OCTOBER 1984

HAY IN 10 WEEKS DIRECT SEEDING ALFALFA

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Definition:

ESTABLISHMENT OF ALFALFA WITHOUT THE USE OF A COMPANION CROP. A PREPLANT SOIL INCORPORATED HERBICIDE IS GENERALLY APPLIED FOR ANNUAL GRASS AND SELECTED BROADLEAF WEED CONTROL.

DIRECT SEEDING or **CLEAR SEEDING** of alfalfa provides an opportunity for producers to grow a hay crop during the year of establishement. In addition, producers who have difficulty in establishing good stands of alfalfa will find this practice beneficial throughout North Dakota. The use of a companion crop competes with seedling alfalfa for moisture, sunlight, nutrients and growing space, especially if not removed early for hay or silage. Companion crop competition is usually the most severe in mid-summer when soil moisture often becomes limiting for growth.

Direct seeded alfalfa must be planted early to provide the potential for two harvests by late August. Early planting in late April or very early May will provide adequate time for two harvests with timely rainfall especially on good moisture sites, in higher rainfall areas statewide and under irrigation. Usually, a minimum of about 10 weeks is required from planting to first harvest if soil moisture is adequate for fast germination and seedling growth. The alfalfa must be planted on a weed-free seedbed or a preplant incorporated herbicide must be applied for grassy weed and selected broadleaf weed control.

Studies at Fargo, ND (Table 1) have compared two alfalfa establishment methods — companion crop vs. direct seeding. Results indicate that when alfalfa is direct seeded without a preplant incorporated herbicide (1971 seeding) weeds are a problem and more total forage can be obtained by harvesting an oat companion crop for hay or silage during the establishment year.

Table 1. Forage dry matter yield of an oat companion crop and direct seeded alfalfa with and without a preplant incorporated herbicide. Fargo, ND (1971-1972).

Seeding Method	Tons Dry Matter/Acre 1971	1972
Companion Crop	2.7	2.4
Direct Seeded		
No Herbicide	1.3	—
Preplant Herbicide	—	2.5

When a preplant incorporated herbicide was used for weed control (1972 seeding) the forage yield of the two seeding methods was equal, but two alfalfa harvests were obtained in 1972 compared to only one harvest in 1971.

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14AGR-9-1

A similar study was conducted at Norbeck, SD in 1971 by South Dakota State University (Table 2). The alfalfa direct seeded without a preplant incorporated herbicide was not harvested for forage due to a severe weed infestation. Weeds were mowed and removed to eliminate competition with alfalfa. Direct seeded alfalfa with a preplant incorporated herbicide yielded about 0.5 tons of dry matter per acre compared to 2.6 tons per acre for the oats companion crop when harvested at the late milk to early dough growth stage. Oats planted and harvested as grain was another establishment method in the South Dakota study. The oat crop yielded 58 bushels per acre with 1.7 tons of straw produced.

Table 2. Forage dry matter yield of an oat companion crop and direct seeded alfalfa with and without a preplant incorporated herbicide. Norbeck, SD (1971).

Seeding Method	Tons Dry Matter Per Acre
Companion Crop	2.64
Direct Seeded	
No Herbicide	0.00*
Preplant Herbicide	.46

* Severe weed problem - weeds mowed and removed.

In the South Dakota study, use of a companion crop limited weed contamination in the first harvest to less than 15 percent of the dry matter yield. When neither a companion crop or a preplant incorporated herbicide was used during establishment, first harvest yields contained 45 to nearly 100 percent weeds.

Alfalfa variety yield trials are often established using a preplant incorporated herbicide for weed control at the North Central Experiment Station, Minot, ND. Alfalfa dry matter yields during the establishment year are about 1.0 ton per acre when harvested once during the growing season.

Forage yields of alfalfa following the year of establishment are similar between establishment methods. In general, any differences in forage yield is due to the yield of the alfalfa and/or the companion crop during the establishment year.

