Trade-offs in Cereal Rye Management Prior to Organic Soybean

Traditionally, organic agriculture has relied on soil tillage and cultivation for weed control. However, tillage is fuel and labor intensive and can lead to the destruction of soil structure. Alternatively, the use of cover crops can help to manage weeds and improve soil health.

In an article recently published in *Agronomy Journal*, researchers report on a field experiment that compared soil health, weed biomass, productivity, labor requirements, and profitability of three management strategies for a cereal rye cover crop prior to organic soybean.

The team found soil health improvements and labor savings when cereal rye was terminated with a roller-crimper prior to planting soybean compared with when no cover crop was planted. Profitability, on the other hand, was highest when cereal rye was harvested for forage prior to soybean planting.

These results show that growing cereal rye can improve soil health, reduce labor requirements, and enhance profitability, but no one management strategy provided all of these benefits. More research is needed to better understand how management can be improved to overcome trade-offs between strategies.


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Optimizing Sugarbeet Nitrogen Rate in the Red River Valley

Nitrogen (N) is a critical input for sugarbeet (*Beta vulgaris* L.); excess N can reduce the sugar content, but under-application can reduce the root yield. The current recommendation suggests a single fertilizer N application rate of 146 kg N ha\(^{-1}\) to achieve the yield goal of 45 Mg ha\(^{-1}\) in the Red River Valley. However, average sugarbeet yield ranges between 54 and 70 Mg ha\(^{-1}\).

In an upcoming issue of *Agronomy Journal*, researchers report the results of field trials conducted to validate the current recommendation at three Minnesota locations (Ada, Crookston, and Sabin) for the 2015–2016 growing season. In addition, the potential of an active optical sensor was evaluated to determine the response to N application rates of 0, 112, 146, 179 and 213 kg N ha\(^{-1}\).

Sugar yield and economic return were optimized at 112 kg N ha\(^{-1}\). However, economic optimum N rate varied between 0 and 405 kg N ha\(^{-1}\) depending on site and growing year. Late-season (1000–1200 growing degree days) measurements of soil N at a 0- to 120-cm depth and red edge NDVI have potential to predict sugarbeet N response.

The results suggest a revision of current sugarbeet fertilizer N recommendation based on site characteristics and economic return to N applications.


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Cereal rye is rolled at the research site in Aurora, NY. Photo by Kiera Crowley.