

BNFFG Pest Monitoring Series

Click Beetles and Wireworms

Factsheet #2
March 2023



What are click beetles?

Click beetles are a large family of beetles with at least 150 known species living in British Columbia (BC) [1]. These include native and non-native species such as the introduced lined click beetle (*Agriotes lineatus*) and dusky wireworm beetle (*Agriotes obscurus*), which cause damage to grain crops. These two species were introduced on Vancouver Island but have now spread to the lower mainland and have displaced a lot of native click beetles [2].

In spring 2022, research has started in the central interior of BC to determine whether these species are present (see links below for project details). Although preliminary results indicate that there is wide distribution of various click beetle species within the interior, lined click beetle (*Agriotes lineatus*) and striped click beetle (*Agriotes obscurus*) have not yet been positively identified but are suspected to be present in the region (personal observation Harrison 2022).



Click beetle. Judy Gallagher 2020 (CC BY 2.0)



Wireworm damage. Scott Stewart, The University of Tennessee

Damage

Click beetles can cause damage to both cereal [3] and vegetable crops [4]. The damage to crops from click beetles is usually from the larval stage of its life cycle, referred to as wireworms, as they feed on the roots, stems, and seeds in crops, including perennial crops like alfalfa. Wireworms mature in the ground and are attracted to roots, stems, and seeds from CO₂ that the plants release. Wireworm feeding causes seedling mortality[5], leads to reduced crop yields, and causes direct damage and reduced quality of root crops like potatoes, as they eat small holes into the tubers.

Because of the spread of two non-native species and the potential negative impacts on crop yields and quality, it is important for producers to identify click beetles in their fields and to consider how their spread and management are important to healthy crops.

Identification



Wireworms



Wireworm. Scott Stewart, The University of Tennessee-

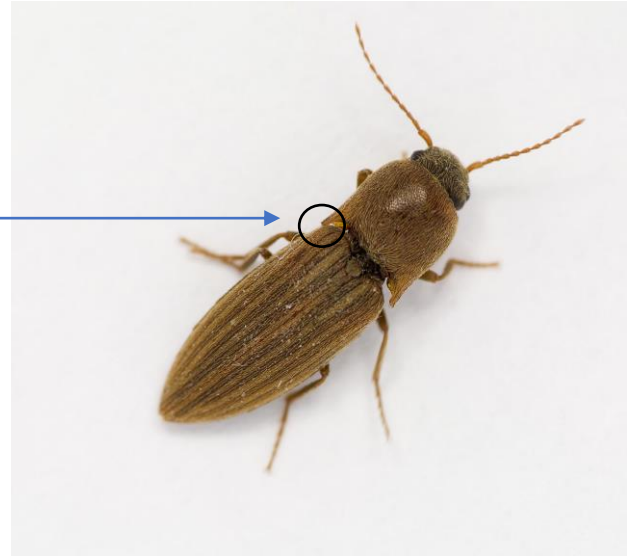


Wireworm. Katja Schulz, Flickr (CC BY 2.0)

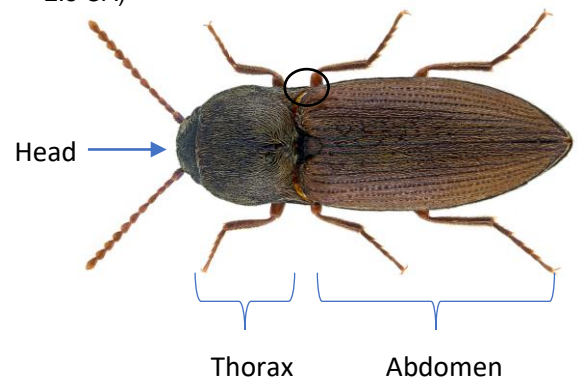
Wire worms can be identified by their light brown hard shelled slender bodies. They can vary in length depending on species and stage of their life cycle.

Click beetles can be identified by the distinctive points on the thorax (between head and abdomen). Click beetle species can vary in size but are typically 12 to 40 mm long.

Adults

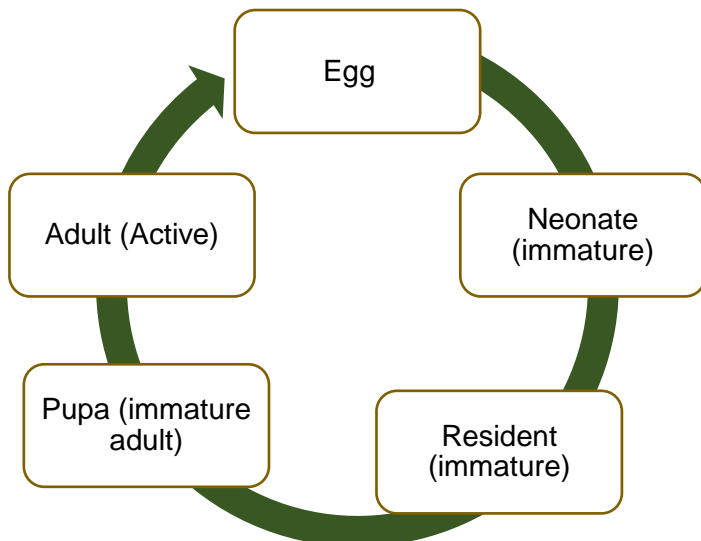


Lined click beetle. Mardon Erbland 2006 (CC BY-NC-SA 2.5 CA)



Dusky wireworm beetle. Udo Schmidt 2016 (CC BY-SA 2.0). Modified from original.

