Reseeding Dry Range

seedings of annual and perennial legumes and grasses successful

Walter H. Johnson

About 2,000 acres of nonirrigated pasture lands in Alameda County have been reseeded successfully to combinations of legumes and grasses.

The seedings—determined by the soil type and depth, and by the work needed prior to seeding—were: *1*, a mixture of perennial grasses and legumes; *2*, perennial grass-annual legume mixture; and *3*, seedings of straight annual legumes.

Good grazing management, determined by the varieties seeded, is essential to success in any reseeding program which can increase the production of meat, milk, and wool by increasing the quantity of feed produced, by improving the quality of the feed, and by lengthening the green feed period.

Perennials

Perennial seedings can offer the greatest feed production. Alfalfa or a mixture of alfalfa and Hardinggrass are the most successful species. Such seedings are limited to better quality soils, with a depth of at least three feet, and the deeper the better. A planting of this type must be considered as any other crop, and adequate preparation must be made. The ground should be cleaned up to eliminate as much native competition as possible before planting, or the natural growth will crowd out some of the seeded species the first season. Growing a crop of grain, Sudan grass for summer pasture, or a good summer fallow, generally produces sufficient cleanup. Summer fallow would be the least desirable, for it takes the land out of production for a year.

Early seedings are most successful. If the land is clean, and has a good seedbed the land may be seeded dry. If further cleanup is needed, seeding is delayed until after the first fall rains have brought up the natural growth. This growth is then worked under and followed immediately by seeding. Too much delay is not advisable, for the later the seeding, the slower the seedlings will start, and the more danger there will be from freezing and heaving.

Where terrain permits, seed should be drilled ½″ deep into a fine, firm seedbed. Broadcasting, followed by ring-rolling or cultipacking has been successful all over the county. Drilling, however, gives a more even distribution of seed, results in a more uniform germination of seedlings, and provides successful stands with less seed than broadcasting.

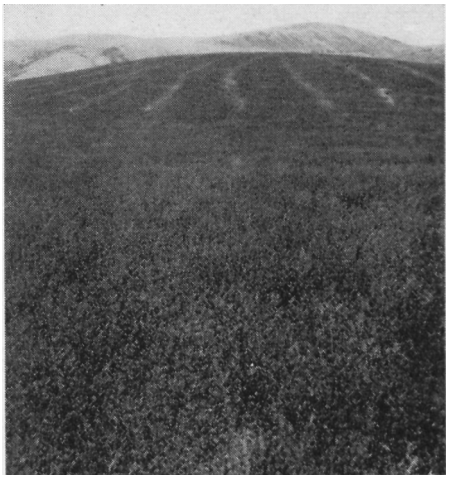
Alfalfa, by itself, may be seeded at from 5-10 pounds per acre. California Common Alfalfa has been the most productive variety. The new variety Caliverde probably will replace Common in future seedings.

A seeding mixture of five pounds of alfalfa and three pounds of Hardinggrass per acre has proved satisfactory.

Perennial seedings have produced green feed all year around and put gains of more than a pound and a half a day on yearling steers during the dry summer months of June, July, and August.

Grass and Legume Mixtures

Mixtures of perennial grass and annual legumes offer possibility for producing large quantities of feed on lands of reasonable fertility, but not having enough depth to support alfalfa.



Stand of two-year-old alfalfa. Had been cut for hay about May 1. This shows regrowth to June 10. Yield here was over two tons per acre. Regrowth is green, nutritious, palatable, and 12-18 inches high. Note feed is dry in background. 1952.

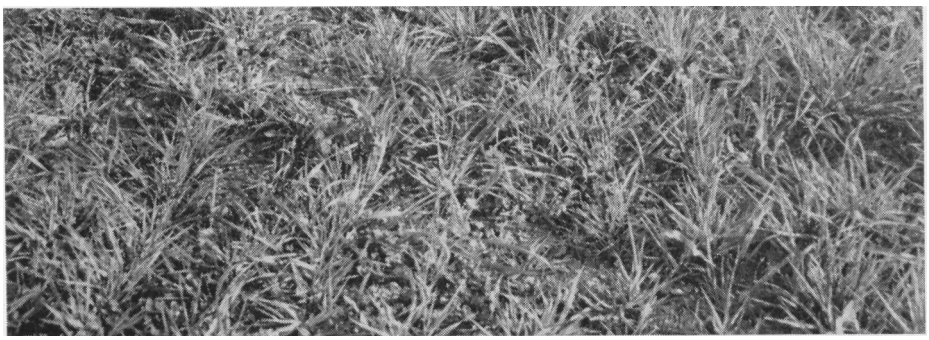
Because a perennial grass is in the mix, the ground must be cleaned up, prepared, and seeded as for straight perennial seedings.

A mixture of Hardinggrass, Rose clover, Crimson clover, and Subterranean clover has been successful. Hardinggrass can be seeded at from 1-5 pounds per acre, depending upon the expense, the method of seeding, and the thickness of stand desired. Two to three pounds of Hardinggrass per acre — seeded and cared for properly — can produce an entirely satisfactory stand. The clovers should be seeded light so they do not offer too much competition and crowd out the Hardinggrass seedlings. One pound of Rose clover, one pound of Crimson clover, and ½ pound each of Mt. Barker and Tallarook subclovers are sufficient.

