

Thomas M. Kon¹, Gina Fernandez¹, Penelope Perkins-Veazie¹, and Karen Blaedow²

Department of Horticulture, North Carolina State University¹, tom_kon@ncsu.edu, gina_fernandez@ncsu.edu, penelope_perkins@ncsu.edu
North Carolina Cooperative Extension Service, Henderson County Center², karen_blaedow@ncsu.edu

Justification/Background

Primocane growth management of blackberry by commercial growers relies on summer pruning/tipping primocanes at multiple heights throughout the growing season.

Tipping can promote lateral branches and increase subsequent yields; however, it is a time sensitive and expensive process (~\$600 per acre) that increases the risk of cane blight infection.

In 2019, an experiment was initiated to compare effects of primocane growth management strategies on cane architecture, reproductive development, and fruit quality of 'Prim-Ark Traveler' blackberry in Mills River, NC.



P-Ca treated primocane (left) and an untreated primocane (right). Internodal distance and lateral branch development appear to be influenced by P-Ca.

Materials and Methods

Three treatments were evaluated:

- Untreated control,
- Tipping at ~46 cm and ~91 cm plant height, and
- 200 ppm P-Ca + 0.125% (v:v) non-ionic surfactant

P-Ca treatments were applied using a CO₂ sprayer when cane height was ~56 cm:

- P-Ca was applied at ~3 week intervals, until flower bud development was observed

Primocane height was measured at ~3 week intervals throughout the growing season. At a commercially acceptable level of maturity, plots were harvested twice per week for six consecutive weeks.

- Marketable yield, unmarketable yield, and average fruit weight was determined.

Morphometric Characterization followed harvest on three primocanes per plot. Canes were cut at the base and moved to the lab for analysis, measurements included:

- Basal cane cross-sectional area
- Fruiting nodes/cane
- Lateral branches/cane, lateral branch length, and nodes/lateral branch
- Leaf area meter/cane
- Fresh and dry weight of each tissue type (cane, lateral branches, leaves)

Results

- Visible effects of P-Ca on primocane height were apparent within 14 days of the initial application and a significant reduction in height (25% reduction) was observed 21 d after treatment (Figure 1)
- Cumulative, marketable, and cull yield did not differ among treatments (Table 1)
- There were no differences in primocane leaf area, flower no., flower density (flowers/unit cm² cane cross-sectional area), and lateral branching among treatments (Table 2)

