SURFACE SOWING TRIAL - NORTH TARANAKI

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Taranaki pastures are notoriously weedy and the use of a cheap weedkiller to control these weeds would therefore appear to be the answer to the Taranaki dairy-maiden's prayer. In this paper I will describe an experiment designed to show the effect of weed spraying as a preliminary to surface sowing of pastures.

First let us briefly look at the weeds normally encountered in dairy pastures in Taranaki. Ragwort and Californian thistle are both common and are both difficult to control without chemicals. Hormones are being used successfully against both and I believe that hormones are cheaper and more effective than sodium chlorate. Docks are also troublesome especially on high fertility land, but they are very difficult to control. The new hormone weedicide claimed by the Americans to be successful in dock control may be the answer, although results to date in the two trials recently established have not been encouraging.

Weeds of the river flats in the north and east of the Province, viz. pennyroyal and buttercup reduce the production of this land very considerably. They can to a large extent be kept in check by preventing the pastures becoming pugged in wet weather and they can also be controlled, temporarily at least, by applications of a hormone weedkiller in the spring.

The weeds which are probably responsible for the largest decrease in production from our permanent pastures however, are those generally grouped together and called "flatweeds". The main weeds in this group are ribgrass or plantain (*Plantago lanceolata*), catsear (*Hypochaeris* spp.), hawkbit (*Leontodon hispidus*), hawksbeard (*Crepis capillaris*), and field daisy (*Bellis perennis*). In some old, run-out pastures such weeds occupy seventy to eighty per cent of the ground cover and quite often up to thirty per cent of the cover is flatweeds.

One of the commonly accepted methods of renovation of these weedy, run-out pastures has been severe harrowing and surface sowing. To get some information on the effect of killing the weeds in the pasture when the seed was sown, a trial was laid down at Egnont Village (between New Plymouth and Inglewood) in March, 1950. The paddock was a poor one with about forty per cent of flatweeds. One half of the paddock was sprayed with one and half pints of "Weedone 57" per acre and the other half left unsprayed. Across the other way, one half was given a heavy harrowing with Bevin harrows and the other half left unharrowed. Seed was surface sown in strips right across the paddock on both harrowed and unharrowed areas, so that all combinations of surface sowing, harrowing and weed spraying were included.

The effect of spraying was soon evident. Flatweeds were almost eliminated from the sward within about three months and white clover was reduced by about fifty per cent at the same time, but the growth of grass was much more vigorous and ryegrass had increased slightly in quantity. In September 1950 (i.e. six months after treatment) the paddock was inspected after it had been closed up for three weeks. The whole of the sprayed area was covered with a vigorous, though patchy growth up to three to four inches, while there was practically no growth on the unsprayed area.

The paddock was closed for hay in early October and cut on 4th January 1951. The crop generally was very poor, being stalky and containing little clover. The hay from the sprayed half of the paddock contained very little weed compared with that from the unsprayed area and was much more leafy. Samples of hay were taken from equivalent parts of the sprayed and unsprayed areas. The sample from the unsprayed plot which had been top-dressed with 4 cwt. serpentine super plus 1 cwt. potash, contained 29.8% of weeds while the sample from the sprayed plot, similarly topdressed contained only 2.3%.

Following the cutting of hay, normal grazing with a regular two to three weeks spell was continued until the beginning of June when the paddock

was closed up for spring feed. At the last inspection made last week there was a much more dense, even and vigorous growth on the sprayed area which contained more ryegrass and less of the poorer grasses such as sweet vernal and brown-top. There was quite a considerable reduction in white clover after spraying and although it has recovered considerably, especially where topdressed with phosphate and potash, there is still less on this plot than on the unsprayed area.

The other most interesting feature of this experiment is that there was practically no improvement brought about by surface sowing of any species on either the sprayed or unsprayed areas. Perennial ryegrass, short rotation ryegrass, cocksfoot, crested dogtail, red clover, white clover, subterranean clover and lotus major were all sown. Topdressing applied when the seed was sown was, as mentioned earlier, 4 cwt. serpentine super plus 1 cwt. potash per acre, and pasture management has been good since the trial was commenced, so that the failure of the sown species to establish, is difficult to explain.

The poor results from surface sowing even where accompanied by heavy topdressing, harrowing and spraying, leads one to ask just how effective surface sowing is in general. I have seen so many examples of poor results that I personally think that on those farms where really good results have been claimed, much of the credit can be given to the improved fertility built up by topdressing and better grazing management which have accompanied the surface sowing.

I believe that the best results from surface sowing are got from sowing seed in late July or August on paddocks which have been fed out on during the winter. Harrowing, rolling and sowing the seed and finally rolling, both evens up the surface of the ground again and produces a good seed bed for young grass to establish.

Harrowing did not in itself improve the sward, nor did it have any appreciable effect on the establishment of surface sown species.

There are several interesting features of the trial. The first is that with the dying out of the weeds there was an appreciable increase in ryegrass and in the vigour of the pasture in spite of a reduction in clover. Some consider that the extra vigour is due to the effect of extra humus supplied by the rotting roots of the weeds, while it may be due to reduced competition for the available food supply.

Although a dressing of 4 cwt. of phosphate plus 1 cwt. of potash on untreated pasture did considerably increase the clover in the sward and its vigour, the improvement brought about so far has not been as spectacular as where the pasture was sprayed with weedkiller. The response to fertilisers on the unsprayed pasture has not been nearly as great as had been expected from results of topdressing trials carried out previously and I am not convinced that the results obtained in this trial can be taken as an absolute standard, even for this soil type. It is significant that the owner has since considered ploughing the paddock up as the improvement even from spraying and surface sowing and topdressing was too slow.

An important fact is that on this particular farm, every paddock was poor and weedy when the present owner took over a few seasons ago. He is adopting a plan of ploughing and resowing the poorest pastures, ample topdressing with phosphate and potash and close subdivision (including the use of the electric fence) making regular rotational grazing possible. Under these circumstances spraying those pastures which cannot be ploughed for a few years is probably a sound policy.

However, I have inspected pastures on many farms where the weeds have been killed, but where the grass is so poor that it still produced only a small proportion of what it could produce if ploughed and sown in good pasture.

On many of these farms pastures have deteriorated through bad management and lack of fertiliser. After spraying, the weeds very quickly return, unless the management is improved and the fertility built up.

What recommendations, then, can one make from these results.

1. The first is that a hormone weedkiller applied low volume will almost eliminate flatweeds in a pasture. The owner of the farm on which the trial was conducted, and who is also a contractor, considers that two applications each of $\frac{3}{4}$ pint of the material used are more satisfactory than one application of $1\frac{1}{2}$ pints. His reasons for this are:-

- (a) that with two applications, say in spring and autumn, seedlings and regrowth plants are killed by the second spraying and there is better permanent control.
- (b) that the lighter application does not affect the clover and therefore the pasture does not get any check to growth. He considers that as low as half pint per acre may be satisfactory if the paddock is grazed short when sprayed.

2. That harrowing in the autumn does not in itself have any great beneficial effect on poor pastures.

3. That surface sowing even when accompanied with killing of flatweeds and harrowing is not a certain method of pasture improvement.

4. That ploughing and resowing in good grasses and clovers is far the most valuable method of pasture improvement.

There is a real danger that many farmers will be carried away by the spectacular results of the weed-killing and will lose sight of the fact that their pastures are producing much less than they should because of the poor grasses in them. For that reason I would not recommend this practice unless it is part of a comprehensive scheme of pasture improvement and is accompanied by ample topdressing and good grazing management.

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