

Occurrence of maize redness disease in Hungary

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Abstract

Maize redness (MR) is a severe disease of corn associated with stolbur phytoplasma (16SrXII-A) which is transmitted to the host plant by the cixiid planthopper *Reptalus panzeri* (Low). The disease is characterized by midrib, leaf and stem reddening, followed by reddening and desiccation of the whole plant and abnormal ear development with poor seed set. During the MR epidemic, disease symptoms can be present in up to 90% of the plants, and yield losses can be over 50%. Previously reported presence of *R. panzeri* in Hungarian vineyards and their natural infection with stolbur phytoplasma, in addition to economic importance of maize production, increased the need for a survey of MR presence in the territory of Hungary.

During August and September of 2010 selected maize fields in several production areas of Hungary were surveyed for the occurrence of reddening symptoms on maize. This year *R. panzeri* and *Hyalesthes obsoletus* cixiids were also collected from a single maize field in the vicinity of village Monorierdő. A total of nine sampling sites were included in the survey. In the autumn of 2013 MR symptomatic maize plants were sampled from the post-control plots of the National Food Chain Safety Office in Central Hungary, Monorierdő. Phytoplasma identification was performed using a nested PCR on the 16S rRNA gene with primer pairs P1/P7 and R16F2n/R16R2. In parallel, all samples were tested with TaqMan real-time PCR amplifying phytoplasma nonribosomal *map* gene of the 16SrXII-A subgroup, applying plant

endogenous control (EC) with slight modification of probe labelling and PCR conditions.

Only in three out of 25 symptomatic maize plants, collected from nine sampling sites in 2010, was the stolbur phytoplasma (16SrXII-A) identified by PCR/RFLP based analysis of the 16S rRNA gene. All three stolbur-infected corn samples originated from the same locality, Monorierdő, Central Hungary where the potential planthopper vectors were identified. As for analysed insects, two out of six *R. panzeri* and three out of eight *H. obsoletus* specimens proved to be positive for the presence of stolbur phytoplasma. The results were confirmed by real-time PCR. None of the other maize samples, collected at other localities were positive for any phytoplasma. In one out of three MR symptomatic maize samples originated from post-control plots of Monorierdő in 2013, the stolbur phytoplasma was also detected and significant differences were registered in the susceptibility of maize genotypes tested.

Based on these results it is concluded that stolbur phytoplasma associated with maize redness disease and the identified vector of the disease, *R. panzeri* are present in corn in Hungary. The role of *H. obsoletus* in MR epidemiology in Hungary is yet to be studied since this cixiid was not reported to play a significant role in MR epidemiology in Serbia.

Keywords

Cixiids, real-time PCR, stolbur phytoplasma, *Zea mays*

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