TREE CONTROL ON FARMS

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Summary

The advantages of killing trees standing as opposed to felling them while green are discussed and the chemicals which can be used for doing this are mentioned. It is pointed out that different species of trees respond to specific chemicals in a different manner and that there is no particular chemical which can be used for all trees.

The various chemicals which have been found most useful are detailed and mention is made of the lack of translocation of all of them from one part of a tree to another.

The effect of time of application is mentioned and there are some brief remarks on costs.

THE CONTROL of unwanted trees in forestry operations was discussed in 1966 by Wendelken, Hedderwick and Beveridge, but up to the present little seems to have been offered on the control of unwanted trees on farms. The subject is, in fact, a new one for it is only in recent years that pressure of economics has forced farmers to realize that trees may not always be the desirable features of the landscape that traditional thinking has hitherto held them to be. Moreover, it has only recently been appreciated that the axe and the chain-saw are not necessarily the best means of dealing with the problem and that perhaps poisoning them standing can in the long run result in considerable cost savings.

The chemical control of trees in forestry is well established and overseas has been employed in tropical forestry for very many years. In the New Zealand exotic forests it is more recent, but nevertheless is now standard practice in locations where there is a market for neither pulp nor posts. In the conversion of cut-over native bush to exotics it is even newer and hardly out of the experimental stage. The same can be said of the control of trees on farms, and very little seems to have been published on this.

KILLING v. FELLING

Several advantages accrue from the killing of trees standing as compared with felling them while still green. The principal ones are as follows:

- (1) Trees killed standing may be burned after a year or two with far less trouble than if felled green. In fact, some trees, such as willows (*Salix* spp.), poplars (*Populus* spp.) and some eucalypts (*Eucalyptus* spp.) are virtually impossible to burn green and if felled and left to dry soon accumulate a thicket of weeds which inhibits later burning. If the burning is then unsuccessful, there is soon a harbour for vermin and a source of infection for the rest of the farm.
- (2) If trees are killed standing and later felled and left, they do not take root again as would willows and poplars felled green.
- (3) There is little or no sprouting from stumps.

- (4) If the killed trees are not in the way, they may be left to fall naturally. There is, of course, some hazard to stock and this is a price that has to be paid but when the trees do fall they are fairly rotten and much lighter than when green.
- (5) Most species break up on falling and are so rotten that they are no barrier to feeding stock. The thickets of weeds which accumulate under trees felled green do not develop.
- (6) By poisoning trees standing, light is let in and grass comes away quickly. Most species are bare of leaves or needles in a year or less—even in a few weeks in some cases—and it is thus possible to grow grass on the land with much less effort and time than if the trees had to await felling and disposal.

APPLICATION OF CHEMICALS

There are many methods available for killing trees standing. Of these, ringbarking is the oldest and most familiar. However, it is hard and time-consuming work and, unless a thorough and complete job is done, the trees do not die. Even when death does result, it rarely occurs in less than two years and may take much longer.

Poisoning has therefore replaced it and the chosen chemical can be administered in a number of ways.

Probably the best known of these is frilling, a frill being a ring of downward axe cuts into which concentrated chemical is dribbled from a pressure oil can, paint brush, backpack tank or the like. The job is very much easier than ringbarking but, like ringbarking, the frill must be complete with most species or the tree does not die. With smooth stemmed trees this is no problem, but when trees are encountered with heavily fluted trunks, or with very thick bark, or when many stems are growing close together or the trees are leaning or fallen, the job becomes impossible and other means have to be adopted.

One of these is basal spraying with one of the hormone type weedicides such as 2,4-D in fuel oil, a system which works well with some species which have thin bark. Thus, young wattles (*Acacia* spp.), willows and poplars are easily and quickly killed, though at a rather high cost in chemicals, for high concentrations have to be employed.

Blazing or notching also works well with some chemicals. Arsenic is the most effective but cannot be used in this way on farms because of its high animal toxicity.

A number of chisel-like devices have been developed for notch poisoning, most of them having a hollow handle to contain the chemical and a valve which releases a measured dose into a notch cut in the base of the tree.

Finally, there is the borehole system. This is most valuable where expensive chemicals have to be used because of the lack of waste and the high efficiency resulting from getting the chemical right into the sap stream. Moreover, dangerous chemicals can be used, for there is no spillage to become available to stock. The liquid is absorbed into the wood in twenty minutes or less.

The borehole system is capable of considerable mechanization and it is this aspect which has engaged the writer's attention since he first became interested in poison thinning in forestry operations in 1956 and in farm work in 1964. These experiments have culminated in the production of the "Super Sirex" motorized drill which is now quite widely used in forestry work in this country and in farm contract work.

CHEMICALS

A great many chemicals have been tested by the writer over the last few years but only those which have emerged successfully from the trials will be mentioned in any detail. They vary greatly in price per gallon, from about \$1.75 for arsenical weedicide bought in bulk to over \$22 for picloram/2,4,5-T and dicamba bought in gallon containers.

However, it is not the price per gallon which always determines which chemical to use with a particular species. Factors such as animal toxicity have to be considered and some farmers prefer that AMS be used on their farms even though the cost is higher and the results much slower.

