Rogue Valley Variety Trial: 2001 Season and 1997 - 2001 Cumulative Results
Richard J. Roseberg, Associate Professor

Introduction
Alfalfa continues to be an important forage crop in Southern Oregon on well-drained soils. Highest yields are achieved under irrigation, but alfalfa is also grown successfully in non-irrigated, deep soils. New varieties are developed each year, usually by research departments of private seed companies. Most improved varieties have resistance to one or more diseases and insects that can affect growth, yield, persistence, and economic return from the crop.

As a service to seed companies and growers, the SOREC routinely evaluates commercially available and some soon-to-be released experimental varieties to determine their adaptation and yield potential under the soil, climate, and management conditions of this area. Due to generation-to-generation variability that can occur in alfalfa seed, results from experimental selections may not be indicative of the eventual performance of the released varieties (later generations of seed from the same germplasm) that are sold commercially. However, information from this trial may be helpful to companies and growers alike when evaluating varieties for possible release or use. The latest forage production trial was planted in 1997, including 18 entries from private companies and 3 older public varieties from USDA development programs as controls.

Materials and Methods
Planting and Past Fertilizer Management
The 21 entry trial was planted in a randomized complete block design, with four replications per entry. The site is on the SOREC Hanley Farm, near Medford, OR, and is mapped as a Central Point sandy loam (Coarse-Loamy, mixed, mesic Pachic Haploxerolls). As detailed in previous reports, all entries were seeded on June 4, 1997, with a Planet Jr. single row seeder. Each plot was 35 ft long by four rows wide at an average one foot row spacing (10 inch spacing for two yield rows, 14 inch spacing for outer border rows to fit harvest machine wheel tracking). During soil tillage and preparation for planting, the area received 1 Ton/ac of "White Cloud" coarse limestone. As the area had been heavily fertilized in the fall of 1996 with N, P, K, S, and micronutrients for a sugar beet seed variety evaluation, no additional fertilizer was applied before or during the 1997 growing season. Emergence and growth in 1997 were excellent. Growth was good in 1998, and due to high residual levels of P and K, no fertilizer was added during the 1998 growing season. The field was fertilized with the material 0-15-30-15 at the rate of 630 lb/ac on Dec.10, 1998. This provided N, P2O5, K2O, and S at 0, 95, 189, and 95 lb/ac, respectively. The field received KCl at the rate of 380 lb/ac on June 2, 1999, providing 228 lb K2O/ac. After the 1999 season, the field was

1 Brand names of herbicides used in this experiment are mentioned for the convenience of the reader only, and do not imply registration or recommendation for use by the author or Oregon State University.
fertilized with the material 0-15-30-15 at the rate of 700 lb/ac on Dec.6, 1999. This provided N, P₂O₅, K₂O, and S at 0, 105, 210, and 105 lb/ac, respectively. During the 2000 season, KCl was applied at the rate of 475 lb/ac on July 7, 2000, providing 285 lb K₂O/ac.

**Fertilizer- 2001 Season**

Between the 2000 and 2001 seasons, the field was fertilized with the material 0-15-30-15 at the rate of 700 lb/ac on Dec.4, 2000. This provided N, P₂O₅, K₂O, and S at 0, 105, 210, and 105 lb/ac, respectively. No additional fertilizer was applied during the 2001 season.

**Herbicides:** During the dormant season, a three-part tank mixture of paraquat (Gramoxone Extra) at 1.5 pint/ac (0.47 lb a.i./ac), a non-ionic surfactant at 0.25% of spray volume, and diuron (Karmex80DF) at 2.0 lb/ac (1.6 lb a.i./ac) was applied on Dec. 12, 2000. No other herbicides or other pesticides were used prior to or during the 2001 growing season.

**Irrigation**

Rainfall and irrigation totals occurring between listed events during the 2001 season are summarized in Table 1.

**Harvest and Data Analysis**

Using a Swift Mfg. Co. walk-behind forage harvester, the center two rows of each four-row plot were harvested for yield determinations. In 2001, four cuttings were made, on May 17, June 21, July 26, and September 5. Due to an unusually dry spring, the weather was favorable for the first cutting by mid-May, and the first cutting was made at late bud to first bloom stage. Second cutting occurred at late bud, third cutting at late bud to first bloom, and fourth cutting at about 5% bloom. After weighing the freshly cut forage, sub-samples from each plot were weighed immediately after cutting and also after oven drying to determine moisture content at harvest. Harvest weights were thus corrected to oven dry values, and analysis of variance was done using SAS computer software (SAS Institute, Cary, NC).

**Results and Discussion**

Irrigation deliveries were less than normal due to drought conditions, thus reducing the number of irrigations between both the first and second, and the second and third cuttings, from two to one. Precipitation during the growing season was barely 2 inches compared to nearly 6 inches in 2000. Despite the moisture stress in 2001, stands continued to grow, but 3rd cutting yields especially were probably reduced compared to normal due to the mid-summer water stress. Weed competition was slight in 2001 as varieties exhibited vigorous, competitive stands. Disease pressure, especially stem nematode (the major alfalfa pest in this area) was not visible. This lack of disease or other pest pressure resulted in all varieties appearing healthy, so that stand appearance was not visibly different between varieties. Gopher activity was significant in very few plots, and
results from these plots were not included in the data analysis. Gopher control efforts are an ongoing part of trial management.

Rainfall amounts were below average during the entire spring and summer, forcing the crop to rely almost completely on irrigation water, which was also more limited than normal. By eliminating irrigation on certain other fields, we were able to supply irrigation water for all but one normal irrigation event for the alfalfa trial. Weather in 2001 was somewhat warmer than normal, especially during the mid to late summer. Although the SOREC weather station only recorded two days with a maximum temperature above 100F, there were an additional 53 days above 90F. These warm temperatures combined with the more limited water probably resulted in some moisture stress during mid to late summer. Drying and curing weather was good to excellent for all cuttings. In local production fields, very little hay was damaged by rain due to the generally dry conditions throughout the summer.

