Ridge Planting Saves..Soil, Water

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Ridge Planting Saves..Soil, Water

Abstract
A new system of row-crop farming holds promise in protecting soil from water erosion, in reducing drowning in poorly drained areas and in possible reduction in labor and power requirements. The new system - called ridge planting - combines the high yields of surface planting with the conservation features of contour listing. The system has been under development by Iowa State College and USDA agricultural engineers for the past 4 years.

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A NEW SYSTEM of row-crop farming holds promise in protecting soil from water erosion, in reducing drowning in poorly drained areas and in possible reduction in labor and power requirements. The new system — called ridge planting — combines the high yields of surface planting with the conservation features of contour listing. The system has been under development by Iowa State College and USDA agricultural engineers for the past 4 years.

If you have erosion or flooding problems, we suggest that you think about ridge-planting farming for future operations when more specific details and recommendations become available. There may be some areas where ridge planting would have no advantage over conventional row-crop systems. But the ridge-planting system represents a system which is being developed and tested for use in problem areas — particularly for those areas where soil erosion or poor drainage is troublesome.

This in itself may seem unusual since these are two very different problems. Though different principles are involved, ridge planting works toward the solution of both. The purpose of this article is to give you an idea of what ridge planting is, how it’s done and what it will do.

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What Is It?

Ridge planting is similar to listing except that corn is planted on top of the ridges rather than in the furrows. The ridges aren't cultivated out but are kept throughout the year.

The ridges are laid out on a slight grade from the contour. It's similar to laying out contour strip cropping or contour listed furrows. But in ridge planting, a level area is used at all row ends for turning around. This level, unridged area usually is planted to grass and used as a waterway.

In terraced fields, the ridges are placed parallel to the terraces as in contour farming. Ridges should be plowed parallel to the higher of two terraces until the lower terrace is reached. Ridge rows running clear through drain into the grassed waterways at the ends; short rows drain into the next lowest terrace channel. By plowing the parallel ridges down from the upper terrace to the next lowest terrace, you'll find that the furrows usually drain into the waterways.

In unterraced fields, the situation is again similar to contour farming. The ridge rows are made parallel to and below an initial graded line until the grade in the furrow is about 4 percent. A new graded line is laid out, and a grassed turning strip is established above it. Short rows empty into the turning strip.

The slight grade in the furrow channels lets excess water from heavy rains drain slowly from the field. The excess water, thus, flows slowly across the slope in the furrows rather than straight down the slope. This helps keep soil from being washed away.

Studies indicate that contouring cuts soil loss to about one-third of that of up-and-down hill surface-planting row crops and that contour listing cuts soil loss to one-third of that of contoured, flat-planting strip crops. Ridge planting reduces soil loss in the same manner. Water stays on the field longer so that more of it has a chance to soak into the soil and be stored for the dry season.

How To Do It . . .

Ridges are about 42 inches apart—the normal corn row spacing—and are about 12 to 15 inches high. They're about 28 inches wide at the bottom and are separated by 14-inch furrows. The ridges themselves are formed with a moldboard plow.

With a 14-inch-bottom plow, the 14-inch furrow slice is turned over onto 28 inches of unplowed land. In this case, only a third of the land is plowed while making ridges, though disking before ridge plowing increases the seedbed depth and reduces the draft of the plow.

We've used a 2-way moldboard plow. This can be reversed at the end of each furrow so that you can make another ridge on the return trip. Reversing the plow at the end of each row keeps the turned earth moving toward the unplowed strips of the field. Back furrows and dead furrows are eliminated, and time spent at ends of the field is at a minimum.

In our work, we've used a wide front-end tractor so that both front and rear wheels could be used as guide wheels. We adjusted the wheel widths so that the front and rear tires on one side of the tractor always ran in the furrow just made on the last trip across the field. This is both an easy and accurate means of spacing the new ridge parallel to the last one. It also helps guide the tractor, especially on side hills.

We placed a side-dress fertilizer attachment on the tractor to drop fertilizer ahead of and slightly to the land side of the plow forming the ridge. The result: deep placement—8 inches below the ridge surface—of fertilizer exactly below the row during the initial tillage operation. All crop residue is located together, and the fertilizer is dropped on the trash.

Planting . . .

