Prohexadione-calcium Applications to Suppress Runner Growth in Strawberries Grown in a Plasticulture System.

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Keywords: *Fragaria x ananassa*, Apogee, gibberellic acid, inhibitor, stolon

Abstract

The labor and cost of runner (stolon) removal has slowed the adoption of plasticulture systems for strawberries in northern regions of North America. To provide adequate growing time, planting must occur earlier in the north than in the fall-planted southern region and, as a result, stolons (runners) are produced due to the warm, long-day conditions of summer. Runners are undesirable in plasticulture systems because they interfere with spraying and harvest, reduce marketable yield and are expensive to remove by hand. Prohexadione-calcium (Apogee®) is a gibberellic acid synthesis inhibitor that can reduce shoot growth in plants. Summer-planted 'Honeoye' strawberries grown in a plasticulture system in Maine, were treated with foliar sprays of prohexadione-calcium one, two or three times, approximately two weeks apart, at rates of 50 ppm, 100 ppm or 200 ppm, beginning when runner development was first noticed, or had runners removed by hand. The higher rates and doses of prohexadione-calcium in this trial provided the greatest inhibition of runner development and the highest marketable yield. Increasing rates and doses also tended to increase leaf number, reduce petiole and runner internode length, and reduce plant dry weights. Fruit size tended to be reduced under the highest number of sprays. Foliar sprays of prohexadione-calcium at 100-200 ppm appears to provide an effective means to reduce runner plant production for summer-planted strawberries grown in plasticulture.

INTRODUCTION

Strawberry production in much of the southern to middle United States has shifted from a perennial matted row system to annual, fall-planted plasticulture systems and based cultivars developed in California and Florida (Black et al., 2002). These systems allow for extended plant growth into the fall, winter and spring months and utilize high yielding, but winter-tender cultivars. Attempts to adapt this system to the Northern United States have met with very limited success. The short growing season and severe temperatures of the north often preclude adequate plant growth and flower bud development during the fall and winter to make such systems successful (Fiola et al., 1995). Cultivars best adapted to such systems may lack adequate hardiness to survive the winter. Thus, growers in the north must plant significantly earlier than growers in the south and use hardy cultivars. However, under the long day, high temperature conditions of summer, strawberry plants produce numerous runner plants (stolons), whereas few, if any, runner plants are produced when plants are established in the fall. Runner plants are a liability in a plasticulture system. They are a sink for assimilates, nutrients and water, reducing resources that otherwise could support fruit bud development in the mother

plant. They also interfere with cultivation and spraying, and often root in the planting holes or along the edge of the mulch, essentially becoming weeds. Removing runner plants by hand is labor intensive to the point of making the system cost prohibitive. Developing techniques that provide for adequate plant growth in plasticulture systems in the north without the burden of runner removal could significantly improve the yield, quality and profitability of strawberry production in northern growing regions. Prohexadione-calcium (Apogee®) is a gibberellic acid synthesis inhibitor which is registered to reduce vegetative growth in commercial apple orchards (Unrath, 1999). Previous research has suggested that this material may reduce runner growth in strawberry when applied as foliar sprays (Black, 2004).

MATERIALS AND METHODS

Dormant strawberry crowns, cv. 'Honeoye', were planted on 12 July 2004 into double rows on a 1 m wide raised bed covered with black plastic mulch. Plants were spaced 30.5 cm apart within rows with the rows 76 cm apart on the bed. Two trickle irrigation lines ran under each row and were used to supply water and fertilizer to the plants as needed. Flower clusters were removed as they appeared during the planting year. Each treatment plot consisted of 40 plants (20 per row) or 6 m of bed length.

The treatments included a control of hand cutting runners, and 50 ppm, 100 ppm, and 200 ppm concentrations of prohexadione-calcium (Apogee ®) applied as foliar sprays. All of the treatments were applied one, two or three times at two week intervals. The prohexadione-calcium treatments were initiated when runners first started to appear on the plants (10 August). The second prohexadione-calcium spray, for those beds receiving two or three applications was applied on 24 August, and the third spray (only for beds receiving three applications) was applied on 7 September. For the hand cutting treatment, beds that were cut three times had the same treatment dates as those beds sprayed three times. Beds that were cut twice were cut only on the last two spray treatment dates, and those that were cut once were only cut on the last spray date (7 September). At the end of the growing season (20 October) single plant samples were harvested from each plot to measure vegetative development. Straw mulch was applied for winter protection in December and removed the following April. Pesticide applications, including fungicides and insecticides followed regional recommendations. Plants were harvested twice weekly beginning 27 June, 2005 and ending 11 July.

