WEED CONTROL IN GRASS-SEED CROPS IN HAWKES BAY

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In dealing with this subject I have endeavoured to cover the general situation, types of weeds found, times of spraying, quantities used, etc.

It is generally acknowledged that weeds are on the increase. Many theories are advanced as to the reason for this, but the fact remains that they are prevalent enough to be a menace and some form of control is necessary. Weeds are specially prominent in young pastures and as these are usually saved for seed because of their high Rye yield this infestation is a serious matter.

The old method of weed eradication was the summer fallow but modern science has produced the hormone sprays. Their efficiency has been proved and the Department of Agriculture estimates that 70 per cent of young grass crops saved for seed in the Hastings district are now sprayed.

The most troublesome weeds in Hawkes Bay in order of importance are as follows:-

WINGED THISTLE: A profuse seeding variety, capable of forming a dense thicket four feet high that sheep will not penetrate. This weed responds well to spraying and can be killed with small quantities of 2,4-D conc. 100% kill can be achieved with as little as half-pint per acre if sprayed at the right time, i.e. when the plant is still flat on the ground in the rosette stage.

SCOTCH THISTLE: Found on the richer, heavier country and likely to be troublesome in young grass. Slightly more resistant to spray than Winged but can be killed with $\frac{1}{2}$ to $\frac{3}{4}$ pint of 39 per cent 2,4-D concentrate.

SHEPHERDS PURSE: A short lived annual with a taproot and flat rosette of serrated edge leaves. A flowering stem of six to twelve inches long. Seed pods look like the shepherds wallet of olden days. $\frac{1}{2}$ to $\frac{3}{4}$ pint is effective against this.

HEDGE MUSTARD: Often called wild mustard and looks like wild turnip except that the turnip flowers are three to four times bigger than the mustard. $\frac{1}{2}$ to $\frac{3}{4}$ pint for this also.

DOVESFOOT, WILD OR SOFT (GERANIUM): Flowers are $\frac{1}{2}$ " in diameter and pale purple in colour. This with Crowsfoot and Celery leafed Buttercup are more resistant and require 1 to 1 $\frac{1}{2}$ pints per acre.

BARLEY GRASS AND GOOSE GRASS: Have proved very troublesome to grass-seeders, particularly in the older pastures. I have yet to learn of a spray that will effectively control these two weeds and not affect the Ryegrass.

CHICKWEED: With the less prevalent Mouse-eared Chickweed is a sprawling annual with tender stems like thin string. Flowers are small, white and clustered. It flourishes in the richer better worked soils. These weeds are very resistant, the Mouse-eared particularly so, and no great result has been achieved in spraying.

AMARANTHUS RETROFLEXUS, REDROOT, REDSHANK OR PIGWEED: Its most characteristic mark is a long fleshy red taproot, fringed with pink or white rootlets. Stem up to 3 ft. stout and green. Small flowers crowded in a bristly green spike. A pint and a half is necessary for an effective spray.

DOCKS: Are troublesome in the heavier, richer Hawkes Bay soils. These are too well known to need description. Unless treated in the small seedling stage they are tough customers. I have sprayed old man docks with 2 $\frac{1}{2}$ pints and done no more than wither the leaves.

BURR CLOVER: This can over-run a Ryegrass crop in the heavier lands to such an extent that it is not worth harvesting. $\frac{3}{4}$ to 1 pint will knock this weed back sufficiently to enable the Rye to be harvested.

SPEEDWELL: Is an annual with trailing stems about 6 ins. long. It has heart-shaped leaves coarsely toothed and flowers of pale blue. It is more or less resistant but 2 pints or more effects a control.

FATHEN: Probably needs no introduction. More about this weed later.

CALIFORNIAN THISTLE: I have not had a great deal of experience with this thistle although a large area was sprayed with 3 pints with very gratifying results. I have controlled Californian thistle in wheat with 1 pint.

STINGING NETTLE: Grows under trees and in heavily stocked areas. Commands respect for its ability to sting. Not troublesome in Ryegrass. $\frac{3}{4}$ to 1 pint gives effective control.

