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How Much Soil Does A Turfgrass Sod Farm Deplete?

One of the first questions asked of anyone involved in turfgrass sod production is, “How many times can you harvest sod before you run out of soil, or how often do you have to truck in more soil?”

Just looking at a piece of sod, the impression usually is that a large amount of soil is in fact being trucked off the farm, so the question seems logical. Fortunately for sod producers, they aren’t actually selling their farms an inch at a time but are in fact “growing” more top soil as a result of their farming practices and the growth habits of turfgrass.

The question of soil depletion through sod harvesting was answered by the scientific community in 1978 as a result of two independent studies and reconfirmed by the Internal Revenue Service in 1979.

Compressing the findings into a single statement, Dr. Richard Skogley, University of Rhode Island ⁽¹⁾ reported, “...measurements have been made which clearly show that sod farming is not a soil depleting enterprise when compared to other, accepted, routine agricultural enterprises. The studies have indicated that the age of the stand and harvesting method can very significantly influence soil losses. Data obtained also reaffirmed that soils are improved through turfgrass production as a result of incorporation of large amounts of organic matter.”

Summary of Scientific Findings:

University of Rhode Island, Dr. C.R. Skogley:

Soil erosion from sod production should be minimal; previous research has demonstrated the advantages of handling and rooting sod that is thinly cut (less soil loss, quicker rooting and reduced trucking costs); when sod is harvested, most of the grass root system is left in the soil; sod returns the equivalent of nearly four tons of organic matter per acre to the soil each year; the thickness of the root layer removed, with soil attached in harvested sod is in the range of 0.36 inches to 0.21 inches.

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University of Guelph, Ontario, Rd. R.W. Sheard and Mr. V. Van Patter:

Grass plants add organic matter to the soil by the decay of old roots and shoots while living and following harvesting by the plowing-in of root remains; thatch may be mistaken in part for mineral soil by those unfamiliar with the sod industry, resulting in over estimation of soil removal; the depth of soil removed in sod harvesting averaged 0.37 inches for eight different study sites.

U.S. Internal Revenue Service, 1979 Revenue Ruling 79-267:

The soil that is removed with each harvesting of sod is partially replenished through the decomposition of grass roots that remain in the soil and through the addition of fertilizer and lime to the soil. As a result of these farming techniques, there is no measurable reduction in the volume of soil present. The soil created by the taxpayer's agricultural methods is not subject to the depletion allowance.

The following table has been reproduced from "Soil Conservation" (Bennett, H.H. 1939. Soil Conservation. McGraw-Hill, Inc., New York. Page 191.)

Soil Treatment	Tons of soil Removed Per Acre	Yrs. Required to Remove 7 inches	Percent Rainfall Run-off
Uncultivated, weeds pulled	207	29	49
Cultivated through summer	247	24	31
Same, w/deeper plowing	21	428	28
Continuous turfgrass sod	2	3,547	12
Wheat every year	40	150	25
Corn, wheat clover rotation	14	437	14
Corn every year	107	56	27

Conclusion:

Although some misinformed people may view turfgrass sod farming as a form of strip mining and a waste of a natural resource, it's really quite the opposite. The lower portion of harvested sod may appear to be soil, but is really a leafy portion attached to a thatch/root layer that normally measures 1/2 to 3/4 inches thick

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containing a bit of soil. Turfgrass production improves farmland soil by adding organic materials and nutrients. Grass roots are continually developing, dying off, decomposing, and redeveloping. Organic matter keeps soil microbes active and improves soil chemical and physical properties.

Dr. C. Richard Skogley's research at the University of Rhode Island showed that when sod is harvested, most of the grass root system is left in the soil. He found that sod fields contained an average difference of 1.9% more organic matter. Work by Skaradowski and Sullivan ⁽²⁾ found that sod production fields increased in organic matter with time. Assuming that a 6-inch depth of soil on an acre weighs 1,000 tons, then this represents 19 tons per acre returned to the soil. Based on a five-year study, it could be concluded that the sod operation had added the equivalent of nearly four tons of organic matter to the soil each year.

Turfgrass sod production is much less destructive to farm land than other types of agriculture, particularly open row, annually harvested crops. It is an environmental plus because of the erosion control it offers and the amount of run-off it captures.

Turfgrass, whether its on a farm, home yard or sports field significantly reduces soil erosion and the resultant filling of storm sewers and waterways with siltation. At the same time it allows water to slowly infiltrate into the ground and surface water systems after being filter through the grasses' leaf, thatch and root structures.

1. Skogley, C.R. and B.B. Hesseltnine. 1978. Soil Loss and Organic Matter Return in Sod Production. University of Rhode Island, Kingston, RI

2. Skaradowski, S. and W.M. Sullivan. 1995. The Effects of Commercial Sod Production on Soil Dynamics. American Society of Agronomy. Madison, WI. R.I. Agricultural Experiment Station #3186.

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