

## CHEMICAL CONTROL OF EUCALYPT REGROWTH

J. A. ROBERTSON\* and C. H. PEDERSEN\*

## ABSTRACT

*The control of Eucalypts resprouting from broken stumps and lignotubers following land clearing operations was investigated in southern Queensland.*

*Stumps of Eucalyptus populnea (poplar box) and E. largiflorens (black box) with coppice shoots 0.9-2.5 m tall and 5-7.5 cm in diameter at the base were killed by spraying the bases of individual stems with butyl 2, 4, 5-T or a mixture of picloram and 2, 4, 5-T in diesel distillate. Picloram considerably enhanced the effect of 2, 4, 5-T and reduced variability of response. The results suggest possible seasonal, environmental and species differences in effectiveness of the chemicals used.*

## INTRODUCTION

The capacity of eucalypts to resprout after fire or chemical injury has been reported by Kerr (1925) and Jacobs (1951). Rooted trunks broken at ground level or above during land clearing operations normally resprout and produce several coppice shoots. Trees regrowing in this way as a result of bulldozing or chaining these woodlands are difficult to kill either with chemicals or by mechanical means and pose husbandry problems for crop and pasture preparation and management (Moore, 1969, 72).

Two species that commonly coppice after mechanical clearing operations in semi-arid woodlands are *E. populnea* (Poplar box) and *E. largiflorens* (black box). A method of thinning woodlands of single-stemmed trees of *E. populnea* by chemical injection has been reported by Robertson and Moore (1972). Injection is not practicable for coppice growth arising at ground level and the work reported in this paper was designed to test the efficiency of applying chemicals directly to the bark at the base of shoots. The chemicals used were butyl 2, 4, 5-trichlorophenoxyacetate, and 4-amino, 3, 5, 6-trichloropicolinic acid (picloram) as the isooctyl ester formulated in mixture with 2, 4, 5-trichlorophenoxyacetic acid as propylene glycol butyl and marketed as Tordon 255 Brushkiller.\*

## EXPERIMENTAL METHODS

Experiments on *E. populnea* regrowth were conducted in southern Queensland at the Wycanna Woodland Research Centre, 28 miles north-west of Talwood (latitude 28°S); those on *E. largiflorens* were conducted at "Bullamon Plains" Thallon some 60 miles west of Wycanna. The annual rainfall at both experimental areas averages 501 mm, 70 per cent of which falls during the summer months. However rainfall during the period treatments were applied was below average; 441 mm in 1966 and 324 mm in 1967.

Multi-stemmed regrowth, three years old and 0.9-2.5 m high was treated in all experiments. Ten sprouting stumps of *E. populnea* and fifteen of *E. largiflorens* were used per treatment. Both Tordon 255 and 2, 4, 5-T were applied in diesel distillate. Controls were diesel distillate alone and no treatment. The basal 30 cm of each regrowing shoot was sprayed to complete wetness with a pneumatic sprayer at a pressure of approximately 30 p.s.i. In *E. populnea* experiments Tordon 255 was applied at concentrations of 0.05, 0.075, 0.1, 0.2 and 0.4 per cent picloram, and butyl 2, 4, 5-T alone at a single concentration of 2.0 per cent active ingredient, that is, equivalent to that in the highest dose of Tordon 255. Applications were made in July and October, 1966 and in January, May and September, 1967. In the *E. largiflorens* experiment, Tordon 255 was applied at concentrations of picloram

\* Woodland Ecology Unit, C.S.I.R.O., Cooper Laboratory, Lawes, Queensland, 4345.

\* A trade name registered by the Dow Chemical Company.

TABLE I  
*Effects of B 2, 4, 5-T and Tordon 255 applied as basal stem sprays at different concentrations and application times to Eucalyptus populinea regrowth. 10 stumps/ treatment*

Compounds	Treatments Per cent active ingredient	Mean volume/stump ml	Percentage of trees dead April 1969						Means all times
			Application times						
			July 1966	Oct. 1966	Jan. 1967	May 1967	Sept. 1967		
Tordon 255	0.05 picloram + 0.2 2, 4, 5-T	308	60	70	50	50	100	100	66.0
	0.075 picloram + 0.3 2, 4, 5-T	305	90	50	90	50	100	100	76.0
	0.1 picloram + 0.4 2, 4, 5-T	318	80	70	80	80	90	90	80.0
	0.2 picloram + 0.8 2, 4, 5-T	363	80	100	90	90	100	100	92.0
	0.8 picloram + 2.0 2, 4, 5-T	327	100	100	100	100	100	100	100.0
Means		324	82	78	82	74	98	82.8	
B 2, 4, 5-T	2.0 2, 4, 5-T	301	—	20	20	100	80	80	55.0
Diesel Distillate		285	10	10	10	70	30	30	26.0

TABLE 2  
*Effects of B 2, 4, 5-T and Tordon 255 applied as basal stem sprays at different concentrations and four application times to regrowth of Eucalyptus largiflorens.*  
 15 stumps/treatment