RESULTS AND DISCUSSION

Prohexadione-calcium treatments were at least as effective, and in some cases significantly more effective, than hand cutting to control runners on strawberry plants during the planting year (Figure 1). Increasing the rates of prohexadione-calcium from 50 ppm to 100 ppm, and from 100 ppm to 200 ppm generally improved runner control. Increasing the number of applications from one to two did not significantly effect runner numbers, and increasing the number of applications from two to three only improved runner control significantly for the lowest rate (50 ppm) of prohexadione-calcium. Runners that formed on prohexadione-calcium-treated plants had shortened internodes, and this effect increased as rates and application numbers increased. Leaf petiole length was significantly reduced under the two higher prohexadione-calcium rates when they were applied three times. Plant dry weights, excluding runners, were reduced as prohexadione-calcium rates and applications increased, although this was only significant at the two highest rate and frequencies. Crown and leaf numbers tended to increase with

prohexadione-calcium sprays, but the effect was only significant at the highest rates and frequencies.

Increasing rates and application numbers of prohexadione-calcium led to increasing yields (kg/plot) in this study. Fruit yield also increased in the hand-cut plots when runners were removed three times as opposed to only once. None of the prohexadione-calcium treatments significantly reduced yield, and the higher rates and frequencies tended to increase yield over the hand cut plots. Fruit size was largely unaffected by the prohexadione-calcium treatments. Although there appeared to be a slight trend toward fewer grams per fruit with the treated plants, none had fruit size significantly lower than the hand cut controls. The percentage of cull fruit by weight was similarly unaffected in any consistent manner by prohexadione-calcium treatments, although increasing application numbers or hand removals tended to reduce cull weight, most of which was due to fruit below marketable size (<5g).

Previous research with prohexadione-calcium on strawberry has shown it significantly inhibits runner production, but that it could also cause significant reductions in plant size, fruit size and marketable yield, depending upon rates, timing of applications and cultivar (Black et al., 2002, Handley et al, 2007). This study has demonstrated that, for the variety 'Honeoye', a rate of 100 ppm applied three times, or rates of 200 ppm applied one, two or three times, over the growing season of a non-fruiting planting year, was more effective than hand cutting to control runners. Lower rates and application frequencies also reduced runner growth, but at levels lower than observed with minimal hand cutting. Although plant size could be reduced by the highest rates and frequencies used in this study, most notably leaf petiole length and dry weights, fruit yield the following spring tended to increase with the higher treatment rates, and fruit size was largely unaffected. This suggests that prohexadione-calcium could offer an effective means to inhibit runner growth for plasticulture systems in regions where crowns must be planted under long days and warm temperatures because fall planting and winter harvests are not feasible. This could greatly reduce the labor costs of these systems, for which runner removal has been a major economic barrier to adoption.

ACKNOWLEDGMENTS

The authors would like to acknowledge the technical support of Patricia McManus and Christina Howard, and David Pike for his assistance.

Literature Cited

Black, B. L., J.M. Enns, and S.C. Hokanson. 2002. A comparison of temperate-climate strawberry production systems using eastern genotypes. HortTechnology 12:670-675.

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Fiola, J.A., R.J. Lengyen, and D.A. Reichert. 1995. Planting density and date affect productivity and profitability of 'Chandler', 'Tribute', and 'Tristar' in strawberry plasticulture. Adv. Strawberry Res. 14:49-52.

Handley, D., M. Hutton and R. Moran. 2007. Strawberry plant growth and yield in response to increasing prohexadione-calcium rates in a plasticulture system. HortSci. 42(4): 983.

Unrath, C.R. 1999. Prohexadione-Ca: A promising chemical for controlling vegetative

growth of apples.

