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## WEED CONTROL IN FORAGE SEED CROPS

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One of the major problems in the production of forage seeds is weeds. Each year inspectors reject more fields because of weeds than for any other reason. In general, weeds are a more difficult problem in forages used for seed than in those used for herbage. In stands used for herbage the crop plants can be grown close together to prevent the entry of weeds. However, to maximize seed set in forages grown for seed, the stand must be kept from getting too thick. When spaces are left between crop plants weeds have an excellent opportunity to invade.

### Losses Caused by Weeds

Weeds are problems for a number of reasons:

1. They reduce yields as a result of competition with crop plants for light, nutrients, moisture etc. Heavy infestations of weeds during the time the stand is being established can often result in serious yield reductions in following years.
2. Weeds cause serious problems in the harvesting of forage seeds. Many weeds are still green at the time the crop has matured. As a result, delays in drying and threshing losses are often incurred.
3. Weeds affect seed quality. Regulations outlined in the Canada Seeds Act decree that forage seed containing either prohibited or primary noxious weed seeds can not be sold as pedigreed seed. The Act also states that only limited quantities of secondary noxious (Class 3) and other (Class 6) weed seeds are permitted in pedigreed seed. In addition to the regulations there is another problem. Every year fields are granted pedigreed status even with a large number of weed species present. When seed from these fields is processed large quantities of good seed are lost trying to remove the weed seeds and other dockage.

### Control of Weeds in Forage Seed Crops

#### 1. Cultural Control

Cultural control is extremely important. The establishment of a strong, healthy stand is a necessity and should form the basis of any weed control program. Some of the things to keep in mind in regards to cultural control are as follows:

- a. Use clean, high quality seed .
- b. Forages for seed should be grown only on clean land. Weed infested land should be cleaned up prior to planting the crop. A year of summerfallow is often necessary the year before planting a forage crop for seed.
- c. Use proper fertility practices
- d. Use crop rotations that will reduce weed populations. It is extremely important to completely destroy all perennial forage crop plants before establishing a new stand. When seed from one forage crop contaminates seed from another forage crop separation is sometimes extremely difficult.
- e. Row spacing can be a useful tool in controlling weeds. Work by Dr. P. Pankiw at Beaverlodge has shown that short growing legume crops such as alsike clover and birdsfoot trefoil produce the highest yields when planted in rows spaced 12 inches apart. At this row spacing they were very competitive and were able to prevent the entry of many weeds. At row spacings greater than 12 inches weed growth increased markedly. In red clover, row spacings between 12 and 18 inches effectively reduced weed invasion. Alfalfa appeared to have a beneficial effect on preventing weed invasion up to row spacings of 24 inches.

In aggressive grasses, such as brome grass and timothy, narrow rows (12 inches) are effective in excluding many weeds. However, in grasses, such as Russian wild ryegrass, which are slow to develop and are poor competitors, row spacing has little effect.

When row spacings are greater than 2 feet wide interrow cultivation is usually required.

- f. The use of increased seeding rates will help to control weeds. However, the length of time the stand will effectively produce seed could be reduced by these increased seeding rates.
- g. Mowing or clipping during the year of establishment can be an effective means of controlling weeds. When the mower is set to cut just above the tops of the forage seedlings weed seed production is greatly reduced and light is permitted to penetrate through to the crop.
- h. Companion crops grown with legumes in years when moisture conditions are adequate usually have no detrimental effect on production in subsequent years. Under such conditions

they have a beneficial affect in terms of weed control. However, in years of inadequate moisture conditions, companion crops frequently weaken legume stands and permit the entry of weeds in subsequent years. Similarly, companion crops generally weaken grass seedlings and result in increased weed populations in subsequent years.

## 2. Chemical control

The use of herbicides in forage seed stands requires greater care and attention than in cereal and oilseed crops. In general, timing of the herbicide application is frequently more critical in forage seed stands than in cereal and oilseed crops. In addition, the number of herbicides available to control weeds in forage crops is considerably less than in cereal and oilseed crops.

Herbicides which are currently registered for use in forage crops grown for seed are as follows (All rates are given in terms of product. For additional information growers should consult "Chemical Weed Control in Forage Crops", Alberta Agriculture. Agdex 120/642):

### A. Herbicides for use in the establishment of seedling legumes.

- a. Eptam - For chickweed, corn spurry, lamb'squarters, redroot pigweed, wild oat and volunteer cereal control in alfalfa. The herbicide should be applied prior to planting and incorporated once to a 2 to 3 inch depth (by setting the disc or other implement to cut at 6 inches). It is available either as an emulsifiable concentrate (128 ounces per gallon) or as a granule (10%). It should be applied at 60 fluid ounces per gallon of emulsifiable concentrate in 10 gallons per acre of water or 30 pounds per acre of granule. Under poor germination and growing conditions temporary crop stunting and cupping of the first leaves can occur. Since volunteer cereals are susceptible to Eptam, grass or cereal crops should never be used as companion crops.
- b. Embutox E - For lamb'squarters, redroot pigweed, shepherd's purse, stinkweed, wild buckwheat and wild mustard control in alfalfa and bird's-foot trefoil. Embutox will also suppress perennial weeds such as Canada thistle and dandelions. It should be applied at 40-50 fluid ounces per acre when the alfalfa or trefoil is in the 1-to 3-trifoliate leaf stage and the weeds in the 2-to 5-leaf stage. High water volumes

(15 to 20 gallons per acre) are required when spraying Embutox. Early treatment is the key to success with Embutox.

