

determined and then the cultural treatment that is likely to control those particular causes must be given if the largest net advantage is to be derived.

THE CONTROL OF SOIL MOISTURE.

The low moisture content of the soil is the principal cause of low yields on stubble land. "A dry season," "too little rain," "hot winds" are generally given as causes of partial failure. In the drier parts of the province the control of soil moisture is the most serious question to be faced in the handling of stubble fields.

So far as this portion of the general problem of managing stubble fields is concerned only two things can be done—(1) endeavor to keep the moisture already in the soil from escaping, and (2), try to get more in.

The moisture in stubble land escapes in only two ways—by evaporating directly into the air and by being pumped out by weeds or other volunteer plants growing on the land. Evaporation can be effectively lessened by creating and maintaining a soil mulch—a loose layer of dry soil on the surface of the field—through which moisture escapes very, very slowly. The loss of moisture through the growth of weeds can be controlled by killing the weeds when they are small.

Getting additional moisture into stubble fields is a more difficult problem than keeping in what may be already there. Our autumn, winter and spring seasons are dry. In the seven months from September to March, inclusive, only about one-third of the year's precipitation falls, and a large portion of this is in the form of snow and therefore not easily controlled. It must be apparent to all that a receptive surface soil, that is one loose on top as a result of surface cultivation or ploughing, is likely to absorb more of the fall and spring showers and melted snow than an untilled field, particularly on undulating or rolling land.

To prevent the "run off" ploughing would seem preferable to surface cultivation or no cultivation, and no cultivation and fall ploughing should prove better than spring ploughing. But "the stubble holds snow" and "fall ploughing dries out." If in ploughing to store moisture in the soil we lose some that is already there, what is the net result?

WEEDS.

Weed seeds on the surface of stubble fields are a menace, not only to the crop immediately following, but to the farm as a business concern. If they are left to take their own course they seldom germinate until spring, and then the plants generally mature and drop their seeds either before or at harvest time. Incidentally they use up tons of moisture, lessen the yield of the crop and increase the cost of cutting, stooking, threshing and marketing it. Most of these are annuals that die when subjected to the low temperature of winter. Obviously, they ought to be encouraged by some form of cultivation to germinate in the fall. In any case, fall cultivation induces a greater spring germination and enables us to kill the young plants by subsequent cultivation.

It is regrettable that in dry autumns the seeds of annual weeds can be started only with difficulty; but biennial weeds can be completely controlled by thorough surface cultivation with the disc or shallow ploughing either in fall or spring.