
Sagebrush or Grass

D. N. Hyder, F. A. Sneva, and W. A. Sawyer



Squaw Butte-Harney Experiment Station, Burns, Oregon. Jointly operated and financed by Crops Research Division, Agricultural Research Service, USDA, and Oregon Agricultural Experiment Station, Corvallis, Oregon.

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Foreword

Sagebrush or Grass has been prepared especially for the 10th Annual Field Day, June 14, 1958. The Field Day program this year emphasizes range grass production. General range improvement at Squaw Butte isn't all due to weather. Range research is paying off in more grass and more beef.

Every rancher wants more grass, more beef, and more profit. It's easy and profitable to grow more grass. During the last 5 years Squaw Butte's range has been changing as a result of range reseeding, brush and larkspur control, and management.

The opportunities this work offers today are--"Sagebrush or Grass."

In addition to range work the station has a productive research program on flood meadow improvement and beef cattle nutrition and production.

The Range Research Program is directed by Donald N. Hyder and Forrest A. Sneva, range conservationists.

The Flood Meadow Program was directed by Clee S. Cooper until his recent transfer to Montana. This vacancy is expected to be filled soon.

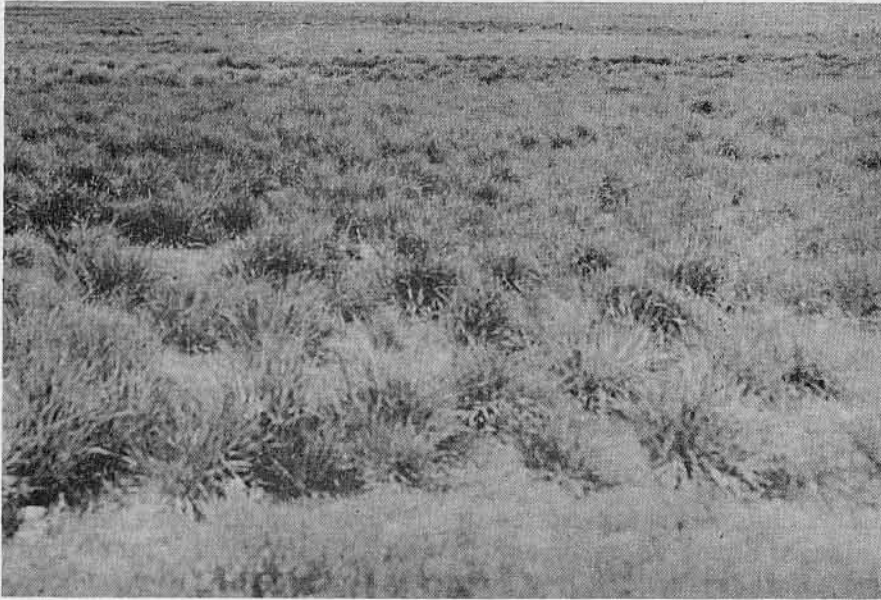
The Livestock Program is directed by Farris Hubbert, Jr. and Robert R. Wheeler, animal husbandmen.

W. A. Sawyer,
Superintendent

Acknowledgments

Contributions were made by D. E. Booster, agricultural engineer, Oregon Agricultural Experiment Station, who designed and constructed the Oregon Grass Seeder; D. W. Hedrick, associate in range management, Oregon Agricultural Experiment Station, who assisted in the evaluation of responses to sagebrush control; and W. R. Furtick and D. O. Chilcote, weed agronomists, Oregon Agricultural Experiment Station, who cooperated in research on chemical control of rabbitbrush.

Range Management Pays Off



Crested wheatgrass is good spring feed and may be used to delay turnout date on native forages.

Much has been said about increasing range production by seeding crested wheatgrass and by spraying to kill big sagebrush, but often the easiest and quickest way to increase range production is to **DELAY TURNOUT DATE**. This works until early June turnout. Turnout date at the present time is generally about the first of April.

Most important is the amount of green grass leaves on each working acre through May and early June. The larger the "crew" at work, the greater the production of feed. A single clipping to ground level in mid-May has reduced grass production 60%. Too much early grazing reduces production even more.

On Squaw Butte Range, cattle are held on meadows and fed hay until about the last week in April. They are then moved to fields of crested wheatgrass.

