

## EFFECTS OF VARIOUS HERBICIDES AND APPLICATION TIMING ON BROADLEAF WEED CONTROL

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### Summary and Application

Effective control of broadleaf weeds in pastures is necessary in order to obtain desirable yields of high-quality forages. The objectives of this study were to determine the effect of application timing with various pasture herbicides (2,4-D amine, 2,4-D ester, Cimarron, Cimarron Max, Amber, Fuego, Pasturegard, Grazon P+D, Weedmaster, Redeem R&P, Range Star, Surmount, and Plateau). Three application timings were evaluated on the control of annual broomweed [*Gutierrezia dracunculoides* (DC.) S.F. Blake.], woolly croton [*Croton capitatus* Michx.], and western ragweed [*Ambrosia psilostachya* DC.]. Annual broomweed was effectively controlled (>93%) 30 days after treatment (DAT) with all herbicides (except Plateau) in the early and mid-timing; however, in the late application timing, only Fuego 1:8 provided > 90% control. Western ragweed was effectively controlled (>99%) 30 DAT with all herbicides (except Cimarron and Plateau) in the early and mid-timing; in the late application timing, however, Cimarron Max I, Fuego 1:8, Grazon P+D, Surmount, Range Star, and Weedmaster provided satisfactory (>87%) control. Woolly croton was effectively controlled 30 DAT with all herbicides (except Redeem) in the early and mid-timing; in the late application timing, however, only Fuego 1:8, Cimarron Max, Grazon P+D, and Surmount provided satisfactory (> 88%) control. Annual broadleaf weeds should be controlled when weeds are small and actively growing with the most cost effective herbicide labeled.

### Introduction

Pasture and rangeland weeds often reduce forage yield, quality, and animal performance. Weeds such as woolly croton, annual broomweed, and western ragweed are common in Texas pastures. Applications of herbicides for broadleaf weed control often result in increased desirable grass cover. In native range grasses, every pound of weed controlled generally results in an equal amount of forage produced. In improved bermudagrass pastures, every pound of weed controlled can result in 2 pounds of forage produced. Research indicates (1,2,3) that annual broomweed, woolly croton, and western ragweed can be effectively controlled with pasture herbicides when properly applied. The objectives of this study were to determine the effects of timing applications and various herbicides on annual broomweed, western ragweed, and woolly croton.

### Methods and Materials

A split-plot design was established during the 2002 growing seasons in Stephenville, TX. Main plots included three application timings (early=24 April, mid=23 May, and late=25 June), and subplots included various herbicide rates. Broadleaf weeds averaged 2, 14, and 24 in. height at the three application timings. Herbicide treatments listed in Table 1 were applied with a backpack CO<sub>2</sub> sprayer delivering 15 gallons per acre (GPA). Percent visual control of annual broomweed, western ragweed, and woolly croton was estimated 30 DAT.

Table 1. Product names, chemical names, amount applied, and cost/A of treatments used in this application timing study.

| Product Name         | Chemical Name                 | Amount Applied     | Cost/A <sup>†</sup> |
|----------------------|-------------------------------|--------------------|---------------------|
| Agristar 2,4-D amine | 2,4-D amine                   | 1.5 pt/A           | 2.81                |
| Agristar 2,4-D LV6   | 2,4-D LV6                     | 1.5 pt/A           | 4.17                |
| Cimarron             | Metsulfuron methyl            | 0.25 oz/A          | 5.87                |
| Cimarron Max I       | Metsulfuron + 2,4-D + dicamba | 0.25 oz/A + 1 pt/A | 6.48                |
| Amber                | Triasulfuron                  | 0.47 oz/A          | 4.00                |
| Fuego 1:8            | Triasulfuron + dicamba        | 0.56 oz + 12.5 oz  | 8.50                |
| Fuego 1:10           | Triasulfuron + dicamba        | 0.47 oz + 10 oz    | 6.83                |
| Fuego 1:12           | Triasulfuron + dicamba        | 0.39 oz + 8.3      | 5.69                |
| Grazon P+D           | Picloram + 2,4-D              | 1.5 pt/A           | 6.19                |
| Plateau              | Imazapic                      | 4 oz/A             | 10.00               |
| Pasturegard          | Triclopyr + fluroxypyr        | 1.5 pt/A           | N/A <sup>‡</sup>    |
| Range Star           | 2,4-D amine + dicamba         | 1.5 pt/A           | 5.25                |
| Redeem R&P           | Triclopyr + clopyralid        | 1.5 pt/A           | 14.06               |
| Surmount             | Picloram + fluroxypyr         | 1.5 pt/A           | N/A                 |
| Weedmaster           | 2,4-D + dicamba               | 1.5 pt/A           | 5.46                |

