Peanut (*Arachis hypogaea* L.) Cultivar Response to Prohexadione Calcium

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ABSTRACT

Peanut digging efficiency is often reduced due to excessive vine growth. The plant growth regulator prohexadione calcium retards vegetative growth and improves row visibility by inhibiting internode elongation resulting in improved digging efficiency and in some instances increases in pod yield. The objective of this research was to determine the effects of prohexadione calcium on row visibility and pod yield of newly released and commercially available cultivars AT VC-2, Brantley, CHAMPS, Georgia Green, Gregory, Perry, Phillips, NC-V 11, NC 12C, Tamspan 90, and VA 98R and the breeding lines N02006, N01013T, and VT 976133. Although differences in row visibility were noted among cultivars, prohexadione calcium improved row visibility in almost every experiment regardless of cultivar. The cultivars NC 12C and Perry were more responsive to prohexadione calcium in terms of pod yield than NC-V 11 or VA 98R. Response of these cultivars was independent of digging date. In other experiments, prohexadione calcium improved row visibility of the cultivars AT VC-2, Gregory, NC-V 11, Perry, VA 98R, and Wilson, but did not increase yield when compared with non-treated peanut. In a final experiment, prohexadione calcium improved row visibility of the Virginia market type cultivars Brantley, CHAMPS, Gregory, and Phillips and the experimental lines N02006, N01013T, and VT 976133. Row visibility for the experimental line N01013T was improved at 2 of 4 sites by prohexadione calcium. In a final experiment, prohexadione calcium increased row visibility of Georgia Green, Gregory, and Tamspan 90 but did not affect pod yield of these cultivars.

Key Words: Digging date, plant growth regulator, pod yield, row visibility.

Excessive vine growth of peanut (*Arachis hypogaea* L.) reduces efficiency of digging and vine inversion. Reduction in efficiency is often attributed to poor row visibility. Additionally, pods often shed from plants in the digging process and can lead to substantial yield loss, especially when soil conditions are not conducive for pod and soil separation or due to early maturity.

Prohexadione calcium (Apogee® Plant Growth Regulator, BASF Corporation, 26 Davis Drive, Research Triangle Park, NC 27709) is registered for management of vegetative growth of peanut and other crops (Anonymous, 2003; Byers and Yoder, 1999; Grossman *et al.*, 1994; Lee *et al.*, 1998; Nakayama *et al.*, 1992; Yamaji *et al.*, 1991). Culpepper *et al.* (1997) and Mitchem *et al.* (1996) reported that prohexadione calcium improved row visibility of peanut and increased pod yield. Beam *et al.* (2002) reported that increased pod yield of peanut by prohexadione calcium was attributed in part to increased pod retention and less pod loss during digging and inversion of vines.

Digging date can dramatically affect pod yield and market grade characteristics of peanut (Jordan *et al.*, 1998; Sholar *et al.*, 1995). Culpepper *et al.* (1997) reported that response of six Virginia market type cultivars to prohexadione calcium was independent of digging date. However, yield response to prohexadione calcium was cultivar dependant. Beam *et al.* (2002) reported that response of the Virginia market type cultivar NC 12C did not differ when peanut was dug on two dates approximately 2 to 3 wk apart. The mechanism of increased yield was attributed to greater pod retention and less shedding during the digging and inversion process (Beam *et al.*, 2002).

The effect of prohexadione calcium on yield of the cultivars Brantley, Georgia Green, CHAMPS, Phillips, and Tamspan 90 and the promising breeding lines N02007, N01013T, and VT 976133 has not been documented in the literature. In experiments conducted during 2001 and 2002 at one location, Faircloth *et al.* (2005) reported prohexadione calcium increased row visibility for the cultivars Gregory, Perry, VA 98R, and Wilson but did not affect pod yield. Beam *et al.* (2002) reported response of the cultivars NC 10C, NC-V 11, NC 12C, Perry, and VA 98R to prohexadione calcium in separate experiments with only one digging. Additional research is needed to better define growth and yield response of newly released and more peanut cultivars to prohexadione calcium. Therefore, research was conducted in North

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Carolina to determine the effect of prohexadione calcium on row visibility and pod yield of recently released cultivars.

