

Forage Queen



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THE EDITOR'S TWO CENTS

This is the first issue of "Forage Queen" since I assumed responsibilities for forage and seed crops in the Fresno County Farm and Home Advisors Office. This publication will include several items of interest. I hope they are timely for your farming operations.

If you have suggestions for topics, I would appreciate hearing from you.

ALFALFA VARIETIES

Many growers are deluged with information concerning one variety of alfalfa or another. Enclosed you will find a discussion of several public and private company varieties by Dr. Vern Marble, Extension Agronomist for the University of California Agricultural Extension Service.

Also enclosed is a variety reaction chart to several different environmental factors.

ALFALFA VARIETY SCREENING TRIALS

Results of the first three year's production on alfalfa screening trials at the Westside Field Station in Five Points are currently being computed.

This work included a non-dormant trial with sixteen variety entries and a semi-dormant variety trial with eight entries. Moapa was used as the base variety for cutting in the non-dormant trial. Lahontan was used as the base variety in the semi-dormant trial.

Results of the three-year totals will be in the next issue of "Forage Queen".

CALIVERDE 65 ALFALFA

This fall a few alfalfa growers have planted approximately five thousand acres of a new Experiment Station alfalfa variety called Caliverde 65.

This variety has been developed with

stem nematode and spotted alfalfa aphid resistance. It will be particularly adapted to coastal areas, Sacramento Valley and the northern part of the San Joaquin Valley where stem nematode and spotted alfalfa aphid have been major pests of alfalfa.

Many of you will recall the favorable yields produced by the old Caliverde variety prior to the infestation of spotted alfalfa aphid. Tests have shown that Caliverde 65 will yield about the same as Caliverde in the absence of stem nematode or spotted alfalfa aphid.

Leaf spot resistance is about the same. Caliverde 65 is less winter dormant than Lahontan. No University of California tests have been completed on Caliverde 65 in the Fresno area. It will be included in a screening trial to be planted at the Westside Field Station next March.

Several plantings of commercial fields are already in the ground on the west side of Fresno County. Presumably, by 1967 adequate seed will be available for all growers interested.

LEGUME SEED INOCULATION

Thorough inoculation is sound economy. It would take approximately twenty tons of manure or one half ton of ammonium sulfate per acre to supply as much nitrogen to alfalfa as is fixed in the nodules.

This is a lot of nitrogen for 25¢ an acre, approximate cost for inoculation.

Alfalfa seed should be treated with the proper species of nitrogen-fixing bacteria to aid root nodulation, especially if the field to be planted has not grown alfalfa in recent years.

Not all bacteria that fix nitrogen are highly effective. It has been reported in Kansas that of all the strains of alfalfa nodulation bacteria that were isolated, only 27% fixed a high amount of nitrogen, 21% fixed small amounts of nitrogen and 52% fixed moderate amounts of nitrogen. Inoculation with proper bacteria is inexpensive insurance.

Much of the alfalfa seed on the market today has been commercially treated; hence, additional treatment should not be needed. If necessary, seed should be inoculated just prior to planting into moist soil.

When the Rhizobia are added to the seed surface and stored for more than a day in a dry, hot place, the bacteria will die. Bacteria added to pelleting materials will remain active after several weeks' storage.

WEED CONTROL

Weeds can often make the difference in whether or not you make a stand of alfalfa after planting. Weeds also play a large part in alfalfa quality and up to \$15 a ton in alfalfa prices.

Weed control should start long in advance of planting your alfalfa seed. Fields may be prepared early in the fall and pre-irrigated. The weeds that then emerge may be disked lightly before planting.

Sufficient moisture from pre-irrigation or rain fall usually results in good stands. Cloddy seed beds or placement of alfalfa seed too deep (over $\frac{1}{2}$ " beneath surface) also results in poor stands. Pre-irrigation will avoid having to irrigate alfalfa plants before they germinate. Irrigating small alfalfa plants increases the chance of weed problems.

Some Fresno County soils are deficient in phosphorus necessary for alfalfa

production. In most of these soils an economic response can be obtained from an annual application of 80 pounds actual phosphorus per acre. (Plant tissue samples can be analyzed for phosphorus content to determine the actual needs of existing stands. Information on procedures for sampling are available at the Farm and Home Advisors Office)

Herbicides are available for controlling weeds before and after their germination. For information concerning herbicides consult University of California Weed Control Recommendations for 1966, available at the Farm and Home Advisors Office. Weed Control Farm Advisor, Bill Fischer, is available to help answer your questions in this area.

