Foliar Nitrogen Fertilization May Increase Soybean Yield

Biological N fixation (BNF) alone in soybean \( \text{Glycine max (L.) Merrill} \) crops is efficient as a N source to the soybean crop at yield levels up to 3,800 kg ha\(^{-1} \). However, for yields above 4,000 kg ha\(^{-1} \), the N cannot be sufficient to fill the last seed, considering that the activity of the radicular system and the nodules acting in BNF decrease exponentially towards the end of the development cycle when the pods are formed.

In an article recently published in Agronomy Journal, researchers reported that BNF was not sufficient to meet the requirements of a soybean crop with high yield under no-till (NT) system and that foliar N fertilizer application at the R3 (beginning of pod) to R4 (full pod) growth stage may be needed to fill the last seed of the upper third of the plant.

The researchers found that foliar N fertilizer was efficient at improving the yield but may not be sufficient to offset additional fertilizer cost, even though the additional cost of applying 5 to 10 kg N ha\(^{-1} \) is minimal. These results demonstrated that N foliar applications increase the yield of soybean under certain tropical and subtropical environmental conditions.


Accuracy and Precision of Plant Biomass Mineral Analyses

Laboratory accuracy and precision are essential for scientific research in order to obtain reliable and repeatable results on which scientific and other decisions are based. Accuracy refers to the closeness of a measured value to a standard or known value. Precision refers to the closeness of two or more measurements to each other.

In the March–April issue of Agronomy Journal, the precision and accuracy of laboratories that conduct mineral analyses of plant biomass on a fee basis were tested by having them conduct mineral analyses on subsamples of the same set of switchgrass samples and a certified biomass standard. Mineral content of biomass can affect its use in conversion to bioenergy and its feed value for animals.

Laboratories differed significantly in both accuracy and precision even though several used the same analysis method, indicating that the differences among laboratories were due to within-laboratory procedures and quality control. Laboratories should be using sample standards to monitor both precision and accuracy of their analyses.

It would be advisable for researchers submitting samples to service laboratories to replicate the unknown samples to determine precision and to include replicated standards among the submitted samples to determine accuracy.


Comparisons of university and commercial laboratory biomass calcium (Ca) and potassium (K) analyses using five switchgrass standard samples. Standard errors are above the mean bars. Laboratory results differed significantly. Laboratories F and G had the highest overall rating for both accuracy and precision.