EXTENSION NOTES

Ontario

COVER CROPS HELP TREE SEEDLINGS BEAT WEED COMPETITION

Planting cover crops, such as rye grass or clover, can be an important step in turning fragile or marginal lands into productive forests. By slowing the spread of weeds, cover crops help seedlings compete for sunlight, nutrients and water, with reduced need for herbicides or other weed control.

Some cover crops also enrich and stabilize the soil. They are particularly useful in preventing slopes from eroding which, in turn, reduces the amount of silt carried into waterways. A tractor, seeder and mower are needed to grow cover crops in large areas.

This Extension Note explains how to choose, plant and grow cover crops in order to improve the growth of hardwood seedlings.

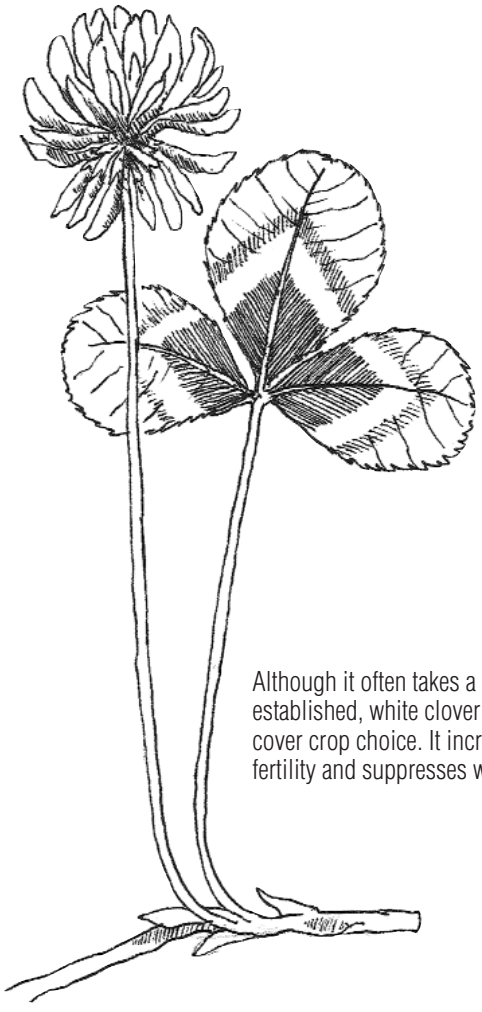
THE BENEFITS OF COVER CROPS

REDUCED HERBICIDE USE

Hardwood seedlings grow best when they have an ample supply of sunlight, nutrients and moisture. When other plants compete for the same resources, these seedlings rarely survive long enough to outgrow the competition.

Cover crops keep competing plants at bay, with reduced need for herbicides or other weed control. Because they grow low to the ground, cover crops give seedlings access to sunlight, while discouraging competing weeds from taking root. While it's true cover crops also compete with seedlings, they are not as damaging as weeds.

Field trials conducted by the Ministry of Natural Resources have shown that cover crops can cut herbicide use by as much as 50 per cent and the cost of chemical weed control by up to $25 a hectare. As well, rodent damage to young seedlings was reduced to less than five percent of the trees, while tree survival rates were as high as 99 per cent.



Although it often takes a year to become established, white clover is a popular cover crop choice. It increases soil fertility and suppresses weed growth.

Perennial ryegrass is a popular cover crop choice. It establishes quickly and suppresses the germination of competing weeds in the first year.

PREVENTING SOIL EROSION

The root systems of cover crops help prevent erosion by securing the soil. They are particularly useful on slopes where rain can carry soil into waterways and degrade water quality and fish habitat.

Cover crops can also improve the condition of the soil. Depending on the species, they can help loosen compacted soil and increase soil organic matter, moisture and fertility.

FOOD FOR WILDLIFE

Some cover crops, such as white clover and rye grass, are excellent winter foods for birds, small mammals and deer.

SELECTING A SITE

Cover crops thrive on slopes and flat areas, but they don't do well on low sites that may be prone to flooding.

