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# Agriculture

## Alfalfa Seed Production

### Introduction

The recommendations for alfalfa seed production techniques are presented as a general guideline of the steps involved. Adaptation to local conditions is a prime consideration.

### Field Selection

The most important factor in field selection is the weed spectrum present. Good recommendations for perennial weed control in established alfalfa seed fields are not presently available. Consequently, it is important to eliminate perennial weed problems before seeding down to alfalfa. Sweet clover is considered a weed in these circumstances. It is advisable to avoid fields with a history of sweet clover to control the problem of carry-over seed in the soil.

The importance of starting alfalfa seed production on a clean field, requires field management practices to start two years earlier. Certified production requires using land that has not grown alfalfa two years prior to seed down. Begin by assessing the weed spectrum and initiating an appropriate weed control program. Do not plant rapeseed the two years prior to alfalfa establishment to avoid the problem of volunteer rapeseed. Cereals are the preferred crops to grow at this time as they allow the broadest range of weed control. If perennial grasses, such as quack grass, are present consider a fall application of Roundup or an equivalent.

Although alfalfa is adapted to a wide range of soil conditions, best results are achieved when using deep, medium textured, well drained soils. Avoid poorly drained or saline soils. For certified production ensure neighbouring fields pose no hazard. Keep other alfalfa at least 165 feet (50 metres) from the seed field. A field sheltered from the wind benefits the bees, increasing the chances for pollination in the field. Keep in mind the difficulties of maintaining isolation posed by removing stray alfalfa plants from bush areas. Another requirement for good establishment is a well worked seedbed. Summerfallow the year prior to establishment is advisable.

### Seedbed Preparation

The land should be well worked to produce a firm fine seedbed. Some emphasis must be placed on making the bed firm enough to allow for a relatively shallow seed placement. We recommend placing the alfalfa seed no deeper than 1/2 inch (2 cm ). A firm seedbed also allows moisture to move upward in the soil profile and provides more upward in the soil profile and provides more moisture for the germinating seed. As a rule of thumb, the heel of your shoe should not sink more than 1/4 inch (1 cm) into a good seedbed. To produce a bed this firm generally requires some packing. The only caution here is on the clay soils. If you pack them too much you may run into crusting problems after a rain. However, in most other soils it is virtually impossible to overpack. Some growers have had good success seeding into undisturbed stubble fields. This practice conserves the maximum amount of soil moisture and provides a firm seedbed but limits the weed control options that are available. Growers wanting to seed into stubble should select only the cleanest fields.

### Companion Crops

Although most growers still use a companion or nurse crop when establishing new fields, an increasing number now plant without one. On sandy soils a companion crop may be necessary to control wind and water erosion. The advantages to seeding without a nurse crop are:

- less competition for light, water and nutrients

- greater seedling vigor

- more flexibility in your weed control program

increased winter hardiness

increased seed production in the first harvest year

The negative aspect of not using a nurse crop is the increased opportunity for the weeds to flourish. The loss in income from not using a nurse crop is normally offset by the increased seed production in the first year.

Flax and canola are the preferred companion crops. Seed them in a separate operation, prior to and at right angles to the alfalfa seeding. This method minimizes the competition between the alfalfa and the nurse crop. Another method is to exclude the nurse crop from every fourth or fifth run of your seeder, drilling the alfalfa using only these runs. Depth control in this case usually ends up as a compromise with the alfalfa being seeded slightly too deep. When a companion crop is used, its seeding rate should be cut by at least one-third to cut down on the competitive effect on the alfalfa. Reducing the seeding rate by one-third or one-half rarely reduces the final yield of the nurse crop by more than 10 or 20 percent.

## Seeding Rates, Dates, and Row Spacing

It has been shown at numerous locations throughout North America that the highest seed yields are obtained from fields containing from 14,000 to 30,000 plants per acre (35,000 to 75,000 plants per hectare) planted in 24 inch to 48 inch (60 to 120 cm) rows. The narrower rows and higher plant populations are more suited to the moister areas of the province. Seed yields from stands grown much denser than this have suffered. The following table, from work conducted at the University of Manitoba, illustrates the effect of stand density on seed yield.

Table 1: Plant Population and Seed Yields in 24 inch (60 cm) Rows at Glenlea, Manitoba - 1971

Plant Population		Average Seeded Yields	
Per acre	Per ha.	lbs/acre	kg/ha
174,000	430,000	212	237
87,000	215,000	306	343
43,000	106,000	350	392
30,000	74,000	388	435
22,000	54,000	518	580
14,000	35,000	488	547
10,000	25,000	477	534

To achieve seed stands of these densities, growers have been sowing 0.5 to 1.0 lb/acre (0.5 to 1.0 kg/ha). Considering alfalfa contains about 220,000 seeds per pound (485,000 seeds per kilogram) even these low seeding rates can be too high. However, even under the best managed conditions there is considerable seedling mortality before the stand produces its first crop. If the stand is too dense it can be thinned out at a later date. Cutting your seeding rate to below 0.5 lb/acre (0.5 kg/ha) is not recommended.

The most successful establishments have been obtained by very early spring seedings. Seed as early as the land can be worked. This makes best use of the early spring moisture and allows the seedling to develop a good root system before the heat of the summer.

A lack of soil moisture and a relatively short growing season associated with August seedlings generally add up to less than a 50 percent chance of establishing a stand. Even when successful, they rarely produce a satisfactory seed crop the following year.

