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The One-Way Disk Tiller

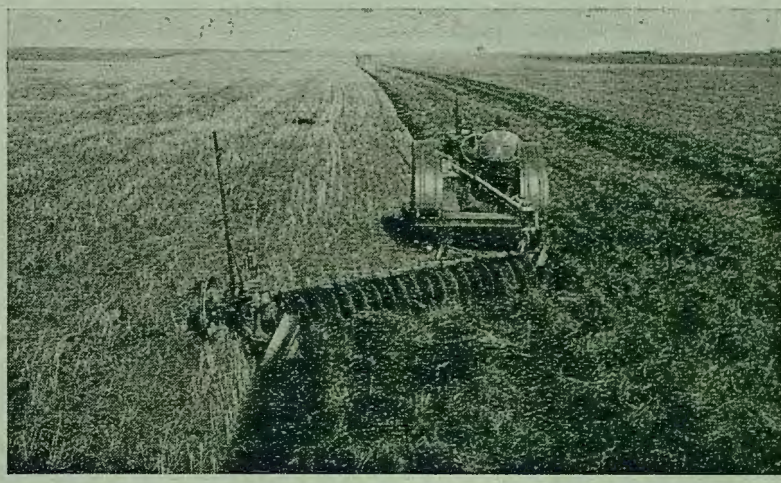
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The one-way disk tiller is a comparatively new soil tillage implement that is used instead of the plow in some conditions and to supplement it in others. It bears a resemblance to both the disk plow and the disk harrow. Manufacturers use various trade names for the machine. It consists of a series of disk blades, all mounted in the same gang and set to throw the dirt in the same direction. The gang is set in a frame mounted on wheels, by means of which it is held in place as it does its work. The gang bolt is not set at right angles to the direction of travel but makes an angle of about 60 degrees with the furrow. Most makes of the disk tiller, have three wheels, corresponding to the wheels of a horse or tractor plow; namely, the front and rear furrow wheels and the land wheel. These wheels serve essentially the same purpose as the wheels on the plow. The tendency for the machine while at work is to slide in the direction opposite to which the dirt is being thrown. This is prevented by a flange on the furrow wheels and also by the angle at which the furrow wheels are tipped away from the untilled land. Thus the machine follows the tractor without shifting to one side. The disks are raised and lowered by means of a hand lever lift or a power lift. The large sizes are usually equipped with a power lift.

Size and Capacity

The disk tiller is made with working widths ranging from 4 feet to 10 feet thus making it possible to obtain a size to fit most any farm tractor. Many machines, especially the larger sizes, are equipped with a detachable section which may be removed to decrease the working width if desired. The disks vary in diameter from 20 inches to 26 inches, and the spacing between them usually is 8 or 10 inches. Machines equipped with the larger disks have the greater spacing.

The capacity will vary somewhat with conditions, but in general it is twice that of a moldboard plow. A tractor capable of pulling a 3-bottom, 14-inch plow can handle a disk tiller about 7 feet wide. It is evident that the acreage covered



per day would be about twice that which could be covered with a moldboard plow.

Quality of Work

The soil can be loosened and pulverized to a depth of 7 or 8 inches, although the average depth of tillage ranges from 3 to 6 inches. Since all of the soil is thrown in the same direction, the surface is left without back furrows or dead furrows if the tiller is drawn around the field instead of back and forth in lands. The furrow slices are not inverted as with the moldboard plow, and trash and stubble are not completely covered. Instead, the trash is partly mixed with the soil and much of the surface cover such as straw and stubble projects out of the ground after plowing.

The bottom of the furrow is not flat as it would be with a moldboard plow, but is curved because of the shape of the disk. The height of the projections between furrows will depend on the size and spacing of the disks and on the angle at which the gang is set with the tractor axle. Most tillers have an adjustment by means of which this angle may be changed. As the angle is increased, the disks tend to cut out the ridges between the furrows better and is therefore usually greater for shallow work than it is for deep tillage. As the angle is increased, the working width of the tiller is decreased slightly. In general, the ridges between the furrows will not be high enough to be objectionable.

Field of Usefulness

The tiller has not been used in Minnesota to the extent that it has in regions where small grains are grown on a large scale, such as parts of Nebraska, Kansas, Texas, and Montana. However, it is being used to some extent in certain parts of western Minnesota and especially in the Red River Valley. Because of the following advantages, farmers have become interested in it and many have tried it. Large areas may be covered in a comparatively short time. This makes it especially advantageous for summer-fallow and for tilling stubble land immediately after the small grain crop has been removed. Such practice is desirable from the standpoint of weed control and moisture conservation, but plowing usually requires more time than is available at that season of the year. The rough condition in which the surface is left is ideal for catching and holding snow and preventing soil blowing. In fact, this method of tilling the soil is coming to be looked upon as an important method of controlling wind erosion.

The one-way disk tiller has not been in use long enough to determine its effects on the soil where it is used year after year instead of the moldboard plow. Since the work done by it is of a different character than that done by the moldboard plow, it is commonly felt that where the tiller is used, the moldboard plow should be used at least once every 2 or 3 years. However, no dependable information is available on that point.

Until now this machine has been used mostly in semi-arid regions. It has been demonstrated that, under many conditions, the seedbed resulting from its use is equal in quality to that prepared by other methods. To what extent it can be advantageously used in humid regions, remains to be seen. Obviously, it must first be used cautiously in areas where it has not previously been tried. It is not suitable in fields that are very stony.