunja, Lješkopolje and Beri). In all inspected vineyards dominant variety of grapevine was black variety Vranac and, in a lesser extent, black variety Kratošija.

In order to detect presence and the beginning of nymph emergence, lower side of the oldest grapevine leaves were visually inspected from mid-May to mid-June, while adults were collected from the beginning of July to the end of August. In each locality 10 rows were checked per vineyard. For nymph presence, ten plants in each row were inspected and adults were collected directly from the grapevine plants by sweeping with entomological net (10 bits per row). Collected adults were preserved in 75 % ethanol for subsequent identification. Presence of *S. titanus* eggs were checked in two and three year-old grapevine shoots (approx. 30 cm long) in winter time. In each locality, 50 shoots per vineyard were collected and examined in laboratory.

### Results and discussion

During 2012, nymphs and adults of *S. titanus* were found in two out of three inspected localities. The occurrence of *S. titanus* in grape-growing region of Podgorica is presented in Fig. 1.



Fig. 1. Occurrence of *S. titanus* in grape-growing region of Podgorica (2012)

As a result of visual inspection, the first nymphal instars were observed in localities Šušunja and Beri during the end of May. They were found on the lower side of the oldest grapevine leaves, which were the closest to the bark of the grapevine plant (Fig. 2). During the visual inspections larval skins were also observed on the lower surface of the grapevine leaves. According Aldini et al. (2003) visual inspection of the lower surface of the leaves is better for determining immature stages of *S. titanus*.



a  
b  
Fig. 2. *S. titanus* nymph: a – first instar; b- third instar

(typically two triangular black spots on the dorso-lateral part of the last urite)

According to the number of detected nymphs and sporadically present larval skins, population density of *S. titanus* was ranked as low, and resulted in 4-9 detected nymphs on the grapevine leaves per vineyard. As a result of continuous monitoring in following months, the first adults on these two localities were collected in the third decade of July (Fig. 3). The population rate remained low and number of captured adults varied from 1-10 in July and August (Fig. 4).



Fig. 3. *S. titanus* adult



Fig. 4. Collecting adults by sweeping using entomological net

Results of this survey showed that in 2012, in locality Šušunja low presence and population density of the nymphal stages and adults are similar with data from our previous research (Radonjic et al., 2012). On the other hand in 2012, presence of *S. titanus* was detected the first time in locality Beri. This location was under continuous monitoring from 2010, but presence of the leafhopper was not registered. The latest findings could indicate on gradual spreading of the *S. titanus* in the adjacent parts and localities within the Podgori ki subregion with population size that has been considered as low.

In 2012 presence of *S. titanus* was not detected in locality Lješkopolje, although it was registered in 2011 (Radonjic et al., 2012).

As a result of 150 total examined two and three year-old shoots on presence of *S. titanus* overwintering eggs, they were found in samples taken from localities Beri and Šušunja. Eggs were found laid beneath the bark of shoots (Fig. 5).

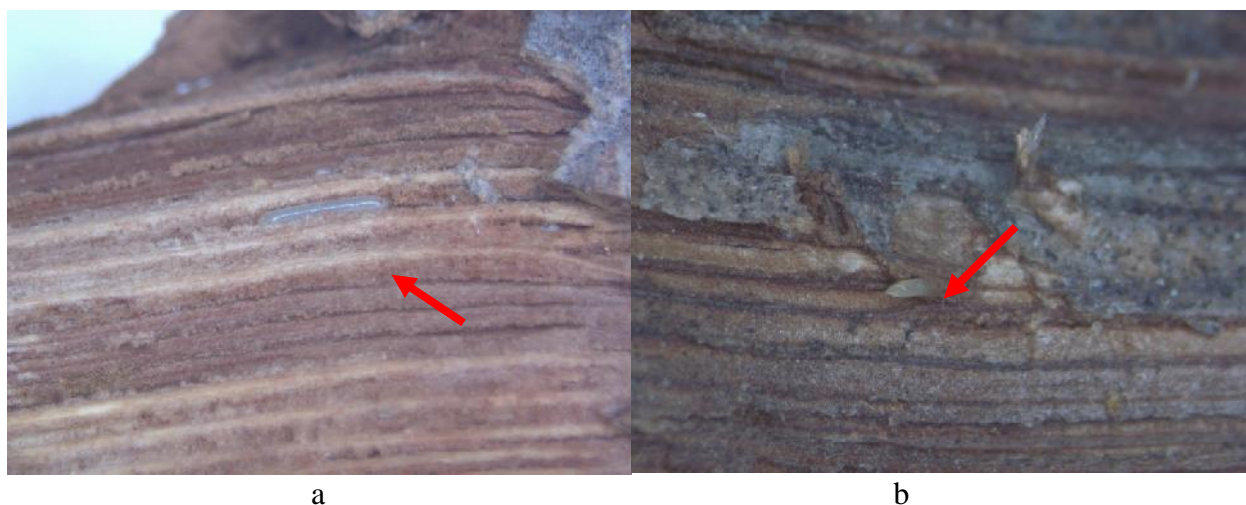


Fig. 5 (a, b). *S. titanus* eggs: laid beneath the bark of two and three year old grapevine shoots

The number of overwintering eggs were also low. It was found 8 and 14 eggs in 50 examined samples taken from Beri and Šušunja, respectively. No eggs presence was found in locality Lješkoplje.

### Conclusion

Data presented here showed that *S. titanus* is established pest in Podgori ki subregion which is the largest wine-growing region in Montenegro. Although population density of the leafhopper was ranked as low in 2012, and similar with previous years, repeated detection of *S. titanus* in locality Šušunja and detection in locality Beri for the first time, indicate its adaptation on agroecological conditions in this wine-growing area and, consequently, real risk to gradually invade the whole this wine-growing area. Established presence of *S. titanus*, as well its spreading, could be serious threaten of possible occurrence of FD phytoplasmas.

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