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Leaflet 73

Chemical Repellants

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FRONT COVER: Norway spruce treated with Aaprotect *(32692)*

CHEMICAL REPELLANTS

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INTRODUCTION

Chemical repellants are used in parts of the continents of Europe and North America to aid the establishment of forest trees by protecting them against damage by browsing animals. When tested in British forestry plantations, however, chemical repellants used abroad have rarely been found effective. They have also in most cases proved prohibitively expensive in both materials and cost of application. Between November 1965 and May 1977 the Wildlife Research Branch of the Forestry Commission have tested 34 chemical repellants against a variety of browsing animals. Thirty-one of these proved to be inadequate. Of the remaining three, two are suitable for forest use, the third for use in gardens.

No effective systemic repellants, chemicals applied to the roots or foliage and taken up by the tree, have been found. Therefore contact repellants—repellants that are applied to the tree's exterior by dipping, spraying, painting or smearing—are the only types available to protect the tree from the damaging mammals. A contact repellant requires repeated application as it is eroded by weather and also any new growth of the tree after the repellant has been applied is unprotected. The three repellants found effective under British conditions are those known commercially as "Aaprotect", "Dendrocol 17" and "Fowikal". Aaprotect has consistently reduced overwinter browsing damage by 95 per cent when applied to the whole tree against roe deer, fallow deer and rabbits. The manufacturers claim that it will also prevent bark stripping by rabbits, particularly in orchards, and clipping by hares. Dendrocol 17 appears to be similarly effective in preventing winter browsing by deer. Short-term protection of garden roses and ornamental shrubs against browsing by roe deer may be obtained at any time of year with Fowikal. No repellant has yet been found that will effectively prevent fraying damage by deer.

REPELLANT AND APPLICATION

Aaprotect

Only those parts of the tree actually treated with repellant are protected. Untreated areas, however close they may be to the treated area, will be at risk to damage. This means that the new growth produced in the spring is not protected. It is therefore essential that the repellant is sprayed on annually until the tree has outgrown the vulnerable stage.

Since the chemical can be phytotoxic to newly flushed foliage only protection of dormant foliage can be achieved. Time of application must therefore be confined to the period from mid-November, but this will give full protection for the ensuing months, until flushing begins again in the spring.

Aaprotect is normally applied by spraying but it is cheaper to protect transplants prior to planting by dipping either singly or in bundles. Dipping however, should only go as far as the root collar: roots must not come into contact with the chemical. Immediately after dipping the surplus chemical should be allowed to

drain off, away from the roots, back into the dipping tank. Trees previously dipped in insecticide may also be dipped in Aaprotect when dry. The alternative methods of application by painting or smearing onto all or part of the plant increase the labour involved in application over that of spraying. The exception to this rule occurs when hardwoods are being treated when it is less wasteful to paint or smear than to spray.

Aaprotect comes as a thick, white liquid which needs to be diluted in proportions of one part repellant to one part of water by volume. In mixing, the water should always be added to the repellant rather than the other way round. It is recommended that not more than 8 litres are mixed at one time as the Aaprotect is only in suspension and will quickly separate out if left to stand. When the material is to be smeared or painted dilution is unnecessary.

The most satisfactory sprayer is one of the knapsack type with a jet of approximately 0·9 mm aperture size. It is necessary to agitate the sprayer frequently to prevent sediment forming and causing a blockage. To give a complete and even coverage of the tree with a minimum of waste, spray pressure should be maintained at 2 kgf/cm² (kilogram force per sq. cm).

Using a knapsack sprayer at that pressure, 25 ml of the spray solution should give complete coverage of Norway spruce approximately 300 mm high. Approximately 50 litres of the spray solution will be required per hectare at a stocking density of 2,000 trees per hectare. 31·5 kg of Aaprotect are required to make up 50 litres of solution.

