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8-Year Study of Tillage Methods Summarized

TO TILL OR NOT to till or just how best to till the spring wheat areas of the northern Montana plains is a subject that has been argued many ways since the arrival of the first homesteaders.

Our research workers think they have a good many of the answers, but at any rate enough information has been compiled to let the individual farmer weigh the facts against his own particular operation and find his own answer.

You can find many of these facts in the recently published Montana experiment station bulletin No. 468, "The Effect of Tillage Method on Soil and Moisture Conservation in the Plains Area of Northern Montana," by Torlief S. Aasheim, project supervisor, SCS, North Montana Branch station, Havre.

8 Years of Study

The bulletin reports and summarizes the results of 8 years of tillage investigations conducted at Froid and at Havre. Nine methods of fallow were compared in the project—continuous use of the one-way, moldboard plow followed by duckfoot and waffle packer that left the field in a pitted condition, moldboard plow followed by duckfoot, moldboard plow followed by rod weeder, moldboard followed by basin lister, continuous use of blade subsurface cultivator and continuous use of sweep subsurface cultivator. Several of these practices were varied by burning the stubble before the tillage operations began.

The following summary of the effect of these various tillage methods on erosion control, moisture conservation, crop yield, quality and weed control is taken directly from the bulletin:

Erosion Control

1. Very little wind or water erosion has occurred on any of the treatments in this study.
2. Observations made on farms in the surrounding area indicate that north-south stripping plus a stubble mulch or cloddy mulch are necessary for effective control of wind erosion on fallow.

Moisture Conservation

1. Sub-surface tilled fallow worked with a blade-type tiller has contained the most soil moisture at seeding time.

Crop Yield

1. Yield of spring wheat has been about the same on all methods of fallow.

Quality of Wheat

1. Protein content of spring wheat has averaged highest on moldboard plowed fallow.
2. Test weight of spring wheat has been about the same on all methods of fallow.

Weed Control

1. Weeds have been a little more difficult to control on sub-surface tilled fallow than on fallow worked with a oneway disk or moldboard plow.
2. Some sub-surface tillers are more effective than others in killing weeds.
3. Grain has been about equally clean during the crop season on all types of fallow.

Sub-Surface Tillage

Recommendations on sub-surface tillage begin with the statement that stubble mulch on the surface of fallow land is helpful in controlling wind and water erosion. It helps control wind erosion by reducing surface wind velocity and helps con-

trol water erosion by reducing splash and runoff.

The two chief problems in connection with stubble mulch are in seeding and cultivating through heavy trash. From the standpoint of erosion control, farmers are advised to leave as much stubble on the surface as possible. However, the amount actually to be left must be limited by the amount the drill will operate through effectively.

Where there is heavy stubble, one or more diskings may be necessary.

Disking should not be over 3 inches in depth because sub-surface tillage done much deeper than that is not very effective in killing weeds.

If the crop is harvested with a combine, a straw spreader is recom-



—National Safety Council

mended to eliminate difficulty with straw windrows at seeding and fallowing times.

Tillage Tools

In the selection of sub-surface tillage implements farmers are advised to consider size, clearance, weed killing ability and sturdiness of construction. A wide machine built in sections will follow the contour of the land better and give better weed kills than one rigid machine. Clearance is needed to go through large amounts of stubble, Russian thistles and other surface trash without clogging.

The sub-surface tillers that tend to stir the surface soil are more effective in killing weeds. Sturdiness of construction is very important, as bent sweeps or beams will hinder successful tillage.

Operation

The sub-surface tiller should be pulled at about 5 m. p. h. and properly weighed so that a uniform shallow cultivation will result. Sub-surface tillage done on warm dry days will result in better weed kills than if the weather is cool and damp.

Treaders made by reversing the prongs on a certain type of rotary hoe, have been used to advantage following sub-surface tillers under some conditions. The treader breaks the straw into shorter lengths, anchors it into the soil, breaks up clods in which weeds might continue to grow and generally results in a more easily seeded field. The treader is not recommended where the stubble is light.

Seeding

A drill with wide spacings between rows will go through more stubble mulch than one with narrower spacings. The single disk drill tends to push the straw aside instead of going directly over it as a double disk drill does. The shoe type drill with staggered shoes and wide spacings will go through a lot of trash, and puts seed in a good seedbed.

Experiments in these test areas show no advantage in soil moisture the following spring from sub-surface tillage operations done in the fall.