Forest Research
The Research Agency of the Forestry Commission

Rhododendron: control best practice.

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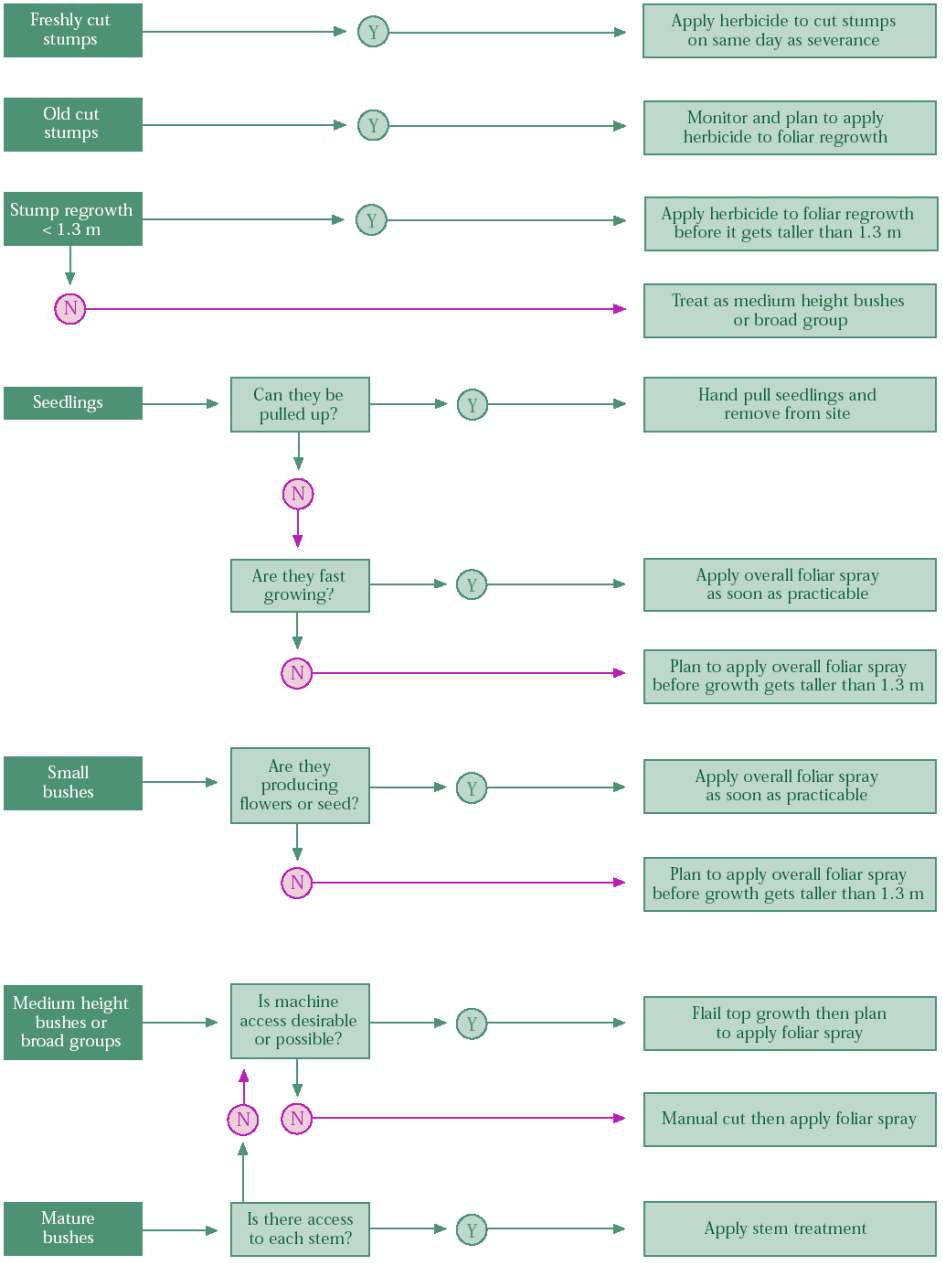
Current methods of control

Decision chart - to identify the recommended control methods for bushes of a specific type (see table 1).



