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Effect of Apogee and Ponnax on Stolon Production and Yield of Florida-Grown Strawberry.[1]

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Stolon production by strawberry plants in Florida fruiting fields is highly undesirable. Stolons (runners) act as a sink for photosynthates and nutrients, reducing the amount of resources available for fruit production in an annual hill production system. The presence of stolons makes it more difficult for pickers to find berries among the excess vegetation. Hence, manual labor must be used to remove runners in the fruiting field at a cost of $40 to $60 per acre. If a low-cost chemical means could be found to reduce or eliminate runner production in the fruiting field, producers would benefit greatly.

The use of plant growth regulators has been investigated to promote runner production of strawberry for perennial and nursery production. Results from these experiments have been mixed. Growth regulators influence delicate aspects of plant growth. Applications rates and precise timing are key factors in achieving success. Other researchers are using growth regulators to achieve the opposite effect, the inhibition of stolon production in the fruiting field.

Apogee®, a relatively new agricultural chemical produced by the BASF Corp., is a gibberellic acid inhibitor. Currently Apogee® is registered for use in apples to control fire blight. In addition, it has been shown to have several benefits for apple producers including reduced terminal growth, increased red color and fruit set (Greene and Autio, 2002). Plant growth was retarded by applications of Apogee® but floral initiation was not delayed in comparison to other growth regulators (CCC, uniconazol, and ancymidol). These results suggest that these products may be useful for control of stolons on the 7,000 acres of strawberry production in Florida.

'Strawberry Festival' strawberry plants were planted on 19 October 2000 and grown following current University of Florida recommendations (Maynard and Olsen, 2000). Treatments consisted of Apogee® (1.7 and 3.4 oz ai/acre), Ponnax® (2.5 and 4.1 oz ai/acre), and a control. Treatment rates, application timing, and number of applications were chosen according to manufacturers' recommendations. Treatments were applied in a volume of water corresponding to 900 liters per hectare. Treatments were arranged in a randomized complete block design replicated 4 times with 14 plants/treatment plot. Spray materials were applied on16 and 30 November and 14 December 2000.

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Fruit harvest began on 8 December 2000 and continued twice weekly until 1 March 2001 for a total of 26 harvests. Fruit were graded for marketability (not misshapen, > 10g) and disease incidence (anthracnose and Botrytis fruit rot). Runner length and number per plot were recorded on 8 and 27 December. Runners were removed after observation.

Yield and yield components were separated by monthly and seasonal totals. Stolon number and length were analyzed for each observation date. All data was analyzed using SAS 8.0 with ANOVA procedures.

Significant differences were detectable among treatments during each analysis period for marketable weight and number of berries (Table 1). During December, both Apogee® treatments yielded less than Ponnax® at the 4.1 oz ai/acre rate, while the control and the lower Ponnax® treatments were not significantly different. Fewer differences were observed in the number of marketable berries with the lower Apogee® rate producing fewer fruit than the control and the highest Ponnax® application.

During each observation period, lower yields for plants treated with Apogee® were due to the fact that these plants never produced a large leaf and crown structure capable of producing abundant fruit. The 2002-03 season was unfavorable for strawberries due to abnormally low temperatures, which began in December and lasted through March, and resulted in commercial yields reductions of 50%. If the weather had been warmer, these differences might have been less pronounced. However, it may be that a single application of Apogee® at the second spraying date would have been sufficient to suppress runner production with less yield reduction. Work by Hicklenton and Reekie (personal communication) in Nova Scotia has shown that the suppression of runner production by Apogee® outlasts suppression of leaf growth. Ponnax® at 4.1 oz ai/acre enhanced yield over the control during January (Table 1). This is of special interest as market prices are quite high during January (averaging $16/12 lb flat compared to a $12/flat average in Feb. and $10/flat average in March). A yield increase obtained during this period represents a significant economic advantage to commercial strawberry growers.

Stolon production was dramatically reduced by the application of Apogee® (Table 2). Neither Apogee® treatment produced runners. At the first observation date, the control produced more runners than all other treatments. However, the average length of stolons was similar between the control and Ponnax® treatments. Observations made on 27 December revealed that differences between Ponnax® and the control in terms of number of stolons produced had disappeared, but the stolons produced by plants treated with Ponnax® were significantly shorter. This is a great disadvantage as the stolons are still acting as a sink for photosynthates but they grow close to the plant making detection and removal more difficult. No differences were detected in disease incidence among treatments.

Literature Cited

Greene, D.W. and W.R. Autio. 2002. Apogee -- a new growth retardant for apples. University of Massachusetts Extension Fact Sheet. F-127R.

Maynard, D.G. and S. Olson. 2000. Vegetable production guide for Florida. SP 170. University of Florida Press. Gainesville, FL.

Table 1. Monthly and Total Yields of 'Strawberry Festival' strawberry plants after application of Apogee® and Ponnax®

Treatment	Marketable Weight (flats/acre)	Marketable # of Berries (thousands/acre)
December 2000		
Control	193	818
Apogee 1.7 oz ai/acre	96	400
Apogee 3.4 oz ai/acre	112	557
Ponnax 2.5 oz ai/acre	160	662
Ponnax 4.1 oz ai/acre	210	923
January 2001		
Control	424	1951
Apogee 1.7 oz ai/acre	414	1672
Apogee 3.4 oz ai/acre	311	1515
Ponnax 2.5 oz ai/acre	483	2160
Ponnax 4.1 oz ai/acre	531	2282
February 2001		
Control	619	2596
Apogee 1.7 oz ai/acre	541	2404
Apogee 3.4 oz ai/acre	350	1655
Ponnax 2.5 oz ai/acre	585	2474
Ponnax 4.1 oz ai/acre	556	2265
March 2001		
Control	121	557
Apogee 1.7 oz ai/acre	39	209
Apogee 3.4 oz ai/acre	35	191
Ponnax 2.5 oz ai/acre	134	592
Ponnax 4.1 oz ai/acre	94	435
Totals		
Control	1357	5922
Apogee 1.7 oz ai/acre	1091	4685
Apogee 3.4 oz ai/acre	808	3918
Ponnax 2.5 oz ai/acre	1363	5888
Ponnax 4.1 oz ai/acre	1391	5905

Table 2. Stolon Number and Length as affected by Apogee® and Ponnax® Treatments.

	8 December 2000		27 December 2000	
	Number	**Length (in)**	**Number**	**Length (in)**
Control	9	6	15	18
Apogee 1.7oz ai/acre	0	0	0	0
Apogee 3.4oz ai/acre	0	0	0	0
Ponnax 2.5oz ai/acre	4	8	12	14
Ponnax 4.1oz ai/acre	8	7	17	16