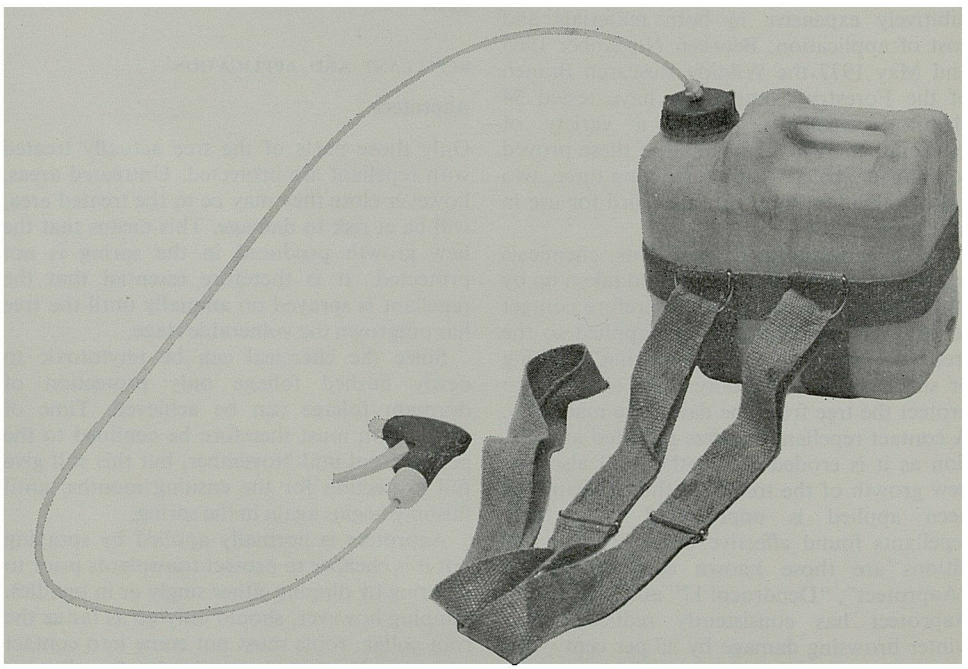

PLATE 1 The B20-L Sprayer for use with Dendrocol 17 *(C5136)*

Aaprotect contains 32 per cent ziram which is an irritant to the skin, eyes, nose and throat. Protective clothing should therefore be worn when spraying and gloves worn at all times when handling the material. Washing facilities should always be available and hands should be thoroughly washed after use and before smoking or eating.

At October 1977 prices the materials alone for one hectare of plantation would cost £86. It is not advisable to economise on material by only treating a proportion of each tree, for example the leading shoot, because the expected level of protection is then substantially reduced. Given reasonable ground conditions in terms of slope and access from tree to tree, approximately 6–7 man hours will be required per hectare for treatment. This time would include mixing, filling the sprayer and an allowance for personal needs.

Dendrocol 17

Dendrocol 17 is only suitable for application during the autumn/winter period for protection against winter browsing. It is formulated as a liquid suitable for spraying, dipping or painting without the need for first diluting. A knapsack-type sprayer may be used, but this can be wasteful as a large aperture jet (approximately 1·5 mm) is required. A more suitable applicator is the B-20L sprayer (Plate 1). This sprayer has a hand-trigger pump which delivers approximately one ml of spray for each squeeze of the trigger. A single one ml of spray is given to the terminal bud of each tree shoot to be protected.

Care must be taken to avoid inhalation or ingestion of the spray mist. The material is not known to affect the skin but the use of gloves is considered advisable when working with this repellant. Dendrocol 17 is not soluble in water and equipment, after use, is best decontaminated with a 25 to one petrol/oil mixture.

Fowikal

Fowikal is most suitable for short-term (approximately 6 weeks) use at any time of year in gardens against roe deer browsing roses and ornamental shrubs. The material does not alter the appearance of the plant and the odour, although strong, is not unpleasant nor is the material phytotoxic to growing plants. This repellant is available either as a

SUPPLIERS AND QUANTITIES

Item	*Supplier*	*Quantities available*
1. **Repellants**		
Aaprotect	Duphar-Midox Ltd. Smarden, Ashford, Kent, TN27 8QL	5 kg containers (5 kg will make up 8 litres of spray solution)
Dendrocol 17	Berkshire Factors Ltd. London Rd., Sunningdale, Berks. SL5 OER	5 kg and 20 kg containers (4·5 kg = 5 litres of spray solution).
Fowikal	— " —	5, 10 and 25 litre containers 12 and 18 oz aerosol cans
2. **Sprayers** (for applying Dendrocol 17) B.20L sprayer	— " —	

liquid ready for spraying (most types of garden sprayer will cope with this material) or in an aerosol can. Fowikal is a relatively harmless material. However, unnecessary contact with the skin should be avoided and ingestion, inhalation and contact with the eyes must be prevented.

CONCLUSIONS

In view of the high cost of materials, the labour intensity involved using this type of treatment and the need for annual application, it is not recommended that repellants are applied to forest plantations with an area in excess of 2 ha. Fencing will be cheaper than any known chemical repellant in protecting areas greater than this in extent. However, where special amenity plantings, such as specimen trees and those on trunk roads and motorways, extend further than 2 ha and either the stocking density is low or a fence is unacceptable, chemical repellants may have a role.

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