## Variety Selection

Certified seed has always produced higher returns than common seed. It involves very little extra expense or labor. Producing certified seed requires planting foundation seed of Canadian varieties or registered foreign variety seed. The Canadian Seed Growers Association publication "Regulations and Producers for Pedigreed Seed Crop Production" outlines the rules governing pedigreed alfalfa production.

When selecting the right alfalfa variety consider the following points:

variety marketability

long range market outlook

relative seed yielding ability

seed stock availability

It is strongly recommended that growers discuss marketing opportunities with the various seed companies buying alfalfa, before making their variety decisions. These companies can also provide the grower with stock seed of proprietary or private varieties, and public varieties. If the grower chooses to produce one of the older Canadian public varieties, then seed can be purchased from the Canadian Forage Seed Project through the local agricultural extension agent.

## Inoculation and Fertilization

Inoculate alfalfa seed with the proper nitrogen fixing bacteria just prior to seed down. The best method is dampening the seed slightly with water or a sticker solution, adding the inoculant and mixing thoroughly. Suitable sticker solution can be made from 2 tablespoons per quart (25 millilitres per litre) of corn syrup in 1 litre (1 quart) of water. Apply just enough of the solution to dampen the seed. Once inoculated, sow the seed as soon as possible.

## Weed Control

Even in clean fields, growers will find it necessary to employ herbicides when establishing their alfalfa. With the low seeding rate and relatively wide row spacings, new alfalfa fields offer little competition to weeds. Consult with local extension personnel for the most effective herbicides for their areas, and consult Manitoba Agriculture's **Guide to Crop Protection** for the appropriate rates of application.

Where no companion crop has been used, EPTC (Eptam), preplant incorporated, generally provides good control of annual grasses and some broadleaf weeds. When using Eptam, care should be taken to ensure that it is incorporated immediately after applying it to the soil. Then, follow up with a second incorporation to thoroughly mix the chemical into the seedbed. Trifluralin (Treflan) has also been used by growers as a preplant incorporated herbicide. Pursuit is also registered for grass and broadleaf weed control in seedling alfalfa. Weeds can also be controlled by mowing and growers could consider a hay cut in their control program, but this will result in the loss of the seed production in the year of mowing. Consult Manitoba Agriculture, Food and Rural Initiatives **Guide to Crop Protection** for current recommendations.

If a companion crop has been used, the list of herbicides is shortened. Therefore, when choosing the companion crop, bear in mind potential weed problems. Check to see if chemicals are available for their control.

One advantage to an early seeding without a nurse crop is the possibility of applying Velpar when the stand becomes dormant in the fall. If the alfalfa comes into full bloom by fall it can be considered well enough established to apply Velpar in the first year. This will then give good control of annual grasses and several broadleaved weeds. Note that Simazine or Princep is not registered for application in the seedling year.

Once the stand is established, Princep and Pursuit can be used to control grass and broadleaf weeds. Velpar can be used for broadleaf weed control. Some growers also use row crop cultivation in the seed production years in an effort to control weeds but this can lead to root pruning and reduced seed yields.

For further information refer to Manitoba Agriculture, Food and Rural Initiatives **Guide to Crop Protection** published annually by Manitoba Agriculture, Food and Rural Initiatives.

## **Insect Control**

One of the major constraints to seed production on the Canadian prairies has proven to be insect pests attacking the alfalfa plant. Over the past four to five years, growers have repeatedly identified lygus plant bugs, aphids, and grasshoppers as the biggest problems to face in increasing seed production. The first step in any control program is to monitor the seed fields and identify the insects before they can cause too much damage. Fortunately, there are cultural practices, such as burning and selective pesticides that can be employed to control these pests. For further information refer to Manitoba Agriculture, Food and Rural Initiatives publication, *Field Scouting Guide* and Agriculture Canada publication 1435, *Insect Pests*.

## **Harvesting**

After pollination, it takes five to six weeks for the plant to produce mature seed. Therefore, growers can plan on starting harvest approximately six weeks after either the bees are removed from the field or the crop has finished blooming. The crop can be swathed, then wait until two-thirds to three-quarters of the seed pods have turned dark brown or black. It is advisable to swath when it is damp enough to avoid the loss of seed pods. Swathing in the direction of the prevailing wind helps to prevent the rolling of swaths and subsequent seed loss. A roller can be used to further anchor the swath. Some growers also leave a narrow strip of standing alfalfa between every couple of swaths to limit the wind action. One advantage of swathing is that it allows seed that is nearly ripe to mature before combining.

To cut down on seed losses, many growers are turning to desiccation and straight combining. Normally, this involves spraying Reglone to kill the green tissue and dry out the standing crop. However, any early hard frost will give the same effect. After spraying Reglone, the crop will be ready to combine in 3 to 5 days.

## **Stand Maintenance**

A well established, clean seed field needs surprisingly little maintenance to keep it productive to the full life of stand. Weed control and insect pest control programs are carried out on an annual basis. Spring burning for pest management also controls most diseases. Generally, growers do not apply an annual application of fertilizer unless their stands show an obvious nutrient deficiency that can be confirmed by soil test and plant tissue analysis.

One factor in maintaining yields that is frequently overlooked is the stand density. Most stands thicken up after the first or second harvest and should be thinned back to 30,000 plants per acre (75,000 plants per hectare).

There is no standard method used for thinning but most frequently cross-cultivating is used. Often it requires more than one thinning operation to achieve the desired results. Growers are advised that thinning in the spring is preferred, as fall thinning can lead to increased winter injury.