

Research Information Note 293

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CUT STUMP APPLICATIONS WITH IMAZAPYR, by Colin Edwards and John Morgan

Abstract

Treatment of stump surfaces with herbicides is commonly used as a means of controlling shoot regrowth. Four herbicides currently approved for this method of application are, glyphosate (e.g. Roundup Pro¹), triclopyr (e.g. Timbrel¹), 2,4-D/dicamba/triclopyr (Broadshot¹) and ammonium sulphamate (e.g. Amcide¹). A recently introduced herbicide, imazapyr (Arsenal 50¹), has potential as an improved means of cut stump treatment when compared with currently approved products.

[¹Registered Trade Name]

Introduction

1. Arsenal 50 (Cyanamid UK), is a 50 g/l (4.6% w/w) liquid formulation of imazapyr with full label approval as a pre-planting herbicide in forestry. It is a non-selective translocated herbicide with contact and residual activity on a wide range of grasses, annual and perennial broadleaved and herbaceous weeds. Imazapyr has been recommended previously as a foliar treatment for the control of woody weeds and rhododendron (Willoughby, 1995; Edwards *et al.*, 1994).
2. In the USA and Canada, Norway, Sweden and other Nordic countries, imazapyr is approved for woody weed control and is used extensively as a cut stump application to prevent the regrowth of coppice shoots from a wide range of tree species including *Acer* spp., *Betula* spp., *Fraxinus* spp. and *Quercus* spp. It is now clear that cut stump applications with this product are permissible under British legislation. Its use as a cut stump treatment is restricted to sites where Sitka spruce, Japanese larch, lodgepole pine and Corsican pine are to be established. Limited evidence indicates Douglas fir, Norway spruce and Scots pine may also be grown safely. A minimum of 5 months must elapse between treatment and planting on a site. Imazapyr must not be used as a site preparation treatment for broadleaved tree species.
3. This Note describes results from three field experiments where imazapyr has been successfully applied as a cut stump treatment to woody weeds. Findings show the potential for imazapyr to be used for cut stump treatment.

Experimental treatments and results

Loch Awe 5: Cut stump treatment of rhododendron

4. Mature *Rhododendron ponticum* L. bushes were cut down in July 1993 using a Menzi Muck flail mounted on a tracked excavator (Murgatroyd, 1993). The flailed stumps were treated with a range of herbicides to evaluate their potential to control shoot regrowth. Recommended rates of glyphosate (20% product solution), triclopyr (8% product solution) and three rates of imazapyr (10% and 20% product solution and undiluted) were compared with a control (no herbicide). Herbicide applications were made within 5 days of stump severance using a knapsack sprayer fitted with a solid cone nozzle. The herbicide solutions were applied to the point of run-off, to six selected stumps in each of five replicate blocks.
5. Percentage of stumps with shoot regrowth and height of foliage regrowth were assessed at the end of the first growing season. The 20% imazapyr solution and undiluted imazapyr applications completely inhibited shoot regrowth from all stumps treated. The application of herbicide significantly reduced the

proportion of stumps with shoot regrowth when compared with control plots ($P<0.001$) (Figure 1). Comparisons among the three herbicides indicated that imazapyr (mean value of three rates) gave the lowest percentage of shoot regrowth, although this was not statistically significant.

- Treated stumps produced smaller shoots than untreated stumps ($P<0.05$) (Figure 2). Imazapyr treatments (using mean of three rates) reduced the height of regrowth significantly more than any of the other herbicides ($P<0.05$).

