

ALFALFA VARIETY AND BRAND CHARACTERISTICS FOR CALIFORNIA

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Each year, more and more alfalfa varieties and brands are marketed. The University of California Cooperative Extension Service and Department of Agronomy and Range Science have a long history of cooperation in determining the areas of adaptation for alfalfa varieties. In 1958, when I began my career as Extension Agronomist, there were only four or five varieties available for farmers to choose among in California. In the southern desert it was African, California Common, Arizona Common, Hairy Peruvian, and to a much lesser extent some exotic varieties such as Arabian and Indian. Further north, in the San Joaquin Valley, we had a few more including Caliverde, Buffalo, and the new release from the USDA and the University of California, Lahontan. When the spotted alfalfa aphid (SAA) struck in 1953-54, and soon developed into an epidemic and crises of major proportions, all varieties but Lahontan (and to a lesser extent African since it had some resistance, and could probably be classed in our present scheme as having "low resistance") soon disappeared. Seed growers learned more rapidly than hay growers that SAA resistance was imperative!

New Varieties to Answer Problems

It wasn't long before a new variety, Moapa, was selected from an old African field by identifying plants that had resistance to the SAA. For several years after Moapa's release in 1957-58, California got along with only two varieties, the semidormant Lahontan grown in the north, and Moapa, grown in the south. Of course, there are always some who feel the old is better than the new and it took several years before most farmers were growing SAA resistant varieties, and that particular threat disappeared.

I say disappeared because it was not eliminated. The SAA, reproducing asexually, mutated on several occasions and new biotypes were developed, one of which rendered the old variety Moapa completely susceptible. Fortunately, by the late 1960's when this biotype problem was rapidly developing in other areas besides Imperial Valley, many new varieties of alfalfa that were capable of producing in the southern desert area, were appearing. This included Moapa 69, which only required substituting two of the nine original clones of Moapa to make a new variety with higher yield and which could again withstand the SAA. I give you this background by way of introduction to the idea that even when we only had three to five varieties, each found its own particular place depending upon its characteristics and the requirements which are peculiar to each climatic region, localized area, individual soil, and farmer use. Farmers will always look to those who have the most intimate knowledge about alfalfa varieties for a recommendation for their own particular field.

New Varieties Have Increased Persistence

I will never forget a visit I made to Imperial Valley in the early 1960's. The farm advisor took me to visit a prominent alfalfa grower in the El Centro area, one who is with us here today. This producer said to me "Come here, I want to show you what you University people have done to me!" A little apprehensively, I got in the truck with him and we drove to a field that had just completed its fourth year of production from some of the original Certified seed of the variety Moapa. Today it is not uncommon to have a variety that will last four production years in the Imperial Valley, but in those days, as many of you will remember, alfalfa was grown nearly as an annual crop, with much renovation and reseeded of entire fields done each fall. Now, some touch up occurs in many fields but nothing of the magnitude the word "renovation" implied in the pre-1960 era. Moapa was selected from old fields of African. It not only had resistance to SAA, but fortunately the plants selected had "persistence".

Since the "Moapa Era" other varieties have come and gone in the low desert valleys of southern California and southern Arizona. Most were developed for high yield and SAA resistance, with no increased persistence. How many of you hear of El Unico or Sonora any longer? These were popular varieties when they were tested and released in the mid to late

1960's. Others have come and gone in the 1970's, such as Sonora 70, Mesa Sirsa, UC Cargo, etc. Today we have the popular CUF 101 developed by Dr. William F. Lehman at the Imperial Valley Field Station. This variety has had wide acceptance and is probably the most common variety now grown in the southern deserts of California and Arizona, and is exported to many parts of the world including Australia, South Africa, and Argentina. It is widely planted in the Middle East as well as closer to home in Mexico. Many have called CUF 101 the first "multiple resistant" variety for the southwest. It has also been one of the sources for breeding many other new, improved private varieties that offer a wide base of desirable characteristics, such as resistance to the stem nematode, bacterial wilt, southern anthracnose, and downy mildew. But what gives a variety its popularity? True enough, every new variety needs advertising to become established, but in the long run I believe most producers in the southwest base their judgment on three factors, which are interrelated.

1. Performance or yield.
2. Persistence and a variety's ability to produce at a high level for three to four years.
3. Quality.

A Partnership

Until the early 1960's, nearly all the varieties released were from USDA and University public breeding programs. Today, if we examine the origin of the 93 varieties that are listed in Tables 1 and 2, you will see that only 17 are from public agencies, or only 18%, when you consider all the varieties that are classified for the State of California with its very diverse climates. If we speak only about the low desert valleys, we have a much higher percentage since the strong public breeding programs of the University of Arizona and the University of California have been extremely active and productive in releasing excellent new varieties as they have been needed. In the last few years, many private companies are increasing their commitment to breeding improved varieties for the low desert areas of southern California and southern Arizona. Both public and private researchers are working to provide varieties that will produce at a high level over a longer period of time, and provide dairies with high quality forage.

Public alfalfa breeders are also working to develop "germ plasm" with high resistance to specific problems. These are not finished varieties, but provide elite breeding material for many other breeders developing new varieties. For example, let's look at Table 3 which summarizes the yield and stand persistence for five varieties after the second year. This trial was planted October 9, 1981 and was harvested on a schedule that allows a good estimate of total seasonal yield from only harvesting four harvests during the season, if those harvests are properly spaced. These data are provided by Bob Hagemann, Farm Advisor for Imperial County. Notice that for the cutting of June 23, 1983, there is virtually no difference between the five entries, and only a very small difference (which is nonsignificant statistically) when one considers the total harvests that have been made over the year and a half that are represented. All varieties appear to be performing essentially the same. Even in stand persistence there is little difference among entries, although all entries seem to be declining in their stand over time. That is to be expected, but it is interesting to see that none seem to be dying out more rapidly than any other. Incidentally, all of these entries have at least a moderate level of resistance to Phytophthora root rot, and so far as we know, none have resistance to Rhizoctonia stem and root canker, the two diseases which along with "scald" appear to be most devastatingly severe on stands in the Imperial Valley.

The same situation exists near Holtville at the Imperial Valley Field Station on a different soil, Imperial clay. Table 4 lists 15 alfalfa varieties and experimentals that have a history of two years, planted October 7, 1981. These data were provided by Dr. William F. Lehman of the Imperial Valley Field Station, and indicate that there are many entries that perform similarly, many of them private varieties. This trial was harvested four times per year to estimate total seasonal production just as the Kuhn trial conducted by Imperial County had the same number of harvests. It has been shown that you can accurately estimate total seasonal production by harvesting only four cuts per year as long as two cuts are taken early between March 15 and July 5, one cutting between August 1 and September 1, and one late cutting sometime between October 1 and December 1. I make this explanation so you won't think production on the Imperial Valley Field Station is poor -- it only represents four cuttings per season and not the eight to nine that would ordinarily be taken. Although this data has not yet been analyzed statistically, I doubt there is

enough difference between the yield of the top 10 entries to attach any particular significance to where they happen to be placed in their ranking in this trial.

