

## **Occurrence of EMARAV and CLRV in tree species native to Finland**

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Since the first report of accumulation of virus-like symptoms in downy birch (*Betula pubescens*) and silver birch (*B. pendula*) in Fennoscandia in 2007 by Jalkanen et al., *Cherry leaf roll virus* (CLRV) could be associated with the disease symptoms. Samples from symptomatic birch species showing leaf roll and proliferation, chlorosis, vein banding and mottling of leaves were collected in the following years from different regions in the country and assessed for a CLRV infection by RT-PCR. Furthermore, mountain ash trees (*Sorbus aucuparia*) with ringspot and mottling symptoms characteristic for an infection with the *European mountain ash ringspot-associated virus* (EMARAV; Mielke and Mühlbach, 2007) were included in the study as well as singular trees of other woody host species native to Finland. It was found that red elderberry (*Sambucus racemosa*) as well as six different *Betula* species which are typical deciduous tree species of the boreal forests were infected by CLRV; besides many virus affected silver and downy birches from locations all over the country, an individual sampled curly birch (*B. pendula* var. *carelica*) as well as several dwarf (*B. nana*), mountain (*B. pubescens* ssp. *czerepanovii*), and Kiilopää birches (*B. pubescens* ssp. *appressa*) growing in the northern part of the country up to the alpine tree line were CLRV affected.

As expected symptomatic *S. aucuparia* trees were found to be infected by EMARAV; however an infection with CLRV of mountain ash could also be confirmed in two sampled trees revealing a mixed infection with the two viruses in a single case.

Sequence analysis of CLRV samples originating from birches in Finland based on short fragments of the coat protein (112 bp) and 3' non-coding region (375 bp) revealed unique phylogenetic relationships of the virus isolates.

### Reference

Jalkanen, R., Büttner, C., von Bargaen, S. (2007). Cherry leaf roll virus, CLRV, abundant on *Betula pubescens* in Finland. *Silva Fennica* 41, 755-762.

Mielke, N., Mühlbach, H.P. (2007). A novel, multipartite, negative-strand RNA virus is associated with the ringspot disease of European mountain ash (*Sorbus aucuparia* L.). *Journal of General Virology* 88, 1337-1346.