# Control of Tansy Ragwort in Western Oregon Pastures with 2,4-D

Circular of Information 665

January 1978

Agricultural Experiment Station
Oregon State University, Corvallis

# CONTROL OF TANSY RAGWORT IN WESTERN OREGON PASTURES WITH 2,4-D

Bill D. Brewster, M. Philip Rolston, and Arnold P. Appleby

Bill D. Brewster is Instructor, M. Philip Rolston is Graduate Assistant, and Arnold P. Appleby is Professor in the Crop Science Department, Oregon State University, Corvallis 97331.

## SUMMARY

1. Comparable tansy ragwort control was achieved with amine and ester formulations of 2,4-D.
2. Tansy ragwort control was most effective when 2,4-D was applied in the fall or spring to rosette-stage tansy.
3. Fall 2,4-D applications caused less clover injury than spring applications. Retreatment in the spring with a low rate of 2,4-D may be necessary to control spring-germinating tansy seedlings.
4. Wetting agent may not improve tansy ragwort control with 2,4-D amine, but may increase clover injury.
5. A single application of 2,4-D will rarely, if ever, provide permanent tansy ragwort control.

## INTRODUCTION

Tansy ragwort *(Senecio jacobaea)* infests 4.5 to 9 million acres in western Oregon, according to OSU Extension Service estimates. This poisonous Old World weed was first reported in the Pacific Northwest in 1922. Its rapid spread is indicative of its adaptability to the climate and conditions in western Oregon. Tansy ragwort is most often found in recently cutover forest land, pastures, and waste areas.

Livestock losses in 1972 were estimated to exceed $1.25 million. Reduced pasture and alfalfa hay production are also considerable as fields are plowed to control this weed.

The objectives of this research in pastures were (1) to compare the effectiveness of 2,4-D (2,4-dichlorophenoxy acetic acid) amine versus ester, (2) to demonstrate the optimum stage of growth for tansy ragwort control with 2,4-D, and (3) when clover is present, to determine rates and times of 2,4-D application to maximize tansy ragwort control and minimize clover injury.

## EXPERIMENTAL PROCEDURES

Thirty-two field experiments were conducted from 1972 to 1977 in tansy ragwort-infested western Oregon pastures. All experiments were structured as randomized block designs with at least three replications. Plot size was either 6' by 30' or 8' by 25', depending on the experiment. Applications were made with a $CO_2$ pressurized backpack sprayer or a compressed-air bicycle-wheel sprayer.

Visual evaluations were made as percent tansy ragwort control and percent clover injury during the spring or summer following treatment.

All 2,4-D rates were expressed as pounds acid equivalent (a.e.) per acre.

## RESULTS

### Amine vs. Ester

Spring applications with 1.5 lb/A of the amine and ester formulations at many locations (Table 1) always produced at least 70% control. The ester tended to be more consistent than the amine at the lower rate.

### Stage of Growth

Two trials that were conducted to investigate the optimum stage of growth for spring 2,4-D applications produced nearly identical results (Fig. 1). Control at both locations was most effective after the tansy ragwort rosettes exceeded 6" to 10" in diameter. Excellent control was obtained over about a one-month period at both locations, but after the tansy ragwort began to bolt, the control fell off sharply. For the most effective control with 2,4-D, tansy ragwort must be in an actively metabolizing vegetative state. In western Oregon, this period usually occurs in the spring during April and May but varies with local environmental conditions.

### Spring vs. Fall Applications

Fall applications of 2,4-D have been shown to be effective in controlling tansy ragwort. Several trials (Table 2) have shown that fall applications of 2,4-D tend to be less injurious to white clover than do spring applications.

A trial was conducted to directly compare the effects of fall vs. spring 2,4-D amine applications on a grass-white clover pasture. No surfactant was added to the spray solution. Clover injury was first manifested as epinasty which was soon followed by a slight chlorosis and eventual necrosis of the leaves. Fall application caused considerably less white clover injury (Fig. 2) so this treatment should be a good

alternative to spring 2,4-D applications when white clover is an important component of the pasture. Tansy ragwort control exceeded 90% during the spring following application of 2 lb/A in November (Fig. 2). By summer, new tansy ragwort seedlings had emerged in the fall-treated plots so that the spring treatments were providing superior control compared to the fall applications. However, clover injury from the spring treatments also remained higher and acceptable tansy ragwort control was not achieved until well into the grazing season. Although white clover injury from spring 2,4-D applications is generally not permanent, much of the production is lost for the grazing season.

A split application of 1 or 2 lb/A in the fall followed by 3/4 lb/A in the spring provided tansy ragwort control that was superior to fall-only applications and was less injurious to the clover than the spring applications.