Varieties for Specific Conditions

Soil differences in the low desert valleys are often the basis for choosing an alfalfa variety. Although most soils in the desert are a clay or clay loam, some sandy soils near rivers (particularly the Colorado River), or in areas where sand has been deposited (some parts of the Imperial and Coachella valleys), are historically infested with root-knot nematode species as well as other kinds of root nematodes. A good example is the low production and poor persistence that have been highlighted in the Palo Verde Valley with the recent discovery that the very rapid stand decline of CUF 101 was probably due, in part at least, to damage from root nematodes, particularly the root-knot nematode. CUF 101, widely and successfully grown on heavy soils in the low desert, is quite susceptible to root nematodes.

Stand decline in some new varieties and experimental selections, and the resulting invasion of bermudagrass on sandy soils near the Colorado River have been greatly reduced in variety evaluation trials conducted by Les Ede, Farm Advisor for Riverside County. Les has been working with Bill Lehman, John Radewald (Extension Nematologist from Riverside), and me in evaluating the effect of some of the newer selections under heavy nematode infestation. Tables 5, 6 and 7 summarize three trials planted on heavily nematode-contaminated areas, the first two on the Strochein Ranch near Blythe, and the third on the Fisher Ranch near the Cibola Bridge in lower Palo Verde Valley. Table 5 summarizes the stand decline from a planting in October 27, 1981, over the next two years. Six varieties are involved, with UC Cibola clearly demonstrating its persistence, along with UC 227 which was selected from CUF 101 at the Hull Farm near Blythe, in a trial planted in December 1979 and previously reported. UC Cibola was selected from a number of varieties planted in the mid 70's on the Fisher Ranch, evaluated in Palo Verde Valley, Imperial Valley, and the San Joaquin Valley, and accepted for certification as a new variety in December 1982. Of the six varieties listed in Table 5, only UC Cibola and UC 227 have shown any persistence, due no doubt to their development in nematode infested areas. The other four have no special selection for resistance to nematodes, although Moapa and Moapa 69 were known many years ago to have resistance to some of the species of root-knot nematode. Apparently we are dealing with another species of root-knot nematodes in this location.

Table 6 documents the stand decline and weed development of bermudagrass under fumigated and nonfumigated conditions, also on the Strochein Ranch adjacent to the trial previously discussed. These were planted on the same day and illustrate the consistency of UC Cibola in maintaining its stand even under nonfumigated conditions, with little invasion of bermudagrass compared to the other entries.

The 12 entries planted November 7, 1981 on the Fisher Ranch (summarized in Table 7) show the same kind of decline in stand through the second year after establishment, although somewhat more irregularly. UC Cibola is clearly superior to most other entries, although there are a number of others that have been selected for nematode resistance that after two years are not too different from UC Cibola. These would include UC 251 and UC 247 (both selected from the Hull Ranch trial near Blythe), UC 248 (selected from greenhouse work by Dr. Larry Teuber at U.C. Davis), UC 227 (an earlier selection from the Hull Ranch trial completely from CUF 101), and the older germplasm UC PX 1971 (selected by Bill Isom in the Perris Valley). The poorest persisting four entries, UC 236, Sonora, CUF 101, and UC 235, were not selected with any thought for nematode resistance, but Sonora for productivity and the others from persistence and productivity at the Imperial Valley Field Station. For specific conditions such as represented by these sandy desert soils where the root nematodes are a severe problem, varieties must be specifically developed to meet the production, persistence, and quality requirements of growers. UC Cibola is only the beginning -- a stop-gap. From this beginning, many new varieties will emerge from private industry that will have better adaptation to such specific conditions.

A similar type trial was initiated in Imperial Valley several years ago, conducted by Drs. Frank Laemmlen and John Radewald. The current data indicate that on this site, a sandy soil in central-west Imperial Valley, UC Cibola is yielding higher than any other entry and is persisting. There are 11 entries in this trial with many commercial varieties. I am confident that UC Cibola will persist where the principal problem is root-knot nematodes. I am also confident from observations made in a five-year old stand of alfalfa at

the West Side Field Station in west Fresno County that UC Cibola will also persist where Phytophthora root rot is a major cause of stand decline. Table 8 summarizes the stand persistence difference among 36 entries in a trial planted November 2, 1978 at the West Side Field Station in Fresno County. UC Cibola (tested as UC 127) was among the most persistent entries in readings taken May 4, after one of the most severe winters we have ever experienced in central California. In this trial CUF 101 had less than a 40% stand remaining compared to UC Cibola's 60%. In observations made on November 3, 1983, but which are not summarized, UC Cibola and Arizona Ron were the best looking entries in terms of stand persistence and vigor.

Variety Evaluation in Other Areas

The University of California Cooperative Extension has a wide-reaching variety evaluation program to determine the adaptation of approximately 200 different varieties, brands and experimental selections. Many of these are adapted to the northern, cold winter, mountainous areas, which are similar to the large alfalfa growing regions of the midwestern United States. For the past 20+ years, a regional variety evaluation program has been conducted at U.C. Davis by the surrounding county farm advisors, the Department of Agronomy & Range Science, and myself. Tables 9 and 10 illustrate some of the data collected at U.C. Davis, including production and persistence. This area only harvests six times per year with nondormant varieties, and five with the more semidormant, slower-growing varieties. As you can see from Table 9, there are many new nondormant entries, many of them still experimentals, that are both persistent and high yielding. The 1983 production (the fourth year) shows that of the top seven entries, five are experimentals and only two are established varieties. It is especially encouraging to see the increased persistence when compared with Lahontan, considered a check variety in terms of persistence in heavy soils. Although not shown in this paper, other semidormant varieties are also much more productive and as persistent as Lahontan when grown in deep Yolo clay loam soil at U.C. Davis.

These examples are only a small part of the total evaluation program being conducted by Cooperative Extension throughout the State of California. In 1983 some 37 trials, about half harvested for yield and the other for observation purposes, were in place throughout the state. An additional 23 trials have already been established this fall.

Annual summaries are made of all alfalfa trial data. These are published as Agronomy Progress Reports, for specific regional areas. Reports of 1982 trial results are available from my office as will be the data from the 1983 program as soon as it is summarized and printed. The aim of our program, together with private industry, is to characterize the area of adaptation for the many alfalfas that are being produced by public and private breeders. Through the development of such data, farmers will have a better idea as to the varieties that will fit their particular situation.