<sup>†</sup> Price may vary for different locations.

<sup>‡</sup> NA = Price not available.



Figure 1. Annual broomweed at the early timing application on 24 April 2002 (less than 2 in. tall)



Figure 2. Annual broomweed at the mid-timing application on 23 May 2002.



Figure 3. Annual broomweed at the late-timing application on 25 June 2002.

### Results and Discussion

There were application timing by weed species, application timing by herbicide treatment, and weed species by herbicide treatment interactions., therefore data is presented by weed species and application timing.

**Annual broomweed.** In the early (April) and mid (May)-timing applications, all herbicide treatments effectively controlled (>93%) annual broomweed (Table 2), except for Plateau. Plateau was recently labeled for pastures to control annual grasses and sedges. It was included in this trial because its activity on broadleaf weeds was not well known. Plateau should not be used for traditional broadleaf weed control. It should only be used when there is a specific grassy weed (crabgrass, field sandbur, etc.) problem, because it has little activity on pasture broadleaf weeds, and it can reduce forage yield of improved pastures (data published in Forage Research in Texas 2003, Effect of various herbicides on yield of established Coastal bermudagrass).

Control of annual broomweed was drastically reduced in the late (June)-timing application. Only Fuego 1:8 provided at least 90% control at the late-timing

application. The late-timing application was typically dry and the weeds were relatively large. This illustrates that annual weeds must be small and actively growing in order for herbicides to be effective.

**Woolly croton.** Woolly croton was effectively controlled (>93%) in the early-timing application with all herbicide treatments, except Redeem. In the mid-timing application, all herbicides provided excellent control (>88%), except for Redeem (65%), Range Star (80%), Weedmaster (80%), and Plateau (83%), which could be considered moderate-good control. The late-timing application had drastically lower control of woolly croton; only Cimarron Max I, Fuego 1:8, Surmount, and Grazon P+D provided satisfactory control (>88%). These herbicides seem to be more active when weed growth slows, probably due to the fact that all these are mixtures of different herbicides.

**Western ragweed.** Western ragweed is not an annual, but is classified as relatively easy to control and thus could be managed as an annual. In the early and mid-timing applications, western ragweed was effectively controlled (>99%) by all herbicide treatments, except for Cimarron, Amber, and Plateau. These herbicides should not be used alone when perennial weeds are present, due to their lack of performance on perennials. Again, the late-timing application had drastically lower control of ragweed. This was especially true with 2,4-D amine, Cimarron, and Amber. In the late-timing application, Cimarron Max I, Fuego 1:8, Grazon P+D, Range Star, Surmount, and Weedmaster provide satisfactory (>87%) control of ragweed. Tank-mixing herbicides with different modes of action seemed to improve efficacy when weed growth starts to slow down.

### **Conclusions**

Annual broadleaf weeds are relatively easy to control with herbicides when they are applied at the proper growth stage (when weeds are small and actively growing). Herbicide treatment selection should be based on economics. The cheapest herbicide, 2,4-D amine, provided equal control of the weeds in this study when early and mid-timing applications were used. Thus, 2,4-D amine would be recommended when these weeds are small and actively growing. If weeds are not actively growing or other perennial weeds are present, a mixture of herbicides with different mode of action may improve efficacy.