Materials and Methods

Methods common to all experiments. Experiments were conducted in northeastern North Carolina in conventionally tilled raised seedbeds. Soils included a Norfolk sandy loam (fine-loamy, siliceous, thermic, Aquic Paleudults) with pH 5.7 to 6.1 and 1.5 to 2.1% organic matter at the Peanut Belt Research Station located near Lewiston-Woodville and the Border Belt Tobacco Research Station near Whiteville and a Goldsboro sandy loam (fine-loamy, mixed, thermic, Arenic Hapludults) with pH 5.8 and 2.0% organic matter at the Upper Coastal Plain Research Station located near Rocky Mount. Plot size was 4 rows (91-cm spacing) by 9 to 12 m. Peanut was seeded in early to mid May of each year at rates designed to achieve a final in-row plant population of 12–15 plants/m in a single row planting pattern.

Prohexadione calcium was applied at 140 g ai/ha at 50% row closure and then repeated 3 wks later. Fifty-percent row closure was considered the time when approximately half of vines from adjacent rows were touching. Crop oil concentrate (Agri-Dex, 83% paraffin-based petroleum oil and 17% surfactant, Helena Chemical Co., 5100 Poplar Ave., Memphis, TN 38137) and 28% urea ammonium nitrate (UAN), each at 1.2 L/ha, were applied with prohexadione calcium in 140 L/ha aqueous solution using a CO_2-pressurized backpack sprayer equipped with 8002 regular flat fan spray nozzles (Teejet nozzles, Spraying Systems Co., Wheaton, IL 60187). Production and pest management practices, other than plant growth regulator applications, were held constant over the entire test based on North Carolina Cooperative Extension Service recommendations (Brandenburg, 2006; Jordan, 2006a 2006b; Shew, 2006).

Visual estimates of row visibility were recorded in mid September using a scale of 0 to 10 where 0 = a peanut canopy that is flat with indistinguishable rows and 10 = a peanut canopy with triangular-shaped rows that are clearly visible. Peanut was allowed to air dry for 4 to 7 days after digging, and final pod yield was converted to 8% moisture. Moisture was recorded in the field during mass determination and adjusted appropriately.

Data for row visibility and pod yield were subjected to analyses of variance appropriate for the treatment structure in each experiment. Means of significant main effects and interactions were separated using fisher's Protected LSD test at $p \leq 0.05$.

Interaction of cultivar and digging date. The experiment was conducted during 2000 and 2001 at Lewiston-Woodville and at Rocky Mount. Prohexadione calcium was applied as described previously to the Virginia market type cultivars NC-V 11, NC 12C, Perry, and VA 98R. A non-treated control for each cultivar was included. Two digging dates were also included for each cultivar with one occurring the last wk of September and the second digging date occurring during the second week of October. These cultivars most likely reached optimum during this period of time (Williams and Drexler, 1981). However, logistically it was difficult to dig each cultivar precisely at the time of optimum pod maturity. The experimental design was split plot with digging date serving as the whole plot unit and combinations of cultivar and prohexadione calcium serving as sub plot combinations. Sub plots were replicated four times for each whole plot unit. Data for row visibility were subjected to analysis of variance appropriate for the treatment structure containing 5 sites, 4 cultivars, and 2 prohexadione calcium rates. Data for pod yield were subjected to a similar analysis of variance that also included 2 digging dates. Data for row visibility was collected prior to the first digging date.

Evaluation of new cultivars and experimental lines. The experiment was conducted during 2002 at Lewiston-Woodville, Rocky Mount, and Whiteville with the Virginia market type cultivars AT VC-2, Gregory, NC-V 11, Perry, VA 98R, and Wilson. Peanut was seeded as described previously and was dug only once in early October at all locations. Prohexadione calcium was applied as described previously, and a non-treated control for each cultivar was included. The experimental design was a randomized complete block with combinations of cultivar and prohexadione calcium replicated four times. Data for row visibility and pod yield were subjected to analysis of variance appropriate for the treatment structure containing 3 sites, 6 cultivars, and 2 prohexadione calcium rates.

