VARIEGATED THISTLE CONTROL

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The farm referred to in this paper consists of 1060 acres of hilly country between Wanganui and Hunterville. The elevation ranges between 250 and 950 feet above sea level. The hillsides are steep and subject to slipping. There are considerable areas of easy country, mostly on ridge tops and elevated places; most of the sheep camps are on elevated country. Most of the easy country and particularly the sheep-camping areas grow variegated thistles if not controlled. Owing to the general topography and difficult features, vehicles are not used and transport is by saddle horse or pack horse, and latterly by aeroplane. About 100 acres are taken up with patches of bush.

Stock wintered are 230 polled Angus cattle and 2300 sheep of which about 1250 are breeding ewes.

I want to say at the outset that what I am talking about does not purport to be the complete eradication of variegated thistle. Where the growth of thistle has been extensive and of long duration there are large quantities of seed in the ground. Plants come up from this seed when the surface of the pasture is broken. Their complete destruction means manual or mechanical labour which I am not discussing.

What I propose to talk about is the reduction in the amount of thistle to a stage where there are only scattered thistles or scattered patches of thistles. The bulk of my farm is now in that condition and the rest is clear. A few years ago, in the summer there were wastes of variegated thistles concealing the grass and aggregating probably 15% to 20% of the farm area. Thistle took the best of the good easy country where there was any depth of loamy soil. The sides of the hills and ridges were left in grass.

The methods used to control variegated thistle have been the use of suitable grazing management combined with a search for suitable pasture plants which can successfully compete with and subdue the luxuriant growth of thistle. Smaller paddocks have been entirely cleared by cutting. Lately some hormone weedkillers have been used.

Take grazing management first. The great bulk of the North Island hill country has been brought into production by the use of fire and hoof and tooth, by extensive rather than intensive methods. Hoof and tooth have not lost their vigour. The problem is to use them against variegated thistle in the best way at the best time and without harm to the stock employed.

Many, perhaps most, farmers familiar with variegated thistle would say that stock don't eat it unless it has been cut and has wilted. That may be so under normal grazing conditions yet a few variegated thistle plants even in the hard spiny flowering stage will be eaten right down to the stump by sheep in a shearing holding paddock. Why? Obviously because the sheep were hungry and because there were a lot of them.

To make stock effectively control variegated thistle in hill country pastures:

(1) There must be a lot of stock.

(2) They must be hungry.

(3) The stock must be there at the time when the thistles are most vulnerable to assault.

I find I can provide these conditions by rotational grazing. When the paddock is spelled, the prickly leaves of the young thistle plants are lifted up from their horizontal position by the growth of grass into something approaching a vertical position. Stock do not eat a hard flat rosette shaped thistle, clinging hard to the ground with its spikes upward, but when the same leaves are lifted upright by the growth of grass, stock will eat a lot of them. Because the paddock has been spelled, it will carry a lot of stock, so I put in all the sheep on the farm that are suitable for the purpose. I may get a concentration of ten sheep to the acre on an average-sized paddock

of a hundred and fifty acres. Because there are a lot of sheep in the paddock, they soon get hungry. Even in the first few days when the feed is good they will eat quite a lot of thistle and other stuff for variety - provided there are a lot of sheep. As they clean up the best of the feed and start to get hungry they eat a lot more thistle and other not very palatable feed such as old Yorkshire Fog. At this stage they still do not eat the flat-growing thistles clinging to the ground where the grass is habitually short, but they will go down the steep hill faces and nip back young manuka and gorse shoots, especially in winter. I let them stay hungry for a day or two. It does not seem to do them any harm. Then they go on to very good feed in another paddock that has been spelling and repeat the process.

I don't know which is the best time of the year for the job. I feel it should be in the autumn when the thistle leaves are young and tender and only just beginning to get prickly, and there is a strong growth of grass keeping the leaves upright. In practice, though, I do not think the autumn results are much better than the winter. One trouble about the autumn is that once vigorous growth starts, the stock do not seem to get a paddock bare enough quickly enough. On a farm such as I am describing, carrying mostly breeding ewes and hoggets, the two paramount objectives of grazing management in the autumn must be to get the ewes well in lamb and to keep the lambs or hoggets thriving without a check as long as possible. I find my hoggets need to be spread out as much as possible, so they can be ruled out for thistle control. The same applies to two-tooth wethers being fattened for butchers in the winter, though I sometimes run them with the main mob of ewes for a time. That only leaves me the breeding ewes, and with vigorous autumn growth I find it takes them to long to get a paddock really bare enough for all the young thistles to be eaten. If the two-tooth ewes are running with the old ewes, they, the two-tooths, are even more susceptible to a check at tupping time and it is even more important not to leave the mob too long in a paddock. From early May, through on until lambing, the ewes do not seem to be worried by going hungry for a day or two, and although the thistles are harder, quite good results are obtained. My country is not suitable for rotating mobs of sheep once lambing gets well under way, and from then on the thistles get away and flower except on the areas where they are cut or sprayed.