Amine Formulation With and Without Wetting Agent

The addition of a wetting agent did not improve the activity of fall-applied 2,4-D amine on tansy ragwort (Table 3) but may have increased injury to seedling white clover. While spring-applied 2,4-D amine seemed to be slightly more effective when wetting agent was added at two locations in 1976, no advantage was seen when one location was retreated in 1977 (Table 4).

Retreatments

One year following April 2,4-D applications, a reduced tansy ragwort population was measured (Table 5). However, sufficient seedlings had established during the subsequent fall and spring to justify retreatment. A one- or two-year spray program often will not completely eliminate a serious tansy ragwort infestation.

Table 1. Effect of formulation and rate of spring applications of 2,4-D on percent tansy ragwort control in western Oregon

| Location | County | Date | % Tansy Ragwort Control* 2,4-D (lbs a.e./A) LV ester 1.5 | LV ester 3.0 | amine + W.A. 1.5 | amine + W.A. 3.0 |
|---|---|---|---|---|---|---|
| 1 | Benton | Apr. 18, 1972 | 98 | 100 | - | - |
| 2 | Linn | Apr. 18, 1972 | 88 | 100 | - | - |
| 3 | Linn | Mar. 28, 1973 | 93 | 100 | - | - |
| 4 | Tillamook | Apr. 23, 1973 | - | 100 | - | - |
| 5 | Tillamook | Apr. 23, 1973 | - | 99 | - | - |
| 6 | Curry | Apr. 16, 1974 | 87 | 96 | 88 | 95 |
| 7 | Coos | Apr. 17, 1974 | 85 | 99 | 73 | 92 |
| 8 | Douglas | Apr. 17, 1974 | 82 | 99 | 89 | 99 |
| 9 | Douglas | Apr. 18, 1974 | 95 | 100 | 93 | 98 |
| 10 | Douglas | Apr. 18, 1974 | 95 | 100 | 91 | 97 |
| 11 | Linn | Apr. 14, 1974 | 94 | 98 | 72 | 93 |
| 12 | Linn | Apr. 13, 1974 | 100 | 100 | 99 | 100 |
| 13 | Linn | Apr. 25, 1974 | 93 | 98 | 70 | 95 |
| 14 | Tillamook | May 21, 1974 | 77 | 95 | 83 | 96 |
| 15 | Lincoln | May 2, 1974 | 87 | 97 | 70 | 92 |
| 16 | Yamhill | May 7, 1974 | 89 | 98 | 97 | 97 |
| 17 | Yamhill | Apr. 6, 1974 | 98 | 99 | 99 | 100 |
| 18 | Columbia | May 8, 1974 | 87 | 97 | 89 | 95 |
| 19 | Linn | Apr. 9, 1976 | 90 | - | 99 | - |
| 20 | Linn | Apr. 9, 1976 | 96 | - | 98 | - |
| Avg. Locations 6-18 | | | 90.3 | 98.2 | 87.3 | 96.1 |

*Evaluated during the summer following treatment.

Table 2. Effect of 2,4-D rate, formulation, wetting agent (WA), and date of application on tansy ragwort and white clover

| | | | % Tansy Ragwort Control* | | | | | % Clover Injury* | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | LV ester | | amine + WA | | amine | LV ester | | amine + WA | | amine |
| Location | County | Date | 1.5 | 3.0 | 1.5 | 3.0 | 1.5 | 1.5 | 3.0 | 1.5 | 3.0 | 1.5 |
| 1 | Lincoln | May 2, 1974 | 87 | 97 | 70 | 92 | - | 35 | 78 | 23 | 43 | - |
| 2 | Columbia | May 8, 1974 | 87 | 97 | 89 | 95 | - | 5 | 37 | 0 | 30 | - |
| 3 | Linn | Apr. 9, 1976 | 90 | - | 99 | - | 91 | 42 | - | 55 | - | 38 |
| 4 | Yamhill | Nov. 16, 1974 | 90 | 96 | 93 | 96 | - | 0 | 0 | 0 | 0 | - |
| 5 | Linn | Nov. 28, 1974 | 100 | 100 | 100 | 100 | - | 8 | 18 | 18 | 18 | - |

*Evaluations made in early to mid-summer.

