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FRUITS AND VEGETABLES DEMAND INTENSIVE NUTRIENT MANAGEMENT

Fruit and vegetable producers have long recognized the impact of soil fertility on quality. They fertilize their crops intensively to ensure good quality. But with increasing regulation of nutrient management, we need to know the optimum levels of the environmentally sensitive nutrients—nitrogen and phosphorus—more precisely.

Nothing beats fruits and vegetables for healthy nutrition. Fruits and vegetables provide minerals, vitamins, and other substances that enhance health and prevent disease through their role as antioxidants. The soils they grow in, and the minerals they are fertilized with, influence their quality: the nutrients they contain and their effectiveness as health foods.

Most fruits and vegetables return higher value per acre than other field crops. As a consequence, they are managed more intensively. They tend to be grown on soils of lighter texture: soils which are more manageable and less sensitive to weather, and easier to irrigate. However, these soils are not the best at retaining nutrients. In this combination of management intensity and soils, the economic optimum comes closer to conflicting with the environmental threshold than it does for field crops.

Research is providing answers. Scientists are actively addressing the question of how to harmonize intensive production practices with the environmental goal of minimum risk of water contamination.

Balanced levels of fertilization provide a partial answer. For example, in a recent field experiment in Ontario, green peppers removed more nitrate from the soil when they were fertilized with phosphorus. As a consequence, 30% less nitrate was left behind at harvest: nitrate that would have been susceptible to leaching from the rooting zone. At the same site, another experiment showed a positive association between phosphorus taken up into the tomato plant and soluble solids in the fruit. Balanced fertilization can improve quality of both water and fruit.

Mineral nutrients impact the levels of health-functional components in fruits and vegetables. Even in high phosphorus soils, new research has shown that phosphorus fertilization can boost phytochemicals like anthocyanins, flavonoids, and lycopene in tomatoes. Recent results from Nova Scotia indicate that both phosphorus and potassium fertilizers can boost—by up to 28%—the levels of health-promoting polyphenolics and anthocyanins in wild blueberries.

Intensive nutrient management demands more research. The optimum level of nutrients—the level that balances quality of food produced with quality of water protected—is often in question. The precise level of intensity that threatens water quality is one part of the question. Another is the level of intensity at which the risks to water quality out-weigh the benefits to food quality. It is in the interest of both agri-business and the public sector to invest in such research. A good deal of such research is in progress.

Is the current level of nutrient management intensive enough? With closer attention to soil testing, plant analysis, and recent research findings, crop advisers and producers can deliver more health to their ultimate customers.

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