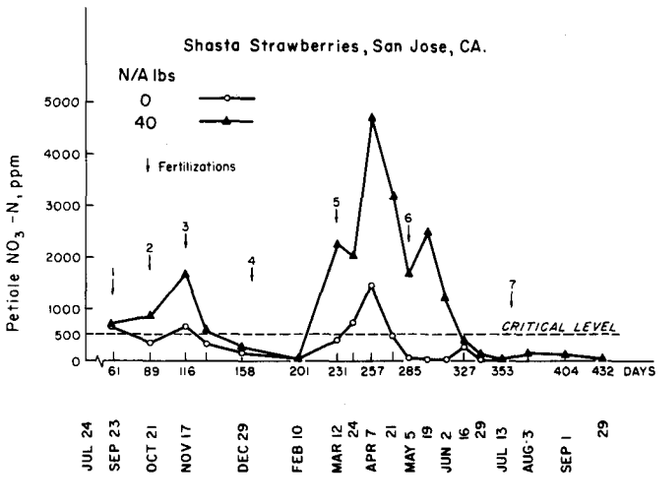
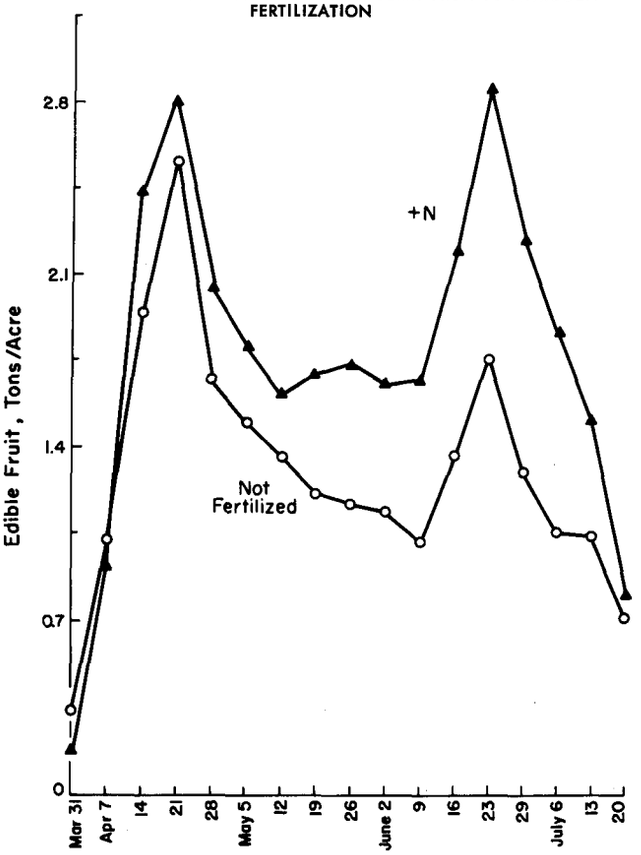
PETIOLES TELL THE NITROGEN STORY FOR STRAWBERRIES

GRAPH 1. RELATIONSHIP OF PETIOLE NITRATE-N VALUES TO NITROGEN FERTILIZATION



GRAPH 2. RELATIONSHIP OF EDIBLE STRAWBERRY FRUIT TO NITROGEN FERTILIZATION



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THE PETIOLE (leaf stalk) of a young fully expanded strawberry leaf indicates the nitrogen content of the strawberry plant when it is tested either by the "quick test" with diphenylamine reagent or by a laboratory analysis using either the phenoldisulfonic acid procedure or the new nitrate electrode method. In the quick test, if a drop of diphenylamine reagent placed on the cut surface of the petiole (cut at a slant) turns blue immediately, the strawberry plant is well supplied with nitrogen and fertilizing with nitrogen at that time is usually not warranted. If, however, the test is negative, as indicated either by a lack of blue color formation or by a browning of the cut surface, fertilizing with nitrogen is indicated—provided, of course, that there is sufficient growing weather remaining for the crop to benefit from nitrogen fertilization.

The leaves of strawberry plants with a negative diphenylamine test are usually light green to a faint yellowish green. As the severity of the nitrogen deficiency increases, the leaves (blades) develop a reddish bloom and the petioles become reddish in time. A positive diphenylamine test from leaves that are a light green to yellow, indicates a deficiency in sulfur or possibly some other nutrient. Under these conditions the addition of nitrogen will not be beneficial to the crop unless the fertilizer used also contains sulfur or whatever nutrient is deficient.

As a diagnostic tool, the diphenylamine test for nitrate in petioles of strawberries is invaluable, but once a fertilizer program has already been selected, the phenoldisulfonic acid procedure evaluates the nitrogen status of the plants more fully than does the diphenylamine test.

The specific effects of nitrogen on yield depend on timing, as shown in the 1970 results for the Shasta variety under field conditions at the University of California Deciduous Fruit Station, San Jose. The yields in this experiment (graph 2) were not affected appreciably by the nitrogen fertilizations until the second crop. The petioles indicate why this happened: the nitrogen supply in the unfertilized soil was above the critical level until nearly all the fruit for the first crop had been produced. Thereafter, the petiole nitrate values and the yields of the unfertilized plants declined much faster than those of the fertilized plants. At the same time the yields and petiole nitrate-N values from the fertilized plots for the second crop were much greater than those from the unfertilized plots. In essence the low petiole nitrate-N values were related to a lower fruit production, and conversely, high petiole nitrate-N values were related to higher fruit production.

The plants did not always take up the nitrogen that was added to the soil as a side dressing. Perhaps at these times, the soil was too cold for the roots to be active. Possibly, the roots became dormant in those cases when most of the crop had been produced. Or possibly the materials were not applied effectively, even though the same method of application was used at all times. Nevertheless, whatever the cause may have been for the failure of the plants to pick up the nitrate from the soil, fertilizing with nitrogen should be done only at those times when the plants can make use of nitrogen most effectively in plant growth and in fruit production. Thus, by letting the plants "tell" their story, the nitrogen needs of the crop can be met and fruit production can be maintained at maximum capacity.

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