



## How Does Corn Stover Removal Effect Nutrient Management?

### *What is the expected tonnage of stover per acre?*

Stover tonnage is based on grain yield, for every 40 bushels/acre of corn produced at 56 lbs per bushel at 15.5% moisture, 1 ton of residue, at 10% moisture, is produced. Therefore, with grain yield of 180 bushels of grain, 4.5 tons of stover is produced and with 210 bushels of grain yield, 5.25 tons of stover is produced. While this is an estimate of the total amount of stover available, end-use will dictate the harvestable stover yield. Stover destined for use in cellulosic ethanol production, needs to be free of soil and as such only a partial stover harvest of, 20 to 60 percent of the amount of stover available is recommended. While harvesting for bedding or feeding can contain some soil, it is advised to leave approximately 2.5 tons of residue to maintain soil quality.

### *What is the value of nutrients being removed with the stover?*

The nutrient value of the stover depends on the growing season, management practices in season, time of grain harvest, and geographic location, and what part of the plant is being removed. For example, more nutrients are concentrated in leaves and husks than in the stalks. Per ton of dry harvested corn stover, average nutrient concentrations include 17 lbs of nitrogen, 4 lbs of P<sub>2</sub>O<sub>5</sub>, 34 lbs of K<sub>2</sub>O, and 3 lbs of sulfur. Multiplying these nutrient values in pounds per ton by current fertilizer prices in dollars per pound gives the value of nutrients in the residue based on dollars per ton of residue removed.

Nutrient amount (lbs/ton) x fertilizer price (\$/lb) = Value of Nutrients in Stover (\$/ton) Additionally, consideration should be given to the effect of removal on soil pH. Harvesting 1 ton of corn residue per acre removes cations equivalent to 35 lbs of lime. If lime is worth \$40/ton, \$0.70 should be added to the value of crop residue.

### *What is the impact of stover removal on soil quality and health?*

Soil quality as defined by soil health is impacted by several components, soil organic matter, soil compaction, soil structure, water infiltration, and water and wind erosion. Removal of too much corn stover can decrease soil organic matter over time and increased wheel traffic from harvesting operations can lead to soil compaction, especially if field conditions are wet. Excess stover removal can also increase the risk of water and wind erosion. Therefore, sustainability of stover removal on soil health needs to be based on careful evaluation of each field and situation to determine the rate of stover removal. A study in Nebraska investigated the impact of tillage practices, soil type, and slope on the amount of residue needed to limit soil erosion from water to less than 5 tons per acre per year on silt loam and silty clay soils. If the fields were being disked, had a 2% slope with an average yield of 150 bushels per acre. However, fields that were no-tilled and even up to a 10% slope could have stover removed and still have less than 5 tons/acre/year eroded by water.

### *Sources: (Verified 8/30/2019)*

<https://cropwatch.unl.edu/2017/corn-stover-removal-nutrient-value-stover-and-impacts-soil-properties>

<https://www.extension.iastate.edu/stover/content/soil-quality>

### *Legal Statements*

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