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Hailed-out soybean fields

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Hailed-out soybean fields

Abstract

An unfortunate hailstorm "harvested" a large number of soybean fields in a swath across northwestern Iowa on October 1. In these fields, the amount of soybean seed knocked from the plants varied from minimal to essentially the entire yield. Although nothing can be done to replace the lost grain, at least nitrogen (N), phosphorus (P), and potassium (K) nutrients returned to the soil in the soybean grain can be accounted for when planning nutrient applications for 2003 crops. An estimate of soybean bushels per acre lost is needed to approximate nutrient return to the soil.

Keywords

Agronomy

Disciplines

Agricultural Science | Agriculture | Agronomy and Crop Sciences

INTEGRATED CROP MANAGEMENT

Hailed-out soybean fields

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Hail damage to soybean plants.

[Enlarge](#) [1]

For P and K, the calculation is straightforward. Either multiply the estimated yield lost times the bushel equivalent content for P₂O₅ and K₂O (for soybean, 0.80 lb P₂O₅/bu and 1.50 lb K₂O/bu), or if the loss was significant or the crop not harvested, simply assume fertilizer or manure P and K applied before planting were never removed from the soil. With both approaches, P and K returned to the soil in soybean grain will be available for future crop use. Because the soybean residue was not affected, there is no difference from a normal harvest.

It is expected that the usual "soybean credit or rotation N effect" for the soybean-corn or other soybean-crop rotations will not change in hailed fields. At harvest, the majority of aboveground plant N is contained in the soybean seed (see the October 23, 2000, *Integrated Crop Management* newsletter article [Dry fall leads to field fires](#) [2], pages 175-177, for a discussion of the N, P, and K content of mature soybean). Therefore, an estimate is needed of the additional N that will be supplied by the hailed-out soybean seed. In recent research conducted at multiple sites across Iowa, the measured soybean seed N content averaged 3.1 lb N/bu (this value will vary somewhat depending upon grain protein content). For example, a soybean yield of 40 bu/acre would contain approximately 125 lb N/acre.

In essence, think of the soybean grain lost to the soil as fertilization with an organic N form. Therefore, an estimate is also needed in regard to conversion of the seed N (organic N) to crop-available inorganic N (estimate of net mineralization). Not all of the seed N will be available the first year. Although it is not known exactly what the availability will be, a suggested estimate is only 80 percent of soybean seed N being readily released to the soil

during decomposition (with 20 percent tied-up in soil microorganisms, soil organic matter, or released over several years). Using this approach, in a 40-bu seed loss/acre approximately 100 lb N/acre would become available to the following crop. In high yield-loss situations, it is possible that the rotation and hauled-out soybean seed could supply all or nearly all of a corn crop N need. In those instances, a suggested management practice is to apply a small amount of N (15-30 lb N/acre as starter or weed-and-feed) next spring to offset any delay in N availability or lower than expected N supply from the soybean seed. The amount of crop-available N calculated would vary depending upon the soybean yield and hail loss estimate. In partial loss situations, subtract the estimated available N from the expected crop N need.

Common questions and answers on N loss and availability

Question: If the soybean seed germinates this fall, will there be a change in N availability?

Answer: If there is any impact, it is likely to increase the decomposition of the organic seed materials and enhance N release.

Question: Is tillage needed to prevent N loss?

Answer: Volatilization should not be an issue, so tillage to cover the seed is not needed. Given erosion concerns related to tilling soybean stubble, it would be better to leave the fields alone this fall. Also, tillage should not be necessary to promote seed decomposition.

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Links:

[1] <http://www.ent.iastate.edu/imagegal/plantpath/soybean/hail/soyhaildamage.html>

[2] <http://www.ipm.iastate.edu/ipm/icm/2000/10-23-2000/dryfallfires.html>

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