

No.7 THE CONTROL OF BURGANS IN EAST GIPPSLAND

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SUMMARY

Burgans (*Kunzea peduncularis*) is a native plant belonging to Myrtaceae and widely spread throughout East Gippsland, where it presents a serious control problem on semi-improved pasture land.

Chemical and biological methods of control have been tried, but they do not offer a practical economic method of controlling the pest.

Burgans rapidly develops after clearing and the removal of the eucalypt canopy, and after an infested area has been cultivated there is usually a rapid regeneration from old roots and new seedlings.

Unless cultivation is followed promptly by successful pasture establishment and improvement, the land can rapidly revert back to forest.

By means of pasture improvement, stock management, vermin control, and sometimes re-forestation, control of burgans can be successfully achieved.

Measurements have been made of the lateral movement and rate of development of Burgans by means of quadrats in the East Gippsland area, and the conclusions from experiments are presented in the article.

INTRODUCTION

Burgans (*Kunzea peduncularis*) often misnamed "manuka" is a bushy shrub which grows to 20 feet in height under good conditions. The leaves and flowers are similar to those of manuka (*Leptospermum scoparium*), but the plant has a more compact and profusely branched habit of growth which gives individual plants a pleasing appearance when in flower. The fruit is a capsule about 3/16 inch in diameter and smaller than the fruit of the true manuka. A distinguishing feature is that the calyx is retained on the burgans capsule after flowering. The leaves of burgans are more prickly and harder

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than those of manuka. The most important difference from the point of view of control between the two species is the root systems. Burgans develops a tabular root at the crown like a small mallee root, but manuka does not. This large woody root is the main source of regeneration after the top growth has been removed in clearing infested areas.

Burgans is a native of south-eastern Australia. It is naturally widespread throughout the forests, but is kept in check by the shading of the eucalypt canopy. The serious infestation of some areas today is due to the removal of the tree cover and may be regarded as the first stage in the progression back to forest. To reverse this natural process it is necessary to control the environment by effective pasture development or establishing a productive forest cover.

The Victorian Department of Agriculture has been interested in the agricultural problems associated with the development of burgans infested land since the immediate post-war years. Various groups of landholders have approached the Victorian Government from time to time with requests for Government financial assistance in the control of burgans and suggestions have been made that burgans should be proclaimed under the Vermin and Noxious Weeds Act. However, the plant has not been proclaimed for reasons published in the Bairnsdale Press by E.J. Pemberton - Supervisor of Land Settlement (1948).

FIELD SURVEY

Initially the extent of infested areas was estimated in a land use survey conducted by Drake (1957). It was concluded that burgans was concentrated on the margins of forest and timbered areas on private properties. These were paddocks which had been ring barked and partly or wholly cleared of standing timber, but with the advent of rabbits and shortage of cheap labour the follow up operations of maintaining native pastures by grubbing regrowth was not possible.

As burgans has been regarded as a possible proclaimed noxious weed by some landholders, its rate of spread into uninfested areas was the object of investigation on a permanent quadrat pegged out on an actively moving face of burgans in a typical infested paddock at Fernbank. The area pegged was $\frac{1}{4}$ chain in width and 100 yds. long and traversed the moving face of the burgans infestation from the first plants 10 feet or more in height to the limits of the area infested with new seedlings. Numbers of plants, location within quadrat, height of plants were measured and onset of flowering was noted. The quadrat was maintained during the 1952 and 1953 seasons but was then removed when the landholder cultivated the area.

Sufficient measurements and observations were made to demonstrate that the increase in area of an established infestation is quite slow, but the growth and increase in vegetation within infested areas is more rapid.

In the first year the average growth of new seedlings was to 5 inches high. Subsequently the annual increase averaged 12 inches until the maximum height was reached. In the entire quadrat area of 550 square yards there was an increase of 7% in plant numbers. Most of this increase was against the mature flowering plants. Here in the first 20 yards section of the quadrat there was 47% increase in plant numbers. In the last 20 yard section there was no increase in plant numbers.

It was noted that young plants less than 2 ft. in height did not flower and produce seed. The established plants in the last two sections had not flowered. It was concluded from this that seed distribution from mature shrubs is not very widespread and is probably by strong winds during the initial fall of seed after the ripening of the capsule.

Following the land use survey and the observations on the permanent quadrat it was obvious that the burgans problem was a fairly static situation and rapid regeneration of burgans was only taking place where bush paddocks were being cleared and not completely developed to improved pasture.

BIOLOGICAL CONTROL

The possibility of biological control had aroused considerable interest among landholders for obvious reasons following reports from New Zealand of the successful control of manuka (*Leptospermum scoparium*). It was mistakenly believed in East Gippsland that burgans, locally misnamed "manuka", was the same as the New Zealand plant. In New Zealand manuka blight causing death of the plant is the result of infestation with a species of scale insect belonging to the genus *Eriococcus*. Manuka blight *E. leptospermi* has been identified by the Biology Branch of the Department of Agriculture on specimens of ornamental *Leptospermum* in Melbourne and East Gippsland gardens and a similar condition is seen on most *Leptospermum* observed in the East Gippsland district. Two attempts were made to introduce *E. leptospermi* onto burgans at Fernbank. These attempts were unsuccessful.