Life Cycle



Click beetles have multiple stages of their life cycle. **Adults** emerge, mate, and lay **eggs** between late April and July. **Neonates** are immature wireworms that are newly hatched that emerge in the summer and grow while feeding on crops into the fall. After the neonate survives in the soil for one winter it is considered a **resident** wireworm and can take several years to mature into the **adult** click beetle. During this time it continues to feed until it turns into a pupa and then into an adult.

Monitoring



When to monitor

Because of their life cycle, the best time to monitor for click beetles is prior to planting when the wireworms are closer to the soil surface (April to late August).

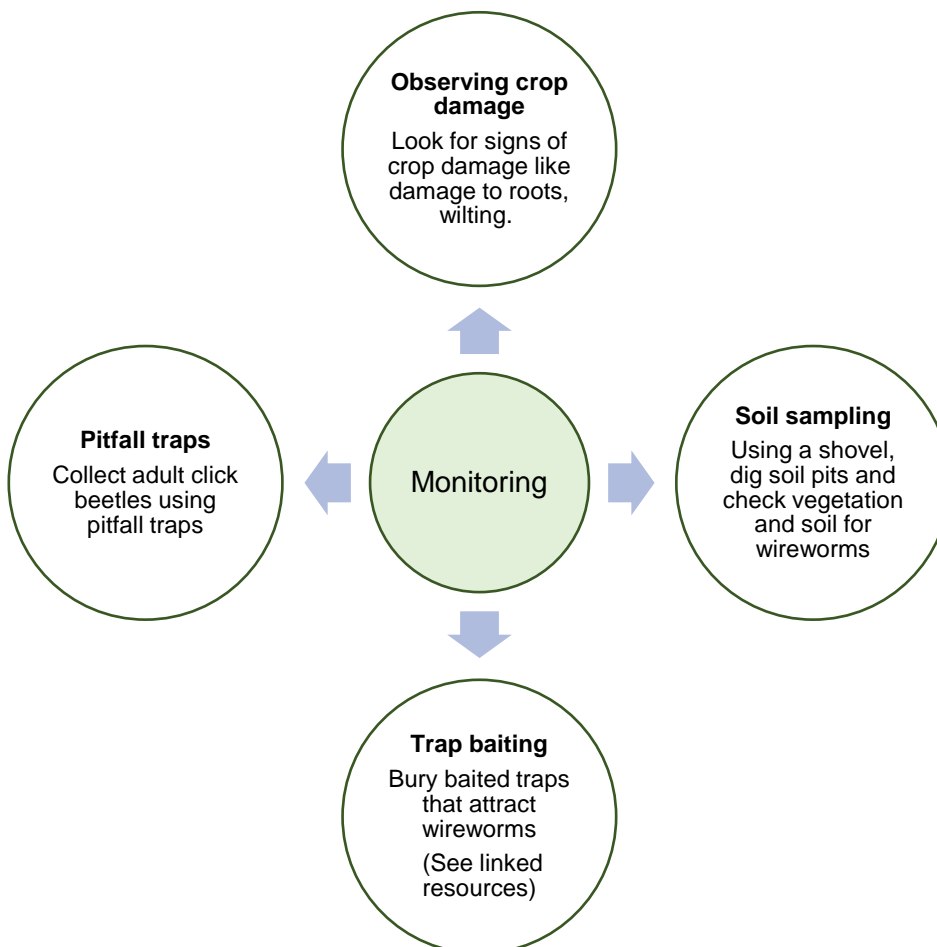
Additionally, you can look for adults on top of the soil even though adults do not cause direct damage to crops. Adults emerge on top of the soil and so can be more easily monitored to get a general idea of current and potential wireworm risk [6] as directly monitoring wireworms populations in the soil can be difficult.



Pitfall trap installed in spring 2022.

How to monitor

There are several different methods to monitor and identify the presence of the click beetle species which include [6] :



See linked resources below to get more detailed information on these options. If a species cannot be identified, record where and when they were collected and reach out to your regional entomologist and/or use other resources below to help with identification.

If possible, keep specimens in a container in the freezer, or take good photographs of adults or wireworms. It is easier for experts to identify pests with actual specimens or at least good images.

Controls



Several different aspects of integrative pest management (IPM) can be considered to reduce the damage from click beetles and to reduce the spread of the non-native species. These include cultural, chemical, and biological controls. Cultural controls include rotating crops, using resistant crop varieties, trap crops etc. Wireworms have some natural biological controls: natural enemies that cause wireworm fatalities, like some species of common stiletto flies (*Thereva nobilitata*) [7] and ground beetles that eat wireworms when they are small [6].