Another factor that has to be taken into account in judging the hardness or intensity of autumn grazing is the effect on the establishment of clovers. I sow quite a lot of clover either on established pasture with manure or on scrub burns, and I think that hard grazing is detrimental to its establishment.

I think a point of importance to be stressed is that where you give heavy mob-stocking followed by a complete spell, you get growth even in mid-winter - at any rate in the Wanganui hill country. The thistles nearly always grow in good soil on the easy country where stock congregate. The heavy mob-stocking gives heavy manuring and if you can get and keep grass there, you get winter growth. About the latter end of June this year we had fourteen hard frosts in succession. The stream in a shady place near my house was frozen completely across and still we had growth in the spelled paddocks.

To sum up the grazing part:-

I find I can provide a mob of from nine hundred to fifteen hundred grown sheep. In my paddocks that means a density of from six to ten sheep to the acre for control of thistles by rotational grazing. They are generally in a paddock for a week or ten days. If the mob is down to about nine hundred they may be longer. From the point of view of pasture production and doing the sheep well they should probably be moved sooner than I move them; from the point of view of eating thistles they should stay in a paddock longer.

Earlier in this paper I referred to the use of a suitable pasture plant which could compete with and subdue variegated thistles on what has become the thistles' own ground. We would like this plant to be one of the conventional pasture plants. But suppose the plant having these qualities turns out to be one that we neither wanted nor expected. Should we discard its use on that account, because Nature provided the implement to her own design instead of to our design? I say "No! Provided that the intruding plant is palatable and harmless to stock and confines the intrusion to the

areas where variegated thistle is bad".

During the course of years I have tried to establish on thistle areas most of the usual pasture grasses and clovers. I have also tried other less common ones including paspalum, Indian Doob, Kikuyu grass and Agropyron repens - these four both by seed and by transplanting turf. I have also tried (from seed) speargrass, brown-top, Bromus sterilis and other grasses whose names I have either forgotten or have never known.

The one grass that has to date proved able to compete successfully with vigorous variegated thistle, is wild barley grass. I noticed it first about five years ago. It came as a volunteer in a patch of what had been five-foot-high thistles near a tree. There was this patch of thick, vigorous looking, grass sward about ten feet across with only an odd rather backward-looking thistle or two in it. That would be about June or July. That patch remained virtually free from variegated thistles during the following summer while they flourised all round it

I collected seed from there and sowed a few other small areas in ground that was left bare as patches of dense variegated thistles died down in the summer. The sowings were only in small patches such as could be covered by a few handfuls of seed heads. Some grew, some did not. Where a few plants grew and seeded there would be in the following summer (that is two years from the first sowing) quite a big patch of strong grass sward with barley grass dominant and only scattered thistles.

The fact that thistles are still growing there may make the experiment seem unimpressive to one who has visions of a field with variegated thistles completely exterminated, but the change is tremendously important to a hill country grazier.

To appreciate fully the significance of the change one wants to see a neighbouring area of some chains across, completely covered with thistles five or six feet high and impenetrable to animals or to a man whether on foot or on horseback. The only way to get through such areas or to get stock out through them is to cut a track, a slow and literally a painful business.

There is not much grass left alive under dense thistles like that - generally only weak plants of Yorkshire Fog. I have tried to re-establish grass as the thistles die off in January/February by sowing on the bare ground seed of mixtures on hand, mixtures of which rye-grass has been the principal ingredient. The sowings of the conventional grass seeds have never succeeded. This has no doubt been partly on account of the competition by young thistles but I think also because the soil conditions that suit a prolific growth of variegated thistle do not suit our usual pasture grasses. These special soil conditions seem to suit the barley grass but only for a year or two. It dies out then, but instead of leaving bare ground or complete cover of thistles, it leaves a sole of grass which by that time seems to find the soil conditions changed and quite congenial. I have found that as barley grass goes out, it is replaced by perennial rye, Poa annua, white clover, a little Yorkshire Fog and some of the creeping grasses.