A second experiment was conducted during 2005 and 2006 at Lewiston-Woodville. Prohexadione calcium was applied to the Virginia market type cultivars Brantley, CHAMPS, Gregory, and Phillips and the experimental lines N02006, N01013T, and VT 976133 as described previously. Pod yield was not determined in this experiment because of concerns over maturation at digging and other harvesting constraints. The experimental design was split plot with cultivar serving as the whole plot unit and prohexadione calcium rate

Table 1. Row visibility of the peanut cultivars NC-V 11, NC 12C, Perry, and VA 98R following application of prohexadione calcium at Lewiston-Woodville and Rocky Mount in 2000 and 2001.[a,b]

	Lewiston-Woodville				Rocky Mount			
	2000		2001		2000		2001	
Cultivar	− PC[c]	+ PC	− PC	+ PC	−PC	+ PC	− PC	+ PC
NC-V 11	6.3 d	9.0 a	2.5 de	8.5 a	2.9 c	6.6 a	2.3 cd	6.2 b
NC 12C	3.3 e	7.8 c	1.9 ef	6.1 c	3.0 c	4.4 b	2.3 cd	6.2 b
Perry	4.1 e	8.0 bc	1.1 f	7.4 b	1.3 d	5.2 b	1.6 d	7.9 a
VA 98R	6.0 d	8.8 ab	3.1 d	8.3 ab	2.7 c	7.0 a	2.7 c	8.6 a

[a]Means within a location and year followed by the same letter are not significantly different according to Fisher's Protected LSD test at $p \leq 0.05$.

[b]Row visibility defined using a scale of 0 to 10 where 0 = a flat canopy with no row definition and 10 = peanut rows that are triangular in shape.

[c]Abbreviation: PC, prohexadione calcium. Prohexadione calcium was applied at 140 g/ha with crop oil concentrate and nitrogen solution when 50% of vines from adjacent rows were touching. This treatment was repeated 3 wk later.

serving as sub plots with each cultivar. Four replications were included for each sub plot. Data for row visibility were subjected to analysis of variance appropriate for the treatment structure containing 4 sites, 4 cultivars, and 2 prohexadione calcium rates.

Evaluation of market types. A final experiment was conducted during 2005 and 2006 at Lewiston-Woodville to compare response of Georgia Green (runner market type), Gregory (Virginia market type), and Tamspan 90 (Spanish market type) response to prohexadione calcium. Date for row visibility and pod yield were subjected to analysis of variance appropriate for the 3 cultivars and 2 prohexadione calcium rates.

Results and Discussion

Interaction of cultivar and digging date. The interaction of site X cultivar X prohexadione calcium rate was significant for row visibility. Prohexadione calcium increased row visibility for the cultivars NC-V 11, NC 12C, Perry, and VA 98R when compared with non-treated peanut during both years at both locations (Table 1). However, considerable variation in row visibility was noted when comparing within a location and year combination. Row visibility in absence of prohexadione calcium at Rocky Mount during 2000 was higher for NC-V 11 and VA 98R than for NC 12C or Perry (Table 1). This response was not the case during 2001 at this location or at Lewiston-Woodville. The cultivar Perry had the lowest row visibility score compared with the other cultivars when prohexadione calcium was not applied at Lewiston-Woodville during 2001, and row visibility of Perry was always lower than that of VA 98R in absence of prohexadione calcium. When prohexadione calcium was applied, row visibility of the cultivar NC 12C was the lowest among the four tested cultivars. However, no clear trend was evident when comparing NC-V 11, NC 12C, and VA 98R. These results are consistent with other research indicating that prohexadione calcium increases peanut row visibility (Beam *et al.*, 2002; Culpepper *et al.*, 1997; Faircloth *et al.*, 2005). However, the magnitude of response was often different depending upon location and growing conditions.

Row visibility of these cultivars could have been attributed to differences in growth habit or prohexadione calcium. The cultivar NC 12C has a semi-runner growth habit (Jordan, 2006a) and often expresses excessive vegetative growth, and row visibility is often more difficult to discern for this cultivar than for many of the other Virginia market type cultivars. The cultivar Perry often expresses a semi-runner growth habit with a minimally distinct main stem (Jordan, 2006a). The cultivars NC-V 11 and VA 98R have distinct main stems and runner growth habit that improves row visibility regardless of prohexadione calcium treatment. These observations indicate that rows for the cultivars NC 12C and Perry are more difficult to distinguish than those of NC-V 11 and VA 98R. Therefore, prohexadione calcium may be a valuable management tool to establish sufficient row visibility to improve digging precision. The threshold score at which improvements in row visibility is of no practical significance has not been established for peanut. One limitation to our small-plot research is that the impact of row visibility on precision of digging is not inherent in the experimental procedure. Although row visibility was poor in many instances, peanut was dug without movement from ideal tracking through the field. Additional research is needed at the farm level to

Table 2. Influence of digging date and prohexadione calcium rate on peanut pod yield at Lewiston-Woodville and Rocky Mount in 2000 and 2001.[a]

	Lewiston-Woodville				Rocky Mount			
	2000		+2001		2000		2001	
Digging date	− PC[b]	+ PC	− PC	+ PC	−PC	+ PC	− PC	+ PC
	kg/ha							
Late September	5020	5280	3300	3490	4060	4610 *	5130	5310
Mid October	5020	4650 *	2750	2880	3800	4000	4980	5480 *

[a]*Indicates significance at $p \leq 0.05$ when considering prohexadione calcium rates within a year, location, and digging date. Data are pooled over cultivars.

