



GROWING ALFALFA FOR SEED IN ARIZONA

Stephen H. Husman and M. J. Ottman

Seed production for profitability is challenging. Cultural practices differ from those commonly used in forage production. This article outlines management recommendations that may help to accomplish profitable seed alfalfa yields.

Planting Date

Planting seed alfalfa in the early fall, after summer temperatures have moderated, produces the best results at elevations less than 3000 feet. Optimum time of planting ranges from mid-September through mid-November with the month of October preferred. Early fall planting will increase first year seed yields and generally results in reduced winter annual weed competition problems on new stands during the establishment period.

Stand Establishment

Plant population is one of the most critical components of alfalfa seed production. Plant population is highly correlated with seed yield. Thick stands commonly associated with high forage yields usually result in low seed yields. Plant seed in rows on beds to enable cultivation and target a plant population of 100,000 or fewer plants per acre. Excellent yields have been obtained with less than 25,000 plants per acre. Numerous research studies conducted in several western states have all shown that low seeding rates and low plant populations result in the highest seed yields. In general, a seeding rate of 0.9–1.3 pounds per acre is recommended with a final stand consisting of a minimum of 6 inch spacing between plants on 36–40 inch rows. If planting 2 seed lines per bed, 12 inch spacing between plants per seed line would be considered optimum. Oftentimes, the highest yields have been recorded with 1 plant every 12 inches with single line on 36–40 inch rows.

After stand establishment, stand thinning is recommended in the 2–4 true leaf stage. Uniform plant spacing results in more robust plants which may flower up to 10 days earlier and produce more seed per plant than plants in dense stands. Again, stand density within the row has a profound effect on yield potential. Optimal stand density increases nectar production and attractiveness to pollinators while decreasing floral abortion. In addition, optimal plant population and configuration result in:

1. Open, erect plants that allow greater flower access by bees and increased light penetration.
2. Shorter plants that are less prone to lodging.
3. Increased penetration of pesticides and more effective dessication at harvest.

Spring Clipping

In the low deserts of Arizona, plants are actively growing six to eight weeks before the seed crop is initiated. Clipping and removal of top growth should occur just prior to the start of the seed production period. Clipping off the top growth too early reduces root food reserves and will likely reduce seed yield. Generally, removal of top growth at low desert elevations should occur around April 1. After removal of top growth, cultivate to control weeds and destroy volunteer alfalfa plants. The first flowers will then develop in about 30 days with full bloom 2 to 3 weeks later.

Flower Pollination

“Tripping” of the alfalfa flower is necessary for pollination. Tripping is a process that occurs when the stigma (a female flower part) becomes uncovered and lodges in the groove of the standard petal. Alfalfa has the ability to self and cross pollinate. However, cross pollination with the use of introduced bees is essential to produce high yields. Bees are covered with pollen during the tripping process and then deposit some of it on new flowers with each visit. Honey bees are used as the primary alfalfa pollinator.

Colonies of bees should be moved into fields gradually as the bloom period progresses. All colonies should be in the field within a week prior to peak bloom. Hives should be placed in groups of 12 to 18 per site, spaced about 180 yards apart with a final population of three or more colonies per acre. Colonies should be placed about 80 yards into the interior of the field with a final configuration of groups on 180 yard grids. More than three colonies per acre can result in an accelerated seed set.

Irrigation Management

Highest seed yields are obtained when irrigations during the seed production period provide slow, continuous growth while preventing severe plant stress or excessive stimulation of vegetative growth. Managing irrigation water to accomplish all of these objectives is another critical management input to accomplish high seed yields. The seed crop will require approximately 3 acre feet of water with timing based on soil texture type. Deep, fine textured soils have the ability to supply the seed crop water requirement with less frequent irrigations than that required by coarse textured or shallow soils.

Independent of soil type, the objective is to skillfully time irrigations to maintain slow, continuous plant growth. Excessive moisture stress during the seed production period may reduce bloom production, while excessive soil moisture will stimulate vegetative growth. Both scenarios will likely lead to reduced seed yields.

