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Section II

Alfalfa

Chapter 12

Variety Selection and Budget

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Alfalfa is grown throughout the Intermountain West under a wide range of conditions. These growing conditions include a diversity of elevations, soil types, irrigation water availability and quality, field slopes, and management practices. Specific conditions that exist on farms and ranches must be considered when selecting a variety.

As with other inputs and management considerations, varieties selected for planting should meet the objectives of the forage system on the farm or ranch. How alfalfa fits into cropping systems and crop rotations may influence the alfalfa varieties that are selected for planting. Additionally, alfalfa grown for the dairy market (more cuttings and a possible shorter stand life) versus the hay feed market (few harvests and longer stand life) can be affected by the alfalfa variety planted on the farm.

Producers should select varieties based on personal study and thoughtful consideration using as much factual (quantitative data) information as possible. Check with your local Extension office or Agricultural Experiment Station for yield performance data and other plant performance characteristics of varieties that interest you (csucrops.com). Ask your local seed dealer, crop consultant, or seed representative for additional information. Information about varieties obtained from neighbors may be useful, but testimonials can be highly subjective.

More than one variety should be planted on farms with large acreages of alfalfa. Varieties have unique strengths and weaknesses. Planting several varieties will reduce the risk of poor performance if one variety fails to meet production expectations. After thor-

ough study, producers should select several varieties that appear well suited to their farm or ranch. Test strips of these varieties should be planted to check performance under specific field and management conditions.

There are a large number of alfalfa varieties available for commercial production in the U.S. Such a large number of varieties present a challenge to growers to select varieties from such a large number of possibilities. A listing of varieties available for planting in the United States is located online at <http://www.alfalfa.org/>. Under the “Education” drop down list, click on “alfalfa variety leaflet”.

The major factors that should be considered when selecting alfalfa varieties are listed in Table 1 and are discussed below.

Table 1. Major factors to consider when selecting an alfalfa variety.

- Yield potential
- Disease resistance
- Winter hardiness/Fall dormancy
- Forage quality
- Special conditions and specialty traits (i.e. high water table, grazing, dryland, biotech traits)

Yield Potential

Forage yield has a direct effect on profitability (Fig. 1). Producers should utilize comparison data for varieties. Don't rely on subjective information on which to base a decision for selecting a variety. At the Western Colorado Research Center at Fruita we routinely conduct variety performance tests for alfalfa. Yield data are summarized annually and made available to the public. Re-



Fig. 1. For risk management purposes, several adapted alfalfa varieties should be planted, especially on farms with large acreages of alfalfa.

sults of these trials are posted on the Internet after each cutting. This information is available at www.csucrops.com. There are several other locations in the western states where alfalfa variety performance tests are conducted.

Look for other alfalfa forage yield tests conducted by universities, seed companies, consultants, and others that are similar to your conditions. Tests should be conducted under comparable climates, soils, elevation, irrigation conditions, management practices, and pest pressures. Today, in many cases, check varieties used for comparison are not "old" varieties, such as Ranger. Also, varieties used for comparison purposes are typically within the same fall dormancy.

Some people may be lured into planting "old" varieties. Avoid planting old varieties of alfalfa. Yields of old varieties such as Ranger, Vernal, and Lahontan, are low in comparison to more recently developed varieties (Table 2). In fact, these old varieties often have the lowest yields under these test conditions.

If at all possible, identify varieties that are high yielding at two or more locations and for more than one year. In other words, using only first year yield data should be avoided when making variety selection decisions. Preferably, yield information is avail-

Table 2. Performance of "old" alfalfa varieties at Fruita, Colorado (1984-1995).

Variety	No. of location years	Percent of test average	Ranking
Lahontan	6	88	18 of 20
Ranger	13	88	17 of 18
Vernal	6	91	13 of 15

able for the life of the stand. Varieties that are high yielding across several locations and years indicate performance stability under changing conditions.