Table 1. Alfalfa variety and brand growth characteristics, principal areas of use, and distributor/owner/originator. December 1983.

| Variety or brand | Winter ¹ dormancy | Fall ² growth | Principal ³ areas of use | Distributor or owner or originator | Information supplied by: |
|---------------------|---------------------------------|-----------------------------|---|--|--------------------------|
| WINTER DORMANT | | | | | |
| Apollo | D | 3 | 6,8 | North American Plant Breeders | Jim Moutray |
| Apollo II | D | 3 | 6,7,8 | " " | " " |
| Armor | D | 2 | 6,7,8 | " " | " " |
| AS-67 | D | 2 | 8 | Ferry-Morse | Phil Robnett/Tony Wilson |
| AS-60F | D | 3 | 8 | " " | " " |
| Atra 55 | D | 2 | 8 | Arnold-Thomas Seed Service | Jack McGillis |
| Blazer | D | 2 | 8 | Union Seed Co. | Jess Bice/Don Brown |
| DeKalb Brand 120 | D | 2 | 8 | Ramsey Seed/ DeKalb-Pfizer Genetics | Doug Roberts |
| DeKalb Brand 130 | D | 3 | 2,8 | " " | " " |
| DeKalb Brand 131 | D | 3 | 8 | Ramsey Seed | Tim Martin |
| Drummor | D | 3 | 6,7,8 | Northrup King | Bill Knipe |
| Epic | D | 2 | 8 | Union Seed Co. | R. R. Kalton |
| Gladiator | D | 2 | 8 | Northrup King | Bill Knipe |
| GT-58 | D | 3 | 6,8 | Ferry-Morse | Phil Robnett/Tony Wilson |
| Iroquois | D | 1 | 8 | New York College of Ag., Cornell Univ. | R. P. Murphy/C. C. Lowe |
| Oneida | D | 1 | 8 | " " | " " |
| Pacer | D | 2 | 8 | Union Seed Co. | Jess Bice/Don Brown |
| Peak | D | 2 | 8 | Union Seed Co. | R. R. Kalton |
| Phytor | D | 2 | 8 | Northrup King | Bill Knipe |
| Pioneer Brand 524 | D | 2 | 8 | Pioneer Hi-Bred International Inc. | Boyd Hartman |
| Pioneer Brand 526 | D | 2 | 8 | " " | " " |
| Pioneer Brand 532 | D | 3 | 7,8 | " " | " " |
| Pioneer Brand 545 | D | 2 | 8 | " " | " " |
| Raidor | D | 3 | 8 | Northrup King | Bill Knipe |
| Ranger | D | 1 | 8 | USDA/Univ. of Nebraska | Vern Marble |
| RS 209 | D | 3 | 6,8 | Ramsey Seed Co. | Tim Martin |
| Spredor 2 | VD | 1 | 8 | Northrup King | Bill Knipe |
| Summit | D | 3 | 6,8 | NC+ Calif. Seed | Jim Loe |
| Sunrise | D | 1 | 6,8 | " " " | " " |
| Thor | D | 2 | 8 | Northrup King | Bill Knipe |
| Trumpetor | D | 2 | 8 | " " | " " |
| WL 220 | D | 2 | 8 | Germain's/W-L Research | Larry Satterlee |
| WL 221 | D | 2 | 8 | " " | " " |
| Valor | D | 1 | 8 | Union Seed Co. | Jess Bice/Don Brown |
| Vancor | D | 2 | 8 | Northrup King | Bill Knipe |
| Vernal | D | 1 | 8 | University of Wisconsin | Vern Marble |
| SEMI WINTER DORMANT | | | | | |
| Alpha I | SD | 4 | 2,3,5,6,8 | NC+ Calif. Seed | Jim Loe |
| AS-49 | SD | 4 | 2,3,5,6 | Ferry-Morse | Phil Robnett/Tony Wilson |

Table 1. (Continued)

| Variety or brand | Winter ¹ dormancy | Fall ² growth | Principal ³ areas of use | Distributor or owner or originator | Information supplied by: |
|--|---------------------------------|-----------------------------|---|---|--------------------------|
| AS-49R | SD | 4 | 2,3,5,6 | " " | " " " " |
| Cimarron | SD | 4 | 2,5,6,8 | Great Plains Research Co., Inc. | Thad Busbice |
| Condura 74 Brand | SD | 4 | 2,5,6,8 | Continental | Eldon Hoffman |
| DeKalb Brand 167 | SD | 4 | 2,3,5,6 | Ramsey Seed | Tim Martin |
| Eagle | SD | 3 | 2,6,7,8 | O's Gold | Jerrold Ocheltree |
| GT-55 | SD | 3 | 2,3,5,6,8 | Ferry-Morse | Phil Robnett/Tony Wilson |
| Hawk Brand | SD | 3 | 2,8 | Green Thumb, Inc. | Jim Froman |
| Lahontan | SD | 3 | 2,3,5,6 | USDA/Univ. of Nevada | Boyd Hartman |
| NC+ 5500 Brand | SD | 4 | 2,3,5,6 | NC+ Calif. Seed | Jim Loe |
| Pike | SD | 4 | 2,3,4,5, 6,7 | Northrup King | Bill Knipe |
| Pioneer Brand 555 | SD | 4 | 6,8 | Pioneer Hi-Bred International, Inc. | Boyd Hartman |
| SD 76 Brand | SD | 4 | 2,5,6,8 | Garner Seed | Bob Shotwell |
| Seagull Brand | SD | 3 | 2,8 | Green Thumb, Inc. | Jim Froman |
| WL 312 | SD | 3 | 2,6,7,8 | Germain's/W-L Research | Larry Satterlee |
| WL 314 | SD | 3 | 2,6,7,8 | " " | " " |
| WL 316 | SD | 4 | 2,6,7,8 | " " | " " |
| WL 318 | SD | 4 | 2,5,6,8 | " " | " " |
| 1019 Brand | SD | 4 | 2,3,4,5,6, 7,8 | Northrup King | Bill Knipe |
| Washoe | SD | 3 | 2,4,5,6,8 | USDA/Univ. of Nevada | Boyd Hartman |
| INTERMEDIATE WINTER DORMANT TO MODERATELY NON WINTER DORMANT | | | | | |
| Amador | ID | 5 | 2,3,4,5,6, 7 | Northrup King | Bill Knipe |
| Baron | ID | 4 | 2,3,4,5,6 | North American Plant Breeders Univ. of Calif. | Jim Moutray |
| Caliverde 65 | ID | 4 | 2,3,5,6 | Continental | Vern Marble |
| Condura 73 Brand | ID | 4 | 2,3,5,6 | Ramsey Seed | Eldon Hoffman |
| DeKalb Brand 185 | MND | 5 | 4,5,6 | Security Ag Research | Tim Martin |
| Joaquin 11 | MND | 5 | 2,3,4,5,6 | New Mexico State Univ. | Steve Rusconi |
| Mesilla | MND | 5 | 2,4 | NC+ Calif. Seed | Bill Melton |
| NC+ 6600 Brand | ID | 5 | 3,5,6,7 | " " " | Jim Loe |
| NC+ 8000 Brand | MND | 7 | 4,5,6 | " " " | " " |
| NC+ 8800 Brand | ID | 5 | 4,5,6 | " " " | " " |
| Pioneer Brand 581 | ID | 4 | 2,3,5,6 | Pioneer Hi-Bred International | Boyd Hartman |
| WL 450 | MND | 5 | 3,5,6 | Germain's/W-L Research | Larry Satterlee |
| WL Southern Special | MND | 5 | 2,3,5,6 | " " | " " |
| 919 Brand | ID | 5 | 3,4,5,6 | Northrup King | Bill Knipe |
| NON WINTER DORMANT | | | | | |
| Ardiente | ND | 6 | 1,3,4,5 | Ferry-Morse | Phil Robnett/Tony Wilson |
| AS-13R | ND | 6 | 3,4,5,6 | " " | " " " " |
| Galaxy | ND | 6 | 1,3,4,5,6 | NC+ Calif. Seed | Jim Loe |
| GT-13R Plus | ND | 6 | 3,4,5,6 | Ferry-Morse | Phil Robnett/Tony Wilson |