Figures

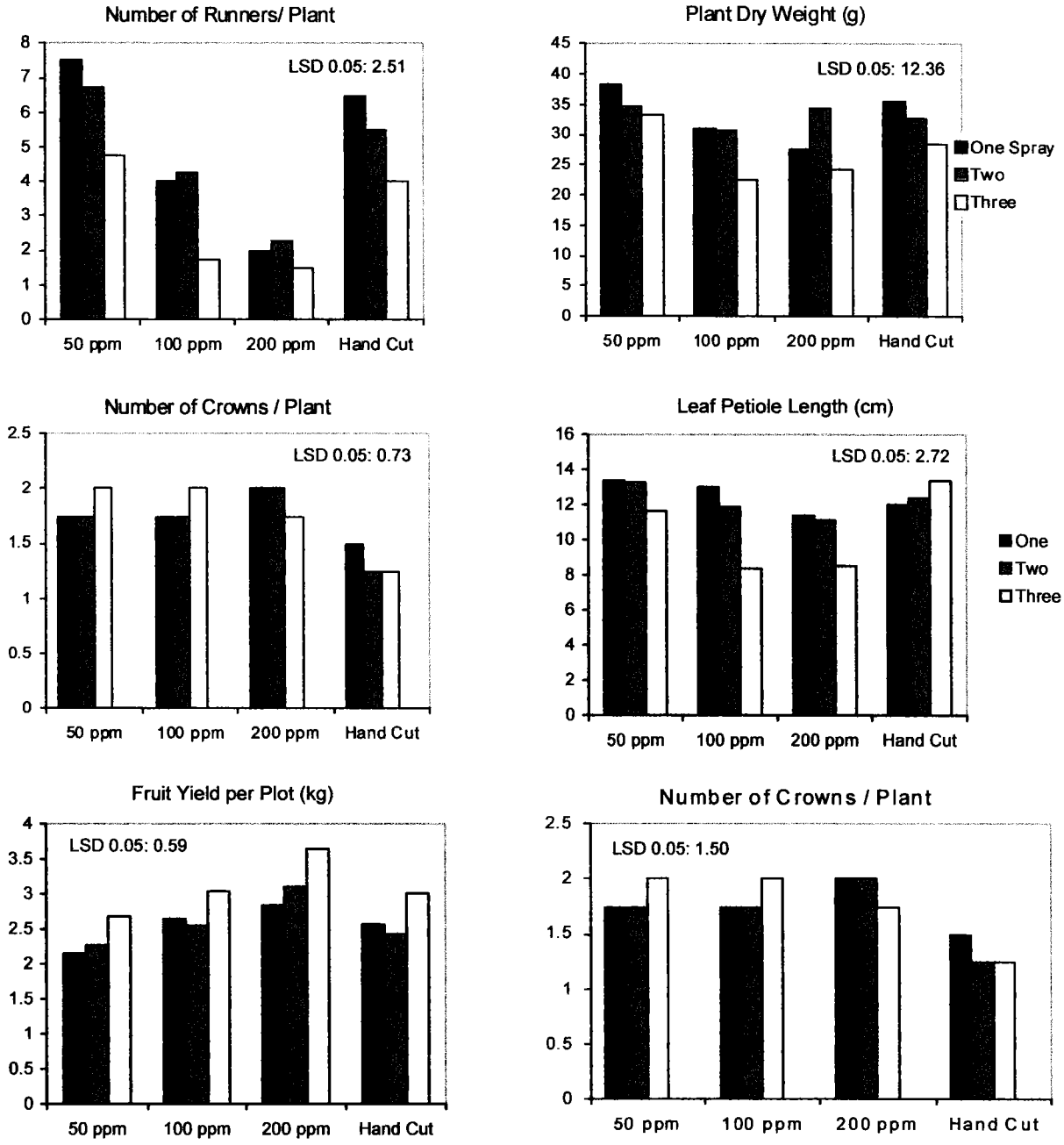

Fig. 1. Effect of increasing rates and application numbers of prohexadione-calcium sprays and hand removal of runners on subsequent runner growth, plant dry weight, number of crowns, leaf petiole length, fruit yield and fruit size in 'Honeoye' strawberry plants.

