Sensors Gauge Nitrogen Needs

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The use of crop sensors for the optimization of nitrogen application was presented recently by Dr. Ole Wendroth, soil physicist at the University of Kentucky, Lexington.

He explained that farmers downloading a yield map from their combine monitors may notice that there's an enormous spatial variability in corn yield.

"In this case, the lowest yield class is about 50 bushel per acre, the highest about 150 bushel per acre," he explained.

This has occurred even though the farmer has applied the same amount of nitrogen fertilizer, pesticides and everything else everywhere in the field.

"So with the same amount of fertilizer we have such a wide range in yields and that's a problem," Wendroth said. "The problem is, if some areas had not received so much nitrogen they still would have yielded well; and other areas could have had more nitrogen in order to yield even better.

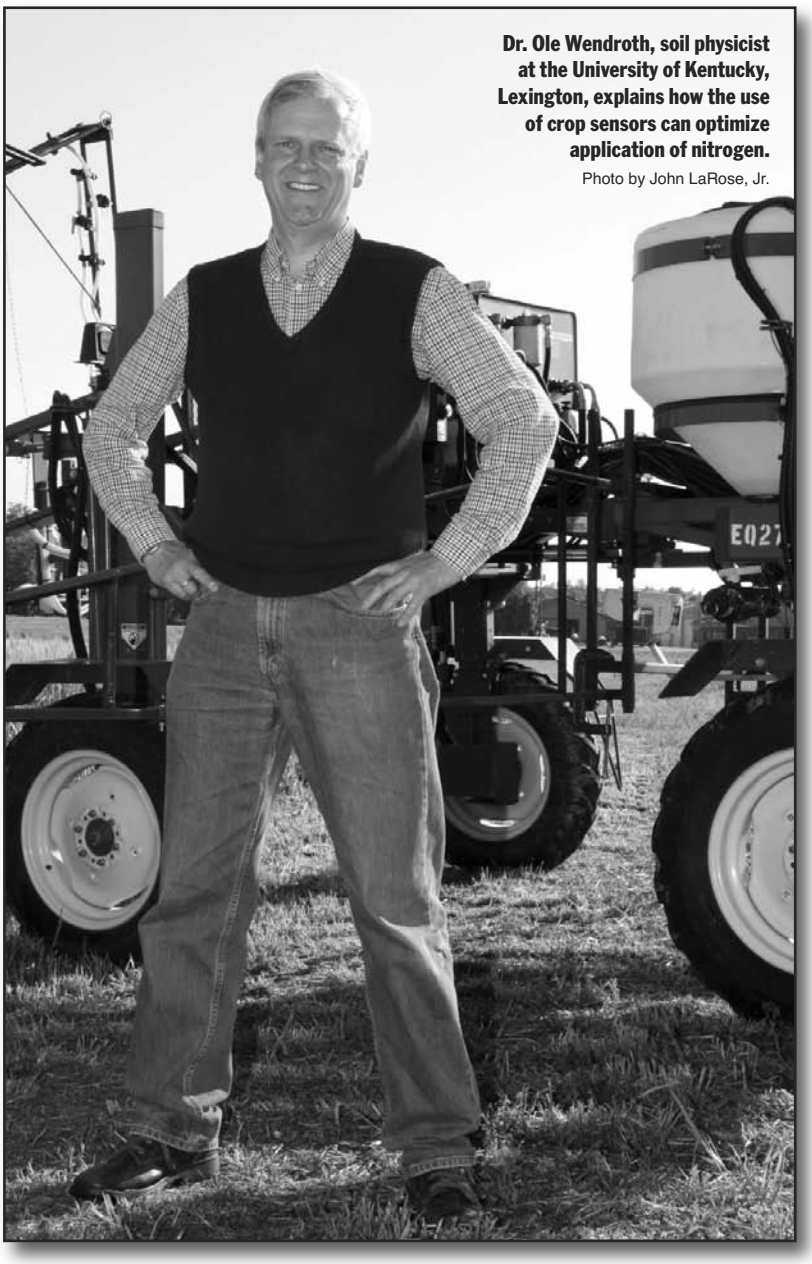
"On the other hand, having applied a given amount of nitrogen in some areas resulting in low yield, what happened to all that nitrogen? Was it lost? So we want to use sensors similar to those we have in our homes, a thermostat on our air conditioning or heating system that controls temperature efficiently by only turning on the pump when needed. That's the idea of these crop sensors," he explained.

Wendroth displayed three different sensors that were used in nitrogen application experiments. He noted that field soils are variable and throughout a long field one can expect tremendous soil changes. The optical sensors use canopy reflectance of light to measure the nitrogen needs of the plant.

"The reflectance of light in early spring is what the farmer sees with the dark intensity of green," he said. "Well fertilized wheat or other crops show a darker green."

Wendroth said that even if a farmer has only one or two Greenseeker sensors attached to the boom of the sprayer it is better than nothing.

"With sensors at about every 10 to 12 foot along the boom we can still see a relationship to yields, so if the farmer wants to go that close down in the application it can be done," he added. "Nowadays sprayers are designed in a way that the same rate is applied over the entire width of the boom, 90 foot and the largest booms are 120 feet. I think it is only a matter of a short time we can apply different rates of fertilizer from that segment of the boom, maybe 10 to 12 foot can be individually driven by the sprayer computer.



Dr. Ole Wendroth, soil physicist at the University of Kentucky, Lexington, explains how the use of crop sensors can optimize application of nitrogen.
Photo by John LaRose, Jr.

"Another thing is, those sensors right now are certainly expensive but you also have to appreciate the value that results for the environment. We can certainly reduce nitrogen losses, but we can also use the nitrogen more efficiently at the spot where we need it," he summed. Δ

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