This is a good early feed, and crested wheatgrass can stand fairly heavy grazing. Native grasses in the sagebrush generally are not grazed until after the middle of May.

Too much early grazing is the most serious problem in range management.

The second most serious problem is **DISTRIBUTION OF GRAZING**. Too much range is far from water, and the feed is underutilized. Water developments, water hauling, proper salting, fencing, and riding can bring this lost feed within reach. Much stock water on Squaw Butte Range is now trucked to frequently moved troughs to keep the cattle on good grass and prevent overgrazing. The cost of hauling water runs about 50¢ to \$1.50 per cow month in this operation where the maximum hauling distance is three miles.

A little delay in **TURNOUT DATE** and improved **CATTLE DISTRIBUTION** help produce more beef on the range.

The new OREGON GRASS SEEDER looks good

Soil firming and furrow placement of seed has given faster emergence, 2-3 times more survival, and higher yields after stands are established. These are some of the reasons why the new Oregon Grass Seeder looks good.

The Oregon Grass Seeder employs new techniques for seed placement that appear especially desirable on soft range seedbeds. The seed is placed in pressed furrows, on firm soil, and then covered with loose soil.

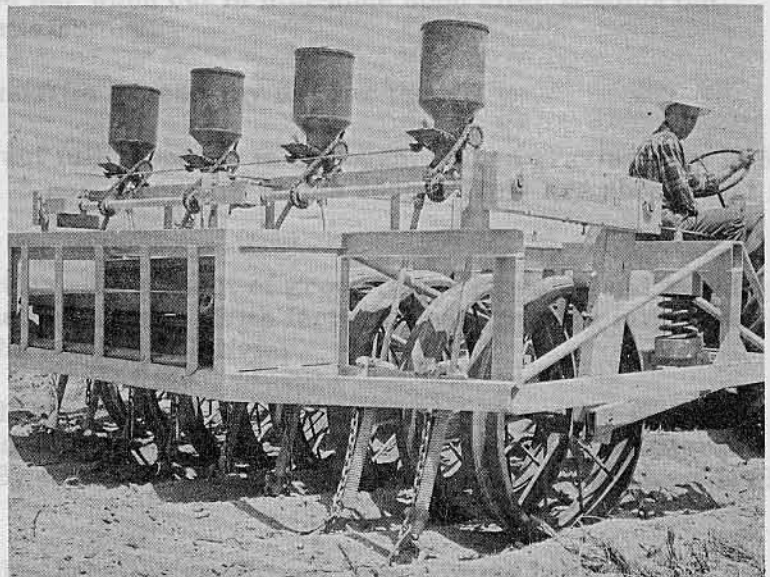
This is accomplished with press wheels serving a dual purpose. Besides firming the soil prior to seed placement, the press wheels also act as furrow openers. Each wheel makes a track 6 inches

wide. A V-shaped rib around the center of the wheel presses a seed furrow 1 inch deep in the center of the wheel track. The grass seed is dropped into the seed furrows and covered by drag links.