RECOMMENDATIONS

FIELD SELECTION

Alfalfa will produce more forage if planted on productive soils. It requires a deep, fertile, well-drained soil with good water-holding capacity and a near neutral pH — slightly acid to slightly alkaline. It is not tolerant of saline-alkali soil in the seedling growth stage, but once established it is moderately tolerant. The crop will not tolerate surface flooding once growth begins. Periodically flooded areas in an alfalfa field should be planted to reed canarygrass or creeping foxtail at the time of alfalfa establishment.

In general, alfalfa will be more productive following row crops or small grains in the rotation. Never plant alfalfa on recently plowed alfalfa fields as these areas are usually low in available soil moisture at deeper depths, limiting potential yields. If disease organisms are present in old fields, the cycle can be broken by planting to other crops for several years.

When selecting a field for alfalfa, consider past herbicide use. For example, carryover of the triazine herbicides such as atrazine or the benzoic acid herbicides such a Banvel will completely kill or severely injure seedling alfalfa.

A firm, clean, weed-free seedbed is required for alfalfa establishement. Direct seeded alfalfa requires a preplant incorporated herbicide applied for weed control, especially if a hay crop is to be harvested during the establishment year. If necessary, pack the seedbed before planing. A firm seedbed is essential to insure a maximum planting depth of ¼ to ½ inch on medium to heavy-textured soils and ½ to ¾ inch on sandy soils to provide good soil-seed contact for moisture transfer to the seed during germination and to help prevent drying out of the soil surface.

DATE OF PLANTING

Direct seeded alfalfa must be planted early, usually late April to very early May. Early planting is necessary if two harvests are to be obtained by September 1 under dryland conditions in higher rainfall areas or during good moisture years throughout the state. Early planting will generally permit two harvests by late August under irrigation.

WEED CONTROL

Clean, weed-free fields are essential for high yields of direct seeded alfalfa and longevity of alfalfa stands. Perennial broadleaf and grassy weeds such as quackgrass should be controlled before planting by tillage and/or use of a non-selective herbicide such as Roundup (glyphosate). See Extension circular W-253 entitled 'Agricultural Weed Control' for herbicide recommendations and application rates for specific perennial weed problems.

Two preplant, soil incorporated herbicides are approved for use on direct seeded alfalfa (no companion crop or grass in seed mixture). They are **EPTAM** or **GENEP (EPTC)** and **BALAN (BENEFIN)**.

BALAN - 1.0 to 1.5 lbs active ingredients per acre.

Balan provides very good to excellent control of most annual grasses and very good control of several annual broadleaved weeds. It is weak on smartweed, ragweed and wild mustard. Established perennial weeds are not controlled. Tolerance of seedling alfalfa is good. Use the lower rate on light to medium-textured soil and the higher rate on heavy, clay soils. There are no soil pH limitations. Apply a minimum of 5 gallons per acre of carrier when using ground application equipment. Balan may be applied in a liquid fertilizer carrier.

Apply preplant to a smooth, dry seedbed. Incorporate into soil with a tandem disc set to cut 4 to 6 inches deep or a field cultivator with sweeps. Incorporate immediately if possible. Incorporation may be delayed 8 hours if wind velocity is under 10 miles per hour. If soil is wet, lumpy or trashy, a second incorporation will be beneficial to thoroughly mix herbicide into the soil. Level and firm seedbed following incorporation by harrowing.

EPTAM or GENEP (EPTC) - 2.0 to 4.0 lb active ingredients per acre.

Eptam provides excellent control of several annual grasses and fair to good control on certain broadleaf weeds. Foxtail control is usually good. It provides fair control of wild oats but is weak on kochia, Russion thistle, wild mustard and wild sunflower. Established perennials are not controlled. Tolerance of seedling alfalfa is fair to good. Some temporary stunting and sealing of the first leaves is often noted on overlapped areas. DO NOT USE IF ATRAZINE WAS USED IN THE FIELD THE PREVIOUS YEAR. Carryover of atrazine or triazine compounds plus an application of Eptam or GENEP increases herbicidal activity and will usually cause severe injury to alfalfa seedlings. Application rates vary depending on soil type. The lower application rate is for annual grass control on light-textured, low organic matter soils. Apply using a minimum of 10 gallons of carrier when using ground application equipment. Eptam or GENEP may be applied with a liquid fertilizer carrier.