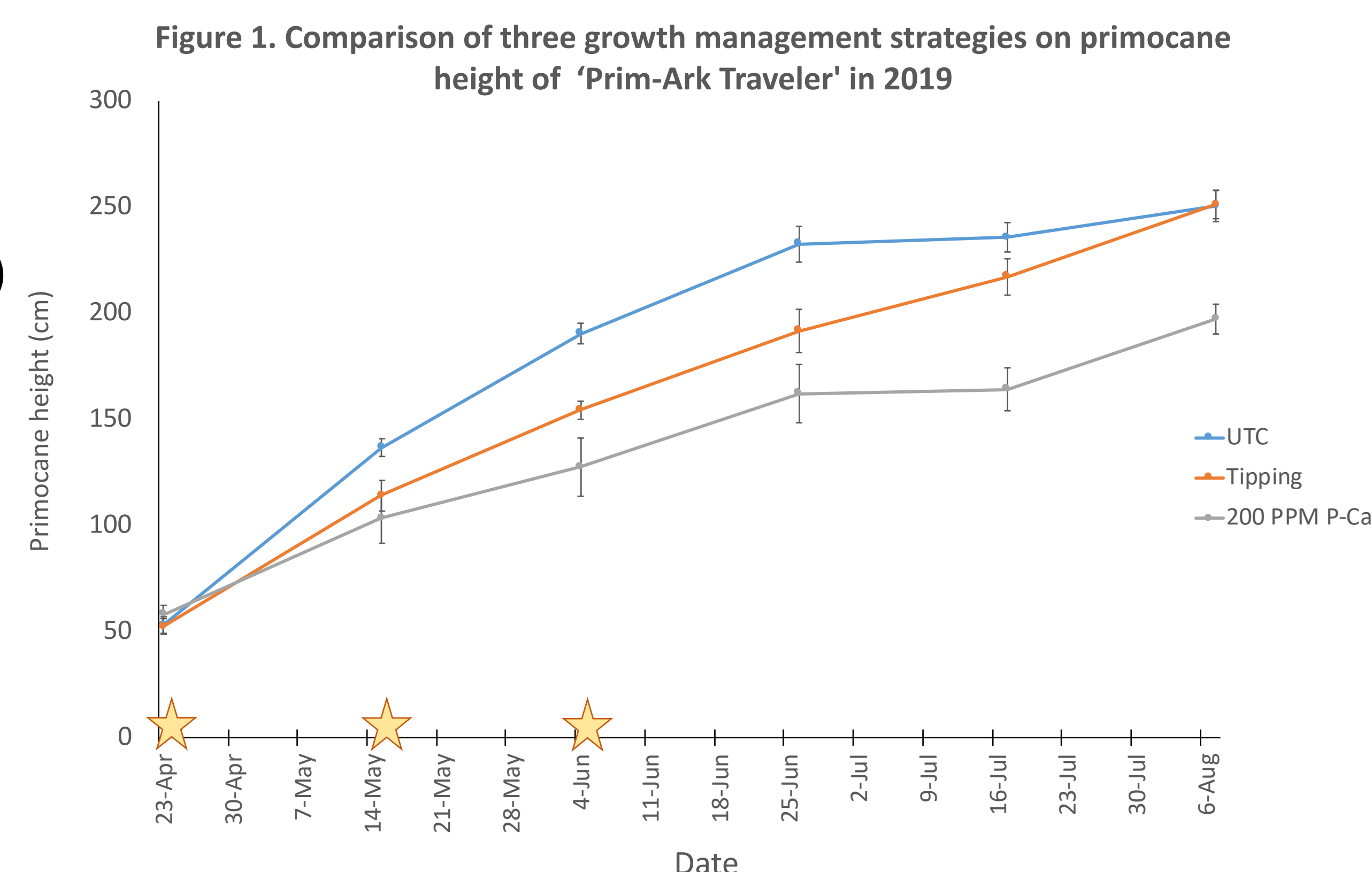


Table 1. Comparison of primocane management strategies on yield of three-year old 'Prim-Ark Traveler'.

Treatment	Cumulative Yield (kg)		Marketable Yield (kg)		Cull Yield (kg)	
Control	2.2	NS	1.8	NS	0.5	NS
Tipping	1.6		1.3		0.3	
P-Ca	1.3		1.0		0.2	

Within column, mean separation by Tukey's (P = 0.05).

Table 2. Comparison of primocane management strategies on basal circumference, leaf area, flower number, and lateral branch characteristics of three year old 'Prim-Ark Traveler'.

Treatment	Circ. (cm)	Leaf Area	Flower (no.)	Flower no./CSA	Laterals		
					Count (no.)	Length (cm)	Node (no.)
Control	4.3	6651	153	92	8	58	14
Tipping	4.5	6826	161	102	8	61	15
P-Ca	4.0	5246	98	75	7	51	12

Within column, mean separation by Tukey's (P = 0.05).

Conclusions

- While tipping resulted in a similar reduction in plant height early in the growing season, the effect was ephemeral
- Although P-Ca shows promise as an alternative to reduce primocane height, this practice would likely need to be augmented with practices to enhance fruiting lateral number and subsequent productivity
- Data from this study did not accord with previous work reporting a positive influence of P-Ca on a floricanne-fruiting blackberry



Untreated control (left), tipping (center), and P-Ca (right) displaying the visible effect of P-Ca on primocane height and internodal distance.

Future Directions

- While P-Ca application patterns could be refined to determine if negative impacts on yield can be avoided, continued evaluation of chemical and/or cultural practices to enhance lateral branch development and reproductive potential should also occur

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