

BEST MANAGEMENT PRACTICES

CHAPTER 12



Land Rolling Corn Fields

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Historically, land rolling was used to improve germination in alfalfa and grass-seed production systems. Recently, land rolling has been expanded to row-crop production systems. Land rollers are used to push rocks into the soil, thereby reducing the risk of harvest losses and combine breakdowns. Benefits from land rolling include reduced equipment breakdowns, reduced harvest losses, reduced operator fatigue, ability to place the combine head closer to the soil surface, and improved emergence. Lowering the combine head can reduce soybean losses because, the pods can be very close to the soil surface. However, in corn production lowering the combine head to near the soil surface will produce a minimal impact on harvest efficiency. Primary disadvantages are increased compaction and erosion. We suggest that land rolling should be considered only in fields containing a large number of rocks. This chapter investigates the impact of land rolling on corn production.

Land Rolling Introduction

Land rolling is simply pulling a large cylindrical roller over the field to smooth and push small rocks into the soil. Land rollers range in price and can cost up to \$50,000. Custom land-rolling rates in Iowa average \$6.55/acre (Wolkowski, 2011). There are many types of land rollers and they range in size from 20 to 85 feet wide. Land rollers can have smooth, notched, and coil drums. The coil and notched systems leave the soil rougher than the smooth-drum system. Coil drums help break up rootballs, whereas notched system breaks up rootballs and push rocks into the soil (DeJong-Hughes et al., 2012). Drums have a packing force similar to the closing wheels on a planter.

Benefits of Land Rolling

1. Ability to operate sprayers and combines at faster speeds.
2. Reduced equipment breakdown during critical periods.
3. Reduced harvest losses.
4. Reduced operator fatigue.
5. Improved seed germination.
6. Accelerated microbial decomposition as a result of pushing crop residues into the soil.
7. Reduced stand variability.

Rollers effectively push rocks down into the soil, and in a no-tillage system, a land roller will lower mounds left by burrowing rodents and dramatically reduce the risk of equipment damage. A fist-sized or

larger rock can cause significant damage to a corn combine, especially cylinders and/or concaves. Repair costs resulting from rock damage can potentially cost tens of thousands of dollars to a \$300,000 combine. Mounds left by burrowing animals, such as pocket gophers, can be equally problematic. Land rolling may also help speed surface residue mineralization by breaking apart corn rootballs, and reducing the risk of flat tires.

Animal mounds can bounce and jar spraying and harvest equipment, leading to structural or mechanical damage and malfunction. Land rolling can partially smooth these areas and minimize undue stress on equipment. Combining at high speeds in fields with animal mounds can increase the chance of ears bouncing out of the header. Adjusting the combine header to avoid rocks, reduces the risk of combine damage and repair costs, but can leave low-hanging ears in the field. Land rolling conducted after planting can reduce this risk as well as improve contact between the corn seed and the soil.

Disadvantages of Land Rolling

1. Crushes soil aggregates and destroys the surface roughness that protects the soil from wind and water erosion. This can result in soil sealing and reduced seedling emergence.
2. Increases weed seed germination by improving soil to weed seed contact (Lessen, 2009).
3. Leads to seedling damage if rolling is conducted after emergence.
4. Reduces water infiltration and increases erosion rates (Al-Kaise et al., 2011).
5. Increases soil compaction.
6. Includes difficult-to-document economic benefits (DeJong-Hughes et al., 2012).

Mitigating the Disadvantages of Land Rolling

1. Return the crop residue and maximize residue cover after planting.
2. Roll only areas containing rocks.
3. Avoid land rolling after plant emergence.
4. Do not roll wet fields.
5. Do not roll fields to level tire ruts.
6. Configure tractor and roller tire size and spacing to your row spacing.

References and Additional Information

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A G R O W I N G I N V E S T M E N T

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