### **Literature Cited**

- 1) Bovey, R.W. and R.E. Meyer. 1990. Woolly croton (*Croton capitatus*) and bitter sneezeweed (*Helenium amarum*) control in the Blackland Prairie of Texas. *Weed Tech.* 4:862-865.
- 2) Boyd, W.E., E.B. Herndon, and R.E. Sosbee. 1983. Herbicidal control of common broomweed. *J. Range Manage.* 36:521-524.
- 3) Meyer, R.E. and R.W. Bovey. 1990. Influence of sulfonylurea and other herbicides on selected woody and herbaceous species. *Weed Sci.* 38:249-255

Table 2. Effect of application timing of various herbicides on annual broomweed, western ragweed, and woolly croton in 2002 at 30 days after treatment (DAT).

|                      | Annual Broomweed   |            |            | Western Ragweed  |            |            | Woolly Croton    |            |            |
|----------------------|--------------------|------------|------------|------------------|------------|------------|------------------|------------|------------|
|                      | Application Timing |            |            |                  |            |            |                  |            |            |
| Treatment            | 04-24-2002         | 05-23-2002 | 06-25-2002 | 04-24-2002       | 05-23-2002 | 06-25-2002 | 04-24-2002       | 05-23-2002 | 06-25-2002 |
|                      | % Control 30 DAT   |            |            | % Control 30 DAT |            |            | % Control 30 DAT |            |            |
| No herbicide         | 0                  | 0          | 0          | 0                | 0          | 0          | 0                | 0          | 0          |
| 1.5 pt/A 2,4-D LVE   | 99                 | 99         | 63         | 99               | 99         | 60         | 99               | 88         | 63         |
| 1.5 pt/A 2,4-D amine | 99                 | 99         | 35         | 99               | 99         | 19         | 93               | 99         | 60         |
| 0.25 oz/A Cimarron   | 96                 | 93         | 45         | 25               | 45         | 17         | 96               | 95         | 60         |
| Cimarron Max I       | 99                 | 99         | 82         | 99               | 99         | 87         | 99               | 99         | 90         |
| 0.47 oz/A Amber      | 98                 | 93         | 43         | 78               | 66         | 15         | 98               | 92         | 78         |
| Fuego (1:8 A)        | 99                 | 99         | 90         | 99               | 96         | 90         | 99               | 95         | 90         |
| Fuego (1:10 A)       | 99                 | 99         | 85         | 99               | 94         | 88         | 99               | 94         | 88         |
| Fuego (1:12 A)       | 99                 | 99         | 85         | 99               | 93         | 82         | 99               | 95         | 63         |
| 1.5 pt/A Surmount    | 99                 | 99         | 78         | 99               | 86         | 88         | 99               | 95         | 90         |
| 1.5 pt/A Pasturegard | 99                 | 99         | 10         | 99               | 99         | 63         | 99               | 96         | 50         |
| 1.5 pt/A Redeem      | 99                 | 98         | 65         | 99               | 93         | 63         | 63               | 65         | 40         |
| 1.5 pt/A Grazon P+D  | 99                 | 99         | 77         | 99               | 99         | 90         | 99               | 93         | 88         |
| 1.5 pt/A Weedmaster  | 99                 | 99         | 65         | 99               | 99         | 87         | 98               | 80         | 70         |
| 1.5 pt/A Range Star  | 99                 | 99         | 65         | 99               | 99         | 88         | 97               | 80         | 69         |
| 4 oz/A Plateau       | 25                 | 5          | 5          | 25               | 33         | 10         | 99               | 83         | 15         |
| <b>LSD</b>           | <b>12</b>          | <b>20</b>  | <b>17</b>  | <b>15</b>        | <b>26</b>  | <b>16</b>  | <b>20</b>        | <b>17</b>  | <b>18</b>  |