PLANTAIN: Has a rosette of leaves with flower stalk coming up from the centre. $\frac{3}{4}$ pint should be effective although I have had a failure with $2\frac{1}{2}$ pints during the summer.

SUCKLING and CLUSTER CLOVER: These flourish more on lighter poorer land, or paddocks sown with inferior seed. 1 to $1\frac{1}{2}$ pints per acre, particularly if the clover is very troublesome.

In examining a Ryegrass pasture it is difficult to estimate the strength of spray to be used. A rough guide is whether the main weeds are susceptible or resistant. When in doubt err on the generous side.

The usual method is to apply the hormone approximately one week after the stock have been removed, the paddock having been grazed bare, prior to closing for seed. By waiting one week the weeds have time to lift and are more easily sprayed.

A second method is to graze hard up to the first week in October, remove stock and then spray. A week or ten days later replace stock and they will eat all the withered weeds as well as the grass. They should be kept on the area until the usual closing time, i.e. end of October.

The third and probably the most efficient method is to remove stock for a short period in early spring, late August or early September, and then spray using only half quantity of hormone, from $\frac{1}{4}$ to $\frac{1}{2}$ pint per acre. When weeds are so very young it takes very little to kill them. When possible, it is an advantage to spray on dull days, particularly in the early morning while the dew is still on the grass. I am not advocating dull day spraying only, but it is more effective. Growers were quick to recognise the advantages of spraying their grass-seed paddocks, as they found crops easier to harvest as there were no weeds to go through the mill. Anyone who has had to clear a mill that is blocked with thistles will appreciate this. Crops were found to ripen more evenly and more quickly without the hindrance of weeds. In some cases they found crops could be harvested that would otherwise have been a write-off because of the amount of Burr Clover, Cluster Clover and other smothering weeds present.

One farmer in the Onga Onga district told me that in a paddock of lightish land he estimated that his seed yield had doubled because the Haresfoot trefoil had been so severely checked. This was sprayed with 1 pint of water based 2,4-D concentrate because of the Sub. Clover present.

On another paddock of heavier land that had received $1\frac{1}{2}$ pints of conc., we measured the yield from a half acre strip and compared it with the yield from a similar area alongside unsprayed. The test showed 25 per cent more from the sprayed area.

Another important economic aspect is the possibility of baling the threshed straw if it is clean. Most farmers like to remove this after the mill has been through. I have seen residue that would have made excellent threshed hay left unbaled and fouling paddock because it contained 10 per cent of Scotch thistles. The saving does not end there either, for a clean sample of seed costs less to dress. Having less rubbish in it the cleaning process is easier.

Each year in Hawkes Bay alone there are approximately 20,000 sacks of rubbish, straw and weed seed dumped from the seed dressing stations.

Surely this terrific total can be reduced starting from the growers end.

Another disadvantage of a dirty crop is the danger of spreading weeds. When a crop is cut and left to ripen grass and weeds ripen together. If the weeds are screened and blown out of the mill they can be spread in a thin layer over a large area.

The cost of spraying varies from 10/- or 12/- per acre to 25/- or 30/-, so the increase in yield does not have to be very great to cover this expense.

In the early stages many farmers were somewhat worried about the possible effect of hormones on the actual seed, but it has been proved beyond any measure of doubt that they have absolutely no effect at all. Our knowledge of the effect of hormones on weed seeds though, leaves much to be desired. It has been suggested that the seeds of affected plants are left sterile. I recommend to any of you who have the chance to experiment with plants such as winged thistle or Scotch thistle, fathen, docks etc., to try spraying a plant or two in the seeding stage and comparing the germination of the seed with that of some unsprayed plants from the same area.

Of the other cash crops grown in Hawkes Bay, cereals and clover and peas are the most important.