Apply preplant to a smooth, dry seedbed. Incorporate using a tandem disc set to cut 4 to 6 inches deep or a field cultivator with sweeps. If seedbed is wet, lumpy or trashy, a second incorporation will help to thoroughly mix herbicide into the soil. Level and firm the seedbed following incorporation by harrowing.

BROADLEAF WEEDS may be a problem following emergence of alfalfa seedlings. For early post emergence weed control in new seedings of direct seeded alfalfa (no companion crop), the following herbicides may be used.

2,4-DB amine - 0.5 to 1.5 lb active ingredients/acre
2,4-DB ester - 0.5 to 1.0 lb active ingredients/acre

2,4-DB provides fair to good control of annual broadleaf seedlings of Russian thistle, wild mustard, pennycress, cocklebur, lambsquarters and pigweed. It is not effective on grassy weeds. Apply when weeds are less than 3 inches tall and when alfalfa has reached the one to two trifoliolate leaf growth stage. Use the high rate if weeds are 2 to 5 inches tall. Ester formulations should be used at the lower rates if weeds are small and at higher rates if weeds are 2 to 5 inches tall. Some twisting and leaf malformation may be noted on alfalfa seedlings. Do not cut or graze within 60 days after application.

PREMERGE (Dinoseb) 1.5 lbs active ingredients/acre

Apply to new seedings of direct seeded alfalfa when weed seedlings are small and when alfalfa has one or more trifoliolate leaves. Leaf tip burn will be noted on alfalfa. Do not use at temperatures higher than 85°F as crop injury may be severe. Do not graze for six weeks after application.

SEEDING RATES

Direct seeded alfalfa requires a higher seeding rate if a hay crop is to be harvested during the establishment year. The crown area of young alfalfa plants is small and fewer shoots develop compared to older branching crowns. More plants are required in the establishment year to provide optimum yields of forage. Suggested pure live seed seeding rates for North Dakota by establishment method are provided in Table 3.

Table 3. Pure live seed (PLS) seeding rates for alfalfa in North Dakota

Seeding Method	Area of State	
	West	East
	....lbs PLS/acre....	
Dryland		
Companion Crop	5	6
Direct Seeding		
No hay harvest	5	6
Hay harvest	6	8
Irrigation		
Companion Crop	8	8
Direct Seeding		
Hay harvest	10-12	10-12

SEED INOCULATION

Plant preinoculated seed or inoculate seed just prior to planting with the correct strain of nitrogen fixing bacteria. Protect inoculum from high temperatures. Inoculum contains beneficial living bacteria. Temperatures of 75°F will decrease

bacterial numbers sharply if maintained at this temperature for two to three months. The alfalfa seed serves as the carrier for placing adequate numbers of bacteria into the soil to effectively nodulate alfalfa roots for nitrogen fixation.

FERTILIZATION

SOIL TEST - apply a broadcast application of phosphorus and potassium, if required. The response of alfalfa stands to fertilization has been variable throughout North Dakota. In general, soils testing low in these nutrients will provide the best yield responses to fertilization. Alfalfa stands will remove about 12 pounds of phosphate (P_2O_5) and 50 pounds of potash (K_2O) per ton of forage produced. Studies indicate that a preplant incorporation of fertilizer for the life of the stand tends to improve the response of alfalfa to fertilization. If preplant incorporation of the required nutrients is not feasible, then apply an annual broadcast application in the fall, early spring or between cuttings based on the yield goal for your farm or ranch.

HAY HARVEST

Harvest the first crop of direct seeded alfalfa when the stand is at 25 to 50 percent bloom. Randomly pick 10 stems of alfalfa across the field. If five stems in 10 have one or more flowers open, the stand is at the 50 percent bloom growth stage. Harvest the second crop at the 10 to 20 percent bloom growth stage.

If adequate growth is not obtained to harvest for hay until after September 1 delay harvesting until just prior to or immediately after a killing frost. Leave a 4 to 5 inch stubble to catch snow for winter protection and/or leave uncut strips 2 to 3 feet wide periodically across the field to trap snow. A young stand of alfalfa is more tolerant to winter injury than an old stand, so harvest the crop for hay if growth is adequate.

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