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GERMINATING SEED BAIT TECHNIQUE FOR SAMPLING SOIL INSECT PESTS

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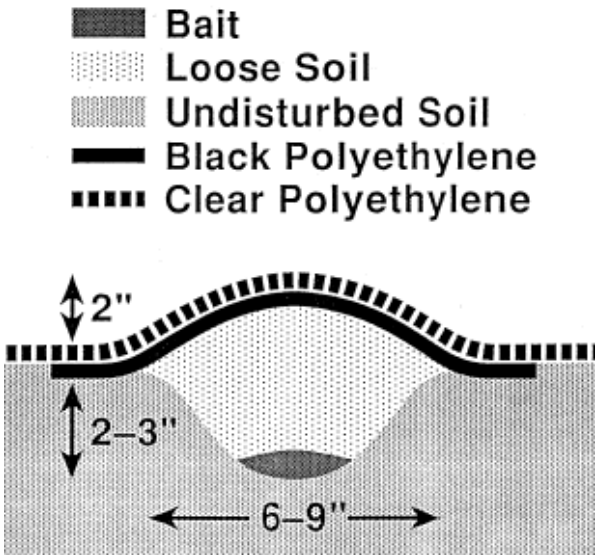

Picture source: Iowa State University

Germinating seed baits (pictured left) have been shown to be the most cost-effective relative sampling technique for a variety of subterranean insect pests, especially immature of phytophagous beetles. Seed bait technique can complement or replace absolute sampling method such as spade sampling that are more laborious and time-consuming. Germinating seed bait technique has been used successfully in agronomic crops, vegetable crops, pasture, and fields under the Conservation Reserve Program because this method is relatively easy to set up and remove for assessing wireworm populations.

Materials needed: Untreated corn/wheat/sorghum seeds, water, black polyethylene trash bag, colored flag or marker, shovel, large Ziploc bags (optional)

1. A mixture of seeds can be used for increasing attractiveness of seed baits to different insect species (especially for detecting wireworm species).

2. Pre-soak the seed mixture for a 24-hour period before placement to encourage seed germination.

3. Dig a soil pit about 10 inch wide and 3-6 inch deep in soil and put an appropriate amount of seed mixture in the hole. Insects are attracted to the heat and carbon dioxide released from the pit, which means that you can make the bait attractive by deploying a wide but not-too-deep bait. Bait stations beyond 6 inches deep attract few insects because most insects live in the upper 2-3 inches of soil. Certain root maggots and immature coleopteran pests may move deeper into soil in order to diapause (winter sleep); using seed baits to assess such deep-dwelling or diapausing insects is difficult.

4. Cover the seeds with a shallow layer of soil and put a 15 inch x 15 inch piece of black polyethylene cover (e.g., commercial trash bag) on top of the mound to seal it. Use soil to seal the edges of the cover. Black cover will trap solar radiation and facilitate seed germination. It also will deter animals from disturbing the bait. You can put colored flags to mark the position of your bait stations (inform tractor drivers about trap locations to prevent accidents!). Clear cover over the black cover may not be needed.

5. Although it is difficult to recommend a specific number of baits per acre, about a dozen bait stations in a 40-acre field will be sufficient. Remember, the fewer the number of bait stations, the lower will be your sampling accuracy and vice-versa. Adjust the number of bait stations according to your experience with field conditions.

6. It is recommended that seed baits be maintained for at least one week in spring of each year or up to one week prior to planting crops. If feasible, seed baits should be deployed throughout the production season in fields with a history of insect infestation in order to monitor the peak larval activity. With clever deployment of bait stations in an intensive sampling program, you may be able to time your insecticide applications during the peak activity period for the target pest.

7. At the end of sampling period, dig out the germinating seeds AND soil surrounding the seed bait. Sometimes insects, like wireworms, collect just under the seed bait; hence, collecting surrounding soil improves pest detection. Carefully go through the sample by manually sorting the seed bait on a large plastic tray or by pressure washing over a mesh. Using a tray prevents insects from dropping off the soil sample and reduces error.

8. For an intensive sampling program with large number of samples, soil around the bait station can be stored in a Ziploc bag, kept frozen and checked at a later date (freezing slows down soil pests). Due to the high organic matter of these baits (i.e., germinating seeds), the major portion of the bait needs to be processed in a timely manner and may not be storable.

9. Ensure that you keep good records of the location of baits on paper and your observations. Using a GPS to mark locations is a very good idea for long-term sampling plans.

Note: Attractiveness of seed bait to insects may be affected by their population distribution, quality of seed bait, and species present. Seed baits can be deployed for different time periods in order to trap a variety of below-ground and surface-dwelling insects. Insecticidal treatments should be applied at the most appropriate time toward the most vulnerable stage of insect lifecycle.

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