Disease Resistance

Resistance to many of the major diseases found in the U.S. and western states have been bred into new varieties. The most important alfalfa diseases in western Colorado requiring highly resistant varieties are bacterial wilt, phytophthora root rot, fusarium wilt, and nematodes. Most new varieties released to the public contain resistance to bacterial wilt and phytophthora root rot. Standardized tests are used by alfalfa breeders to characterize the level of disease resistance in alfalfa varieties. Resistances ratings used in alfalfa are different than those used for many other crops. High resistance in alfalfa does not mean that 100% of plants are resistant as assumed by some people (Table 3).

Table 3. Rating categories used for describing disease resistance in alfalfa.

% Resistant Plants	Resistant Class	Abbreviation
>50	High Resistance	HR
31-50	Moderate Resistance	R
15-30	Low Resistance	MR
6-14	Susceptible	LR
0-14		S

Alfalfa stem nematodes are a serious problem in western Colorado and many other locations in the West U.S., as well as in

other areas of the region (Fig. 2). These nematodes invade the plant causing yield loss, stand decline, and may predispose the plant to invasion by other pathogens.

Varieties selected for planting in locations known to have nematodes should have high resistance to nematodes.

Roundup-Ready® Alfalfa Varieties

Alfalfa varieties have been developed recently that are tolerant to Roundup (glyphosate) herbicide. Roundup-Ready alfalfa was deregulated and released for commercial production in the United States but does carry with it some restrictions, particularly related to exports. This technology allows growers to apply Roundup to alfalfa as prescribed on the herbicide label without harming the alfalfa crop. In the time since Roundup-Ready alfalfa varieties have become available, the number of companies licensed to sell Roundup-Ready alfalfa and the number of varieties available in the marketplace has increased dramatically. During the period between 2005-2007, 22 seed suppliers collectively offered 41 varieties of Roundup-Ready alfalfa. These new varieties are spread across several fall dormancies but the most common is fall dormancy 4.

Growers who plant Roundup-Ready alfalfa for forage production are required to sign and comply with a Technology Agreement (a Monsanto license). This Technology Agreement specifies how the crop is to be managed for production; outlines guidelines for how the alfalfa forage is to be marketed; how the stand is to be taken out; and other considerations. Roundup-Ready alfalfa seed cannot be produced for any purpose without a separate seed company contract. Growers must also follow the Technology Use Guide and other supplemental information as provided by Monsanto. Growers must also pay a technology fee when they purchase the seed. The cost of the seed along with the technology fee increases the price of the

seed compared to that for conventional alfalfa seed. In general, in the western United States, the price of Roundup-Ready alfalfa seed is approximately 2 times higher than conventional seed. Accordingly, the price of Roundup-Ready alfalfa seed often ranges from \$5.50 to \$6.50 per pound; however,



Fig. 2. Alfalfa stem nematodes are a serious problem in western Colorado. White flagging as shown in the photograph is diagnostic for the presence of alfalfa stem nematodes.

according to some university studies, the higher seed cost is typically offset by improvements in weed control performance, yield, and forage quality. Roundup-Ready technology may have value in the establishment year of alfalfa, extending the life of an alfalfa stand, fields with high annual weed pressure, fields with perennial weeds problems, and others.

Stand Persistence

Stand persistence in Intermountain West locations varies because of environmental factors and management practices. Environmental factors such as cold temperatures, snow cover, soil fertility, and irrigation water management affect stand persistence. Management practices such as cutting schedule, fall harvest management, fertilizer applications, and varietal selection also affect stand persistence.

Stand life in the mountain states varies considerably, ranging from three years up to twenty years. Generally, in many of the low

elevation valley areas, alfalfa stands are in production from three to five years while at higher elevations stands are often in production much longer. However, longer stand life may be related to producer acceptance of low yields.

Stand persistence at higher elevations depends primarily on winter hardiness while stand persistence in low valley areas depends heavily on the disease resistance of the variety.

Winter hardiness is a more accurate indicator of winter survival than fall dormancy

Winter Hardiness/Fall Dormancy

Fall dormancy rating has been considered by many people to also mean winter hardiness. Fall dormancy and winter hardiness are not synonymous terms, particularly in modern alfalfa varieties.

