



Site Selection and Stand Establishment

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Invest time and money early!



Rather than later
when *more* time and money are required to
salvage a situation
as compared to avoiding it in the first place.



Site Selection and Stand Establishment

10 most commonly asked
questions regarding
site selection and
stand establishment



1. Where should I plant my alfalfa?



Site conditions can limit yield and profit potential.

Some site limitations can be overcome or reduced, but the cost may be high.

Site Selection

◆ Soil Factors

■ Soil Texture

- Ideal – Sandy loam, Silt loam, clay loam
- Marginal – Loamy sand, silty clay
- Undesirable – Sand, clay

■ Soil Depth

- >6 feet Ideal, 3-6 feet Marginal, <3 feet Undesirable

■ Water table

- Constant
- Fluctuating

Site Selection

◆ Soil Chemistry

	Ideal	Marginal	Undesirable
pH	6.3-7.5	5.8-6.3 & 7.5-8.2	<5.8 or >8.2
Salinity (EC)	0-2	2-5	>5
Exchangeable Sodium (ESP)	<7	7-15	>15
Boron (mg/L)	0.5-2.0	2-6	>6

Site Selection

◆ Water Supplies

■ Quantity

- 48” of irrigation required/year
- Must be available when needed

■ Quality

- Well water may have excess salt
- Alternative sources or blend with higher quality water

Site Selection

- ◆ Biological Factors
 - Diseases
 - Nematodes
 - Weeds
 - Rodents
 - Crop Rotation Issues
 - Autotoxicity
 - Herbicide carryover





2. When is the best time to plant my alfalfa?



Planting Date

- ◆ Traditionally, most alfalfa in the San Joaquin Valley has been planted in the late fall to early spring months.
- ◆ But, cold temperatures slow alfalfa seedling growth and weeds compete more successfully.
- ◆ Cool temperatures and high humidity also promote some seedling diseases.



Planting Date Research



- ◆ Temperature
- ◆ Daylength
(photoperiod)

Planting Date Research

“Normal” →

Planting Dates	# Cuttings		1 st Year Total Yield
9/18	4	15% increase	7.4 a
11/14	4		6.4 b
12/13	3	28% reduction	4.6 c
4/11	3		4.5 c
5/28	2	50% reduction	3.0 d
LSD (0.05)			0.72

Planting Date Research

Planting Dates	1st Year Total Yield	2nd Year Total Yield	Total
9/18	7.4 a	7.5 a	14.9
11/14	6.4 b	6.5 b	12.9
12/13	4.6 c	6.1 b	10.7
4/11	4.5 c	6.3 b	10.8
5/28	3.0 d	6.2 b	9.2
LSD (0.05)	0.72	0.61	



Planting Date Recommendations

- ◆ **Optimum Planting Date: Sept. 15 – Oct. 31**
- ◆ Planting can be delayed until early spring (Feb. 1-March 15) rather than planting in late winter (December).
- ◆ Or, follow fall harvested crop with a winter cereal then an early maturing summer annual and delay planting alfalfa for a year.

Advantages of Early Planting

- ◆ Rapid germination, increased seedling vigor
- ◆ Higher yields that may persist into 2nd and subsequent years
- ◆ May provide greater opportunity for timely herbicide applications

Potential Disadvantages to Early Planting

- ◆ Must provide moisture to germinate seeds
- ◆ Egyptian Alfalfa Weevil
 - Usually not a problem in new hay, but early planted fields may be attractive to adult weevils.
- ◆ Sclerotinia stem and crown rot (white mold)
 - Can be severe if the winter is wet or foggy.



3. How should the field be prepared for planting?





Land Preparation

- ◆ Proper field preparation is crucial because the stand will be intensively managed and harvested for a 3-5 year period.
- ◆ Stands cannot usually be replanted or thickened successfully

Land Preparation



- ◆ Loosen soil to remove impediments to root growth (compaction, layers)
- ◆ Level field for irrigation, drainage, and ease of harvest

Land Preparation



- ◆ Checks and Borders
 - Width between levees should be based on soil type, slope, length of checks, and flow rate of irrigation water.
 - Width of harvesting equipment is also considered.

