

# OVERSEEDING AND MANAGEMENT OF OLDER ALFALFA STANDS

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## ABSTRACT

Overseeding another forage species into a depleted alfalfa stand can extend stand life and improve the yield and marketability of the hay. Potential overseeded forage species include annual and perennial grasses and legumes. The species selected for overseeding can affect yield, forage quality, and the suitability of the forage for the end market. Factors to consider are the desired time to keep the alfalfa in production (annuals or perennials, or number of harvests or years), climatic conditions, and the end-market user. Overseeding grasses into alfalfa usually creates a mixture of hay that has a lower nutritional value than alfalfa hay alone, which is suitable for dry cows, horses, or other livestock. Overseeding legumes into declining alfalfa stands creates a different forage product than overseeding grasses. Most clovers are comparable to alfalfa in nutritional value and therefore may be better suited for lactating dairy animals. Clovers are not affected by the Egyptian alfalfa weevil and can withstand poorly drained, saturated soil conditions that are detrimental to alfalfa.

**Key words:** alfalfa, overseeding, grasses, clovers

## INTRODUCTION

Overseeding is the planting of other forage species or alfalfa into existing alfalfa stands to extend the stand life of the alfalfa or to maximize economic returns. This paper summarizes practices associated with overseeding, including variety selection, and benefits and disadvantages of each forage variety. Most of the information in this paper comes from the Overseeding and Companion Cropping in Alfalfa publication by Canevari et al. (2000), available from ANR publications: <http://anrcatalog.ucdavis.edu>.

## WHEN TO CONSIDER OVERSEEDING?

Alfalfa stands that produce good high quality forage should not be mixed with other crops. However, when alfalfa stands fall below approximately 5 plants/ft<sup>2</sup>, yields decline (Table 1). At this point a decision should be made to either extend the stand life of the alfalfa by overseeding with another forage, or to remove the stand and rotate to another crop.

The choice of an overseeded forage depends on how long the alfalfa field will stay in production and on the intended market. Annual forages are selected for those fields that will

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be in production for less than a year; perennials for those with anticipated production for one or more years. Legumes are recommended if the intended market is the dairy industry because of their high forage quality. Grass mixes are recommended for the horse hay market. The range of crude protein, acid detergent fiber, and neutral detergent fiber for alfalfa and overseeded species is shown in Table 2.

### **OVERSEEDING ANNUALS**

The best annual forage for the dairy industry is likely to be berseem clover. Berseem resembles alfalfa in growth habit, is of high forage quality, resists weevils, tolerates saturated soils, and can increase yields by up to 2 tons/acre over alfalfa alone in the first 3-4 harvests. A disadvantage of berseem is that the higher moisture content and biomass than alfalfa alone takes longer to dry, which is a problem during cool, wet springs.

Oat (or other cereals such as barley, wheat, and triticale) and tetraploid annual ryegrass is the best annual forage for the horse hay market. These cool season grasses make the greatest contribution to yield early in the season (1-3 tons/acre) over alfalfa alone and decline by midsummer. Grasses harvested in the vegetative stage have a higher crude protein and lower fiber (ADF and NDF) than those cut during early bloom. Grasses overseeded into alfalfa need to be fertilized with 40-60 lbs of total nitrogen per acre. Annual grasses are competitive with alfalfa and can cause stand losses. Select disease resistant varieties to maximize stand health. During some years it may be difficult to cure large volumes of high moisture forage.

### **OVERSEEDING PERENNIALS**

The best perennial forage for the dairy industry is red clover. Red clover is similar to alfalfa in forage quality and has increased yields by 2 tons per acre in poor alfalfa stands. Red clover also resists weevils, is competitive against weeds, and tolerates poorly drained soils. However, red clover is a slow growing perennial so increased yields may not be seen until the following season, it has a higher moisture content than alfalfa so takes longer to cure, and is heat sensitive so yields decline in the summer.

There are many different perennial grass forages for the horse hay market. These include orchardgrass, tall fescue, perennial ryegrass, bromegrass, and timothy. Yields are increased in alfalfa fields overseeded with grasses compared to alfalfa alone. As with annual grasses forage quality depends on time of harvest with earlier cuttings having higher protein and lower fiber than later ones. Compared with annuals, perennial grasses are slow to establish, and one season is usually required before a full yield potential is reached. Perennial grasses provide good winter and summer weed control; however, foxtail is often a problem in perennial grass/alfalfa stands with few if any control options. The perennial grasses listed in Table 2 are cool season grasses, so productivity drops off significantly during summer months in the Central Valley because of heat sensitivity. The perennial grasses need to be fertilized with 40-60 lbs of nitrogen per acre per cutting. It may be difficult to cure large volumes of high moisture forage during some years. If fescue varieties are used, be sure to choose endophyte free varieties (fungus in some fescues may affect the health of livestock).

## **OVERSEEDING ALFALFA INTO ALFALFA**

Results with overseeding alfalfa into alfalfa have been mixed. Some growers have seen a yield increase associated with the practice, while others have not. Autotoxicity (effect of existing alfalfa plants on germination of new plants), competition for light, nutrients, and water by existing alfalfa plants may affect the newly germinating alfalfa. Factors that caused the stand loss to begin with (such as low spots) impact alfalfa seedling development. In a 2-year alfalfa overseed study conducted by R. Long, alfalfa seedlings in an established stand did well initially, but by the end of the second year most died out. Those plants remaining were weak and did not contribute to yield increases in the existing stand. Alfalfa is routinely seeding into existing alfalfa stands in the Imperial Valley. Typically seedling recruitment can be successful. However, frequently the original cause of stand loss (scalding, compaction, or standing water) once again causes loss of stand. Seeding alfalfa into existing stands is usually less successful than overseeding other crops into existing stands.

