INVESTING IN NEW VARIETIES OF ALFALFA: DOES IT PAY?

Roby Kettle, Extension Educator
William W. Riggs, Extension Educator
Jay Davison, Central Area Plants and Soil Specialist

INTRODUCTION

New varieties of alfalfa are constantly on the market. It seems that varieties that were available when a field was planted are updated with new varieties by the time the stand needs re-established. Compared to older varieties of alfalfa, newer releases often have increased yield potentials and have improved multiple pest resistance (MPR). Improved MPR increases both yield and stand longevity.

Yield potentials of improved varieties, under intensive management, are frequently 5-40% greater than the older releases (Gray 1998). However, they often cost $1 or more per pound than the older varieties.

As an agriculture producer you are an investor in your business. You want your investment dollars to provide the highest possible return. Investment in alfalfa seed is a long-term investment. You will be rewarded or discounted for 5-7 years or longer based upon the right or wrong choice of the variety of alfalfa you plant.

Compared to older varieties, do newer varieties provide a higher net return? Do increased returns pay for higher seed costs?

COST OF SEED SEEMS IMPORTANT BUT...

New varieties are priced higher in an attempt to recover production costs associated with variety development. However, the cost of alfalfa seed should not be a strong determinant for variety selection. A few cents more for a pound of seed does not represent a large portion of the production costs especially when considering the potential benefits of improved seed. Seed costs are about 13% of the stand establishment costs and less than 3% of the total production costs over three years (Long 1998). For example: Vernal is a variety commonly grown in Intermountain regions, and has
been around for many years. Some growers still plant this variety. In nearly 60 years of testing in California, the top producing variety averaged 17.2% more yield than Vernal and in some cases up to 40% more (Putnam 1998). The cost of seed seems less significant when compared to yield increases of this magnitude.

CASH FLOW

Cash flow is the life of any business. Without adequate cash flow a business will wither and die. With healthy cash flow (which usually equates to adequate profit margins) most businesses flourish. When considering the returns of any long-term investment, look at the cash flow that the investment provides. To assess cash flow, compare the initial investment against the estimated cash return from the investment over a series of years. That accomplished, you can assess the potential profitability of your investment.

WHAT ARE THE EXTRA COSTS & REVENUES WITH HIGHER YIELDING VARIETIES?

The price of alfalfa seed depends upon supply and demand. New releases usually cost $2.50/lb. or more. Older releases and public varieties can often be purchased for $1.50-$2.50/lb. Obviously, buying the newer varieties costs extra money. In addition to higher seed costs other variable cash costs/revenues will change with higher production, including: (1) Increased seed costs cause the initial investment to go up; (2) Fertilizer costs may increase with increasing yield; (3) Harvest costs per acre increase with increasing yields; (4) Higher yields increase gross revenues; (5) Taxes are lower for the establishment year, but will increase with higher yields and net revenues.

In some cases, irrigation costs may increase in order to get adequate water to the plant so it can produce at its genetic potential. This would mainly depend upon the irrigation method. Irrigation costs may or may not increase, depending upon the situation.

COSTS THAT DO NOT CHANGE FROM PLANTING HIGHER YIELDING VARIETIES

Fixed cash costs are costs that are incurred regardless of the amount of production. A good example of a fixed cash cost is seedbed preparation. The cost to prepare a seedbed does not change with the variety of alfalfa planted. Other fixed costs include fertilizer application, herbicides, labor, and the machinery involved in planting. Fixed cash costs influence total farm profitability but do not affect the economics of planting higher yielding varieties. Non-cash fixed costs such as depreciation will also remain constant when using dated varieties or new releases.

ASSUMPTIONS FOR THE ECONOMIC ANALYSIS

1. Alfalfa is drilled at 20 pounds per acre. The seed cost is $1.50/lb. for a public variety and $3.00/lb. for a new variety. Total seed cost is $30.00/acre to establish the public variety and $60.00/acre for the new variety. This is an additional cost of $30.00/acre for the new variety.

2. Alfalfa utilizes 10 pounds of P2O5 out of the soil per ton of hay. Fertilizer (11-52-0) is $280/ton.

3. The tax rate is 28 percent. We assume that there is other income to offset negative cash flows associated with the initial investment. Be aware that taxes vary based on individual tax rates, depreciation, and other factors.

4. Hay is sold for an average of $85/ton.
5. Harvest costs are $25.34/ton to swath, bale, and stack (Myer 1997). This includes all machinery and labor costs.

6. The average yield is 5.51 tons/acre per year, which is the yield for Vernal in Tulelake, CA, Alfalfa Cultivar Trial (Putnam 1997). More information on variety trials can be found at http://agronomy.ucdavis.edu/alfalfa.wg.

7. Returns for the new variety are evaluated for increased yield potentials of 5% to 10%. In the Tulelake trial yields range from 100% to 115% of Vernal (Putnam 1997).

8. The economic return is evaluated over a five-year stand life.

9. Environmental factors are not considered limiting. The plant has adequate water, fertility, good soil and environmental conditions so it can produce at its genetic potential.

Advantages of a 5% Yield Increase

Table (1) exhibits net cash flow (NCF) and the internal rate-of-return (IRR) from an investment in an improved variety with a 5% yield increase. At the end of five years, total NCF increases by $34.09/A. The IRR or return on investment due to a 5% yield increase is 43.81%.

