Notes on Noxious Weeds Recommendations

D J. Gilbey
Department of Agriculture and Food, Western Australia

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NOTES ON NOXIOUS WEEDS RECOMMENDATIONS

A supplement to the "Recommendations for the Control of Primary Noxious Weeds and Secondary Noxious Weeds" booklet by G.A. Pearce.

This booklet contains answers to questions raised by R.W.C.O.'s and D.W.C.O.'s at a series of A.P.B. Conferences at Forrestfield in March, April and May, 1973.


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NOTES ON NOXIOUS WEEDS RECOMMENDATIONS

Arum lily (*Zantedeschia aethiopica*)

Q. Busselton - any further research?

A. No recent research has been carried out on this plant and the recommended treatment is still 2,4-D.

Blackberry (*Rubus fruticosus*)

Q. Present recommendation is not safe near susceptible crops, e.g. orchards and potatoes.

Albany - Are there any alternatives to 2,4,5-T for use near gardens and orchards? The present recommendation is not effective on the narrow leaf variety, e.g. Brunswick variety.

A. The danger of using 2,4,5-T near susceptible crops is only related to spray drift at the time of spraying and not to volatility after spraying. Therefore, providing spray drift is not being carried towards a susceptible crop, it should be quite safe to use 2,4,5-T in these situations.

A fine spray of small droplets tends to drift more than larger droplets. In difficult situations with susceptible crops nearby, spray drift could be minimised by using a high volume of water with high output nozzles at low pressure. This would produce larger droplets. Volumes up to 1:1200 would be satisfactory, on thick blackberry.

Trials at Brunswick on the narrow leaf variety in 1970/71 showed that top growth can be readily removed by a burn either before or after spraying with Tordon or 2,4,5-T. If pasture is then established, it would be expected that grazing stock can control regrowth if stock are managed with this objective. Where treatments have been followed up no greater difficulty has been experienced.

Caltrop (*Tribulus terrestris*)

Q. Vorox and 2,4-D ester at the same rates as for Linuron appear to be as effective.

A. The present recommendation of 2,4-D is still the most effective treatment where spray drift is not hazardous.
Because of recent changes in the price structure of Vorox and Linuron, it would be worthwhile using Vorox in preference to Linuron where spray drift is a problem. Pound for pound of chemical, Linuron is more effective against caltrop than Vorox, but the rate of Vorox can be increased to 5 lb/acre (5.6 kg/ha) or 2 lb/acre (2.2 kg/ha) + 1 lb 2,4-D sodium salt/acre (1.1 kg/ha) and still be cheaper than Linuron.

Cape tulip (Homeria spp.)

Q. There is no alternative recommendation to burn and spray. Very few farmers are prepared to burn (except when multiple cropping) and an alternative method is considered highly desirable. Need to investigate the value of cropping in breaking bulb dormancy.

Present recommendations can't be used on coastal sands where there are no stubbles or feed to burn. Cape tulip, therefore, sprouts over a longer period. Has or can any work be done on this problem?

York - Reported that better results were obtained when plants were sprayed in early flower than before flowering - more often noticed with one-leaf.

A. Where farmers are not prepared to burn, heavy summer grazing to produce a bare area may help to reduce dormancy of Cape tulip. High dormancy is associated with a dense, heavy growth of pasture and Cape tulip top growth.

Heavy grazing is not an equal alternative to burning, but could be considered as the next best alternative and as such it would be better than a summer ploughing or doing nothing. Where burning is not carried out, there is likely to be a higher dormant corm population. The reduction in tulip will then be slower after each spray application.

The value of summer cultivation has been widely investigated and it has very little effect on the sprouting of Cape tulip corms.

Cereal cropping could be the first step in a control programme to provide a stubble for a good burn.

With two leaf tulip, cropping the year after spraying can be very helpful. A general germination of corms usually occurs and these can be killed by spraying in the crop and using ½ lb (0.56 kg/ha), 2,4-D per acre. If the farmer is prepared to grow a second crop and spray for corms this is usually desirable. Generally cultivation in itself is of little value in controlling Cape tulip corms unless it can be done in July when it would give a high degree of control. A stubble burn after cropping would
encourage the greatest possible early emergence of Cape tulip, and increase the effectiveness of control either by cultivation for the second crop or spraying in the following pasture year.

