THE WEED SITUATION IN RELATION TO FIELD CROPS

by
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MR. J. H. HEWLETT: In dealing with this aspect of weeds, which is probably well appreciated by many present to-day, I shall purposely curtail myself to a brief description of the problem in relation to field crops and try to bring forth suggestions whereby some concerted efforts can be made to combat this menace to production.

In field crops the weed problem can be broadly divided into two groups, namely: (1) That which can be controlled by the exercise of reasonable skill in culture and reasonable expenditure; (2) That which requires the exercise of skill in culture and heavy expenditure to control but which on any farm is complicated by the fact that re-infection occurs from sources outside the control of the individual farmer concerned.

Group (1) consists mainly of Fathen, Tares, Wild Oats and Wild Turnip. With the exception of Wild Turnip, these weeds can be prevented from taking unreasonable toll of grain yields by means of care in selection of clean seed and cultivation, although, at times, seasonal conditions can make the problem very difficult indeed. Judicious fallowing can be made to pay handsome dividends and many successful farmers will say they cannot afford not to fallow.

Threshing appliances often bring weeds on to a property. This is particularly prevalent to-day with the harvester thresher owing to the fact that they are not always properly cleaned out after threshing each crop, and also because existing weeds are spread over the field and these cannot be entirely eradicated by burning. In this respect there is no reason why threshing appliances should not be constructed so that the ease and certainty of cleaning completely could be carried out in a minimum of time.

Unfortunately I have no definite dressing records available relating to crops prior to the advent of the header, but it is the general opinion among merchants and farmers that the losses during machine dressing have considerably increased. This represents a loss to the farmers and also presents difficulties for the seed dresser in that the capacity of a machine can be reduced by 15% or more for an increase of 5% in weed content above the normal.

Group (2). In Canterbury we are concerned entirely with Californian Thistle which in the past few years has increased with amazing rapidity even on those farms where abnormal efforts have been made to combat it. Nothing can be more discouraging than the invasion of Californian Thistle on clean land by the medium of flood, water course and wind blown seed. The producing power of our most valuable asset, the land, is being reduced. Large scale concerted action is required now and the way is easier than ever before by the advances made in modern weed-killers which are readily available.

Have we not sufficient information on original research in the U.S.A. and England to embark upon large scale operations against weeds through the co-operation of Government Departments, Catchment Boards, County Councils, contractors and farmers? Is it a question of lack of equipment? If so, could not blueprints be acquired and the equipment fabricated in the Dominion as we have skilled industries which could do this job? Are we spending too much time seeking for the ideal and neglecting application?

Several farmers have developed their own equipment and are courageously leading the way to weed eradication in field crops on a practical scale.

Large scale trials on farms in Canterbury with its variations in climate between the plains and the foothills should yield rapid results in knowledge and development of equipment. The time to start is now and even though the present position is held it will be far superior to the rapid deterioration which is taking place, especially in the case of Californian Thistle. Sufficient information is already available for us to tackle this problem with knowledge and understanding.

The situation requires the formation of an organization with the finance to carry a planned and concentrated attack on the weed problem. We must paint our house right now to keep it from going to pieces. We will get the very best paint later.

DISCUSSION:

MR. G. C. WARREN (Federated Farmers): I am very glad to hear Mr. Hewlett speak about the Californian Thistle menace. I come from a good medium cropping area and it is a very sorry picture to be seen there, on some of the finest wheat growing land. Even ten years ago you could go into a paddock and leave nearly a quarter of the sheaves on the ground because they were not worth picking up and that area has probably increased more rapidly during the past few years. Grazing is giving some measure of control, and therefore there is a tendency to leave the pastures down longer, but we do not want to graze where we sow wheat. If this conference could put more time into dealing with the menace of thistles in our wheat growing land, it would be doing New Zealand a very good turn.