Fall dormancy rating is from 1 (very dormant) to 11 (very nondormant). Historically, the general rule has been to choose a fall dormancy rating equal to the number of harvests. Fall dormancy of alfalfa is based on morphological characteristics of the vegetative growth observed in the fall after the last cutting. The expression of fall dormancy results from the combined effects of short days and cool temperatures. Under short-day conditions, differences among dormant and nondormant varieties are magnified at low temperatures. Under the long-day conditions of spring and summer there is little difference in regrowth between dormant and nondormant varieties. Under short-day conditions, hardy varieties have the greatest dormancy response, and nonhardy varieties have the least. Thus, a decrease in photoperiod and temperature causes a greater decrease in the top growth of fall dormant varieties than in the nondormant varieties. Varieties adapted to southern regions have a

more erect, taller regrowth while northern varieties produce long or short, prostrate stems.

Winter hardiness, in contrast, is the capacity of a plant to withstand winter injury and plant loss and provides a more accurate indicator of winter survival than does fall dormancy. The scale for winter hardiness ranges from 1 (very winter hardy to 6 (no winter survival). Winter hardiness evaluations are a recent determination that was initiated in 1995 and was revised in 2003 (see <http://www.naaic.org/stdtests/wintersurvivalnew.htm>). It is a trait of critical importance for alfalfa grown in the northern United States. Winter hardiness of alfalfa varieties is best determined when varieties are exposed each year to harsh winter conditions. However, winter conditions vary each year making a consistent, accurate measurement of winter hardiness difficult. Thus, consistent assessment of winter hardiness is more difficult to obtain than fall dormancy.

For years, fall dormancy has been used as a predictor of winter hardiness. The association of fall dormancy with winter survival is no longer valid. For example, alfalfa varieties are now available with fall dormancies of 4-5 but have winter survival ratings of 1-3. This results in alfalfa with higher yield potential but does not compromise winter survival. Such new varieties are faster to recover after cutting and are well suited for green chop or when hay can be dried and baled quickly to avoid regrowth into windrows.

While fall dormancy may be an indicator of winter hardiness there are alfalfa varieties, for example, that are fall dormant but not very winter hardy. It becomes difficult to determine how varieties will perform in specific locations just by looking at their fall dormancy ratings. Variety performance tests and grower experience at specific locations are valuable in providing alfalfa growers

with information to assist them in selecting varieties that perform well on their farm or ranch.

Varieties best adapted to mountain west conditions need moderate winter hardiness for low valley areas and increased winter hardiness for higher elevations (Fig. 3).



Fig. 3. Varieties adapted to western Colorado need moderate winter hardiness for low valley areas and increased winter hardiness for higher elevations.

Non-winter hardy varieties are likely to experience plant losses in many years in the Intermountain West. Varieties that are extremely winter hardy generally produce lower yields because of early fall dormancy and slower regrowth in the spring and following harvests.

The National Alfalfa & Forage Alliance publishes variety characterization information for alfalfa varieties that are currently available for purchase in the United States. This organization is a good source of information to check ratings for winter survival, fall dormancy, pest resistance, and other plant characteristics of a large number of alfalfa varieties. This alfalfa variety information is available online at www.alfalfa.org.

Forage Quality

In recent years, hay quality has become more important in determining selling price. The quality of the hay required to meet the needs of the end user must be determined. Hay quality needs of animals vary, depending on animal species, its age, and use.

Many factors have a significant impact on hay quality. Some of these factors, such as stage of maturity, weeds, fertilizer, irrigation, insects, and diseases, have a greater impact on forage quality than the variety. Nevertheless, when establishing a comprehensive production system, hay quality of a variety should be considered. Some varieties are known to be more difficult than others to obtain high quality hay.

Developing varieties with improved forage quality and reduced lignin is currently an important focus of many alfalfa breeders. Multifoliate alfalfa varieties have been shown to produce higher quality hay than some of the traditional alfalfas. Improved forage quality of multifoliate over trifoliate alfalfas appears to be more evident when multifoliate expression levels are high. In the future, technologies such as herbicide-tolerant alfalfa (e.g., Roundup-Ready) may help hay growers better manage weeds that negatively impact forage quality, marketability, and hay selling price (Fig. 4).



