



# Wireworm Scouting: The Shovel Method and the Modified Wireworm Solar Bait Trap

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Wireworms (*Limonius* spp) can damage cereal grain crops, resulting in increased weed pressure and reduced stands, yields, and profits. Wireworms are the immature larval stage of click beetles, and these beetles can spend several years in this larval stage feeding on germinating seeds and young seedlings, resulting in thin crop stands and lower yields. Crop damage is not detected until after planting when it is too late to make preventive pest management decisions. This situation makes wireworm scouting prior to planting essential.

Spring arrives quickly in the dryland cropping region of the Pacific Northwest, so every day is critical. Fall cereal grain seeding conditions can also change quickly, most often due to precipitation. A delay in planting can be costly but so can an infestation of wireworms. Consequently, taking time to properly scout for wireworms can provide an excellent return on investment.

## Identifying a Wireworm

The first requirement when scouting for wireworms is to be able to correctly identify them. Wireworms are  $\frac{1}{4}$  to  $\frac{3}{4}$  inch long, have hard, slender, semi-cylindrical bodies, and are white, yellowish, or coppery color. They have 3 pairs of short legs located behind the head (Figure 1).



Figure 1. Wireworms vary in size.

## Where to Start Scouting

Wireworm scouting should start in fields that historically have had excessive weed pressure and disappointing grain yields. Sampling should begin when soil temperatures reach a minimum of 45°F in the spring and less than 80°F in the fall. Sampling should be completed prior to planting, so rates of seed-applied insecticide can be adjusted.

## Shovel Method

The shovel method is the quickest and easiest way to sample for wireworms, but it may be the least accurate (Figure 2). To take samples, follow these steps:

- Step 1.** Dig down about 10 inches and lift the shovel of soil for examination.
- Step 2.** Round off the soil sample to approximately 6 inches in diameter.
- Step 3.** Sift through at least 20 shovels of soil from different locations in the field. This is extremely important because wireworm distribution is usually patchy or irregular.

A suggested threshold for determining the level of economic injury is an average of 4 or more wireworms per 20 shovels of soil. At this level, it may be profitable to use a preventive treatment (Gesell 1983).

## Modified Solar Bait Trap Method

The modified solar bait trap method requires additional time and is more difficult to use, but it is also the most accurate method for wireworm sampling. To take samples, follow these steps:

- Step 1:** Monitor soil temperature in the field until it nears or reaches 45°F at a depth of 4 inches.
- Step 2:** Mix equal parts untreated wheat and corn seed. Pour  $\frac{1}{2}$  cup of the wheat-corn mixture into a nylon stocking and tie off the end with string (Figure 3). Soak the filled stocking in water for 24 hours. Soaking the seed mixture is crucial because it starts the germination process. Because wireworm locations can be patchy, a minimum of 10 traps should be used per field.



Figure 2. The three steps for shovel sampling for wireworms.



Figure 3. Filling up the nylon bait trap with wheat and corn seed.

**Step 3:** Dig a hole in the soil approximately 3–5 inches deep and 8–10 inches wide. Place the bait trap in the hole and spread the grain mixture across the bottom of it. Leave the string outside the hole to help relocate the trap (Figure 4).

**Step 4:** Cover the bait trap with sufficient soil to create a mound over the bait, but do not pack the soil.

**Step 5:** Cover the soil with a piece of black plastic approximately 1 to 3 feet square, and then cover this with a piece of clear plastic that is the same size or a little larger. This helps warm the soil, which helps germinate the bait that will attract wireworms. Cover the edges of the plastic with soil to keep it from blowing away. Place a flag in one corner of the plastic to make it easier to relocate the site (Figure 5).

