WINTER CLEANING SUBTERRANEAN CLOVER PASTURES WITH NON-SELECTIVE HERBICIDES

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Abstract

Winter cleaning by non-selective herbicides applied to an annual pasture was investigated in a field experiment at Rutherglen in 1996. Paraquat and Sprayseed? were compared at two rates and five different application times. All herbicide applications on July 29 produced the greatest mean increase in legume composition (59% to 81%) of the pasture, although this coincided with a reduction in mean legume dry matter (5t/ha to 4.5t/ha) compared to the earlier application on July 8. Low herbicide rates tended to be safer on legumes and achieve a desired level of grass control earlier in the season while later applications required higher rates to achieve the same degree of change in botanical composition.

Key words: winter cleaning, subterranean clover, non-selective herbicides, legume composition, legume dry matter

Introduction

The widespread increase in herbicide resistant weeds in mixed farming systems has necessitated the adoption of alternative methods of weed control. The use of non-selective herbicides to remove annual grass and broadleaf weeds applied within the ley phase of pasture crop rotations has been promoted as an effective means of controlling resistant species. The advantages of this approach have been shown in terms of increased livestock production and increased wheat yields and grain protein levels of following crops (1, 2). This experiment compared different rates and timing of non-selective herbicides applied to a subterranean clover pasture and the subsequent effect on pasture composition and dry matter production.

Materials and Methods

The non-selective herbicides paraquat and Sprayseed? were applied to an annual pasture containing subterranean clover (*Trifolium subterraneum*) at 350 plants/m^2 and annual grasses at 680 plants/m^2. The grasses were predominantly annual ryegrass (*Lolium rigidum*), vulpia (*Vulpia spp*), winter grass (*Poa annua*), barley grass (*Hordeum leporinum*) and wild oats (*Avena fatua*). Treatments consisted of paraquat applied at two rates, 1.5 and 2 L/ha (0.3 kg and 0.4 kg ac/ha) and Sprayseed? (paraquat + diquat) applied at 1.5 and 2 L/ha (0.187 kg ac/ha paraquat + 0.112 kg ac/ha diquat and 0.25 kg ac/ha paraquat + 0.15 kg ac/ha diquat). All treatments were applied at a water rate of 100 L/ha. The applications were made on June 24, July 8, July 29, August 19 and September 9. The first herbicide treatment was applied when the subterranean clover plants had reached the recommended growth stage (six true leaves). Six quadrants (25 x 25cm) were sampled randomly from each treatment on November 14, bulked, weighed and sub sampled. The sample weight for Sprayseed? 1.5 L/ha at the July 29 timing was not recorded. The samples were hand-separated into clover, grass and other species, and dried at 65^{0}C for 24 hours.

Results and Discussion

The proportions of clover and grass dry matter were highly dependent on the timing of herbicide application. The July 29 application increased the sub clover component (to >80%) for all treatments compared to other times and the control (59%) (Fig. 1). The June 24 application produced an unsatisfactory change in legume component of the pasture sward, primarily due to the herbicides opening the canopy of the pasture allowing secondary germination of grass weeds. The late timing on September 9 had least effect on botanical composition, due in part to the maturity of the grasses and the high level of dry matter present which reduced the effective contact of the herbicides with the plants.

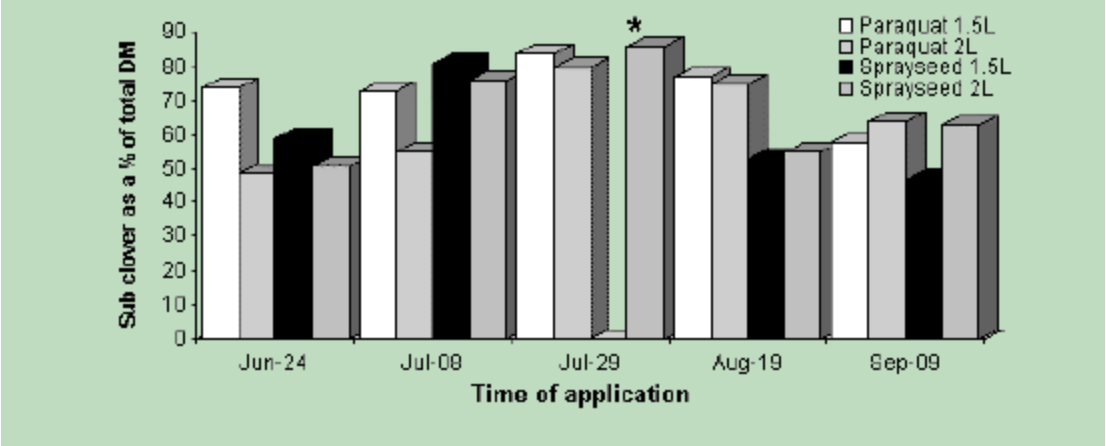

Figure 1: The effect of herbicide rates and time of application on subterranean clover as a percentage of dry matter on November 14. (* indicates not sampled).

Paraquat at 1.5 L/ha applied on June 24 and July 8, resulted in significantly higher legume herbage production of > 5t/ha compared to the control (3t/ha) and all other treatments (Fig. 2). Paraquat at 2L/ha and Sprayseed[?] for both rates applied on the June 24 had significantly less legume herbage growth. There were no significant differences between paraquat and Sprayseed[?] on legume composition and herbage biomass when applied from early July The general trend over the application times indicated that late herbicide application will reduce the potential regrowth of the legume during spring compared to the early application time.

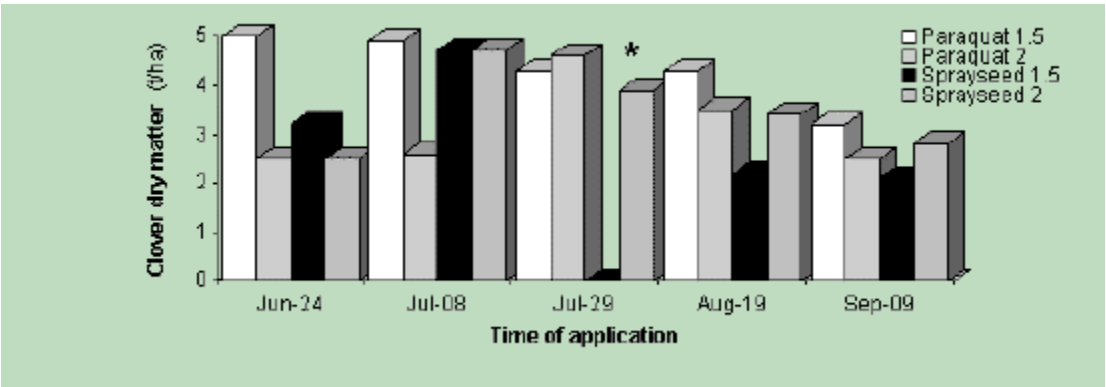

Figure 2: The effect of herbicide rates and time of application on total legume dry matter. (* indicates not sampled).

Conclusion

The results indicated paraquat or Sprayseed? applied to annual pastures in mid-to-late July tended to produce the most desirable increase in legume content of an annual pasture. Early application and high rates of both herbicides significantly reduced legume dry matter compared to the low rate of paraquat. All treatments applied from late July reduced total legume dry matter compared to early application times.

References

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