However, cropping cannot be included as a recommended practice for Cape tulip control:

* Where cropping is not a profitable enterprise;
* Because cropping operations cannot be reliably timed to get the maximum effect on Cape tulip.

Many cape tulip plants could be expected to emerge or re-establish in a crop after the last cultivation and spraying with 2,4-D must then be done when the crop is tillering or stooling out. This may not coincide with the ideal time for spraying Cape tulip, which is critical.

The recommended times for spraying Cape tulip (July-September) are the critical times when it is expected that old bulbs of emerged plants would be exhausted (and are unable to sprout again) and new bulbs would not have formed. This is the only time when any truly effective control measures can be carried out, which emphasises that spraying in the pasture after a full emergence has no equal alternative.

To support the argument for burning before spraying, the following results can be quoted to farmers. This experiment was carried out at Bannister and Bokal, and shows the percentage of dormant bulbs 10 weeks after the break of the season.

<table>
<thead>
<tr>
<th>TREATMENT</th>
<th>% DORMANT BULBS 10 WEEKS AFTER BREAK</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Bokal 1961</td>
</tr>
<tr>
<td>Burnt, March</td>
<td>0</td>
</tr>
<tr>
<td>Cultivated, March</td>
<td>17.0</td>
</tr>
<tr>
<td>Nil</td>
<td>26.6</td>
</tr>
<tr>
<td>Burnt, April</td>
<td>2.9</td>
</tr>
<tr>
<td>Cultivated, April</td>
<td>17.6</td>
</tr>
<tr>
<td>Nil</td>
<td>25.3</td>
</tr>
</tbody>
</table>

These results show the difference between sites and considerable differences will occur from year to year, but burning has always broken dormancy better than any other treatment. It is the combination of a full emergence and a spray timed to stop the plant from reproducing itself that should be recommended most strongly to the farming community.
Carnation weed  \textit{(Euphorbia terracina)}

Q. Geraldton - any new developments in control methods?
A. No.

Cotton bush  \textit{(Asclepias fruiticosa)}

Q. Bunbury - reported that in the recommendations the percentage concentration of chemical is omitted - he considered it should be included. There are other examples:

- he also stated that the recommendation of 2 pints of 80% chemical was giving fluctuating results and was worst in dry weather situations; recovery was up to 90% -

- Esperance people reported that Vorox and 2,4-D was giving good results under similar circumstances.

A. The percentage concentration of chemical has been omitted from the recommendations book because the form of each chemical is given (e.g. ester or amine etc.) and the A.P.B. only handles one concentration of each form of chemical, e.g. the A.P.B. only handles 80% 2,4,5-T ester.

If you are using chemical other than standard supplies, the rate will need to be altered in proportion to any change in concentration from the standard supply.

Poor results would be expected with 2,4,5-T in dry conditions, but providing the plants are not stressed for water, the present recommendation would be the best treatment.

Couch grass  \textit{(Cynodon dactylon)} and Kikuyu  \textit{(Pennisetum clandestinum)}

Q. Recommendations in varied situations?
A. See Page 10.

Doveweed  \textit{(Eremocarpus setigerus)}

Q. Narrogin reported that they were obtaining no effect of spraying 2,4-D on small plants in dry land pasture - large plants in water-courses etc. were, however, quite successfully treated.

Goomalling - 2,4-D 80% ester poor results this year with two pints.

Good results were obtained with \(\frac{3}{2}\) pints ester at Pingelly.
A. The recent series of dry summers could readily explain the poor results in spraying dowereed with 2,4-D ester. Technical ester in distillate has given better results and either technical ester in distillate or 2 pints paraquat per acre (2.8 l/ha) would be more satisfactory under dry conditions.

Gorteria (Gorteria calendulacea)

Q. Would 2,4-D amine be satisfactory for gorteria control? If so, it would be considerably cheaper, especially as shires have to finance all townsite control.

A. 2,4-D has been used in trials on gorteria and has given poor results. Although it has given better control when combined with paraquat, it was still an unsatisfactory treatment. (see also Vorox Page 11).