Vegetative Growth of Two Strawberry Cultivars Treated with Prohexadione-calcium Root Dips and Foliar Sprays

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Additional index words. *Fragaria ananassa*, Duch., runners, Apogee, GA, growth regulator

Abstract

Strawberry growers in northern regions of the North America have had limited success in adopting high-yielding plasticulture systems of southern regions because they must plant during the summer months and, as a result, must invest considerable time and labor into removal of runner plants. Dormant crowns of 'Allstar' and 'Jewel' strawberries (*Fragaria ananassa*, Duch.) grown in one gallon pots in a greenhouse were treated with prohexadione-calcium (Apogee®) at 150 ppm as root dips prior to planting with and without Agri-Gel, or as two foliar sprays 14 days apart at the first visible development of runners. The two cultivars varied significantly in their response to prohexadione-calcium root dips. The dip treatment significantly delayed runner production in 'Allstar'.

Although the plants had nearly the same number of runners as the control when harvested, the runners were less developed. The root dips all but halted runner production in 'Jewel', but also resulted in some plant morality. Foliar sprays of prohexadione-calcium reduced runner numbers by about 70% for both cultivars. Prohexadione-calcium treatments increased leaf and branch crown numbers and total plant dry weight. Root dips and foliar sprays of prohexadione-calcium were effective in reducing runner plant production for strawberries grown on plasticulture in northern regions where fall planting is not feasible. Such treatments could significantly improve the economic viability of strawberry plasticulture in Northern climates.

Introduction

Strawberry production in much of the southern to middle United States has shifted from a perennial matted row system to annual, fall-planted plasticulture systems and based cultivars developed in California and Florida (Black et al., 2002). These systems allow for extended plant growth into the fall, winter and spring months and utilize high yielding, but winter-tender cultivars. Attempts to adapt this system to the Northern United States have met with very limited success. The short growing season and severe temperatures of the north often preclude adequate plant growth and flower bud development during the fall and winter to make such systems successful (Fiola et al., 1995). Cultivars best adapted to such systems may lack adequate hardiness to survive the winter. Thus, growers in the north must plant significantly earlier than growers in the south and use hardy cultivars. However, under the long day, high temperature conditions

of summer, strawberry plants produce numerous runner plants (stolons), whereas few, if any, runner plants are produced when plants are established in the fall. Runner plants are a liability in a plasticulture system. They are a sink for assimilates, nutrients and water, reducing resources that otherwise could support fruit bud development in the mother plant. They also interfere with cultivation and spraying, and often root in the planting holes or along the edge of the mulch, essentially becoming weeds. Removing runner plants by hand is labor intensive to the point of making the system cost prohibitive. Developing techniques that provide for adequate plant growth in plasticulture systems in the north without the burden of runner removal could significantly improve the yield, quality and profitability of strawberry production in northern growing regions. Prohexadione-calcium (Apogee ®) is a gibberellic acid synthesis inhibitor which is registered to reduce vegetative growth in commercial apple orchards (Unrath, 1999). Previous research has suggested that this material may reduce runner growth in strawberry when applied as foliar sprays (Black, 2004). Root dips may provide a less expensive and more effective means of delivering this material to strawberries. The addition of a polymer-based gel used to reduce root stress in transplants may improve the efficacy of such root dips by slowing degradation of the prohexadione-calcium and reducing the initial uptake.

Materials and Methods

Dormant strawberry crowns of two cultivars 'Allstar', a mid-late season, weak runner producer, and 'Jewel', an early-midseason, strong runner producer, were planted on 15

June into one gallon plastic pots filled with soilless media (Farfard® No. 2). Just prior to planting crown roots were dipped for five minutes in one of the following treatments: 1. Water, 2. Polymer-based gel (Agri-Gel® @ 0.25 oz./gal), 3. 150 ppm prohexadione-calcium (Apogee ®), 4. Gel +150 ppm prohexadione-calcium. Another set of crowns received no root dip, but received two foliar sprays with 150 ppm prohexadione-calcium at first visible runner growth (17 July) and 14 days later (31 July).

Plants were grown on benches in a greenhouse at the Maine Agricultural and Forest Experiment Station in Monmouth, Maine, with 78°F day temperature and 60°F night temperature. The plants were fertilized weekly with soluble 20-20-20 fertilizer. All flower trusses were removed as they appeared, similar to how these plants would be treated during the planting year in the field. The plants were harvested to measure vegetative parameters on 26 September, 2006.