The amount of thistle varies from season to season and it is generally worse after dry weather has opened up the turf. I am not prepared to give a definite opinion as to whether the breaking of the turf by cattle results in a reappearance of thistles, but I think it does. I am quite sure that the breaking of the turf by man and his implements brings a recrudescence of thistles. There has been a striking instance of this lately where rabbiters have used a plough to turn a furrow for laying poison. The trail of the plough is now a trail of seedling thistles even where it went through clean turf with no visible sign of thistles in recent years. The thistles come in the same way where rabbiters make a trail of spits with spade along ridges that have grown variegated thistles or where men break the turf to put a post in. I think these thistles come from seed in the ground and not because the freshly turned soil makes a seed bed for wind blown seed.

For these reasons I think that anybody aiming at the complete extermination of thistles will always have to deal with an annual recrudescence on any country where thistles have once been bad. On a hill farm such as mine I doubt whether a complete covering of the farm once or twice a year to deal with all re-appearing thistles is practicable. It may be necessary to be reconciled to the presence of some variegated thistles

in the same way as we are reconciled to the presence of some other weeds - but only provided that management or local conditions prevent them from spreading in what we may call epidemic form and completely occupying large areas of ground to the exclusion of grass.

From what I have seen of spraying and dusting weedkiller on my own and neighbouring country, I think that management should aim at going a step further than spraying. That step is to make the conditions congenial for the re-establishment of pasture and uncongenial for the regrowth of thistles on the ground left bare as the thistles die. Ground which I saw sprayed in the Rangitikei last year by tractor and power-spray remained bare for some weeks and then began to cover with thistle seedlings and weeds. The weed becoming dominant last year was chiefly a kind of small stinging nettle. In other placing I have seen fat-hen or Cammomile daisy fill the spaces

I submit that this problem of making conditions congenial for the establishment or re-establishment of a strong pasture is the vital problem in the control of both gorse and thistles. The sight of weed-covered hills where people have been killing weeds for years is evidence of our failure to solve it.

Fifty years ago today the axes were ringing in the bush on my country - in the winter of 1901 - and in the following summer, after the burn, the packmen and some of the bushmen would be cutting tracks for the horses with the grass seed. Today people look at gorse and thistle-covered gullies and ridges not far away and say that it would cost more to clear the country and get it back into grass than the land is worth. Good land has become marginal land solely because of the spread of weeds and the cost of weed control. What a betrayal of our heritage! What a problem for posterity if it has to maintain an expanding political economy still based on a contracting farm economy!

The chemists and the mechanicians have come to our aid with cheaper ways of killing weeds. We still have to make grass grow instead of weeds. Can we re-establish a strong rich grass sward under the same conditions as those under which weeds became dominant - the conditions under which the weed cover is expanding in some districts?

There is the work for the biologist and the pasture man.

I do not expect many people to be impressed by the idea of sowing barley grass. Most people look on it as a weed. Perhaps they don't recognise it during the winter period when it is growing luxuriant and vigorous foliage and only recognise it when it carries an awned seed-head and is drying up. At any rate sowing it is an unconventional thing, and most people look on unconventional things as eccentric.

Nevertheless I am going to venture to state a theory which like all good theories must rest on certain demonstrated facts which are:-

(1) There are areas of pasture-land in some districts where the conditions suit variegated thistles, where they grow dense, thick and impenetrable, year after year to the almost total exclusion of grass.

(2) The photographs which were taken by two officers of the Department of Agriculture show that barley grass will grow thickly and luxuriantly during the winter in the thistle areas. In other words the local condition, whatever it is, that favours this intense growth of thistle also favours an intense growth of barley grass.

(3) When the local condition no longer favours barley grass it is replaced by rye grass, white clover, Poa annua, etc., and the ground remains relatively free from thistles except for scattered plants.

From these three facts I think it is logical to deduce the theory that barley grass changes the peculiar local conditions that causes variegated thistle to flourish.

If the theory is accepted I suggest:-

(a) That it be tried out on some other country besides mine.

(b) That cultivated barley be tried as a green cover-crop for the re-establishment of grass on thistle areas.

(c) That a search be continued for a grass that has the valuable properties of barley grass without the undesirable features that cause a prejudice against it.