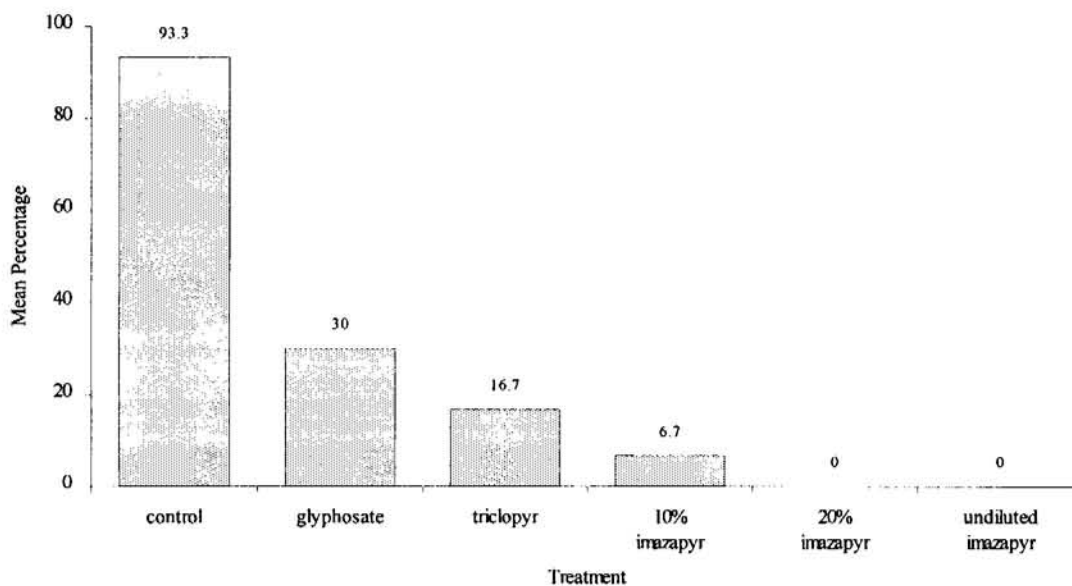


Figure 1. Percentage of stumps with shoot regrowth 2 years after herbicide application.

York 8: Control of broadleaved woody regrowth

- In trials funded by British Rail, comparisons were made between four herbicides applied as cut stump treatments to control regrowth from freshly felled broadleaved trees on a railway embankment. Sycamore (*Acer pseudoplatanus*), ash (*Fraxinus excelsior*) and hawthorn (*Crataegus monogyna*) were the main species present. Tree height ranged from 3 to 15 metres and mean dbh of all trees in the experiment was 13.5 cm. A 20% product solution of imazapyr was compared against the recommended rates of glyphosate (10% product solution), triclopyr (4% product solution), ammonium sulphamate (40% solution) and a control (no herbicide). Applications were made in August 1993 through a knapsack sprayer or forestry spot gun. Herbicides were applied to the point of run-off to cut stump surfaces within one day of felling.

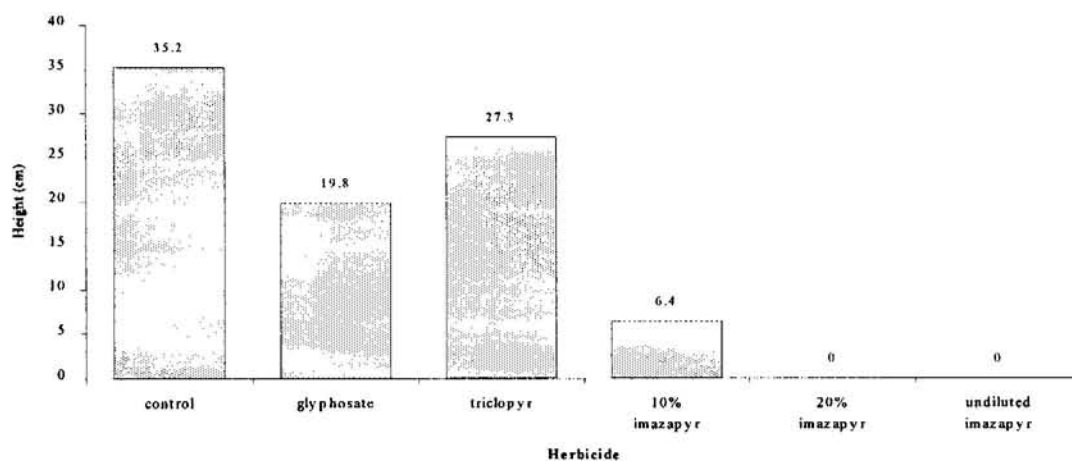


Figure 2. Mean height of shoot regrowth from treated stumps 2 years after application.

8. There were significant differences between the mean number of coppice shoots regrowing from the felled stumps one year after treatment. Treated stumps had significantly fewer coppice shoots than the untreated controls ($P<0.01$). Imazapyr reduced numbers of coppice shoots on stumps more than ammonium sulphamate or glyphosate ($P<0.05$). Imazapyr treated stumps produced fewer coppice shoots than triclopyr but this was not significant (Figure 3).

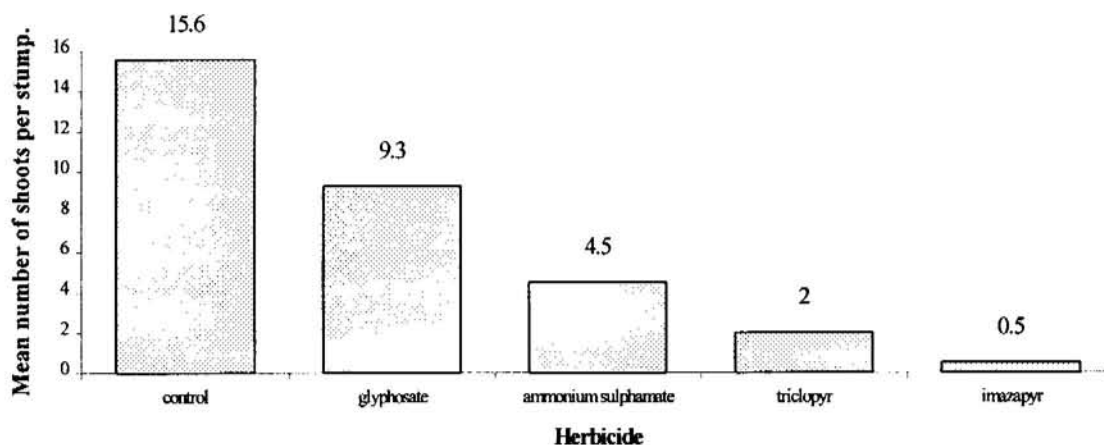


Figure 3. York 8: mean number of coppice shoots per stump.