Land Preparation



- ◆ With flood irrigation, eliminate high and low spots to improve the efficiency of the irrigation system.

Land Preparation



- ◆ Firm and smooth soil for optimum crop emergence
 - Grape-sized or smaller clods
 - “Fluffy” seedbeds may negatively affect stand establishment



4. What about fertilization, especially nitrogen?



Fertilization

- ◆ Determine which nutrients are needed
 - Soil tests - provide an estimate of soil condition and nutrients available for plant uptake



For Alfalfa Establishment, Requested Analyses

- ◆ pH
- ◆ Phosphorus
- ◆ Potassium
- ◆ ECe (electrical conductivity of the saturation extract)
- ◆ Calcium
- ◆ Magnesium
- ◆ Sodium
- ◆ SAR (sodium absorption ratio)



Nitrogen



Adding nitrogen fertilizer
doesn't benefit alfalfa,
but it does provide a boost to weeds,
and is generally not economical.

Nitrogen

- ◆ Only consider applying nitrogen if conditions for nodulation are poor, soil nitrate levels are below 15 ppm, or organic matter content is <1.5 percent.
- ◆ If soil temperatures are <60F for several weeks after planting, you may see a response to N.
- ◆ Apply low rates (10-15 pounds). Greater amounts inhibit nodulation and delay crop development.



5. How much seed should I plant?



Seeding Rate

- ◆ Research Shows.....
 - Growers can successfully establish a stand with 10-15 pounds of seed per acre.
(under ideal conditions)
 - Traditionally, growers plant 20-30 lbs/A

Seed Characteristics

◆ Raw Seed

- 200,000 to 250,000 alfalfa seeds per pound
- At 25 lbs/A seeding rate
 - 5,625,000 seeds/A
 - 129 seeds/ft²

