1993 California Avocado Research Symposium Pages 80-83
California Avocado Society and University of California, Riverside

THE POSTHARVEST RESPONSE OF 'HASS' AVOCADO TO DIFFERENTIAL PREHARVEST NITROGEN TREATMENTS

M. L. Arpaia. J. L. Mever. D. S. Stottlemver. G. S. Bender and G. W. Witnev
Department of Botany and Plant Sciences,
University of California, Riverside

In June of 1992 we collected fruit samples from the Cashin Creek Ranch nitrogen fertilizer trial (Brown Block) based on the Fall 1991 leaf analysis. Leaf N of the sampled trees ranged from 1.77 to 3.05% nitrogen and represented 14 trees. Ninety fruits per tree were harvested (the same approximate fruit size was harvested from each tree) and returned to UC Riverside for the subsequent storage tests. The fruit from each tree were divided into three 30 fruit lots and stored at 5C (41F) for either 0, 3, or 6 weeks. After storage the fruit were held at 20C (68F) for ripening. Flesh firmness after storage and ripening were monitored. In addition, the length of time to eating ripeness (1.5 1bf or less flesh firmness), vascular (1-4) or flesh (0-5) discoloration and the presence or absence of decay was recorded. A fruit with a score of 3 or greater for either vascular or flesh discoloration was categorized as having moderate/severe chilling injury.

At the time of harvest, a pulp sample was taken and analyzed for N, P, K, Ca, Mg, B, Zn, and Mn. The relationship between leaf N and pulp N is reported in Table 1. Clearly the two are related, in the sense that as leaf N increases so does pulp N. Figure 1 reports the effect of leaf N on the time to eating ripeness. A significant trend in time to eating ripeness was detected when fruit were ripened either immediately after harvest or after three weeks of storage. In both cases fruit that were harvested from trees with higher leaf N ripened 1 to 1.5 days faster. There was no difference detected after 6 weeks of storage. Note that with storage the time to eating ripeness declines; no storage, 7 days; 3 weeks, 5 days; and 6 weeks, 2 days. Regardless of leaf N, the incidence of chilling injury after 3 weeks of storage was relatively minor. After 6 weeks storage however, there was a trend towards greater chilling injury with increased leaf N (Figure 2). In summary, it appears from this preliminary study that tree nitrogen nutrition can impact the postharvest life of the "Hass" avocado.

Future Plans:

We plan to repeat this study in June 1993 using fruit again from the Cashin Creek Ranch site. We also plan after the completion of the second year of data collection to analyze the data using both leaf and pulp nutrient analysis.

Table 1. Relationship between leaf nitrogen content and pulp nitrogen content.

Leaf Nitrogen (%)[z]	Pulp Nitrogen (%)[y]
1.77	0.79
1.92	0.81
2.08	0.70
2.11	0.79
2.28	0.79
2.34	1.17
2.46	1.33
2.53	1.23
2.65	1.55
2.74	1.48
2.86	1.36
2.90	1.37
3.00	1.38
3.05	1.87

[z] Samples for leaf analysis collected in September 1991.

[y] Samples for pulp analysis collected in June 1992. Composite samples from each tree were taken (5 fruit, replicated 3 times per tree).

Figure 1. The influence of nitrogen on the time to eating ripeness.
Cashin Creek Fertilizer Study, June 1992.