CHOOSING COVER CROP SPECIES

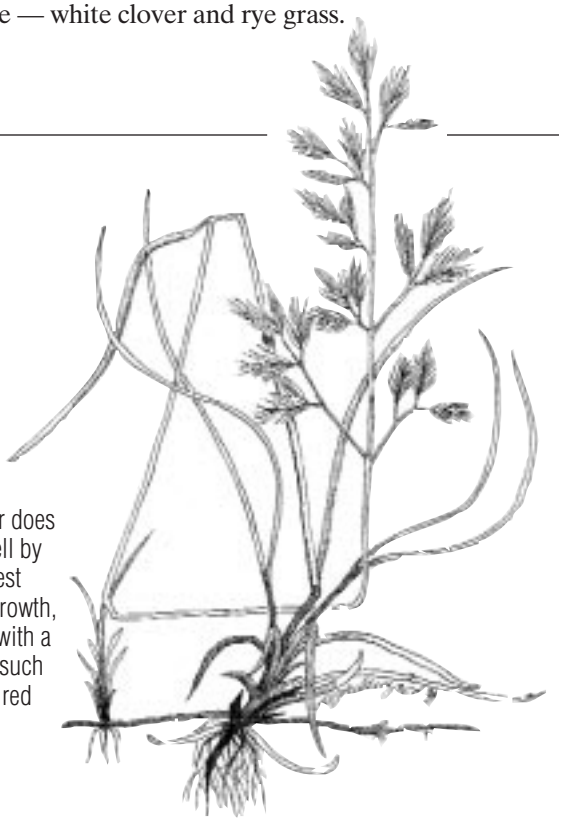
When choosing the best cover crop for your tree plantation, it's important to know whether or not the cover crop produces its own seed or if new seed must be purchased and sown each year. Also, you should be aware that some cover crops can increase pest problems or attract rodents that might feed on the seedlings. One agricultural pest, for example, thrives on millet. The Ministry of Natural Resources has tested two cover crops traditionally used in agriculture — white clover and rye grass.

WHEN TO PLANT COVER CROPS

Cover crops can be planted either one year before tree seedlings or during the same year.

When cover crops are planted the year before, soil erosion and water runoff are reduced. To effectively slow the growth of competing weeds, sow white clover early so that it becomes established before the trees are planted. If you are using machines to plant the trees, however, there are some disadvantages to early sowing. Tire traction can be reduced. Because cover crops hold soil moisture, there may also be fewer days in the spring when fine-textured soils are dry enough for planting.

If you plant cover crops during the same year as seedlings, using a machine to plant trees is easier. With this option, however, cover crops may not grow enough in the first year to prevent weeds from germinating. The use of a second, faster growing cover crop, such as winter wheat, timothy grass or barley, along with your primary cover crop can help solve this problem.



White clover does not grow well by itself. For best long-term growth, seed along with a short grass such as creeping red fescue.

A COMPARISON OF THE BENEFITS OF TWO COMMON COVER CROP SPECIES

TABLE 1 — COMPARISON OF WHITE CLOVER AND RYE GRASS

	WHITE CLOVER	RYE GRASS
Appearance	• There are several types of white clover, including wild white clover and Dutch white clover • Ladino clover is not recommended for tree plantations because it grows to a height of 34 centimetres	• Grows rapidly in dense clumps
Weed Suppression	• Although it can take up to a year to become established, white clover suppresses weed germination	• Becomes established quickly • Its dense cover, large root mass and ability to absorb nitrogen, suppresses weeds, specially late annual weeds and quack grass
Life Span	• Most varieties live five years • Self-seeding	• Annual rye grass dies in winter • Perennial rye grass survives winter • Self-seeding
Competition and Control	• Can spread into the vegetation-free areas around tree seedlings • When necessary, growth can be controlled with herbicides	• Can spread into the vegetation-free areas around tree seedlings • Not easily controlled by herbicides
Soil Building	• Increases soil fertility by producing nitrogen • Can reduce frost heaving on fine-textured soil	• Increases soil organic matter • Can reduce frost heaving on fine-textured soil
Wildlife	• Excellent winter food for upland game birds, rabbits and deer	• Excellent winter food for deer
Varieties and Amount Required	• Dutch white clover requires five kilograms of seed a hectare • Wild white clover varieties, such as Grasslands Huia or New Zealand, require five kilograms of seed a hectare combined with five kilograms of the creeping red fescue variety Jasper	• The many varieties require eight kilograms of seed a hectare
Cost	• About $23 a hectare	• About $15 a hectare
Sowing	• Sow in early spring just as frost comes out of ground • Areas that have adequate moisture can be seeded no later than mid-August • Seedings in September or October rarely survive the winter • When sowing, add the recommended nitrogen producing bacteria to the hopper	• Sow in early spring for best results • Areas that have adequate moisture can be seeded in summer • Can be seeded from mid-August to mid-September when there is less competition from germinating weeds

