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Survey of the Presence of *Scaphoideus titanus* Ball in Hungary

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A survey for the presence of *Scaphoideus titanus* – the vector of the quarantine grapevine yellow phytoplasma (*Flavescence dorée* FD) – was carried out in the year 2007–2008 in all Hungarian vineyards. The conclusion is that *S. titanus* has spread from the southern border of Hungary to the eastern wine growing regions.

Keywords: *Scaphoideus titanus,* grapevine, phytoplasma vector.

In Europe *Scaphoideus titanus* Ball 1932 (Auchenorrhyncha, Cicadellidae) feeds exclusively on *Vitis* sp., but does not cause any direct damage. *S. titanus* is a univoltine species and the only known vector of *Flavescence dorée* (FD), a quarantine grapevine yellow phytoplasma. The simultaneous presence of FD infected vines and *S. titanus* can induce a rapid progression of the disease (Boudon-Padieu, 2000).

Surveys for the presence of *Scaphoideus titanus* have been carried out since 2004 in all Hungarian wine growing regions. The aim was to identify and characterize phytoplasmas and their vectors infecting grapevine in Hungary. In 2006 new sites near the Hungarian borders, in 9 counties, were involved in the surveys. In 2006 the first finding of *Scaphoideus titanus* was confirmed in Csurgó, located in Somogy region (South-West Hungary). Besides in that year *S. titanus* was found in Bács-Kiskun and Zala counties, too. The highest populations were recorded in abandoned vineyards near the Serbian border (Dér et al., 2007). From this time *Flavescence dorée* (FD) phytoplasma and its vector *S. titanus* have been involved in the survey program of the Hungarian Central Agricultural Office for all Hungarian wine growing regions with high priority.

S. titanus has been reported in four countries neighbouring Hungary: Slovenia (Seljak, 1987), Serbia (Magud and Toševski, 2004), Croatia (Budinšak et al., 2005) and Austria (Zeisner, 2005). It allows the assumption that the leafhopper was not introduced by propagating material but it has been spreading from the south to the north in a natural way, presumably due to warmer, dryer climatic conditions (Dér et al., 2007). However, as for weather conditions, the majority of hatchings occurred more quickly in cold, rather than in mild winter conditions, because chilling could enhance precocity and syncrony of hatching of *S. titanus* (Chuche and Thiéry, 2009).

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The inability of the leafhopper to disperse over long distances has been documented: it is known that *S. titanus* does not disperse significantly beyond 24 m from the vineyard, suggesting that the leafhopper can colonise by its own means only nearby vineyards (Lessio and Alma, 2004, 2006). Consequently it is human activities that have played the major role in the long-distance dispersal and in introducing this vector into previously unoccupied areas (Bertin et al., 2007).

So far FD phytoplasma was reported in two countries at the south border of Hungary: Serbia and Slovenia (Seljak, 2008).

From 2006 to 2008 symptomatic grapevine plant material and insect vector samples were collected from the infected fields and analyzed in the Central Laboratories for Pest Diagnosis in Budapest by PCR tests and RFLP analysis. Based on these results it can be concluded that *Flavescence dorée* phytoplasma is absent in Hungary at present. However Bois noir (BN) phytoplasma was identified in several grapevine samples.

Materials and Methods

In the year 2007–2008, from the beginning of June to the end of September, 1–4 vineyards were investigated in each of the 19 Hungarian counties to detect *S. titanus* adults with yellow sticky traps. Ten sticky traps (10 × 16 cm) per vineyards were located and changed every two weeks. In 2008 the yellow sticky traps were placed at the neighbouring vineyards of the sites of previous year. The aim was to investigate the spreading of the vector.