Fig. 4. In recent times, hay quality has become more important in marketing alfalfa hay and in determining selling price.

Special Considerations

Special considerations for variety selection may be important to meet unique field and management conditions. A producer who decides to grow alfalfa in a field that has a high water table should seed a variety that tolerates high water tables. Fields that are routinely grazed should be planted with a variety that is adapted for grazing. A variety adapted to dryland conditions will likely be different than varieties that are suited to irrigated conditions.

Varieties, Brands, and Blends

Growers who purchase named varieties of officially certified seeds are assured of variety performance and genetic integrity. Certified ("blue tag") seed is widely available and highly recommended for reliable performance. Each certified, registered alfalfa variety is a distinct genetic variety. Unlike registered varieties, seeds sold as blends, brands, variety not stated, and commons are not pedigreed and they cannot be certified.

Today, most genetic material of alfalfa is developed by private breeding companies. The rights to genetic material may be sold to other companies who, in turn, affix their company's variety, brand, or blend name. Alfalfas may be marketed as a single variety, or mixed into a blend or sold as a variety-not-stated branded product.

Diverse business arrangements make it difficult to determine how new and novel some of these varieties, brands, and blends really are. Alfalfa seed sold as non-certified blends is impossible to assess because from year to year, the percentage of each component variety can change; thus, the performance of the blend may also change. Some blends may contain one variety, and/or be diluted with other filler varieties that could be low-yielding or less persistent.

Seed Price

Seed costs of conventional alfalfa varieties are approximately 5% of the total cost of establishing alfalfa when allocated across the life of the stand (assuming a 4-year stand life) while by comparison the seed costs of Roundup Ready alfalfa varieties are approximately 10%. Seed of a variety that costs more, yields more, and has more value is worth the extra investment in seed costs. Selecting an alfalfa variety based only on seed price is shortsighted. However, buying high-priced seed of a variety that does not perform better than seed of a low-priced variety is not wise.

Controlling input costs and maximizing hay yields and selling price are critical for profitable alfalfa hay production. Table 4 shows the relationship among production costs, yield, and selling price. Keeping production costs low, while maximizing yields and selling price will result in more profits than when yields and selling prices are low and production costs are high. This data table shows in a quantitative manner how these three factors work together to affect the net returns or profits of alfalfa hay production in western Colorado.

Tables 5-14 shows estimated costs and returns per acre of irrigated alfalfa grown in western Colorado using conventional and Roundup-Ready alfalfa varieties. These crop enterprise budgets are an estimate of potential profitability based on the assumptions of the input data. Costs and returns for specific farms will vary and hence it is important for producers to conduct their own analysis to determine how various inputs will affect the profitability on their farm/ranch.

The enterprise budgets in Tables 5-14 are for fall establishment and for each year of the 4-year life of the stand. The main differences between establishing Roundup-Ready alfalfa and conventional alfalfa were higher seed costs for Roundup-Ready alfalfa. The cost to establish Roundup-Ready

alfalfa was \$72.09 more per acre than for conventional alfalfa. There was a \$9.47 higher return per acre with Roundup-Ready alfalfa than conventional alfalfa for each of the 4 years of hay production because of lower herbicide costs for Roundup-Ready alfalfa.

Over the life of the stand, conventional alfalfa was just slightly more profitable than Roundup-Ready. However, hay yields and hay quality of Roundup-Ready alfalfa and conventional alfalfa varieties were assumed to be the same. Also, market prices were also assumed to be the same for both

Roundup-Ready varieties and conventional alfalfa varieties. If the alfalfa stand does not thin and weed control is superior over the life of the stand by growing Roundup-Ready alfalfa varieties and this translates into higher hay quality and a higher selling price, it is possible for growers to obtain increased profits with Roundup-Ready alfalfa varieties. Thus, it is important for producers to conduct their own analysis using input data specific for their farm/ranch to determine which varieties are best suited for their operation.

Table 4. Net return per acre of irrigated alfalfa in western Colorado as affected by production costs, yield, and selling price.