Heliotrope (Heliotropium europaeum)

Q. Bruce Rock - has been difficult to control with 2,4-D in the past few years.

A. The reaction of heliotrope to herbicides is influenced strongly by growing conditions, particularly soil moisture. When making active growth, good results can be expected from 1 pint 80% 2,4-D ester per acre (1.4 l/ha) with a second application about three weeks later to cope with recovery and plants missed with the first spraying. High volume treatments give best results but circumstances may justify the use of a mister.

Under dry conditions, or to obtain a rapid kill when plants are approaching flowering, 1 pint Gramoxone or Reglone per acre (1.4 l/ha) is recommended. A second treatment is usually necessary a week or two later. Application of these herbicides with a mister is not recommended.

Horehound (Marrubium vulgare)

Q. How much wetting agent required for Kuron recommendation? Eastern States recommendation suggests 50 : 50 chemical wetting agent mix. Is this correct?

Can distillate and technical ester be used as alternative treatment?

Gnowangerup - poor year with slow growth, 2 lb (0.9 kg) 2,4-D ester plus water plus distillate was unsuccessful and suckering resulted.

Is a higher rate warranted?
A. There is no value in increasing the amount of wetting agent in any solution beyond the 2 to 4 pints (1.1 to 2.3 l) per 100 gallons (455 l) of mixture that is generally recommended.

Distillate and 2,4-D technical ester can be used on horehound seedlings but would not be a satisfactory alternative to Kuron on plants beyond the seedling stage.

Under poor growing conditions, there is no advantage in applying more than 2 lb 2,4-D ester per acre (2:2 kg/ha). In such a situation, Gramoxone or Reglone could be used at 2 pint (1.1 l) per 100 gallons (455 l) of water for spot spraying.

**Paterson's curse (Echium plantagineum)**

Q. Moora - is there any information arising from 1970 trials? - can rates of Vorox be increased (safely) on small, non-pastured private blocks?

A. The 1970 trials have shown that Paterson's curse is so easily controlled by using the spray graze technique in pasture or the Vorox plus 2,4-D mixture for other areas, there is no point in any further trials. An alternative to Vorox would only be likely if it was cheaper, and because of the low price of Vorox, this is most unlikely.

On small non-pastured private blocks, 3 lb Vorox per acre (3.3 kg/ha) could be used.

**Saffron thistle (Carthamus lanatus)**

Q. Recommended 2 pints 2,4-D ester not effective after run-up and flowering. However, there is no alternative. Would technical ester be suitable?

Narrogin referred to difficulties met in the area, but went on to say they were probably explained by varietal problems and longer wet seasons previously described by Mr. Peirce.

It was further stated that 2,4-D was not entirely effective on late germinations - diquat, paraquat seemed to have possibilities, but care was needed.

The question was asked - "Do surviving plants set viable seed"?

Spray graze at Perenjori - variable effect in one 50 acre paddock at 1 pint 2,4-D amine 50%.

May have been moisture stress.
A. Technical ester in oil would always be expected to be more effective than 2,4-D applied in water and would probably have the same effect as paraquat and diquat.

However, it is too late to spray Saffron thistle after it has run up and is flowering.

Viable seeds are set on plants that survive the 2,4-D spraying.

The variable effect of spray graze at Perenjori is quite likely to have been due to moisture stress.

Salvinnia (*Salvinia auriculata*)

Q. Nothing is successful?

A. This is not so. The recommended treatment with Gramoxone does control Salvinnia plants that are sprayed. However, Gramoxone is not translocated in plants so that in a thick mat of Salvinnia where many plants may not be reached by the direct spray, regrowth can be expected. Repeated spraying as new growth appears is therefore necessary in many situations. Further trials are continuing with herbicides that would have some residual effect.

Soursob (*Oxalis pes-caprae*)

Q. Weedazol on mature plants - resuckered?

Mr. Booth referred to the case of a farmer at Salmon Gums who was trying to control soursob (in a garden) by covering small patches with black plastic. He enquired as to its possible value.

Mr. Peirce stated that because soursob had no dormancy the method may be useful.

A. It is too late to spray with weedazol when the plants are mature. Spraying should be no later than June when most of the plants would be approaching bulb exhaustion and just commencing to flower.