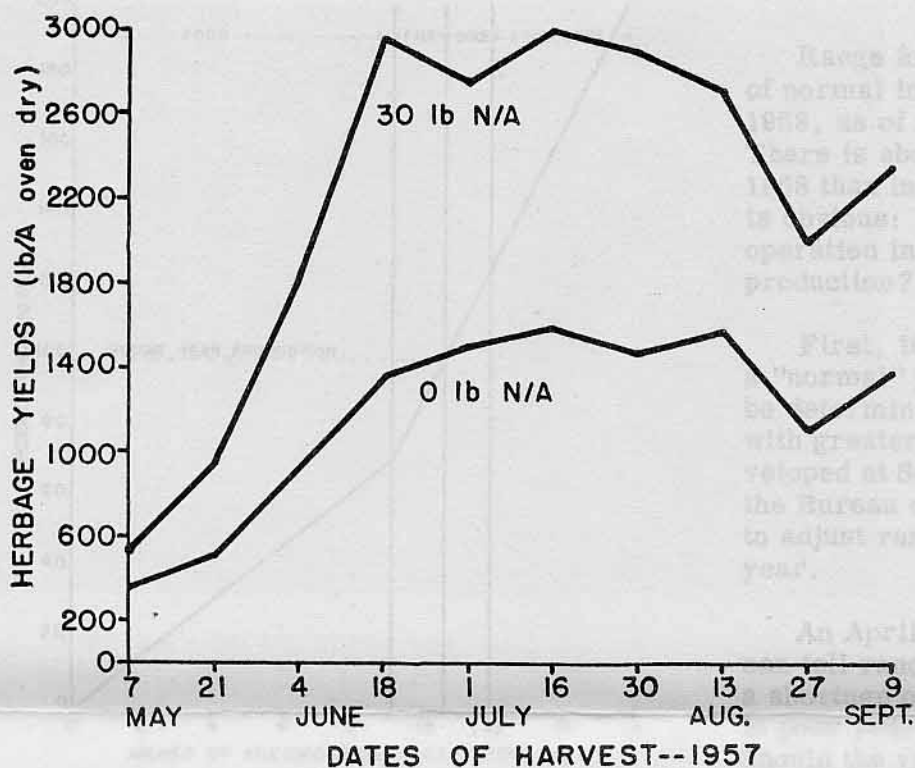
The seeder has sturdy construction and withstands rough treatment. Each press wheel is individually suspended to permit operation on rough terrain where rocks and brush may be encountered. A compression-type coil spring transmits frame weight to the press wheels. The test model is an 8-row seeder weighing 2,600 pounds. Extra weight, up to 600 pounds per wheel, may be carried in weight boxes on the frame to give the desired wheel-track depth in different soil conditions. On firm seedbeds wheel tracks are faint but seed furrows are pressed to the full 1-inch depth and provide excellent seed placement.

The seed is permitted to free-fall from the seed metering units, through seed tubes, into the V-shaped furrows in the center of the wheel tracks. Tension-type, close-wound coil springs are used as the lower portions of the seed tubes that protrude below the frame behind the wheels. The springs snap back into position after being deflected by rocks or brush. A drag link fastened to the lower end of each seed tube covers the seed. Fairly heavy drag links are required for closing seed furrows on moist and on firm seedbeds. Standard grain drill drags are sufficient on soft soil.

Individually suspended wheels are spaced 12 inches center to center. Seed is dropped behind the wheels in pressed furrows and covered with loose soil by drag links.



Fertilize Crested Wheatgrass for More Feed



DOUBLED YIELDS WITH 30 POUNDS OF NITROGEN PER ACRE.

Results were obtained with surface applications of ammonium nitrate in either late fall or early March. It requires 90 pounds of ammonium nitrate to provide 30 pounds of nitrogen.

Nitrogen costs about 17¢ per pound, so 30 pounds is worth about \$5.00. The average crested wheatgrass production is about 800 pounds (oven dry) per acre. On this basis the average cost per ton is \$12.50. For early spring feed this is cheap enough to compete with hay produced on high priced land.

Yield curves show when nitrogen increases rate of growth. Note high production in 1957--a wet year.

It is also cheap enough to compete with rye hay that must be planted each year.

Crested wheatgrass makes fairly good hay when cut in mid-June soon after heading out. Later cutting, however, is quite unsatisfactory.

Fertilized crested wheatgrass cannot be grazed any earlier though.

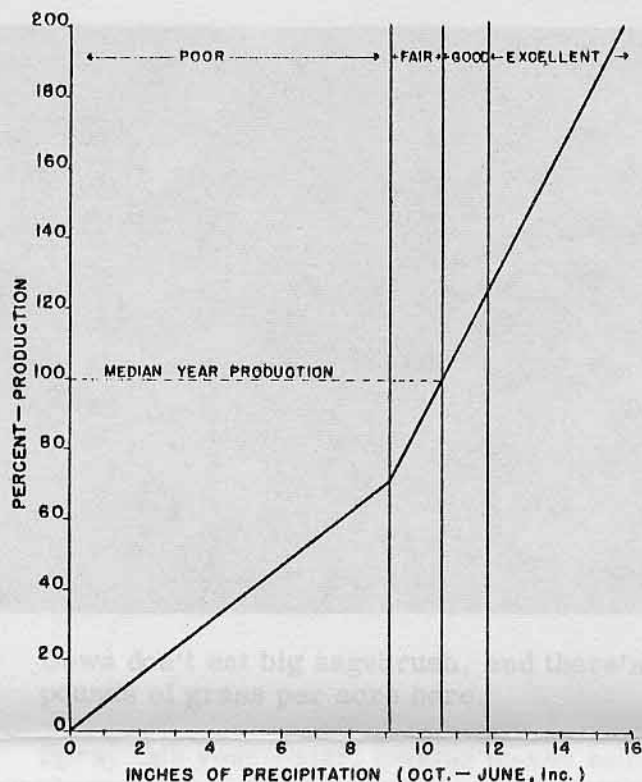
Too much early grazing will prevent full response to nitrogen. When grazing only in May and June, stocking rates of 4.5 and 1.5 acres per cow month respectively are about right for unfertilized and fertilized fields.