Table 3. The effect of wetting agent on tansy ragwort control and white clover injury with 2,4-D amine (November applications)

| Treatment | Rate (lb a.e./A) | Evaluated March 26, 1977 | |
|---|---|---|---|
| | | % Tansy Ragwort Control | % Seedling White Clover Injury |
| 2,4-D amine | 1.0 | 84 | 42 |
| 2,4-D amine | 2.0 | 92 | 58 |
| 2,4-D amine + W.A. | 1 + 1/2% | 77 | 51 |
| 2,4-D amine + W.A. | 2 + 1/2% | 88 | 64 |

Table 4. The effect of surfactant on tansy ragwort control with 2,4-D (April applications)

| Treatment | Rate (lb a.e./A) | % Tansy Ragwort Control* 1976 Location 1 | 1976 Location 2 | 1976 Avg | 1977** Location 2 |
|---|---|---|---|---|---|
| 2,4-D LV ester | 1.5 | 90 | 96 | 93 | 98 |
| 2,4-D amine | 1.5 | 91 | 93 | 92 | 95 |
| 2,4-D amine + W.A. | 1.5 + 1/8% v/v | 99 | 98 | 98 | 92 |

*Evaluated during the summer following treatment.

**Location 2 retreated spring 1977

Table 5. Tansy ragwort density 1 year after April 2,4-D applications

| Treatment | Rate (lb a.e./A) | Tansy Density Plants/sq. ft. | % Tansy Cover |
|---|---|---|---|
| 2,4-D LV ester | 1.5 | 2.8 | 7.6 |
| 2,4-D amine | 1.5 | 1.9 | 9.4 |
| 2,4-D amine + W.A. | 1.5 + 1/2% | 1.8 | 9.8 |
| Untreated control | - | 3.4 | 17.8 |

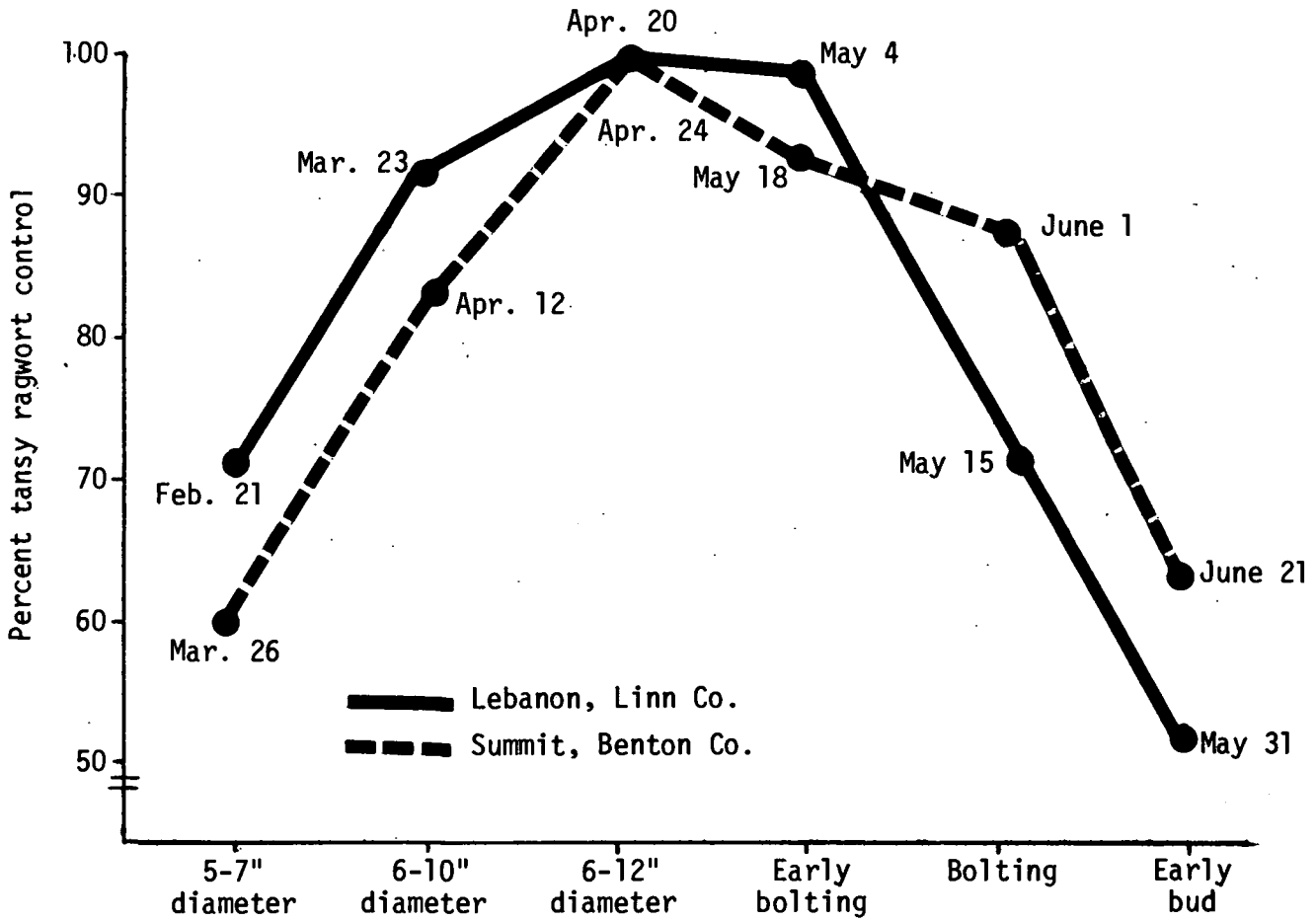


Figure 1. Effect of growth stage, date of application, and location on tansy ragwort control with 2,4-D.