Yield ton/acre	Price per ton	-----Cost per acre-----					
		200	250	300	350	400	450
3.5	100	150	100	50	0	-50	-100
4.5		250	200	150	100	50	0
5.5		350	300	250	200	150	100
6.5		450	400	350	300	250	200
7.5		550	500	450	400	350	300
8.5		650	600	550	500	450	400
3.5	110	185	135	85	35	-15	-65
4.5		295	245	195	145	95	45
5.5		405	355	305	255	205	155
6.5		515	465	415	365	315	265
7.5		625	575	525	475	425	375
8.5		735	685	635	585	535	485
3.5	120	220	170	120	70	20	-30
4.5		340	290	240	190	140	90
5.5		460	410	360	310	260	210
6.5		580	530	480	430	380	330
7.5		700	650	600	550	500	450
8.5		820	770	720	670	620	570
3.5	130	255	205	155	105	55	5
4.5		385	335	285	235	185	135
5.5		515	465	415	365	315	265
6.5		645	595	545	495	445	395
7.5		775	725	675	625	575	525
8.5		905	855	805	755	705	655
3.5	140	290	240	190	140	90	40
4.5		430	380	330	280	230	180
5.5		570	520	470	420	370	320
6.5		710	660	610	560	510	460
7.5		850	800	750	700	650	600
8.5		990	940	890	840	790	740

Table 5. Summary of Estimated Costs and Returns per Acre Establishing Irrigated Alfalfa Hay In Western Colorado.

ITEM	UNIT	PRICE (dollars)	QUANTITY	AMOUNT	YOUR FARM (dollars)
INCOME					
Alfalfa Hay	Ton	0.00	0.0	0.00	0.00
TOTAL INCOME					0.00
DIRECT EXPENSES					
Fertilizers	Acre	280.00	1.0		280.00
Irrigation Supplies	Acre	10.50	1.0		10.50
Seed/Plants	Acre	54.00	1.0		54.00
Hand Labor	Hour	10.00		0.08	0.78
Irrigate Labor	Hour	10.00		1.00	10.00
Operator Labor	Hour	12.00		0.97	11.63
Diesel Fuel	Gallon	2.26	6.89		15.57
Repair & Maintenance	Acre	5.22	1.0		5.22
Interest on Op. Cap.	Acre	6.96	1.0		6.96
TOTAL DIRECT EXPENSES					394.66
RETURNS ABOVE DIRECT EXPENSES					-394.66
TOTAL FIXED EXPENSES					21.98
TOTAL SPECIFIED EXPENSES					416.64
RETURNS ABOVE TOTAL SPECIFIED EXPENSES					-416.64
Note: Cost of production estimates are as of December 15, 2008					

Table 6. Summary of Estimated Costs and Returns per Acre Irrigated Alfalfa Hay-First Year in Western Colorado.

ITEM	UNIT	PRICE (dollars)	QUANTITY	AMOUNT	YOUR FARM (dollars)
INCOME					
Alfalfa Hay	Ton	138.00	7.5	1035.00	1035.00
TOTAL INCOME					1035.00
DIRECT EXPENSES					
Fertilizers	Acre	78.00	1.0		78.00
Herbicides	Acre	44.48	1.0		44.48
Insecticides	Acre	8.00	1.0		8.00
Irrigation Supplies	Acre	42.00	1.0		42.00
Seed/Plants	Acre	13.50	1.0		13.50
Custom Fert/Lime	Acre	5.00	1.0		5.00
Hand Labor	Hour	10.00		1.54	15.42
Irrigate Labor	Hour	10.00		4.00	40.00
Operator Labor	Hour	12.00		1.15	13.83
Diesel Fuel	Gallon	2.26	10.90		24.66
Repair & Maintenance	Acre	13.93	1.0		13.93
Interest on Op. Cap.	Acre	14.13	1.0		14.13
TOTAL DIRECT EXPENSES					312.95
RETURNS ABOVE DIRECT EXPENSES					722.05
TOTAL FIXED EXPENSES					34.22
TOTAL SPECIFIED EXPENSES					347.17
RETURNS ABOVE TOTAL SPECIFIED EXPENSES					687.83
Note: Cost of production estimates are as of December 15, 2008.					

