

Penetration behavior of different aphid species on *Lupinus angustifolius* L. genotypes

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Due to the high level of protein content in the seeds of up to 40%, the ability to fix nitrogen by symbiosis with rhizobia and the deep root system improving soil structure and quality, lupin cultivation is of growing interest. Wild types of lupins accumulate alkaloids which are toxic metabolites working as deterrents for several pests and diseases. A high content of alkaloids prohibits the use of lupins in human and animal diets. Breeding of cultivars with a low content of alkaloids ("sweet lupins") in the 1930's enhanced the use of lupin seeds for human and animal nutrition, but led to a higher susceptibility to e.g. different aphids. Aphids harm plants by penetrating the cells, feeding on the phloem sap, leading to an inhibition of plant growth and by serving as vectors of different viruses. Three genotypes of blue lupin (*Lupinus angustifolius* L.) with different levels of alkaloid concentrations - the sweet genotypes "Boregine" and "Bo083521AR" with a low content of alkaloids, and the bitter, alkaloid rich genotype "Azuro" - were evaluated with regard to the penetration behavior of the lupin aphid (*Macrosiphum albifrons*), which is well adapted to alkaloids in *Lupinus*

angustifolius L., and the polyphagous aphid species green peach aphid (*Myzus persicae*) and black bean aphid (*Aphis fabae*).

A method to record the penetration behavior of aphids is the Electrical Penetration Graph (EPG). Aphids are fixed on a thin gold wire by a droplet of silver glue. The conductivity of this attachment allows carrying low current through the aphid when stylet penetration occurs. The wired aphids produce an electrical signal during the penetration progress. Depending on the penetrated plant tissue and the different parts of penetration procedure, e.g. salivation or phloem sap ingestion, the recorded waveforms of wired aphids show different patterns.

The aim of the test is to analyze, how far the penetration behavior of the well adapted lupin aphid is different from that of the polyphagous green peach and black bean aphid on bitter and sweet lupin genotypes. Results obtained up to now give hint that the lupin aphid is unaffected by the alkaloid level while the green peach and the black bean aphid show an alkaloid-level depending penetration behavior.