Table 1. (Continued)

| Variety or brand | Winter ¹ dormancy | Fall ² growth | Principal ³ areas of use | Distributor or owner or originator | Information supplied by: |
|-------------------|---------------------------------|-----------------------------|---|--|--------------------------|
| Moapa 69 | ND | 6 | 1,3,4,5,6 | USDA/Univ. of Nevada | Boyd Hartman |
| ND 80 Brand | ND | 6 | 1,3,4,5,6 | Garner Seed Co. | Bob Shotwell |
| Pierce | ND | 7 | 1,4,5 | Northrup King | Bill Knipe |
| Pioneer Brand 572 | ND | 7 | 1,3,4,5 | Pioneer Hi-Bred International | Boyd Hartman |
| Rincon | ND | 6 | 2 | New Mexico State University | Bill Melton |
| WL 512 | ND | 6 | 1,3,4,5,6 | Germain's/W-L Research | Larry Satterlee |
| WL 514 | ND | 6 | 1,3,4,5,6 | " " | " " |
| WL 515 | ND | 6 | 1,2,3,4,5,6 | " " | " " |
| 819 Brand | ND | 6 | 1,4,5 | Northrup King | Bill Knipe |
| Valador | ND | 6 | 1,4,5 | " " | " " |

VERY NON WINTER DORMANT

| | | | | | |
|--------------------|-----|---|--------|-------------------------------|----------------|
| Converde 95 Brand | VND | 7 | ,3,4,5 | Continental | Eldon Hoffman |
| CUF 101 | VND | 8 | ,4,5 | Univ. of Calif. | Bill Lehman |
| Granada | VND | 8 | ,4,5 | North American Plant Breeders | Jim Moutray |
| Hayden | VND | 7 | 1,4 | Univ. of Arizona | Mel Schonhorst |
| Lew | VND | 7 | 1,3 | " " " | " " |
| Maxidor | VND | 8 | 1,4,5 | Northrup King | Bill Knipe |
| Mesa Sirsa | VND | 7 | - | Univ. of Arizona | Mel Schonhorst |
| Pioneer Brand 5929 | VND | 8 | ,3,4,5 | Pioneer Hi-Bred International | Boyd Hartman |
| Sonora 70 | VND | 7 | 1 | Univ. of Arizona | Mel Schonhorst |
| UC Cibola | VND | 7 | 1,4 | Univ. of Calif. | Bill Lehman |
| UC Salton | VND | 7 | 1,4 | " " " | " " |

¹Winter Dormancy and Example Variety

VND = Very nonwinter dormant (CUF 101)
 ND = Nonwinter dormant (Moapa 69)
 MND = Moderately nonwinter dormant (Mesilla)
 ID = Intermediate winter dormant (Caliverde 65)
 SD = Semi winter dormant (Lahontan)
 D = Winter dormant (Vernal)
 VD = Very winter dormant (Norseman)

²Fall Growth Similarities

1 = Vernal
 2 = Thor
 3 = Lahontan
 4 = Caliverde 65
 5 = DeKalb Brand 185
 6 = Moapa 69
 7 = UC Salton
 8 = CUF 101

³Principal Areas of Use

1 = Low desert valleys of southern California, southern Arizona, and southern Nevada.
 2 = Intermediate and high desert valleys of southern California, southern Arizona, southern Nevada, southern New Mexico and west Texas.
 3 = Coastal valleys of central and southern California.
 4 = Southern San Joaquin Valley.
 5 = Northern San Joaquin Valley.
 6 = Sacramento Valley.
 7 = North coastal valleys.
 8 = High elevation mountain valleys of northern California, Nevada, northern Arizona, and northern New Mexico.

