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VARIABLE RATE FERTILIZING—SOME NEW DEVELOPMENTS

Recent developments in precision agriculture technologies are exciting. As refinements are being developed, more and more practical and beneficial tools are becoming available for on-farm use. One area that greatly affects plant nutrient management is variable rate technology (VRT). The capability to change the rate of fertilizer being applied has been available for a couple of decades, but there are some recent products or techniques that make better use of VRT.

One is the capability to have "sectional control" on an air-drill planter or a fertilizer applicator. For example it divides a formerly 48 ft. wide machine into six sections, each 8 ft. wide, that can be turned on or off to prevent overlap. This technology was initially used in sprayers applying pesticides, but is now available for fertilizer applications. This is beneficial because not all fields are easily accessible and depending on the natural obstructions in a field — for example creeks, sloughs, bush areas, rock piles, or exposed bedrock — it is not possible to drive in straight lines from one end of the field to the other. Field operations usually involve turning around the obstructions. Earlier, this meant either leaving areas untreated or unplanted, or overlapping to ensure no gaps of application. I have seen presentations that show reductions of fertilizer product applied of up to 10% by eliminating the previous overlapping.

Another is improved ways to decide what rate of fertilizer to apply on different parts of a field, called "management zones". When VRT became available, it lacked the ability to assess different areas separately and then decide and justify what different nutrient rates to apply. It is not uncommon for equipment engineering developments to exist before the agronomic justification and decision making capability is refined. Initially, different management zones were delineated based on one or a few sources of information. For example, topographic position (e.g. upper slope, mid-slope, lower slope, and depression), or soil color (e.g. different shades of dark or light as affected by organic matter content of the topsoil), or previous yield maps breaking a field into categories a number (e.g. 5) of low to moderate and to high yielding areas. Each source of information was called a layer of information. Now there are sophisticated systems that combine remotely sensed satellite technology images measuring crop growth over multiple years (e.g. up to 25 years), along with topographic position, soil color, and yield map layers of information, in order to break a field into a series of unique and repeating management units.

Separate soil sampling by management zones is now possible. This is a way to access soil testing result information separately for specific management zones, as described above, to come up with unique and improved recommendations for each zone. This can reduce the number of soil samples gathered, and reduce the time and cost of taking and analyzing samples. Previously, fields were grid-sampled where soil sample locations were set based on an actual physical grid, e.g. one sample in the center of a set area (1 to 5 acres), and maps showing areas of different nutrient availability levels were developed. Instead, now a series of random soil samples, usually 15 to 20, are taken within the same delineated management zone types and bulked together. Then, a sub-sample is analyzed separately for each different management zone.

These are just three examples of recent developments of precision agriculture products that are now available to improve the way VRT is used on farms. The benefits of using VRT continues to improve with time and is being used by an increasing number of farmers.

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