

IDENTIFYING ODORANT LURES TO DEVELOP AN ATTRACT & KILL STRATEGY TO MANAGE WIREWORM

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While European regulations on the use of phytosanitary products are evolving rapidly, there are few alternative strategies available for growers to control wireworm larvae (Coleoptera: Elateridae). As the foraging behaviour of these larvae is influenced by belowground volatile organic compounds (VOCs), it is important to focus on root-soil insect interaction mediated by semiochemicals to develop control tools based on promising attractants or repellents.

First, we aimed at identifying the volatile organic compounds released by three potato cultivars, which were previously shown to undergo contrasted levels of wireworms' infestation in the field: Monalisa (susceptible), Spunta (intermediate) and Charlotte (less susceptible). We performed a non-destructive headspace dynamic sampling to collect tuber VOCs, at two different physiological growing stages. All samples were then analysed by gas chromatography-mass spectrometry. We found a total of 65 VOCs. Significant differences were highlighted between the global profiles of the two growing stages, but not between the three cultivars. Among the most important VOCs released: 1-octen-3-ol, 2-phenoxyethanol, 2-undecanone, (*E*)-2-nonenal and other aldehyde molecules with short carbon chains.

Second, we performed behavioural assays to characterize the biological activity of these three cultivars on wireworms' behaviour. We used dual-choice olfactometers and palatability tests to compare cultivars. We found that the larvae preferred moving toward Charlotte than any of the other cultivars, the less susceptible one. This suggests the existence of other cues than VOCs in the differentiation of the cultivars by wireworms. Also, we developed olfactometers assays with alginate beads containing potato extract, the attractiveness of the beads at different storage times was evaluated. We observed a strong appeal of this formulation. These last results pave the way for the use of potato extracts instead of specific VOC compounds to lure wireworms in the field, and to potentially associated them to bio-insecticides as already accomplished under laboratory conditions.

Keywords: *Agriotes*, volatile organic compounds, semiochemical, encapsulation, biological control.