TABLE 1 — COMPARISON OF WHITE CLOVER AND RYE GRASS (CONTINUED)

	WHITE CLOVER	RYE GRASS
Disadvantages	• Can increase species of worms that feed on seedling roots if area around trees is not kept free of vegetation • Can provide habitat for mice and other rodents that feed on seedlings	• Can provide habitat for mice and other rodents that feed on seedlings
Maintenance	• To reduce rodent habitat, mow in early September • For best self-seeding, mow in summer when seeds are ready for dispersal • Allow the plants to reach 10 centimetres in height before the first mowing	• To reduce rodent habitat, mow in early September • For best self-seeding, mow in summer when seeds are ready for dispersal
Site Conditions	• Low tolerance to drought • Does not germinate well in wet areas • Ideal soil pH is 5.1 to 7.5	• Low tolerance to drought and heat • Ideal soil pH is 5.5 to 7.5

Figure 1— Green ash seedlings are planted 2.4 metres apart. The cover crop, white clover, is grown in a 1.2 metre strip between the rows of trees. The 1.3 metre strips immediately surrounding the trees should be kept free of weeds by cultivating or applying herbicides. Use of cover crops in this manner reduces the amount of herbicide required in plantations by 50 per cent.

HOW TO PLANT COVER CROPS

Cover crops are planted with the same equipment used to plant other agricultural crops. To establish cover crops between rows of trees, follow these steps:

PREPARING THE SITE

Fields with silt loam to clay loam soils should be ploughed and disced in the fall, if you intend to plant a cover crop the following spring. Sandy loam and loam soils should be ploughed and disced in the spring, just before a cover crop is planted.

On fields where agricultural crops grew during the previous season or where erosion is a problem, cover crops can be sown directly over crop stubble.

SOWING

With a broadcast seeder, sow clover just as the frost is coming out of the ground in the spring. If seed is sown later in the season, ensure that there is enough moisture in the soil for germination.

When seeding clover, add the recommended bacterial inoculant (available from seed suppliers) to the seed hopper before seeding. Follow the instructions on the inoculant package. The bacteria help to convert atmospheric nitrogen to forms that plants can use.

Calibrate your seeder. Broadcast the seeds according to the rates specified in Table 1.

PLANTING

If you are planting trees the year after the cover crop is sown, mow the cover crop in the fall. If a lot of weeds appear in the first season, make sure you mow the weeds before they go to seed. Raise the height of the mower so that it cuts all the weeds that are taller than the cover crop.

Plant trees in rows that are far enough apart to allow mowing equipment to cut the cover crop.

PROTECTING PLANTS FROM WEEDS

Weed growth should be controlled in a one-metre area around each seedling for the first three years of a seedling's life. This can be done by cultivating or by using the herbicide simazine.

If weeds are controlled manually, cultivate or hoe each spring and fall, and as required in the summer.

To control weeds with simazine, apply the herbicide immediately after planting. In addition to killing weeds, it prevents white clover and rye grass from germinating in the treated area. Apply simazine again each spring or fall for three years or until tree branches prevent access by an agricultural sprayer.

MAINTAINING COVER CROPS

Because mowing reduces habitat for rodents that feed on the tree seedlings over winter, be sure to mow at least once a year in early September. However, more frequent mowing may be necessary. Mowings that are done when the cover crop is going to seed will help broadcast the seeds. If ground nesting birds, such as bobolinks or field sparrows, are present, do not mow until the young birds have left the nest.

Cover crops should be mowed at least once a year. This reduces habitat for rodents that might feed on tree seedlings.

COVER CROP RESEARCH

The effectiveness of cover crops as tools for re-establishing hardwood forests in southern Ontario is being evaluated by the Ministry of Natural Resources. Field trials are being conducted through the Vegetation Management Alternatives Program, which is developing safe and effective alternatives to herbicide spraying. Field tests have already shown that cover crops reduce the need for herbicide spraying in young plantations.

For more information on cover crop evaluation in southern Ontario contact:
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For information on cover crop varieties and the cost of seeds, contact seed suppliers or your local office of the Ontario Ministry of Agriculture and Food, and Rural Affairs.

The Ministry of Natural Resources is investigating the use of cover crops, including commercially available mixes of grains and clovers, as a means of reducing weed competition with tree seedlings. The grains establish quickly in the first year providing both weed control and food for wildlife. By the second year, the clovers are densely established.

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