Compounds	Treatments Per cent active ingredient	Mean volume/stump ml	Percentage of trees dead April 1969				Means all times
			Application times				
			Oct. 1966	Feb. 1967	May 1967	Sept. 1967	
Tordon 255	0.05 picloram + 0.2 B 2, 4, 5-T	202	100.0	93.3	93.3	93.3	94.8
	0.075 picloram + 0.3 B 2, 4, 5-T	188	100.0	93.3	100.0	93.3	96.7
	0.10 picloram + 0.4 B 2, 4, 5-T	181	100.0	100.0	100.0	100.0	100.0
	0.20 picloram + 0.8 B 2, 4, 5-T	196	100.0	100.0	100.0	100.0	100.0
	0.40 picloram + 1.6 B 2, 4, 5-T	179	100.0	100.0	100.0	100.0	100.0
Means		189	100.0	97.3	98.7	97.3	98.3
B 2, 4, 5-T	0.4 B 2, 4, 5-T	195	80.0	66.6	73.3	86.6	76.6
	0.8 B 2, 4, 5-T	181	93.3	73.3	86.6	86.6	84.9
	1.6 B 2, 4, 5-T	184	86.6	73.3	100.0	93.3	88.3
	3.2 B 2, 4, 5-T	195	100.0	86.6	100.0	100.0	96.7
Means		189	89.9	75.0	90.0	91.6	86.6
Diesel Distillate		187	60.0	13.3	26.6	66.6	41.6

similar to those in the *E. populnea* experiments, but butyl 2, 4, 5-T alone was applied at 0.4, 0.8, 1.6 and 3.2 per cent active ingredient.

Treated stumps were considered dead if following complete drying of leaves and twigs, there was no resprouting for at least 18 months after treatment. Final counts were made in April, 1969; that is 33 and 19 months respectively from the first or last application dates on *E. populnea* and 30 and 19 months from those on *E. largiflorens*.

## RESULTS

The treatments applied and the percentage kills at different application times are shown in Tables 1 and 2.

## DISCUSSION

The results show that coppicing stumps of both *E. populnea* and *E. largiflorens* can be killed by Tordon 255 applied in diesel distillate to the basal 30 cm of stems, 5-7.5 cm in diameter. *E. largiflorens* appeared more susceptible than *E. populnea* with kills at low chemical concentrations being less variable over different seasons of application. Tordon 255 at a concentration of 0.05 per cent picloram and 0.2 per cent 2, 4, 5-T killed more than 90 per cent of treated stems of *E. largiflorens* following each of four applications from October, 1966 to September, 1967. A Tordon concentration of 0.2 per cent picloram plus 0.8 per cent 2, 4, 5-T was required to produce comparable effects at the same times on *E. populnea*. Diesel distillate alone killed 42 per cent of treated *E. largiflorens* but only 26 per cent of *E. populnea*.

Butyl 2, 4, 5-T alone at 2 per cent killed an average of 55 per cent (range 20-100 per cent) of *E. populnea* clumps, while the addition of 0.6 per cent picloram to this 2 per cent butyl 2, 4, 5-T gave 100 per cent kills at each application time (Table 1). Similarly, 0.4 per cent butyl 2, 4, 5-T killed an average of 77 per cent (range 67-87 per cent) of *E. largiflorens* stumps while Tordon 255 containing 0.1 per cent picloram and 0.4 per cent butyl 2, 4, 5-T killed 100 per cent at each of the four application times.

Although the better and less variable results obtained in the *E. largiflorens* compared with the *E. populnea* experiments show a clearly different response by the two species they could also reflect differences due to soils. Other unpublished experiments indicate that higher percentage kills and less variable results are obtained from basal stem spraying *E. populnea* on grey cracking clays than on lighter textured, less fertile red-brown earths and solodized solonetz.

The data in these experiments are too few to draw firm conclusions about effects of application times. However, as in the injection experiments of Robertson and Moore (1972), time of application appeared to have some effect, particularly at low and marginal dose levels.

## ACKNOWLEDGEMENTS

Cooperation of Mr. and Mrs. R. Gore of "Wycanna", Talwood, and Mr. and Mrs. S. Willis of "Bullamon Plains", Thallon, is gratefully acknowledged. Assistance of Mr. G. Woodward with the final plant counts is also appreciated. The isooctyl ester of picloram was donated by Dow Chemical (Aust.) Pty. Ltd.

## REFERENCES

- JACOBS, M. R. (1951)—The growth and regeneration of Eucalypts. *Journal of the Australian Institute of Agricultural Science* 17: 174.
- KERR, LESLEY R. (1925)—The lignotubers of Eucalypt seedlings. *Proceedings of the Royal Society of Victoria* 37, (1): 79.
- MOORE, R. M. (1969)—Tree and shrub control—An ecological perspective. *Proceedings 1st Victorian Weeds Conference* 1968.

- MOORE, R. M. (1972)—Trees and shrubs in Australian grazing lands. In "Plants for Sheep in Australia: A review of pasture, browse and fodder crop research 1948-70" ed. J. H. Leigh and J. C. Noble. Angus and Robertson, Sydney.
- ROBERTSON, J. A., and MOORE, R. M. (1972)—Thinning *Eucalyptus populnea* woodlands by injecting trees with chemicals. *Tropical Grasslands* 6: 141-150.

[Accepted for publication Dec. 5, 1972]