Effect of Daminozide on Nutrient Accumulation in ‘McIntosh’ Apple Fruits

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Abstract. Succinic acid-2,2-dimethyl hydroxide (daminozide) treatment reduced both N concentration (dry wt basis) and content (mg/fruit) of ‘McIntosh’ apple (Malus domestica) early in the growing season. Ca concentration was higher in treated fruits at the beginning and end of the growing season but, due to fruit wt reduction by daminozide, Ca content per fruit was not significantly different. Daminozide did not influence either concentration or content of P, K, Mg, Fe, Mn, or Zn. Concentrations of all elements examined decreased during the growing season while total content per fruit increased.

Daminozide is a growth retardant widely used in regulating vegetative growth and fruit quality in commercial apple production. It has been shown to influence the nutritional condition of apple trees as determined by foliar analysis (1, 3, 5, 10), but less attention has been given to the nutritional status of the fruit. In this paper we report some nutritional changes in ‘McIntosh’ apple fruit during one growing season as influenced by 6 consecutive years of daminozide treatment.

Four rows of 17-yr-old ‘McIntosh’ apple trees on Malling 7 rootstocks were selected, 2 rows of which had been sprayed with 2000 ppm daminozide in mid-June for 6 consecutive years (1969 - 1974). Six trees were randomly selected in each row and a sample of 10 fruits per tree were collected at a height of 1.5 m on 9 dates throughout the 1974 growing season from 28, to 140 days after full bloom.

Fruits were weighed, washed several times in distilled water, frozen, and were later thawed, quartered and the core tissue removed. Quartered sections of peel and pulp tissue were dried at 80°C and ground in a Wiley mill to pass a 40 mesh screen. Analyses of K, Ca, Mg, Fe, Mn, and Zn were performed on a Perkin-Elmer 403 Atomic Absorption Spectrophotometer following the procedure of Jones and Isaac (4). N was determined by the standard Kjeldahl method. P was determined colorimetrically by the ammonium molybdate method. Data were analyzed for statistical significance by the t-test.

Increased Ca concentration in response to daminozide also concur with the results of Ashby and Looney (1) for N concn in the pulp and peel of ‘Spartan’ apples, along with reduced foliar N levels. We previously reported a significant decrease in foliar N concn in the same treatment blocks in response to daminozide (3). Martin et al. (5) also found daminozide treatments reduced soluble N content of the fruit. Singh noted a reduction in leaf N in 1-year-old trees in sand culture (9).
Literature Cited

Yield and Maturity of 'Concord' Grapes following Spring Frost
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Abstract. Severe frost injury was incurred about full swell on one group and about 4th leaf on another group of 'Concord' (Vitis labrusca L.) vines where sprinkling was interrupted during the night. The wet tissues were less cold resistant than dry tissues. Yield was reduced 22% by the early frost, 52% by the later frost. Bloom was delayed 10 days by the early frost, 18 days by the later frost. At harvest the berries were larger than non-frosted on the early-frosted vines and equal in size on the late-frosted vines. Color and soluble solids were lower on the frosted vines.

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A severe spring frost may kill every growing shoot on grape vines. Unlike tree fruit species, however, the vine bears dormant buds that are fruitful and can produce a partial crop (1, 3, 4, 7, 8). Such buds include secondary buds in the compound buds which produced the frozen primary shoots, basal primary buds that had not started growth, and latent buds from previous seasons (3). The reduction in crop

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