Table 7. Summary of Estimated Costs and Returns per Acre Irrigated Alfalfa Hay-Second Year in Western Colorado.

ITEM	UNIT	PRICE (dollars)	QUANTITY	AMOUNT	YOUR FARM (dollars)
INCOME					
Alfalfa Hay	Ton	138.00	6.75		931.50
TOTAL INCOME					931.50
DIRECT EXPENSES					
Fertilizers	Acre	78.00	1.0		78.00
Herbicides	Acre	44.48	1.0		44.48
Insecticides	Acre	8.00	1.0		8.00
Irrigation Supplies	Acre	42.00	1.0		42.00
Seed/Plants	Acre	13.50	1.0		13.50
Custom Fert/Lime	Acre	5.00	1.0		5.00
Hand Labor	Hour	10.00		1.54	15.42
Irrigate Labor	Hour	10.00		4.00	40.00
Operator Labor	Hour	12.00		1.15	13.83
Diesel Fuel	Gallon	2.26	10.90		24.66
Repair & Maintenance	Acre	13.93	1.0		13.93
Interest on Op. Cap.	Acre	14.13	1.0		14.13
TOTAL DIRECT EXPENSES					312.95
RETURNS ABOVE DIRECT EXPENSES					618.55
TOTAL FIXED EXPENSES					34.22
TOTAL SPECIFIED EXPENSES					347.17
RETURNS ABOVE TOTAL SPECIFIED EXPENSES					584.33
Note: Cost of production estimates are as of December 15, 2008.					

Table 8. Summary of Estimated Costs and Returns per Acre Irrigated Alfalfa Hay-Third Year in Western Colorado.

ITEM	UNIT	PRICE (dollars)	QUANTITY	AMOUNT	YOUR FARM (dollars)
INCOME					
Alfalfa Hay	Ton	138.00	5.50		759.00
TOTAL INCOME					759.00
DIRECT EXPENSES					
Fertilizers	Acre	78.00	1.0		78.00
Herbicides	Acre	44.48	1.0		44.48
Insecticides	Acre	8.00	1.0		8.00
Irrigation Supplies	Acre	42.00	1.0		42.00
Seed/Plants	Acre	13.50	1.0		13.50
Custom Fert/Lime	Acre	5.00	1.0		5.00
Hand Labor	Hour	10.00		1.54	15.42
Irrigate Labor	Hour	10.00		4.00	40.00
Operator Labor	Hour	12.00		1.15	13.83
Diesel Fuel	Gallon	2.26	10.90		24.66
Repair & Maintenance	Acre	13.93	1.0		13.93
Interest on Op. Cap.	Acre	14.13	1.0		14.13
TOTAL DIRECT EXPENSES					312.95
RETURNS ABOVE DIRECT EXPENSES					446.05
TOTAL FIXED EXPENSES					34.22
TOTAL SPECIFIED EXPENSES					347.17
RETURNS ABOVE TOTAL SPECIFIED EXPENSES					411.83
Note: Cost of production estimates are as of December 15, 2008.					

Table 9. Summary of Estimated Costs and Returns per Acre Irrigated Alfalfa Hay-Fourth Year in Western Colorado.

ITEM	UNIT	PRICE (dollars)	QUANTITY	AMOUNT	YOUR FARM (dollars)
INCOME					
Alfalfa Hay	Ton	138.00	5.00		690.00
TOTAL INCOME					690.00
DIRECT EXPENSES					
Fertilizers	Acre	78.00	1.0		78.00
Herbicides	Acre	44.48	1.0		44.48
Insecticides	Acre	8.00	1.0		8.00
Irrigation Supplies	Acre	42.00	1.0		42.00
Seed/Plants	Acre	13.50	1.0		13.50
Custom Fert/Lime	Acre	5.00	1.0		5.00
Hand Labor	Hour	10.00		1.54	15.42
Irrigate Labor	Hour	10.00		4.00	40.00
Operator Labor	Hour	12.00		1.15	13.83
Diesel Fuel	Gallon	2.26	10.90		24.66
Repair & Maintenance	Acre	13.93	1.0		13.93
Interest on Op. Cap.	Acre	14.13	1.0		14.13
TOTAL DIRECT EXPENSES					312.95
RETURNS ABOVE DIRECT EXPENSES					377.05
TOTAL FIXED EXPENSES					34.22
TOTAL SPECIFIED EXPENSES					347.17
RETURNS ABOVE TOTAL SPECIFIED EXPENSES					342.83
Note: Cost of production estimates are as of December 15, 2008.					