MR. BLACK (Agronomy Division): In the preliminary trials we have had at the Agronomy Division we have had very valuable results, and the major factor we have found, is the time of application of the hormone weed-killer to the thistle. Put it on at the right time and the weed-killer can get down right into the roots and give you if not 100% kill, a very high percentage kill with one spray, but you must put in on at the right time. It is no use in the Spring and there are two reasons for that; firstly that you have not got enough leaf surfaces to enable the plant to absorb sufficient weed-killer to be present in lethal quantity when it is distributed to the whole numerous root system, underground. You must wait until the plant is well grown so that you can get a sufficient leaf surface for the required amount of hormone weed-killer to be absorbed. In the second place, you must put the weed-killer on at a time when it will be carried to the roots. In the early part of the season the plant is growing, and it is still growing on the reserves of foodstuffs stored up in the roots. The movement is upwards. The time to apply the weedkiller is when the movement is downwards. That is when the plant is just coming into flower. It is no longer growing upwards and it requires very little food and the surplus is being sent down for storage into the roots system. Apply your weed-killer then and it will be carried down into the roots and give you infinitely better results. I doubt if you will ever get a one hundred per cent kill with a spray. You must spray every stem and you must cover it completely. Put on enough weed-killer to cover the plant completely without putting on so much that it runs off. You can get a very good kill if you spray in the early flowering stage and practically no kill in early Spring. I hope there may be someone present who can tell us whether that is borne out in their experiments.

MR. WATKINS (Ivor Watkins & Co.): I would beg the conference's time to read a very short notice in which are the results of experiments with 2-4D in regard to Californian Thistle from the United States. "From various experimental reports on the destruction of Californian Thistle it is clear that Californian Thistle plants are in the resistant category. Any single treatment of 2-4D will not eradicate Californian Thistle but the concentration generally recommended is one and a half to 2 lbs. to get complete destruction of the plants. It is a decided advantage in getting at least two sprayings of 2-4D during the season, three if possible." The results show that applications are more effective in the early bud stage, which completely supports Mr. Black's statement. Applications made during the early bud stage will stop growing activities. Following that statement, we have done some experimental work regarding the application of the hormone to the eradication of Calif. Thistle and other root forming weeds. We found that the bud stage is the criterion and one of the times at which the plant seems to be particularly susceptible. Overseas trials lead us to believe that the increase in grain yields is well worth while investigating, and I feel that there are many cases with arable crops where grain increases could be definitely brought about by the use of this particular type of chemical.

MR. J. F. BROWN (Department of Agriculture): I have done quite a lot of work with Californian Thistle and first wish to agree heartily with what Mr. Black says that you should spray in the flowering stage or when it is in bud. In this case however, we are dealing with crops and when the thistle comes into flower in a crop, the crop is fairly well on, and you are going to damage the crop. It would seem that we have to get on to the thistle before it reaches this stage. An experiment was carried out before the thistle flowered and showed it can knock the thistle back and if you don't get it right through the root system it will shoot away again next year. I think that when you sow your wheat, you should be treating the thistles when they are flowering, the year before the land is ploughed. I have dug up

thistle and it seems that the spray will go down so far and will not at all times get into the growing tips of the roots. In this case the thistle will shoot away again next year and you will have to spray them a second time. I have known that after two years' treatment you can have quite a good clean-up.

MR. D. V. GORDON (Imperial Chemical Industries): Mr. Black said it appears that we have some means of control. It makes you wonder why we have not been able to go ahead in developing these things. There are two problems to which we have had to give serious consideration. These chemicals we are concerned with are a development for weed control in cereal crops, but the things that worry us are, (1) the treatment of wheat with a hormone will result in decreased yield and (2) the treatment of a crop would affect the germination of the seed from the crop later. In Australia they have had an eleven bushel increase. There was no evidence of a decrease in yield. In Canberra a series of tests showed no decrease in germination. The thing was too big to go ahead with. I would like to hear from Departmental officers what their opinion is as regards the seriousness of any reduction in the germination of the grain.