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GENERAL DISCUSSION

MR. PETERSON: I would like to say how much I appreciated Mr. Tripe's paper. I think it has set a standard of which we could well take notice. His paper was not only a paper on weed control, but it also contained some really excellent information on pasture control and, incidentally, on sheep management. We are a bit inclined sometimes to get led away with new things; new chemicals and new methods of applying them. We do tend to forget the hoof and the tooth and I think there are a good few lessons there of which we could take note.

MR. HAMBLYN: I would also like to congratulate Mr. Tripe. Variegated thistle is an extremely important weed in certain districts and can cause a great deal of trouble and I am particularly interested in the question of establishing grasses that will help to make for control. I do know that it is a very long, slow, drawn out process if tackled by killing alone. There is one point and that is that variegated thistle established on sheep camps gets on to ridges. I do want to stress the fact that where you have a large number of sheep they will generally scatter for their camping and do not concentrate like small numbers do. With regard to Phalaris I think it may be quite an important grass for doing this job and it also has another capacity which may be very important in thistle control for as the thistles grow up so will it. I do not like barley grass.

MR. NEILL: I would like to know if Mr. Tripe noticed if heavy stocking of ewes had any effect upon his lambing.

MR. TRIPE: No, I have not noticed any difference. I generally have a lambing of 100%.

MR. WARD: I would like to ask Mr. Duncan about the time of the over-sowing in the trial he mentioned showing improvement of 10% in cover of weeds. I feel that I may have obtained better results by earlier sowing.

MR. DUNCAN: We over-sowed actually at the approved time, in that case, spring, in the beginning of October and autumn sowing in April. However, the April figures were much better than the October figures except for clover. I think the over-sowing results are fairly general myself and I do not think we could expect any better results.

MR. BARRAUD: Mr. Duncan made mention of dusts in some of his trials as against sprays. I would like some verification from him regarding dusts. We contend that dusts can be very dangerous in large scale commercial use.

MR. DUNCAN: We found that the spraying was twice as efficient as dust and we are keen on the spraying. On the point of regrowth of variegated thistle, I mean regrowth from the seedlings that were in the soil.

MR. BARRAUD: I understand that seeds can remain dormant for some 20 years.

MR. DUNCAN: That is a bit conservative, anything from 20 to 30 years; which is quite a long time.

MR. MADDEN: Mr. Tripe said he did not think we would be impressed by barley grass. I am. I am very unfavourably impressed. I think that we could experience difficulties nearly as bad in some respects with barley grass as with many other weeds. Mr. Tripe did mention, however, that barley grass came on more fertile land. When the ground became saturated with animal manure barley grass could be expected to come in and if that is so I think we could use a more valuable grass. Italian rye would surely be better than barley grass. There is a point to that - in Hawke's Bay and other parts of New Zealand, I have been asked how to get rid of barley grass. The barley gets into the eyes and between the teeth of the sheep and while Mr. Tripe has been impressed with barley grass I think something else would be more useful and less harmful. I would prefer to fight variegated thistle with the good farm management methods Mr. Tripe has mentioned with something other than barley grass.

MR. TRIPE: I have just pointed out its uses and shown the results it has achieved. I think it would be better to use a superior grass and I mean to make further experiments on other land. I have tried short rotation

ryegrass and I have also tried other ryegrasses without success. Has anybody any observations on any residual effects of dusts. Where I have sprayed or cut I have another crop coming up the following year. Where I have used dust very little thistle has come back.

MR. KERSLAKE: Can we have an indication from Mr. Brodie regarding the recovery of pasture after chemical control?

MR. BRODIE: Everything we could see we killed and I might add, we killed a number of Arum Lilies quite a few chains away - they took it very badly.

MR. TRIPE: There was one particular photograph showing a very dense area of thistle. That particular area seemed to be entirely covered with it. What happened there when the thistle died. Did you have any grass etc?

MR. BRODIE: In that particular case the thistles are still withering because I have no cattle in that particular paddock, but out at the back where we had thistle - I had had no cattle in the paddock for four to five months - I put in a mob and you would not know there had been any thistle there.

MR. TRIPE: What grass survived. We find only Yorkskire Fog.

MR. BRODIE: I would not like to say, but I could take you for a ride and you would not think I had a problem of variegated thistle at all. This year after spraying from the air I had thick pastures where I have had bare pastures before.

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