Fewer Approved Herbicides

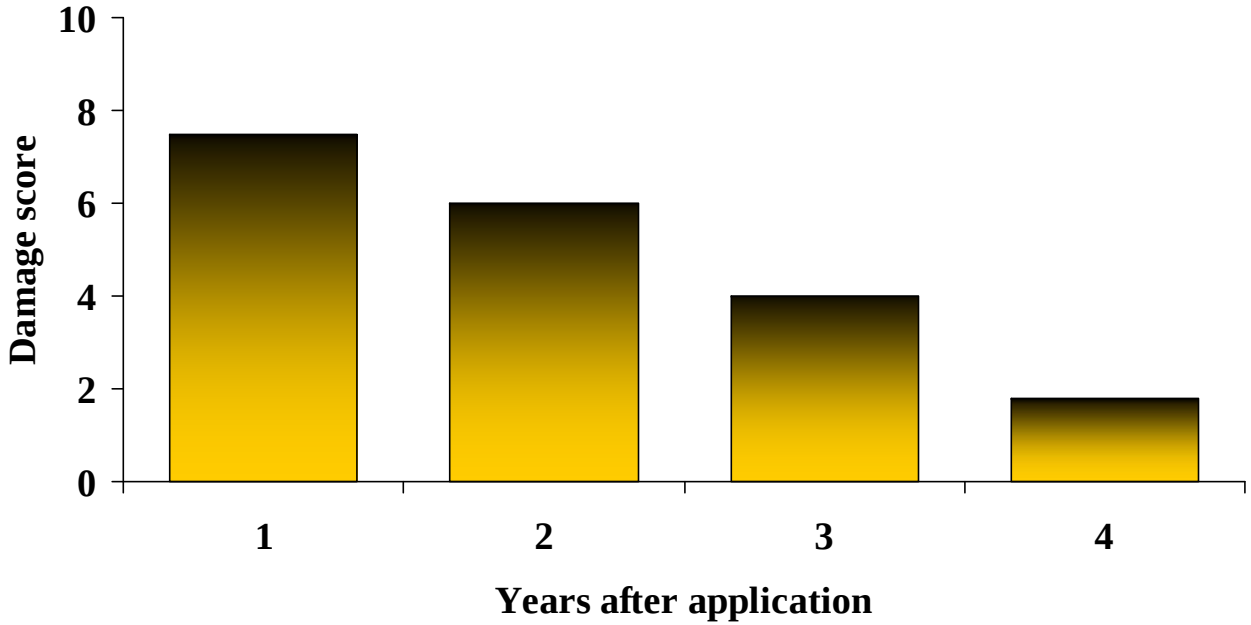
Herbicide	Hazard classification for products	Selectivity	Application method & rates
Glyphosate	Roundup ProBiactive and Envision – none For other products, refer to FC practice guide and product labels	Non-selective	Cut stump -20% solution Foliar spray – 2% solution (plus 2% Mixture B) Stem injection – 25% solution
Triclopyr	Irritant to eyes and skin Harmful if swallowed or in contact with the skin Harmful to aquatic life	Perennials and woody weeds	Cut stump - 8% solution Foliar spray – 2.5% solution
2,4-D/dicamba/triclopyr	Irritant to eyes and skin Harmful if swallowed Harmful to aquatic life	Annuals, perennials and woody weeds	Foliar spray – 7.5% solution
Adjuvant (High Trees Mixture B)	Irritant to eyes and skin Harmful if swallowed Harmful to fish		Foliar spray – 2% total spray volume

- Fewer herbicides approved for use than in previous years (presumption against use of 2,4-D/dicamba/triclopyr on FE land).