[b]Abbreviation: PC, prohexadione calcium. Prohexadione calcium was applied at 140 g/ha with crop oil concentrate and nitrogen solution when 50% of vines from adjacent rows were touching. This treatment was repeated 3 wk later.

more clearly define the benefits of prohexadione calcium from a row visibility standpoint and to establish a threshold for row visibility that is needed either with or without prohexadione calcium to ensure precise digging. When pooled over cultivars, row visibility ranged from 4.4 to 9.0 on a scale of 10.0 when prohexadione calcium was applied (Table 1). Row visibility ranged from 1.1 to 6.3 when prohexadione calcium was not applied, and in 14 of 16 combinations of site, year, and cultivar, row visibility was rated at 4.1 or less. The remaining non-treated combinations were rated at 6.0 and 6.3.

Interactions of site X digging date X prohexadione calcium rate, digging date X prohexadione calcium rate, and cultivar X prohexadione calcium were not significant for pod yield. However, the interaction of site by prohexadione calcium rate and digging date was significant. Application of prohexadione calcium improved pod yield by 550 kg/ha at 1 of 4 sites when peanut was dug in late September (Rocky Mount during 2000), and pod yield increased (Rocky Mount during 2001) when peanut was dug in mid October (Table 2). Peanut yield was significantly decreased when prohexadione calcium was applied and peanut was dug late at Lewiston-Woodville in 2000 (Table 2). Prohexadione calcium did not affect pod yield at Lewiston-Woodville in 2000 or 2001 when peanut was dug in late September, or at either digging date in 2001. Prohexadione calcium did not affect peanut yield when peanut was dug in late September or mid October at Rocky Mount in 2001 and 2000, respectively. Culpepper *et al.* (1997) and Beam *et al.* (2002) reported no interaction between prohexadione calcium and digging date for harvested pod yield. However, Beam *et al.* (2002) did report that pod loss decreased when prohexadione calcium was applied and digging was delayed when compared with digging later but not applying prohexadione calcium.

Although differences in yield were noted among cultivars, response was not dependant upon prohexadione calcium or digging date. However, pod yield did vary by location and year combination. When pooled over digging dates and prohexadione calcium rates, the cultivars NC 12C and Perry yielded higher than NC-V 11 and VA 98R at Lewiston-Woodville during both years and at Rocky Mount in 2001 (Table 3). At Rocky Mount in 2000, pod yield of NC-V 11 and Perry exceeded yield of NC 12C; yield of NC-V 11 and VA 98R was similar. Higher pod yield of NC 12C and Perry may have been associated with partial resistance of these cultivars to Cylindrocladium black rot [*Cylindrocladium crotalaria* (Loos) Bell and Sobers] which is often present in fields at these locations (Shew, 2006). Tomato spotted wilt virus was not observed at these locations during 2000 and 2001, and other foliar and soil-borne diseases were controlled with bi-weekly fungicide applications.

Evaluation of new cultivars and experimental lines. Considerable variation in cultivar response to prohexadione calcium was noted among the three sites (Table 4). At Rocky Mount, row visibility was improved to a value of at least 9.4

Table 3. Pod yield of the peanut cultivars NC-V 11, NC 12C, Perry, and VA 98R at Lewiston-Woodville and Rocky Mount during 2000 and 2001.[a]

	Lewiston-Woodville		Rocky Mount	
Cultivar	2000	2001	2000	2001
	kg/ha			
NC-V 11	4690 b	2380 c	4240 ab	4850 b
NC 12C	5320 a	3710 b	3700 c	5580 a
Perry	5310 a	4240 a	4520 a	5600 a
VA 98R	4650 b	2090 c	4010 bc	4860 b

[a]Means within a location and year combination followed by the same letter are not significantly different according to Fisher's Protected LSD test at $p \leq 0.05$. Data are pooled over digging dates and prohexadione calcium rates.