- c. Tropotox Plus - For lamb'squarters, redroot pigweed, shepherd'spurse, stinkweed, wild buckwheat and wild mustard control in red and alsike clovers. It should be applied at the same rates and under the same conditions as Embutox E.
- d. Carbyne - For wild oat control in alfalfa and sweet, red and alsike clover. Carbyne should be applied at 34 to 50 fluid ounces per acre when the wild oats are in the 2-leaf stage. It should be applied in 4 to 5 gallons per acre of water and at a pressure of 45 pounds per square inch.
- e. Hoegrass - For wild oat, green foxtail, Persian darnel and barnyard grass control in alfalfa and red and sweet clovers. Hoegrass should be applied at 52.8 fluid ounces per acre in a spray volume of 10 gallons per acre of water. It should be applied when the weeds are in the 1-to 4-leaf stage (1-to 3-leaf stage for Persian darnel). Best results are obtained when the majority of weeds are in the 2-to 3- leaf stage.

B. Herbicides for use in established legumes

- a. Embutox E - For narrow-leaved hawk's-beard control in alfalfa. It should be applied in the fall at 50-60 fluid ounces per acre and in a spray volume of 15 to 20 gallons per acre of water.
- b. Princep - For smartweed, lamb'squarters, wild buckwheat and wild oat control in alfalfa. It should be applied at a rate of  $1\frac{1}{4}$  pounds per acre in the fall prior to freeze-up. A spray volume of 15 to 20 gallons per acre of water is required.
- c. Kerb 50W - For chickweed, shepherd's purse, quack grass, lamb'squarters, timothy, volunteer cereal and wild oat control in alfalfa. Kerb should be applied at 2 to 3 pounds per acre. It can be applied either in the late fall but prior to freeze-up or in the spring before new growth starts. Fall applications are preferred. Weed killing activity will be increased by rain or a light irrigation following application of the herbicide. Weed control will not be consistent if applied to soils with greater than 5 percent organic matter.

- d. Sinbar - For shepherd'spurse, annual sowthistle, stinkweed, wild buckwheat and foxtail barley control in alfalfa. It should be applied at  $5/8$  pounds per acre on sandy loam and loam soils and  $1\frac{1}{4}$  pounds per acre on clay loam and clay soils. Sinbar can be applied to dormant alfalfa in the fall or in the spring before crop growth begins. Rainfall within two weeks after the application of Sinbar improves its activity. Since Sinbar has a long residual effect in the soil no other crops should be planted within two years of application.
  - e. Carbyne - For wild oat control in alfalfa and sweet, red and alsike clover. Carbyne should be applied at the same rates and under the same conditions as in seedling stands of these crops.
- C. Herbicides for use in the establishment of seedling grasses.
- a. 2,4-D and MCPA - For the control of many broadleaved weeds in seedling grasses. A 16 fluid ounce rate of formulations with 80 ounces per gallon (acid equivalent), or equivalent rates of other formulations, should be used. The grasses should have 3 leaves or more and the weeds 2- to 5 leaves at the time of application. Early treatment is essential for good weed control.
  - b. Banvel LH - For clover, wild buckwheat, smartweed, corn spurry, cow cockle and tartary buckwheat control in creeping red fescue. Banvel LH will also suppress Canada thistle and perennial sowthistle. It should be applied at  $7\frac{1}{2}$  to 10 fluid ounces per acre when the crop is in the 3-leaf stage and the weeds in the 2- to 5-leaf stage. A spray volume of 8 gallons per acre of water is required. Banvel LH can be tank mixed with 2,4-D (amine formulation) to control a wider range of weeds.
  - c. Carbyne - For wild oat control in bromegrass, creeping red fescue, timothy, crested wheatgrass and Russian wild ryegrass. It should be applied at the same rates and under the same conditions as in seedling stands of legumes.
  - d. Hoegrass - For wild oat, green foxtail, Persian darnel and barnyard grass control in creeping red fescue, Russian wild ryegrass, intermediate wheatgrass and crested wheatgrass. Hoegrass should be applied at the same rate and under the same conditions as listed for seedling legumes.

D. Herbicides for use in established grasses

- a. 2,4-D and MCPA - For the control of many broadleaved weeds in established grasses. Not more than 16 fluid ounces of formulations with 80 ounces per gallon (acid equivalent), or equivalent quantities of other formulations, should be used. These herbicides can be applied in the spring prior to the crop reaching the shot-blade stage. They may also be applied in the fall after a seed crop has been removed. They should not be applied in the fall of the year of seeding where the crop has been seeded without a companion crop and a seed crop is expected the following year. Serious yield losses can occur from such treatments.
- b. For clover, wild buckwheat, smartweed, corn spurry, cow cockle and tartary buckwheat control and the suppression of Canada thistle and perennial sowthistle in creeping red fescue. Banvel LH should be applied at 7½ to 10 fluid ounces per acre in a spray volume of 8 gallons per acre of water. Banvel LH can be tank mixed with 2,4-D (amine formulation) to control a wider range of weeds. Do not use Banvel LH on timothy.
- c. Carbyne - For wild oat control in bromegrass and Russian wild ryegrass. It should be applied at the same rates and under the same conditions as in seedling stands of legumes.