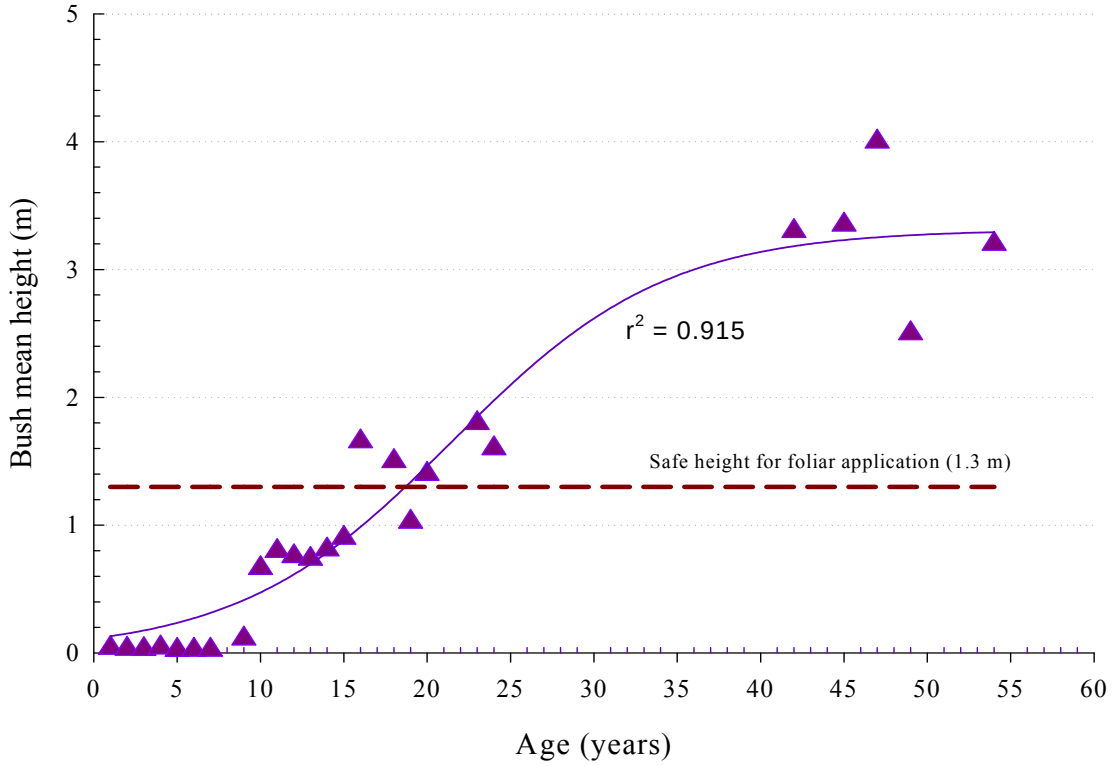
- Efficient applications needed to ensure rapid kill, and reduce use of pesticides in forests (UKWAS)

Partial herbicide applications are ineffective

Bush health score over four years following spot application with glyphosate,
(0 = healthy; 10 = dead)



Bush height growth with age



- Herbicide application too early causes damage to habitat,
- Herbicide application too late increases costs (requires cutting first)

Control - foliar application.

Date of glyphosate application	Date of health assessment *Health scored 1-6, where 1 = healthy; 6 = dead*		
	6 month	12 month	18 month
16 May	5.8	6	6
20 June	6	6	6
5 July	5.7	6	6
16 Aug	5.8	6	6
16 Sept	6	6	6
19 Oct	5	6	6
Control	1	1	1

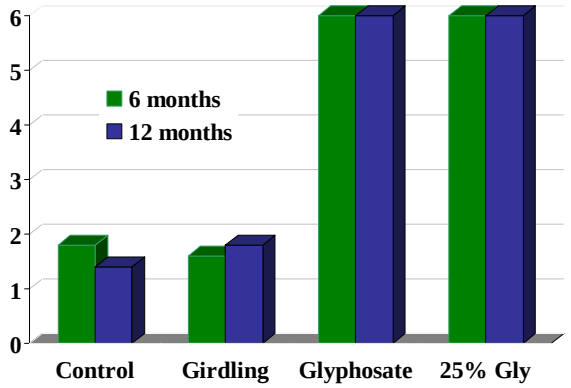
Control – Foliar regrowth

Age of regrowth when glyphosate applied	Date of assessment *Health scored 1-6, where 1 = healthy; 6 = dead*	
	6 month	**12 month**
Control (no herbicide)	1	1
3 months	6	6
4 months	6	6
5 months	6	6
7 months	5.5	6
13 months	6	6
16 months	6	6