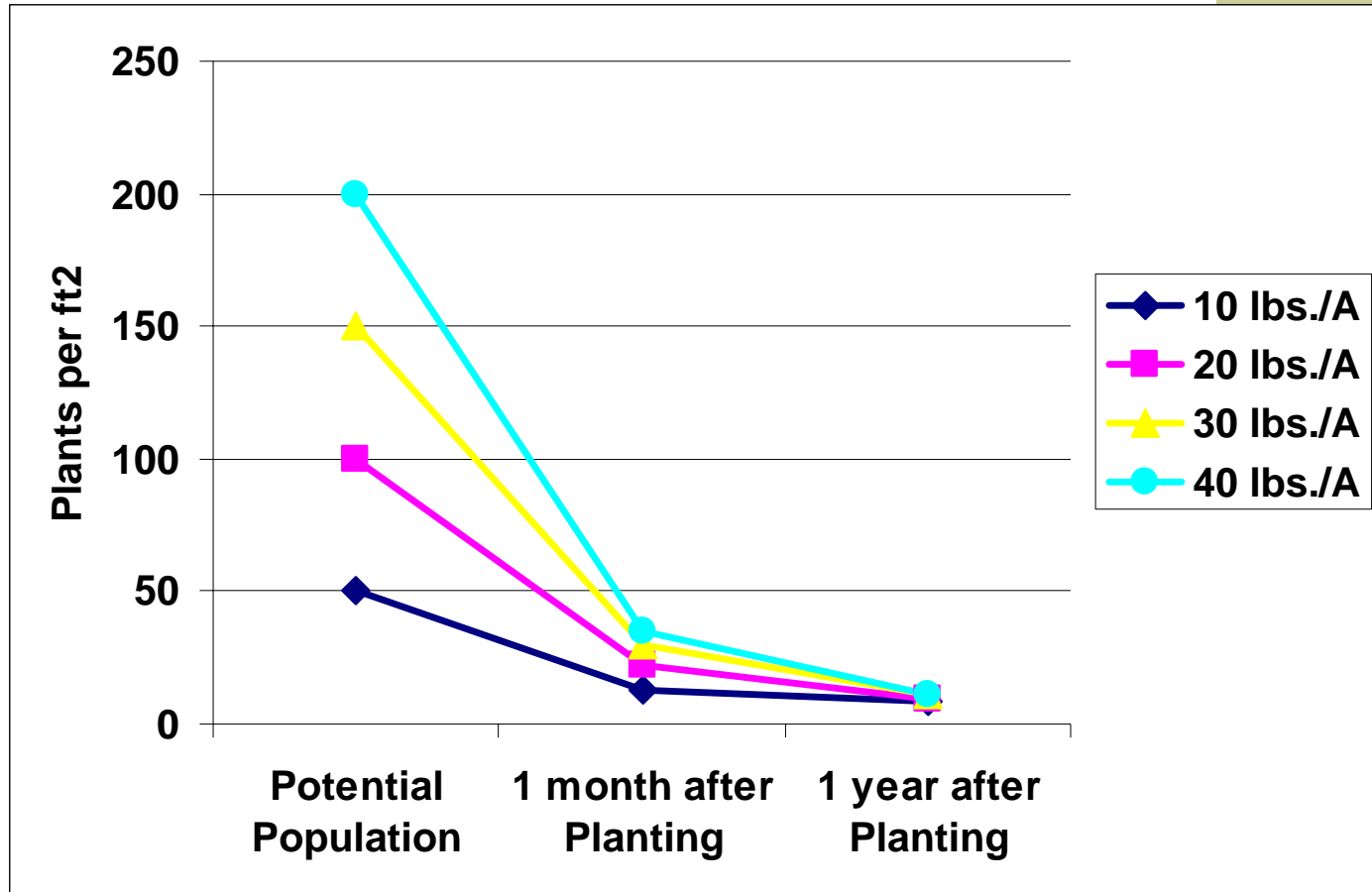
◆ Coated Seed

- 1/3 fewer seeds per pound
- At 25 lbs/A seeding rate
 - 3,751,875 seeds/A
 - 86 seeds/ft²

About 5 seeds/ft² for every 1 lb/A planted

Goal: 20-50 plants/ft²

Effect of Seeding Rate on Plant Density



Seedling Survival

- ◆ Poor seedbed conditions, seeding depth control, insufficient or excessive moisture, poorer than expected seed germination, seedling diseases, inclement weather, or other factors can quickly reduce the population.
- ◆ The number of plants surviving the first year after seeding is likely to be about 40-50%.

Lower seeding rates have higher survival rates

What's the cost?

Seeding Rate (lbs/A)	Average Cost per Acre for Proprietary Varieties
10	\$25
20	\$50
30	\$75
40	\$100

Assumes average price of \$2.50/lb for proprietary varieties.

What's the cost?

Seeding Rate (lbs/A)	Average Cost per Acre for Proprietary Varieties	Average Cost per Acre for Roundup Ready Varieties
10	\$25	\$60
20	\$50	\$120
30	\$75	\$180
40	\$100	\$240

Assumes average price of \$2.50/lb for proprietary varieties and \$6/lb for RR.



6. Do I need to inoculate or treat the seed with fungicides?



Seed Coatings

May be used to extend short seed supplies,

but more often used to provide lime, fertilizer, *Rhizobium* bacteria and/or a pesticide in close proximity to the seed to enhance seedling survival and development.

It has been suggested that seed coating enhances germination so that the same number of seedlings will be established despite planting fewer seeds.

Comparison of Seed Treatments & Coatings. Kearney Ag Center, 1988-89.

