

WINTER ANNUAL WEED CONTROL WITH DIURON IN ANTELOPE VALLEY ALFALFA

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WINTER ANNUAL WEEDS such as common foxtail (*Hordeum murinum* L.) and mustards (*Sisymbrium* spp.), have been a problem for Antelope Valley hay growers for the past 30 years, and have often reduced the selling price of first-cutting alfalfa by \$8 to \$10 per ton. Older methods of control included cultivation and spraying with dinitro and oil. However, cultivation reduces the alfalfa stand, and dinitro with oil is not always effective. Control that would last three or four months was the object of five herbicide screening trials conducted in 1959 and 1960 in the Antelope Valley, using five promising chemicals. These studies showed 3-(3, 4-dichlorophenyl)-1, 1-dimethylurea (diuron) was the most effective herbicide and that it could be

used without apparent damage to the alfalfa.

Two commercial-scale trials were then established in 1961 using diuron at rates of 0, 1.2, 1.6, and 2.0 lb per acre in alfalfa fields at the Almondoz and Kiewit ranches. A third trial, at the University of California's Antelope Valley Field Station, covered a wider spectrum of dosages (from 0 to 3.7 lb per acre) to establish crop tolerance more critically. The diuron was applied in all trials with a commercial spray rig using 100 gallons of water per acre. Treatments were replicated three to four times and individual plot sizes varied from one-third to one-half acre.

Yields were recorded for all five cuttings at the Antelope Valley Field Station, but only the first cutting was measured at the other two locations. Yield data were taken by harvesting an equal portion of each plot into one windrow and baling it with a commercial baler. The portion of the bale which protruded out of the baler was measured as the baler left the plot and went into a new plot. This measured portion was adjusted and each bale was individually weighed to give plot yield. Grab samples of forage were randomly taken from each treatment after cutting and the weeds and alfalfa were separated and weighed to determine the weed percentage. Lahontan was the variety at the field station and California Common at the other two locations. Soils in the test areas ranged from a loamy sand to a sandy loam.

The effect of weeds on alfalfa quality was determined by taking five bales at random from each treatment at all locations. Score cards were given to commercial hay buyers and they were asked to establish a price for each lot of hay, and add comments.

Weeds

Mustards (*Sisymbrium* spp.), shepherds-purse (*Capsella bursa-pastoris* L.), lambsquarters (*Chenopodium album* L.), redstem filaree (*Erodium cicutarium* L.), common foxtail (*Hordeum murinum* L.), red brome (*Bromus rubens* L.), and annual bluegrass (*Poa annua* L.) were controlled by the diuron treatments. Even the lowest rate of diuron (1.2 lb per acre) gave 95% control leaving a trace of common foxtail. All rates of diuron used controlled established common foxtail plants in the three- to five-leaf stage. Established filaree with four to five leaves was not killed by the diuron treatments. The

Harvesting experimental weed control plots in alfalfa with a 14' self-propelled windrow swather. First cutting, 1961



TABLE 1. ALFALFA HAY AVERAGE YIELD

Diuron treatment	Almondoz first cutting*		Kiewit first cutting*		AVFS*	
	T/A	T/A	first cutting	1st-5th cutting	T/A	T/A
lb/A						
Check	2.57	1.8	2.53	6.9		
1.2	2.59	1.8	...	..
1.6	2.38	1.6	2.27	6.7		
2.0	2.34	1.6	2.17	6.8		
2.5	...	..	2.14	7.0		
3.1	...	..	1.90	6.7		
3.7	...	..	1.56	6.1		
LSD 5%	.18	.24	1.70	.5		
% weeds in check	32%	20%	15%	0		

*Principal weed: Almondoz first cutting = common foxtail; Kiewit first cutting = shepherds-purse; AVFS first cutting = common foxtail.

TABLE 2. AVERAGE ESTIMATED SALE PRICE FROM FIRST CUTTING

Diuron treatment	Almondoz	Kiewit	AVFS
lb/A	\$	\$	\$
Check	20.75	23.50	24.00
1.2	28.00	27.20	...
1.6	28.30	27.70	27.00
2.0	28.30	27.80	27.30

Average quoted price from five individual commercial alfalfa hay buyers.

THE ALFALFA HAY

Diuron offers alfalfa growers the possibility of excellent control of winter annual weeds, according to Antelope Valley tests, with no damage to the crop when properly applied. Clean alfalfa resulting from treatment returned \$12 to \$15 per ton more than weed-infested hay (including cost of treatment), and was also ready for a quick sale.

diuron at 1.6 and 2.0 lb per acre at the Kiewit Ranch gave 90% control of pigeon grass (*Setaria* sp.) throughout the summer. Diuron at the 1.6 and 2.0 lb-per-acre rates significantly reduced total yield, but when weed weight was subtracted from total forage weight, alfalfa yields were actually increased (table 1). Alfalfa yields were significantly reduced only where diuron rates were increased to more than 3 lb per acre.

Later trials and commercial treatments showed that satisfactory control may not be expected where annual weeds are well established. These observations showed poor control of common foxtail in the

four- to five-leaf stage on loamy soils. Higher dosages of diuron are necessary on heavier soil types such as silt loam to clays.

Increased value

At the Almondoz Ranch the increased value of the clean alfalfa would have returned \$12 to \$15 more than the cost of treatment. The differences in price between the treated and untreated hay, quoted by the buyers at the field station and the Kiewit Ranch, amounted to only a break-even return (above the cost of chemical treatment). However, the advantages of a quick sale possibility for the clean first-cutting alfalfa were also important. A delayed sale of weedy alfalfa causes losses, such as moisture shrinkage, insurance, storage costs, and interest on the investment of hay. Table 2 shows the buyers' average quoted prices. A standard comment by many buyers was that the quoted price for the check plot was a fair price, but they would be unable to pay that price since this hay could only be used for grinding at that time. Careful observations of the alfalfa market would show the greatest price advantage for clean alfalfa hay in years when prices are low and buyers are more selective. When alfalfa is in good demand, as in 1961, small amounts of weeds are not as objectionable to the buyer.

Diuron acceptance

Diuron is being accepted by growers in the Antelope Valley to control winter annual weeds. Commercial applications of 1.2 to 1.6 lb per acre of diuron have been made on a large scale over the past three years. When applied properly, growers report excellent winter annual weed control and no damage has been



Control of common foxtail in alfalfa by winter (dormant) application of 2.4 lb per acre of diuron herbicide. Note normal weed infestation at first cutting in untreated control strip (right). Antelope Valley Field Station, 1961.

reported from commercial treatments. Diuron is also being recommended for use on the margins of one-year or older hay fields where weeds are spreading into the field. Diuron should be applied just prior to the anticipated rain or irrigation.

Registration

This herbicide is registered for use only on dormant or semidormant alfalfa varieties and must not be used on non-dormant varieties. Diuron can be a very effective tool to produce weed-free alfalfa hay if growers can evaluate fields and anticipate weed problems. (For the current recommendations and limitations on the use of diuron in alfalfa hay, contact your local Farm Advisor's Office and/or consult the latest U.C. weed control recommendations. ALWAYS READ THE HERBICIDE LABEL CAREFULLY BEFORE USE.)

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At the Antelope Valley Field Station with

