WEED PROBLEMS IN LONGER ROTATIONS

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Unfortunately, I have no experimental data to illustrate what weed problems can be expected to occur in longer rotations in Saskatchewan. To the best of my knowledge no such data have been documented. Consequently, I will have to combine a theoretical knowledge of basic weed control principles with observations made at the practical level in an attempt to project into the future and speculate on the problems that will arise.

At the outset it might be as well to itemize the major basic weed control principles that in my opinion have a bearing on weed problems in longer rotations. These major principles are:

1) When annual crops are produced in a monoculture they cannot possibly take full advantage of all of the ecological niches within the field, ie. they cannot effectively utilize all the available moisture, light and nutrients in the field. Consequently, these "niches" will be prime sites for invasion by weeds.

2) Weed control must involve a systems concept if it is to be effective, ie. we must utilize all control measures at our disposal and not use herbicides as a substitute for poor management.

3) Control of annual weeds can be achieved more readily with herbicides than can perennial weed control.

4) Most species of weeds produce seed that can lie dormant in the soil for sufficiently long periods to preclude the possiblity of acceptable control being achieved by means of summerfallow alone.

5) The use of fertilizers alone cannot be considered as an effective control measure for weeds since most of our problem field weeds will respond just as well to the increased fertility as the crops.

In view of these basic principles then, we can expect to have a continual battle with weeds regardless of the management practices that we follow. By changing the type of management, however, we may change the type of weed problem that we have to cope with.

With a decrease in the amount of summerfallow more intensified and more sophisticated weed control measures will be required. In my view, summerfallow does tend to mask "sins of omission" in the weed control program, and the lack of summerfallow will have to be compensated for in some other way. In other words greater attention will have to be paid to such things as the use of weed-free crop seed, weed control in the fall, choice of the crop to be grown, and the proper selection and application of herbicides. I hasten to add that these are all important weed control measures with or without summerfallow and should be given strict attention at all times. I

do feel, however, that in areas where a more intensive type of agriculture is practiced than we have followed to date in Saskatchewan, more judicious attention has been given to such items to keep weed infestations at levels that permit continuous cropping. The alternative of course, and one that to me is undesirable, is to rely much more heavily on the use of herbicides.

I would like to make reference to two specific types of problem that I forsee with the use of longer rotations in Saskatchewan.

At a meeting of the Canada Weed Committee in Winnipeg in 1968, I was asked to give a paper on "New field husbandry techniques and their implications in weed control". At that time I suggested that without summerfallow creeping perennial weeds such as quackgrass would become a much greater problem in annual crops in western Canada than they have been to date. I see no reason to change my opinion in 1975 since I believe that the summerfallow has done a pretty effective job in keeping persistent perennial weeds in check. Should a persistent perennial weed such as quackgrass become predominant in annual crops it could be a very difficult problem to solve in a continuous cropping system. In fact, I would guess that the least likely candidate for successful selective control in a grain crop by a herbicide is quackgrass.

The other problem that no doubt will arise relates to the use of soil-applied herbicides. Over the past few years the use of soil-applied herbicides for the selective control of weeds in the crop have increased sharply. The best examples of such herbicides in western Canada are Avadex BW and Treflan. A number of other soil-applied herbicides similar to Treflan have been registered recently or will be registered in the near future. All of these soil-applied herbicides require incorporation in the soil, either as a preplanting or an immediate postplanting treatment. In fact, this type of herbicide will have the desired effect only when well incorporated in the soil. Thus, the presence of excess surface trash on the soil will cause a marked reduction in the efficacy of these herbicides, especially if they are applied in solution form. Under a continuous cropping system, additional build-up of trash could make it very difficult to achieve the necessary degree of soil incorporation required by herbicides such as Avadex BW or Treflan.

In dealing with the weed problem in longer rotations I have confined my remarks to the use of annual crops. Obviously, inclusion of perennial forages within the rotation will alleviate some of the annual weed problems associated with annual crops. Similarly, inclusion of a fall-sown grain crop in the rotation can do much to control any annual species of weeds that depend on soil disturbance in the spring for optimum seed germination, for example wild oats.

In conclusion, the adoption of longer rotations in Saskatchewan will require more intensified and sophisticated measures of weed control, and over a period of time it will no doubt be necessary to cope with different types of weed problems than have been general to date. Hopefully, a more judicious use of the systems approach to weed control will be practiced rather than a marked increase in the dependency on herbicides to cope with the problem.

DISCUSSION

Question: Are you considering volunteer grain as a weed, any ideas on controlling volunteer grain?

Answer: Big problem, one may consider Gramoxone, however, cost is prohibitive. Feasibility of using this herbicide will depend on economic return received from crop.

Question: How effectively can winter annuals be controlled?

Answer: Efficiency of herbicide depends on mode of action (i.e. soil uptake or translocated). Translocated herbicides need active plant growth which could pose a problem in the fall.