

BOTH PROHEXADIONE-CA AND GA4+7 REDUCE SKIN DEFECTS OF APPLE

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ABSTRACT

Russet and scarf skin are cosmetic defects of apple fruit that are initiated in the epidermal and hypodermal cell layer during the first 40 days after bloom. These defects can be the greatest single cause of economic loss in some cultivars. Growers commonly apply early season GA4+7 sprays to reduce the severity of these defects. The GA biosynthesis inhibitor prohexadione-Ca (P-Ca) is also applied during this period to reduce shoot growth. Application of both P-Ca and GA4+7 during the same period may reduce the efficacy of either material, according to the current US label for P-Ca.

Replicated field experiments were undertaken in 2005 to determine if P-Ca (a) directly affect scarf skin and russet, and (b) reduces the efficacy of GA4+7 sprays for russet and scarf skin control. Each study included four treatments: (1) an untreated control, (2) a single application of P-Ca (138-250 ppm, Apogee) at petal fall (PF), (3) three or four sprays of GA4+7 (15-20 ppm, Provide) at 10 d intervals beginning at PF, and (4) a combined P-Ca and GA4+7 treatment at the same timings and rates as above. Treatments were applied to fully guarded multiple tree plots with an axial fan air blast sprayer. The incidence of russet or scarf skin was determined on a

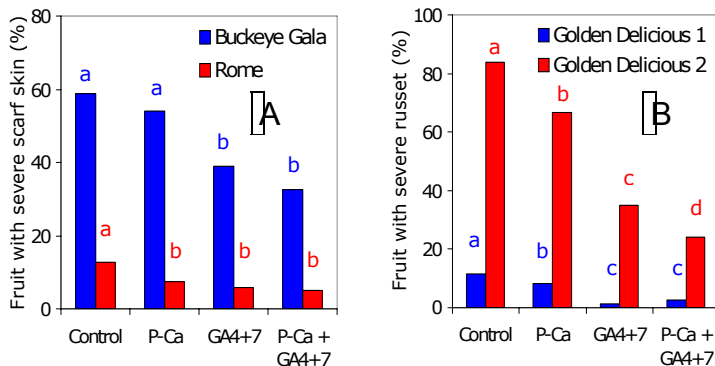


Fig. 1. Effects of P-Ca and GA4+7, alone or in combination, on the percent of fruit with severe scarf skin (A) or russet (B).

random sample of 100 fruit per plot removed at harvest. Defects were considered severe if more than 20% of the fruit surface was affected. Duncan's Multiple Range Test was used to separate treatment effects at $P < 0.05$.

P-Ca reduced the proportion of fruit with severe scarf skin in one experiment, and russet in both experiments. A single application of P-Ca at PF was generally not as effective as multiple GA4+7

sprays. P-Ca tended to increase, rather than reduce, the efficacy of GA4+7 sprays. These seemingly paradoxical results may be explained by the effects of P-Ca on biosynthesis and metabolism of GA's. P-Ca reduces shoot growth by blocking the conversion of inactive GA20 into highly active GA1. P-Ca also inhibits the enzyme responsible for inactivation of growth-active GA's (Rademacher and Kober, 2003). The effects of P-Ca on biosynthesis and metabolism of GA's could result in an elevated level of endogenous GA4, accounting for the additive effects of P-Ca on russet and scarf skin control.

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LITERATURE CITED

Rademacher, W. and R. Kober. 2003. Efficient use of prohexadione-Ca in pome fruits. *Europ. J. Hort. Sci.* 68(3): 101-107.