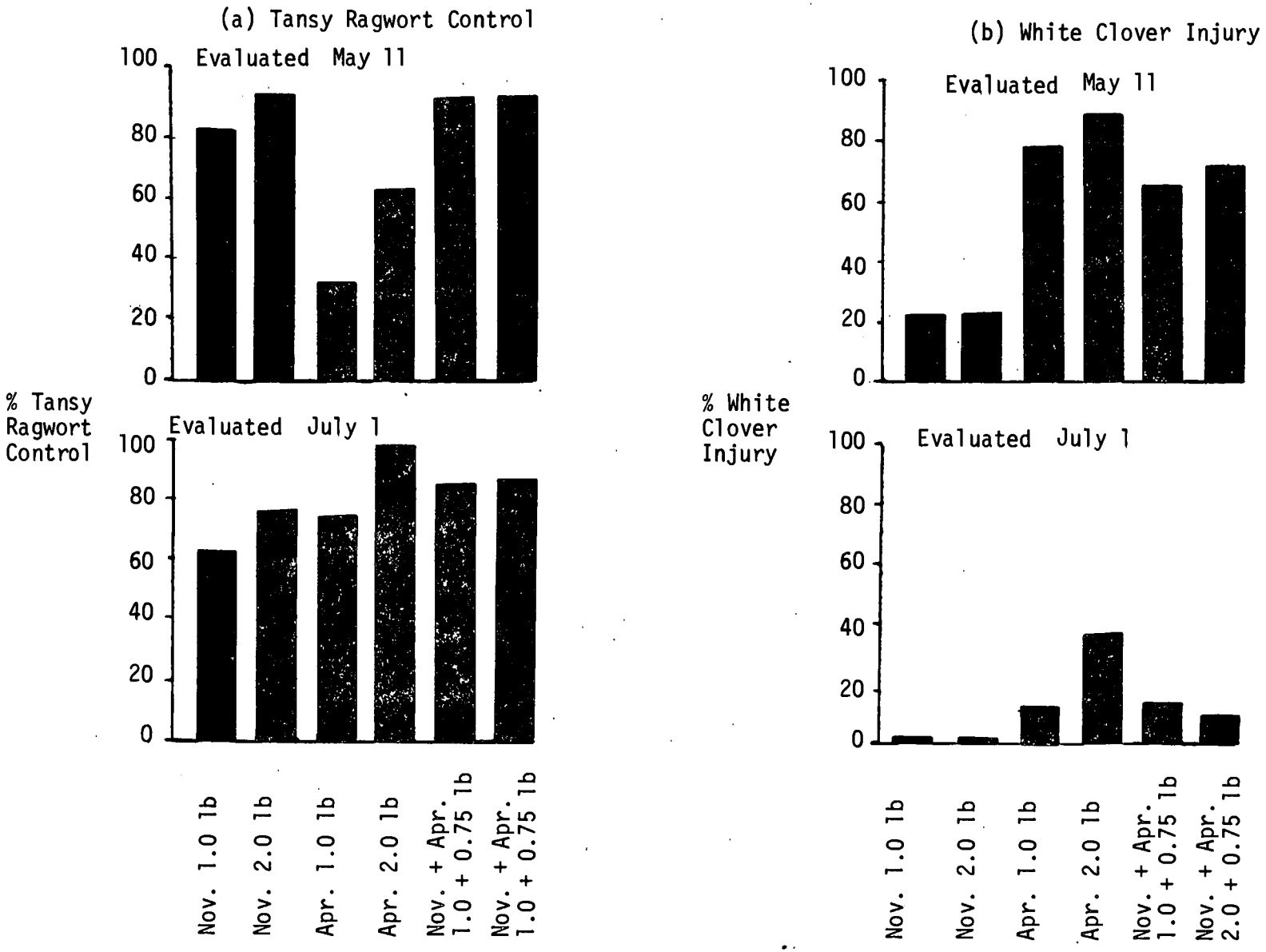


Figure 2. Tansy ragwort control (a) and white clover injury (b) following fall (November) and spring (April) applications of 2,4-D amine applied at 0.75, 1.0, and 2.0 lbs a.e./A, evaluated on May 11 and July 1.