

## AQUATIC WEED CONTROL

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### Summary

Dichloropropionic acid, which for some years has been the standard chemical for controlling emergent grass drain weeds, can be complemented by paraquat. A trial on reed sweetgrass (*Glyceria maxima*) is described to illustrate its use in drain work. Mercer grass (*Paspalum distichum*) is proving a major problem weed in drains, and trials and future control are discussed.

### EXPERIMENTAL

All rates quoted refer to lb active ingredient applied per acre. The two trials discussed were laid down by the Rukuhia weed team whose assistance is acknowledged.

### REED SWEETGRASS

(*Glyceria maxima*)

The slow rate of knockdown of dichloropropionic acid can be a disadvantage in drain weed control, and this is important when treatment is delayed. It is particularly important in local body work where it is physically impossible for, say, a Drainage Board to spray all its drains at the optimum time. The problem can be solved by adding amitrole to dichloropropionic acid for more rapid knockdown. Amitrole is available only in commercial mixtures which can suffer from formula inflexibility. To alter the rate of one component chemical must alter the rate of any other chemicals in the mixture, with possibly unsatisfactory results as regards cost or control.

Paraquat has the same rapid knockdown action as amitrole, as well as the long-term ability to control a wide range of drain weeds.

### TRIAL

In late April, 1964, a trial was laid down with the following treatments on a thick stand of *Glyceria maxima*:

Treatment (lb)	Cost Per Acre
Paraquat 3	£17 12s. 6d.
Paraquat 1	£ 5 17s. 6d.
Paraquat 1/diuron 16	£42 7s. 6d.
Dichloropropionic acid 20	£12 3s. 0d.
Dichloropropionic acid 15	£ 9 2s. 0d.

Treatments were replicated and a non-ionic wetting agent was used at 0.25% with 150 gal of water per acre.

Previous work had shown that paraquat at 2 lb would control this weed. The 3 lb rate was used to investigate possibilities of longer control, and 1 lb to determine a minimum rate.

## RESULTS

Two weeks after treatment, paraquat treatments showed a severe effect but dichloropropionic acid treatments had had little effect.

After six weeks, paraquat 3 lb had given the best knockdown and paraquat plus diuron was better than paraquat alone at the 1 lb rate. Knockdown from dichloropropionic acid was greater at 20 lb and about equal to paraquat 1 lb.

Sixteen weeks after treatment, dichloropropionic acid treatments and paraquat plus diuron had resulted in 100% control and a clear waterway, although regrowth was just starting on the latter treatment. There was 5% regrowth on paraquat 3 lb plots and 20% on the 1 lb plots.

In mid-October after 24 weeks, dichloropropionic acid treatments showed 10% regrowth and had given a clear waterway. Paraquat 1 lb plus diuron 16 lb had 30% regrowth and the channel was not considered clear enough for satisfactory water flow. Paraquat 3 lb and 1 lb were covered by 100% regrowth.

## CONCLUSIONS

The following specific conclusions were reached, regarding paraquat.

- (1) Paraquat at 2 lb is necessary to control *Glyceria maxima*.
- (2) A clear waterway will be maintained for about four months.
- (3) Paraquat at 3 lb gave no extra benefit.
- (4) The addition of diuron to paraquat prolonged control but not economically.

Other trials on different drain species have shown the same picture. Paraquat is quicker in action than dichloropropionic acid and at adequate rates achieves a clear channel about two months sooner. But its effect fades more rapidly and total control period is not as long.

It is concluded that dichloropropionic acid alone is still the best material to use on emergent grass weeds because it gives a longer period of control for a similar cost. However, if time is short and rapid knockdown is required, paraquat can be used but respraying may be necessary to maintain a clear channel in the spring.

## MERCER GRASS (*Paspalum distichum*)

*Paspalum distichum* and *P. dilatatum* remain two problem weeds in waste place vegetation control, which have increased as competing species are destroyed. *Paspalum distichum* is a very real problem in drains because it can grow in water as well as on land.

## TRIAL

A series of trials have been carried out on this weed and in late April, 1964, a further trial was laid down in a dry drain using the two most promising chemicals to date — bromacil and amitrole-T. Treatments were:

Treatment (lb)	Cost per acre
Bromacil 24	£100 10s. 0d.
Bromacil 16/paraquat 2	£ 78 15s. 0d.
Diruon 16/paraquat 2	£ 50 1s. 0d.
Amitrole-T 8	£ 14 8s. 0d.

Treatments were replicated and a non-ionic wetting agent was used at 0.25% in the last three treatments. Water was used at 100 gal per acre.

Previous trials had indicated that 8 lb of amitrole-T was better than 4 lb. Paraquat was used with a reduced rate of bromacil and with diuron to try to reduce cost.

#### RESULTS

During the winter and spring, frosts browned off all growth and there was no visual improvement from any treatment. Control assessment was not possible until November. Percentage control is shown in the following table.

Treatment (lb)	November	% Control at February	April
Bromacil 24	90	95	95
Bromacil 16/paraquat 2	65	65	30
Diruon 16/paraquat 2	55	—	—
Amitrole-T	70	—	—

#### CONCLUSIONS

While amitrole-T and diuron had given some control, this was lost once normal vigorous summer growth started. Bromacil appears to be the most promising chemical but rates of at least 24 lb are required. There is no satisfactory chemical control once this weed is in the water.

The trial can be criticized for the time of treatment. For instance, amitrole-T applied in, say, February would still have given some control through until the following summer. But dichloropropionic acid/amitrole mixtures normally used for chemical drain cleaning, plus frosts, will also give a fair measure of control. If anything other than usual chemical cleaning is to be carried out, it is considered that complete eradication is necessary to justify the expense necessary.

Normal chemical cleaning is at least less than half the cost of mechanical cleaning. But if *P. distichum* is present in the water, mechanical cleaning is necessary, and can cost up to three times that of normal mechanical cleaning.

Therefore, expensive chemical elimination to prevent infestation of waterways is justified in the long term, because future annual cleaning costs will be reduced many times.

#### CONCLUSION

The difficulty and cost of controlling *P. distichum* illustrates the basic problem in chemical drain weed control. As one weed is killed out, another takes its place. A very noticeable example has been the spread of *P. distichum* following reduction of *Glyceria maxima*.

It might well be better to maintain a weed that can be controlled by judicious chemical pruning, than eliminating it and having it replaced by a resistant weed. While white clover (*Trifolium repens*) is not normally regarded as a weed, it fits this concept very well as it will cover drain banks to prevent fretting, will not impede water flow materially, and can be maintained in a relatively pure association by paraquat weeding.