

Using Leaves For Corn, Soybean Production

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Farmland can benefit from the application of leaves collected from municipalities. However, there are some agronomic issues regarding soil quality and crop production which every producer should consider before agreeing to accept leaves for land application.

For example, what is the nutrient value of the leaves which will be applied? How will the leaves affect the organic matter content of the soil? Will the extra carbon immobilize too much nitrogen? How will the application of leaves impact grain yields?

A three-year study was conducted by Dr. Joseph Heckman at the Rutgers Snyder Research and Extension Farm in northern New Jersey in order to address these concerns and others.

The trial consisted of the application of three different rates (0, 10, and 20 tons dry matter per acre) of leaves to field plots each November for three consecutive years. The plots were chiseled soon after application of the leaves and planted to corn or soybeans the following spring.

Soybean plots were split to compare 0 vs. 100 pounds per acre of additional nitrogen. The corn plots were split to compare 170 and 270 pounds per acre of additional nitrogen.

Tree leaves have a relatively low concentration of most plant nutrients (1 percent N, 0.1 percent P, and 0.4 percent K) and a high carbon to nitrogen ratio of approximately 50:1. However, an application of 20 tons per acre of tree leaves (approximately 6 inches deep) adds an estimated 45 pounds P per acre, 171 pounds K per acre, 108 pounds Mg per acre, and 738 pounds Ca per acre.

Soil analyses were performed one year after the three-year study was completed. As expected, soil organic matter increased with the heavy applications of leaves. Organic matter content was 2.4 percent, 2.9 percent, and 3.1 percent on plots receiving 0, 10, and 20 tons per acre, respectively. Mehlich-3 levels for P and Mg

did not significantly increase with the annual application of leaves, but at the 20 ton per acre rate, Ca and K levels showed a significant increase.

The application of leaves to cropland does cause some immobilization or "tie-up" of available nitrogen. Soybean plants in the trial exhibited mild symptoms of nitrogen deficiency until a well-nodulated root system was established. However, this did not seem to reduce soybean grain yield.

When a higher rate of N was applied to corn grown on soil amended with leaves, grain yields generally increased by the additional nitrogen fertilizer.

There is still some uncertainty in making nitrogen recommendations on corn fields where leaves have been applied. Therefore it was determined in the study that more research is needed on crop nit-

rogen requirements under these conditions.

Generally soybean and corn yields were comparable or better in soils amended with leaves compared to the unamended soils. Corn yields appeared to increase from approximately 2 to nearly 20 bushels per acre with addition of the leaves. The researchers speculated that the improvement was in part due to improvements in soil moisture holding capacity.

One item not specifically addressed is the fact that leaves supplied by municipalities sometimes contain a small amount of bottles, cans, and other undesirable materials. Leaves collected from curbside are usually vacuumed into a truck and of course the vacuum will pull in whatever loose material happens to be in or around the leaf piles. If a producer is not willing to accept a certain amount of foreign



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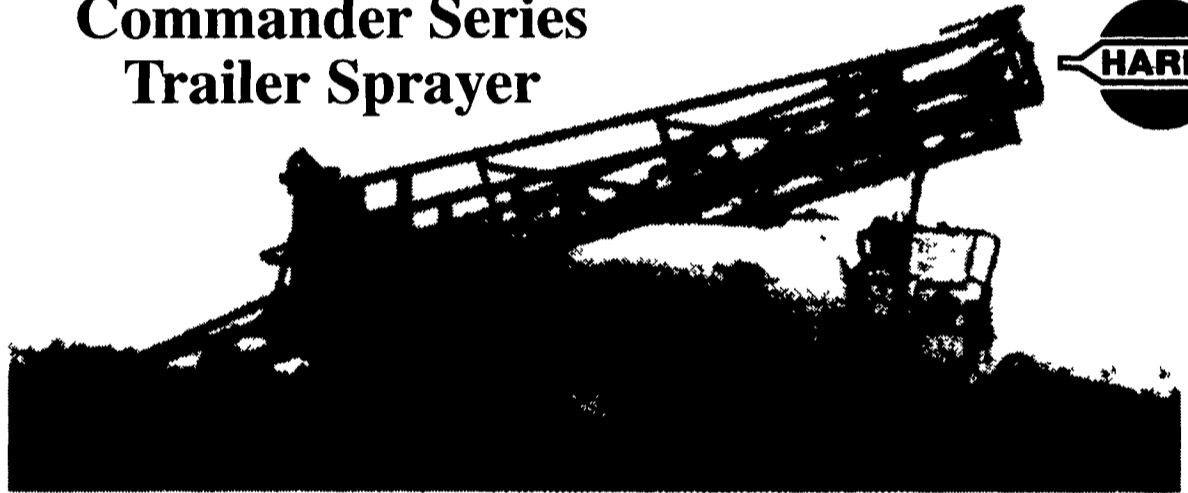
material in the leaves, he or she should probably not accept bulk leaf waste. The exception to this would be if the leaves were composted and screened, but there is still a possibility of some inorganic material passing through the screens.

In general, the application of tree leaves to cropland appears to enhance certain soil physical properties such as organic matter and to a lesser degree provide a source of nutrients. Increasing soil organic matter

can result in higher yields on amended soils. Careful attention must be paid to managing carbon and nitrogen because there is the potential for nitrogen immobilization. Higher N rates might be necessary to compensate for the additional carbon added in the leaves.

Some fields will benefit more than others from the addition of leaf waste. Each producer needs to decide if this is a practice that would be worth the extra management on his or her farm.

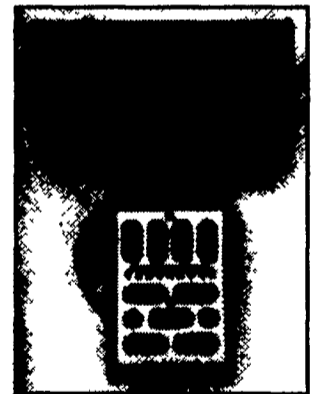
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