In managing for maximum production, the amount of green tissue standing and working through May and early June makes the difference. With fertilization it takes a larger working "crew"; nevertheless, stocking may be 2-3 times heavier.

Nitrogen not only gives more feed, but feed of better quality which averages 4% higher crude protein content through May and June. In early May, fertilized crested wheatgrass contains 7-8% more crude protein. By late June the difference has narrowed to about 1-2% more in fertilized grasses.

Another fertilization bonus: It helps keep the sagebrush from coming back.

Forecast Range Production



Range forage production was just 45% of normal in 1955. The forecast for 1958, as of April 1, is 190% of normal. There is about four times more grass in 1958 than in 1955. The ranchers' problem is obvious: How to maintain a stable operation in spite of extremes in forage production?

First, it helps to know production in a "normal" year, then stocking rates can be determined from range survey data with greater accuracy. Information developed at Squaw Butte is now used by the Bureau of Land Management in Oregon to adjust range survey data to a normal year.

An April forecast of range production can tell ranchers whether there will be a shortage or surplus of range forage. In poor years there is a serious shortage. Should the rancher feed hay longer and turnout later, cut down on numbers turned out, or bring the cattle in earlier? In

excellent years there is a surplus of forage when the range is stocked on the basis of normal productivity. Can the rancher take advantage of these excellent years by turning out more livestock or keeping them out later in the fall?

Rain and snow especially make the difference from year to year. Add total precipitation figures from October 1 to June 30 and read "percent-production" from the production curve. The production curve presented is for Squaw Butte Range. It applies equally well to crested wheatgrass fields, sprayed fields, and unimproved range. Similar curves have been prepared for each weather station in eastern Oregon.

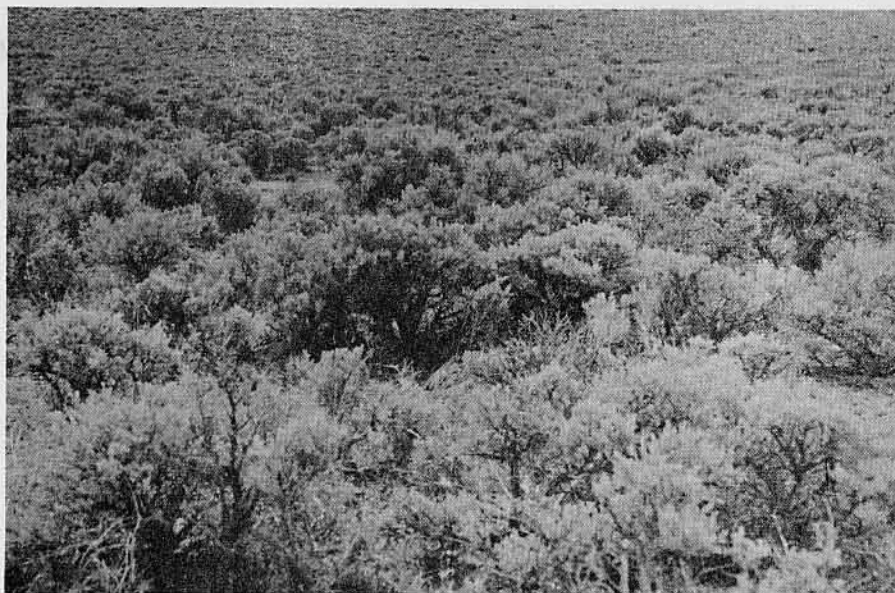
The April forecast is made by adding the precipitation figures from October 1 to March 31, plus the normal precipitation for April, May, and June to obtain the 9-month total. This forecast is revised on May 1, June 1, and July 1.

