FEEDING BEHAVIOUR AND PERFORMANCE STUDIES ON DIFFERENT POPULATIONS OF THE BLACK CURRANT - LETTUCE APHID *NASONOVIA RIBISNIGRI* ON RESISTANT AND SUSCEPTIBLE LETTUCE CULTIVARS

Cindy J.M. ten Broeke; Joop J. A. van Loon; Marcel Dicke.

Laboratory of Entomology, Wageningen University, P.O. Box 8031, 6700 EH Wageningen, The Netherlands. cindy.tenbroeke@wur.nl

The black currant-lettuce aphid, *Nasonovia ribisnigri* (Mosely), is an economically important pest of lettuce, *Lactuca sativa* L. Lettuce can get seriously damaged by high numbers of this aphid species, causing deformation of the head, changing leaf colour and reduction of vigour in seedlings. Although small numbers of aphids have no effect on yield, the presence of living aphids is a cosmetic problem, making the lettuce unmarketable. Additionally *N. ribisnigri* is acting as a vector of viruses, including Cucumber mosaic virus and Lettuce mosaic virus. The control of the lettuce aphid in cultivated lettuce is largely based on genetic host plant resistance, considered to be the most desirable control measure for this aphid. Host plant resistance is based on a single gene, the *Nr*-gene, introgressed from the wild lettuce species *Lactuca virosa* L. which provides absolute resistance against *N. ribisnigri*. The *Nr*-gene has not yet been cloned and the resistance mechanism is not known. Moreover, *Nasonovia* populations insensitive to the *Nr*-based resistance in lettuce have emerged in several locations in Europe since 2007. The objective of this project is to unravel the resistance mechanism of the *Nr*-gene in lettuce by a combined metabolomics / proteomics / transcriptomics approach of phloem composition studies, in concert with detailed behavioural and performance studies on the aphid. The identification of the chemical basis of host-plant resistance will allow plant breeders to accelerate their breeding programmes. Using the EPG-technique, the penetration and feeding behaviour of 5 different *Nasonovia ribisnigri* populations (biotype 0, biotype 1 from Germany, biotype 1 from Paris, biotype 1 from Perpignan and biotype 1 from Belgium) were studied on the resistant cultivar Corbana and the susceptible cultivar Pinokkio. In the survival tests the mortality and larval development were studied. Additionally, reproduction and colony development tests were performed. Biotype 0 aphids showed a significant reduction in phloem sap intake on Corbana compared to Pinokkio and almost all aphids died on Corbana. The few that were able to survive and developed into adults on Corbana, took 14 days to develop into adults, compared to 8 days on Pinokkio. From the biotype 1 populations the populations from Belgium and Perpignan showed a significant reduction in phloem sap intake on Corbana compared to Pinokkio, whereas the German and Paris population did not show a significant reduction of E2. The German population seems to have the least difficulties to feed on Corbana, while the Perpignan population has most difficulties to feed on Corbana. This trend was also observed in the survival experiment in which aphids from the German population showed the highest survival and aphids from the Perpignan population showed the lowest survival. Overall the aphids of the biotype 1 populations took 2 to 4 days longer to develop into adults on Corbana compared to Pinokkio.