

THE USE OF LIVESTOCK AND COMPETITIVE PLANTS

TO CONTROL WEEDS ON ANNUAL RANGES

R. Merton Love, Professor of Agronomy
University of California, Davis

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In most agricultural crops a weed is recognized as a weed. The question is one of distinguishing between black and white, e.g., mustard in barley. This also applies to many of our range weeds. A poisonous plant such as Halogeton, an extremely undesirable one such as Klamath weed, and some of our brush species stand out as special problems. These may be attacked in orthodox ways. (However, the acreage involved, and the relatively low value of such lands, often make cost of control the primary consideration.)

The problem of weeds and weediness is not always so simple. It is often one of degree. And in no phase of agriculture is this better exemplified than on the annual-type ranges of California.

The idea of using livestock as a means of biological control is not necessarily new. And certainly the use of competitive grasses is now standard practice in some areas of California to aid in rehabilitation of brushlands after burning. It seems worthwhile, at a conference such as this, to focus attention for a few minutes on this aspect of weed control.

Since the mission days of Father Serra many introduced plants have found their way to the range lands of California. With the ever-increasing necessity of obtaining greater returns per acre to take care of our ever-growing population, our ranchers are not willing to accept the low returns from weedy ranges.

On much of California's foothill ranges the cover includes the following winter annuals. They may be grouped into two classes:

Undesirable
("the weeds")

- nitgrass
- native fescues
- introduced fescues
- wild barleys
- red brome
- ripgut

Desirable
("the crop")

- broadleaf filaree
- soft chess
- slender wild oats
- native annual clovers
- red stem filaree
- bur clover

Everyone may not agree with this order, but I have placed what I consider to be the most undesirable ones first on the list. Ripgut is a borderline grass. It is very palatable and nutritious when young, but the ripe panicles are obnoxious because of the barbed awns on the seeds which do not readily shatter. Broadleaf filaree is not undesirable, but it is not very valuable either.

To the above lists should be added the hundreds of species of flowering plants found on the range. In some fields, particularly abandoned cropland, the undesirable species listed may comprise 90% of the ground cover. What method of weed control can be used to change this balance? It is obvious that no selective chemical will perform this miracle.

Studies of the life cycles of species in the two classes show that, in general, the undesirable annuals mature earlier than the desirable ones. (Medusa-head and goatgrass are notable exceptions.) This is true regardless of the spring rainfall pattern. If mowed or very closely grazed in early April (in the Sacramento Valley foothills) the undesirable grasses produce less seed. On the other hand, the desirable grasses and legumes recover from the grazing and set a good seed crop. They also use more of the available soil moisture, which in turn helps inhibit the development of summer weeds such as tarweed and star thistle. This program calls for removal of the stock from the field in question before the last spring rains.

The improvement of a given range area by such means is a slow process, but some progress should be noted each year. Probably three range subdivisions are necessary, so that fields 1, 2, and 3 could be treated in the above manner in a three-year rotation.

A mixture of winter annual legumes is a very effective aid to the above program. Those now being widely used in California are rose clover, bur clover, the subclovers, and crimson clover. They should be inoculated and the soil fertilized with phosphate or the appropriate legume-promoting soil amendment. This treatment stimulates legume growth. Furthermore, the livestock search for grasses and coarser weeds in the field. The result is a fairly rapid change-over in the composition of the cover from 90% undesirable to 90% desirable plants.

But there are additional benefits. Dr. John P. Conrad, Professor of Agronomy at Davis, has shown that the legume-grass pastures may produce four times as much feed as the unimproved range, and six times as much protein per acre. The experimental work at the Brown Hereford Ranch, Sacramento County, was verified by livestock-days on the same ranch. On a much larger scale it has been put into practice on the Sunnybrook Farms in Placer County.

Summary

1. There is a gradation of "Weediness" of plants on the annual-type ranges, but most fall into one of two groups.
2. The two groups of plants may be called "undesirable" (the weeds) and "desirable" (the crop). Plants of the first group mature earlier than those in the second, and they do not recover as well from a heavy spring grazing.
3. If there are three range subdivisions, fields 1, 2, and 3 may be grazed heavily in the spring the first, second, and third years, respectively. Such a three-year rotation will gradually increase the percentage of desirable plants on the range.
4. A mixture of winter annual legumes applied in the fall (once) will materially speed up the process.
5. Attention to these factors is essential:
 - a. Maturity dates of competing plants.
 - b. Moisture and fertility requirements of the species.
 - c. Timeliness and intensity of grazing.