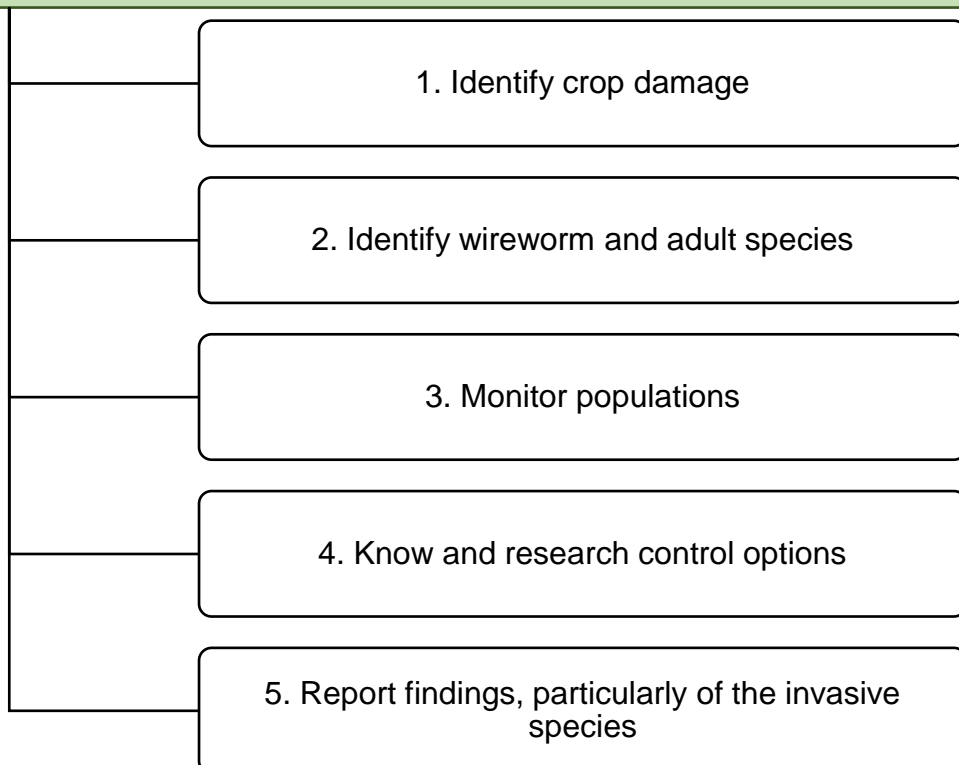
Currently there is ongoing research investigating the potential management of pest species, like wireworms, through natural enemies and how their presence might be encouraged through land management adjacent to the fields (see linked resources).

Chemicals have been used in the past to successfully manage wireworms but current registered pesticides can have varying levels of success depending on the species [6], and pesticides often impact non-target insects and spiders that might be beneficial to a crop.



Common stiletto fly. B.J.Shoenmakers 2016 (CC01.0)

Overall, the best start to mitigating crop damage from native species, and limiting the spread of non-native species is:



Resources



Links:

Facebook Page for insect monitoring in central interior project :

<https://www.facebook.com/profile.php?id=100090075117545>

Inaturalist BC is a good resource for identifying unknown beetles and connects you to other naturalists and citizens that will verify identification if possible

<https://www.inaturalist.org/>

Field Heroes, a comprehensive resource with more information on beneficial insects and pest management from the prairies <https://fieldheroes.ca/>

Guide to Pest Wireworms in Canadian Prairie Field Crop Production , which has more information on wireworm and adult click beetle trapping (including making bait traps) and control

https://publications.gc.ca/collections/collection_2021/aac-aafc/A42-125-2021-eng.pdf

Government of British Columbia Directory for Regional Entomologists

<https://dir.gov.bc.ca/gtds.cgi?searchString=Entomologist&search=Search&for=people&attribute=title&view=&matchMethod=is&searchString=&sortOrder=ascending&sortBy=name>

Research partners

This factsheet was produced by Meganne Harrison (a graduate student at the University of Northern British Columbia) as part of a two-year project (2022/2023) that is collaborating with farmers and ranchers to monitor and identify pests of concern for the agriculture sector across the Bulkley-Nechako and Fraser-Fort George regions.

Meganne's research is being overseen by Dr. Dezene Huber (University of Northern British Columbia) and Dr. Jasmine Janes (Victoria Island University) with support from Serena Black (BC Forage Council) and a dedicated Project Oversight Committee.

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Opinions expressed in this presentation are those of the author and not necessarily those of the Governments of Canada and British Columbia, the BC Forage Council, MITACS, or the Investment Agriculture Foundation of BC. The Governments of Canada and British Columbia, the BC Forage Council, MITACS, and the Investment Agriculture Foundation of BC, and their directors, agents, employees, or contractors will not be liable for any claims, damages, or losses of any kind whatsoever arising out of the use of, or reliance upon, this information.

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