in the spring or fall when the hair coat is either being shed or coming in:

**Date Applied** | **Days Readable**
--- | ---
Sept. 1 | 60
Oct. 15 | 150-180
May 19 | 60

When applied after October 15, numbers remained legible for 5 to 6 months, even on dark red animals, but lasted only 2 months in the spring or fall. Comparable lasting qualities with the dye were obtained on experimental animals at the Central Plains Experimental Range by R. E. Bement of the Agricultural Research Service. He applied the dye in May, and had to make a second application in August. This last application was readable until the end of September, but then faded as the new hair growth came in with cool fall weather.

In addition to the black dye, a red dye was used on the white faces of Hereford animals. It also worked well, but the advantages gained were not worth the time consumed in applying face markings.

When first applied, the dye may appear wet or perhaps a dirty brown. Since about 15 to 30 minutes are required for the color to develop, the dye should be applied thoroughly just once, then allowed time to color. Protective gloves and old clothing should be worn, although the material is not particularly harmful to the skin.

At Manitou, two shoe-polish bottles equipped with daubers were used to mix the dye and apply the numbers to the cows. Half the dye was put in each shoe-polish bottle, and an equal amount of hydrogen peroxide added. The two bottles marked 24 animals with large numbers at a total cost of less than $1.50. Mr. Bement used a vegetable brush to mark the experimental animals at Central Plains Experimental Range at a comparable low cost.

Either of these two methods works well for marking only a few animals, and the entire contents of a bottle need not be used at one time. The remainder of the dye and peroxide can be saved for future use within the restriction stated on the bottle for storing conditions and longevity. If a large number of animals are to be marked, a more efficient method, such as a pressure spray can, may be feasible. (Note: Hair color is applied in Beauty Salons in plastic squeeze bottles. This method might work on cow hair.—Ed.)

Human hair dye for marking cattle should be useful wherever an identification mark may be needed for a relatively short time. For example, in artificial insemination work individual cows could be marked with a suitable code number to denote the difference in herd sires or breeding date. Also in beef herd improvement programs where pregnancy testing is common, cull animals could be marked when they are tested. If the operator did not wish to sell or separate cull animals at this time, he could easily separate and gather the marked animals from the herd at a later date, and thereby avoid considerable handling.

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**MANAGEMENT NOTES**

Cooperative Range Management in Oregon—Sagebrush Control

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Highlight

Sagebrush control on suitable sites continues to be a desirable range improvement practice. In Oregon, rancher-Extension cooperative planning groups allow pooling of individual acreages resulting in extremely low bids for both herbicides and aerial application. Brush control and range seedings provide needed flexibility in range management planning.

Sagebrush control, where sufficient desirable understory grasses are present, continues to be an excellent tool of range management. It has been found generally from the sand-sage areas of the plains to the big-sage in the West that "on the right site" money spent for sagebrush control is a sound investment.

In many areas brush control and other range improvement programs of land managing agencies have far overshadowed programs on private land. This is not so in Harney County, Oregon. The need for and value of sagebrush control programs has been well recognized by ranchers in Harney County. For the past 14 years, County Extension Agent Ray Novotny and rancher committees have organized sagebrush control programs on a county-wide basis. Harney County, with 6,483,840 acres is located in southcentral Oregon. Over 73% of the county is in public ownership. Of the remaining
1,530,000 acres in private ownership, approximately 1,343,000 are rangelands. An estimated 25% of the private land or 335,700 acres could be seeded. Over 35% or 470,000 could be sprayed for sagebrush control. Forty percent or 579,000 acres could be improved by management alone. A Bureau of Land Management district and parts of two national forests lie within county boundaries. Both land managing agencies have had range improvement programs underway for some time. As in most cases, Federal range programs are not intended to or cannot accomplish the total improvement program. Development on private lands is also essential. In some cases, such as Harney County, they lead the way.

To begin with, but also concurrent with control programs, Agent Novotny developed educational programs to provide information on the value of sagebrush control, range seeding, and other improvement and management practices. This included the selection of sites, forage increases to be expected, influence on livestock performance, and other management implications. The educational program was helped along significantly by the presence and work of the researchers at the Squaw Butte Experiment Station located in Harney County.

During each winter, the county agent and a small planning group of ranchers develop plans and procedures for the spring sagebrush control program. This requires a survey of interested ranchers to determine location and number of acres to be sprayed. Once the information is assembled, separate bids are let for the spray material (2,4-D butyl ester) and aerial application. Aerial application bids are divided into fixed-wing and helicopters. Both types of aircraft are utilized where necessary to do the best job of brush control under a variety of conditions. The benefits of group action for brush control can be demonstrated by the bid prices obtained for 1966. The bid to furnish 6,000 gallons of 2,4-D butyl ester (6 lb/acre acid equivalent) delivered in Burns was just under 60¢/gallon. Bids to cover aerial application (including flagging) were around 80¢/acre for fixed-wing and 1.40 for helicopter. Thus, total costs of applying 2 lb herbicide are about $2.00/acre with fixed-wing aircraft and $2.60 for helicopter. For the most part, herbicides have been applied in 5 gallons of water with a sticker spreader, but some diesel has been used. This certainly is a very good price when compared to the $2.00 to $3.50 application costs alone reported in some parts of the West in the past year or so.

Wildlife habitat is not ignored even though the brush control programs are conducted on private land. In the high country, aspen and willow thickets are skipped. Other desirable browse plants such as bitterbrush are carefully avoided. In addition, sagebrush is not sprayed on rough, steep canyons that are especially desirable for wildlife.

As a result of this program which has developed over the past few years, significant accomplishments have been made in Harney County (Table 1).

Range revegetation, consisting primarily of seeding crested wheatgrass, has been a major program in Harney County along with the brush control. Seeding of crested wheatgrass provide early spring forage, and allow deferral of sprayed and other native ranges. A combination of seeded, sprayed, and non-treated native ranges provides great flexibility in management programs on both public and private lands.

Exactly what this means to Harney County is hard to say. An estimate of the value of such a program if continued was recently made by Art Sawyer, Superintendent of the Squaw Butte Station. He estimated that if range improvement potentials in the county were fully developed by 1975, Harney County could run 25% more cows, calf weaning weights could be increased by 50 lb., and the calf crop increased 10%.

The combining of these factors would result in an increase of salable calf weights from 15½ million to 23½ million lb. annually, or an increase of 51%. Figuring a 20¢/lb. calf, that would amount to an annual income increase to the ranchers of $1,600,000.

Sawyer goes on to explain that such accomplishments can only be realized by maintaining a balanced year-around forage supply, improving nutrition, management, and quality of livestock, and planning ahead for the long haul.

This program serves to demonstrate what can be accomplished in range management when a group of private ranchers see an opportunity and decide to take advantage of it. The county extension agent served as a catalyst, an organizer, and as a source of information around which the program was built. All lands, public and private alike, have and will continue to benefit as a result of this program. The economy of the county has been and will continue to be strengthened as a result of this program of cooperative range management.

Table 1. Acres sprayed and seeded by private ranchers and public land managing agencies through calendar year 1965 in Harney County, Oregon.

<table>
<thead>
<tr>
<th>Ownership</th>
<th>Sprayed</th>
<th>Seeded</th>
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<tbody>
<tr>
<td>Private</td>
<td>74,200</td>
<td>38,000</td>
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<tr>
<td>BLM</td>
<td>44,335</td>
<td>111,000</td>
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<tr>
<td>Forest Service</td>
<td>7,424</td>
<td>8,637</td>
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