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### Disease Note

## FIRST REPORT OF *CANDIDATUS PHYTOPLASMA PRUNORUM*, THE EUROPEAN STONE FRUIT YELLOWS PHYTOPLASMA ON PEACH TREES ON THE TERRITORY OF CANTON OF GENEVA, SWITZERLAND

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### ABSTRACT

In recent years, '*Ca. P. prunorum*', the agent of ESFY was reported from several apricot orchards of Canton of Wallis, the main apricot production region in Switzerland (Genini and Ramel, 2004). The psyllid vector *Cacopsylla pruni* was also found in several locations in the Lake Geneva area (Ackermann *et al.*, 2006). The presence of the disease and of its proven vector *C. pruni* at the eastern part of the Lake Geneva area, as well as the existing risk of dissemination of ESFY to other stone fruit orchards along the Lake Geneva are the reasons for which ESFY needs to be studied further. ESFY and its possible dissemination through *C. pruni* on the territory of Canton of Geneva, bordering France, has never been yet studied. In 2016, visual observations were conducted in several stone fruit orchards near Geneva. Plant material was obtained from peach trees, displaying some of the typical symptoms such premature leaf colouration, leaf-roll, tree decline (Sabaté *et al.*, 2015), in the autumn, when the concentration of the phytoplasma in the upper parts of the trees is the highest. Phloem was prepared from branches and was extracted with a CTAB-based adapted protocol (Lefort and Douglas, 1999). PCR amplification of phytoplasma DNA was achieved with the universal primers: fP1/rP7 (Deng and Hiruki, 1991; Schneider *et al.*, 1995). All positive samples were tested with the ESFY-specific non-ribosomal primers ECA1/ECA2 (Jarausch *et al.*, 1998). Typical symptoms of ESFY, like premature leaf colouration, leaf yellowing with reddish edges, leaf-roll, severe chlorosis, die-back of top branches and partial or, complete decline of the trees (Figure 1) were found in a peach orchard (GPS coordinates: 46°15'17.4"N 6°12'40.7"E) located in the area of Collonge-Bellerive, close to Geneva city. Ten trees were sampled in this orchard. The presence of '*Ca. P. prunorum*' was confirmed in two of them (Figure 2 and Figure 3). At the beginning of spring 2017, the monitoring of the ESFY symptoms in the infested orchard was resumed. Early bud break was found on the two infected trees and the infection was confirmed again by PCR (Figure 4 and Figure 5). The same symptoms were observed in many trees of this orchard, which correlated with the previous autumn observations. Trapping confirmed the presence of the insect vector *Cacopsylla pruni* (Bodnár *et al.*, 2018) in the infected area. In order to understand more about the origin and the diversity of ESFY phytoplasma in this area, additional plant and insect samples will be analyzed. The correlation between symptoms and infected plants will be studied further. We report here for the first time on the occurrence of '*Candidatus Phytoplasma prunorum*' ('*Ca. P. prunorum*') the agent of ESFY on the territory of Canton of Geneva.

**Keywords:** *Rhizopus stolonifer*, grapes, *Rhizopus bunch rot*, ITS region, pathogenicity.

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Figure 1. ESHY symptoms on peach trees in early autumn, in which infection was later confirmed: leaf yellowing with reddish edges, leaf reddening, leaf-roll and dieback of some branches.



