

## **APPLYING APHIDS AS BIOSENSORS FOR INVESTIGATING THE DYNAMIC DISTRIBUTION OF SYSTEMIC INSECTICIDES IN PLANTS**

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Aphids are globally widespread pests on many agricultural and horticultural crops. Their feeding damage and ability to transmit plant viruses can cause significant loss in plant productivity and it could be considered to have major impact on yield. Effective aphid control requires systemic distribution of insecticides within plants in order to reach hidden individuals such as those on the leaf undersides. The investigation of active ingredient (AI) translocation within plants is therefore of major interest in insecticide research. Different types of bioassays allow the investigation of AI movement along the plant vascular system by recording aphid mortality on defined plant parts. The application could be either done to foliage or to roots. Data will show how the AI translocation either within the xylem or the phloem can be determined based on the biological response of feeding aphids. The relevance of plant physiology on resulting translocation patterns is also demonstrated. A special test set-up recording the honeydew production of infested aphids over time demonstrates how different AI kinetics affect translaminar mobility and root uptake. Field studies investigate the compound distribution in growing plants according to different application types, with the analytical AI quantification in the plant tissues revealing a very good agreement with derived information from aphid assays and therefore confirming the suitability of applying aphids as biosensors.