Table 2. Alfalfa variety and brand ratings for pest resistance.¹ December 1983

| Variety or brand | SAA | PA | BAA | PRR | Sc | Rz | BW | FW | S An | CLS | DM | SN | RKN |
|------------------------|-----|----|-----|-----|----|----|----|----|------|-----|----|----|-----|
| WINTER DORMANT | | | | | | | | | | | | | |
| Apollo | MR | R | S | R | S | S | R | R | MR | LR | LR | MR | S |
| Apollo II ³ | MR | MR | S | HR | -- | -- | R | HR | MR | -- | -- | MR | -- |
| Armor | S | MR | S | R | -- | -- | R | R | MR | -- | -- | -- | -- |
| AS-67 | MR | MR | LR | LR | -- | -- | R | MR | MR | MR | MR | LR | MR |
| Atra 55 | S | MR | S | MR | -- | -- | R | MR | S | HR | HR | -- | -- |
| Blazer | S | HR | S | MR | S | S | HR | R | LR | -- | -- | R | -- |
| DeKalb Brand 120 | S | HR | -- | R | -- | -- | HR | R | LR | -- | -- | R | -- |
| *DeKalb Brand 130 | R | R | LR | LR | -- | LR | R | MR | MR | MR | -- | MR | -- |
| *DeKalb Brand 131 | R | S | S | S | -- | -- | MR | -- | S | LR | R | S | -- |
| Drummor | R | -- | -- | R | -- | -- | R | -- | MR | R | R | MR | -- |
| Epic | LR | HR | -- | R | -- | -- | HR | R | LR | MR | -- | MR | -- |
| Gladiator | S | R | S | S | -- | -- | R | MR | LR | MR | R | MR | -- |
| GT-58 | HR | R | LR | HR | -- | LR | R | HR | MR | MR | MR | MR | MR |
| *Iroquois | S | S | S | S | S | S | R | -- | S | LR | -- | S | -- |
| *Oneida | S | S | S | R | -- | -- | HR | -- | S | R | MR | S | -- |
| Peak | S | HR | S | MR | S | S | HR | R | S | -- | -- | R | -- |
| Phytor | S | S | S | R | -- | -- | R | -- | S | MR | MR | S | |
| Pioneer Brand 524 | R | LR | -- | -- | -- | -- | MR | R | -- | -- | MR | -- | -- |
| Pioneer Brand 526 | R | MR | -- | -- | -- | -- | R | -- | -- | -- | MR | -- | -- |
| Pioneer Brand 532 | R | MR | -- | MR | -- | -- | R | R | MR | -- | -- | -- | LR |
| Pioneer Brand 545 | R | LR | -- | R | -- | -- | R | R | -- | -- | -- | LR | |
| Raidor | S | S | S | S | -- | -- | R | MR | R | R | R | MR | |
| *Ranger | S | S | S | S | -- | -- | MR | -- | S | MR | MR | S | |
| *RS 209 | R | LR | S | R | S | S | R | R | MR | LR | LR | S | S |
| Spredor 2 | S | S | S | S | -- | -- | HR | -- | S | R | R | -- | -- |
| *Summit | R | R | LR | MR | -- | LR | R | MR | LR | LR | LR | R | -- |
| *Sunrise | R | LR | S | LR | -- | -- | R | MR | LR | LR | MR | LR | -- |
| Thor | S | S | S | S | -- | -- | HR | -- | S | R | R | MR | -- |
| Trumpetor ³ | S | R | S | S | -- | -- | MR | R | R | R | R | MR | -- |
| WL 220 | MR | HR | MR | MR | -- | -- | R | MR | S | LR | LR | LR | S |
| WL 221 | R | R | -- | LR | -- | -- | R | MR | MR | LR | -- | MR | -- |
| Valor | S | R | S | S | S | S | R | MR | LR | MR | -- | -- | -- |
| Vancor | S | R | S | R | -- | -- | R | MR | R | R | R | R | -- |
| *Vernal | S | S | S | S | -- | -- | R | -- | S | LR | MR | S | MR |
| SEMI WINTER DORMANT | | | | | | | | | | | | | |
| *Alpha I | R | HR | LR | R | -- | LR | R | MR | R | LR | MR | MR | -- |
| AS-49 | HR | LR | S | LR | -- | -- | MR | R | LR | MR | MR | R | LR |
| AS-49R | HR | MR | S | MR | -- | -- | MR | R | LR | MR | LR | R | LR |
| *Cimarron | MR | R | S | MR | -- | -- | R | R | R | MR | LR | -- | -- |
| *Condura 74 Brand | R | R | LR | R | -- | LR | R | MR | R | LR | MR | MR | -- |
| *DeKalb Brand 167 | R | LR | S | MR | -- | -- | LR | -- | S | LR | LR | LR | -- |
| Eagle ³ | R | R | LR | R | -- | -- | R | R | R | -- | -- | R | -- |
| GT-55 | R | R | LR | HR | -- | LR | MR | HR | MR | MR | MR | MR | MR |
| Hawk Brand | R | R | -- | R | -- | -- | R | MR | MR | MR | LR | LR | S |
| *Lahontan | R | S | S | MR | S | S | R | S | S | S | S | R | S |
| *NC+ 5500 Brand | R | R | S | R | -- | -- | R | -- | S | LR | LR | LR | -- |
| Pike | MR | R | S | R | -- | -- | MR | MR | S | R | R | R | MR |
| Pioneer Brand 555 | R | MR | -- | LR | -- | -- | R | R | LR | -- | -- | -- | LR |
| *SD 76 Brand | R | R | LR | MR | -- | LR | R | MR | MR | LR | LR | MR | -- |
| Seagull Brand | R | R | -- | R | -- | -- | R | MR | MR | MR | MR | MR | S |
| WL 312 | R | R | LR | R | -- | -- | R | MR | LR | MR | LR | MR | -- |
| WL 314 | R | HR | LR | LR | -- | -- | R | R | LR | -- | -- | HR | -- |
| WL 316 ² | R | R | LR | MR | -- | -- | MR | R | R | -- | -- | MR | -- |
| WL 318 | R | HR | LR | MR | -- | -- | R | MR | MR | MR | MR | LR | S |
| 1019 Brand | MR | LR | -- | R | -- | -- | MR | -- | -- | R | R | R | -- |
| *Washoe | R | MR | S | R | -- | -- | R | S | S | S | S | R | S |

Table 2. (Continued)