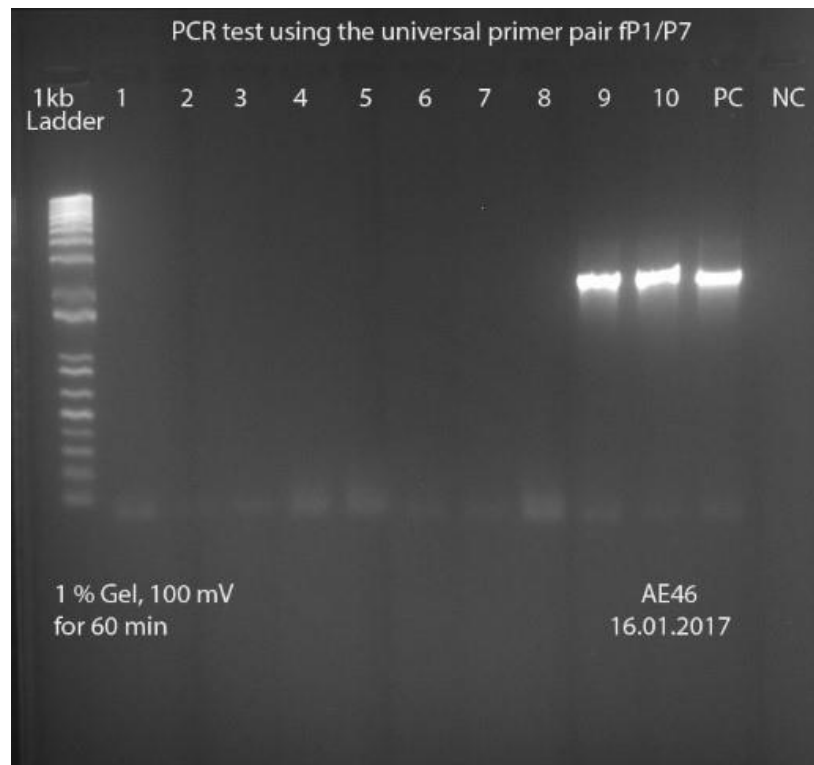


Figure 2. Electrophoregram of a PCR amplification with universal primers fP1/P7 (1-10: peach tree samples, NC: negative control, PC: positive control ESFY strain I1).

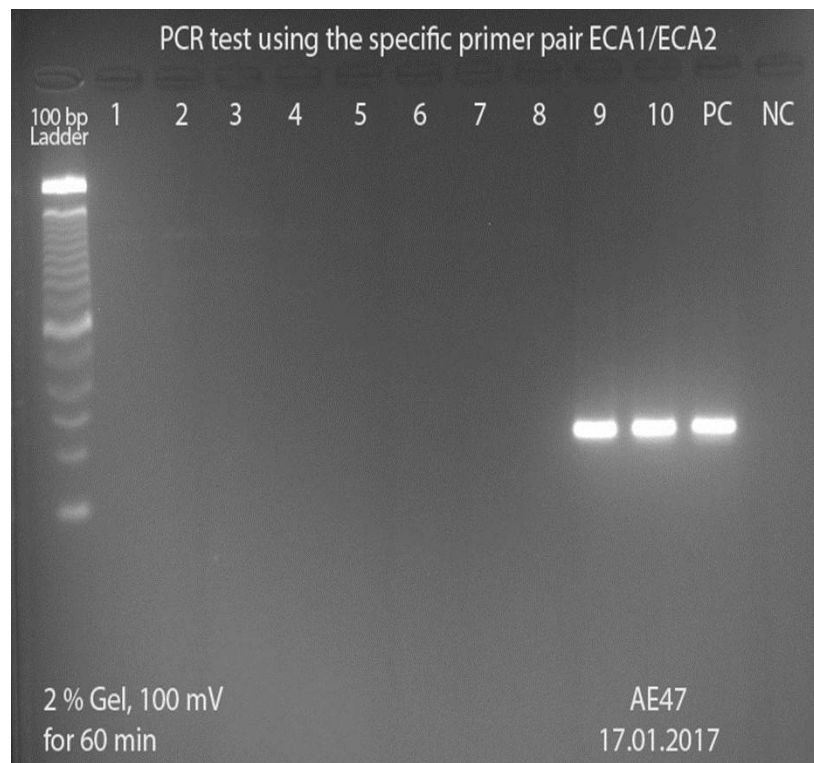


Figure 3. Electrophoregram of a PCR amplification with ESFY-specific primers ECA1/ECA2 (1-10: peach tree samples, NC: negative control, PC: positive control ESFY strain I1).



Figure 4. General view of ESFY symptoms on an infected peach tree, observed at the beginning of April 2017: Early bud break, reddening of the twig bark.



Figure 5. ESFY symptoms on twigs of an infected peach tree, observed at the beginning of April 2017: Premature leaf coloration, leaf-roll.

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