Table 4. Peanut row visibility following application of prohexadione calcium at Rocky Mount, Whiteville, and Lewiston-Woodville in 2002.[a,b]

	Rocky Mount		Whiteville		Lewiston-Woodville	
	− PC[c]	+ PC	−PC	+ PC	− PC	+ PC
AT VC-2	4.9 b	9.6 a	2.3 fg	3.0 efg	2.5 c	7.5 a
Gregory	5.2 b	9.9 a	3.3 def	5.5 b	2.9 c	6.8 ab
NC-V 11	3.4 cd	9.7 a	1.8 g	4.3 bcd	2.0 c	7.0 ab
Perry	2.4 d	9.4 a	2.2 fg	4.3 bcd	2.0 c	5.9 b
VA 98R	5.1 b	9.6 a	2.8 efg	6.8 a	3.0 c	7.6 a
Wilson	4.4 bc	10.0 a	3.8 cde	4.8 bc	3.0 c	7.5 a

[a]Means within a location followed by the same letter are not significantly different according to Fisher's Protected LSD test at $p \leq 0.05$.

[b]Row visibility defined using a scale of 0 to 10 where 0 = a flat canopy with no row definition and 10 = peanut rows that are triangular in shape.

[c]Abbreviation: PC, prohexadione calcium. Prohexadione calcium was applied at 140 g/ha with crop oil concentrate and nitrogen solution when 50% of vines from adjacent rows were touching. This treatment was repeated 3 wk later.

on a scale of 0 to 10 regardless of cultivar. In contrast, row visibility at Whiteville ranged from 3.0 to 6.8 at Whiteville and 5.9 to 7.6 at Lewiston-Woodville when prohexadione calcium was applied compared with a range of 2.0 to 3.0 for non-treated peanut at that site. Rainfall during 2002 at Whiteville was more abundant than rainfall at Lewiston-Woodville or Rocky Mount, and rainfall at the latter two locations was similar (data not shown). However, research plots at Lewiston-Woodville were irrigated periodically during the season while research plots at Rocky Mount were not irrigated. A greater abundance of rainfall or periodic irrigation most likely contributed to greater vegetative growth and poorer row visibility, regardless of prohexadione calcium treatment.

The interaction of cultivar X prohexadione calcium and the main effect of prohexadione calcium were not significant for pod yield. Yield for each cultivar did vary by location (Table 5). Only one digging date was used per location. Optimum maturity for the cultivars evaluated in these experiments can vary by as much as 15 d (Jordan, 2006a). Therefore, differences in pod yield among cultivars noted in these experiments should be considered inconclusive.

Table 5. Peanut pod yield of six cultivars grown at Rocky Mount, Whiteville, and Lewiston-Woodville in 2002.[a]

	Rocky Mount	Whiteville	Lewiston-Woodville
	kg/ha		
AT VC-2	3740 ab	5750 ab	4420 c
Gregory	3780 ab	4970 c	4690 bc
NC-V 11	3940 a	5380 bc	4590 bc
Perry	3570 ab	4540 d	4670 bc
VA 98R	3460 b	5330 bc	4950 b
Wilson	3620 ab	6140 a	5530 a

[a]Means within a location followed by the same letter are not significantly different according to Fisher's Protected LSD test at $p \leq 0.05$. Data are pooled over prohexadione calcium rates.

In the second experiment, the interaction of site X cultivar X prohexadione calcium rate was significant for row visibility. Prohexadione calcium increased row visibility for all cultivars and experimental lines at both locations during 2005 (Table 6). At Rocky Mount during 2006, row visibility of all cultivars and the experimental lines N02002 and VT 976133 was improved by prohexadione calcium. However, prohexadione calcium did not improve row visibility of any of the cultivars or experimental lines at Lewiston-Woodville during 2006. Row visibility at this location during 2006 for all cultivars was scored at 6.7 or higher when peanut was not treated with prohexadione calcium.

Evaluation of market types. The interaction of year X cultivar X prohexadione calcium rate was significant for row visibility but not for pod yield. During 2005, row visibility increased from 3.3 to 9.0 when prohexadione calcium was applied to Georgia Green and 3.4 to 8.8 when prohexadione calcium was applied to Gregory (Table 7). Prohexadione calcium increased row visibility of Tamspan 90 from 2.1 to 5.5. In 2006, row visibility did not differ among the three market types within a prohexadione calcium treatment (Table 7).

