

## **9-15 Virus-induced symptoms in leaves of woody plants**

von Bargaen S; Bandte M; Büttner C

*Humboldt-Universität zu Berlin, Faculty of Agriculture and Horticulture, Department of Crop and Animal Sciences, Division Phytomedicine, Lentzeallee 55/57, D 14195 Berlin, Germany*

*Email: susanne.von.bargaen@agrar.hu-berlin.de*

### **INTRODUCTION**

A lack of knowledge of the presence and frequency of occurrence leads to the impression that viral diseases in forest trees are rare and therefore unimportant. The opposite is true. Virus-infections of broad leaved trees are widespread in forests as well as in urban areas. They are of economic impact, because stress tolerance of infected trees is considerably reduced (Nienhaus 1985, Nienhaus & Castello 1989, Büttner *et al.* 2013).

### **MATERIAL AND METHODS**

Viruses have been identified to infect different broad-leaved trees and shrubs including the genera *Acer*, *Betula*, *Fagus*, *Fraxinus*, *Populus*, *Prunus*, *Quercus*, *Sambucus*, *Sorbus*, *Ribes*, *Rubus*, and *Ulmus*. In this study we are documenting virus-like symptoms we found in these important woody hosts, which were cultivated in forests, parks and as road-side trees.

### **RESULTS AND DISCUSSION**

Virus-induced symptoms in leaves of deciduous trees display a large variety of discoloration, deformation, or decline. Important leaf symptoms are vein-netting, veinbanding, chlorotic spots, ringspots and line patterns, which are sometimes displayed as oak-leaf line pattern. Mosaic symptoms are characterized by distinct areas of at least three different colors and can thereby be distinguished from diffuse mottle and large chloroses. Common deformations induced by viruses are little leaf, leaf narrowing or fanleaf, leafroll, distortion or blistering. Cell death is often induced by virus-infections leading to tissue damage visible as necroses of leaves, dieback of twigs, and finally decline of the whole tree.

Virus-induced symptoms may be confused with other biotic or abiotic factors, depending on developmental stage of plants as well as the vegetation period. However, virus-induced aberrations are usually uneven distributed in affected plants and areas (Bandte & Büttner 2004). Detailed expertise is a prerequisite to distinguish symptoms typically induced by viruses from other factors, allowing recognition and estimation of virus abundance in deciduous trees in order to maintain the health status of forest and urban trees.

## ACKNOWLEDGEMENTS

Research was funded by the DFG-grants BU890/14-1, BU890/15-1 and BA3961/2-1.

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