WEED CONTROL IN THE PRAIRIE PROVINCES

Losses Caused by Weeds

It costs money to grow weeds. Weeds in a crop reduce the yield to an extent which varies according to the proportion and kinds of weeds present. Estimates of the actual reduction of yield throughout the prairie provinces vary considerably, but careful experimental work at many widely separated places indicates that Western grain yields are reduced by about 20 per cent through the competition of weeds in the field. Put another way, Western farmers on the average harvest three bushels of wheat per acre less than they would if they had no weeds, with a reduction in the yields of other grain crops at least in proportion.

Large as the loss is through lowered yields, other losses from weeds add up to at least twice as much. Obvious are the costs involved in harvesting, threshing and shipping. A large item is the extra summerfallow cost made necessary because of weeds. In many parts of the West it would hardly be necessary to summerfallow at all if it were not for weed control; yet it is in these districts, where perennial weeds are most prevalent, that the summerfallow is now a frequent and costly operation. In other districts, where moisture conservation makes a frequent summerfallow advisable, no more tillage than would provide a suitable seed bed would be needed if it were not for the weed growth.

Weeds also add to the cost of between-crop tillage, result in lowered grades of coarse grains and forage crops, involve the purchase and maintenance of additional machinery, and lead to a marked reduction of land values. All told, the annual cost of weeds to Western farmers would make a very respectable war loan.

General Considerations

Practically all of the troublesome weeds on prairie farms have been introduced from outside, mainly as impurities in seed, feed and fodder. The same agencies account for the spread of weeds to new locations, together with distribution by wind and by farm implements or vehicles. These and other possible methods of spreading infestation should be guarded against as part of any control program.

In the control of weeds in the field there are two basic principles which have to be observed, modified according to the particular habit of the weed most prevalent in the field. The seeds of weeds are disposed of by promoting the germination of the seeds and killing the young plants, while the control of perennial weeds is mainly a matter of starving the root system through preventing the development of leaves.

l by Authority of Hon. J. G. Gardiner, Minister of Agriculture, Ottawa.

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Summerfallow Methods

The summerfallow year offers the chief opportunity to lessen or control the weed infestation of a field. The seeds of many weeds are able to remain dormant in the soil for a considerable number of years; hence the summerfallow tillage should be planned to secure the greatest possible germination of weed seeds. Generally speaking, weed seeds will only germinate at a depth in the soil more or less proportionate to the size of the seed. Very small seeds will germinate only at or close to the surface. Medium-sized seed will germinate from a rather greater depth; for instance, wild mustard will germinate freely at between two and three inches. Larger weed seed, such as wild oats, will germinate at any depth to which fields are usually worked.

Summerfallow tillage is done to kill the weed seedlings in the field and to provide suitable conditions for a new growth. After-harvest tillage, usually a light disking, will, under suitable moisture conditions, frequently assist in securing a fall growth of weed seedlings which will be killed by winter frost. Spring tillage should start according to moisture and growth conditions, usually by mid-May, and should be repeated as seedlings develop, before they become a drain on soil moisture. If wild oats is the chief weed being dealt with, it is advisable to allow a growth of from four to six inches to develop and then work the field on a hot dry day to secure a maximum kill.

Packing after tillage of the summerfallow will usually assist in securing a prompt re-growth of weed seedlings. It is usually advisable to allow an interval between tillage and packing so that the roots of the seedling weeds will be killed. Packing will frequently increase the liability to soil drifting and may not be advisable for this reason.

To control perennial weeds, the summerfallow must be tilled at sufficiently frequent intervals to keep the field absolutely black. This may require tillage as frequently as every week in the earlier part of the season, but the interval can be increasingly longer later in the year. For the control of couch grass, the field should be ploughed or one-way disked, to a depth of three or four inches, about May 15 and all regrowth kept down by repeated tillage until the roots are dead. For the control of Canada thistle or sow thistle, the start of the black fallow can be delayed until the first half of July and the field then kept black until the end of September. One or two tillage operations for the control of such annual weeds as may be present can be conducted earlier in the season. A full season of black summerfallow will not eradicate poverty weed but will reduce the infestation sufficiently to give a grain crop a chance. Alternate years of crop and summerfallow is the most suitable cropping system in areas infested with poverty weed.

Surface Cultivation

Extensive experimental work and the experience of a great number of farmers have shown that, in most of the prairie area, surface cultivation of the summerfallow is to be preferred to deep working. Surface tillage is more efficient in providing suitable conditions for the growth of successive crops of weed seedlings; properly done, it is effective in killing growing plants, costs less per acre and allows a rapid and timely working of the field. Whatever the implement used, the condition and operation must provide a clean and complete cut across the whole width of the machine to ensure a kill of all weed growth.

Deferred Seeding for Wild Oat Control

The seed of wild oats may remain dormant in the soil from one to three years. Accordingly, when a field is heavily infested with wild oats, a summerfallow, no matter how well done, may still be rather badly polluted. In such cases it is frequently advisable to delay spring seeding until the first growth

of wild oats has developed. These are destroyed by tillage and the grain crop, preferably barley or an early variety of wheat or oats, sown immediately. The same delayed seeding procedure is used to advantage for crops sown after stubble where wild oats are prevalent.

