

THE EFFECT OF PROHEXADIONE CALCIUM AGAINST THE SUNFLOWER ROOT PARASITE *OROBANCHE CUMANA*

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Abstract

Orobancha cumana is a root-parasitic weed, a so called obligate holoparasite. This class of parasites doesn't carry out own photosynthesis. It obtains nutrients and water from sunflower as host plant and thus complements its life cycle. Broomrape is a highly variable parasite. It can adapt very fast to the sunflower genotype. Therefore, the control of broomrape is very problematic. One of the few solutions to this problem is the chemical control via the Clearfield® system. It contains an imidazolinone-tolerant sunflower with a genetic modification (non-GMO) of the acetohydroxy acid synthase (AHAS). The Clearfield® sunflower can still produce leucin, isoleucine and valine despite a treatment with e.g. imazamox. The herbicide is systemically distributed to roots of the host, reaches the parasite via a physical connection (haustorium) and inhibits the AHAS of *O. cumana*. Field studies have shown that Prohexadione calcium (PHDC), a plant growth regulator, can improve the efficacy of the Clearfield® herbicide. Low rates of Imazamox did not provide season long control of broomrape. However, the number of emerged *O. cumana* plants was significant lower than in the untreated control. The combined application of Imazamox and PHDC did result in a field plot without emerged *O. cumana*. The current work is aimed to show, that a similar effect could be reproduced in pot trials.

To determine the race independent synergistic effect of the herbicide with the plant growth regulator a test system was established. In this system different sunflowers with known genotype were used and tested with a collected batch of *O. cumana* seeds from Spain.

For understanding the effect of PHDC, a distribution study of the plant growth regulator in sunflower has been conducted. Interestingly, the growth regulator showed a fast-systemic distribution to the roots.

Keywords: *O. cumana*, prohexadione calcium, Clearfield® system, *Helianthus annuus*