Department of Primary Industries and Regional Development
GOVERNMENT OF WESTERN AUSTRALIA

Journal of the Department of Agriculture, Western Australia, Series 4

Volume 11
Number 7 *1970*

Article 3

1-1-1970

Progress in research on noxious weeds

Geoffrey A. Pearce

PROGRESS IN RESEARCH ON NOXIOUS WEEDS

By G. A. PEARCE, Seed Certification and Weed Control Branch.

RESEARCH on noxious weeds has enabled the development of many practical methods for the control of these weeds. Where the recommended treatments have been accepted by farmers, large scale operations have reduced the areas infested and stopped spread into new paddocks.

But despite the progress made, there are a number of weeds for which practical control measures are not available.

Blackberry

As early as 1951, trials in Western Australia showed that annual spray applications of 2,4,5-T were needed at the rate of one half gallon in 250 gallons water per acre. Although a complete kill with a single application was claimed in some Eastern States at the time, recommendations in other States are now virtually the same as those in Western Australia.

Ecological studies in Victoria have shown the existence of as many as 10 or 12 different types of blackberry, most of which are resistant to the present control measures.

Several areas in Western Australia show a similar type of resistance and chemical trials are being undertaken on them.

Cape tulip

Early work on Cape tulip demonstrated the effectiveness of 2,4-D in controlling this weed. An unusual feature is that the plants are not killed in the year they are sprayed. Although the spray largely prevents the weed from flowering, the important action of the spray is to sterilise the newly developed corms and inhibit the development of cormils. The value of the treatment is only seen the following year when the corms do not produce plants.

Because of this, and the likelihood of dormant corms being present, farmers often doubt the value of spraying Cape tulip.

Investigations have revealed a wide variation in dormancy from year to year, even at the same location. At some places a high proportion of corms fail to germinate. If this happens even the most

Dense stands of blackberry such as this no longer occur in pasture areas. Annual treatment for three or four years eliminates the problem

A heavy stand of Cape tulip in a clover pasture. Removing the Cape tulip by spraying can give increased pasture growth in the following years

careful spraying programme is not likely to give much reduction in weed numbers.

Soil temperature has a major influence on germination of Cape tulip. Once the soil temperature drops below 60° F, the number of corms which germinate falls rapidly. Minimum soil temperatures below 50° F are common in autumn and winter.

The percentage of corms which germinate at the beginning of the growing season depends on the soil temperature at that time.

As the date of the break of season becomes later, soil temperatures decline, and this is accompanied by a steady increase in dormancy. The break of season is also accompanied by a fall in temperatures, which would explain the high dormancy counts often recorded.

Obviously if virtually complete control of Cape tulip is to be obtained in one season, all corms must germinate.

The only way of inducing complete germination is to provide the conditions necessary for germination while the soil temperature is still favourably high. Burning the surface cover during the autumn increases germination because the infiltration of the first rains is faster on a bare surface than on a covered surface. Light autumn rain of 15 to 20 points falling on a bare soil increases the soil moisture enough to cause Cape tulip corms to sprout before the temperature falls enough to inhibit germination.

Thus, providing some rain falls during the autumn before the season normally opens, corm dormancy will be reduced if the area is burnt.

Despite the success of the present recommendations for cape tulip control, there are still problems which need investigation. It is obvious that results are often poor on low-lying areas which become boggy. Also the small subsidiary corms appear to have greater dormancy than the larger main corms. A herbicide which would kill the growing plant would have obvious advantages.

Patersons curse and saffron thistle in pasture

Farmers did not accept early recommendations to use high rates of application of 2,4-D for the control of Paterson's curse and saffron thistle in pastures. They have probably been justified in this because of the cost of the chemicals

Once saffron thistle runs up to flower, sheep refuse to graze amongst dense stands so that the fodder is not available. Spraying before the flowering stalks form makes the plants palatable to sheep

recommended, the damage caused to the pastures, and the presence of dormant seeds which produce a new crop of weeds in the year after spraying.

Annual spraying over four or five years would be needed to obtain a reasonable reduction of the weed infestation. This spraying would cause a steady decline in the productivity of the pasture each year.

To overcome these problems, a system incorporating a combination of spraying and grazing has been developed. The success of this programme has been shown on numerous demonstration plots throughout the agricultural areas, and many farmers are now using the technique.

With Paterson's curse the spraying is carried out in early winter and six to 10 weeks after germination. For saffron thistle, because of a spread of germination, an application should be made just as the flowering stalk begins to form.

The infested area is sprayed with 1 pint of 50 per cent. 2,4-D amine per acre.

Seven days after spraying, the paddock should be stocked with sheep at four to five times the normal stocking rate for the district. The sheep should be kept on the area at this high level of stocking for about six weeks, but not until the pasture begins to suffer from overgrazing.

The pasture treated must be a reasonably good legume-based pasture, which will compete with the weeds and provide feed when the weeds are killed. At the recommended rates of application, 2,4-D will not affect the clover or other pasture species.

If the heavy grazing is not carried out, most of the weeds recover in two to three weeks and make normal growth. In the wilted condition after spraying, the weeds are selectively grazed by sheep and quickly eaten out. Any weed regrowth which does occur after grazing usually survives.

Following this treatment the pasture should make normal growth and compete strongly with the sprayed weeds which are either killed out or become unimportant species within the pasture.

This spraying and grazing technique can be repeated each year until the dormant weed seeds are exhausted.

In some situations it is not possible to apply the 2,4-D from the ground. Considerable success has been achieved with an aerial application of one half pint of 2,4-D ester per acre. This has allowed hilly country around Geraldton, not accessible to ground spray equipment, to be sprayed and then grazed as recommended.

Noxious weeds on roadsides

The use of general purpose herbicides which kill all weeds has been common in certain situations for a number of years. However, such treatments have been too costly for the treatment of noxious weeds on roadsides and other areas. In the past the standard practice has been to apply 2,4-D early in the winter and re-spray the surviving weeds in the spring at the early flowering stage.

This has a number of obvious disadvantages and trials have been carried out to

devise a treatment to allow a single application. A mixture of 1 lb. of Vorox AA plus 1 lb. of 2,4-D per acre has been shown to be effective. This treatment kills practically all annual weeds present so that any surviving noxious weeds or later germinating plants are readily seen. Where it is desired to leave grasses on the treated area, linuron can be used in place of Vorox AA.

This treatment has proved so effective that it is now standard practice for all roadside spraying in Western Australia. Workers in other States are interested in this development and have begun to test it under their own conditions.

Seed dormancy trials

A detailed research programme has been started to investigate the dormancy of the seed of Cape tulip, Paterson's curse, saffron thistle, Bathurst burr and caltrop.

Factors under investigation include depth in the soil, variation between locations, soil temperatures and dormancy control mechanisms.

Such studies are naturally long term, but they have already yielded helpful information which will influence control measures in the future.

It appears likely that there are a number of varieties of saffron thistle and this needs further investigation.

Two leaved Cape tulip cormils seem to have a one year rest period after formation, whereas one leafed Cape tulip seed either germinates the year after maturation or is rendered non-viable and disintegrates.

Current research

Problems at present under investigation include:—

- Seed dormancy studies on Cape tulip, Paterson's curse, saffron thistle, Bathurst burr and caltrop.
- The competitive effects of Cape tulip and the effects of spraying on pasture.
- Cultural and chemical control of calotropis, and cotton bush.
- Herbicide trials on blackberry, soursob, arum lily, sorghum almum, parkinsonia and pennyroyal.