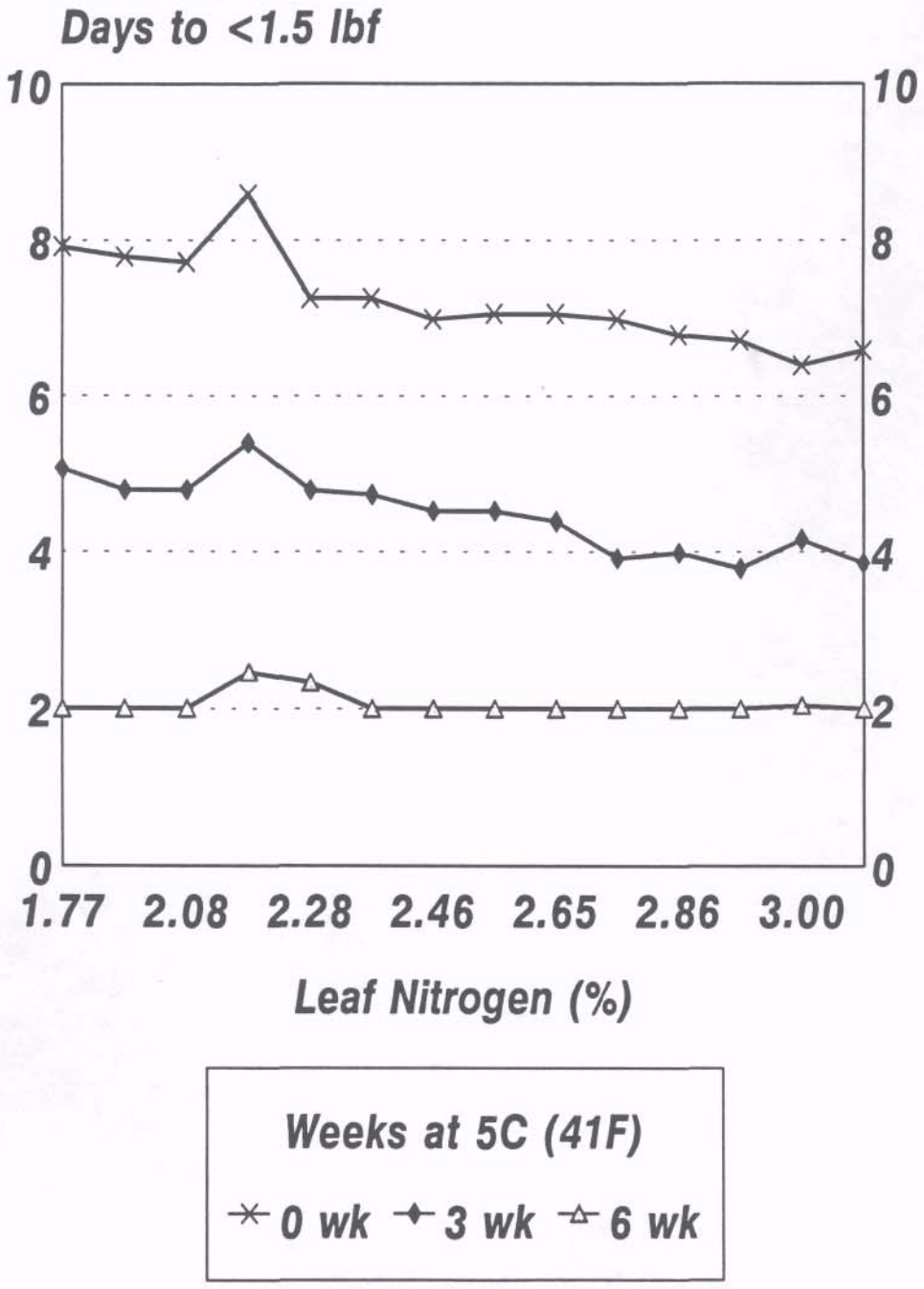
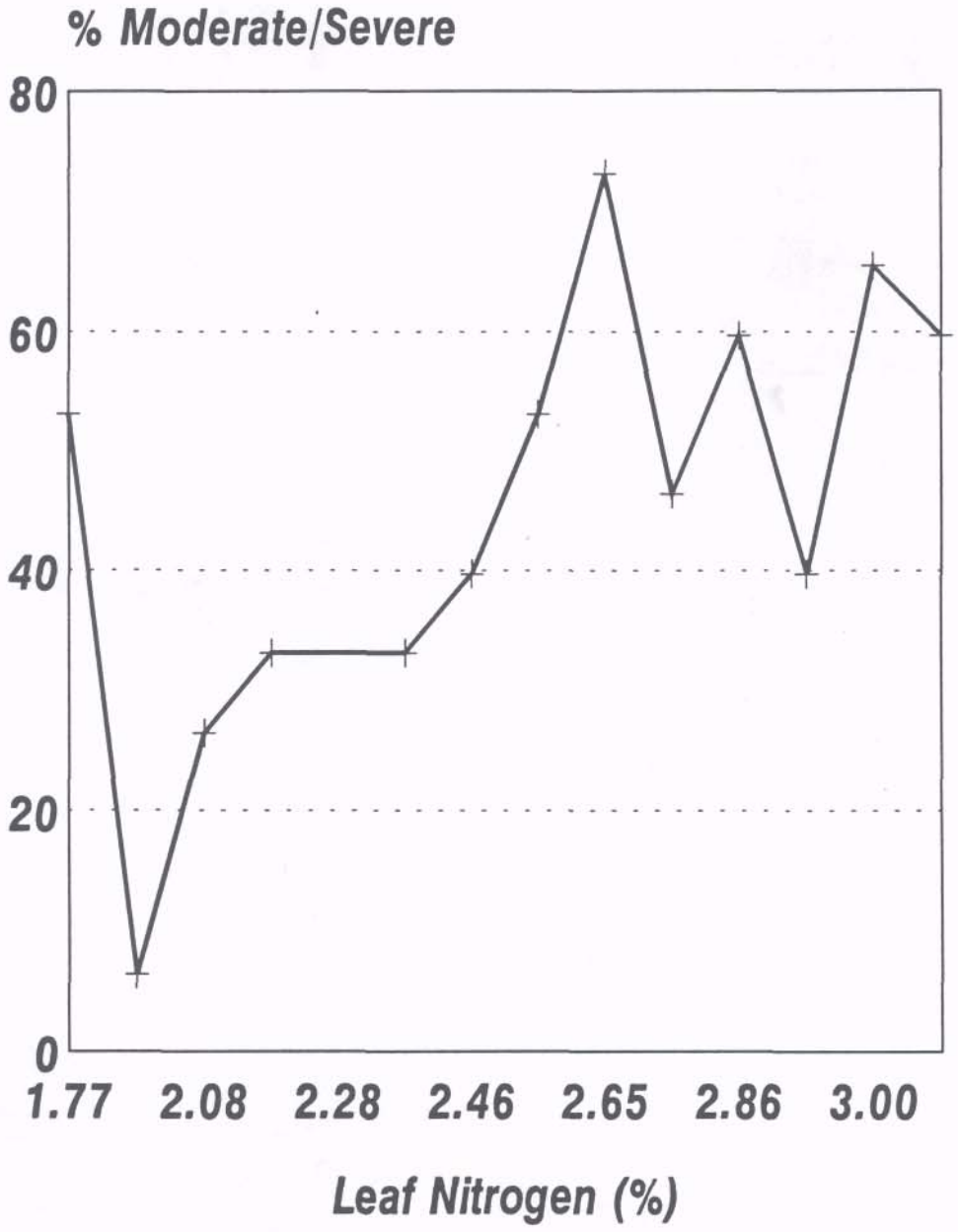


Figure 2. The influence of nitrogen on the incidence of moderate/severe chilling injury after 6 weeks at 5C. Cashin Creek Fertilizer Study, June 1992.



Fruit rated 3 or greater for vascular (1-4) or flesh discoloration (0-5).