



NOV 3 1978

UNIVERSITY OF IDAHO

# Wireworms in Potatoes

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Wireworms were the major insect pest in potatoes before DDT and other chlorinated hydrocarbon insecticides were used. Before the late 1940's some growers reported total loss of their crop to wireworm injury while others suffered less severe but still significant losses. The pesticides we are now using are not as persistent as the chlorinated hydrocarbons, so the number of wireworms in our soils is slowly increasing. Hopefully, damage will never approach the injury levels of the past.

Wireworm adults are click beetles — the long slender beetles that flip themselves into the air to get back on their feet when placed on their backs. The larvae are hard-bodied, slender, cylindrical, shiny, yellow-to-brown "worms" with small legs. Usually their last body segment is prolonged or forked. Larvae are found in damaging numbers most often in fields that have not been in annual crop production for several years. Examples are pastures and sagebrush lands being brought into potato production. The most common wireworm found in our irrigated lands is the sugarbeet wireworm, *Limonijs californicus*. The most common dryland species is the Great Basin wireworm, *Ctenicera pruinina*.

## Nature of Damage

Wireworms bore holes in tubers. The holes, which look as if they were made by stabbing the tuber with a nail, usually are lined with potato skin.

Wireworm feeding on the seed piece and stem also opens the tuber to decays and rots. This can result in an unhealthy plant with reduced yield.

## Seasonal and Life History

The life cycle of our most common wireworms is 3 to 4 years under favorable conditions. Wireworms spend the winter in the soil either as partially grown larvae or as new adults in overwintering cells. Adults work their way to the soil surface in the spring when soil temperatures reach 55° or above. These adults eat little if anything and cause no economic damage. As soon as the female emerges from the soil, she mates, then burrows back into the soil and lays eggs at depths of 1 to several inches. Some females may not



*Internal injuries from potato wireworm*



*External injuries from potato wireworm*

lay all of their 300 eggs at one location but will return to the soil surface, fly to another nearby area, then reenter the soil and continue egg laying. Because of these flights and the requirements for larval development, we often see spotty infestations. The sugarbeet wireworm prefers vegetated areas while the Pacific Coast wireworm, *L. canus*, prefers unvegetated spots for laying eggs.

Wireworm larvae cause the most severe feeding damage during their 2nd and 3rd years. In the spring when soil

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**Materials available for wireworm control.**

Insecticide	Minimum days from application to harvest	Maximum per acre actual material	Application methods and remarks
<b>BROADCAST</b>			
Dasanit 15G	none	5 lb	Preplant broadcast. Work Dasanit into top 3 to 4 inches of soil.
Dyfonate	none	4 lb	Incorporate Dyfonate by discing.
parathion	none	6 lb	Work parathion into top 4 to 9 inches of soil.
diazinon	none	6 lb	Work diazinon into top 4 to 8 inches of soil. Soil temperature must be 50°F or above at 6 inch depth. Soil moisture content must be above 50 to 70% of the water holding capacity of soil. Keep all persons and animals out of parathion treated fields for 48 hours.
<b>BAND</b>			
<i>Use only for row spacing specified on labels.</i>			
Dyfonate	application at planting	2 lb	Apply at planting in subsurface bands 3 to 4 inches on both sides of and 2 inches below the seed pieces.
Thimet	90	3 lb	Distribute Thimet granules evenly in furrow or granules may be banded on each side of row at planting time.
<b>FUMIGANTS</b>			
D-D	preplant application	250 lb (25 gal)	Plow in or inject into fallow soil at 12 inch intervals and 8 inches deep at least 3 weeks before planting potatoes. Soil temperatures should be between 50 to 90°F at 6 inch depth. Do not treat when soil is very wet or very dry. Poor wireworm control may be expected when soil temperatures are below 50°F. Do not plant onions for 2 years after ethylene dibromide treatment. Observe all label precautions.
ethylene dibromide soilbrom	preplant application	Follow label directions	
Terr-O-Cide 15 & 30			
Telone II			
Telone C			
Telone C-17			
Terr-O-Cide 15D & 30D			

temperatures reach 50°F or above, the larvae move upward toward the soil surface from depths of 6 to 24 inches where they have spent the winter. When soil surface temperatures reach 80°F or higher, they move downward again. In irrigated fields with complete foliage cover, this higher temperature level may never be reached. During the 3rd or 4th seasons, mature larvae transform to fragile pupae in earthen cells. In 3 to 4 weeks, the pupae change to adults which remain in the earthen cells until the following spring. Wireworms in all stages may be present in the soil during any growing season.

