

Using crop rotation to control wireworms

Problem

Wireworms, the larvae of the click beetle, can cause severe damage to potatoes (and other susceptible crops). They burrow into the tubers and render them unsuitable to be marketed for consumption. Wireworms can also cause significant damage to sugar beet, cereal, maize, legumes and various vegetables. Usually, several types of wireworms with different characteristics are involved.

In spring and autumn, the wireworms are usually found in the top soil layers, eating crop roots. In adverse conditions, the larvae retreat to deeper soil layers. In spring, the adult beetles lay their eggs into the loose, humid soil of permanent meadows and temporary grassland as well as cereals, but not in root crops. The beetles undergo a metamorphosis during 3-5 years with up to 15 larval stages. The larvae cause the most damage in their second and third year of metamorphosis.

So far, a direct control for wireworms in or immediately before susceptible crops has not yet been achieved.

Solution

Reduce the infestation risk by planning your crop rotation: By cultivating a one-year grass-clover ley and by placing the potatoes after the third or even fourth year of ploughing the ley, the intensity of infestation can be considerably lowered.

Outcome

Implementing a well-designed crop rotation has so far proven to be the most effective measure against wireworm damage. By minimising the share of grass-clover ley in the crop rotation, the metamorphosis of the larvae can be disturbed. In the fourth year after grass-clover ley or ploughing of soil, the risk of infestation is under 10 %.

Practical recommendation

- Perennial grass-clover leys promote wireworms. For this reason, a perennial cultivation of grass-clover ley should be avoided if there is any indication of wireworm infestation.
- After ploughing the meadows or the perennial grass-clover ley, wait until the third or, if possible, even fourth year to plant susceptible crops like potatoes, carrots, onions or salad.
- In general, a diverse crop rotation promotes various beneficial organisms and lowers the infestation of wireworms.
- No cultivation of potatoes in strongly affected areas!

Applicability box

Theme

Pest and disease control, crop-specific measures

Geographical coverage

Potato cultivation areas

Application time

Entire crop rotation

Required time

If necessary adaption of the crop rotation; effort for assessing the infestation

Period of impact

Succeeding potato crops

Equipment

None

Best on

Potatoes or other crops susceptible to wireworms, like carrots, onions or salad



Photo 1: Wireworm larvae (Photo: Wikimedia).

- Rye, fodder radish and vetch are a possible green manure for overwintering. A low infestation of wireworms was observed in crop rotations with peas and lupines.
- The cultivation of legumes (peas, field beans, bush beans) and Brassicas (white cabbage, fodder radish, mustards) can reduce damage from wireworms.
- Grain legumes but also cereals are ideal preceding crops for potatoes.
- Keep the soil moist whilst allowing the potatoes to mature.
- Harvest the potatoes on time because the longer the tubers are in the soil, the more risk of an infestation increases
- Control couch grass (*Elymus repens*) because its roots can promote the metamorphosis of the wireworm larvae.

Practical testing

Check your crop rotation and consider the criteria mentioned above: how could you reduce the presence of wireworms? Since they are not very mobile, the infestation within a plot can be compared across the years. In order to assess the infestation, the wireworms are lured into pot or plate traps and then counted (see Practice Abstract 029). Comparing annual assessments provides an indication of the population development within a plot and of the effectiveness of a control measure. However, the effects of crop rotation measures on the wireworm population will only be observable after several years.

Evaluation and sharing of the results

Use the comment section on the [Farmknowledge platform](#) to share your experiences with other farmers, advisors and scientists! If you have any questions concerning the method, please contact the author of the practice abstract by e-mail.



Further information

Video

- [Drahtwurmbekämpfung im Biokartoffelanbau](#), a Swiss-German FiBL-video with English subtitles, is available on [youtube](#); it gives insight into well-proven and new approaches on wireworm control in potato cultivation.

Links

- The technical leaflet [Organic Potatoes](#) (German edition) contains further tips on preventive measures against yield-reducing wireworm infestation as well as references to publications on this pest. The English version of the guide will be available in summer 2017 at [FiBL-Shop](#).
- The subpage [Pest and disease control](#) on the information website [Farmknowledge](#) provides information on the control of potato-related pests.
- Check the [wireworm control options](#) provided by [NCAT](#), giving information on how to detect and treat wireworm infestation.
- For gardeners, the [Practical Herbalist](#) provides [Natural Tips for a Wire Worm-Free Garden](#) to expulse or trap wireworms.

About this practice abstract and OK-Net Arable

Publishers:

Research Institute of Organic Agriculture (FiBL), Ackerstrasse 113, Postfach 219, CH-5070 Frick, Phone +41 62 865 72 72, info.suisse@fibl.org, www.fibl.org

IFOAM EU, Rue du Commerce 124, BE-1000 Brussels

Phone +32 2 280 12 23, info@ifoam-eu.org, www.ifoam-eu.org

Authors: Hansueli Dierauer, Gilles Weidmann, Franziska Siegrist (FiBL)

Contact: hansueli.dierauer@fibl.org

Permalink: orprints.org/31031

OK-Net Arable: This practice abstract was elaborated in the Organic Knowledge Network Arable project. The project is running from March 2015 to February 2018. OK-Net Arable promotes exchange of knowledge

among farmers, farm advisers and scientists with the aim to increase productivity and quality in organic arable cropping all over Europe.

Project website: www.ok-net-arable.eu

Project partners: IFOAM EU Group (project coordinator), BE; Organic Research Centre, UK; Bioland Beratung GmbH, DE; Aarhus University (ICROFS), DK; Associazione Italiana, per l'Agricoltura Biologica (AIAB), IT; European Forum for Agricultural and Rural Advisory Services (EUFRAS); Centro Internazionale di Alti Studi Agronomici Mediterranei - Istituto Agronomico Mediterraneo Di Bari (IAMB), IT; FiBL Projekte GmbH, DE; FiBL Österreich, AT; FiBL Schweiz, CH; Ökologial Mezőgazdasági Kutatóintézet (ÖMKI), HU; Con Marche Bio, IT; Estonian Organic Farming Foundation, EE; BioForum Vlaanderen, BE; Institut Technique de l'Agriculture Biologique, FR; SEGES, DK; Bioselena, Bulgaria

© 2017