<table>
<thead>
<tr>
<th>Year</th>
<th>Gross Return From New Variety</th>
<th>Seed</th>
<th>Harvest</th>
<th>Fertilizer</th>
<th>Net Cash Return</th>
<th>Tax Implications</th>
<th>Net Cash Flow</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>$0.00</td>
<td>($30.00)</td>
<td>$0.00</td>
<td>$0.00</td>
<td>($30.00)</td>
<td>($8.40)</td>
<td>($21.60)</td>
</tr>
<tr>
<td>1</td>
<td>$23.42</td>
<td>$0.00</td>
<td>$6.98</td>
<td>$0.74</td>
<td>$15.69</td>
<td>$4.39</td>
<td>$11.30</td>
</tr>
<tr>
<td>2</td>
<td>$23.42</td>
<td>$0.00</td>
<td>$6.98</td>
<td>$0.74</td>
<td>$15.69</td>
<td>$4.39</td>
<td>$11.30</td>
</tr>
<tr>
<td>3</td>
<td>$23.42</td>
<td>$0.00</td>
<td>$6.98</td>
<td>$0.74</td>
<td>$15.69</td>
<td>$4.39</td>
<td>$11.30</td>
</tr>
<tr>
<td>4</td>
<td>$23.42</td>
<td>$0.00</td>
<td>$6.98</td>
<td>$0.74</td>
<td>$15.69</td>
<td>$4.39</td>
<td>$11.30</td>
</tr>
<tr>
<td>5</td>
<td>$23.42</td>
<td>$0.00</td>
<td>$6.98</td>
<td>$0.74</td>
<td>$15.69</td>
<td>$4.39</td>
<td>$11.30</td>
</tr>
</tbody>
</table>

**NCF**  $34.90  
**IRR**  43.81%
Advantages of a 10% Yield Increase

Table (2) exhibits the NCF and IRR that would result with a 10% increase in yield. The NCF calculated for a five-year stand life is $91.40/A and the IRR is a stunning 101.48%

<table>
<thead>
<tr>
<th>Year</th>
<th>Gross Return From New Variety</th>
<th>Seed</th>
<th>Harvest</th>
<th>Fertilizer</th>
<th>Net Cash Return</th>
<th>Tax Implications</th>
<th>Net Cash Flow</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>$0.00</td>
<td>($30.00)</td>
<td>$0.00</td>
<td>$0.00</td>
<td>($30.00)</td>
<td>($8.40)</td>
<td>($21.60)</td>
</tr>
<tr>
<td>1</td>
<td>$46.84</td>
<td>$0.00</td>
<td>$13.96</td>
<td>$1.48</td>
<td>$31.39</td>
<td>$8.79</td>
<td>$22.60</td>
</tr>
<tr>
<td>2</td>
<td>$46.84</td>
<td>$0.00</td>
<td>$13.96</td>
<td>$1.48</td>
<td>$31.39</td>
<td>$8.79</td>
<td>$22.60</td>
</tr>
<tr>
<td>3</td>
<td>$46.84</td>
<td>$0.00</td>
<td>$13.96</td>
<td>$1.48</td>
<td>$31.39</td>
<td>$8.79</td>
<td>$22.60</td>
</tr>
<tr>
<td>4</td>
<td>$46.84</td>
<td>$0.00</td>
<td>$13.96</td>
<td>$1.48</td>
<td>$31.39</td>
<td>$8.79</td>
<td>$22.60</td>
</tr>
<tr>
<td>5</td>
<td>$46.84</td>
<td>$0.00</td>
<td>$13.96</td>
<td>$1.48</td>
<td>$31.39</td>
<td>$8.79</td>
<td>$22.60</td>
</tr>
</tbody>
</table>

**NCF**  $91.40

**IRR**  101.48%

ECONOMIC IMPACTS OF AN IMPROVED VARIETY OF ALFALFA

Net cash flow (NCF) and internal rate-of-return (IRR) are tools that can be used to evaluate the return from an investment. Net cash flow is cash revenue less cash outlay received by the grower during years 0-5.

The IRR is a method calculating a rate-of-return than can be used to evaluate alternative investments. IRR takes into consideration the time-value of money.

Money has potential earning power if invested or decreases in buying power over time as inflation erodes its value. If IRR is greater than your acceptable rate of return, then you should make the investment.

IRR cannot be directly compared to simple rate-of-return or compound interest. However, if you are contemplating two investments, choose the investment with the highest IRR.

BREAK-EVEN SEED COSTS ASSOCIATED WITH A 5-10% YIELD ADVANTAGE
How much would you have to pay for higher yielding varieties before they become uneconomical to invest in?

Assuming a cost of certified Vernal at $1.50/lb. bulk seed, the cost of an improved variety, with a 5% yield advantage, would have to reach $5.42/lb. before NCF and IRR are zero. With a 10% increase in yield, bulk seed costs could elevate to $9.35/lb. before NCF and IRR are zero. As an investor you would never pay your break-even price because you want a return on your investment.

This analysis does not consider potential long-term benefits of multiple pest resistance and increased stand longevity, which often improve with better varieties of alfalfa. Nor does the analysis consider higher quality that may result from some varieties (quality is more a function of maturity of the plant at harvest than of the variety harvested). Be aware that often there is little difference in the yield for top producing varieties in a trial. In this case look for the ones that give the best pest resistance.

WHAT ABOUT DRYLAND OR RESTRICTIVE ENVIRONMENTAL CONDITIONS?

Up to this point we have assumed that environmental conditions are not limiting. What if you are planting alfalfa in a dryland or limited irrigation, will higher priced seed still pay? Most likely not. If water is the limiting factor no variety will produce to its genetic potential. In this case cheaper seed will give similar yields without the high initial investment. If the environmental conditions are consistently wet, then plants other than alfalfa should be considered.

SUMMARY OF ECONOMIC ANALYSIS

In summary, an impressive rate-of-return is generated from an improved variety with a conservative increase in yield. In this example, seed costs would have to increase substantially to make the selection of an improved variety an undesirable option. And finally returns for alfalfa stands established at less than 20 lbs. PLS/A are even more attractive at the yields addressed above.

**Literature Cited:**


