large-scale usage would be dependent on improvement of techniques for the more resistant species. The injector will undoubtedly be of greatest economic value where widely spaced cuts will give effective kills, and immediate requirements would seem to be in the development of either more readily translocated formulations than 2,4,5-T, or penetrating agents with 2,4,5-T; in this regard the use of dibutyl-phthalate as a penetrating agent with 2,4,5-T, oil-soluble amines of 2,4,5-T, and picloram (4-amino-3,5,6-trichloropicolinic acid) are currently being investigated.

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SOME FIELD RESULTS WITH MIXTURES OF PICLORAM (4-AMINO-3,5,6-TRICHLOROPICOLINIC ACID) AND PHENOXYACETIC HERBICIDES ON CERTAIN SCRUB WEEDS IN NEW ZEALAND

In New Zealand 2,4,5-T (2,4,5-trichlorophenoxyacetic acid) has been the pre-eminent scrub-killer, but its deficiencies in the control of gorse by aerial application and difficult-to-kill resprouting species such as blackberry, sweet briar, barberry, and boxthorn are well known.

Because picloram was reported to have a slower rate of tissue destruction than 2,4,5-T or 2,4-D (2,4-dichlorophenoxyacetic acid), and as it was likely to be an expensive compound to manufacture, investigations were made with combinations of picloram and the phenoxyacetics, in comparison with picloram alone and the standard phenoxyacetic treatment. The objective was to determine a dosage of picloram with 2,4,5-T or 2,4-D which would give an acceptable rate of stem dehydration, with a maximum degree of root kill, at a more economic level than possible with picloram alone.

1. Gorse (Ulex europaeus) - In studies on the effect of application in relation to seasonal growth stage of gorse, picloram alone has been slower in initial stem reaction than the standard 2,4,5-T ester treatment, especially under more hardened growth conditions.

Mixtures of picloram and 2,4,5-T applied during active shoot growth have given highly acceptable initial brownoff, and, under different plant age and site conditions, stem kills consistently superior to the standard treatment. The minimum dose required for completely acceptable kills on established gorse appears to be 0.25 lb picloram combined with 0.75-1 lb 2,4,5-T.*

*active ingredient expressed as lb per hundred gallons of water unless otherwise stated
Picloram/2,4-D mixtures have been rather less effective, especially under less active growth conditions.

Further studies with picloram/2,4,5-T as 1:3 or 1:4 mixtures look very promising from applications by air (1 lb picloram per acre) or by mist-blower (0.25% w/v picloram using about 40 gallons per sprayed acre) during the soft growth stage.

2. Blackberry (Rubus fruticosus complex) - On chronic resprout forms of blackberry, picloram/2,4,5-T mixtures have consistently produced more rapid cane kill than picloram alone. The picloram and mixture have been superior to the standard in regrowth suppression. For near-complete resprout control the minimum dosage required has been 0.375 lb picloram combined with 1 lb 2,4,5-T. This has produced an overall control equal to twice the dosage of picloram alone and both appear to be considerably more effective as a single application than the standard 2 lb of 2,4,5-T on all forms of New Zealand blackberry.

3. Sweet briar (Rosa rubiginosa syn. R. eglanteria) - Picloram alone and in mixture with 2,4,5-T and 2,4-D has proved very active against sweet briar when applied from the stage of early bud burst through full leaf to early green hip. Picloram 0.375 lb in mixture with 1 lb 2,4,5-T or 2,4-D as high-volume sprays has given the most rapid stem kill. Misting applications during spring and early summer of 0.25% w/v picloram in mixture with 2,4,5-T or 2,4-D appear to be very effective on bushes up to 5 feet high.

Considering the ease of application the most practical kill of sweet briar has been achieved with 2-4% picloram granules applied from the outer drip line to the plant crown. At the rate of 1-4 g active per 6-inch-basal-diameter bush, picloram granules have given complete kills of bushes up to 8 feet high in treatments from late winter to mid-spring (first bud movement to early leaf). In contrast to granular fenuron (N-(phenyl)-NN-dimethylurea), no permanent grass damage has occurred.

4. Broom (Cytisus scoparius) - All growth forms of broom during spring and early summer have been remarkably susceptible to picloram mixtures with both phenoxyacetic compounds. Complete kills of 10-feet-high bushes have been achieved with treatments of picloram 0.18 lb in combination with 0.5 lb 2,4-D or 2,4,5-T, using high-volume application from the stage of early flower to dark pod.

It would appear that spray treatments of picloram and 2,4,5-T or 2,4-D act in a truly complementary manner on these woody weeds so that sublethal dosages of each component can be employed to obtain a final kill. The more
rapid terminal stem kill with the mixture may leave the picloram component to act residually on the lower lateral and underground buds, which are so often insufficiently controlled by the phenoxyacetic component alone.

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WOODY PLANT CONTROL IN FORESTRY PRACTICE IN QUEENSLAND

Most woody plant control in forestry may be considered in broad terms as an integral part of the establishment and maintenance of an optimum stocking of the most desirable tree species on a given area, and may take the form of selective removal of undesirable species or individuals or replacement of one tree community with another. In each case the success of control measures is influenced, usually favourably, by competition from the desired tree crop, and the techniques described in this paper may fall short of requirements if applied directly in other situations where the effect of competition is reduced or absent.

1. Exotic pine plantations - Wattle and eucalypts are sprayed prior to planting with 2,4,5-T (2,4,5-trichlorophenoxyacetic acid) ester in water at 0.5 to 1.0% using a low-volume knapsack application. Average rate of application is about 1 lb 2,4,5-T per acre, and, because it is applied precisely where it is required on the individual plants, it is as effective as up to 4 lb/ac overall, (for example, from the air). This operation costs as little as 30s per acre and results in a large saving at subsequent tendings; persistent coppice in older plantations is controlled by a cut-stump/frill treatment with 2,4,5-T amine, 1% in water. Brush box (Tristania conferta), which is highly resistant to 2,4,5-T, is controlled with AMS (ammonium sulphamate), but this treatment can be expensive and further work on the control of this species is desirable.

In the plantations of Australian Paper Manufacturers Pty Ltd, a similar pre-planting wattle spraying is carried out, but, because of intensive site preparation, it is possible to use mechanical slashers between the rows for early tendings. Within the rows, hand-slashing or spraying is used.

Mechanization of pre-planting spraying has been carried out to a limited extent only. Advantages are obvious only where wattle is uniformly dense and site preparation sufficient for easy access. Control of coppice on fire-breaks is also carried out, two or three sprayings being