The percentage yield curve was determined from actual yield data, and does not represent percentage deviations from normal precipitation. Since this is a new endeavor, the yield curve will be improved in the next few years.

Larkspur in sagebrush can also be controlled. Spray at the right time and kill both. Ask about this.

Cows do eat grass, and there's plenty here 5 years after spraying--1,000 pounds on each acre in 1967.

Sagebrush Control Makes Profit



Cows don't eat big sagebrush, and there's only 150 pounds of grass per acre here.

Spray this year--start making money next year. Choose an area where the clumps of bunchgrasses are thick enough to permit stepping from clump to clump. Spray with 2, 4-D ester at 1-1/2 lb./A. in water at 5 gal./A. when the sagebrush is growing rapidly. It's easy, fast, and effective.

Don't graze before June in the year of spraying, nor in the first year after spraying. Thereafter graze moderately (remember the working "crew" in May) so that the higher production can last a long time.

Real profit comes by grazing moderately and keeping the grasses strong so that the sagebrush finds it difficult to return.

Spraying might be planned to last 50 years rather than just 10 years as figured above.

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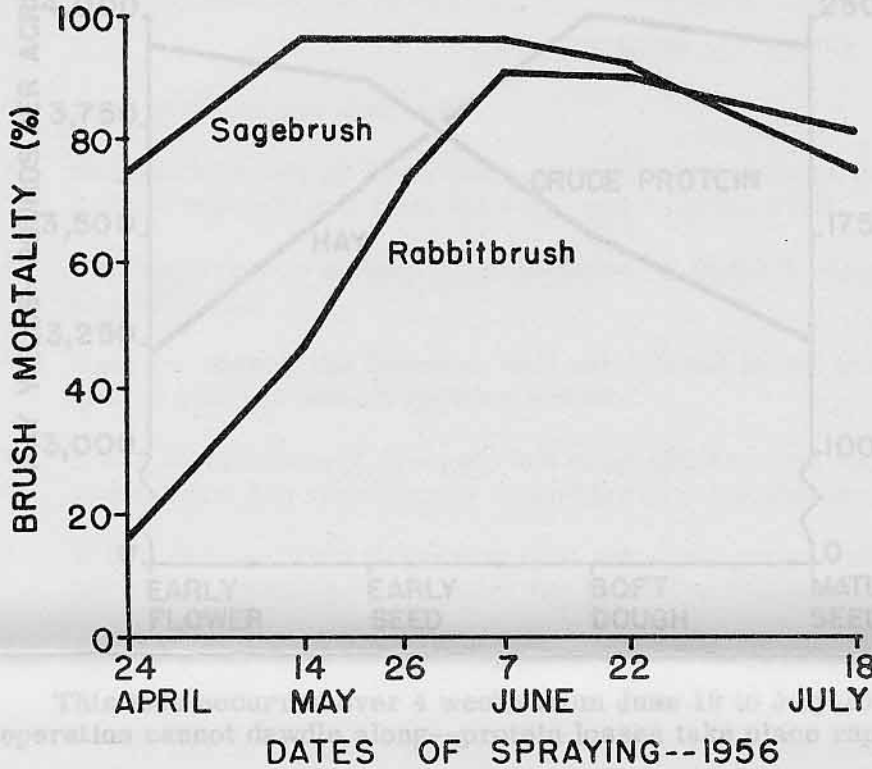
A 30 to 40% annual return on an investment is BIG business.

And that's the way it works with sagebrush spraying. Beef production increases by 10 pounds or more per acre. Counting those extra 10 pounds of beef at 10¢ (with value above 10¢ going to overhead) each sprayed acre returns at least \$1.00 per year.

Spraying generally costs \$2.50 to \$3.00 per acre, and lasts for 10 years or more. For an investment of \$3.00, \$10.00 and up is indeed BIG business.

Spray to Kill Rabbitbrush

It's much easier than expected. Though it takes twice as much 2, 4-D ester (3 lb./A.) to kill rabbitbrush as to kill big sagebrush, the real problem is when to spray.