Table 10. Summary of Estimated Costs and Returns per Acre Establishing Irrigated Alfalfa Roundup Ready in Western Colorado.

ITEM	UNIT	PRICE (dollars)	QUANTITY	AMOUNT	YOUR FARM (dollars)
INCOME					
Alfalfa Hay	Ton	0.00	0.00		0.00
TOTAL INCOME					0.00
DIRECT EXPENSES					
Fertilizers	Acre	280.00	1.00		280.00
Irrigation Supplies	Acre	10.50	1.00		10.50
Seed/Plants	Acre	124.38	1.00		124.38
Hand Labor	Hour	10.00		0.08	0.78
Irrigate Labor	Hour	10.00		1.00	10.00
Operator Labor	Hour	12.00		0.97	11.63
Diesel Fuel	Gallon	2.26		6.89	15.57
Repair & Maintenance	Acre	5.22	1.00		5.22
Interest on Op. Cap.	Acre	7.89	1.00		7.89
TOTAL DIRECT EXPENSES					466.75
RETURNS ABOVE DIRECT EXPENSES					-466.75
TOTAL FIXED EXPENSES					21.98
TOTAL SPECIFIED EXPENSES					488.73
RETURNS ABOVE TOTAL SPECIFIED EXPENSES					-488.73
Note: Cost of production estimates are as of December 15, 2008.					

Table 11. Summary of Estimated Costs and Returns per Acre Irrigated Alfalfa Hay-First Year-Roundup Ready in Western Colorado.

ITEM	UNIT	PRICE (dollars)	QUANTITY	AMOUNT	YOUR FARM (dollars)
INCOME					
Alfalfa Hay	Ton	138.00	7.50		1035.00
TOTAL INCOME					1035.00
DIRECT EXPENSES					
Fertilizers	Acre	78.00	1.0		78.00
Herbicides	Acre	18.04	1.0		18.04
Insecticides	Acre	8.00	1.0		8.00
Irrigation Supplies	Acre	42.00	1.0		42.00
Seed/Plants	Acre	31.10	1.0		31.50
Custom Fert/Lime	Acre	5.00	1.0		5.00
Hand Labor	Hour	10.00		1.54	15.42
Irrigate Labor	Hour	10.00		4.00	40.00
Operator Labor	Hour	12.00		1.15	13.83
Diesel Fuel	Gallon	2.26	10.90		24.66
Repair & Maintenance	Acre	13.93	1.0		13.93
Interest on Op. Cap.	Acre	13.50	1.0		13.50
TOTAL DIRECT EXPENSES					303.48
RETURNS ABOVE DIRECT EXPENSES					731.52
TOTAL FIXED EXPENSES					34.22
TOTAL SPECIFIED EXPENSES					337.70
RETURNS ABOVE TOTAL SPECIFIED EXPENSES					697.30
Note: Cost of production estimates are as of December 15, 2008.					

Table 12. Summary of Estimated Costs and Returns per Acre Irrigated Alfalfa Hay-Second Year-Roundup Ready in Western Colorado.