If the ridges are formed well ahead of planting time, they can be allowed to settle naturally. But, if planting is to be done very soon after ridge plowing, firm the ridge by treading with a rotary hoe pulled backward. If the ground is weedy or the ridge not as high as wanted at planting time, disk the ridges with a disk cultivator before planting.

The planting can be done with conventional mounted equipment, using a single-disk furrow opener. Either drill or hill-drop equipment is satisfactory. Starter fertilizer may also be placed in the ridge during the planting operation.

Weed Control . . .

Other factors aside, weed control holds the key to success with the ridge-planting system. Weeds held down corn yields considerably in Missouri tests of this system. We knew also that it took much hand labor to control weeds
in ridge-planted cotton and tobacco.

In our own tests we applied 1 1/2 pounds per acre of 2,4-D ester in 10 gallons of water at planting time. (If 2,4-D is applied at this rate after the corn has come up, it may damage the corn plants and reduce the yield.) The pre-emergence 2,4-D application controlled broadleafed weeds and stunted annual grass seedlings for from 4 to 6 weeks. Most of our tests were conducted on the heavier clay soils. On lighter soils, there's some possibility that the 2,4-D might leach down into the seed area and cause damage and reduce yields.

We did the first mechanical cultivation with a cultivator equipped with four disk tillers per row when the corn was 12 to 15 inches high. Besides killing weeds, such a cultivation helps maintain the ridges.

We set the front 12-inch disks at a slight angle with the row so that soil was pushed rather than thrown into the row. The rear 16-inch disks were set to gather soil from the furrow and to throw it onto the ridge.

Since the corn is high and because the furrows aid in guiding the tractor, the first mechanical cultivation can be done at a higher rate of speed than on surface- or lister-planted corn. The slow forward motion and careful attention usually needed for early mechanical cultivations are eliminated.

Usually only one other mechanical cultivation is needed to control the weeds in the corn since the 2,4-D delays the time of the first cultivation.

Picking . . .

Conventional corn picking equipment can be used to harvest the corn. The tapered ends of the gathering points can be lowered into the furrow where they're able to run under and gather lodged stalks. Fewer ears are left in the field.

Seeding Oats, Legumes . . .

When it's time to plant oats and legumes in the rotation, ridges are disked down and planted with regular equipment. The grassed turning strips and waterways are maintained throughout the rotation. Hay can be harvested from the turning strips at the same time legume hay is harvested.

Alfalfa presents no problem because the 2,4-D used in the corn year kills any volunteer alfalfa which survives the ridge plowing. Bromegrass, however, may need to be disked several times to kill it.

Protection Offered . . .

We've already described the soil erosion protection offered by ridge planting. Let's take a closer look at how ridge planting offers crop drowning protection. How can ridge planting help in poorly drained areas?

The height of the ridge, together with the graded drainage ways of the furrows where there is a grade, provides some protection against crop drowning during flooding conditions and reduces the drowning of crops in poorly drained areas.

Drainage problems occur most often in soil depressions or on relatively level land. Ridges above a low area keep a lot of excess water from reaching the depression. But even on level land and where water does reach a depressed area, ridge planting helps avoid drown-outs.

The key lies in the fact that, instead of the water being spread evenly over a flat seedbed, it collects in the furrows—leaving the top of the ridge, where the corn is planted, above the water line. In case of more serious flooding, the period of drowning is reduced because the top of the ridge emerges first as the water recedes.

In our tests, the elevation of the ridge caused excess water to drain rapidly from the seed layer and reduced the period of flooding after each rain. The ridge dried faster than the furrow, and the moisture content of the ridge was somewhat less than at equivalent depths in the furrow in periods between rains.

We found the temperature of the ridge to be generally higher than that of the furrow. The warmer, drier ridge resulted in the plants on the ridge germinating earlier and coming up ahead of surface- or furrow-planted corn. These two factors are beneficial in the spring in getting around cold, wet soil. We also obtained higher and more uniform plant populations with ridge-planted corn than with furrow- or surface-planted corn.

Yields from ridge-planted corn are about the same as those from surface-planted corn. In drouth years, such as 1953 and 1954, we got slightly lower yields in well-drained areas but higher yields in areas where drainage or soil erosion was a problem. And, of course, the soil is held on the land to contribute to higher yields in later years.