In general, post-emergence herbicides are most effective on weeds in the seedling stage. Timing is of a critical nature with the application of most herbicides.

WATCH THE HAY SHRINKAGE

Dairymen interested in purchasing hay should remember to calculate tonnage on a dry matter basis. Hay is usually 90% dry matter. If you buy a ton of hay containing 90% dry matter for \$30, your money has purchased 1,800 pounds of dry matter. However, if the hay you pay \$30 for contains only 80% dry matter, you have purchased 1,600 pounds of dry matter. At \$30 a ton this difference of 10% moisture will cost you \$3.33. For an average dairy of 250 cows eating 33 to 35 pounds per day, the difference due to shrinkage would amount to about \$582.75 per month or \$6,993 per year.

HEATING OF ALFALFA CUBES IN STORAGE

With the probable increase in the use of alfalfa cubes in this part of the state, consideration should be given to the dangers of spontaneous combustion in storage.

A barn in the Woodland area recently burned destroying the barn and 3,000 tons of cubes. Stored cubes should be checked for heating at least once a week.

A pipe or a rod can be used for a probe and the temperature estimated by feeling the probe after its removal. Thermocouple lines can also be installed in storage barns prior to filling, and this provides a fast, convenient method of monitoring temperatures.

However, remember that a thermocouple measures the temperature at one point. Hay is a good insulator so it is possible to have a hot spot several feet from a thermocouple without any immediate response.

An aeration system in the storage barn is good insurance and is well worth considering.

WHEN TO CUT

Cutting alfalfa at the proper time is important not only to good hay quality but also to the life of the stand. Recently it has been shown that 1/10 bloom, the old method of determining the time to cut, is not always a good index to use. Many factors may affect bloom and the alfalfa may be past the proper cutting time when 10% of the blooms show up. A better method is when 25% of the basal shoots are from a half inch to an inch long. If cut at this stage the new shoots are unmolested by the cutter bar and will give a rapid growth resulting in an earlier cutting next time. This not only gives good quality hay but increases yield.

FIGURING ACTUAL PHOSPHORUS

Many Fresno County soils need additions of phosphorus for economic growth of alfalfa. Phosphorus is available in the form of phosphorus pentoxide (P_2O_5) commercially for fertilizer use. P_2O_5 contains 44%

actual phosphorus or P. A simple way of calculating P_2O_5 applications is $P \times 2.3 = P_2O_5$ or P_2O_5 divided by 2.3 = actual phosphorus.

IRRIGATED PASTURE BULLETINS

Growers interested in planting irrigated pastures may be interested in reading the following three publications available at this office.

1. Irrigated Pasture Production in Fresno County
2. Seeding Irrigated Pastures in Fresno County
3. Preparing Land for Irrigating Pasture.

SABBATICAL LEAVE

I will be on sabbatical leave at the University of California, Davis from January 1 to July 1, 1967. In my absence Dick Eide, Dairy Farm Advisor, will work with any of you concerning alfalfa and corn silage crops.

Aaron Nelson, livestock Farm Advisor, will handle calls in regards to irrigated pastures. Don May, Vegetable Crops Farm Advisor, will handle certified seed and farm calls related to alfalfa seed production.

Bob Sheesley

Bob Sheesley
Farm Advisor

REACTION OF VARIETIES TO SEVERAL DIFFERENT FACTORS

Varieties	Winter Dor- mancy	Spotted Alfalfa Aphid	Pea Aphid	Leaf Spot	Bacter- ial Wilt	Phytoph- thora Root Rot	Mildew	Stem Nema- tode	Root Knot Nema- tode
Moapa	N	R	S	S	MS	S	S	S	T
Sonora	N	R	S	S	S	S	S	S	T
WL 501	N	R	MS	S	?	S	T	S	?
Joaquin 11	N	R	S	S	?	?	S	?	?
Mission 63	N	R	S	S	?	?	MS	?	?
Sierra	N	?	?	?	?	?	?	?	?
Mesa Sirsa	N	R	S	S	S	S	MS	S	?
Caliverde	I	S	VS	T	R	S	T	S	S
Caliverde 65	I	R	?	T	R	S	T	R	?
PSA-1	I	R	T	T	?	?	T	T	?
Cal. Common	I	S	S	S	S	S	S	S	S
SW-19	I	R	S	T	?	?	T	R	?
AS-13	I	R	S	?	?	?	-	T	?
Germaines Eldorado	I	R	S	?	?	?	-	T	?
Lahontan	D	R	S	S	R	T	MS	R	VS
AS-49	D	R	S	?	?	?	MS	?	?
Resistador	D	I	S	T	?	?	T	?	?
Washoe	D	R	T	S	R	T	T	R	S
Zia	D	R	VS	S	R	T	S	T	S
Cody	D	R	VS	S	R	S	S	?	S
Ranger	VD	S	S	?	R	S	S	S	?
Vernal	VD	S	S	?	R	S	S	S	R
Rambler	VD	S	S	?	R	S	S	S	S
Rhizoma	VD	S	S	?	?	?	S	?	?