This figure shows that big sagebrush is killed easily a month earlier than green rabbitbrush (*Chrysothamnus viscidiflorus*). These are mortality results when mixed stands were sprayed on various dates with 2, 4-D ester at 3 lb./A. The 2, 4-D was applied in water at 5 gal./A. and at 10 gal./A. with 5 gal./A. nearly as good as 10.

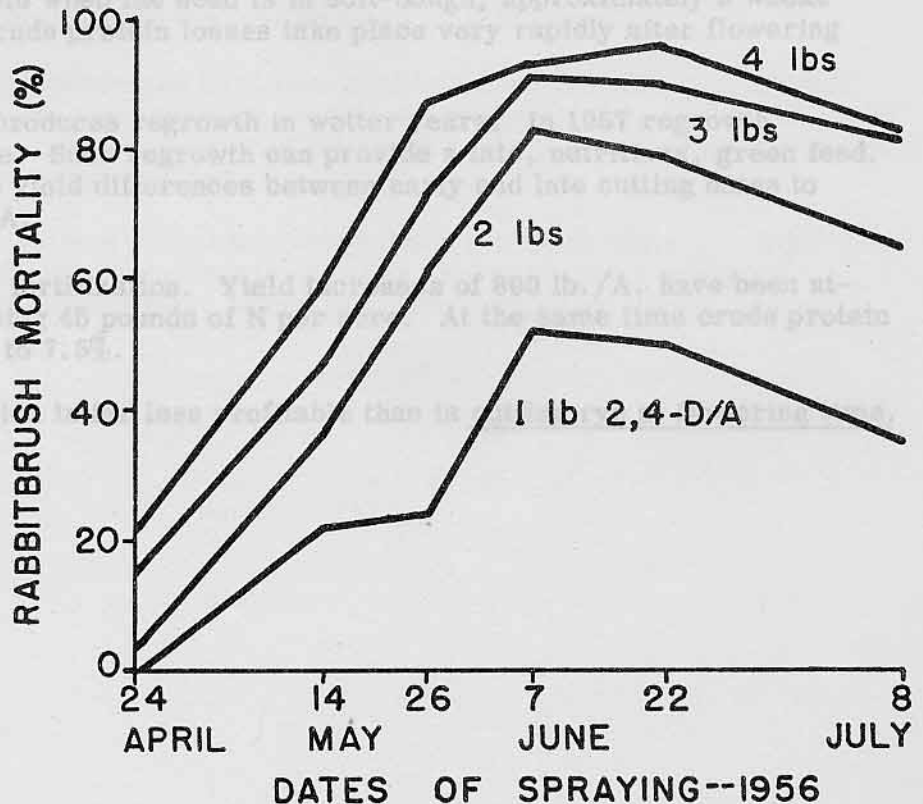
Most successful results on rabbitbrush have been obtained by spraying in June.

Timing of spray applications: Wait until the new twigs on rabbitbrush are at least 3 inches long and the deep-rooted bunchgrasses (such as bluebunch wheat-

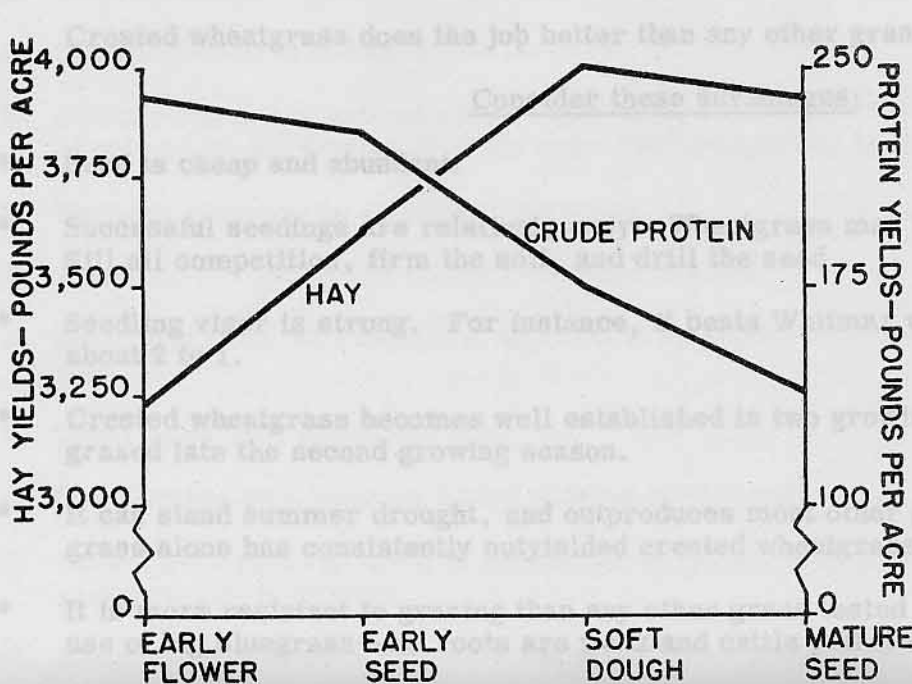
grass, Idaho fescue, and crested wheatgrass) are beginning to head out. In very dry years like 1955, soil moisture would be depleted by this time and rabbitbrush would not be killed. If soil moisture in the top 10 inches of soil is still good, and shallow-rooted grasses like sandberg bluegrass are still green, then spray. Otherwise wait for a wetter year.

