

Removing Forages from the Rotation in a Direct Seeding System

Direct seeding an annual crop into a forage crop being terminated from the rotation has been successful under research and field conditions. In a direct seeding system, herbicides are used in place of tillage to remove the forage crop.

Using conventional tillage methods to remove forage from a rotation has several disadvantages compared to using direct seeding methods. Conventional tillage methods:

- are more costly and time consuming, especially in rocky soils
- dry out the soil and increase the risk of soil erosion
- often reduce the benefits to soil structure and soil organic matter associated with growing forages
- are not as effective in removing forage crops, especially crops such as alfalfa and smooth bromegrass with extensive root systems
- are not as effective for controlling perennial weeds such as quackgrass and Canada Thistle

Results from research by the University of Manitoba and Alberta Agriculture and Forestry and from most field projects indicate that annual crop yields following a forage crop are similar whether a direct seeding or conventional system is used. For example, cereal crop yields are usually higher in dry years and similar in normal or wet years for a direct seeding system as compared to a tillage system.

Herbicide Timing and Rates

Glyphosate products (Roundup Weathermax, Glyfos, Maverick III, Credit, Factor, Roundup Transorb,

Touchdown Total, Vantage Plus Max II and others) are used to remove forage crops in a direct seeding system.

Fall versus spring spraying

When using tillage methods to remove forages from a rotation, most farmers agree the work should begin in the summer or fall before spring seeding of an annual crop. The same is true in a direct seeding program.

Research by Alberta Agriculture and Forestry clearly shows a yield advantage on barley and most other crops when the forage stand is sprayed in the year before spring seeding, as compared to spraying in the spring before spring seeding. Demonstration work and farmer experiences in Alberta support these research results.

Spraying in the year before seeding is usually more successful than spring spraying for the following reasons:

- soil nitrogen and moisture levels have more time to build up before seeding
- forage plants have more time to break down, reducing the phytotoxic effects of decaying sod
- the seedbed becomes more mellow because the forage root system has more time to decompose over winter
- soil-borne disease organisms have more time to die off

Plant stage

Glyphosate works best when the forage crop is **actively** growing, with grasses having three to four leaves per

stem and legumes being in the bud to bloom stage. For effective control of legumes in the pre-bud or earlier growth stage, consider mixing products such as 2,4-D or Banvel with glyphosate. Please follow label recommendations and ensure the products are registered for tank mixing.

A light frost of -2 to -3°C just before or after a glyphosate application will not reduce control provided daytime temperatures return to the mid-teens. If a heavy frost (-4°C or more) occurs, wait three days and then only apply glyphosate if the plants have recovered and are actively growing.

Glyphosate rates and forage type

Depending on the forage type, glyphosate is applied at a rate of 1.5 to 2 litres/acre (**at 360g/L active ingredient (ai)**) in summer or fall to terminate the forage stand. Hard-to-control forage species, such as orchard grass, meadow brome, meadow foxtail, meadow fescue and smooth brome grass, may need the higher rates for the fall application and/or an additional treatment of 0.5 to 1 litre/acre (360 g/L ai) to control existing vegetation just before spring seeding. Please follow label recommendations at all times.

Grass species with fine leaves, such as creeping red fescue and Kentucky bluegrass, have a very extensive root system and are quite difficult to control with glyphosate products. This situation is especially true if the crop has been used for seed production. The extensive root system allows the plants to regrow one or two months after treatment with glyphosate products. Many times, the regrowth will begin to compete with the direct seeded crop for moisture and soil nutrients. If an annual crop is seeded into a previously treated fescue sod, a preharvest treatment on the annual crop may be required to effectively control regrowth of creeping red fescue and other fine-leaved species.

Preharvest treatment

Most glyphosate products are registered as a preharvest treatment on hay or pasture crops being removed from the rotation. Check the product label to be sure. For effective control of the forage crop, wait at least three days after spraying before cutting hay or grazing pasture. Time is required to allow the herbicide to translocate (move) into the root system. Depending on weather conditions, the quality of the treated pasture or hay crop may begin to decrease 7 to 10 days after spraying.