Results

During the monitoring carried out in 2007, the presence of *S. titanus* was confirmed in 5 wine growing regions (names in bracket after those of the counties refer to localities of finding): Baranya (Nagytótfalu), Bács-Kiskun (Jánoshalma), Csongrád (Ásotthalom),

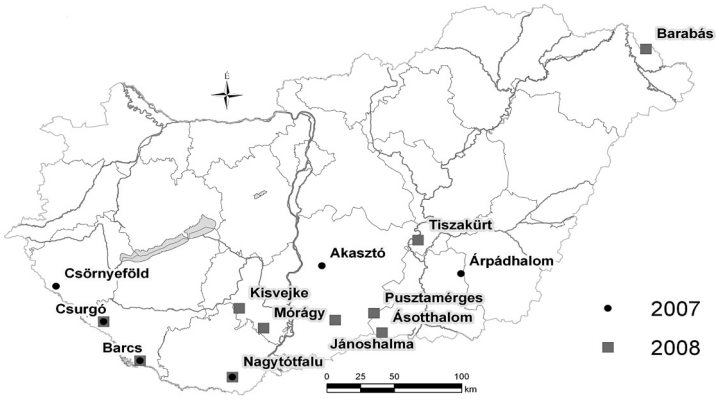

Fig. 1. Occurrence of *Scaphoideus titanus* in Hungary (2007–2008)

Somogy (Csurgó and Barcs) and Zala (Csörnyeföld). All of these areas are located mainly in the southern and south-western parts of Hungary *(Figs 1, 2)*.

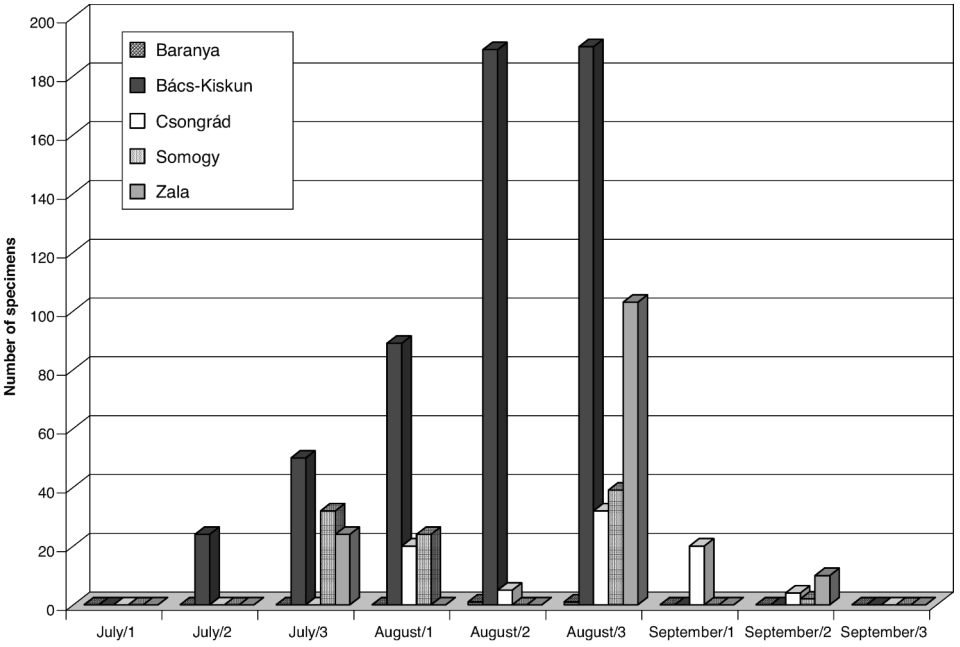

Fig. 2. Population dynamics of *Scaphoideus titanus* in Hungary (2007)

In 2008 *S. titanus* spread from the south to the eastern parts of the Hungarian wine growing areas, but the numbers of specimens were lower, than those in 2007. In 2008 the presence of this species was confirmed in 7 Hungarian counties: Baranya (Nagytótfalu), Bács-Kiskun (Akasztó and Jánoshalma), Csongrád (Ásotthalom and Pusztamérges), Szabolcs (Barabás), Szolnok (Tiszakürt), Somogy (Csurgó and Barcs) and Tolna (Kisvejke and Mórágy) *(Fig. 3)*.

