

Panel Discussion: Cover Crops Used at Vallonia Nursery, Indiana Division of Forestry

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The use of cover crops is one essential step in management of nursery soils. Cover crops serve many different purposes within the soil. First, cover crops help in reducing erosion by stabilizing soil. Second, cover crops can be used as a visual guide to nutrient deficiencies in fields prior to sowing seedling crops. Most important, cover crops build organic matter, which has a positive effect on seedling growth.

Organic matter helps to reduce the buildup of damping-off fungi, which could infect the emerging seedlings. Organic matter also affects soil texture, water-holding capacity, nutrient availability, cation exchange capacity (CEC), soil pH, and the presence and functions of microorganisms that are usually beneficial for seedling growth. In our sandy soils, every 1% buildup of organic matter can release up to 75 lb/ac (84 kg/ha) of nitrogen that can be used by the plants.

Standard Cover Crops

We typically use grass cover crops as opposed to legumes because grass cover crops do not build up as much damping-off fungi as legume crops. The types of cover crops used in our nursery are as follows: Roundup Ready[®] corn, Concept-treated sorghum, sorghum-sudan grass, wheat, and rye.

The Roundup Ready[®] corn and Concept-treated sorghum allow chemicals to be used at planting time or during the growing season to help keep the fields cleaner prior to fumigation. All cover crops are grown until they must be tilled before fumigation. We generally start flail mowing cover crops August 1 (Figure 1) in order to fumigate on or around September 1. Disking, chisel plowing, and ripping are all done to help incorporate cover crop residue.

Living Mulch Cover Crop

Part of the acreage at the nursery is used to grow rye and wheat to be harvested for the seeds and straw. The straw is used to cover all oak, black walnut, and hickory seedbeds for winter protection. In Indiana, a normal winter has cold temperatures (0 to 10 °F [-18 to -12 °C]) with little or no snow for insulation. The beds are covered by 3 in (8 cm) of straw to protect seeds from extreme cold temperatures. The harvested rye is sown at the same time as the tree seeds on all seedbeds. This prevents seedbed erosion and provides protection of all seeds during the winter months. Along with the straw, this dense mat of rye provides protection to the seeds from deer and squirrel predation. The wheat seeds are used to cover all costs incurred from the harvesting of the rye and the bailing of straw by a local farmer.

In late winter or early spring, the rye is sprayed and killed before emergence of tree seeds. Depending upon timing of the application, paraquat or Roundup[™] can be used for a quick burndown of the rye as well as any winter annuals that might be present (Figure 2). This can only be used before seedling emergence. After seedling emergence, Fusilade[®] is used to kill the established rye over the seedbeds.

After the rye has been killed, the straw is removed by means of a controlled burn (Figure 3). Removal of all straw may require the field to be burned more than once. The burning is quick and does not get hot enough to damage exposed seeds. I do feel that you would want to burn before the seeds start to emerge from the ground to avoid seedling damage. All fire can be extinguished by the use of the irrigation system if necessary.



Figure 1—Flail-mowing of corn cover crop at Vallonia Nursery.



Figure 3—Rye straw removed from seedbeds with a controlled burn.



Figure 2—Established rye killed with herbicides before seedling emergence.

The rotation normally used at the Vallonia Nursery is 1 year in wheat/rye, 1 year in corn/sorghum, and then 1 year in seedling production. All ground is fumigated prior to sowing for seedling production.