N = Not winter dormant
 I = Some winter growth
 D = No winter growth - dormant
 R = Resistant
 S = Susceptible

V = Very
 M = Moderately
 T = Tolerant
 ? = Not known

CHARACTERISTICS OF ALFALFA VARIETIES GROWN FOR HAY IN THE GREAT CENTRAL
VALLEY, COASTAL VALLEYS, SOUTHERN LOW AND HIGH DESERT VALLEYS OF CALIFORNIA

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Alfalfa varieties grown in California can be classified into three dormancy categories. These are:

- (1) Northern or winter-hardy varieties (Dormant)
grown in the northern mountain counties of the state;
- (2) Central types or intermediate winter-hardy varieties (Semi-dormant)
These varieties are grown in the Sacramento, San Joaquin, and some coastal valleys, as well as the high desert areas in southern California.
- (3) Southern alfalfa types, or non-hardy or winter-growing varieties.
These types are grown in the Sacramento, San Joaquin, and Coastal valleys as well as the low desert valleys in southern California.

There are gradations of dormancy within each category among the various varieties that fall into the three classifications. Varieties described in this publication will not include those grown in the Northern or winter-hardy areas.

I. CENTRAL OR INTERMEDIATE (SEMI-DORMANT) VARIETIES

A. Developed by Agricultural Experiment Stations.

1. Lahontan--Developed by Nevada and U.S.D.A. and jointly released by the Nevada and California Agricultural Experiment Stations in 1954, this variety was released because of its resistance to the stem nematode. Soon after its release it was discovered to have resistance to the spotted alfalfa aphid as well. It is resistant to bacterial wilt, tolerant in the field to phytophthora root rot, being the most tolerant of this disease under high moisture conditions of any variety grown at present. It is susceptible to most leaf diseases, especially rust, but is tolerant to downy mildew. It is classed as a semi-dormant variety with almost no growth during the months of November, December, January and February. It has proven to be a long-lived variety with some fields known to be as old as 10 years. It is susceptible to root knot nematode.
2. Caliverde--Developed by the California Agricultural Experiment Station, derived from California Common. It has bacterial wilt resistance, resistance to the leaf diseases including downy mildew, but has no resistance to the spotted alfalfa aphid. It is not resistant to any of the nematode diseases. It is not as dormant as Lahontan in the winter time, but does not grow as much as Moapa during this same period.

3. Caliverde 65--Developed by the California Agricultural Experiment Station, and released in 1965, this variety has the appearance of Caliverde, with leaf disease resistance and similar dormancy characteristics. It has the added virtues of being resistant to the spotted alfalfa aphid and tolerant to the stem nematode. Approximately 120,000 pounds of seed was produced in 1965 for release to growers for on-the-farm testing in California. Sufficient seed should be available in 1966.
4. Washoe--Developed in Nevada and U.S.D.A. and similar to Lahontan, except slightly more dormant. Released in 1965 but very little seed produced this year. Larger seed supplies should be available in 1966. The variety is tolerant to the pea aphid, as evidenced by continued growth during period of heavy infestation, and lower numbers of aphids present on stems. It is resistant to the spotted alfalfa aphid and bacterial wilt, but susceptible to the same leaf and stem diseases as Lahontan. Its fall dormancy is similar to Lahontan but has slower spring growth and summer regrowth than Lahontan.
5. Cody--Developed by the Kansas Agricultural Experiment Station and the U.S.D.A., it was released because of its resistance to the spotted alfalfa aphid. It appears similar to Buffalo in its dormancy characteristics, and would be classified as a semi-dormant type. It has yielded fairly well at all locations where it has been tested in the Central Valley, but it is usually slightly lower than Lahontan. It appears to have less pea aphid resistance than is desirable.
6. Zia--Developed by the New Mexico Agricultural Experiment Station, it has Lahontan and New Mexico Common as its parents. It is resistant to the spotted alfalfa aphid and is less dormant than Lahontan. It has yielded exceptionally well in the high desert areas of Los Angeles and San Bernardino Counties. It has also yielded well in the San Joaquin Valley but appears to be extremely susceptible to pea aphid. Pea aphid damage has also limited its productive capacity in trials in the Sacramento Valley.