In cereals we are troubled with fathen, black nightshade and Californian thistle. The two former do not offer much resistance to chemical weedkillers. In fact on some trials carried out on our own place 100 per cent kill was effected using only $\frac{1}{2}$ pint of oil based 2,4-D conc. I feel sure that sprayed at the right time $\frac{1}{2}$ pint would be sufficient to kill these two weeds in cereal crops, thus reducing the cost of the materials to about 4/-. Californian thistles are a tougher customer, but fortunately in cereal crops these do not need to be killed, as control of the weed is sufficient to allow harvesting operations to be carried out smoothly.

Here again clean straw, freed particularly from thistles, is often saleable. Cereals must be sprayed before there is any sign of the head forming or it is liable to affect the grain. It has been proved however that any deformed seed does not pass the deformity on to the next generation.

CLOVERS: These are tricky. Fortunately white clover appears to be the most resistant of the species, but even a liberal application will knock growth back considerably. Suckling, cluster and trefoil can be almost completely controlled by judicious spraying. Some farmers in our district swear by the use of 2,4-D to wipe out suckling and other weed clover, if only temporarily from their rye and clover crops.

Subterranean clover must be handled carefully. This is rather a sensitive point with me as some time ago I wiped out an entire crop of sub. clover that was being saved for seed, by spraying with only $\frac{1}{2}$ pint of oil based spray. This just shows how careful one must be to know the facts before dealing with this and other sensitive crops.

PEAS: Fathen and black nightshade, as in cereals, are the biggest pests and the same treatment applies, except that they should be sprayed with a Dinitro chemical.

For those interested the equipment I use is a standard Lo Vol outfit fitted to a rubber tyred tractor, on which has been mounted a 44 gal. drum. It has a $\frac{1}{2}$ in. centrifugal pump to pump the liquid from the drum through the nozzles on the boom. The 12 ft. articulated boom has 11 nozzles. Its non-rigid ends are useful as they can be lifted for transport through gateways, and they also swing back against the pressure of a spring when striking any obstruction.

En route from drum to nozzles the liquid passes through a foot strainer on the end of the suction hose, through a pressure gauge incorporated in the pump, then through another strainer and a water meter to the boom. The water meter registers accurately to a gallon the amount of mixture used. This is particularly useful in contract work because with accurate driving you can tell in an instant exactly how many acres have been covered, because working with a set pressure, and travelling at a set speed, a constant amount

of mixture is used per acre. The strainers are important for obvious reasons as the nozzles are but 32/1000 inch and do not take much blocking.

To lift the water out into the drum I have fitted a 1½ in. geared pump driven by the P.T.O. which will fill the 44 gal. drum in five minutes. I have found this outfit very convenient, very versatile, and very effective. Water is usually drawn from dams, creeks, or troughs, but must be fairly clean. A couple of items of interest taken from the last two years show that the year before last every farmer who had spraying done in our district, either came back for more or else bought an outfit of his own and, secondly, that last year everyone that had paddocks sprayed, with perhaps one exception, was recognised in his area as being a good farmer. This could be just coincidence but I think it shows that the good farmers are the ones that appreciate the value and economy of killing weeds with hormone sprays.

In conclusion may I summarise with these points. When spraying ryegrass crops spray early, and preferably a week after they have been shut up.

Spray wisely! Know the weeds you are trying to kill and use the 2,4-D accordingly.

Try and spray with the dew on the ground and on a calm day, but above all be careful! You should not need to follow up your good intention of let us spray, with let us pray.

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GENERAL DISCUSSION

MR. BLACK: Mr. Lynch said something to the effect that about 30 per cent of weed was virtually eliminated by spray and yet the production measure was less on the sprayed than the unsprayed portion.

MR. LYNCH: Over a reasonably long period I would say that you can take the production figures I have given you as pretty right.

MR. GARDINER: How much water did you use when spraying $\frac{1}{2}$ pint to acre?

MR. BURGESS: A total of 10 to 12 galls.

MR. SAXBY: It is disappointing to hear that Mr. Burgess has had no results with regard to surface sowing and I should like to know whether Mr. Burgess' observations were frequent enough. Did the seeds fail to germinate or germinate and subsequently die?