St. John's wort (*Hypericum perforatum*)

Q. Murray - needs successive treatments with 2,4-D, 2,4,5-T and distillate (in bracken).

A. Where St. John's wort is growing amongst thick bracken, the first treatment is often ineffective as there is always a strong chance of plants being missed or only partly sprayed with the first application.
Thornapple (*Datura* sp.)

Q. Are there any alternatives to 2,4-D ester? Sometimes this cannot be used.

A. Paraquat or Diquat applied at the rate of 2 pints (1.1 l) per 200 gallons (900 l) of water, plus wetting agent, to completely wet the plants would be effective on thornapple.

A 1:1 mixture of paraquat and diquat with wetting agent could be used.

Variegated thistle (*Silybum marianum*)

Q. Need more information in form of bulletins or journal articles.

A. Local information on variegated thistle is covered in the Noxious Weeds Recommendations book and in the March, 1972, issue of the Journal of Agriculture which contains an article on spray graze.

All other information on this plant would come from the Eastern States and overseas.

A search through Weed Abstracts and other State Department journals may give more information on the biology and ecology of variegated thistle.

Water hyacinth (*eichhornia crassipes*)

Q. Perth area reported that lower volumes than those recommended appeared successful; 2,4-D also quite effective.

A. The volume of water used for spraying water hyacinth could probably be varied by experienced operators according to the density of the plants, and still be successful. 500 gallons (2300 l) of water an acre would be satisfactory on everything up to the heaviest infestations but fail to do the job where water hyacinth is very dense.

Although this plant is easily killed by 2,4-D it is not used in the metropolitan area because of the danger to gardens.

Afghan thistle (*Solanum hystrix, Solanum hoplopetalum*)

Q. Wagin - 3 or 4 germinations to contend with - treatment not handling successive germinations - there appears to be some doubt on effects on older plants.

Is there an alternative to Tordon?
Lake Grace - alternatives to Tordon?

A. The only alternative treatment to Tordon is Banex and the effectiveness of both chemicals is about the same. Of the two, Tordon would persist for longer in the soil.

Doublegee *(Emex australis)*

Q. Any recommendations other than Dicamba?

A. Yes. The noxious weeds recommendations booklet draws attention to the use of Dicamba in cereal crops, and the spray graze technique in pastures.

In cereal cropping, bromoxynil (as Brominil M or Buctril MA), Linuron and Tribunil also give good control of doublegee, providing they are sprayed at the 1 to 3 leaf stage. Recent trials have shown that an early dry working increases the emergence of doublegee and thus greater control is achieved with cultivation after emergence (see Journal Agric. W.A., March 1973).

It is recommended that an early dry shallow working be carried out followed if necessary either by spraying with Bromoxynil, Linuron or Tribunil, while the plants are small, or by a Dicamba and 2,4-D spray when the crop is tillering.

Rates are -

<table>
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<th>Product</th>
<th>Rate</th>
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<tbody>
<tr>
<td>Brominil M or</td>
<td>1 pt/acre (1.4 l/ha)</td>
</tr>
<tr>
<td>Buctril MA</td>
<td></td>
</tr>
<tr>
<td>Tribunil</td>
<td>12 oz/acre (0.8 kg/ha)</td>
</tr>
<tr>
<td>Linuron</td>
<td>1/2 lb/acre (0.56 kg/ha)</td>
</tr>
<tr>
<td>Dicamba</td>
<td>1/2 pt/acre (0.7 l/ha) plus 80% 2,4-D ester 1/4 pt/ac (0.35 l/ha)</td>
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</tbody>
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In pastures the spray graze technique will substantially reduce doublegee, although some loss of clover pasture may occur in some years. Pasture loss has varied considerably from year to year but has generally been small enough for the technique to be satisfactory where doublegee is thick. Spray graze is not recommended on medic pasture.

Results with Tribunil in 1972 were promising and are now being tested on a large scale by the Department of Agriculture at Research Stations. Tribunil at 8 oz/acre (0.56 kg/ha) could be suggested for use on medic and sub.clover pastures on a trial basis only.
Neverdie (Portulaca)


A. Portulaca can be controlled in Sudax by applying Atrazine when the crop is 2 to 5 inches (5 to 13 cm) tall.

Atrazine is sold as Gesaprim 80 and the rate to use is 2 pounds of product per acre when crop is 3 to 5 inches tall.

