

Class 3: This comprises areas of serious and light infestations on land of higher value where winter cereals and annual or perennial pastures can be established. Infestations can be greatly reduced using present techniques.

The problem of galvanized burr is one which has many aspects and its solution will require the use of a balanced approach embodying all methods of weed control. Each situation will demand a different balance of ecological, mechanical, chemical, and stock management methods. Adverse economic conditions and an extremely uncertain and difficult to predict environment accentuate the problem.

THE INFLUENCE OF LAND UTILIZATION ON RAGWORT, *SENECIO JACOBAEA*, AND PROBLEMS ASSOCIATED WITH ITS CHEMICAL CONTROL

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The results of a survey in 1967 have shown that ragwort, *Senecio jacobaea*, occurs on nearly 1 million acres (400,000 hectares) of agricultural land and woodland in Victoria, ranging from high-density infestations to areas of isolated plants. The major infestations are in south Gippsland and in the Otway Ranges in the southern part of the State in undulating or steep hill country with elevations up to 2,000 ft (600 m approximately). The average annual rainfall ranges from 39 to 75 in. (990-1,905 mm).

The main agricultural industries in these areas are dairy farming, beef and wool production, and, to a smaller extent, intense cultivation crops. The various types of land use and the standard of agricultural management have a significant influence on the incidence of ragwort. Cattle avoid ragwort; thus on dairy farms and on beef-producing properties this selective grazing encourages the plant's unhindered development and spread. In contrast, sheep eat ragwort readily and the infestations are effectively depressed on a well-stocked property. This can be regarded as a means of reliable, although temporary, control. Although no specific research work has been carried out in Victoria into the control of ragwort by sheep, it is known that ragwort will recover following the removal of sheep after 5 or more years of heavy grazing. Plants reappear in the first year following the removal of sheep, and recovery is usually complete in the second year. Problems therefore arise

when the type of agriculture is changed from sheep grazing to cattle grazing or other forms of land use. Nevertheless, grazing by sheep is a very important means of controlling large areas of ragwort infestations in Victoria.

In some areas there is a move away from sheep farming into beef cattle, which are at present more profitable, and this is leading to an increase in the ragwort problem. The reluctance of beef breeders to appreciate ragwort as a problem is a difficulty which will be of increasing importance in the south Gippsland hill country.

Many of the farms in this steep and difficult country are uneconomic, which leads to part-time farming, neglect, weed invasion, and finally abandonment of the property. Much of this abandoned farmland, which is infested with ragwort and is now reverting to unproductive scrubland, is being replaced by plantations of *Pinus radiata*, *Eucalyptus regnans*, and *Pseudotsuga menziesii*. There is a problem, however, when ragwort infested land is acquired for forestry. During the transitional stage between farming, when ragwort is often controlled by sheep, and the development of a dense forest canopy, ragwort can seed freely and infest nearby farmlands. This period may range from 5 to 10 years.

In recent years cultivation of some of the difficult terrain in the ragwort areas of south Gippsland has become more common and the succession of intense cultivation, cropping, and sowing down to pastures, coupled with better management, has resulted in good control of ragwort. However, for permanent control, this programme of intensive agriculture must be maintained.

Although ragwort is susceptible to 2,4-D in the young growth stage, and this chemical is widely used, failure to achieve effective control often occurs, which results in the same areas being repeatedly treated year after year. One of the major causes of spraying failure is the various ages of plants and the different types of growth present at the time of treatment. Infestations usually consist of plants in various stages of development, even though they may all originate from the one season's seeds or from the same parental root stock. Some plants are more resistant than others, while regrowth from the crown or from root particles may appear at various times during the year. There is also the possibility of the existence of different varieties or ecotypes of ragwort which may respond differently to the chemical, or there may be plants that have become more resistant through repeated herbicide applications.

Results with mixtures of 2,4-D and picloram have been very good. Treatment with these mixtures could be used effectively on small and difficult infestations where the loss of pasture legumes through the use of picloram is more than compensated for by the successful control of ragwort.