PRACTICAL CONTROL OF GORSE

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I intend to deal with the problem on two classes of land.

Group 1: Land that can be handled with agricultural machinery.

Group 2: Hill country where gorse constitutes a major problem.

No. 1.

I feel this type of country should be handled if possible by either plough or giant discs with the object of establishing a good pasture, followed by good farming practice. Invariably, you will get a reinfestation of seedling gorse but this can be treated with the 2,4,5-T very economically, and after the expense of laying down a good pasture the farmer can't afford to allow any gorse to become re-established on the area. The best method of treatment is by spot spraying when the gorse is about a foot high, as it is easier to see, and yet not high enough to commence flowering. The most important area on this type of land is where you are unable to plough, i.e. such as river banks, and steep verges, and these are invariably the source of your reinfestation. If this is big gorse it should be first cut and burnt or just burnt depending largely on the area to treat, followed by an oversowing and topdressing programme. Regrowth from the large root stock should not be sprayed until at least 2 feet high and on no account should any further burning be carried out on the treated area, as you are baring the ground for seedlings to develop.

No. 2.

The hill country of course, presents a very different problem, but large areas of this type of country are being brought into production by the use of the 2,4,5-T spray. Many farmers quote this type of land as not being an economical proposition to treat in this manner, but I feel that they can't afford not to do something to check the spread. I will endeavour to give some idea of cost. 1,000 acres of land valued at £8 per acre, with a $\frac{1}{4}$ of the area infested with gorse, spraying costs are as follows: material £5.10. 0d.; application £1.10. 0d., making cost per acre £7, putting an overall cost on the land a little over 30/- per acre. Compared with any other method, such as cutting or grubbing, the cost would be more than trebled, with the ever repeating job, year after year. There are however some difficulties to overcome in applying the hormone to this type of land. One of the problems is transport of spray equipment and water. This can be done quite easily where tracks are available to the leading ridges, but if not, it is necessary to pack empty drums into the middle of the gorse in the autumn and allow them to fill during the winter in preparation for spring spraying. The drums should be carefully placed, and consideration must be given to the type of equipment. If a motorised pump is to be used, it is necessary to estimate how large an area 44 gallons will cover and then place the drums accordingly. I advise this type of equipment as it makes the work easier and quicker, which keeps down costs. The pumps can be carried by one man and using about a hundred feet of hose, with a hand wand attached, the operator can cover a fairly large area from each drum. But if the knapsack sprayer is being used the placing of the drums is not so important. In any large scale work I feel the knapsacks are far too slow, but where they can be of great use is for treating the odd bush on comparatively clear country.

The application is the most important part of this work and the spray must be applied carefully to insure a complete coverage over the bush. The rate of application is one gallon of 2,4,5-T to the acre, mixed with one hundred gallons of water, depending largely on the density of the area to be treated. If there is any difficulty in obtaining complete coverage using one hundred gallons to the acre, more water should be added, but on no account should you use less than one gallon of 2,4,5-T to the acre on this type of gorse.

Before any large scale work of this nature is commenced, I feel it would be very advisable to have the operator supervised by a specialist. If spraying is carried out correctly the kill is very high with one application. However, it is always necessary to go back over the area treated, to spray the odd bushes or parts missed. Time of application is not so important as

excellent results have been obtained from spraying at any time of the year, but I believe best results will be obtained between October and April as that is the growing period - the reaction is so much quicker and I think more effective.

This work has been so satisfactory over the past few years, that I feel that the gorse menace is no longer a bogey to the farmer. If he is prepared to adopt a long term programme and concentrate on a given area each year, he must first appreciate the fact that each bush sprayed is one less to seed his already clear country.

Careful planning of a campaign such as this is also important and consideration should be given to the correct type of spray equipment. The problem may be considered from two angles, a high pressure pump working from the bottom of the hill where water is easier to obtain, or a smaller unit working from the top or among the gorse. Both have proved quite satisfactory. The high pressure pump is capable of working efficiently, anything up to a hundred yards up hill, but some thought must be given to the handling of this length hose by even two men.

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DISCUSSION

MR. NEILL: I would like to know what nozzle Mr. Tuckett recommends.

