**Project Title:** Effects of Pacific Hort Grow Plus N and Calboost on fruit set and quality indices in >Bing= sweet cherry, 2007

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**Summary**:

The trial evaluated the effects of two nutritional products on fruit quality and fruit set in >Bing= sweet cherry in a commercial orchard in Lodi, CA. Grow Plus N, applied in three split applications during and after bloom resulted in improved fruit firmness (not statistically significant, but appears to be a real effect), when fruit were harvested at commercial timing. Fruit set and other quality measures were unaffected, with the exception of a slight, but not significantly different, reduction in fruit weight. Grow Plus N slightly advanced maturity. Calboost decreased fruit firmness and showed a slight delay in fruit maturity in the darkest class of fruit.

**Introduction:**

Sweet cherry growers employ a variety of management practices to improve cropping and fruit quality, including a range of plant growth regulators and nutrients. Little is known of nutritional effects on cherry fruit development, with respect to optimum levels, timing of application, and formulation differences. In this pilot study we looked at two nutrients, one that includes nitrogen in an amino acid complex, and one that is purported to improve nitrogen uptake. We evaluated fruit set for the first, and fruit quality measures for both products.

**Orchard/Location:** Wells Lane, Lodi, CA; mature 'Bing'/mahaleb trees

**Treatments and Experimental design:**

Experimental design: Each treatment was applied to 8 contiguous tree rows, separated by 3 untreated rows, with served as the control. Control samples were obtained from the center row only. Treated rows constituted approximately 5 acres each. Five single-tree replicates per treatment were selected based on uniformity of crop load and similar crop load.

<u>PacificHort Grow Plus N (amino acid complex)</u>

Timing of applications: applied at 3 stages: 20% bloom -- 80% bloom -- 7-10 days post petal fall

Application rate: 40 oz per acre applied with normal fungicide program, tank-mixed

<u>PacificHort Calboost + PacificHort Penetrant</u>

Timing of applications: applied at 10-14 days before anticipated harvest

Application rate: Calboost @ ½ gallon per acre + Penetrant @ 3 fl. oz. per acre

Fruit set was evaluated on 3 limb-reps per tree, 5 trees per treatment only UTC and Grow Plus N, not Calboost

Harvest for sampling purposes was coordinated with commercial harvest and quality measures evaluated included: fruit size and weight, firmness, color class for maturity (light red, dark red, mahogany, and dark mahogany corresponded to CTIFL colors 1, 3, 4, and 6, respectively, or CCAB color card equivalents).

At least 100 fruit were sampled from each tree to be evaluated for differences in maturity. A subsample of each salable color class was evaluated for size and firmness. A subsample of 20 fruit randomly chosen from salable fruit was weighed to obtain average fruit weight. Twenty fruit were evaluated by FirmTech for diameter and firmness. Fruit for Calboost evaluation was to have been stored for further testing of firmness, based on the assumption that calcium would improve firmness, however, storage effects were not tested because fruit from this treatment were softer than the untreated control at harvest. Fruit from Pacific Hort Grow Plus N, however, were stored, and firmness did not differ after storage, from the control (data not shown). Yields for Grow Plus N and the control will be obtained from the packing house when available, and analyzed at that time.

Data were evaluated by standard statistical means, using SAS Proc GLM and Student ttests.

**Results and Discussion**

All treatments were compared first for quality measures (Table 1). Because there appeared to be an improvement in firmness due to Grow Plus N, that treatment was then compared only with the untreated control using ttests (only maturity data shown), as was done with fruit set data. Ttests for fruit quality did not change the results in comparing the untreated control and Grow Plus N, with the exception of some maturity numbers (Tables 2 and 3). No difference was found in fruit set. Pacific Hort Calboost reduced fruit firmness, while Grow Plus N improved firmness (although not statistically significant). Fruit size was unaffected by treatment. Maturity was less uniform among fruit treated with Grow Plus N, which appeared to slightly advance maturity, and Calboost appeared to slightly delay maturity.

Previous research has not shown a benefit to calcium products with respect to improving firmness, and if Calboost enhances nitrogen uptake, it would be prudent to test its application earlier in fruit development, as nitrogen applied close to harvest typically decreases firmness. These results are consistent with past experience.

Table 1. Effects of Pacific Hort Grow Plus N and Calboost on 'Bing' fruit set and quality, 2007.

| Treatment | %Fruit set [y] | Firmness (FirmTech units) | Diameter (mm) | Rowsize | Fruit weight (g per 20 fruit) |
|---|---|---|---|---|---|
| Grow Plus N | 13.1 a[x] | 394.0 a | 27.3 a | 10.1 a | 181.3 a |
| Calboost | na | 348.4 b | 27.5 a | 10.0 a | 186.6 a |
| Untreated control | 10.2 a | 374.1 a | 27.5 a | 10.0 a | 187.9 a |

[x]Mean separation by Duncan's Multiple Range Test (P = 0.05%), or by Student's ttest when only 2 treatments are compared. Values within columns not different if same letters are found.

[y] Fruit set calculated from an average of 3.5 flowers per cluster.

Table 2. Effects of Pacific Hort Grow Plus N and Calboost application on 'Bing' maturity, 2007.

| Treatment | %Below minimum light red [y] | %Light red | %Dark red | %Mahogany | %Dark mahogany |
|---|---|---|---|---|---|
| Grow Plus N | 1.0 a[x] | 10.4 a | 34.3 a | 41.2 a | 13.1 a |
| Calboost | 0.0 a | 3.9 a | 49.9 a | 45.9 a | 0.3 b |
| Untreated control | 0.9 a | 10.6 a | 39.4 a | 39.2 a | 9.9 ab |

[x]Mean separation by Duncan's Multiple Range Test (P = 0.05%). Values within columns not different if same letters are found.

[y]Colors based on CCAB color chart.

Table 3. Effects of Pacific Hort Grow Plus N 'Bing' maturity, 2007.

| Treatment | %Below minimum light red [y] | %Light red | %Dark red | %Mahogany | %Dark mahogany |
|---|---|---|---|---|---|
| Grow Plus N | 1.0 a[x] | 10.4 a | 34.3 b | 41.2 a | 13.1 a |
| Untreated control | 0.9 a | 10.6 a | 39.4 a | 39.2 a | 9.9 b |

[x]Mean separation by Student'sTest (P = 0.05%). Values within columns not different if same letters are found.

[y]Colors based on CCAB color chart.