

Nitrogen rate and in-season nitrogen monitoring in June-bearing fertigated strawberries

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Objectives:

- To compare reduced fertilizer nitrogen rates with the grower's standard fertilizer program.
- To evaluate in-season soil nitrate testing and a variety of quick test methods to adjust nitrogen requirements in June-bearing strawberries.

Description: The project was started in 2003 and finished in 2005. In spring, 2003, the variety 'Jewel' was planted. The plot consists of 20 rows in one irrigation zone. Rows alternated between the reduced fertilizer nitrogen rate row and the grower's standard fertilizer program. Three sampling locations, transecting the entire zone were selected. Bi-weekly (2003-04) and monthly (2005) soil samples were collected at a 30 cm depth. Leaves and petioles were taken at each location. The most recently matured leaf was taken and petiole removed. The bottom 2.5 cm of the petiole was used for sap analysis. Reduced nitrogen rate rows and the grower's standard fertilizer program rows were sampled separately. Sampling was occurred between May and October.

Soil and petiole sap nitrate-nitrogen There was a general trend for petiole sap nitrate-nitrogen to increase over the season. A similar increase appears to occur in the soil nitrate nitrogen. The greatest increase in petiole sap nitrate-nitrogen occurred from mid-Aug through September. For the early season sampling dates, petiole sap nitrate-nitrogen did not appear to change in response to fertigation applications. However, in the samplings during August and later fertigated petiole sap nitrate-nitrogen seems to be higher.

Soil nitrate-nitrogen and percent leaf nitrogen Soil nitrate-nitrogen increases slowly over the season. But the percent leaf nitrogen decreases from early in the season (May-June) to harvest. During harvest it is relatively unchanged (June-July). After renovation in late July there was a large increase in percent leaf nitrogen followed by a slow decline to through August and October. The increase in soil nitrate-nitrogen after September 15 is not reflected in the percent leaf nitrogen. Percent leaf nitrogen does not appear to change in response to fertigation applications.

Petiole sap NO₃-N & % leaf N The seasonal percent leaf nitrogen decreases from May until July and increases again after renovation, declining into October. These changes are not reflected in the petiole sap nitrate-nitrogen concentrations. Petiole sap nitrate-nitrogen increases in August to last sampling date, while percent leaf nitrogen decreases.

No clear relationship between soil and petiole nitrate-nitrogen; petiole nitrate-nitrogen and the percent leaf nitrogen, and soil nitrate-nitrogen and percent leaf nitrogen could be determined. So the usefulness in using petiole nitrate-nitrogen or percent leaf nitrogen as an indicator of the soil nitrate-nitrogen status is questionable. This is probably because the strawberry is a perennial woody plant. The nitrogen that is measured using petiole sap or tissue analysis is derived from internally stored, soil organic and inorganic, and finally fertilizer nitrogen. However, these tools may be used to determine the adequate status of nitrogen in the strawberry plant at certain phenological stages of crop development.

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