Weed Control

Weed free seed alfalfa is important for several reasons. Weeds compete for moisture and nutrients, contaminate alfalfa seed and may produce flowers more attractive to pollinators than alfalfa flowers.

In addition, weeds reduce stands and yields, slow seed harvest, and increase cleaning costs. Dependent on weed species anticipated, the use of a pre-plant incorporated herbicide may be considered due to low plant populations and weed competition ability. .

Insect Control

Seed alfalfa has a few unique insect pests in addition to those normally encountered in alfalfa grown for forage. High yields depend on timely control of lygus bugs, alfalfa seed chalcid, spotted alfalfa aphids, spider mites, and stink bugs.

Lygus bugs are the most troublesome insect pest of alfalfa seed production. When present in high numbers, lygus have the ability to prevent seed production. Lygus attack the reproductive plant parts by piercing the plant tissue causing premature bud shed, seed deformation, and reduced seed viability. Control of lygus bugs is warranted in virtually all low desert production.

The following monitoring and treatment threshold recommendations are from the University of California Cooperative Extension. Lygus monitoring should begin prior to first bloom so that the initial decision to treat can be made just prior to bee arrival. Once the flowering period has been initiated, lygus bug populations should be monitored at least weekly. Two sweeps should be made three times in a location and repeated at 10 to 20 locations throughout a field. Each sweep should cover an arc of 180 degrees and strike the top 8 to 10 inches of the plants. Prior to bee placement, chemical control treatment should be initiated when lygus bug populations reach an average of 4 to 6 per sweep. During bloom and seed set, the treatment recommendation is 8 to 10 per sweep. Once seed is successfully set and maturing, 10 to 15 lygus per sweep can be tolerated.

Population thresholds should serve as general guidelines for lygus bug control with chemical application timing based also on lygus bug developmental stages. Insecticide applications should be timed to coincide with the hatching of lygus bug broods. Delay treatment until egg hatch is complete but before the nymphs reach their fourth and fifth (final) instars. Chemical controls for lygus bugs will also reduce or eliminate beneficial insect populations, including bees and must be carefully timed to minimize the total number of applications necessary.

The alfalfa seed chalcid is best controlled by the use of proper cultural practices. The adult chalcid lays eggs in developing alfalfa seed. Larval and pupal development is completed within the seed where insecticides cannot reach. After seed harvest is completed, remove and/or soil incorporate remaining straw and plant debris to effectively eliminate overwintering habitat. Following removal or incorporation of plant debris, irrigate to facilitate rotting of remaining plant material and chalcid destruction. Any seed germinated by this irrigation should be cultivated.

Harvest

When the seed crop is initiated about April 1, combine harvesting can usually occur about the first week of July. The two principal methods of harvesting alfalfa seed are windrow curing followed by threshing or chemical curing followed by direct combining. Chemical dessicant curing is preferred by most seed producers because harvest can be delayed until nearly all pods are ripe. After the dessicant is applied, harvest usually follows within four to five days. Once cured, harvesting should not be delayed since extensive losses may be incurred due to excessive seed shatter.

Harvest of the seed crop is done with a standard combine with alfalfa seed attachments. Harvest should begin when seed moisture is 13% or less. If moisture content of the seed is above 13%, there is risk of heating, seed damage, and combine losses. For more information, contact your local Cooperative Extension office.

Sources used within this publication include:

Dennis, R., and L. Moore., Field Crops 223, "Alfalfa Seed Production in Arizona", University of Arizona.

Hanson, A.A., D.K. Barnes, and R.R. Hill, Jr., Agronomy No. 29., "Alfalfa and Alfalfa Improvement."



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**Cooperative
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**THE UNIVERSITY OF ARIZONA
COLLEGE OF AGRICULTURE AND LIFE SCIENCES
TUCSON, ARIZONA 85721**

STEPHEN H. HUSMAN

Director, Pima County Extension & Resident Director, Tucson Area Agricultural Centers (CAC, RRAC, SRER, WCAC)

REVISED BY:

MICHAEL J. OTTMAN

Agronomy Specialist

CONTACT:

MIKE OTTMAN

mottman@cals.arizona.edu

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