WORK WITH DALAPON

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SUMMARY

THIS paper deals to a considerable degree with tall fescue, which is a bad weed on rich swamp country. An important section deals with weeds in canals and drains. Their destruction by chemical means has saved much money on the Hauraki Plains and given better results than mechanical cleaning. Other sections deal with replacement of poor hill country pasture by better species, by destruction of the poor sward by chemicals, and the possible use of weedicides for the prevention of facial eczema.

In this paper I shall deal only with trials carried out in the Auckland Province where dalapon has been employed, but I will not touch on the control of kikuyu grass, which has been dealt with by Mr. C. Blick.

CAREX LUCIDA

This sedge is prevalent on fertile limestone soils in the Glen Murray district and similar sedges, if not the same, occur on similar soils in other parts of the North Island. It establishes in clumps here and there in a similar manner to tussock grasses of the South Island. Following trials with TCA which proved ineffective, a trial was laid down with the following treatments applied at monthly intervals from September 1955 until March 1956.

1. Dalapon 10lb. + ATA 10lb. in 160 gallons of water.
2. Dalapon 20lb. in 160 gallons of water.
3. Dalapon 40lb. in 160 gallons of water.

The dalapon + ATA was most successful and particularly so when applied in December-January where a 100 per cent. kill was obtained. The 40lb. rate was next in effect and gave best results in October-November when an 86 per cent. kill was obtained. The treatments were sprayed evenly over each plot and destroyed valuable pasture species between the sedge tussocks. (*Paspalum dilatatum* survived.) This promoted ideal conditions for the invasion of weeds. This could be overcome by concentrating the treatments on the sedge tussocks. The effect of the treatments would also have been much better and possibly under such circumstances only half of the material would have been needed. Where the tussock is very thick over-all treatment would have to be given. Dalapon may prove an effective weapon against other sedges causing trouble. While the materials appeared to be most effective during the more active growing period of the plant, kills were good at other times.

TALL FESCUE (*FESTUCA ARUNDINACEA*)

This weed is of major importance in many districts, where it mainly infests rich swamp lands and many inquiries are received concerning measures of control. In unstocked areas alongside drains, canals, or roadsides it can be easily smothered out of existence by *Phalaris tuberosa*, which is taller growing and more vigorous, and is a useful pasture plant. Elsewhere encouragement of a vigorous sole of grass and clover coupled with mowing and at last resort grubbing can be attempted, and it is here that weedkillers can be called in to play a valuable part. However, tall fescue has proved most resistant to weedkillers including TCA, and it was not until dalapon became available that we had anything to give worthwhile results. Six trials in all have been laid down. In the first three

the applications were made on a per plant basis (suitable for treating scattered plants) and the last three on an area basis. The following table outlines the results of the first three trials:—

Date of spraying	Minimum effective dose	Results
May 1956	1oz. dalapon to 20 plants in 3 pints of water.	Plants still dead 9 months after spraying. No ATA tried.
September 1956	1oz. dalapon to 20 plants	Plants still dead 9 months after spraying. ATA as an additive ineffective.
October 1956	1oz. ATA to 5 plants 1oz. monuron to 20 plants	Dalapon ineffective. ATA as an additive to dalapon and monuron gave poor results.

Ineffective treatments caused some scorching, but all the plants recovered. In the trial laid down in October the plants were in early seed head and sufficient water was applied to cover the plants. Penetration as in other trials was incomplete. It would perhaps be considered that this would be overcome by cutting or burning the tall fescue and then spraying the regrowths. This, as it happened, was tried out in the next trial laid down in December with negligible results, probably because of the time of the year.

From the above results it would appear that good results can be obtained except in the spring during vigorous growth of the tall fescue. The per plant basis of application is more suitable for scattered plants, and the plants were scattered in the trials laid down in May and October. In the trial laid down in September the plants were thick and here 1oz. to 20 plants killed almost everything except paspalum. With 1oz. to 40 plants the kill of tall fescue was not really satisfactory, but there was recovery of clovers as well as paspalum.

The next three trials, which were laid down on an area basis, are outlined in the next table:—

Date of application	Treatments per acre	Results
December 1956	15lb. dalapon 15lb. dalapon + 5lb. ATA 15lb. dalapon + 15lb. ATA	Negligible. Slightly better where 150 gallons of water used instead of 300 gallons. Addition of ATA gave little further improvement.
January 1957	40lb. dalapon 20lb. dalapon 10lb. dalapon 40lb. dalapon + 5lb. ATA 20lb. dalapon + 5lb. ATA 10lb. dalapon + 5lb. ATA 40lb. dalapon + 10lb. ATA 20lb. dalapon + 10lb. ATA 10lb. dalapon + 10lb. ATA	Severely damaged; signs of regrowth " " " " " " " " Apparently killed " " " " " " " " " " Severely damaged; signs of regrowth
April 1957	15lb. dalapon 15lb. dalapon + 15lb. ATA 15lb. dalapon + 5lb. ATA 15lb. monuron 15lb. 50 per cent. ATA }	Apparently killed " " " " Severely damaged

Except for the 50:50 mixture of monuron and ATA treatment the April trial was a repeat dressing on top of the December trial. The good effect may be due to the pre-treatment in December; but the plots were not re-treated until the tall fescue had fully recovered. The trials confirm the three previous ones and show that ATA as an additive does not appear worth while on tall fescue and autumn treatment appears likely to succeed. The treatments were applied with 200 gallons water per acre in the trial laid down in January. Another laid down recently is giving promising results. Better cover is obtained if a detergent is used.