MR. L. T. WRIGHT (Federated Farmers): I would say that the Californian Thistle problem has been on my mind since I have had anything to do with farming. We have had two or three systems we have carried out, but not before we have tried spraying. First with sodium chlorate and we treated a patch with a wet spray. In one treatment we had quite a good effect. It was not what I would call a 99% kill on the actual plants that we sprayed but the following year there was a part right round the part we sprayed that came up healthier than ever. We thought from that the job was going to be rather a big one - too big to tackle with the chemicals and so we thought that the best way would be to keep cultivating a piece of land regularly all through the growing part of the year to the Autumn, either by ploughing to cut up all the young shoots or with a cultivator. My system was to cultivate with a broad share grubber 2" to 3" below the surface about every seven days. I kept the times worked by the cultivator and the cost. It was done seventeen times during the growing period of the year. It was first cultivated from a grass paddock and broke up very well indeed. We put it into wheat, and we harvested 75 bushels per acre. The following year I grassed it down with clovers and grasses. The clovers came away very well. I was going to keep it for seed but I practically got no seed. The following year I turned it over again and put it in rape and I had one of the biggest crops of rape I have ever seen on the place. It was well up to my waist. After that the paddock was in such good heart that it went back again into wheat and we got 56 bushels. Since then we have grassed it down again. We live near the Waimakariri River and in the summertime I am certain the Seeds of the Californian Thistle are spread by the wind from the riverbed. From the point of view of production, I feel that that system was the most effective and most productive. There is another system from a farmer's point of view and that is in regard to Lucerne. I have had two experiments in that way. I laid down a paddock five years ago which was infested with Californian Thistle. Of course it was well fallowed and in very good order before the Lucerne weed was sowed. There were thistles coming up amongst the Lucerne but with the regular cutting, now I see no Californian Thistle in that paddock. There are signs of it along the fences just adjacent. I have laid down another paddock since with the same results. In regard to agricultural farming, I look upon the Californian Thistle as being permanent. At the present time I hardly feel we can completely clear up our farms from it, being as I mentioned, in the Waimakariri River area. Another weed that affects cropping is Yarr. Mr. Black has had certain amounts of success with that I hear. In the Spring it is a very great set-back to Spring grown crops like Barley, Oats or Turnips. If there was some chemical that could be sprayed on the land before the actual plants come through to check that weed and it would mean a big thing to production of all the Spring sown crops. We have another two weeds that are similar; the Fat-hen in particular, but we do not seem to be worried with Fat-hen to such an extent as Yarrow. There is another one, and that is Hemlock. Those four weeds are causing us the greatest concern and if something could be done I am sure it would be a great help towards the production of grains in Canterbury, at any rate.

MR. BLACK: We used hormones and none of the treatments affected the Barley. The normal knapsack spraying does not affect it. On the other hand, there seems to be some danger of affecting the seed, when spraying it very early. They have found in England that you get distortion in Barley. In the three leaf stage and when the crop is coming into flower you have a dangerous stage

Apart from that I do not think you need worry about it.

MR. Y. T. SHAND: The hormone method is a scientific one. I want to ask what is the comparative difference in cost. Supposing you are faced with using two treatments. What would be the difference in cost to get rid of the Californian Thistle between the agricultural and the hormone method?

MR. WRIGHT: I claim that I am more than repaid for the extra cultivation put in by the results I get.

MR. MACHIN: I was going to suggest to Mr. Flay that the Agricultural College and the Department of Agriculture might consider some form of co-operation. Perhaps they could be offered some form of advisory service with regard to some of these areas of Californian Thistle. I was going to ask Mr. Flay to tell me whether there was any possibility of such a service being supplied to the farmers, to give them some advice as to what you might be able to use to deal with that.

MR. A. H. FIAY: I do not intend to speak with quite the voice that Mr. Machin suggested I might. I think Mr. Hewlett has opened a very important subject for all our farmers and that our worst weeds which affect us on heavy lands and lands up to the foothills are the twitches; Onion Rooted Twitch, Creep-Fog Twitch, and Old Man Twitch. Then another weed which affects us very seriously is wild oats. It competes most favourably with wheat and barley and constant control is very necessary. We are struggling to-day to eliminate the perennial type of weed, in conjunction with Fathen, wild turnip, and a few others. There is no doubt that a man has got to fallow a percentage, say 1/10th of the farm each year to control weeds at the present time. I have estimated that that cost in agricultural terms would be from six to eight pounds per acre, & for a 200 acre farm would be an expenditure of £200 per annum or therabouts. Almost a pound an acre gone for the control of weeds of the type mentioned. As well as looking for a cheaper means of controlling this Californian Thistle, we want that particular weed spray to control twitches and wild oats and in addition it can widen its scope to wild tares and wild panzies. It is a pretty difficult problem to look at the weed control from the hormone angle other than for specific species. I feel that there is a long way to go with our hormone weed-killers from the commercial or practical point of view. But there is some possibility of hope for Californian Thistle control. I think we may consider using hormone weed-killers shortly for spraying around the paddocks; it might relieve us of the Californian Thistle. But I pin my faith in the meantime on ten per cent of the farm being fallowed, in addition to lucerne.

MR. HALL: I was particularly interested to hear of the thorough experiment carried out by the previous speaker. Years ago we had a machine, eight feet in width, which could be drawn by one horse and it would kill everything that was trying to get above the surface. Twitch was eliminated over a certain area, in one season. It was simply a question of not fallowing for a season, never allowing the twitch to show a green shoot above the ground. That was done by Dr. Hildendorf here in Lincoln College many years ago. It would eliminate Californian Thistle and any other weed you wanted to get rid of.