Among many native insects found to be parasitic on burgans, the only one achieving some measure of control has been identified as another scale insect, *Pulvinaria tecta*.

Small areas of apparently dying burgans can be seen throughout the East Gippsland region. Small scale insects covered in a white woolly material can be found on the branches of infested bushes. In most cases inspected, this infestation has been followed by complete recovery of the bushes from the tabular root at the base of the plant.

CONTROL BY CHEMICALS

Hormone spray trials have been conducted at Glenaladale using 2,4-D and 2,4,5-T materials. Strips of burgans 6 to 8 feet high were sprayed in January, 1951, with each material alone and in mixture at rates of $\frac{1}{2}$, 1 and $1\frac{1}{2}$ gal. per acre. The success of the spraying was in proportion to the concentration of the B.E. ester of 2,4,5-T, which caused considerable defoliation. However, in no case did complete death of the plants occur. The lower parts of the stems remained sappy.

In January, 1952, an increasing degree of recovery was seen on all treatments. The original sprays were repeated to see if it was possible to obtain a complete kill. Although concentrations greater than 1 gal. per acre of 2,4,5-T, when applied twice at a 12-month interval, have killed some plants, there has been a certain amount of re-growth even with the highest concentration of 2,4,5-T used.

Apart from the hormone sprays, arsenical sprays which are highly poisonous to animals, have given some measure of success.

It is apparent that the use of known weedkillers is not likely to play a very important part in the control of burgans. The cost in heavily-infested country, including materials and application, is high. It appears that at least two, and perhaps more applications of a concentrated solution of 2,4,5-T are necessary to give any measure of control. Even if the existing plants are killed by spraying, re-establishment from seed will occur.

MECHANICAL CONTROL

Whether burgans has been previously killed or not the mechanical removal of roots and larger limbs is necessary prior to pasture improvement. In most areas some bulldozing is required before ploughing to remove fallen logs, stumps and scattered trees.

The conventional type of bulldozer blade is not the most efficient mechanical aid for clearing burgans because a

considerable amount of top soil is shifted in packing the scrub for burning. The top-growth tends to be shorn off leaving the tabular root untouched and ready to regenerate quickly. Bulldozers fitted with "grubber" type blade or root-rake are more suitable as less soil is packed with the scrub. The roots of large burgans can be more effectively dislodged and some measure of initial cultivation is achieved. Following bulldozing, the initial ploughing is best done with a heavy stump-jump disc plough which will dislodge most of the roots.

Where the slope is steep and the soil too rocky for cultivation it is doubtful whether pasture development would be an economic proposition. Mechanical scrub slashers have been tested on burgans by the manufacturers and are capable of removing the top growth. If not followed by ploughing the re-growth would be rapid and frequent slashing coupled with heavy top-dressing to encourage grazing would be required to develop land by this method.

CONTROL BY IMPROVED PASTURE

After an infested area is cultivated there is usually a rapid regeneration from old roots and new seedlings. Under these circumstances growth is much more rapid than the spread of burgans into new land. Instances have been seen of attempts to control burgans by one cultivation alone. Unless cultivation is followed promptly by successful pasture establishment and improvement this effort is wasted.

The land use survey Drake (1957) showed that burgans is confined mainly to native pasture areas and that development of improved pastures offers the most effective means of controlling burgans. This is achieved mainly by intense competition and heavier grazing, which prevents the establishment of burgans seedlings. Some cattle grazing in addition to sheep is advisable to keep seedling re-growth to a minimum. Older and well-established plants will continue to grow under top-dressing. However, the prevention of the further spread of burgans in any area lies in the application of the methods of pasture improvement appropriate to that area.

In most areas these methods consist of thorough cultivation, sowing down with a recommended seed mixture and top-dressing with adequate superphosphate in the year of establishment and in subsequent years.

Following conclusions from the land use survey and the observations on the quadrat established on a burgans

infestation at Fernbank, the Department of Agriculture has concentrated efforts on pasture improvement investigations to solve soil deficiency problems in infestation areas. Results of field trials with various fertilizer and trace element treatments have been published by Drake and Kehoe (1954, 1960). Potash fertilizer and molybdenum are often required in addition to adequate superphosphate to achieve fully improved subterranean clover pastures in the burgans infested area.

Provided sufficient cultivation for adequate seed bed preparation is given, a suitable seeds mixture is sown early in the autumn before frosts occur, and the required fertilizer treatment is given, an improved pasture will be obtained which, when properly stocked and managed, will prevent the re-establishment of burgans. The burgans plants which reappear will be sufficiently few to be manually removed.

RE-AFFORESTATION

The control of scrub re-growth by the establishment of a productive forest cover has been demonstrated by private companies growing pines. Following the clearing of scrub and cultivation as for pasture improvement rapidly growing pine plantations have been established in the Stockdale area of East Gippsland. Complete control of burgans is achieved.

ACKNOWLEDGMENTS

Mr. F.R. Drake - District Agricultural Officer, Victorian Department of Agriculture, Bairnsdale, has supplied much of the information in this paper.

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