soluble salts value represents the total conductivity of the water and excludes nonhydrolyzed urea.

Fertigation Management: Area Basis

Another approach to fertigation is to use the water as a means of distributing a certain amount of fertilizer on a given area rather than approaching fertilization from the standpoint of maintaining desired nutritional levels in the growing medium. The water is a carrier of the fertilizer or is a means of broadcasting the fertilizer. Consequently, the total amount of water per unit of fertilizer applied is of little importance, other than that ample water is used to effectively disseminate the fertilizer. The following discussion considers this approach for a fertilizer purchased as a solution.

Solution fertilizers are purchased by the ton (907 kg) and for many solution fertilizers this is approximately 200 gallons (760 liters) of concentrated fertilizer. Thus, 1 ton of 15-5-10 solution fertilizer would contain 300 pounds (136 kg) of N, 43 pounds (19.5 kg) of P and 166 pounds (75 kg) of K.

$$2000 \text{ pounds/ton} \times \frac{15\% \text{ N}}{100 \text{ (constant)}} = 300 \text{ pounds N/ton}$$

$$2000 \text{ pounds/ton} \times \frac{5\% \text{ } P_2O_5}{100 \text{ (constant)}} = 100 \text{ pounds } P_2O_5\text{/ton}$$

$$100 \text{ pounds } P_2O_5\text{/ton} \times 43 \text{ pounds P/100 pounds } P_2O_5 = 43 \text{ pounds P/ton}$$

$$2000 \text{ pounds/ton} \times \frac{10\% \text{ } K_2O}{100 \text{ (constant)}} = 200 \text{ pounds } K_2O\text{/ton}$$

$$200 \text{ pounds } K_2O\text{/ton} \times 83 \text{ pounds K/100 pounds } K_2O = 166 \text{ pounds K/ton}$$

If a nursery operator is to apply 1500 pounds of N (680.4 kg) per acre per year, then 5 tons (4536 kg) or 1000 gallons (3800 liters) of solution fertilizer (15-5-10) should be applied per acre per year. The nursery operator must manage the fertilizer applications and may decide to apply fertilizer 3 times a week during the 10 warmest months of the year. Based on 4 weeks per month (120 applications), the nursery operator would apply about 8.3 gallons (32 liters) of fertilizer or 12.5 pounds (5.7 kg) of N per acre per application.

$$\frac{1000 \text{ gallons/year}}{120 \text{ applications/year}} = 8.3 \text{ gallons/application}$$

$$8.3 \text{ gallons/application} \times 1.5 \text{ pounds N/gallon} = 12.5 \text{ pounds N/application}$$

The 12.5 pounds of N would be injected into the irrigation water at a rate necessary to facilitate N dissemination during irrigation. Consequently, the concentration of N disseminated by the irrigation water varies with the gallons of water applied. If one-half inch of water or 13,500 gallons are applied to irrigate 1 acre, the water would contain 110 ppm N and if 1 inch of water were used to disseminate 12.5 pounds of N, then 55 ppm N would be applied.

The previous example involved disseminating fertilizer by irrigation water on an acre basis. However, when using irrigation systems in which the water is delivered to individual containers, the fertilizer applications are based on container surface area. For example, the surface area of a 20-gallon container is approximately 1.8 square feet (0.16 m^2) which is a fraction of the 43,560 square feet (4047 m^2) in an acre. Thus when applying 1500 pounds of N per acre per year, each 20-gallon container receives 0.06 pound (27 g) of N per year. Assuming 120 applications per year, 0.0005 pound (0.23 g) of N would be applied to each container per application.

$$\frac{1.8 \text{ square feet/container}}{43{,}560 \text{ square feet/acre}} \times 1500 \text{ pounds N/acre/year} = 0.06 \text{ pound N/container/year}$$

$$\frac{0.06 \text{ pound N/container/year}}{120 \text{ applications/year}} = 0.0005 \text{ pound N/container/application}$$

The nursery operator must manage application of the 15-5-10 solution fertilizer so that 0.0005 pound of N is applied per application to each container. This is easily facilitated by injecting the concentrated fertilizer into the irrigation water so that 1 gallon of concentrated fertilizer (1.5 pounds or 680 g of N) is diluted with 2999 gallons (11,396 liters) of irrigation water.

$$\frac{1.5 \text{ pounds N}}{3000 \text{ gallons (fertilizer + water)}} = 0.0005 \text{ pound N/gallon of irrigation water}$$

Note: 1 gallon of water on the surface of an 18-inch-diameter container is approximately 1 inch of water.

If 1 gallon or 1 inch of irrigation water is applied per container, this results in 0.0005 pound of N applied to each container. Even though the concentration of fertilizer applied to the container plant is not a major consideration when fertilizer is applied on an area basis, soluble salts and nutritional levels of the media and irrigation water should be monitored, as discussed previously, to prevent toxicities and to maintain the proper balance of nutrients. Regardless of the approach taken when disseminating fertilizer in the irrigation water, it is Florida law that injection systems contain antisyphon devices to protect the water supply from contamination. Information on antisyphon devices and backflow regulations can be obtained from the County Extension Office.