Results and Discussion

The two cultivars in the trial varied significantly in their response to prohexadione-calcium root dips. 'Jewel' plants had 25% mortality following the prohexadione-calcium root dip alone. With the addition of a polymer-based gel to the dip, the same cultivar showed no mortality. Plant survival was 100% for all other treatments. All prohexadione-calcium treatments significantly increased leaf number per plant for both varieties (Table 1). Petiole length was initially greatly reduced by prohexadione-calcium root dips but at harvest time (103 days later) was not significantly different from control

plants. Foliar sprays of prohexadione-calcium did reduce petiole length compared to the controls, although the effect was only significant for 'Allstar'. All prohexadione-calcium treatments significantly increased crown numbers for 'Jewel', but only the foliar spray treatment had a significant effect on 'Allstar'. Root length was not significantly affected by prohexadione-calcium treatments for 'Jewel', and was slightly increased by the treatments for 'Allstar'. Plant dry weights, not including any runners, tended to increase as a result of prohexadione-calcium treatments, although the effect was only significant for 'Jewel'

Prohexadione-calcium root dips, both with and without poly-based root gel, significantly delayed runner production in 'Allstar', considered a poor runner producer, but only temporarily. When they were harvested, the plants had nearly the same number of runners as the control, but the runners were much less developed, as shown by significantly reduced internode length and dry weight (Fig. 1). The dips all but halted runner production in 'Jewel', which is typically a vigorous runner producer, with very few plants showing any runner development at the time of plant harvest 103 days later. Addition of the gel had no significant impact on final runner number, with or without prohexadione-calcium, although the addition of gel to the prohexadione-calcium root dip appeared to reduce plant mortality for 'Jewel'. Foliar sprays of prohexadione-calcium also significantly reduced runner plant production for both cultivars. Sprays were more effective than root dips for reducing the number of runners produced for "Allstar", but less effective than root dips for 'Jewel'.

From this study, it appears that root dips or foliar sprays of prohexadione-calcium may provide an effective means of reducing runner plant production for strawberries grown on plasticulture in regions where fall planting is not feasible. Root dips may provide a more practical and lower risk means of applying prohexadione-calcium than foliar sprays. It is apparent that strawberry cultivars will differ in their response to prohexadione-calcium, and appropriate rates for each variety would need to be determined before recommendations could be made on a commercial scale

Literature Cited

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Black, B. L. 2004. Prohexadione-calcium decreases fall runners and advances branch crowns of 'Chandler' strawberry in cold-climate annual production system. J. Amer. Soc. Hort. Sci. 129(4):479-485.

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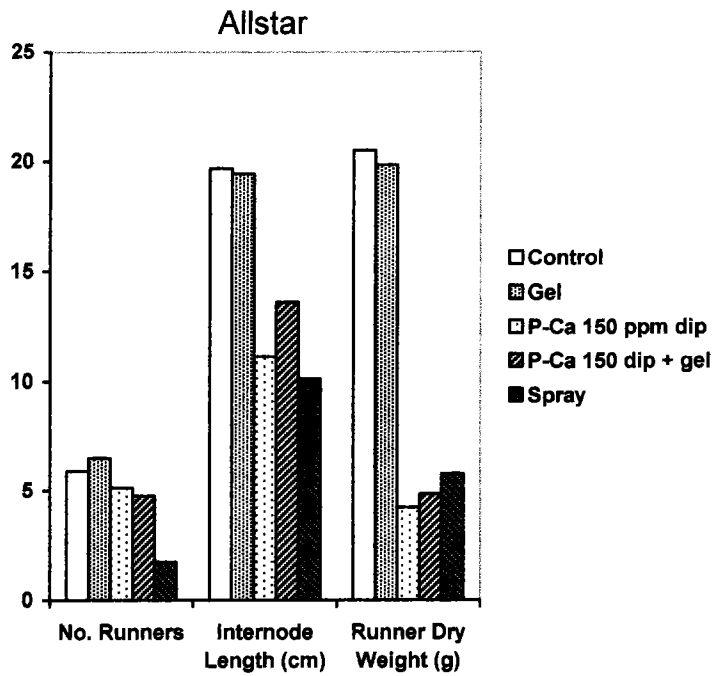
Unrath, C.R. 1999. Prohexadione-Ca: A promising chemical for controlling vegetative growth of apples. HortScience 34:1197-1200.