| Variety or brand | SAA | PA | BAA | PRR | Sc | Rz | BW | FW | S An | CLS | DM | SN | RKN |
|--|---------|---------|----------|---------|----------|----------|---------|---------|----------|----------|----------|----------|----------|
| INTERMEDIATE WINTER DORMANT TO MODERATELY NON WINTER DORMANT | | | | | | | | | | | | | |
| Amador | MR | S | S | R | -- | -- | -- | R | -- | MR | MR | MR | S |
| Baron | HR | HR | HR | R | -- | -- | MR | R | MR | -- | -- | -- | -- |
| *Caliverde 65 | HR | S | S | MT | -- | -- | R | -- | S | MT | MT | MT | -- |
| *Condura 73 Brand | R | LR | S | R | S | S | R | -- | S | LR | LR | R | -- |
| *DeKalb Brand 185 | R | LR | S | LR | -- | -- | S | -- | S | LR | LR | S | -- |
| *Joaquin 11 | R | S | S | LR | -- | -- | -- | -- | S | S | S | LR | LR |
| *Mesilla | R | R | S | LR | -- | -- | -- | R | -- | -- | -- | LR | -- |
| *NC+ 6600 Brand | MR | LR | S | MR | -- | -- | LR | LR | S | LR | LR | LR | -- |
| *NC+ 8000 Brand | R | MR | LR | LR | -- | -- | S | MR | S | S | LR | S | -- |
| *NC+ 8800 Brand | R | MR | S | R | -- | -- | S | -- | S | LR | LR | S | -- |
| Pioneer Brand 581 | R | LR | S | MR | LR | S | R | -- | S | LR | LR | R | S |
| WL 450 | R | MR | MR | MR | -- | -- | MR | -- | LR | LR | MR | R | LR |
| WL Southern Special 919 Brand | R MR | R LR | MR -- | MR R | -- -- | -- -- | R MR | R -- | MR -- | -- MR | -- MR | MR MR | -- MR |
| NON WINTER DORMANT | | | | | | | | | | | | | |
| Ardiente | R | LR | LR | MR | -- | -- | MR | R | LR | MR | MR | LR | LR |
| AS-13R | MR | LR | LR | R | -- | LR | MR | R | LR | MR | MR | R | MR |
| *Galaxy | MR | R | LR | MR | -- | -- | MR | MR | LR | -- | MR | LR | -- |
| GT-13R + | R | LR | LR | HR | -- | MR | R | HR | LR | MR | MR | R | MR |
| *Moapa 69 | R | S | S | S | S | S | S | R | S | S | S | S | LR |
| *ND 80 Brand | HR | MR | MR | -- | -- | MR | HR | S | -- | -- | -- | -- | -- |
| Pierce | HR | R | HR | R | -- | -- | LR | HR | S | MR | MR | R | -- |
| Pioneer Brand 572 | R | R | S | LR | LR | S | S | R | S | S | R | S | R |
| *Rincon | R | R | S | S | S | -- | LR | LR | -- | -- | LR | -- | -- |
| WL 512 | HR | R | LR | MR | LR | LR | MR | R | MR | LR | MR | LR | LR |
| WL 514 | R | R | MR | LR | -- | -- | MR | MR | S | -- | -- | LR | -- |
| WL 515 | R | R | MR | R | -- | -- | LR | R | S | -- | -- | R | -- |
| 819 Brand | R | MR | LR | MR | LR | -- | -- | R | LR | -- | -- | -- | LR |
| Valador | R | | S | R | LR | -- | -- | R | MR | LR | LR | -- | MR |
| VERY NON WINTER DORMANT | | | | | | | | | | | | | |
| *Converde 95 Brand | R | R | S | S | S | S | S | -- | S | S | R | S | LR |
| CUF 101 | HR | HR | HR | MR | LR | -- | S | HR | S | S | LR | -- | MR |
| Granada | HR | HR | HR | R | -- | -- | S | HR | S | -- | MR | S | LR |
| *Hayden | HR | S | S | S | S | S | -- | -- | -- | S | LR | S | LR |
| *Lew | HR | S | S | S | S | S | -- | -- | -- | S | LR | R | S |
| Maxidor | HR | HR | R | MR | -- | -- | -- | HR | -- | -- | -- | R | LR |
| *Mesa Sirsa | HR | S | S | S | S | S | -- | -- | -- | S | LR | LR | LR |
| Pioneer Brand 5929 | R | MR | R | MR | -- | -- | S | R | S | -- | -- | -- | R |
| *Sonora 70 | MR | S | S | S | S | S | S | -- | -- | S | S | S | LR |
| UC Cibola | HR | R | LR | MR | LR | -- | S | HR | -- | -- | LR | -- | R |
| UC Salton | HR | LR | S | LR | LR | S | S | HR | S | S | LR | S | -- |

¹According to the system used by the National Certified Alfalfa Variety Review Board. Information supplied by companies or individuals indicated in Table 1. The author assumes no responsibility for accuracy of the data supplied by the different contributors. Those entries marked with an asterisk (*) have had 1982 ratings which involved "Tolerance" changed to the new system by Vern Marble. This was done since no information on this change was received from the originator/owner/distributor as requested.

²Resistance to *Verticillium* wilt, *Verticillium albo-atrum*.

³Moderate resistance to *Verticillium* wilt, *Verticillium albo-atrum*.

Pests and Diseases

SAA = Spotted alfalfa aphid
PA = Pea aphid
BAA = Blue alfalfa aphid
PRR = Phytophthora root rot
Sc = Scald
Rz = Rhizoctonia stem and root canker
BW = Bacterial wilt
FW = Fusarium wilt
S An = Southern anthracnose
CLS = Common leaf spot
DM = Downy mildew
SN = Stem nematode
RKN = Root-knot nematode species

Resistance Symbols¹

HR = High resistance; >51%
R = Resistance; 31-50%
MR = Moderate resistance; 15-30%
LR = Low resistance; 6-14%
T = Tolerance (see definition below)
S = Susceptible; <5%
-- = No data available

Definitions

- I = Immune. Not subject to attack for a specified pest. Immunity is absolute, and seldom occurs in alfalfa.
- R = Resistance. Ability of plants to restrict the activities of a specified pest.
- T = Tolerance. Ability of plants to endure a specified pest or an adverse environmental condition, performing and producing in spite of the disorder. Not synonymous with low resistance. Used where the resistance mechanism is concerned with the plant's ability to repair, recover, or withstand infestation.
- S = Susceptible. Inability of plants to restrict the activities of a specified pest, or to withstand an adverse environmental condition.

Table 3. Second year yield and stand persistence for four varieties and one experimental selection. Kuhn Ranch, El Centro, Imperial County. Planted October 9, 1981 on Imperial clay loam soil. (Hagemann and Marble)

| Entry | Tons per acre | | Percent full stand | |
|-----------------------|---------------|-----------------|--------------------|--------|
| | 6/23/83 | 5-harvest total | 5/6/83 | 7/1/83 |
| CUF 101 | 1.02 | 7.38 | 65 | 64 |
| Granada ¹ | 0.95 | 7.18 | 71 | 67 |
| WL 515 ¹ | 1.03 | 7.02 | 64 | 66 |
| UC Cibola | 0.95 | 6.93 | 77 | 67 |
| UC 193-B ² | 1.01 | 6.87 | 71 | 68 |
| Mean | 0.99 | 7.08 | 69.6 | 66.4 |
| LSD .05 | ns | ns | ns | ns |

¹Private variety.

²Experimental selection.

