Using Variable-Rate Technology and the P Index for Agronomic and Environmental Phosphorus Management at a Field Level. (S04-mallarino115125-Oral)

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Abstract:

Excess P application to fields increases P loss and impairs water quality. Variable-rate technology (VRT) provides a practical method for changing P application rates. Research has suggested that VRT may not increase crop yield compared with uniform fertilization but can distribute P more efficiently. This technology can be used in conjunction with a P risk index. The P index integrates soil-test P (STP) with other P source and transport factors, identifies mechanisms for high P loss, and suggests improved management practices. The Iowa index establishes risk classes by considering loss of particulate P potentially bioavailable in lakes through erosion, and loss of dissolved P through surface runoff and subsurface drainage. On-farm trials in 12 fields showed that applying fertilizer or liquid swine manure with VRT based on STP did not affect yield but reduced both STP variability and the P applied to environmentally sensitive areas. Complementary demonstrations of P index implementation for within-field conservation management zones showed that both tools can be effectively used to apply P, even to predominantly high-testing fields, while maintaining a reasonably low risk for P loss.

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