Seed Treatment	Stand Density 1 mo. after planting	Stand Density 1 yr. after planting	% Survival
Raw Seed	44.2 abc	14.3	12.8 ef
Raw + Apron	58.1 e	16.5	14.8 def
Raw + PP Inoculum	53.8 cde	12.9	11.5 f
Raw + PPI + Apron	54.8 de	15.6	13.9 def
Raw + gran. Inoc.	49.5 bcde	19.5	17.3 cde
Coated Seed	43.0 ab	17.0	22.9 a
Coated + Apron	44.6 abcd	13.2	17.8 bcd
Coated + Inoc.	35.3 a	15.8	21.3 abc
Coated+Inoc.+Apron	43.0 ab	17.7	23.9 a
Coated+Inoc.+Apron+ Rovral	47.1 bcd	16.5	22.3 ab
<i>LSD (0.05)</i>	<i>10.2</i>	<i>ns</i>	<i>4.86</i>

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Percent survival = number of surviving plants vs. number of seed originally planted.

Raw vs. Coated Seed?

- ◆ Although the number of *pounds* of planting material may be the same, when using coated seed, approximately **1/3 fewer seeds** will actually be planted.
- ◆ Reduction in the number of seedlings per acre can result from the fact that fewer seeds/lb are planted with coated seed, but percent survival can be higher than with raw seed.

Raw vs. Coated Seed?

- ◆ Differences in plant population are not apparent by the end of the first production year.
- ◆ Seed coatings may improve initial seedling survival, but planting raw seed can still result in successful alfalfa seedling establishment.

Raw vs. Coated Seed?

- ◆ The value of seed treatments with Apron or similar fungicides will depend upon the degree of disease pressure.
- ◆ Seed treatments can be viewed as a form of “risk management” which may only pay off occasionally.

Inoculation

- ◆ Nitrogen-fixing *Rhizobium* bacteria in root nodules fix nitrogen from the atmosphere to meet crop needs.
- ◆ Inoculate seed, or buy pre-inoculated or coated seed, or trust field history.





7. How should I plant my alfalfa?



Seeding

- ◆ Broadcast (ground or air) or Drilled
- ◆ Provide uniform distribution and depth
 - Plant seed shallow (1/4-1/2 inch)
- ◆ Good seed to soil contact is important
- ◆ Germination and emergence take only a few days in mid-September

Alfalfa Planting Recommendations

- Calibrate the planter with each seed lot.
 - Differences between raw and coated seed
 - Coated seed flows faster through common seed metering units than raw seed at the same planter setting.





8. How do I get the seed to germinate?



Irrigation

- Provide Moisture
 - Plant prior to anticipated rain
 - Plant and irrigate immediately after seeding
 - Pre-irrigate and plant to moisture
- Soil must remain moist during germination and early seedling development.
 - Seedlings shouldn't be stressed by too much or too little water.



Irrigation

- ◆ Sprinkler irrigation best for germination and emergence, then flood after establishment
 - Costs include rental, water, labor, fuel
 - Advantages
 - higher yields from earlier plantings
 - Small quantities of water at frequent intervals

Irrigation

- ◆ Some growers successfully flood irrigate up a new stand.
 - Field must be level, avoid standing water
 - Crusting can be a problem
 - Must continue irrigation until fall/winter rains take over
 - High spots and borders will emerge following rainfall



9. What is considered an adequate stand?



Keep Seedling Stands If:

- ◆ Uniform population of at least 12 plants/ft² (20 plants/ft² better)
- ◆ Stand counts can be as low as 12-13 plants/ ft² and full production, or nearly full production, can be obtained the first year.
- ◆ Distribution is the key!



10. When can I take the first cutting after establishment?





First Harvest

- ◆ Plants must be well established before taking first cutting.
 - Bloom
 - Root growth

Summary

- ◆ Seedling establishment is a critical phase in the life of an alfalfa stand, impacting production for many years.
- ◆ Time spent planning and preparing for stand establishment pays off in many ways resulting in a dense, vigorous stand that produces high quality high yielding alfalfa for many years.