MR. TUCKETT: For seedling gorse the 46 fan nozzle, but with higher pressures not less than a 59 fan nozzle.

MR. KERSLAKE: Could Mr. Tuckett give us his experience with plastic hose at high pressure please?

MR. TUCKETT: The plastic hose should not be worked over any length of time at more than 50 lbs. pressure.

MR. FIELD: In heavy gorse can you give us some idea how long it would take to spray?

MR. TUCKETT: 4 acres is not a large area for a man to spray in a day - that is in heavily infested country.

MR. ALLEN: Do you hold out any hope of getting any guides for showing where spraying has stopped?

MR. TUCKETT: There has been nothing very satisfactory, but we are hoping in the near future that we shall have something that can be used.

MR. BANFIELD: I have tried Titanium Oxide and that works extremely well on any plants with broad leaves. It works remarkably well on blackberry and gorse, and you can see where it has been applied.

MR. GORDON: I do not think that Titanium Oxide is easy to get as it is in short supply at present.

MR. WATKINS: I would like to speak about the addition of dyes to 2.4.5-T. It has been observed by American Research workers that many of the dye stuffs work in the opposite way to the hormones. I would strongly suggest that farmers first try very small patches when adding dye stuffs to spray mixtures.

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GENERAL DISCUSSION

MR. WATKINS: The question of volatility of hormone weedkillers has been raised. I think that volatility of the 2,4,5-T is not nearly so important as with the 2,4-D compound. The vapour pressure of the butyl ester of 2,4,5-T is lower than that of the butyl ester 2,4-D. Actually there are no non-volatile esters, they are all low volatiles

MR. LYNCH: With regard to the question of volatility I think it might be as well if I explained a little more the trial to which Mr. Matthews referred earlier on. The trial was carried out in hot dry weather and I have a feeling that under these conditions you do get a great deal of increased volatility, more than you would under cooler weather conditions. In dealing with plants like gorse I think one should endeavour to get anything that increases your efficiency of cover and, therefore, I would suggest that a volatile product has certain real advantages.

DR. YEATES: I should like to ask some of the manufacturers present what is the disadvantage, if any, in the cost of the volatile materials. Why should the non-volatile materials be made available unless the cost of the volatiles is considerably higher?

MR. NORRIE: Responding to the question just asked, I think that the volatile form commonly available and generally used would be less costly than the less volatile forms. I think the reason for the introduction of the less volatile forms was to reduce the possibility of vapour drift particularly when spraying near very susceptible crops. Perhaps on a lot of gorse work volatile forms could be used.

MR. GORDON: We are very interested in the efficiency of volatile products and we know the hazards of volatile materials. I quite agree with the point made by Professor Peren that some men are good sprayers whereas others are likely to miss and we feel that having a volatile product overcomes inexperience in wetting for I do think it is difficult to get 100 per cent coverage.

MR. BECKETT: It may be of interest to give the views of a commercial firm which is very interested in the question of volatility. We have one patch of gorse only on the East Coast - the gorse is surrounded by Maori kumera crops. We found that in the hot westerly weather volatiles caused no trouble, but at the same time having seen what damage can be done for over a quarter of a mile from a reasonably small spraying area, I am convinced that in such a position you are better to stick to non-volatile materials.

MR. MATTHEWS: I think there is a place for both products.

MR. BARRAUD: I would like to agree with the last speaker and would take this opportunity of reverting back to Dr. Yeates' paper and the question of coverage which was also emphasised by Professor Peren. Whether volatile or non-volatile forms are used, you must get complete coverage of gorse.

MR. BLACK: With regard to the question of dyes. I remember at a previous conference that Mr. Robinson said he used permanganate of potash as a dye. Can he tell us any more about that?

MR. ROBINSON: I first started using the permanganate of potash because it was the only thing I could find after using many dyes that would mix. It is still not very satisfactory because you cannot see until you are about 25 yards away from the line.

MR. ALLEN: I should like to ask if any effects have been noticed with regard to the effects of aspect in the control of gorse?

DR. YEATES: I do not think that on the area we treated there was any noticeable difference so far as aspect was concerned. It happened that in one place a good clearance of gorse was on the sunny aspect, but further down the valley there is no difference that I can see. If anything there is slightly more regrowth on the more sunny side, but not a great deal.

