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## Biology and management of wireworms

### Background

Wireworms are the larvae of a group of beetles commonly known as click beetles. After falling on their backs they right themselves by flicking themselves into the air and produce a “clicking” sound. There are about 60 species of click beetle in the UK, but the majority of attacks are caused by three *Agriotes* species (*lineatus*, *obscurus* and *sputator*).

### Nature of damage

Wireworms will feed on a wide range of crops and the extent of the damage will depend on the numbers present, the growth stage and vigour of the crop. Wireworms damage seedlings in spring/early summer and attack their stems. Small wounds are caused just below the soil surface, these turn black and are usually enough to cause wilting and eventual death. Wireworm damage to root crops, especially potatoes, can be seen from early autumn onwards. Damage to potatoes results in a loss of quality caused by round holes in the surface leading to deep tunnels into the tubers. Other soil organisms (slugs, millipedes, bacteria, etc) can utilise these holes in the skin to cause further damage. Damage to other root crops result in small blackened pits but the wireworms do not burrow deeply into the flesh.

### Natural enemies

Rooks are the main bird species to feed on wireworms, however soil insects and fungi also attack them.



### Life history

Wireworms have shiny golden brown, tough, firm skin and are cylindrical in shape. They have three pairs of short legs just behind a distinct dark brown head. During May/June on grassy or weedy ground, female beetles lay eggs singly or in small clusters just below the soil surface. Small (1.3mm) transparent white, young wireworm hatch after about a month, they feed on both dead and living plant material in the soil. Mortality of eggs and very young larvae can be very high if soil conditions are dry, as they are very prone to desiccation. As wireworms mature they feed to a greater extent on living plant material below the soil surface. They feed for two, maybe three, short periods, with March to May and September to October being the most intense. They grow very slowly, taking four to five years to mature, burrowing deeper into the soil before emerging as dark brown to black adults during August and September.

## Control measures

- Careful crop rotation should ensure that susceptible crops are not grown following grass or weedy fallows
- Continual disturbance of the soil by rotovating or similar cultivation in March/April and inter row hoeing during the summer helps to expose larvae to the risk of desiccation and predation by soil insects and birds
- Potatoes should be inspected for damage from mid August onwards and early lifting should be considered before late season wireworm feeding
- On smaller areas of land as in glasshouses or polytunnels wireworms can be controlled by steam sterilization
- Active products from glucosinolates contained in cruciferous plants when hydrolysed are said to control soil pests. Green manures including mustard may reduce wireworm activity and act as a soil conditioner

## Further information

### Books and papers

- David Frost (2003) Review of pest and weed control in organic systems, *Organic Centre Wales*
- Marion Gratwick, *Crop Pests in the UK – Collected edition of MAFF leaflets*, MAFF / ADAS Published by Chapman & Hall, London 1992

### Websites

- Bayer crop science Expert Guides: Wireworms (not exclusively organic) <http://www.bayercropscience.co.uk/output.aspx?sec=273&con=592>
- Cyber-Help for Organic Farmers (USA) , <http://www.certifiedorganic.bc.ca/rcbtoa/training/pestmanagement.htm>
- Database of IPM Resources (USA) <http://ipcc.orst.edu/DIR/index.htm>
- Henry Doubleday Research Association <http://www.hdra.org.uk>
- Organic Integrated Pest Management (USA) [http://www.attra.org/attra-pub/summaries/organic\\_ipm.html](http://www.attra.org/attra-pub/summaries/organic_ipm.html)
- The *Pest Bulletin*, HDC. <http://www2.warwick.ac.uk/fac/sci/hri2/hdcpestbulletin/>

*Please note that the USA based websites may not be appropriate in terms of pest life cycles, timing of management operations etc.*

Caiff y Ganolfan Ddatblygu Organig, a gaiff ei rhedeg gan Ganolfan Organig Cymru, ei rheoli gan Awdurdod Datblygu Cymru ar ran Llywodraeth Cynulliad Cymru fel rhan o Cyswllt Ffermio.

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