**Surveying for Wireworms**

No easy method exists to determine severity of wireworm infestation or potential for damage. Infestations will vary within and between fields and from year to year.

Research has shown that over 0.1 wireworm per square foot can cause economic loss to a potato crop. While most crop lands in Idaho do not reach this level of infestation, some do and this makes testing for wireworms advisable. Past cropping history, records of previous soil treatments

and damage to previous crops can serve as indicators of wireworm population levels.

Procedures for testing or surveying for wireworms are outlined in Idaho Current Information Series 328.

**Control**

The different pesticides available for control vary in length of residual activity in the soil. Diazinon and parathion are relatively short-lived. They should be applied to moist soil just before planting. They should be effective if the soil has reached 50° or above which is sufficient for wireworm activity. These materials remain toxic in the soil up to 6 weeks.

Soil fumigants such as ethylene dibromide are effective, but expensive. They should be used when other benefits such as nematode, weed or disease control are desired. Fumigants must be used when the soil is warm enough for wireworm activity since they have no residual after the soil is aerated. They must be applied a minimum of 3 weeks before planting.

Thimet can control wireworms when applied as a sidedress. Apply at planting and at least 90 days before harvest.

Certain cultural control practices can also be effective. One practice is to avoid rotations which include clovers and grasses. Because soil dryness can kill many wireworms in an infested field, fallowing a field can give some control but the control achieved must be weighed against the loss of income from not growing a highly profitable crop with use of pesticides. Plowing the stubble on a field the first 10 days of August can break up the pupal cases. In fields where wireworm populations have been reduced, potatoes (a susceptible crop) should be planted the first year in rotation followed by less susceptible crops such as sugarbeets, beans or corn in the ensuing years.

### *Safety*

All insecticides used for wireworm control are poisonous to both man and insects. Parathion, Dasanit, Dyfonate and Thimet and the fumigants are extremely toxic while diazinon is somewhat less toxic. When using parathion, keep humans and animals off the treated area for at least 48 hours.

The first rule in using insecticides safely is to read the label each time the material is used and understand it completely. Secondly, follow to the letter the manufacturer's directions on safety precautions.

Wear protective equipment such as rubber gloves, a long-sleeved shirt or coveralls, goggles, hat and a proper respirator whenever you open containers, fill insecticide hoppers or apply chemicals. Polyethylene gloves, protective aprons, etc. are required when working with some fumigants.

Remove your protective clothing as soon as possible after use. Wash the gloves first, then unbutton the coat, remove the hat, goggles and boots. Wear gloves while washing protective clothing. Wash clothing before reusing. If chemicals are accidentally spilled on clothing or yourself, remove contaminated clothing and wash yourself thoroughly. Never wear contaminated clothing.

Bury spilled insecticides. Follow label directions for the disposal of containers. Usually, you can puncture and crush metal containers and break glass containers before burying 18 inches deep in a suitable location. Be sure ground waters will not be contaminated. Paper bags can usually be burned, but stay out of the smoke and away from the fumes.

Store all insecticides in a safe place away from children and pets.

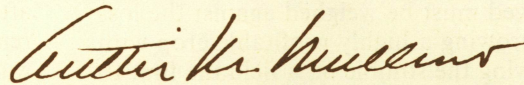
If there is any chance that you may have been accidentally poisoned, see your doctor immediately. If at all possible, take a label with you.

Keep accurate records of the pesticides you apply.

*Pesticide Residues — These recommendations for use are based on the best information currently available for each chemical listed. If followed carefully, residues should not exceed the tolerance established for any particular chemical. To avoid excessive residues, follow recommendations carefully with respect to dosage levels, number of applications and minimum intervals between application and harvest.*

*The grower is responsible for residues on his crops as well as for problems caused by drift from his property to other properties or crops.*

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