Apple russet on Yellow Newtown Pippin

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Apple-marketing programs have educated the consumer to prefer smooth skinned apples. As a result, any surface blemishes on apples are less preferred in the market and wholesale fruit buyers avoid such fruit. Russet is a corking disorder on the epidermis of apple and an annual problem on Yellow Newtown Pippin apples in California. Though russet is simply a surface blemish on the stem end, those fruits affected with it are less valuable in the market.

Previous research on Yellow Newtown Pippin russet has shown that high humidity and warm periods for 30 days after bloom will induce maximum russeting. These environmental conditions are prevalent in the Pajaro Valley of California where Yellow Newtown Pippin are grown.

Recently, research evidence from Australia and New York has shown a reduction of russet on Golden Delicious apple with treatments of gibberellin 4 + 7 or a fungicide, Apasil. Because of the success on the russet-sensitive Golden Delicious, we designed an experiment to test these compounds on uniform eight-year-old Yellow Newtown Pippin trees in the Pajaro Valley.

Seven treatments at two dates with three primary scaffolds per treatment were randomized in the block (table 1). Foliar sprays were applied to the point of drip at petal fall and seven days after petal fall, and a double spray was applied at petal fall and seven days later. Because bloom is not uniform in the Pajaro Valley, the stage of flower development at the time of treatment was established by tagging flowers in pink bud, full bloom, and petal fall. Flowers at other stages of development were removed by hand. For all treatments the adjuvant chlorothalonil was used at 200 ppm. Full bloom was judged to be March 30 with petal fall April 5.

All trees were hand thinned in May as is the commercial practice in the Pajaro Valley. During the growing season no unusual results were evident on the treated fruits. At harvest all tagged fruits were taken for evaluation. The surface area of the apple and that of the russet on the apple were calculated on the basis of an oblate spheroid. Then the percentage of the apple surface with russet was calculated. The length:diameter ratio was determined for each fruit as well.

Russet was not prevented by GA 4 + 7 or Apasil (see table 1). Furthermore, the variability among replicates was so great that there were no statistically significant differences among treatments. It is evident, however, that the oldest fruit (those at the petal fall stage at the time of treatment) had less russet than any other fruit regardless of treatment (see table 1).

The fruit at the petal-fall stage were advanced in development over those at full bloom and pink bud and were subjected to cooler temperatures during the critical early stages of fruit growth. Remember that after bloom high humidity and warm temperatures increase russet, whereas low humidity and temperature decrease russet. None of the treatments altered the location and nature of the russet which was predominantly on the stem end of the fruit.

Though of no commercial value at this time, the GA treatments did result in longer apples (table 2). These differences were clearly visible, particularly when comparing fruit with L/D ratios of 0.69 with those with 0.80. Others have shown similar increases in L/D ratios from GA treatments and in some cases the larger fruit are slightly heavier as well.

Clearly the treatments we tested did not control russet. In our judgment a treatment will have to dramatically reduce russet to be of commercial value. If apples continue to be marketed on the basis of surface beauty, then we see little advantage to treatments which only result in a modest reduction in russet.

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TABLE 1. Percent of Apple Fruit Surface Russetted Following Treatments of GA 4 + 7 and Apasil

Spray date	Treatment	Stage of flower development: Pink bud	Full bloom	Petal fall
April 5, 1977	Control	21	26	9
	GA 4 + 7 50 ppm	13	13	10
	100 ppm	20	19	5
	200 ppm	12	14	11
	1% Apasil	12	16	6
	2% Apasil	16	13	8
	1% Apasil + GA 4 + 7 200 ppm	16	17	7
April 12, 1977	GA 4 + 7 50 ppm	18	21	8
	100 ppm	14	24	10
	200 ppm	18	12	11
	1% Apasil	22	24	12
	2% Apasil	19	20	11
	1% Apasil + GA 4 + 7 200 ppm	21	22	8
April 5 and 12, 1977	GA 4 + 7 50 ppm	31	24	12
	100 ppm	25	13	21
	200 ppm	26	18	18
	1% Apasil	29	25	17
	2% Apasil	33	45	30
	1% Apasil + GA 4 + 7 200 ppm	22	23	19

TABLE 2. Length:Diameter Ratios of Apple Fruit Treated with GA 4 + 7 and Apasil

Spray date	Treatment	Stage of flower development: Pink bud	Full bloom	Petal fall
April 5, 1977	Control	0.69	0.76	0.72
	GA 4 + 7 50 ppm	0.80	0.74	0.75
	100 ppm	0.76	0.75	0.77
	200 ppm	0.76	0.84	0.80
	1% Apasil	0.75	0.70	0.77
	2% Apasil	0.72	0.71	0.78
	1% Apasil + GA 4/7 200 ppm	0.73	0.74	0.79
April 12, 1977	GA 4 + 7 50 ppm	0.79	0.82	0.80
	100 ppm	0.80	0.79	0.83
	200 ppm	0.80	0.79	0.81
	1% Apasil	0.73	0.74	0.70
	2% Apasil	0.70	0.73	0.78
	1% Apasil + GA 4/7 200 ppm	0.81	0.78	0.76
April 5 and 12, 1977	GA 4 + 7 50 ppm	0.74	0.74	0.80
	100 ppm	0.76	0.80	0.79
	200 ppm	0.83	0.81	0.85
	1% Apasil	0.77	0.74	0.74
	2% Apasil	0.73	0.76	0.77
	1% Apasil + GA 4/7 200 ppm	0.79	0.78	0.79