To date, the best results have been achieved when using glyphosate as a preharvest treatment in early September at 1.5 litres/acre (at 360 g/L ai) sprayed on hay or pasture aftermath production that has not been cut or grazed since mid-July. In southern Alberta under irrigation, the preharvest treatment may be used on the final cut of hay. However, waiting until late August or early September to spray can sometimes be risky because dry weather can limit the regrowth of forages, especially grasses, thereby limiting glyphosate's effectiveness.

Higher rates of preharvest glyphosate and/or a preseeding glyphosate application may be needed for effective control of fine-bladed grasses. If preharvest glyphosate is applied to a heavy canopy of forage, a preseeding glyphosate application may also be needed for good control of forage regrowth. This situation may be especially true if the preharvest treatment is applied to a first cut of hay. Please follow label recommendations at all times.

Using preharvest glyphosate products at the first-cut stage allows producers to consider seeding an annual crop for silage, greenfeed or swath grazing in the same year. It also allows the option of seeding a fall-seeded annual crop, such as fall rye, winter triticale or winter wheat, for fall pasture or for grain production in the following year.

Although seeding shortly after treating the forage stand will increase the risk of lower crop yields due to disease and poor seedbed conditions, some producers have used this practice successfully. This method should only be used when there are good moisture reserves to allow the annual crop to germinate.

Seeding

Annual crops

Cereal, oilseed and pulse crops have all been grown successfully by direct seeding into a treated forage stand. The annual crop chosen for the first year after the forage crop should be competitive. It should also have good in-crop herbicide options for control of forage regrowth. For example, alfalfa regrowth can be controlled with cheaper herbicides in cereals than in canola.

Some field experience has shown that barley, wheat and pea yields may be affected by diseases associated with the breakdown of heavy sod, especially root diseases and other soil-borne diseases. Seeding oats or using treated seed will reduce the risk of disease. Also,

the greater the time between spraying and seeding, the less chance there is of soil-borne diseases affecting the seeded crop.

A large-seeded crop may be easier to grow than a small-seeded crop because seedbed conditions may not be ideal. However small-seeded crops like canola have been grown successfully when direct seeded into treated forage stands. It is more difficult to do it successfully with canola and requires good seed-to-soil contact.

Seeding peas into a treated forage stand is not recommended because no herbicides are available to control alfalfa regrowth. Also, peas can fix their own nitrogen, so they do not benefit from the nitrogen fixed by alfalfa. A cereal crop is a better choice for seeding after alfalfa.

Perennial crops

Perennial forage crops have been successfully established using direct seeding equipment. This is particularly true if the forage crop has been seeded after two or three years of direct seeding an annual crop. Please follow the same practices for direct seeding perennial crops as in a conventional system.

Fertility

Sod-bound forage stands are often very deficient in nitrogen, phosphorus, potassium and sulphur. Soil testing and adequate fertilizer applications are critical for good annual crop yields no matter what method is used to remove the forage stand.

Producers should also note that nutrient management may be somewhat different under direct seeding as compared to conventional tillage systems. More fertilizer and/or more effective fertilizer placement and timing may be needed in a direct seeding system.

Equipment

Direct seeding drills with disc-type openers or narrow knives provide the best results when seeding into a treated forage stand. A drill that leaves a strip of bare soil 2 to 3 inches (5 to 7 cm) wide may assist in warming the soil and reducing the possible effects of soil-borne disease organisms.

When seeding into heavy sod, the packer wheels may need adjustments to ensure good seed-to-soil contact.

Pasture rejuvenation

There has been limited success with direct seeding forages into previously glyphosate-treated forages as a method of pasture rejuvenation. Rejuvenation is especially difficult if the old stand is sod-bound and contains a high percentage of grasses with fine leaves, such as creeping red fescue. Until the problems are overcome, direct seeding of forages into a previously treated forage stand should be done with caution.

Summary

Using herbicides and direct seeding equipment can be an effective way to remove forages from a rotation. Each producer needs to design his or her own program for removing forages, considering the type of forage to be removed and the crop that will be seeded.

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