Discussion

In both of the two years of investigations Bács-Kiskun county was the most infested area in Hungary. *S. titanus* could be found mainly in the neglected vineyards. These areas are probably the most important sources of infestations. In 2007 the first appearance of adults was in the middle of July, but in 2008 it was in the beginning of July. Most of adults occurred from the middle of August to the end of September. In July and August both males and females were found, while in September females, presumably having started laying eggs [eggs are laid into stems so presence of adults on leaves is not linked] were more frequent on the adaxial surface of grapevine leaves (Dér et al., 2007).

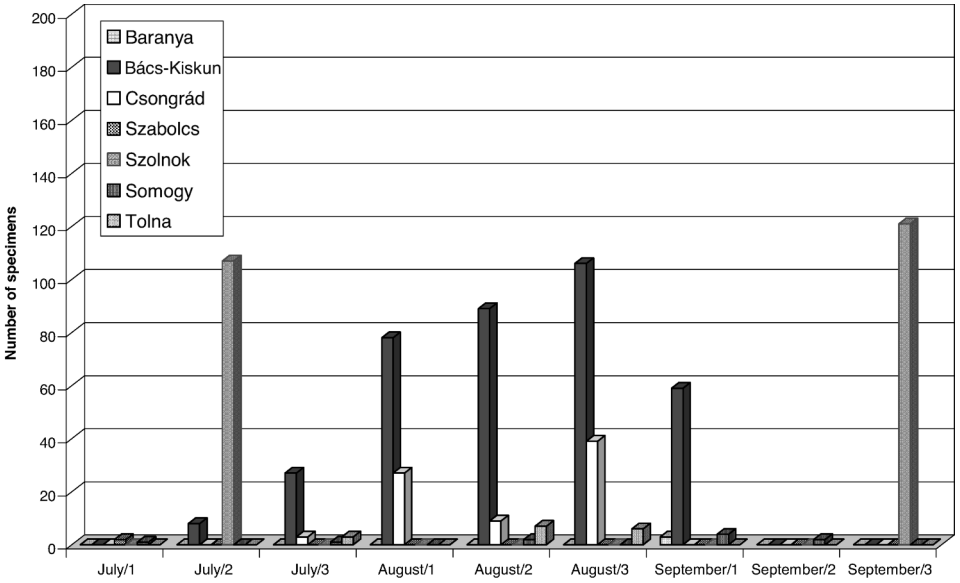

Fig. 3. Population dynamics of *Scaphoideus titanus* in Hungary (2008)

The numbers of the found *S. titanus* specimens were lower in 2008, than those in 2007, presumably the regular chemical treatments against the vector, and/or the meteorological conditions (temperature and precipitation). Climate does not limit the establishment of the vector in the northern Austrian vine-growing regions (Steffek et al., 2007).

The origin of the *S. titanus* population in Szabolcs county (Barabás) in 2008 has not been clarified yet. Most likely the pest has been spread in the egg stage with planting material from the infested parts of Hungary and/or from some other European countries.

The conclusion is that *S. titanus* has spread from the southern border of Hungary to the eastern wine growing regions.

The control of the vector is the main strategy to prevent the spreading of FD phytoplasma from infected areas to healthy vineyards, but according to the Austrian Pest Risk Analysis, the current plant protection practice cannot prevent the establishment and spread of vector populations (Steffek et al., 2007). When the first occurrence of FD is confirmed in Hungary, appropriate phytosanitary measures should be approved. There are currently no regulations in place on the control of the vector in Hungary. It is recommended to appy sulphur or paraffin oil application at bud break in spring against overwintering eggs (Steffek et al., 2007) and when larval stages occur – from the middle of June to the beginning of July – it is important to use chemical control methods against the vector. Experiments will be started the next season in order to evaluate the efficacy of chemical treatments in controlling *S. titanus.*

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