## **STAND ESTABLISHMENT**

Planting a crop into existing alfalfa stands may be very challenging, since seedbed conditions are seldom optimum. Seedbed preparation is very important for successful establishment of any overseeded crop in alfalfa. Usually, a minimum amount of tillage is required. The objective of seedbed preparation is to break up the soil surface in the top 1 to 3 inches, with enough tillage to kill weeds, but with minimal damage to alfalfa crowns. Normally one pass with a spring-tooth harrow, a light discing, or a power-driven (PTO) cultivator is all that is necessary. If weed pressure is high or if the ground is hard, two passes may be required. Prior to tillage, excessive weed growth can also be removed by mowing or with herbicides. After seedbed preparation, planting can take place by broadcasting or drill seeding or using a no till seeder. Planting dates and seeding rates are shown in Table 3. The field may need to be rolled behind the planter to firm the seedbed, break clods, optimize soil-seed contact, and enhance germination. Overseeding can also be done using a conventional grain drill without seedbed preparation, provided the soil is sufficiently soft to allow penetration by the drill and to cover the seed. Irrigation is often useful to promote early germination, which can lead to a uniform plant population and a vigorous seedling stand before cold winter weather.

## **COSTS OF OVERSEEDING**

The costs of overseeding depleted alfalfa stands with grasses or legumes are shown in Table 4. Overseeding may prevent the need for an herbicide and alfalfa weevil treatment. Also, yields of mixed alfalfa stands are often over one ton higher than those of older pure alfalfa stands. The economics of overseeding are market related and depend on the price differential between pure alfalfa and an alfalfa grass or alfalfa clover mix. The market for mixed hay is primarily for horses. The price difference between pure alfalfa and alfalfa mixtures depends on the visual appearance of the hay and the strength of the horse hay market. In some years (such as 2003) alfalfa grass hay sometimes sells for as much as pure alfalfa hay.

Table 1. Minimum stand density required to maintain optimal alfalfa yields.

<b>Production Year</b>	<b>Stand density (plants/ft<sup>2</sup>)</b>
Seedling stand	>25 (range 25-80)
End of year 1	15-25
End of year 2	10-15
Year 3 or 4	6-10 (consider overseeding)
Following years	<3-5 (replace stand or overseed)

Table 2. Range of typical crude protein (CP), acid detergent fiber (ADF), and neutral detergent fiber (NDF) levels for alfalfa and overseeded species.

<b>Species</b>	<b>Stage at swathing</b>	<b>CP (%)</b>	<b>ADF (%)</b>	<b>NDF (%)</b>
Alfalfa, supreme	Vegetative or early bud	22-26	<27	<34
Red clover	Early bloom	18-20	27-32	35-42
Berseem clover	Early bloom	18-22	24-30	36-42
Annual ryegrass	Vegetative	14-16	27-33	40-48
Orchardgrass	Vegetative	15-18	30-34	45-50
Orchardgrass-tall fescue mix	Early heading	10-14	32-37	50-65

Table 3. Seeding dates and rates for crops overseeded into alfalfa for the Sacramento and San Joaquin Valleys. In the Intermountain Region (Northern California) annual grasses are planted Feb to April; perennial grasses are planted Aug to Sept or March to April.

<b>Crop</b>	<b>Seeding date</b>	<b>Seeding rate, lb/acre</b>
<b>Annual Grasses</b>		
Cereals, oat, barley, wheat, triticale	Oct-Jan	40-60
Tetraploid annual ryegrass	Oct-Dec	4-8
<b>Perennial Grasses</b>		
Orchardgrass	Oct-Dec	4-8
Tall fescue	Oct-Dec	4-8
Perennial ryegrass	Oct-Dec	4-8
Kemal festulolium	Oct-Dec	4-8
Bromegrass	Oct-Dec	20-30
Timothy	not practiced	4-6
<b>Annual Legume</b>		
Berseem clover	Oct-Dec	6-12
<b>Perennial Legume</b>		
Red clover	Oct-Dec	8-12

Table 4. Sample costs for overseeding annual ryegrass and berseem clover into a depleted alfalfa stand, compared with the management of alfalfa without overseeding.

<b>Cost per acre (\$)</b>			
<b>Item</b>	<b>Annual ryegrass</b>	<b>Berseem clover</b>	<b>Alfalfa, no overseed</b>
<b>Overseeding Stand Establishment</b>			
Seedbed preparation, seed, planting, irrigation	43	56	--
<b>Production</b>			
Herbicide (winter/ summer)	0	0	40
Insecticide (weevil)	0	0	20
Irrigation	25	55	55
Yield (3 cuttings)	3.5 tons/acre	4 tons/acre	2.5 tons/acre
Harvest costs (\$30/ton)	105	120	75
Total production and stand establishment cost	173	231	190
<b>Estimated total cost/ton</b>	<b>49</b>	<b>58</b>	<b>76</b>

#### REFERENCES

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