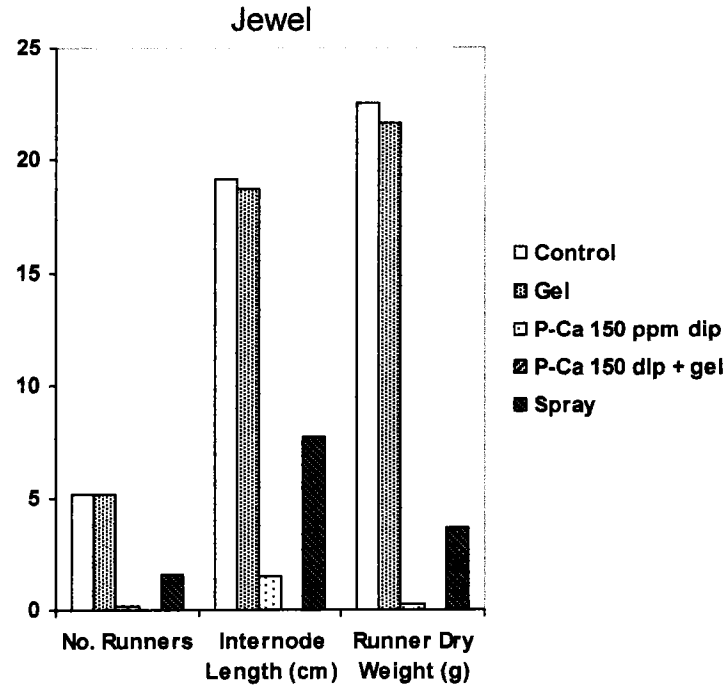
Table 1. Strawberry vegetative growth characteristics in response to 150 ppm prohexadione-calcium (P-Ca) root dips, with or without polymer gel, and foliar spray treatments.

Cultivar	Treatment	No. leaves	Petiole length (cm)	No. crowns	Root length (cm)	No. runners	Plant dry wt. (g)
Allstar	Control	13.25	22.31	1.37	29.75	5.87	15.87
Jewel	Control	12.75	12.87	1.37	26.37	5.12	15.62
Allstar	Gel root dip	14.87	13.62	1.62	31.12	6.50	16.77
Jewel	Gel root dip	11.87	14.44	1.25	25.25	5.12	14.26
Allstar	P-Ca root dip	20.62	16.56	1.37	37.31	5.12	18.53
Jewel	P-Ca root dip[z]	23.33	15.68	2.17	26.00	0.17	22.11
Allstar	P-Ca dip+gel	20.75	16.62	1.37	34.87	4.75	18.12
Jewel	P-Ca dip+gel	21.62	13.94	2.37	26.81	0.00	18.14
Allstar	P-Ca spray	23.75	11.44	2.12	34.37	1.75	15.27
Jewel	P-Ca spray	24.62	8.50	2.62	24.75	1.62	18.28
LSD .05		4.65	5.37	0.68	4.97	1.25	3.56

[z]Treatment had 25% mortality on 'Jewel'. Dead plant data not included in results.

Figure 1. Effects of 150 ppm prohexadione-calcium (P-Ca) root dips, with and without polymer gel, and foliar sprays on runner plant development in 'Allstar' and 'Jewel' strawberry plants103 days after planting.


Allstar
25
20
15
10
5
0
No. Runners
Internode Length (cm)
Runner Dry Weight (g)
Control
Gel
P-Ca 150 ppm dip
P-Ca 150 dip + gel
Spray


Jewel
25
20
15
10
5
0
No. Runners
Internode Length (cm)
Runner Dry Weight (g)
Control
Gel
P-Ca 150 ppm dip
P-Ca 150 dip + gel
Spray

Vegetative Growth of 'Chandler' Strawberry Plants Treated with Prohexadione-calcium Root Dips and Foliar Sprays