Control – Stem treatment

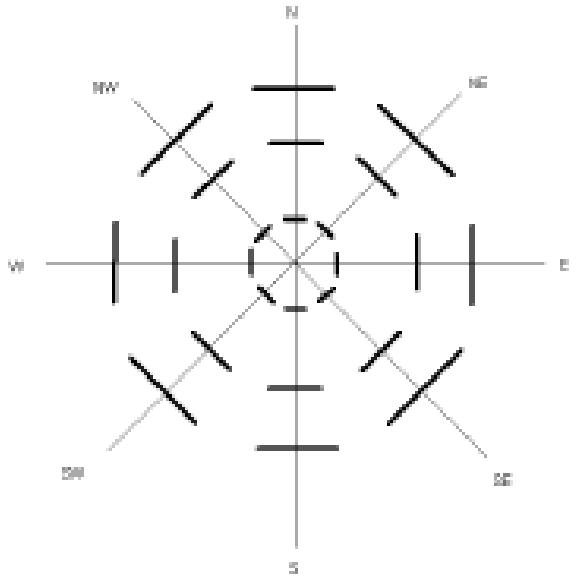
Health score of treated stems 12 & 30 months after application (Kintyre 21).
Health scored 1 – 6, where 1 = healthy and 6 = dead.

Treatment	12 month assessment	30 month assessment
Control	1.4	1.2
Water	2.6	1.6
Girdling	1.8	3.6
Undiluted Glyphosate	6.0	6.0
50% Solution Glyphosate	6.0	6.0
25% Solution Glyphosate	6.0	6.0



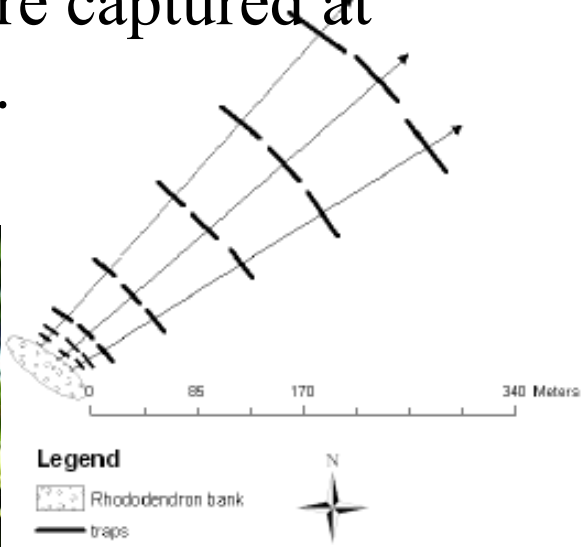
Seed dispersal – capture/release

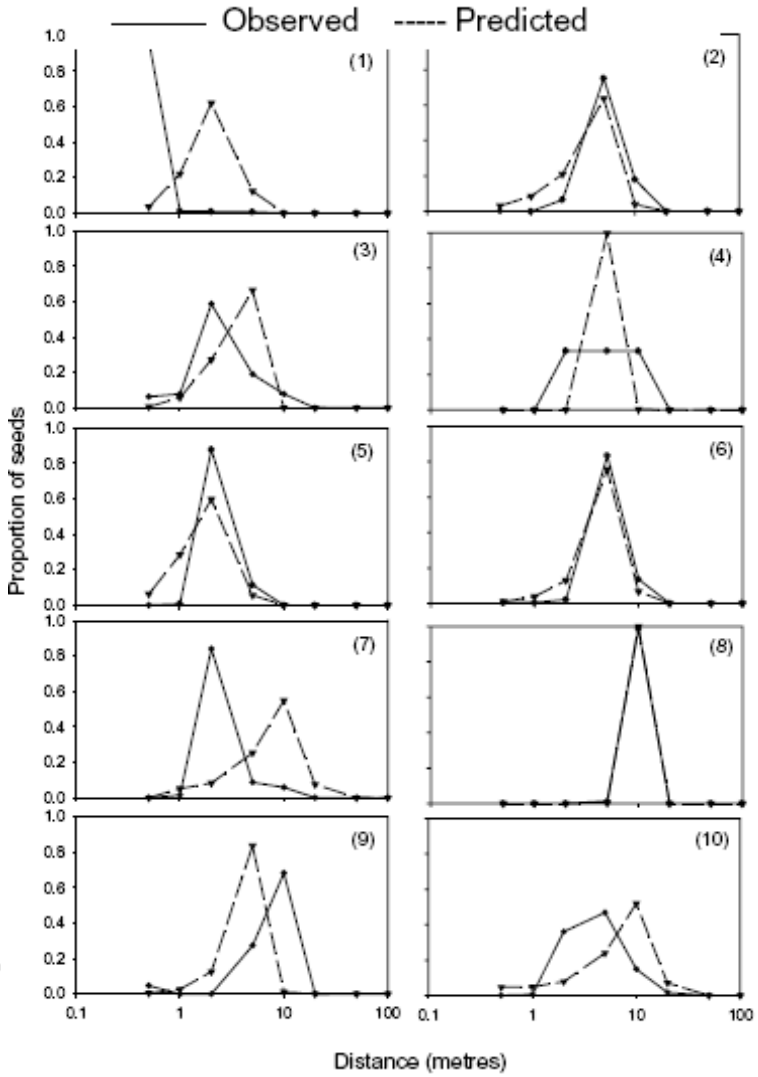
- 99.8% of seeds captured were on traps ≤ 10m from the release point
- Greatest number of released seeds captured at 5m.
- Only 0.001% recorded travelling 50m or more.