GLYCERIA MAXIMA AND DRAIN WEEDS

Glyceria maxima is a bad weed in drains and canals. Dalapon at 20lb. per acre applied in March 1956 with 147 gallons of water per acre with the grass 18in. high and no water in the drain gave a 100 per cent. kill on the Hauraki Plains. Ten pounds was not quite 100 per cent. effective. Based on this one trial the Ministry of Works sprayed the whole of the Awaitei Canal this February by helicopter with about 13lb. of dalapon in 45 gallons of water, taking three trips to make a good cover. Thus 11 miles of drain were covered at £145 per mile. The cost of mechanical cleaning of this canal was £400 to £800 per mile and the problem was getting worse.

It is just as well that the autumn was chosen, because in a trial laid down last November on the Hauraki Plains the dalapon did not kill the glyceria. In this trial 290 gallons of water was applied and this may have had some bearing on the results, but this would scarcely be of much importance. Confirmation of success from autumn spraying can be obtained from another two trials, one of them laid down in the Aka Aka Swamp in March of this year. Here there was 6in. to 9in. of water in the drain and heavy rain occurred 8 hours after application, and a week later the drain was half full of water. By mid-May 90 per cent. of the weeds which included willow weed (*Polygonum persicaria*), *Glyceria fluitans*, and *Alisma plantago aquatica* (a water lily) not only on the drain sides but also in the bottom of the drain appeared dead with a treatment comprising 10lb. dalapon and 5lb. ATA. Dalapon alone at 20lb. and even 40lb. per acre did not give as good control. Monuron at 20lb. and 40lb. per acre was not effective on the weeds below water level. The other trial, again on Hauraki Plains, is giving similar results.

INDIAN DOUB (CYNODON DACTYLON)

This trial was laid down to exterminate Indian doub in lucerne. The treatments comprised 3lb., 4lb., and 5lb. of dalapon with 300 gallons of water per acre and were applied at the end of August last year. The 5lb. treatment killed most of the Indian Doub, but some plants remained which would reinfest the plot if no further treatment was made. The lucerne was retarded to some extent on all plots and slightly more so on the 5lb. plot. By November the lucerne had completely recovered. The intention is to re-treat the plots next August and this should finally eliminate this weed, which is a serious pest in lucerne stands in the Auckland Province. Perhaps autumn applications should be tried.

POOR BROWNTOP AND DANTHONIA SWARDS

There are many thousands of acres of hill country of this type in the North Island. Clover establishment from oversowing has been generally very poor and grass establishment practically nil. It was thought that better results would be secured by burning off the mat of browntop and danthonia with weedicides. The treatments were as follows:—

1. 2½lb. dalapon + 1½lb. ATA.
2. 5lb. dalapon + 2½lb. ATA.
3. 10lb. dalapon + 2½lb. ATA.

These were applied 1 month before, 2 weeks before, and at time of sowing of grass and clover seed. The area was topdressed with molybdenised

superphosphate, 3cwt., and $\frac{1}{2}$ ton of lime. Other plots not treated with weedicide were oversown for comparison and the strike was only fair. As could be expected increased rates of dalapon + ATA gave greater suppression of growth, but no better strike of grass and clover. Where the application was made 1 month before sowing the seed the strike was very good, 2 weeks before it was good, and at time of sowing only fair, and therefore no better than the strike on the plot not treated with weedicide. It would appear therefore that we will obtain much better strikes of good species of grass and clover from expenditure on dalapon + ATA and at the same time reduce the incidence of the poor-producing danthonia and browntop.

FACIAL ECZEMA

Facial eczema is put down to stock eating grass which is growing at a fast rate in the autumn under high rainfall and high temperatures. It is therefore likely to follow autumn rains. Clovers are safe, but grasses and especially ryegrass are not. It was thought that if a check were given to the grass and particularly if increased clover growth followed, stock might be fed safely on the pasture and would not have to be shut up and fed on hay and mature crops. Often they are starved with a lowering effect on lambing percentages.

For the purpose dalapon, ATA, and CIPC were tried at varying rates. It was found that dalapon had to be applied on its own at about 2lb. to give much check to the grasses and improve the clovers. A rate of 1lb. was sometimes not effective enough and 3lb. was too severe. ATA was not as effective on the grasses and affected the clovers, and therefore does not appear to have a place. One trial was located on an area which had been infested with barley grass. Here the dalapon at 3lb. in one series in knocking back the permanent grass species permitted a greater establishment of barley grass seedlings. Dalapon does not therefore appear satisfactory for use in the autumn for dealing with barley grass.

CIPC was also effective at 2lb. in suppressing grasses and increasing the clover content of the sward. One pound was sometimes not effective enough, and the 4lb. rate was more effective than 2lb. in reducing grass growth and increasing clover growth.

The effect of these treatments has yet to be measured in terms of reduction of facial eczema in stock eating the treated pasture.

DISCUSSION

Q.—What is the maximum rate of dalapon to kill barley grass without hurting ryegrass?

A.—Last year 1lb. looked rather too severe. This year it looks like the right rate. Barley grass is such a serious weed that if it is around hedges and gates, apply enough dalapon to kill everything, then resow. If it is actually in the pasture, give lighter rates and repeat doses, one in late autumn and one in spring.

Q.—How long lasting in the soil is a 50 per cent. mixture of ATA and monuron?

A.—We have only had one trial with this mixture on tall fescue, applied last April. At present Dalapon is giving better results.

Q.—What is the tolerance of Indian doub (*Cynodon dactylon*) to dalapon?

A.—In August, which is the time you must spray it in lucerne stands, 5lb. of dalapon did not kill Indian doub. This rate might be effective in autumn spraying of Indian doub in pastures.

Q.—A farmer on sand country near Himitangi wants to know if he can direct drill lucerne into pasture by using dalapon and 2,4-D to kill the turf.

A.—I think it should be satisfactory to mix dalapon and 2,4,5-T.