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Foliar sprays of prohexadione-calcium have been shown to inhibit runner production in strawberry plants, and could therefore reduce the amount of labor required to remove runners for plasticulture systems in the northeast, where earlier planting time is required for plant establishment, but which results in high runner production. Pre-plant root dips of prohexadione-calcium may offer another, less expensive and more efficient method of inhibiting runner growth. Chandler plants were treated with prohexadione-calcium as a root dip at concentrations of 100 or 200 ppm, prior to planting 10 July, 2008 into a plasticulture system in Maine. One half of the plots also received a supplemental foliar spray of 100 ppm prohexadione-calcium on 13 August, when runner plants were first observed emerging in untreated plots. During the planting (non-fruiting) season, prohexadione-calcium root dips significantly reduced runner production. The lower rate reduced runner by 51% and the higher rate by 62%. A single foliar spray of 100 ppm with no root dip reduced runner growth by 24%. The addition of a foliar spray to plots receiving root dips further reduced runner growth, although the effect was not significant. Other vegetative parameters measured were generally also reduced by prohexadione-calcium treatments, including leaf number, petiole length, runner internode length, root length and plant dry weights, although the effects were often not significant. Crown numbers were not significantly affected by any of the treatments. Fruit will be collected in 2009 to determine the effects of the treatments on plant yield and fruit quality.

SmartZone Communications Center Collaboration Suite evvea@comcast.net

Another try
Apogee/strawberries

Monday, September 21, 2009 9:19:25 AM

From: ell10@nysaes.cornell.edu

To: starner@aesop.rutgers.edu; Carpenter@aesop.rutgers.edu; infante@aesop.rutgers.edu; evvea@comcast.net

Attachments: 1060 Handley Revised.doc (173.4KB)
ApogeeGHreport07b.doc (90.5KB)
NEASHS09b.doc (32.4KB)

```
>Subject: RE: Apogee/strawberries
>Date: Mon, 21 Sep 2009 07:26:05 -0400
>Thread-Topic: Apogee/strawberries
>Thread-Index: Aco4lx3H6fbHbIpoQxSuJ6M+ZOW/WwCFMhsQ
>From: "David Handley" <dhandley@umext.maine.edu>
>To: "Kathy Demchak" <efz@psu.edu>, "Roger Batts" <roger_batts@ncsu.edu>,
>         "Edith Lurvey" <ell10@nysaes.cornell.edu>
>Cc: "David Monks" <david_monks@ncsu.edu>, "Brent Black" <brent.black@usu.edu>,
>         "Duane Greene" <dgreene@pssci.umass.edu>,
>         "Julia Reekia" <Julia.Reekie@AGR.GC.CA>
>
>
>Hi All,
>
>Here are a couple of articles and an abstract on the Apogee work done on
>strawberries here in Maine that may help state the case.  I agree with
>Kathy's summary: The feasibility of plasticulture strawberries here in
>New England is very low unless we can overcome the high labor costs of
>runner removal.  More southern growers don't face this cost (at least
>not to this extent) because they have the advantage of being able to
>plant later in the season, under short-day, cooler growing conditions,
>which naturally limit runner production. Foliar sprays of Apogee do a
>good job of inhibiting runners, and can stimulate an increase in yield,
>although the latter effect was somewhat variety dependent in our trials.
>
>
>We have also found that pre-plant root dips with Apogee can effectively
>reduce runner growth after planting, which we feel will offer a good
>option for day-neutral plants, for which a foliar spray is not feasible,
>given that they runner at the same time as they flower in the planting
>season.
>
>Hope this is helpful.
>
>David
>
>David T. Handley
>Vegetable & Small Fruit Specialist
>University of Maine Cooperative Extension
>Highmoor Farm, P.O. Box 179
>Monmouth, ME  04259
>
>207-933-2100
>
>-----Original Message-----
>From: Kathy Demchak [mailto:efz@psu.edu]
>Sent: Friday, September 18, 2009 3:34 PM
>To: Roger Batts
>Cc: David Monks; Edith Lurvey; Brent Black; David Handley; Duane Greene;
```