MR. GORDON: Is it considered advisable to treat gorse, in particular, by aerial application owing to the difficulty of securing satisfactory coverage.

MR. ROBINSON: I cannot see how a 'plane could carry the amount of water required for the operation. Possibly something might be done with helicopters where you could get a better distribution of the spray due to the downward draught created by the props overhead.

MR. ADAMS: I have obtained quite good kills spraying with 30 galls. per acre and I would like to give these results. They cover 4 different types of materials each at 1 gall. per acre:-

Series sprayed 23rd August 1950 - Results as at 24th May 1951.

1	gall.	Butoxy-Ethanol Ester 2.4.5-T	-	Gorse killed 80%.
1	"	" " " " " "	-	" " " "
		and 2.4-D	-	" " 10%.
1	"	Mixed Esters 2.4.5-T and 2.4-D	-	" " 65%.
1	"	Butyl and Ethyl Esters 2.4.5-T	-	" " 95%.

These were all applied in 30 galls. of water using a small type of atomiser. Large scale spraying was also done with a boom in Wainui district. The area consisted of 31 acres and the gorse ranged up to 4 ft. in height. The farmer is well satisfied with the results. He sprayed 31 acres with 2.4.5-T at one-third galls. per acre plus 60 galls. water at a cost of £85 which included the Contractor's charges and own labour. On a per acre basis allowing 10/- for cost of application this would result in a total cost per acre of approximately £3. 5. Od.

MR. SKINNER: With reference to the question of quantities of fluid per acre, I think an important point which should be stressed is that the quantities of fluid required to give a kill in the Auckland Province are very different from the quantities required to give a kill in other districts. In our areas we have found that a total application of around 300 galls. per acre gives a good kill.

MR. MADDEN: With regard to the question of distributing these sprays from aircraft, the aim has not been to kill completely all the gorse, but to kill some of the gorse so that a good fire can be put over the area.

MR. WATKINS: In Texas with applications of between 50 galls. to 250 galls. of water with $3\frac{1}{2}$ lbs. to 4 lbs. of 2.4.5-T, the results were variable with the best control obtained with the higher quantities. The research workers in Texas have not been able to definitely prove why control was better, but they suggested that it is not so vital to get a good coverage as an even coverage.

MR. MITCHELL: I would like to ask if there is anything known of the use of dyes?

MR. GORDON: Our people in England have tested out various colours and have not been successful in finding any colour out of a range of 3,000 dye stuffs except Titanium Oxide which is white. None of the ordinary dyes have been successfully used.

MR. GIDALL: I would like to ask Mr. Skinner whether he uses volatile or non-volatile with these large quantities of water?

MR. SKINNER: We use non-volatile materials, but speaking as a Contractor from an area where we are not greatly worried by volatility, the volatile form of 2.4.5-T, I am quite sure, would be of inestimable value to us in dealing with gorse in our districts in the South Island.

MR. GIDALL: Personally, I think there are great possibilities in spraying that type of gorse with low concentrations of 2.4.5-T and a high volume of water. I have personally had experience of that method in Southland and there are one or two on Banks Peninsula who spray with low concentrations using high pressure booms and orchard nozzles. It is not to get a definite kill, but a sufficient kill so that the gorse can be burnt.

MR. OWENS: There is quite a time lag before a farmer knows whether he has a kill or not.

MR. BRODIE: That would depend entirely on the farmer's experience with hormones.

QUESTION: I would like some idea of the maximum time. Can the gorse be killed eventually and yet live for a period up to say, 6 months?

MR. TUCKETT: I have seen gorse lasting as long as 6 months. That has been caused by the gorse bush being in a dormant stage when sprayed and in the spring or summer it immediately starts up a reaction that is necessary to kill the plant off.

MR. SKINNER: With reference to the question of spraying in the winter months, I have seen gorse sprayed when covered with frost crystals in mid-winter and that gorse showed no visible sign of any reaction for about 7 months, apart from a dulling of the foliage. The kill in that area was every bit as good as if it had been done in the hot months.

MR. MATTHEWS: May I ask if the gorse flowers after it has been sprayed?

MR. NEILL: Spraying will prevent gorse flowering that year.

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