

EQUIPMENT NEEDS FOR LONGER CROP ROTATIONS

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Introduction

The introduction of longer crop rotations may cause some problems to the farmer if equipment is not suitable or available. Possibly, two areas are of major concern; these relate to problems associated with crop residues and to the fact that generally more acres must be tilled, seeded and harvested each year. In some cases these additional crop acres may require more attention and more timely operations than with a shorter rotation.

The geographic location or climatic conditions will also have a bearing on equipment needs since crop residues and weed growth are dependant on the growing conditions of the area. Soil texture will also have some effect on the kind of tillage and seeding operations that are used. To some extent the kind of crop grown may also influence the equipment requirement.

To anticipate equipment needs the purpose of all the operations need to be considered. Tillage operations require consideration of the following: (1) seedbed preparation, (2) herbicide incorporation, (3) weed control, (4) moisture conservation, (5) breaking of sod crops if grown, (6) management of crop residue and (7) erosion control (emergency).

Crop Residues: In the drier areas where there is normally less crop residue, the longer rotations will likely result in a smaller annual residue. Even though it is less each year, there may tend to be an accumulation due to slower decomposition because of fewer tillage operations which would normally bury the residue. These accumulations, if not managed properly, can cause difficulty with seeding.

The first step in managing crop residue begins at harvest; straw choppers are valuable aids in reducing the size or length of the residue. Many choppers, however, do not spread the chopped material very well. Field cropping in successive years will produce crop stands that are likely less dense so that there will be the trend toward wider windrows which will make spreading of the residue even more difficult. To adequately spread the material from wide or double windrows, some additional attachment will be required for the combine. One alternative which will help is to be certain that successive years' windrows are not placed in the same location.

It may also be worth considering the use of straight cut combining rather than windrowing if the crop height is short. This is especially so with short strawed barley since pickup losses can be extremely high. Straight combining will, of course, require cutting equipment in the combine.

Without proper spreading, some difficulty can be anticipated with regard to seeding, ridging of fields, and in some cases weed control problems. Heavy residues, particularly if damp, make placement of seed by some machines difficult. Even discers do not place the seed as deep in heavy trash and more attention to the sharpness of the discs is required. Double disc openers on drills do not penetrate trash well. Hoe drills may penetrate well but are prone to more plugging with the heavy trash. This trash also prevents the soil from flowing around the opener and the seed may not be as well covered.

Discer seeding into stubble will require more careful machine adjustment, including perhaps a width reduction to permit better and more even penetration. The narrower width will also improve machine stability in very heavy residues. The discer does, however, offer the advantage of being able to seed directly into most stubble conditions when in good condition and properly adjusted.

The heavy windrows of residue, if not spread, can contribute to ridging of fields. It sometimes happens that the one disc gang in line with the windrow residue does not penetrate as well. With the adjacent gang cutting deeper there will be a tendency to ridge, since the soil is not moved uniformly across the width of cut. In such conditions the non-uniform seeding depth may result in uneven stands and ripening, partly contributed to by the retention of more soil moisture under the windrow of crop residue.

It has also been observed that wild oats tend to thrive, perhaps because of dormancy and partly because of seed concentration in the windrow, in the area of the windrow. If not controlled, these can reseed the field and thus will require more attention.

Another problem sometimes experienced with crop residue occurs where flax is grown on the heavy clay soils. Frequently the trash cover is not heavy and during the spring wind erosion can occur. The flax straw tends to bunch and at the same time hold the drifting soil. A very uneven field surface can develop and if this happens after seeding the next crop (maybe durum), very uneven emergence and stands will result. In these circumstances it is necessary to ensure that soil surface is in a condition to prevent erosion by the wind.

Crop residues also may interfere with the application of some herbicides which must be incorporated. For example, wild oats may have to be controlled and with certain herbicides the trash prevents applying the liquid

formulation. If a granular formulation is available and is to be used, extra equipment will be necessary for this operation. In many cases it may be leased but often the non-availability or timeliness factor may make purchase of the equipment necessary.

Perhaps many examples of equipment needs could be given, but each must be determined by the particular crop rotation chosen. If longer rotations mean different crops being grown it will often mean some additional equipment requirements. In addition, the necessary expertise in the operation of the equipment must be gained before using the equipment, if the project is to be of most benefit. Therefore, the total equipment requirement should be reviewed before launching into different and longer crop rotations.

Another aspect of longer crop rotations which is related to equipment is the timeliness of operation and the greater use of equipment during the seeding and harvest periods. In many cases more acres are being seeded and more acres are always being harvested. These two operations should be done at the best possible time for maximum returns. To be able to do the larger number of acres may require more or larger sized equipment. Additional labor during these operations may also be needed.

The need for equipment may also spill over to the farmstead in the form of additional storage space. Additional kinds of crops may result in less efficient use of the available storage.

In summary, it appears that equipment needs for longer rotations will vary depending on location and climatic conditions, but can generally be expected to increase in kind and use and perhaps in size. Equipment must be available that will handle the heaviest crop residues anticipated. Careful use of the equipment and even distribution of crop residues at harvest time is essential. The kind of weeds present will also have some influence on equipment requirements.

DISCUSSION

Question: What new invention is available for spreading trash?

Answer: Blower which attaches to chopper can spread trash up to 30 feet.

Comment: In stubble, results indicate a discer as being the most efficient implement for seeding.

Question: Can problem with tough straw be experienced when using a straw chopper?

Answer: Yes, problems can be experienced with tough straw, need more research in this area.

Question: Does not the biggest problem in handling trash occur right after harvest, i.e. following combining?

Answer: Yes it does and this is certainly one area where additional research could be done; however, up until now the demand hasn't warranted research on this problem.

Question: What is the value of crop residue?

Answer: From an organic matter viewpoint, returning residues is essential unless we are willing to return substantial nutrients in the future.