The interaction of year X cultivar X prohexadione calcium rate was not significant for pod yield. Interactions of year X cultivar or year X prohexadione calcium rate were also not significant. Although prohexadione calcium improved row visibility, pod yield was not affected by prohexadione calcium during either year, and there was no interaction between cultivar and prohexadione calcium rate (data not shown). When

Table 6. Influence of prohexadione calcium on peanut row visibility of the cultivars Brantley, CHAMPS, Gregory, and Phillips and the experimental lines N02006, N01013T, and VT 976133 during 2005 and 2006.[a,b]

Cultivar or experimental line	Lewiston-Woodville				Rocky Mount			
	2005		2006		2005		2006	
	−PC[c]	+PC	−PC	+PC	−PC	+PC	−PC	+PC
Brantley	4.3	9.0 *	6.7	7.3	3	7.6 *	5.9	7.5 *
CHAMPS	2.0	7.8 *	7.5	8.4	7.8	9.4 *	5.5	9.5 *
Gregory	3.0	8.5 *	7.3	8.8	4.4	8.4 *	5.8	8.0 *
Phillips	3.0	7.5 *	8.6	9.4	6.7	10.0 *	5.3	9.6 *
N02006	3.3	9.1 *	7.6	8.8	6.8	8.9 *	6.0	8.9 *
N01013T	1.6	5.0 *	7.6	7.5	2.8	7.4 *	5.5	6.0 *
VT 976133	1.8	4.8 *	6.9	7.3	3.9	8.4 *	3.0	7.3 *

[a]*Indicates significance within a cultivar, year, and location when comparing prohexadione calcium rates at $p \leq 0.05$.

[b]Row visibility defined using a scale of 0 to 10 where 0 = a flat canopy with no row definition and 10 = peanut rows that are triangular in shape.

[c]Abbreviation: prohexadione calcium, PC. Prohexadione calcium was applied at 140 g/ha with crop oil concentrate and nitrogen solution when 50% of vines from adjacent rows were touching. This treatment was repeated 3 wk later.

pooled over years and cultivars, pod yield following application of prohexadione calcium differed from non-treated peanut by only 20 kg/ha. When pooled over years and prohexadione calcium rates, yield differences were noted among the three cultivars. Pod yield of Gregory, Georgia Green, and Tamspan 90 was 5830, 4770, and 4100, respectively (data not shown).

Summary

Sequential applications of prohexadione calcium initiated at 50% row closure and repeated 3 to 4 wks later consistently improved row visibility of Virginia market type peanut. The exception to this occurred at one location during a year when peanut growth was limited due to dry growing conditions late in the season. These results are consistent with many other experiments with Virginia market type peanut showing improvement in row visibility following application of prohexadione calcium (Beam *et al.*, 2002; Culpepper *et al.*, 1997; Faircloth *et al.*, 2006). In contrast to results noted for row visibility, a yield increase was not observed when prohexadione calcium was compared across years, locations, and experiments. Culpepper *et al.*, 1997 reported that peanut yield responded to prohexadione calcium and digging date independently. In our research the interaction of digging dates and prohexadione calcium rate was significant for pod yield in some but not all experiments. Additional research is needed to define the interaction of cultivar, prohexadione rate, and digging date, as new cultivars and experimental lines are introduced.

Table 7. Peanut row visibility of the cultivars Georgia Green, Gregory, and Tamspan 90 following application of prohexadione calcium at Lewiston-Woodville in 2005 and 2006.[a,b]

Market type	Cultivar	2005		2006	
		−PC[c]	+PC	−PC	+PC
Runner	Georgia Green	3.3 c	9.0 a	5.0 b	9.5 a
Spanish	Tamspan 90	2.1 d	5.5 b	3.5 b	8.4 a
Virginia	Gregory	3.4 c	8.8 a	4.8 b	9.0 a

[a]Means within a year followed by the same letter are not significantly different according to Fisher's Protected LSD test at $p \leq 0.05$.

[b]Row visibility defined using a scale of 0 to 10 where 0 = a flat canopy with no row definition and 10 = peanut rows that are triangular in shape.

[c]Abbreviation: PC, prohexadione calcium. Prohexadione calcium was applied at 140 g/ha with crop oil concentrate and nitrogen solution when 50% of vines from adjacent rows were touching. This treatment was repeated 3 wk later.

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