Table 4. Two-year yields of 7 alfalfa varieties and 8 experimental selections. U.C. Imperial Valley Field Station, El Centro, Imperial County. Planted October 7, 1981 on Imperial clay soil. Rankings based on four cuts per year as follows: two cuts between March 15 and July 5; one cut August 1 to September 1; and one cut between October 1 and December 1. Four cuts estimates the total seasonal yield very accurately with a correlation coefficient, $r = 0.95$. (Lehman)

| | Four cuttings per year | | | |
|---------------------------------|------------------------|------|-------|---------|
| | Tons per acre | | | |
| | 1982 | 1983 | Total | Average |
| CUF 101 | 5.15 | 4.65 | 9.8 | 4.90 |
| UC 228 ² | 5.06 | 4.58 | 9.64 | 4.82 |
| Pioneer Brand 5929 ¹ | 4.94 | 4.56 | 9.5 | 4.75 |
| UC 227 ² | 5.35 | 3.95 | 9.30 | 4.65 |
| Maxidor ¹ | 4.86 | 4.40 | 9.26 | 4.63 |
| WL 512 ¹ | 4.86 | 4.40 | 9.26 | 4.63 |
| UC 229 ² | 4.78 | 4.34 | 9.12 | 4.56 |
| UC 236 ² | 4.74 | 4.26 | 9.00 | 4.50 |
| Granada ¹ | 4.82 | 4.14 | 8.96 | 4.48 |
| UC 235 ² | 4.78 | 4.16 | 8.94 | 4.47 |
| UC 233 ² | 4.66 | 4.21 | 8.87 | 4.44 |
| WL 515 ¹ | 4.66 | 4.20 | 8.86 | 4.43 |
| UC Cibola | 4.49 | 4.29 | 8.78 | 4.39 |
| UC 230 ² | 4.41 | 4.22 | 8.63 | 4.31 |
| UC 193-B ² | 4.32 | 3.95 | 8.27 | 4.13 |

¹Private variety.

²Experimental selection

Table 5. Stand decline and second year persistence on a soil infested with root-knot and other root nematodes. Strochein Ranch, Blythe, Riverside County. Planted October 27, 1981 on Rositas sandy loam.

| Entry | Percent full stand | | | Inches of height 10/5/83 |
|-------------|--------------------|--------|---------|-----------------------------|
| | 3/25/82 | 5/5/83 | 10/5/83 | |
| UC Cibola | 82.5 | 72.5 | 47.5 | 11.3 |
| UC 227 | 67.5 | 60.0 | 40.0 | 11.2 |
| CUF 101 | 60.0 | 55.0 | 22.5 | 10.5* |
| Arizona BAA | 45.0 | 47.5 | 22.5 | 9.4* |
| UC 228 | 35.0 | 35.0 | 20.0 | 9.5* |
| Moapa 69 | 62.5 | 55.0 | 20.0 | 8.4* |
| Mean | 58.8 | 54.2 | 28.7 | 10.0 |
| LSD .05 | 19.2 | 24.7 | 14.3 | 1.6 |
| .01 | 26.6 | ns | 19.8 | 2.3 |
| CV % | 21.7 | 30.3 | 33.0 | 11.0 |

*Low vigor.

Table 6. Stand decline and second year persistence in a fumigated soil infested with root-knot and other nematodes. Strochein Ranch, Blythe, Riverside County. Planted October 27, 1981 on Rositas sandy loam. October 5, 1983.

| | Percent bermudagrass cover, 10/5/83 | | | Percent full stand, 10/5/83 | | |
|-----------|-------------------------------------|--------------|---------|-----------------------------|--------------|---------|
| | Fumigated | Nonfumigated | Average | Fumigated | Nonfumigated | Average |
| UC Cibola | 0.0 | 20.0 | 10.0 a | 75.0 | 60.0 | 67.5 a |
| Sonora | 0.0 | 65.0 | 32.5 ab | 52.5 | 37.5 | 45.0 a |
| UC 227 | 0.0 | 75.0 | 37.5 b | 55.0 | 32.5 | 43.8 b |
| CUF 101 | 10.0 | 65.0 | 37.5 b | 35.0 | 15.0 | 25.0 c |
| Mean | 2.5 | 56.3 | 29.4 | 54.4 | 36.2 | 45.3 |
| .SD .05 | | | 23.2 | | | 17.4 |
| .01 | | | ns | | | 32.0 |
| CV % | | | 35.1 | | | 17.1 |

Table 7. Stand decline and second year persistence on a root-knot and other nematode infested soil. Fisher Ranch, Blythe, Riverside County. Planted November 7, 1981 on Rositas fine sandy loam soil.

| Entry | Percent full stand | | | |
|-------------|--------------------|-----------|-----------|-----------|
| | 8/4/82 | 12/2/82 | 3/11/83 | 10/5/83 |
| UC Cibola | 82.5 (9) | 75.3 (4) | 76.3 (3) | 61.3 (1) |
| UC 251 | 90.0 (3) | 77.5 (3) | 72.5 (5) | 58.7 (2) |
| UC 229 | 77.5 (12) | 67.5 (5) | 66.3 (7) | 58.7 (3) |
| UC 248 | 87.5 (5) | 67.5 (6) | 67.5 (6) | 55.0 (4) |
| Arizona BAA | 92.5 (2) | 60.0 (9) | 60.0 (10) | 53.7 (5) |
| UC 247 | 95.0 (1) | 87.5 (1) | 80.0 (1) | 50.0 (6) |
| UC 227 | 80.0 (10) | 80.0 (2) | 72.5 (4) | 47.5 (7) |
| UC PX 1971 | 85.0 (6) | 65.0 (7) | 78.7 (2) | 46.3 (8) |
| UC 236 | 85.0 (7) | 62.5 (8) | 62.5 (8) | 42.5 (9) |
| Sonora | 85.0 (8) | 55.0 (10) | 62.5 (9) | 33.7 (10) |
| CUF 101 | 87.5 (4) | 52.5 (11) | 50.0 (11) | 32.5 (11) |
| UC 235 | 77.5 (11) | 50.0 (12) | 50.0 (12) | 26.5 (12) |
| Mean | 85.4 | 66.7 | 66.6 | 47.2 |
| LSD .05 | 10.2 | 13.8 | 18.1 | 21.9 |
| .01 | ns | 18.5 | 24.4 | 29.5 |
| CV % | 8.3 | 14.4 | 18.9 | 32.4 |

Table 8. Fifth year stand persistence of 36 alfalfa varieties, experimental selections and brands. West Side Field Station, Fresno county. Planted November 2, 1978.