ITEM	UNIT	PRICE (dollars)	QUANTITY	AMOUNT	YOUR FARM (dollars)
INCOME					
Alfalfa Hay	Ton	138.00	6.75		931.50
TOTAL INCOME					931.50
DIRECT EXPENSES					
Fertilizers	Acre	78.00	1.0		78.00
Herbicides	Acre	18.04	1.0		18.04
Insecticides	Acre	8.00	1.0		8.00
Irrigation Supplies	Acre	42.00	1.0		42.00
Seed/Plants	Acre	31.10	1.0		31.50
Custom Fert/Lime	Acre	5.00	1.0		5.00
Hand Labor	Hour	10.00		1.54	15.42
Irrigate Labor	Hour	10.00		4.00	40.00
Operator Labor	Hour	12.00		1.15	13.83
Diesel Fuel	Gallon	2.26	10.90		24.66
Repair & Maintenance	Acre	13.93	1.0		13.93
Interest on Op. Cap.	Acre	13.50	1.0		13.50
TOTAL DIRECT EXPENSES					303.48
RETURNS ABOVE DIRECT EXPENSES					628.02
TOTAL FIXED EXPENSES					34.22
TOTAL SPECIFIED EXPENSES					337.70
RETURNS ABOVE TOTAL SPECIFIED EXPENSES					593.80
Note: Cost of production estimates are as of December 15, 2008.					

Table 13. Summary of Estimated Costs and Returns per Acre Irrigated Alfalfa Hay-Third Year-Roundup Ready in Western Colorado.

ITEM	UNIT	PRICE (dollars)	QUANTITY	AMOUNT	YOUR FARM (dollars)
INCOME					
Alfalfa Hay	Ton	138.00	5.50		759.00
TOTAL INCOME					759.00
DIRECT EXPENSES					
Fertilizers	Acre	78.00	1.0		78.00
Herbicides	Acre	18.04	1.0		18.04
Insecticides	Acre	8.00	1.0		8.00
Irrigation Supplies	Acre	42.00	1.0		42.00
Seed/Plants	Acre	31.10	1.0		31.50
Custom Fert/Lime	Acre	5.00	1.0		5.00
Hand Labor	Hour	10.00		1.54	15.42
Irrigate Labor	Hour	10.00		4.00	40.00
Operator Labor	Hour	12.00		1.15	13.83
Diesel Fuel	Gallon	2.26	10.90		24.66
Repair & Maintenance	Acre	13.93	1.0		13.93
Interest on Op. Cap.	Acre	13.50	1.0		13.50
TOTAL DIRECT EXPENSES					303.48
RETURNS ABOVE DIRECT EXPENSES					455.52
TOTAL FIXED EXPENSES					34.22
TOTAL SPECIFIED EXPENSES					337.70
RETURNS ABOVE TOTAL SPECIFIED EXPENSES					421.30
Note: Cost of production estimates are as of December 15, 2008.					

Table 14. Summary of Estimated Costs and Returns per Acre Irrigated Alfalfa Hay-Fourth Year-Roundup Ready in Western Colorado.

ITEM	UNIT	PRICE (dollars)	QUANTITY	AMOUNT	YOUR FARM (dollars)
INCOME					
Alfalfa Hay	Ton	138.0	5.00		690.00
TOTAL INCOME					690.00
DIRECT EXPENSES					
Fertilizers	Acre	78.00	1.0		78.00
Herbicides	Acre	18.04	1.0		18.04
Insecticides	Acre	8.00	1.0		8.00
Irrigation Supplies	Acre	42.00	1.0		42.00
Seed/Plants	Acre	31.10	1.0		31.50
Custom Fert/Lime	Acre	5.00	1.0		5.00
Hand Labor	Hour	10.00		1.54	15.42
Irrigate Labor	Hour	10.00		4.00	40.00
Operator Labor	Hour	12.00		1.15	13.83
Diesel Fuel	Gallon	2.26	10.90		24.66
Repair & Maintenance	Acre	13.93	1.0		13.93
Interest on Op. Cap.	Acre	13.50	1.0		13.50
TOTAL DIRECT EXPENSES					303.48
RETURNS ABOVE DIRECT EXPENSES					386.52
TOTAL FIXED EXPENSES					34.22
TOTAL SPECIFIED EXPENSES					337.70
RETURNS ABOVE TOTAL SPECIFIED EXPENSES					352.30
Note: Cost of production estimates are as of December 15, 2008.					