Likewise, some species may be killed with cheap chemicals but others demand more expensive ones. Thus the cheap arsenic is unrivalled for conifers but is useless for willows and poplars which are best dealt with by using the very expensive picloram/2,4,5-T.

The following are the chemicals now most used by the writer in contract work:

ARSENIC

This is bought in the form marketed by various companies for killing potato tops and for total weed control. It is the most effective with conifers but far less so with most broadleaf trees.

When used in boreholes, it finds its way to the needles in about two days, according to American research, and needles of *Pinus pinaster* in New Zealand have been found to contain 55 ppm two months after treatment.

AMS

AMS is next most effective for the killing of conifers, but is much inferior to arsenic. Its first cost is higher, more is required to get results, and it is much slower in action.

PICLORAM

Picloram is reported to be widely used in Australia for frilling eucalypts but in New Zealand has given indifferent results in the concentrations used for borehole application. However, used in boreholes on eucalypts, it has proved to be the best so far available and it is also proving very useful on willows and poplars.

It has the most valuable property of causing bark to split and fall off, with resulting quick drying of the wood and consequent easier burning of the trees if this is undertaken.

SODIUM CHLORATE

Some tests have been conducted with sodium chlorate on conifers mainly *Pinus pinaster*. Rather heavy doses are required but this is possible within limits as the chemical is cheap. It causes rapid defoliation and willows have been stripped of leaves with it in about a fortnight.

2,4-D AND 2,4,5-T

These were used in early experiments on willows and poplars and reasonable results obtained. However, they have now been replaced by picloram/2,4,D and 2,4,5-T mixtures. They appear to be quite ineffective on conifers.

For basal spraying, the ester formulations in diesel or fuel oil are very good but four or five times as much active chemical has to be used to get the same results as would be obtained with borehole application.

DICAMBA

Though this is an expensive chemical, it has given very good results on willows and trials are continuing. Strangely, it has not proved of much value with poplars.

OTHER CHEMICALS

Many other chemicals have been experimented with, including creosote, formalin, caustic soda and common salt. Some have not worked at all, some have worked fairly well but have been eliminated on a unit cost basis, and some have worked well but have been so expensive that larger quantities of less expensive substances give more economical results.

TRANSLOCATION OF CHEMICALS

Experience has indicated that there is little translocation of chemicals across the grain in trees and some experiments have been conducted to demonstrate this.

In one, a pussy willow (*Salix capraea*) was bored from bark to pith and 2½ gal of water-soluble dye fed into the hole through a tapered plug. After two weeks the tree was felled and sectioned. It was found that the dye had travelled down to the roots and to between 7 and 8 ft above ground level. There had been very little movement sideways and a segment of only about 60° showed any trace of the dye.

Attention was then turned to poplars and other types of willows, using picloram/2,4,5-T and dicamba. In each case the tree was injected with a gallon of water containing a known lethal dose for the size of tree treated. Picloram went straight up the tree and killed only the branch immediately above the point of application. Dicamba showed some signs of travelling down the stem into which it had been injected and affecting others stems of a multi-stem tree but even fifteen months after the experiment was started there was still no indication that the whole tree would die.

These experiments only confirm practical experience—to get a satisfactory kill, a large number of small holes must be drilled and they must encircle the tree.

TIME OF APPLICATION

Though the time of the year at which weedicides are sprayed on plants seems to be very critical if optimum results are to be obtained, there is no indication that this is so when the same chemicals are injected into the sap stream of a tree. The rapidity with which the results are apparent is greatly influenced by the season, as would be expected, but the ultimate results are the same.

Plantation pines poisoned in spring can be distinguished in four or five days and the trees are quite brown in two weeks. Eucalypts treated with picloram respond nearly as quickly.

When deciduous trees are treated after leaf fall, they come into leaf in the spring in a perfectly normal manner but after three or four weeks the leaves shrivel up and die just as would happen had the chemicals been used with the trees in full leaf.

COST OF TREE POISONING

So many factors must be considered when assessing the cost of tree poisoning, that standard rates cannot be given. The main items are as follows:

- (1) The cost of the chemical used and its efficiency.
- (2) The species of tree.
- (3) Tree vigour; plantation trees crowded by their neighbours are much more easily killed than trees growing in the open.
- (4) Access to the trees. Obviously it will be cheaper to deal with trees in a parklike location to which a vehicle can be driven with gear and supplies than trees to which one has to man-handle everything up a hill and then fight one's way through undergrowth.
- (5) The size of the job. It costs just as much to travel to kill a few trees as for a day's work and this must be considered with the others in costing.

When all these are considered, it is found that the practical lower limit is about 20c per tree for *Pinus pinaster* poisoned with arsenic and that \$3 per tree might not be enough for large macrocarpa (*Cupressus macrocarpa*) treated with AMS.

REFERENCES

- Beveridge, A. E., 1966: *Proc. 19th N.Z. Weed & Pest Control Conf.*: 152-9.
Hedderwick, G. W., 1966: *ibid.*: 160-4; 165-9.
Wendelken, W. J., 1966: *ibid.*: 140-4.