Aldershot 4: Stump treatment of birch

9. Herbicides were applied to the freshly cut stumps of birch trees on two separate felling dates; 23 March and 28 October 1988. Tree height before felling was 8–10 metres and mean diameter at breast height was 10 cm. A knapsack sprayer, fitted with a flood jet nozzle, was used to saturate the cut surface and remaining bark of the stumps with all herbicides tested. Each herbicide was applied at three rates (Table 1) and compared with an untreated control.

Herbicide	Formulation of active ingredient	Product rate 1	Product rate 2	Product rate 3	Recommended product rate
Glyphosate	360 g/l	3.3%	6.6%	13.3%	10.0%
Triclopyr	480 g/l	1.0%	2.0%	4.0%	2.0%
Imazapyr	50 g/l	12.5%	25.0%	37.5%	N/A
Triclopyr, Dicamba, 2,4-D	65 g/l 85 g/l 200 g/l	3.5%	7.0%	10.5%	15.0%

Table 1. Herbicides used for cut stump treatments of birch.

10. Regrowth was assessed using a subjective scoring system in July 1989. Birch felled in March produced very little coppice regrowth. Eighteen months after felling all coppice regrowth in this treatment was dead whether treated with herbicides or not.

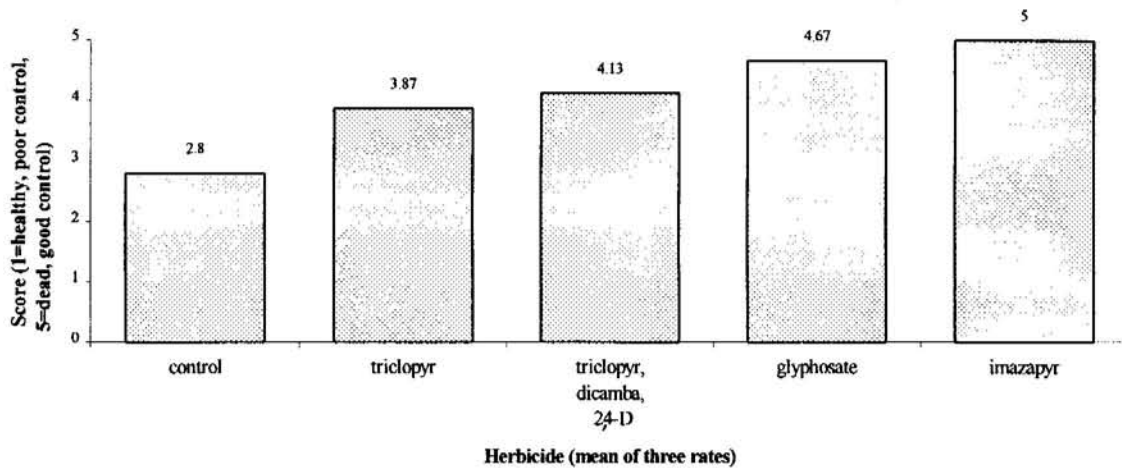


Figure 4. Aldershot 4: subjective score of coppice regrowth from October felling.

11. Trees felled in October produced more coppice regrowth than trees felled in March. All herbicide applications reduced coppice regrowth. Imazapyr gave the maximum control regardless of rate tested although this was not statistically significant (Figure 4).
12. Observations made during the experiment show that the ground flora around the stumps treated with imazapyr was controlled for several seasons after application. Even at the lowest rate of application, a weed-free spot of one metre radius was created, despite low volume application and careful placement of herbicide.

Conclusions

13. Arsenal 50 has proved to be at least as effective as other herbicides with current approval as cut stump treatments for woody weeds. Arsenal 50 has potential as a cut stump treatment prior to planting as a 20% product solution where specific conifers are to be planted.

Caution

14. Arsenal 50 is only approved as a pre-planting spray for forestry purposes and should not be used within stands. Managers must determine the approval status of herbicides before using them.

BEFORE ANY HERBICIDE IS USED READ THE LABEL. IT CARRIES FULL INSTRUCTIONS FOR USE AND FOR THE PROTECTION OF THE OPERATOR AND THE ENVIRONMENT.

References

EDWARDS, C. TRACY, D. and MORGAN, J. (1993). *Rhododendron control by imazapyr*. Research Information Note 233. Forestry Commission, Edinburgh.

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