With proper grazing management, the clovers will thicken up and fill in the second year and years following after the Hardinggrass has become established.

Perennial grass-annual legume seedings have extended the green feed season for from three weeks to two months.

Result of good cleanup before seeding. Picture shows a stand of perennial grasses and annual legumes in March 1951. Had been planted in November 1950. Practically no native competition. Land had Sudangrass spring and summer of 1950. Livermore area.



Annual Legumes

Annual legume seedings offer large increases in feed production on poor, as well as good lands. This is particularly true if proper fertilization is done where necessary.

Very little ground preparation is required. No cleanup the previous year is necessary. In some cases, relatively close grazing the season before seeding may reduce the native competition. Where possible, the ground should be disked dry and shallow—not more than one inch deep. The seed may be broadcast or

Fire Stimulated Germination

effect of burning on germination of brush seed investigated in physiological study of chamise

Edward C. Stone and Gustaf Juhren

The successful use of fire to convert brush areas to agricultural uses is often dependent upon the prevention of subsequent establishment of brush from seed.

If subsequent establishment is to be prevented an understanding of the germination behavior of the seed is necessary. This article reports on the germination behavior of chamise seed—one of the important brush species in the State.

Since the viable seed stored in the duff —leaves and other decomposing vegetative matter covering the ground beneath the plant—is the seed that produces the seedling crop, first consideration was given to its behavior. This seed was collected by running large samples of duff through a clipper-type seed separator using various speed and screen combinations.

The total number of seeds per square foot stored in the duff was found to be extremely variable, even under what was apparently uniformly dense stands of chamise; within the same area some samples contained only 500 seeds per square foot, while others contained as many as 30,000 per square foot. The proportion of this stored seed that was filled—seed containing embryo and endosperm—was very low, ranging from 0% to 4%.

When samples of the duff-stored seed were planted in flats and allowed to germinate without any additional treatment, some germination took place. However, if a 1" layer of excelsior was burned over the planted seed, or if the seed was previously heated in an oven for five minutes at 212°F an eight-fold increase in germination occurred. This indicated that there were two physiologically distinct types of seed in the duff. One type germinated readily without any preliminary heat treatment; while the other type germinated only after it had received such a treatment.

Per Cent of Viable Seed Germinating under Various Treatments

Series No.	Seed gathered from the duff in an old stand			Seed gathered from the plant			
	No treatment (control)	1" layer of excelsior burned over seed after planting in sand	5 min. exposure in 212°F oven before planting	No treatment (control)	5 min. exposure in 212°F oven before planting	Seed pre-germinated 60 days and then replanted	Seed pre-germinated 60 days and then exposed for 5 min. in 212°F oven before replanting
1	12	88	74	78	63	5	22
2	7	93	80	82	71	11	18
3	11	89	90	70	68	7	30
4	20	80	88	87	80	4	13
5	5	95	85	70	68	7	30
Average	11	89	83	77	70	7	23

When seed was collected directly from the plant, only the first type of seed appeared to be present; germination took place readily without any apparent stimulus from a preliminary heat treatment. This presented the problem of explaining the origin of the high proportion of seed in the duff which required a preliminary heat treatment for germination. Two possibilities suggested themselves.

The first to be examined was that a germination inhibitor, destroyed by heat, occurred in the duff and that it was accumulated by the seed when stored in the duff. However, extensive experimentation failed to demonstrate the presence of such an inhibitor.

The second possibility to be considered was that the largest proportion of the viable seed on the plant was readily germinable without a preliminary heat treatment and that this obscured the presence of a smaller amount of seed which required heat stimulation.

This hypothesis was experimentally tested by using seed which had been previously placed under germination conditions for 60 days, thus removing most of the readily germinable seed. When samples of this seed were planted some germination did occur. However, if this seed was first held in a 212°F oven for five minutes and then planted, a three-fold increase in germination was obtained.

On the strength of these data it would appear that the duff serves as a concentrating as well as a storing medium for that seed which requires a preliminary heat treatment. True, at any one time it also contains some seed which does not require the preliminary heat treatment. However, these seeds are continually being removed by germination whenever moisture and temperature are not limiting; while those requiring the heat stimulus do not germinate and are thus not removed until a fire occurs or until they lose their viability.

The difference between the two types of seed appears to be located in the seed coat. The preliminary evidence pointing to a seed coat difference is the fact that there is no apparent difference in the germination of the two types of seed when either the seed coat is cracked or removed; in both instances, the seed germinates readily without any preliminary heat treatment.

On the basis of the physiological re-

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drilled and covered with a ring-roller, cultipacker, or even a chain, cable, tree limb, or board. Satisfactory stands have been obtained by broadcasting seed from the ground or by airplane with absolutely no seedbed preparation, but thinner stands must be expected from this method of seeding.

All clover seed should be inoculated before seeding—a low cost investment to help assure good stands.

A mixture of 30% Rose clover, 40% Crimson clover, 15% Mt. Barker Subterranean clover, and 15% Tallarook Subterranean clover may be seeded at one to 10 pounds per acre. The rate of seeding is determined by the expense and the time the individual stockman will wait for a thick stand. Heavy seeding may result in thick stands in one or two years. Light seedings, with proper grazing management, may become solid stands in three to five years.

These annual legume seedings have lengthened the green feed period for from 2-4 weeks.

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