MR. BURGESS: It is possible that our inspections were not frequent enough. However, I am by no means satisfied with the results of this trial. I do not say that surface sowing under all circumstances is not successful in some degree. As far as I am concerned we shall have to put down more trials and have more accurate and frequent inspections of the area to try and find out more accurately what does happen. My impression is that the grasses and clover failed to establish.

MR. IVERSON: I was also disappointed to hear the results Mr. Burgess has given us for over-sowing, but not unduly surprised. We have had over the last three years considerable success with over-sowing white clover on pastures that have been eaten out.

MR. GIDALL: I would like to ask Mr. Tilley if he has had any experience with Nodding Thistle. In Canterbury this thistle is a problem.

MR. TILLEY: Unfortunately, I have not had any experience at all with Nodding Thistle. A farmer in our district has it and he has sprayed and agrees that it is a tough customer.

MR. HAMBLYN: In studying the data available to me of the grass seed crops and clover crops in Hawkes Bay, I have noticed a remarkable decline in the percentage of machine dressing loss. The second question is in regard to clover. I would like to know if the spray has had an adverse effect on white clover?

MR. TILLEY: In reply to your first question, I feel confident that this decrease in the amount of dressed out rubbish is due entirely to spraying. As regards the second question about clover - in our particular district we find it very difficult to harvest good crops of white clover.

MR. WARD: We have done some limited studies in regard to the fertility of sprayed plants and I am not prepared to state when you can spray a winged thistle plant and ensure that no seed has set. My own view is that if the flower has withered, changed its colour and the seed is normal looking, then that seed will germinate normally. On the other hand you will have caught up on many of the flowers that have not seeded.

MR. TILLEY: I agree with you entirely in that the recommendation for spraying should be made to spray when the plants are young.

MR. BANFIELD: From my experience it is very important indeed to spray as early as possible in the spring following the germination of weed seeds in the spring. If you wait until Christmas time many of these weeds have already done their damage at a time of year when growth is not very vigorous. Where the spraying is carried out as early as possible you go right through the spring and the pastures are so well closed up there is very little infestation the following autumn.

MR. GARDINER: I would like to ask Mr. Tilley when, in his opinion, is the best time to spray pasture for flat weed control; is it in the autumn or spring? I think that by spraying in the autumn you kill the weed and you leave an area on which grass grows during the winter. That is what we have found.

MR. TILLEY: In reply to that question, I think it is very hard to say definitely autumn or spring. There are so many other factors that come into it; the district, the amount of rainfall and the type of pasture. In Hawkes Bay it can be very, very dry in the summer and we get practically no growth in the autumn. We have found that the spring spraying has covered all our needs. In your own districts it could be different and I think spraying should be done to suit the particular district, rainfall and land.

MR. KERSLAKE: When spraying grass seed crops in which there are Ryegrass, Suckling Clover and White Clover, we have noticed a check in the growth of White Clover. Where possible farmers try and save the Ryegrass and White Clover, but we find it hard to do both jobs well. Some people take an early crop of hay off a paddock that they are saving for Clover. If you do that in a Ryegrass paddock, spraying White Clover will definitely check the growth, but as to the amount of seed or the result of the yield I do not think there is a great deal of difference, it just knocks it back and retards its growth for about a fortnight or three weeks, but it would no doubt seed later than it would do normally.

MR. LOVATI: I explained last year that the Railways Department has a very heavy weeding problem; we spend something like a quarter of a million pounds per annum. Our first problem is, of course, the track. As regards adjoining lands there is one very simple answer to that - any farmer who points out the condition of the land adjoining his property may make application to the Civil Engineer and the weeding problem is entirely the farmer's responsibility. In a lot of cases the farmer's property is just as bad. We clear our property and over the fence the farmer's land is just as bad as our property was before we cleared it. We co-operate with the Agriculture Department and have supplied our districts with the chemicals necessary, 2,4,5-T and 2,4-D, together with the necessary implements for their use. Just how far we can go with this depends a lot upon the available manpower. We cannot undertake to remove a man from the track to weed adjoining land, but it is our intention to do all we can.

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