



Research Information Note 289

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APPLICATION OF THE CHEMICAL REPELLENT AAPROTECT TO PREVENT WINTER BROWSING,
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Summary

The chemical repellent Aaprosect is an option for the protection of young trees and shrubs against browsing mammals. This Note gives practical guidance on method, efficacy, application rates, and costs.

Introduction

1. The application of an effective repellent can provide a more economical method of protecting trees than the alternative options of either fencing or guarding with treeshelters or tree guards. However, this advantage is lost if repeated applications are required over the vulnerable period.
2. Almost invariably chemical repellents have not stood up to the claims made for them when tested in British forest plantations, although the application methods recommended by the manufacturers were used. Since 1965, 63 different chemical formulations have been tested by the Forestry Commission Research Division. Thirty-seven showed some repellent effect but only one repellent, Aaprosect, has been consistently effective, reducing damage by 95% (Pepper, 1978) when applied by spraying on to the whole tree to protect against winter browsing by roe deer, fallow deer and rabbits. The active ingredient of Aaprosect is ziram which repels by irritating the sensitive skin of the nose and mouth. Aaprosect is supplied by Universal Crop Protection Ltd., Park House, Maidenhead Road, Cookham, Berkshire SL6 9DS. Tel: 01628 526083.

All repellents must be approved under the Control of Pesticide Regulations 1986 and may only be used as instructed on the label.

3. Trials with Corsican pine have shown that height and diameter growth were unaffected by the treatment of Aaprosect (unpublished report). Other species are now being similarly assessed. Aaprosect may also be applied to the main stems and branches of trees to prevent bark-stripping by voles, rabbits and squirrels, but that application is not discussed in this Note.
4. We frequently receive requests for advice on how best to apply Aaprosect, estimate the quantities required and the cost of this method of tree protection. The information obtained from our laboratory and forest trials is presented in this Note to help answer these questions and to enable the chemical repellent option to be evaluated when considering whether to use individual tree protection (tree guards, treeshelters or repellents) or fencing.

Application method

5. To protect against browsing damage Aaprosect is normally applied to the trees by spraying. However, painting or smearing may be less wasteful than spraying when broadleaves are being treated. The Cooper Peglar CP15 Forestry Model knapsack sprayer with a low volume green polyjet operated at a pressure of 0.7 bar is a suitable combination for spraying.
6. Only the parts of the tree actually treated with repellent are protected. Untreated areas, however close they may be to treated areas, are at risk of damage. This means that new growth produced in the spring is not protected. It is therefore essential that the repellent is applied annually during the vulnerable period.

7. Aaprosect is supplied in 5 kg containers as a thick liquid and before spraying it must be diluted in proportions of one part of repellent to one part of water by volume. When mixing, the water should always be added to the repellent rather than the other way round.
8. Since the chemical can be phytotoxic to foliage which is emerging, Aaprosect should only be applied to dormant foliage. The time of application must therefore be confined to the period mid-November to the end of February. A mid-November treatment will give full protection for the ensuing months until flushing begins again in the spring. From experience, newly planted trees from February onwards should be treated with a weaker suspension of 1 part Aaprosect with 2 parts water. In general, it is best to avoid treating trees in the four week period prior to bud burst.

Application costs

9. The cost of application, either by hectare or by tree, requires information on the following:

- the volume of the spray
- the cost of the spray
- the time taken to apply the spray
- the cost of the labour

10. Volume of spray

The amount of spray solution required to treat individual trees of a range of tree species and sizes is given in Table 1.

Table 1 Volume and application time per tree

Tree species	Size class (mm)	Volume of spray per tree (ml)	Application time per tree (minutes)
Pine	110	20	0.03
	200-300	50	0.04
	400-500	70	0.05
	500-600	80	0.06
	800-900	120	0.09
Spruce	200-300	50	0.04
	500-600	110	0.08
	800-900	140	0.1
Beech	200-300	30	0.02
	500-600	70	0.05
	800-900	80	0.06
Oak	300-400	40	0.03

The volumes of spray are based on measurements of spray solution used to obtain the necessary complete cover of the tree to provide maximum possible protection.

11. Cost of spray

The current retail price (in late 1996) of Aaprosect is £33 to £34 per 5 kg tub which gives a cost of £4.0 per litre of spray solution.

12. Application times and labour costs

The application time is calculated from the following:

- Treatment time per hectare:* The time to treat a hectare varies with tree size, species (Table 1) and stocking density.
- Walking time per hectare:* The time to walk a hectare varies with stocking density and the walking speed of the operator, which can also vary with ground conditions. A walking speed of 60 m per minute is reasonable for good ground conditions. Guidance can be obtained from Output Guide, Weeding 1 (Forestry Commission, 1996) on the basic times for a range of stocking densities and walking speeds.
- Other work:* The other work required during the operation is mainly associated with the refilling of the knapsack. The number of fills is determined by the species and size class of the trees to be treated. Research observations have assessed the average time to mix the solution, fill the sprayer, maintain the sprayer and walk to and from the spraying area to the mixing point at 10 minutes. The time for putting on and taking off protective clothing at the beginning/end of the day, at meal breaks and during personal needs is included in the observed 10 minute period per fill.
- Rest:* A rest allowance of 20% should be included for this operation.

The labour cost per hectare will therefore depend on the tree size and species treated and the stocking density. Examples of calculated costs for the tree sizes in Table 1 are given in Table 2.

Table 2 Costs: Aaprosect

Species	Size class (mm)	Plant spacing 1.8 m			Plant spacing 2.2 m		
		Labour	Spray	Total	Labour	Spray	Total
Pine	110	46	209	255	34	140	174
	200-300	67	666	733	46	446	492
	400-500	82	888	970	58	595	653
	500-600	89	999	1088	62	669	731
	800-900	124	1505	1629	86	1008	1094
Spruce	200-300	60	580	640	43	388	431
	500-600	116	1395	1511	81	934	1015
	800-900	93	1049	1142	65	702	767
Beech	200-300	44	358	402	34	290	324
	500-600	77	889	966	67	720	787
	800-900	93	1049	1142	78	850	928
Oak	300-400	50	444	494	36	297	333

Assumptions:

- Knapsack filled with 15 litres of mix.
- Labour cost of £10 per hour (including oncost).
- Cost of spray mix is £4.00/litre.

13 *Alternative options*

Table 3 gives comparative costs for the alternative protection options of tree guards/treeshelters and fencing.

Table 3 Costs: Tree guards, treeshelters and fencing

		Cost (£/ha)	
0.6 m guards/shelters at £1.40* each installed	plant spacing	1.8 m	3700
		2.2 m	2500
		3.0 m	1200
		4.5 m	600
0.9 m 31 mm mesh 18 gauge rabbit fencing £3.33**/m	area fenced	1 ha	1300
		2 ha	1000
		4 ha	660
		6 ha	550
		10 ha	470

* Potter, 1991 – prices updated to 1996

** G. McKillop, 1996

The cost of single tree protection increases directly with the number of trees per hectare protected whereas the cost of fencing relates to the shape and area of land enclosed. Therefore, the larger the area fenced the lower the cost per hectare.

Safety

14. Aaprosect is approved under the Control of Pesticide Regulations 1986. As an irritant to the eyes, skin and respiratory system the appropriate protective clothing (rubber boots, rubber gloves unlined, face shield and full protective coverall) must be worn during mixing and spraying operations. Operatives must have had the required training and must possess National Proficiency Tests Council certificate of competence modules PA1 and PA6A. Up to date COSSH and risk assessments are also required.

References

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