| Entry | Percent of full stand - 5/4/83 | Duncan's multiple range test (.05) |
|-------------------------|--------------------------------|------------------------------------|
| USDA-SAA-PGL | 68.7 | a |
| Lahontan | 66.2 | ab |
| NK-K7-701 | 62.5 | abc |
| Falkiner | 62.5 | abc |
| AS-13R | 61.2 | abcd |
| Ariz. Ron | 60.0 | bcde |
| UC Cibola (UC 127) | 60.0 | bcde |
| WL 515 | 58.7 | bcde |
| UC 133 | 58.7 | bcde |
| FSRC IH-48 | 58.7 | bcde |
| FSRC ND-75 | 55.0 | cdef |
| C/W 20 | 53.7 | defg |
| WL Ca 423-26 | 53.7 | defg |
| AZ Hayden PX-1 Cycle II | 52.5 | efgh |
| WL 74 CA A | 52.5 | dfgh |
| USDA-PA-1 | 50.0 | fghi |
| WL 512 | 50.0 | fghi |
| Ariz. CAP | 50.0 | fghi |
| Amador | 50.0 | fghi |
| Vanguard | 48.7 | fghij |
| Pioneer Exp. RS | 48.7 | fghij |
| UC 143 | 48.7 | fghij |
| Diablo Verde Brand | 47.5 | fghij |
| Pioneer Exp. RM | 47.5 | fghij |
| UC 148 | 47.5 | fghij |
| USDA-BAA-19 | 47.5 | fghij |
| Moapa 69 | 46.2 | fghijk |
| Valador | 45.0 | ghijkl |
| UC 103 | 45.0 | hijkl |
| FSRC ND-59 | 42.5 | ijkl |
| WL 514 | 42.5 | ijkl |
| Pioneer Brand 572 | 42.5 | ijkl |
| Ardiente | 40.0 | jk1 |
| CUF 101 | 38.7 | k1 |
| Maxidor | 37.5 | 1 |
| Valor | 28.7 | m |
| Mean | 50.76 | |
| LSD .05 | 7.26 | |
| .01 | 9.61 | |
| % CV | 10.2 | |

Table 9. Fourth year height, stand persistence ratings (15 days after harvest) and yield with rankings for comparison. 1979 U.C. regional alfalfa variety trial. U.C. Davis, 1983. Yolo clay loam soil.

| Entry | 1983 tons per acre | % Full stand 8/31/83 | Inches of height 8/31/83 |
|----------------------|-----------------------|-------------------------|-----------------------------|
| NK PX 76-89 | 7.40 (1) | 69 (1) | 19.4 (5) |
| UC 175 | 7.14 (2) | 66 (4) | 19.6 (3) |
| AS-13R | 7.09 (3) | 68 (2) | 19.0 (8) |
| WL Ca 423-26 | 7.08 (4) | 65 (5) | 18.6 (11) |
| NK PCC-77-106 | 6.81 (5) | 66 (3) | 19.2 (6) |
| WL 512 | 6.72 (6) | 59 (7) | 18.0 (14) |
| UC 1032 | 6.58 (7) | 57 (9) | 18.6 (10) |
| Pioneer Brand 572 | 6.24 (8) | 53 (11) | 18.0 (12) |
| FSRC H-67 | 6.15 (9) | 60 (6) | 9.8 (19) |
| Lahontan | 6.13 (10) | 59 (8) | 15.0 (16) |
| UC 176 | 6.07 (11) | 53 (12) | 19.6 (4) |
| WL 514 | 6.07 (12) | 52 (14) | 18.0 (13) |
| CUF 101 | 6.06 (13) | 51 (15) | 19.6 (2) |
| Moapa 69 | 5.99 (14) | 49 (16) | 19.0 (9) |
| UC 143 | 5.79 (15) | 52 (13) | 19.0 (7) |
| UC 168 | 5.42 (16) | 35 (20) | 20.4 (1) |
| Valor | 5.29 (17) | 54 (10) | 8.6 (22) |
| FSRC F-60 | 4.91 (18) | 31 (21) | 9.6 (20) |
| UC 160 | 4.54 (19) | 36 (19) | 17.8 (15) |
| Hunter River Team | 4.44 (20) | 39 (17) | 11.6 (18) |
| Florida 77 | 4.30 (21) | 38 (18) | 9.0 (21) |
| | 4.25 (22) | 27 (22) | 14.2 (17) |
| Mean | 6.01 | 52.6 | 16.6 |
| LSD .05 | 0.78 | 11.0 | 1.41 |
| .01 | 1.03 | 14.0 | 1.87 |
| CV % | 10.3 | 16.3 | 6.7 |

Table 10. Fourth year first cutting yields, Egyptian alfalfa weevil (EAW) damage and vigor ratings. 1979 U.C. regional alfalfa variety trial, U.C. Davis. Planted September 19, 1979. Average of five replications, May 12, 1983. Yolo clay loam soil.

| Entry | Dormancy ¹ | Tons per acre 5/12/83 | EAW damage rating 5/12/83 ² | Vigor rating ³ 5/12/83 |
|-------------------|-----------------------|--------------------------|---|--------------------------------------|
| FSRC H-67 | D | 1.02 (1) | 1.6 a | 8.9 (1) |
| FSRC F-60 | D | .74 (10) | 2.4 ab | 7.6 (3) |
| Team | D | .61 (18) | 2.6 abc | 7.2 (4) |
| Valor | D | .83 (5) | 2.6 abc | 7.8 (2) |
| UC 143 | VND | .74 (9) | 3.2 bcd | 7.1 (5) |
| CUF 101 | VND | .70 (15) | 3.4 bcde | 6.8 (7) |
| WL 514 | ND | .72 (13) | 3.8 cdef | 6.2 (14) |
| UC 176 | VND | .76 (8) | 3.8 cdefg | 7.0 (6) |
| WL 512 | ND | .80 (7) | 4.2 defg | 6.3 (11) |
| WL Ca 423-26 | ND | .83 (4) | 4.4 defg | 6.4 (9) |
| UC 168 | VND | .59 (19) | 4.4 defg | 6.6 (8) |
| AS-13R | ND | .90 (2) | 4.6 defg | 6.4 (10) |
| UC 1032 | ND | .73 (11) | 4.6 defg | 6.2 (12) |
| Moapa 69 | ND | .70 (16) | 4.6 defg | 6.2 (15) |
| UC 160 | ND | .53 (21) | 4.8 efg | 6.2 (13) |
| Hunter River | ID | .54 (20) | 4.8 efg | 4.4 (22) |
| NK PX 76-89 | ND | .86 (3) | 4.8 efg | 6.0 (16) |
| Florida 77 | MND | .48 (22) | 5.2 fg | 5.4 (20) |
| Lahontan | SD | .71 (14) | 5.2 fg | 5.9 (17) |
| NK PCC-77-106 | ND | .66 (17) | 5.4 g | 5.4 (19) |
| Pioneer Brand 572 | ND | .73 (12) | 5.4 g | 5.4 (18) |
| UC 175 | VND | .82 (6) | 5.6 g | 5.0 (21) |
| Mean | | .74 | 4.2 | |
| .05 | | .15 | 1.2 | |
| .01 | | .20 | 1.6 | |
| | | 16.4 | 22.9 | |

¹See Table 1 for dormancy classification key.

²EAW ratings: 1 = no visible leaf damage; 10 = 100% defoliated.

³Vigor ratings: 1 = least vigor; 10 = high degree of vigor.