B. Varieties developed by private companies.

1. AS-49--A synthetic consisting of 12 plant lines selected out of three intermediate hardy alfalfas grown in the Central Southwestern U.S. Clones of these lines in the proportion of 6-3-3 were allowed to intercross and equal portions of seed from each were bulked to make up the breeders lot. AS-49 is resistant to the spotted alfalfa aphid, bacterial wilt, and is intermediate in its cold dormancy, being slightly less dormant than Lahontan. The variety was released in 1961, by the Ferry-Morse Seed Co., and seed is available.
2. Resistador--Developed by Northrup King & Company and tested under the number N-9-500. This variety is slightly less dormant than Lahontan; it is equal to Caliverde and Caliverde 65 in its resistance to leaf diseases, including downy mildew. University tests have shown it to have less spotted alfalfa aphid resistance than Lahontan, and to be susceptible to root rot diseases. It has more pea aphid tolerance than Lahontan.

II. SOUTHERN ALFALFAS - OR NONHARDY WINTER-GROWING (NON-DORMANT) VARIETIES

A. Developed by Agricultural Experiment Stations.

1. Moapa--Developed through cooperative efforts of the Nevada, California and Arizona Experiment Stations and U.S.D.A. and released in 1957. It is resistant to the spotted alfalfa aphid and has some tolerance to bacterial wilt and phytophthora root rot. It is also resistant to several of the species of root knot nematode and for this reason is recommended for planting on the light sandy soils where root knot nematode is present in the San Joaquin and Sacramento Valleys. It is a non-dormant variety being grown on short rotation conditions, and is susceptible to leaf spot diseases.
2. Sonora--Released by the Southwest Alfalfa Group by the U.S.D.A. and the states of Arizona, California, Nevada in 1963. Similar to African in its winter growth, having more winter growth than Moapa. Has excellent resistance to the spotted alfalfa aphid. Appears similar to Moapa in its susceptibility to leaf diseases and the pea aphid. Could also be grown on the light sandy soils where root knot nematode is a problem since this appears to have the same resistance to certain species of root knot nematode as Moapa. When grown in the low desert areas of southern California, it has yielded 10% more than Moapa on a total seasonal basis. In the San Joaquin Valley it has outyielded Moapa by 3% to 6%. It is a short-lived variety and will probably not persist as long as Moapa.
3. Mesa Sirsa--Developed by the University of Arizona and released as a product of the Southwest Alfalfa Group in 1965. It is a non-dormant variety with resistance to the spotted alfalfa aphid. More non-dormant than Moapa and similar to Sonora in this characteristic. It has better downy mildew resistance than Moapa or Sonora. In the Imperial Valley it has yielded slightly better than Sonora. At the Westside Field Station it has yielded slightly better than Moapa over a three-year period.
4. Hairy Peruvian--Introduced to the U. S. from Peru in 1899 by the U.S.D.A. Characterized by hairyness on its stems and leaves. There is no certified seed available of this variety, nor any controlled genetic stocks used for maintaining its identity. The variety is characterized by rapid growth, quick recovery after cutting, and ability to grow during short days similar to the other Southwest non-dormant varieties. Also yields less and is lower in quality than Moapa.
5. California Common 49--Developed by the California Agricultural Experiment Station from California Common, and released in 1949. Similar to California Common in appearance and performance, in the absence of dwarf disease. This variety is tolerant to dwarf virus disease, but it is susceptible to bacterial wilt. It is less dormant than Caliverde but more dormant than Moapa.

