

## Winter wheat and volunteer cereals as host plants for the western corn rootworm in Europe

*Winterweizen und Ausfallgetreide als Wirtspflanzen für den Westlichen Maiswurzelbohrer in Europa*

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Several cereals – including wheat - have already been proved to be suitable as host plants of the western corn rootworm (*Diabrotica virgifera virgifera* LeConte) in laboratory experiments. Under field conditions, however, additional factors such as crop phenology may impede successful juvenile development of the pest insect. Early winter wheat varieties, for example, may mature - and consequently lose root vigour – at a time when larvae are still foraging in the soil. Late varieties, on the other hand, may be more suitable for pest development. Last but not least, corn rootworm larvae may not be able to complete development before maturation of the regular crop, but some may survive until volunteer wheat plants appear after harvest. This small portion of the larval population may then be able to complete development in the already harvested winter wheat fields.

The aim of the presented experiments was to investigate the possibility of corn rootworm development on winter wheat under field conditions. An early and a late winter wheat variety were sown in autumn 2009 and 2010, respectively. Small plots within these experimental fields were infested with defined amounts of *Diabrotica* eggs. Small maize plots in the same fields, similarly infested with corn rootworm eggs, served as control. Germination of volunteer winter wheat plants after harvest was suppressed in one part and augmented in the second part of the early winter wheat plots. Emergence of any western corn rootworm adults was monitored with emergence cages.

Results were similar in both years. A small number of *D. virgifera virgifera* adults emerged in control plots from maize roots, while no beetles were caught in any cages erected above winter wheat plots, independent from variety and the presence of volunteer wheat plants. A comparison of crop phenology and juvenile developmental periods of the corn rootworms showed a lack of synchrony. Both winter wheat varieties started to mature before the main part of the pest population was estimated to reach the pupal stage. Therefore, older larval stages of *D. virgifera virgifera* suffer from severe loss of food supply, making survival of the pest population unlikely. Germination of volunteer wheat plants, on the other hand, starts only after the majority of the larval population has presumably died from starvation.

Our two years results do not allow to completely exclude the possibility of a successful development of small parts of a *D. virgifera virgifera* population in winter wheat under central European field conditions. Nevertheless, results show clearly that an epidemic population development as known from continuous corn is impossible. One reason for this is a lack of synchrony between the phenological development of the juvenile pest stages and the host plants.

Crop rotation therefore remains to be a very effective pest management tool for containment measures in already infested regions, even if winter wheat follows maize in the crop rotation system. It may, however, not be effective enough as a standalone method in isolated outbreak zones. In these cases, it is recommendable to plant only dicotyledone crops after maize and to employ additional eradication measures.

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