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USE OF GIBBERELIC ACID TO ENHANCE FRUIT SET IN RABBITEYE BLUEBERRIES

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Background. Fruit set problems have been evident in rabbiteye blueberries due to poor pollination. There are two main reasons for lack of pollination. The first is low bee activity due to inadequate populations or poor weather conditions for foraging. Secondly, late spring frosts and freezes can damage or kill blossoms. Gibberellic acid, commonly known as GA, is used to increase fruit set in highbush blueberry production when there is insufficient pollination, but will not increase yield when good pollination occurs naturally or if the plant does not set fruit due to physiological stress or disease problems. GA₃ induces parthenocarpy, or the ability to set fruit without pollination and subsequent fertilization. However, results of its use in rabbiteye blueberries have been variable.

On March 10, 1992 a frost of 27°F occurred. Damage to blossoms was assessed and it was determined that 'Tifblue' and 'Delite' had sustained damage of 25% and 75%, respectively, to ovaries of all blossoms. Four GA treatments were randomly assigned to each cultivar: 1) 200 ppm GA₃ applied at full bloom, 2) 200 ppm GA₃ applied 2 weeks later, 3) 200 ppm GA₃ applied at full bloom and 2 weeks later, and 4) untreated control. Plant growth and yield data were collected.

Research findings. Although plant growth was greatly affected by GA₃ treatment for both cultivars, 'Delite' exhibited greater response than 'Tifblue'. Plants sprayed at full bloom and full bloom + 2 weeks had more leaves per shoot than those sprayed once 2 weeks past full bloom or nontreated plants (Table 1). Control plants had significantly more leaf area than all GA treated plants. GA treatment delay and frequency progressively inhibited leaf growth. However, the opposite was true with stem length, with control plants having the shortest stems.

Yield decreased with GA treatment as compared to the control for both cultivars, with 'Delite' having a larger reduction in yield (Table 1). 'Tifblue' had control yields double that of 'Delite'. This is directly related to the March 10 frost damage. Fruit ripening pattern of 'Tifblue' was not effected by GA treatment (Figure 1). At each harvest date the same percentage of fruit was ripe across all treatments. This is demonstrated by the identical shape of the lines. GA delayed ripening of 'Delite' fruit (Figure 2). By June 30, 90% of the nontreated fruit had been harvested, while less than 50% of GA treated fruit had ripened.

Fruit size was reduced with GA application delay and frequency (Table 1). 'Delite' fruit

was larger than that of 'Tifblue', but that is an expected varietal difference. Seed number per berry was not affected by GA. This indicated that GA did not induce parthenocarpic fruit set.

Yield and fruit size may be directly related to the leaf area of the plant. Those plants treated with GA had reduced leaf area and may not have been able to support a full crop load or properly size the fruit. Other studies have linked the smaller fruit size to reduced seed number, however, this was not borne out in this study.

Application. Although plant reponse to GA was negative in this experiment, further exploration may be warranted to determine exact conditions and application methods for positive results. This study indicates that optimum application times and rates need to be determined for each cultivar. Additionally, return bloom and fruit set next year will need to be assessed to determine if the reduction in leaf area reduces subsequent yield.

Table 1. Effect of GA₃ on growth and yield of rabbiteye blueberries.

Cultivar + GA ₃ Treatment	Leaf Number	Leaf Area (in ²)	Stem Length (in)	Yield (lbs/bush)	Fruit Size (g/berry)	Seed Number (seeds/berry)
Tifblue						
Full Bloom	12.6	12.1	7.91	9.67	1.06	54.2
+ 2 wks	12.2	11.0	7.56	8.27	.95	54.2
Full Bloom + 2 wks	13.4	9.4	8.82	6.23	.86	50.6
Control	12.2	14.6	7.08	11.23	1.20	51.5
Delite						
Full Bloom	16.0	9.9	8.46	2.16	1.04	75.6
+ 2 weeks	14.0	8.9	8.04	2.43	1.02	74.8
Full Bloom + 2 wks	16.0	8.4	9.98	1.52	.79	68.8
Control	13.6	13.8	6.59	5.76	1.54	71.8

FIGURE 1. EFFECT OF GA ON TIFBLUE YIELD

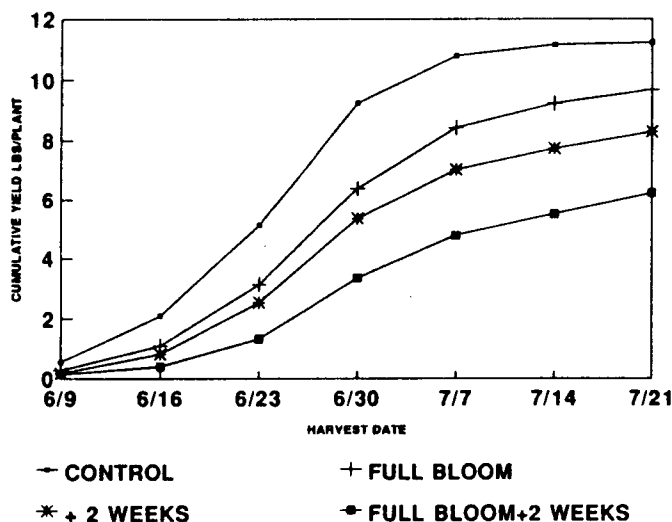


FIGURE 2. EFFECT OF GA ON DELITE YIELD

