Effects of Systemm-CAL and ProGibb on Jersey Peaches in Massachusetts and New Jersey

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Sysstem-CAL™ is a commercial formulation of calcium (4%) and copper (0.25%) intended for foliar applications. There are indications that Sysstem-CAL, additionally, may improve uptake of plant growth regulators. To study this potential with peaches, we conducted experiments in 2010 to determine if Sysstem-CAL could improve uptake of gibberellic acid for a potential reduction in peach flower bud formation.

Materials & Methods

In 2010, 45 4-year-old PF14-Jersey/Lovell trees at the UMass Cold Spring Orchard (Belchertown, MA) and 63 3-year-old PF14-Jersey/Bailey trees at the Rutgers Snyder Farm (Pittstown, NJ) were selected for this trial. Nine treatments were allocated randomly among the trees at each location, giving five trees in MA and seven trees in NJ receiving each treatment. ProGibb was applied at rates of 0, 80, and 160 g per acre, and Sysstem-CAL was applied at 0, 2, and 4 quarts per acre. Nine treatments were derived from all combinations of these two chemicals: 0 ProGibb + 0 Sysstem-CAL, 80 ProGibb + 0 Sysstem-CAL, 160 ProGibb + 0 Sysstem-CAL, 0 ProGibb + 2 Sysstem-CAL, 80 ProGibb + 2 Sysstem-CAL, 160 ProGibb + 2 Sysstem-CAL, 0 ProGibb + 4 Sysstem-CAL, 80 ProGibb + 4 Sysstem-CAL, and 160 ProGibb + 4 Sysstem-CAL. All treatments were applied as tank mixes about 4 weeks before harvest (when new shoots had 20 buds), and all included 0.1% Regulaid as a surfactant. At the second

Figure 1. Leaf damage and associated leaf drop from 4 quarts Sysstem-CAL per acre applied prior to high temperatures in Massachusetts.

Table 1. Effects of varying ProGibb application rates with varying rates of Sysstem-CAL on Jersey peach fruit quality at harvest in Massachusetts and New Jersey.

ProGibb (g/acre)[z]	Sysstem -CAL (qts/ acre)[z]	Average fruit weight (g)	Average fruit diameter (cm)	Flesh firmness (N)	Soluble solids concentration (%)	Return bloom (no./cm of shoot)
			UMass Cold Spring Orchard			
0	0	239	7.61	48.0	11.7	0.40
0	2	239	7.61	46.3	10.9	0.43
0	4	232	7.56	47.3	10.8	0.42
80	0	233	7.56	55.6	10.9	0.29
80	2	228	7.48	57.3	11.2	0.28
80	4	208	7.21	58.6	10.6	0.26
160	0	225	7.46	57.8	11.2	0.17
160	2	237	7.59	55.7	10.7	0.16
160	4	201	7.15	59.3	10.2	0.15
Statistical Significance						
ProGibb		0.1053^{ns}	0.0533^{ns}	<0.0001**	0.0885^{ns}	<0.0001**
Sysstem-CAL		0.0206*	0.0078**	0.5455^{ns}	0.0020**	0.2734^{ns}
ProGibb X Syss-CAL		0.5600^{ns}	0.3398^{ns}	0.8442^{ns}	0.2655^{ns}	0.3456^{ns}
			Rutgers Snyder Farm			
0	0	132	6.25	48.8	11.1	0.31
0	2	136	6.29	49.3	11.0	0.29
0	4	139	6.39	48.3	10.9	0.28
80	0	127	3.16	52.8	10.8	0.27
80	2	129	6.21	51.7	10.8	0.21
80	4	122	6.10	53.0	10.6	0.28
160	0	131	6.20	51.1	11.0	0.21
160	2	132	6.21	50.9	10.8	0.26
160	4	134	6.28	51.5	10.5	0.23
Statistical Significance						
ProGibb		0.0678^{ns}	0.1252^{ns}	0.0098**	0.1950^{ns}	0.0057**
Sysstem-CAL		0.8322^{ns}	0.6865^{ns}	0.9819^{ns}	0.1096^{ns}	0.7307^{ns}
ProGibb X Syss-CAL		0.7605^{ns}	0.7622^{ns}	0.9470^{ns}	0.9060^{ns}	0.0810^{ns}

[z]Treatments were applied about 4 weeks before harvest and when there were approximately 20 buds per new shoot. All treatments included 0.1% Regulaid. For Sysstem-CAL treatments in Massachusetts, overall, 4 quarts/acre resulted in significantly lower average fruit weight, average fruit diameter, and soluble solids concentration. This reduction likely was related to leaf damage which occurred as a result of the 4-quart treatment. In both Massachusetts and New Jersey, ProGibb resulted in a linear decrease in return bloom.

commercial harvest, 10-fruit samples were collected from each tree. Fruit weight, diameter, flesh firmness, and soluble solid concentration were measured. In the spring of 2011, return bloom was assessed by selecting six shoots per tree between 30 and 60 cm long and counting the number of flower buds per shoot. Bloom data are presented as the number of flower buds per cm of shoot length.