Yield data for 2001 is shown in Table 2. Significant differences in variety yields, indicated by significant F test values (Prob.< 0.05), were observed for the second cutting date only. In addition, the difference between varieties was very nearly significant for the 2001 year total yield.

Annual yields in 2001 were slightly greater than in 2000 for best-yielding varieties, but were slightly lower than in 2000 for the poorest-yielding varieties. This “spreading out” of the yield performance is often seen as stand age increases, as the more vigorous and persistent varieties exhibit their improved traits over time.

For the better varieties, yields tended to be slightly greater in 2001 than in 2000 for the first and especially the second cutting, but were very similar to 2000 for the third and fourth cuttings. At equal yield ranking positions, the seasonal total was about 0.2 ton/ac greater in 2001 than in 2000 for the better varieties, but 2001 yield was about 0.2 ton/ac less than in 2000 for the lower-yielding varieties. Reasons for these differences were not obvious, other than the normal differences between varieties with the increase in stand age. The dry spring allowed an earlier than normal first cutting date in 2001, thus allowing longer regrowth periods than normal, especially between the third and fourth cutting. However, the rapid advancement in alfalfa maturity by the time of the 3rd and especially the 4th cutting prevented taking full advantage of the extended regrowth periods that were possible with the cutting schedule in 2001. The applications of fertilizer in December, 2000 and prior years should have been sufficient to avoid any nutrient deficiencies in 2001.

Annual totals and cumulative yields for the entries over the course of the experiment are shown in Table 3. In addition, Table 3 also shows the relative rank changes of the varieties from 2000 to 2001, based on cumulative yield over the course of the entire experiment.

For cumulative yield ranking, Vernal improved the most in 2001, moving up 9 spots from 14th to 5th place. Stamina dropped the most (-10 spots, from 3rd to 13th place). Most of the other varieties did not change much in relative rank, especially those in the lowest one-third of yield. When discussing relative rankings it should be noted that the overall, cumulative yield difference between the highest and lowest yielding varieties was less than 3.0 tons after five years of comparison, indicating an overall similarity in yields, such that small changes in yield can result in fairly large changes in rank position from
year to year. However, the data shows that the difference between the top group of entries and the bottom group of entries gradually increased over time, but that no variety was clearly superior to all the others.

**Experimental Notes**

ABI = Agripro Seeds Inc., Nampa, ID; Dekalb / CH = Dekalb Genetics Corp. marketed by Cascade Hybrids, Sunnyside, WA; CW / Novartis = Cal West Seeds marketed by Novartis Seeds, Golden Valley, MN; CW / L&H = Cal West Seeds marketed by L&H Seeds, Spokane, WA; GrPlRes = Great Plains Research, Apex, NC; Seedtec / Eureka = Seedtec Alfalfa marketed by Eureka Seed, Woodland, CA; FG / Eureka = Forage Genetics marketed by Eureka Seed Co., Woodland, CA; FG / Union = Forage Genetics marketed by Union Seed Co., Nampa, ID; FG = Forage Genetics, Nampa, ID; WL = W-L Research Inc., Warden, WA; NK = Northrup King, Golden Valley, MN (purchased locally); USDA = public varieties, donated by Highland Seed Co., Klamath Falls, OR.

All varieties were planted June 4, 1997 in a Central Point sandy loam soil.

Varieties are listed using the names or designations in effect as of the start of this experiment. Some experimental varieties may have been released by the companies during the course of the experiment, but because later generations of seed that are sold to the grower may exhibit a different growth potential than that of the seed planted here, we have continued to identify the varieties by the name or designation in effect when the seed was planted.

The varieties in Table 2 are listed in order of their 2001 total yield.

The varieties in Table 3 are listed in order of their total cumulative yield.

In the seedling year (1997) alfalfa was harvested on only two dates. In subsequent years, the alfalfa was harvested on four dates per year.
Table 1. Alfalfa Variety Trial Irrigation and Precipitation, 2001. Southern Oregon Research and Extension Center, Medford, OR.

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<th>Time Interval</th>
<th>Precipitation (in)</th>
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Table 2. Yield data (O.D. weight) for alfalfa variety trial, 2001. Southern Oregon Research and Extension Center, Medford, OR.

<table>
<thead>
<tr>
<th>Variety, Brand, or ID Number</th>
<th>Seed Source / Marketer</th>
<th>Fall Dormancy</th>
<th>1st Cut May 17 (T/ac)</th>
<th>2nd Cut June 21 (T/ac)</th>
<th>3rd Cut July 26 (T/ac)</th>
<th>4th Cut Sep. 5 (T/ac)</th>
<th>Yearly Total (T/ac)</th>
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Probability of >

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Table 3. Annual yield totals and cumulative total yield (O.D. weight) for alfalfa variety trial, Southern Oregon Research and Extension Center, Medford, OR.

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<th>1998 Total (T/ac)</th>
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<td>20.75</td>
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Probability of > F value

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<th>0.065</th>
<th>0.268</th>
<th>0.903</th>
<th>0.058</th>
<th>NA</th>
</tr>
</thead>
<tbody>
<tr>
<td>LSD0.05</td>
<td>NS</td>
<td>NS</td>
<td>NS</td>
<td>NS</td>
<td>NS</td>
<td>NA</td>
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<tr>
<td>C.V. %</td>
<td>10.2</td>
<td>7.8</td>
<td>6</td>
<td>7.9</td>
<td>8.8</td>
<td>NA</td>
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</tbody>
</table>

Based on Grand Total data

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Oregon State University
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