>Julia Reekia
>Subject: Re: Apogee/strawberries
>
>Roger - I am going through my emails and articles and will forward
>the pertinent ones to you. I may need to send out a couple of emails
>to obtain one or two other articles, as I don't have copies of all of
>them.
> For us in the Northeastern U.S., the interest is for
>plasticulture production when dormant plants are used as the plant
>source. Dormant plants are used because there is a lack of plug
>plants early enough in the season for Northern growers. It's
>possible that these dormant plants may have place in other
>systems. I had made some comments early on during the discussion
>period that I wanted to make sure we (we being those of us in
>different regions or countries) were coordinated and in agreement on
>how the use pattern was specified. I don't want the use pattern to
>mentioned so specifically that the material becomes useless for
>others. The way the use pattern is currently worded in the project
>description may be generic enough to fit them all. Here are the 3
>situations where I can see a use for Apogee.
>1) As mentioned, when dormant plants are planted during the summer in
>Northern plasticulture production. For plasticulture, yield is
>dependent on branch crown formation rather than runners. However, in
>the North, the plants produce numerous runners during the summer time
>on plastic, which root in the rows, root in other planting holes, and
>make tangled mass of runners on the beds that die off later. So,
>growers remove the runners, but this is very costly - my estimates
>was a a minimum of 40 hours per acre for a "shy-runnering" cultivar
>to 80 for one with more profuse runner production.
>2) For fresh-dug plants by Canadian nurseries. I'm a bit out of my
>area of knowledge here, so I hope someone will correct me (Julia?) if
>I'm wrong. It appears to me that at some point, you may want to
>minimize runner production and get "stockier" fresh-dug plants. It
>appears from some of the literature that Apogee use decreased runner
>production and increased branch crown formation, resulting in higher
>yields. The difference in results from the North vs. South would
>likely be due to differences in environmental triggers, if not
>cultivar. Many of these dormant plant cultivars are ones developed
>for use in matted-row production, were prolific runner production
>is an important attribute.
>3) For summer-planted day-neutral plants in California. In this
>situation, the problem is similar to that in Northern plasticulture -
>fewer runners, with or without a yield increase, would be desirable.
> I will be back with more documentation in just a little
>while. Thanks for your help, Roger. The last 4 people I copied in
>on this message are ones who've done research with the product, and
>may wish to add to what I've said, or correct anything I've said that
>could be inaccurate.
>
>Kathy
>
>At 01:43 PM 9/18/2009, David Monks wrote:
>>Roger:
>>If my memory serves me correct, I conducted a trial at Clayton and
>>Katie Jennings when she was with BASF conducted a large trial in
>>which I collaborated with her at the BASF site on annual
>>strawberries grown on plastic. We counted runners, and determined
>>berry yield. We did not see a reduction in runners nor an affect on
>>yield. So actually we had consistent data in that we did not see
>>any advantages in annual strawberries. Was the request for annual or
>>perennial strawberries or both?
>>David
>>
>>David W. Monks
>>Assistant Director -
>>NC Agricultural Research Service

>>College of Agriculture & Life Sciences
>>Campus Box 7643
>>Raleigh, NC 27695-7643
>>
>>Office: 919-515-2717
>>Cell: 919-830-7684
>>
>>
>> >>> Roger Batts <roger_batts@ncsu.edu> 9/18/2009 10:55 AM >>>
>>I think David Monks mentioned he has seen inconsistent performance in
>>NC. I'll check with him on that. RBB
>>
>>
>>At 10:45 AM 9/18/09, Edith Lurvey wrote:
>> >This is being driven by the need to reduce runners in 'annual'
>> >strawberries, grown, for the most part, on plastic. It would not
>> >actually add to yield, but would improve average berry size and keep
>> >the rows neater.
>> >
>> >Kathy can probably give a better description.
>> >
>> >Did anyone else actually make comments? Other than the fact that it
>> >is a A prioritiy for Canada.
>> >
>> >>Hello Kathy and Edie,
>> >>I am trying to put together (mostly from memory) some notes from
>> >>our discussion session at Cleveland and you two offered the most
>> >>input on Apogee/strawberries. So, I have a few questions, if you
>> >>have the time to respond.
>> >>
>> >>1. Is interest here driven by the reduced canopy impact on
>> >>diseases (as it is in peanuts) or on carbohydrate balancing and
>> >>possible yield assistance? Or something else?
>> >>2. Would this use be for both annual and perennial plantings? If
>> >>not, why would the preferred method be benefited vs. the other
>method?
>> >>3. Can ya'll (I really like that word) remember other comments
>> >>made in Cleveland that I need to put in my notes?
>> >>
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