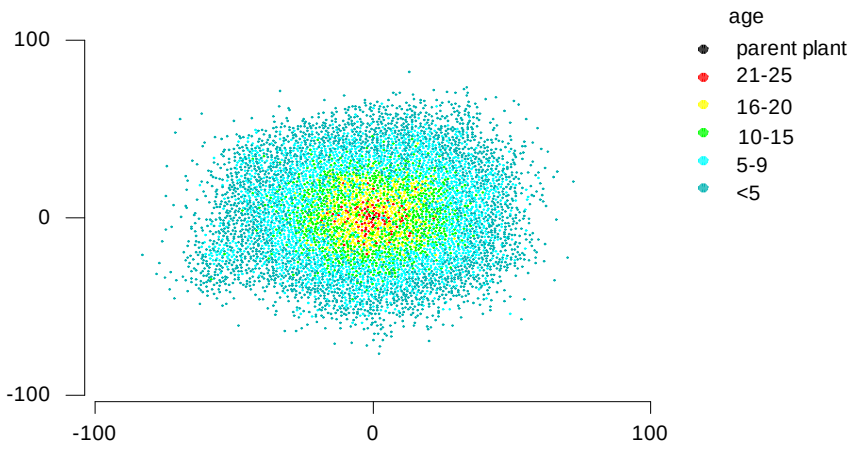
Seed dispersal – natural population

- 97.1% of captured seeds were found on traps ≤ 10m from the source…
- …the greatest number at 1m.
- Only 0.02% travelled 50m or more,
- Only 0.01% were captured at 100 m (~8,000).





Control effort



Used a stochastic, individual-based, spatially- and temporally-explicit model, to predict the spread of *R. ponticum* through a homogeneous landscape, and to investigate the efficacy of a range of control strategies.

1. Control effort concentrated on the expanding front…
2. Control effort concentrated on the individuals close to the point of introduction (core)…

- both above ± return for new seedlings each year.

3. All individuals were ranked by age and the oldest plants removed each year.

Results - control effort

- In older established populations, the strategy that required the least amount of effort to achieve eradication was to start at the core without returning for new seedlings.

- In older established populations, starting at the edge and returning for seedlings never achieved eradication within the range of plant removal effort investigated.

- Regardless of the year that control was initiated, removing the oldest plants each year proved to be a much more efficient strategy than any of the other strategies tested.

Control Best Practice

Sensitive species, such as herbaceous plants and some bryophytes, are adversely affected by the herbicides recommended for rhododendron control, and may in some circumstances cause greater damage than the targeted small bushes or seedlings. Alternative control techniques may have to be considered in these conditions, or the time of application changed to seasons when sensitive species are dormant.

Conclusions

- For eradication projects to be successful, tackle oldest (tallest) bushes first; don't return to cleared habitats for new seedlings until seed source eradicated.

- Majority of wind dispersed seed trapped <100m of source: but models predict longer dispersal distances in higher wind speeds.

- The simulations revealed that the control strategy adopted only begins to matter when an area has been invaded for more than 20 years. However, age-dependent control is the most effective strategy even at this early stage of invasion, whilst starting at the edge and returning for seedlings each year is the least effective option.