This figure shows that 2, 4-D at either 1 or 2 lb./A. is not enough to assure good kills of rabbitbrush. It takes 3 lb./A. to do a good job.

Correct timing and rate of 2, 4-D will kill rabbitbrush in pure stands, and will kill rabbitbrush and big sagebrush growing in mixed stands.



Cut Rye Hay Early



Cut rye hay in the flower stage and save 100 pounds of protein per acre.

Rye hay in 1957 gained 800 pounds per acre from flower to mature seed stage--while crude protein decreased from 6.6 to 3.6%. 100 POUNDS OF TOTAL CRUDE PROTEIN LOST PER ACRE.

To buy this 100 pounds of crude protein in the form of 40% cottonseed meal at \$80 per ton would cost \$10. Ten dollars for 800 pounds of rye straw containing 3.6% crude protein is expensive.

This loss occurred over 4 weeks from June 18 to July 10. This means that the haying operation cannot dawdle along--protein losses take place rapidly in rye.

Rye attains its maximum yield when the seed is in soft-dough, approximately 3 weeks after the plant has flowered. Crude protein losses take place very rapidly after flowering begins.

Cutting rye in early flower produces regrowth in wetter years. In 1957 regrowth amounted to 250 pounds per acre. Such regrowth can provide a late, nutritious, green feed. Remember too that this reduces yield differences between early and late cutting dates to 550 lb./A. rather than 800 lb./A.

Rye will respond to nitrogen fertilization. Yield increases of 800 lb./A. have been attained at the flowering stage, using 45 pounds of N per acre. At the same time crude protein content was increased from 6.6 to 7.5%.

However, nitrogen fertilization is far less profitable than is cutting rye at flowering time.

Why Recommend Crested Wheatgrass?

Crested wheatgrass does the job better than any other grass has done.

Consider these advantages:

- * Seed is cheap and abundant.
- * Successful seedings are relatively easy. Wheatgrass may be seeded in fall or early spring. Kill all competition, firm the soil, and drill the seed.
- * Seedling vigor is strong. For instance, it beats Whitmar wheatgrass in seedling vigor about 2 to 1.
- * Crested wheatgrass becomes well established in two growing seasons, and may often be grazed late the second growing season.
- * It can stand summer drought, and outproduces most other grasses every year. Big bluegrass alone has consistently outyielded crested wheatgrass.
- * It is more resistant to grazing than any other grass tested to date. This is what stops use of big bluegrass--its roots are weak and cattle pull it up.
- * A good competitor for moisture and nutrients, it does a better job keeping sagebrush out than do other grasses studied.
- * Cattle like it in the spring and early summer, when more grass is needed.
- * Ranchers like it. Crested wheatgrass has proven itself on this range.

Big bluegrass and pubescent wheatgrass have remarkable qualities which may be used someday, but not just yet. With present emphasis upon more spring forage, nothing will take the place of crested wheatgrass. Other grasses and alfalfa will likely be better as researchers investigate feed quality for late summer and fall.

Sagebrush-bunchgrass range suffers from early turnout and too much early grazing. The only way to maintain the native forage remaining is to relieve spring grazing pressure. Fields of crested wheatgrass are helping many ranchers by providing good spring forage.