B. Varieties Developed by Private Companies.

1. Caliente--Developed by Ferry-Morse Seed Company and marketed under their new system of names rather than numbers. It is a non-dormant alfalfa composed of 15 clones which combine high resistance to the spotted alfalfa aphid with better resistance to downy mildew than Moapa. Its growth habit is similar to Moapa. It has not been tested extensively by the California Agricultural Experiment Station or Extension Service, as yet.
2. AS-13--Developed by the Ferry-Morse Seed Company, composed of thirteen plant lines selected out of adapted nonhardy and intermediate hardy alfalfas, grown in California and other southwestern states. It is much more nonhardy than Lahontan, and only slightly less hardy or winter dormant than Moapa. It is resistant to the spotted alfalfa aphid and is moderately tolerant to bacterial wilt and foliar diseases. It has rapid recovery after cutting and is similar to Germain's Eldorado in its dormancy characteristics.
3. Germain's Eldorado--Developed and marketed by Germain's Seed Company, this variety appears to be somewhat less dormant than Lahontan but slightly more dormant than Moapa. It has excellent resistance to the spotted alfalfa aphid and slightly more tolerance to downy mildew than Moapa and Sonora. It has some tolerance to the stem nematode, but not equal to Lahontan or Caliverde 65.
4. WL-501--Developed by Waterman-Loomis Seed Company and marketed by Germain's. This variety has excellent resistance to downy mildew. It is more tolerant to the pea aphid than Moapa, and also is slightly more non-dormant in the Sacramento Valley, but about equal to Moapa in the San Joaquin Valley. It is resistant to the spotted alfalfa aphid and appears similar to Moapa in its growth habit.
5. El Camino--Developed by Waterman-Loomis Seed Company and marketed by Germain's Seed Company. It is a non-dormant variety which is resistant to the spotted alfalfa aphid. It has not been tested to any extent in California by the Agricultural Experiment Stations nor Extension Service. Information from Germain's indicates that it has performed satisfactorily during its limited testing time, and outyielded Moapa. It has tolerance to the pea aphid, and should be equal to WL-501 in its tolerance to downy mildew and other foliage diseases. Is less dormant than Moapa and about equal to Sonora in this characteristic.
6. Bonanza--Marketed by the Calapproved Seed Company, it was formerly tested under the designation of Sierra. It is a nonhardy, 35 clone synthetic variety, resistant to the spotted alfalfa aphid, and to downy mildew. It has been reported to have some resistance to the potato leafhopper, which may be of value in the low desert areas of southern California. Preliminary evaluation by the University and other southwestern states indicates that it out yields Moapa. It was more tolerant of the pea aphid and downy mildew than Moapa or Sonora in southern California tests.

7. Joaquin 11--Developed by the Security Seed Company, it is a seven clone synthetic, non-dormant, spotted aphid resistant variety. Similar to Moapa in most characteristics, it has yielded slightly better in some tests of the University, and slightly inferior in others. Apparently equal to Moapa, in its yielding ability.
8. Blends of Alfalfa Varieties--Three prominent Northrup-King brand alfalfas that are blends of different varieties are marketed in California. These are: 819 Brand alfalfa, which is a non-dormant type adapted for the San Joaquin Valley and Southwest; 919 Brand alfalfa is area blended so no specific characteristics can be stated; 10-19 Brand alfalfa is a spotted alfalfa aphid, bacterial resistant variety that appears similar in performance to Lahontan.

III. There may be other alfalfas marketed that are not included in this list. If this is so, the omission has not been intentional but only because they have not been brought to my attention.

There are a number of experimental selections and possible varieties that are being evaluated at the present time by the California Agricultural Experiment Station and the Extension Service. These have been developed largely by the Experiment Stations of the three states of Nevada, Arizona and California and the U.S.D.A. In addition, there are a number of privately developed experimental selections that are being evaluated by public agencies in these three states. There are a greater number of experimental lines being evaluated by most of the private alfalfa seed companies in the State of California, who are conducting their own breeding programs.

It is interesting to note that a great number of experimental lines which are being evaluated at Davis, the Westside Field Station, Riverside and the Imperial Valley Field Station, consistently out yield Moapa and the newer Sonora. For example, one semi-dormant variety in test at the Westside Field Station out yielded Lahontan over a three-year period by 22.6%. In a test of non-dormant types at the Westside Field Station, another experimental selection out yielded Moapa by 18.5% over a three-year period. Undoubtedly some of these public varieties and possibly some of the private varieties will be released in the next several years.

In the next several years additional information will be available on varieties developed by the Agricultural Experiment Stations of the three-state area as well as varieties released by private companies. As this information becomes documented and available, it will be released promptly.