Sowing the Grain Crop

On land infested with weeds, even to a comparatively light extent, it is advisable to sow grain crops heavily, as much as fifty per cent more than would be considered a standard rate in the district on clean land. Heavy seeding gives a uniform thick stand which shades the weeds and results in an earlier ripening and heavier yielding crop, with an added economy in handling due to the lower proportion of weeds.

To enable a grain crop to compete with weeds to the best advantage, seeding should be done as early as possible after such tillage as may be necessary to kill early-germinated or winter-annual weeds.

As a quick ground coverage is of importance in the fight against weeds, the seed should not be sown at a greater depth than will provide suitable moisture for germination.

Commercial Fertilizers Applied in the Drill Row

In districts where experience shows that a growth response is secured from the use of phosphatic fertilizers applied with the seed in the drill row, the use of such fertilizers is of marked assistance in weed control. The effect of soluble phosphatic fertilizer is to promote a rapid and extensive root development, which leads to a faster and more luxuriant plant growth. This assists materially in getting and keeping the crop ahead of the weeds.

The combination of a heavy rate of seeding with the use of phosphatic fertilizer has been in a great variety of circumstances a practical and successful method of controlling weeds.

Mixed Farming Rotations

The control of most weeds can be materially assisted by the growing of hay crops in the rotation, in those areas where soil and moisture conditions are suitable and when the live stock carried will make economical use of the forage growth. A good catch of any of the usual cultivated grasses will, once it is established, compete successfully with practically all annual weeds and will materially reduce and weaken the growth of such perennial weeds as sow thistle and Canada thistle.

To control weeds and obtain a moisture reserve for the following grain crop, it is advisable to plough the grass sod immediately after the last hay crop has been removed and cultivate the land during the remainder of the season. In drier regions it is necessary to follow this treatment with a summerfallow.

Chemical Sprays and Dusts

Annual weeds having rough or hairy leaves, particularly wild mustard or stinkweed, may be controlled in a growing crop by spraying with chemical solutions which do no permanent damage to the crop. Sulphuric acid, applied as a 3 per cent to 4 per cent solution by weight at the rate of 75 to 100 gallons per acre, controls stinkweed and mustard; copper sulphate applied as a 3 per cent solution at the same rate controls mustard. Spraying is more beneficial on fields heavily infested with weeds, and the economic advantage naturally varies with the current prices of the cereal crops. The most effective time for spraying is before the crop reaches the shot-blade stage and before the weeds develop lateral branches. Chief objections to the spraying of crops are difficulty in getting suitable spraying equipment and the large quantities of water used in spraying any extensive acreage.

Difficulties involved in the use of large quantities of water have led to some interest in the possibility of using chemicals in the form of finely divided dusts rather than as sprays. Many chemicals will kill weeds like wild

mustard in a crop when applied in this way, but their efficiency depends on the weeds being wet with dew when the dusting is done. Unfortunately this condition is not common in the prairie provinces at the time when dusting should be done. When dew does occur, the time available for treatment is limited to a short period in the early morning. Some recent experimental work has been done with a view to using a mixture of chemicals which will overcome this limitation, but no definite procedure can yet be recommended.

To eradicate perennial weeds by chemicals, sodium chlorate or commercial weed killers using this chemical are the most suitable. In using sodium chlorate there is a definite fire hazard when the chlorate becomes mixed with organic matter. All clothing, wooden containers or implements, etc., should be thoroughly washed immediately after using.

The comparatively high cost of sodium chlorate treatment, together with the fact that the chemical sterilizes the soil for a year or more, makes the use of this control method impracticable for general field use, but it is useful to destroy perennial weeds in places inaccessible to tillage implements and for the destruction of small patches of weeds making their first appearance. Do not use sodium chlorate to kill weeds among trees or shrubbery; it is likely to injure severely or even kill the plantings.

Sodium chlorate is usually applied in solution, either as a spray or from a watering can. The amount required will vary considerably, according to soil type and moisture, the kind of weed, and the stage and vigour of growth. As a general guide, the following amounts of sodium chlorate per 100 square feet should give satisfactory results: sow thistle 1¼ lb., Canada thistle 1¾ lb., couch grass 2¼ lb., poverty weed 1 lb. Usually the best results are obtained from treatment about the time that the weeds are coming into bloom. A heavy growth of weed may be cut and removed before applying the chemical.

Extremely Persistent Weeds

Leafy spurge, hoary cress, Russian knapweed and poverty weed and bindweed are perennial weeds extremely difficult to eradicate. It commonly requires at least two consecutive years of black summerfallow for complete eradication. A determined effort to eradicate these weeds on their first appearance in new locations is well worth while. Usually they appear in small scattered patches which can be eradicated by the application of sodium chlorate.

Relation to Other Factors

The control of weeds has been discussed without particular reference to other factors affecting crop production. Practices advisable for the control of insect pests, plant diseases or soil drifting, frequently must be considered, but can usually be fitted in with the methods suggested for weed control, at most with minor modifications.

In recent years, natural causes have led to at least a temporary reduction of weed infestation in certain districts. In places, the prevalence of grasshoppers has resulted in a marked decrease in the growth and vigour of sow thistle. A succession of dry seasons has resulted in less trouble from wild oats. Canada thistle, possibly because of combined insect damage and dry seasons, has practically disappeared from areas where it was a major pest a few years ago. A change in conditions may readily provide suitable conditions for re-infestation, and this should be particularly guarded against.

Every weed means less crop. The successful farmer grows grain and forage crops with the fewest weeds possible.

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