Another method for covering the trap is to staple

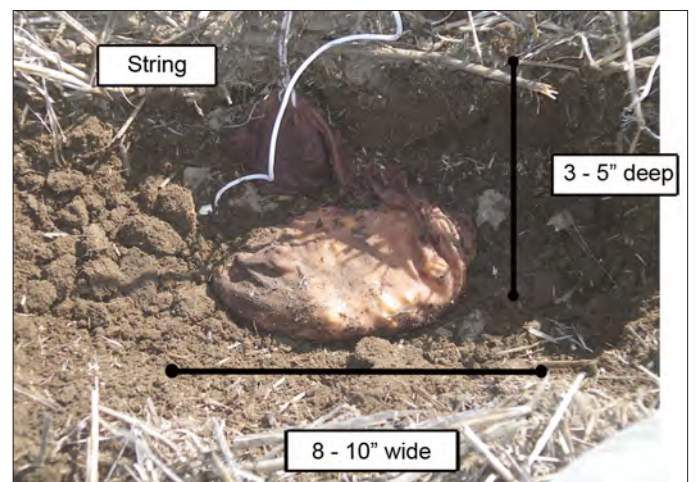


Figure 4. Bait trap placed in a hole 3–5 inches deep and 8–10 inches wide.



**Figure 5.** Bait trap covered with black and clear plastic and flagged.

both the black and the clear plastic to wood lath and drill a hole for a flag that will keep the plastic in place and make it easier to relocate the site.

**Step 6:** Remove the bait traps after 7–10 days, being careful to collect any wireworms that may fall out when removing the bait traps from the soil. Place the bait traps in a small bucket or a resealable plastic bag. Wireworms may be found in the grain and/or may be caught up in the mesh of the stocking (Figure 6).

**Step 7:** Cut the bait trap open and examine the grain



**Figure 6.** Wireworms caught in the mesh of a bait trap.

inside. Then count the number of wireworms in each trap. Using the DATA SHEET (Figure 7), record the average number of wireworms per bait trap for fields and field sites to determine which fields and field portions warrant treatment.

**Step 8:** Determine what level of control is needed. If wireworms are detected, several integrated pest management options can be used. These include incorporating fallow, treating with seed-applied insecticide, and/or delaying planting times (Glogozza 2001; Rice 2003). Table 1 shows one way to interpret wireworm counts collected from modified solar bait traps.

**Figure 7.** Data sheet for determining level of control and for crop records.

DATA SHEET		
	Field and Location†	Number of Wireworms
Trap 1		
Trap 2		
Trap 3		
Trap 4		
Trap 5		
Trap 6		
Trap 7		
Trap 8		
Trap 9		
Trap 10		
<b>Average Number of Wireworms per Trap</b> (Number of wireworms ÷ number of traps)		

† NF: north-facing slope, SF: south-facing slope, EF: east-facing slope, WF: west-facing slope, DB: draw bottom, HT: hill top, F: flat

**Table 1. Wireworm treatment recommendations based on risk of economic damage determined by using the average number of wireworms per bait trap.**

Average Number of Wireworms per Trap	Risk of Economic Damage	Wireworm Treatment Recommendation†
0	Low	No treatment
0–1	Moderate	Possible treatment
1–2	Probable	Treat with recommended rates
2–4	High	Treat with recommended rates
>4	Extreme	Extreme methods‡

† Knowing field history also helps in developing treatment recommendations.

‡ Extreme methods of control include using highest rates allowable of neonicotinoid insecticides, higher seeding rates, and delayed seeding.

## Resources

Gesell, S. 1983. Wireworms as Pests of Field Crops. Entomological Notes, Department of Entomology, Penn State. <http://www.ento.psu.edu/extension/factsheets/wireworms.htm>.

Glogoza, P. 2001. Wireworm Management for North Dakota Field Crops. E-188. North Dakota State University. <http://www.ag.ndsu.edu/pubs/plantsci/pests/e188-1.htm>.

Rice, M. 2003. Trap Wireworms before Planting Corn. Integrated Crop Management Newsletter. Iowa State University. <http://www.ipm.iastate.edu/ipm/icm/2003/4-21-2003/trapwire.html>.



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Use pesticides with care. Apply them only to plants, animals, or sites as listed on the label. When mixing and applying pesticides, follow all label precautions to protect yourself and others around you. It is a violation of the law to disregard label directions. If pesticides are spilled on skin or clothing, remove clothing and wash skin thoroughly. Store pesticides in their original containers and keep them out of the reach of children, pets, and livestock.

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