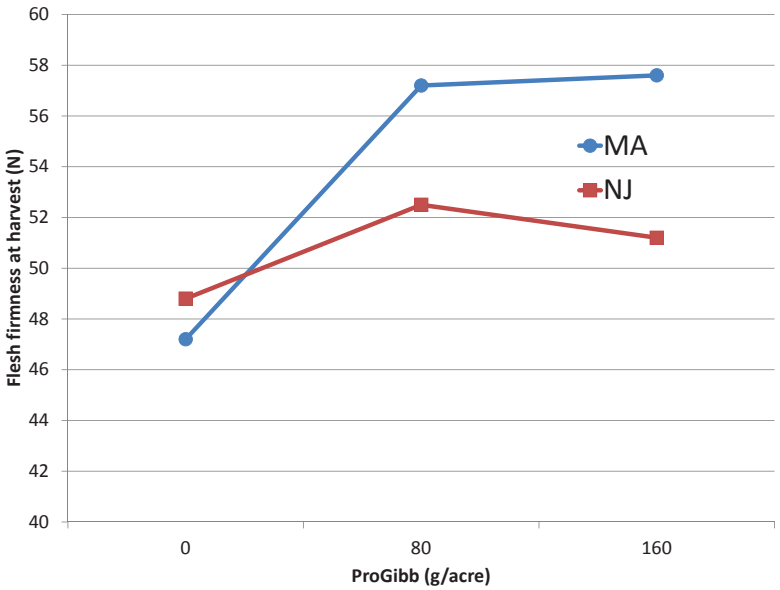

Figure 2. Effects of ProGibb on flesh firmness the year of application of PF14-Jersey peaches in Massachusetts and New Jersey.

Results

Sysstem-CAL had a significant negative effect on fruit size and soluble solids concentration in MA but not in NJ (Table 1). This result likely was due to leaf burn caused by Sysstem-CAL in MA (Figure 1). Application was made when temperatures were in the 70's, but later in the day, they rose to near 90°F. Clearly, application should not occur when very warm temperatures are expected. Sysstem-CAL did not affect flesh firmness or return bloom at either location (Table 1).

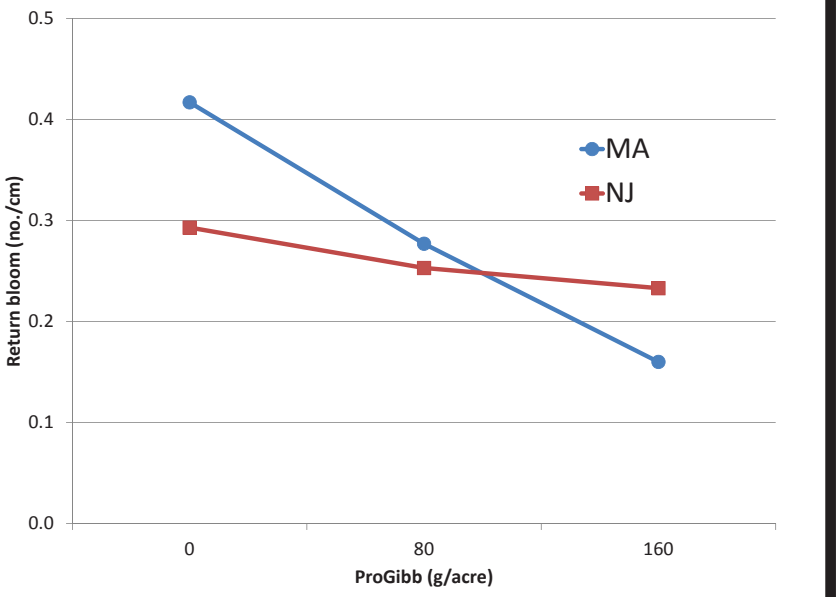

Figure 3. Effects of ProGibb on return bloom the year after application of PF14-Jersey peaches in Massachusetts and New Jersey.

ProGibb had a significant positive effect on flesh firmness (Figure 2, Table 1) and a significant negative effect on return bloom (Figure 3, Table 1) at both locations. Both effects were more pronounced in MA than in NJ. In both locations, it appears that the lower ProGibb rate is just as effective as the higher rate at increasing flesh firmness. Sysstem-CAL did not affect the trees' responses to ProGibb.

Conclusions

This study confirms previous

research showing that gibberellic acid can reduce return bloom in peach, thus reducing potential thinning requirements the year following application. These data also suggest that 40g/acre rate likely will give more desirable reductions in bloom; in MA, the 160g/acre rate overthinned and resulted bare shoots with clusters of flowers near the shoot terminals. Growers should consider this approach for thinning at least some of the early ripening cultivars (earlier than Redhaven).

The additional benefit of increasing firmness the year of application may allow fruit to remain on the tree to a more advanced level of ripening.