*Couch grass (Cynodon dactylon) and Kikuyu (Pennisetum clandestinum)

Q. Recommendations in varied situations.

A. Couch and kikuyu grass can be controlled around houses, and townsites with DPA as outlined in "Weeds and Lawns" Bulletin 3148. Bulletin 3316 "Herbicides for Firebreaks" also describes methods of grass control, around buildings and along firebreaks etc.

HYVAR X, MONURON, ERADONE

Q. Could information be made available regarding the use of certain residual herbicides under various climatic and soil conditions e.g.:

Hyvar X in dry arid areas.
Monuron.
Eradone.

A. Hyvar X is a root absorbed residual herbicide which is very effective in high temperature areas. However, to be effective, it must be washed into the soil by rain. It is the most active chemical for tropical areas.

Monuron is closely related to Diuron and is absorbed by the leaf and also the root system. It does not last in the soil as long as Diuron.

Eradone contains three chemicals: Tandex, which is very similar to Hyvar; Amitrole, which is absorbed through the leaves of plants and 2,2-DPA, which is a grass killer. The chemical is, therefore, good for a knock-down treatment for grass and has a residual effect which makes it extremely effective on perennial grasses.

M.C.P.A.

Q. Comments on effectiveness.
A. M.C.P.A. is a chemical which is very similar to 2,4-D. It is most effective against cruciferous weeds (e.g. wild radish, mustard and turnip) and is far less toxic to clovers and medics. In general, it is not as effective as 2,4-D and is more expensive than 2,4-D. It is usually only recommended for the control of weeds in cereal crops that are undersown with clover or medic.

**Sarsaparilla (Hardenbergia comptoniana)**

Q. Recommendations in varied situations.

A. Sarsaparilla usually occurs as small patches on newly developed land and the recommended treatment is 3 pints 2,4,5-T per acre (4.2 l/ha) applied as a high volume spray.

**SPRAY SEED**

Q. Information?

A. Spray seed is a registered ICI trade name for a mixture of Gramoxone plus Reglone plus wetting agent. Information on its use has been dealt with in several Journal articles.

The Department's attitude is that this technique is very useful for special situations as described in the March 1971 issue of the Journal "Chemical cultivation - its place in crop planting".

**VOROX**

Q. Distinction between use of paraquat and vorox; and vorox and diquat, particularly on gorteria.

A. The distinction between these mixtures revolves around the difference between paraquat and diquat. They are both quick acting contact herbicides that interfere with photosynthesis in plants. Diquat tends to be more effective on broadleaf plants and paraquat more effective on grasses.

However, in trials, paraquat was found to be more severe on gorteria than diquat and although there was only a small difference between their effects on gorteria when mixed with Vorox, the paraquat mixture was better.

(See also gorteria page 5).

**CULTURAL WEED CONTROL AND SEED DORMANCY**

Q. Could cultural recommendation for saffron thistle and Cape tulip be included in the booklet. Cultural methods generally.
Could recommendations be expanded to include information on application methods and carriers etc? And oil: water.

Information required on seed dormancy, e.g. heliotrope, dove weed, Cape tulip cormes, thornapple, amsinkia.

Dissemination of research results - suggest a general report at intervals plus discussions with Research staff at conferences and training courses.

The value of cultural operations for Cape tulip control are discussed under the heading Cape tulip (page 2).

In the March 1973 issue of the Journal of Agriculture, reference is made to the value of cultivation to induce a good germination of annual weeds. This would apply to saffron thistle.

Preliminary results on the seed dormancy of heliotrope indicates that it is fairly low. There is no information available on the dormancy of dovecweed or amsinkia seed.

Overseas information on the dormancy of thornapple indicates that little or no seed will germinate unless it is buried for at least 1 year. This would probably apply mainly to tropical and subtropical environments.

G. Pearce discusses bulb dormancy studies of this plant and the relevant material is referred to in Bulletin 3559 (Control of Cape tulip).