1991

EQUIPMENT FOR RIDGE PLANTING

Elbert C. Dickey
University of Nebraska at Lincoln, edickey1@unl.edu

Paul J. Jasa
University of Nebraska at Lincoln, pjasa1@unl.edu

Follow this and additional works at: http://digitalcommons.unl.edu/biosysengfacpub

Part of the Biological Engineering Commons

http://digitalcommons.unl.edu/biosysengfacpub/252
In ridge plant systems, crops are planted into ridges formed during cultivation of the previous crop.

Row cleaning devices on the planter push weed seed and residue lying on the soil surface from the ridge to the area between the rows, or row middles. The crop seed is planted into the old row in a cleanly tilled strip at a higher elevation than the row middles. A band application of herbicide behind the planter typically is used in the row for weed control. Crop cultivation controls weeds between the rows and rebuilds ridges for the following year.

Ridge planting equipment uses row cleaning devices to push residue and weed seed to the row middles where a crop cultivator can provide weed control. Crop cultivation controls weeds between the rows and rebuilds ridges for the following year.

Ridge plant systems are often lower in cost than other tillage and planting systems, but may not be suitable for all farming situations. Level or gently sloping fields, especially those having poorly drained soils, are well suited to ridge plant systems. The elevated ridge tends to shed the residue to the row middles, allowing earlier soil warming in the spring. This warming, combined with drainage from the ridge, allows soil in the ridge to be drier at planting time than unridged soil. Ridge planting is an excellent choice for soils that are often too wet for early spring tillage.

Ridge plant systems help control erosion by leaving the soil covered with residue until planting. After planting, 30 to 50 percent of the initial residue may be left on the soil surface. Residue covered areas between the rows alternate with cleanly tilled strips in the rows. If planting is done correctly, the cleanly tilled strips will be higher than the residue covered areas, so that water drains from the row to the residue covered row middles.

**Ridge Cleaning Equipment**

Ridge planting equipment uses row cleaning devices to push residue and weed seed to the row middles where a crop cultivator can provide weed control. Removing the residue also enhances warming of the soil.

Disk furrowers can be used to move some of the surface residue and weed seed to the row middle. In general, larger diameter disks will be more effective in moving residue and weed seed, and have less plugging problems than smaller diameter disks. Overlapping, notched-edge heavy duty versions are available to clean the ridge tops. The notched edges aid in keeping the disks rotating when operating at a shallow depth. The
overlapping disks cut the residue without plugging and clear the row area behind the disks.

To minimize side draft, the leading disk should be on the right for half the furrows and on the left for the other half.

Some ridge planters use a wide sweep to clear the ridge top. The flat sweep operates at a shallow depth, sliding under the residue and moving residue, soil and weed seeds to the row middle. Often some type of deflector shields or “trash guards” are used to move the residue, soil and weed seeds off the ridge top as they slide over the sweep.

The horizontal disk is free to rotate and is designed to operate like a sweep, sliding under the residue and soil. Deflector shields keep the row area clean. The rotating action makes the disks self-cleaning and distributes wear around the perimeter of the disk rather than only on the leading edge.

The row cleaning devices should be operated at a very shallow depth, removing less than 1 or 2 inches of the ridge top to keep the row higher than the residue covered row middles. This reduces the erosion potential in the cleanly tilled strips. After planting, the top of the ridge should be 3 to 5 inches higher than the row middle and shaped to shed water to the row middle.

For erosion control, never allow the row area to be lower than the row middle after planting. Doing so can concentrate runoff in the cleanly tilled strips, which increases erosion in the row area on sloping soils when planting is up and down hill. Even if the field is relatively flat and has little erosion potential, creating furrows by operating the row cleaning device too deeply can cause sediment from runoff to be deposited in the row. When dry, these deposits can form a crust that a rotary hoe may not break because the row is lower than the row middles. Additionally, operating row cleaning devices too deeply places the crop seed in a cooler, wetter environment, which can slow germination and emergence.

Operating row cleaning devices too deeply is a common problem with ridge plant systems. The operating depth needs to be only deep enough to keep residue and weed seeds flowing away from the row area. Very little soil needs to be moved and it is not necessary to remove the previous crop root masses. In fact, removing the root masses can cause these problems:

- The removed root masses may be run over by planter gauge wheels, causing non-uniform planting depth.
- A void can be created in the soil where the root mass was removed and the planter may not be capable of placing and covering the seed properly when seeds are dropped into these voids.
- At cultivation, root masses can plug the cultivator or be pushed back into the row, interfering with crop growth or harvest.

Several different methods are used to control the operating depth of the row cleaning devices. Those that operate independently of the planting unit provide the most uniform and consistent depth control. Those devices that mount directly to the planting unit and use the planter gauge wheels for depth control may have inconsistent operating depths. Although not as good as independent depth control, mounting the row cleaning device on the parallel linkage between the toolbar and the planting unit can be an effective compromise between performance and cost.

Planter Stabilizing Attachments

Since ridge planting occurs on the old row, keeping the planter on the ridge is important. On properly formed, flat-topped ridges, planter stabilizing attachments generally are not needed. However, when planting on peak shaped ridges, contours or a slope, an attachment may be needed to help keep the planter on the old row.

Coulters are often added to the planter to cut residue in front of the ridge cleaning attachment. These coulters act as stabilizing devices, similar to the stabilizing coulter added to most row crop cultivators. Another option is the addition of large diameter coulters to the toolbar of the planter. Coulters guide the planter in a straight path, minimizing side-to-side movement rather than actually following the ridge. If the planter is off the ridge, coulters will make it difficult to get the planter back on the ridge.

Tapered stabilizing wheels running in the furrow or angled guidance wheels running on the side of the ridge are sometimes used to help the planter follow the ridge. These devices, used in pairs, are mounted on the toolbar to keep the planter on the old row. In order for these wheels to work properly, they must carry some of the planter weight. Care must be taken when mounting these wheels to keep enough weight on the seed metering drive wheels to prevent slipping. Some ridge planting attachments use small angled guidance wheels on each row unit rather than the larger toolbar mounted guidance wheels.

Active guidance systems are also available to help keep the planter on the ridge. These devices sense the ridge, furrow or standing residue and use mechanical or hydraulic steering systems to keep the planter on the row.

Other Equipment Considerations

For ridge plant systems, a large part of seedbed preparation is done during the ridge building operation. Properly shaped ridges of sufficient height minimize problems at planting time while providing excellent erosion control. It is important that subsequent operations, such as harvesting and fertilizing, do not damage the ridge. Narrow tires and proper wheel spacing on all field equipment are necessary to avoid damaging the sides or tops of ridges. For heavier equipment, a narrow tire may not have adequate load carrying capacity. Dual tires, spaced to straddle the ridge, may be required in these circumstances.