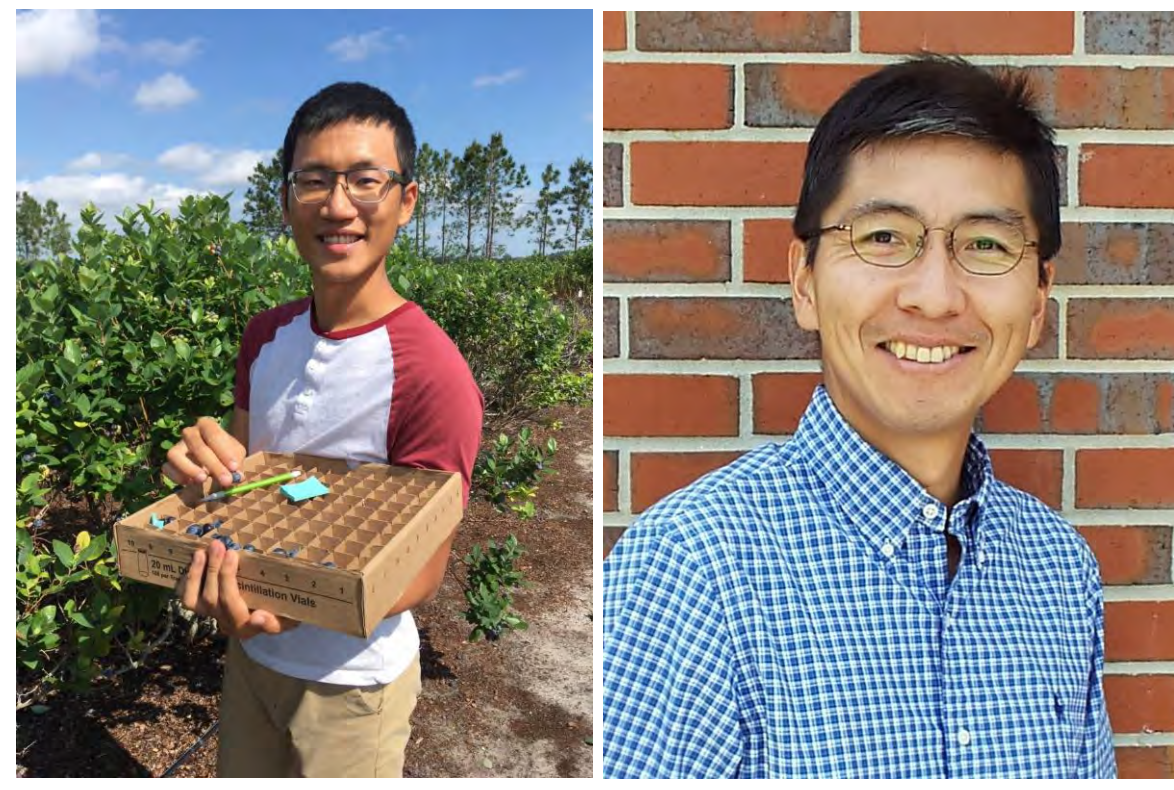


# Season Extension of Subtropical Blackberry Production by Chemical Induction of Defoliation and Bud Break

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## INTRODUCTION

### Blackberry (*Rubus* subgenus *Rubus*)

- Adequate chill hours are needed to release flower buds from dormancy in spring.
- Chilling requirements: 300-900 hours below 45°F in winter.

### Challenges in Florida

- Insufficient chill hours (< 300 hrs) → Bud break and yield ↓
- High heat and rainfall during fruit ripening (June) → Fruit quality and yield ↓

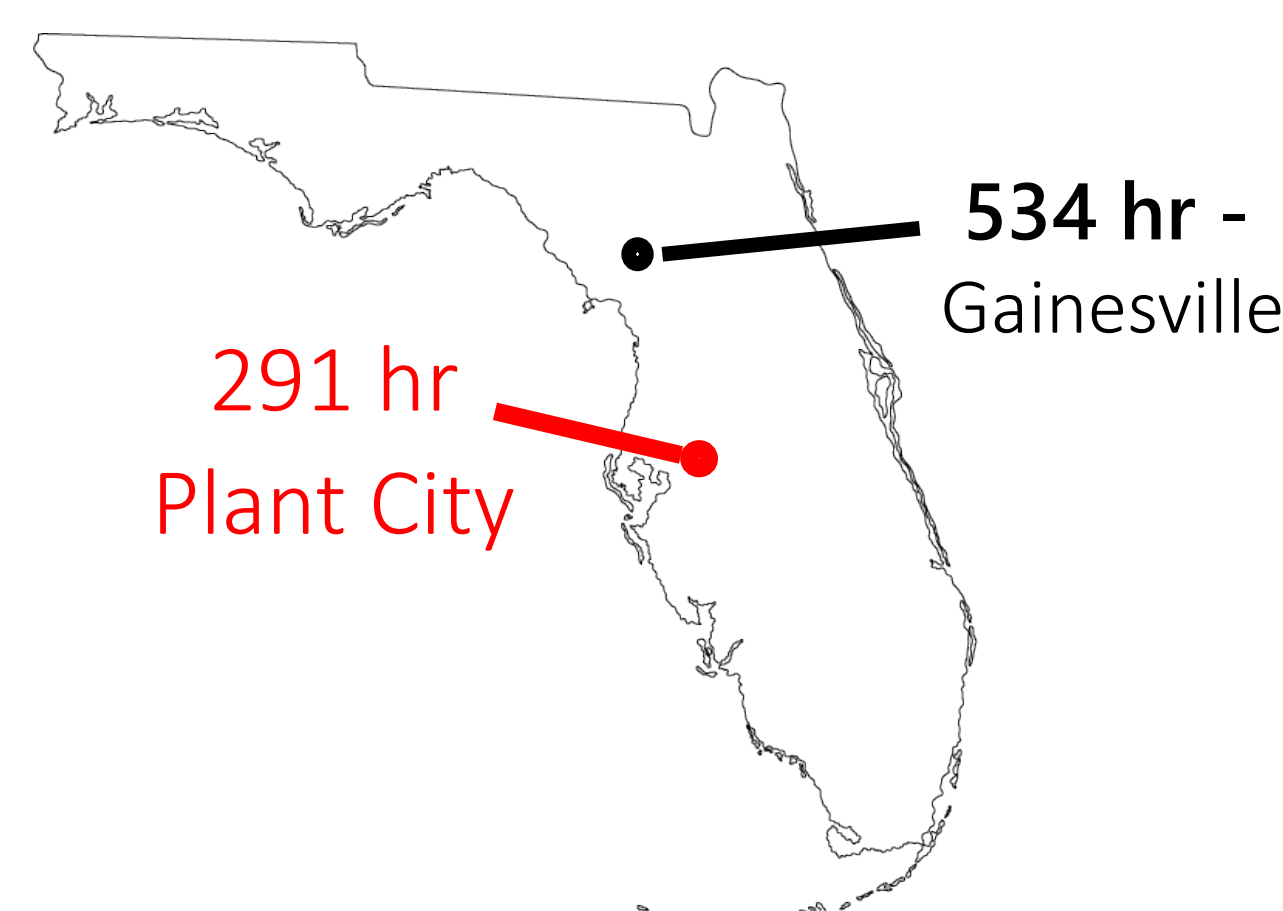
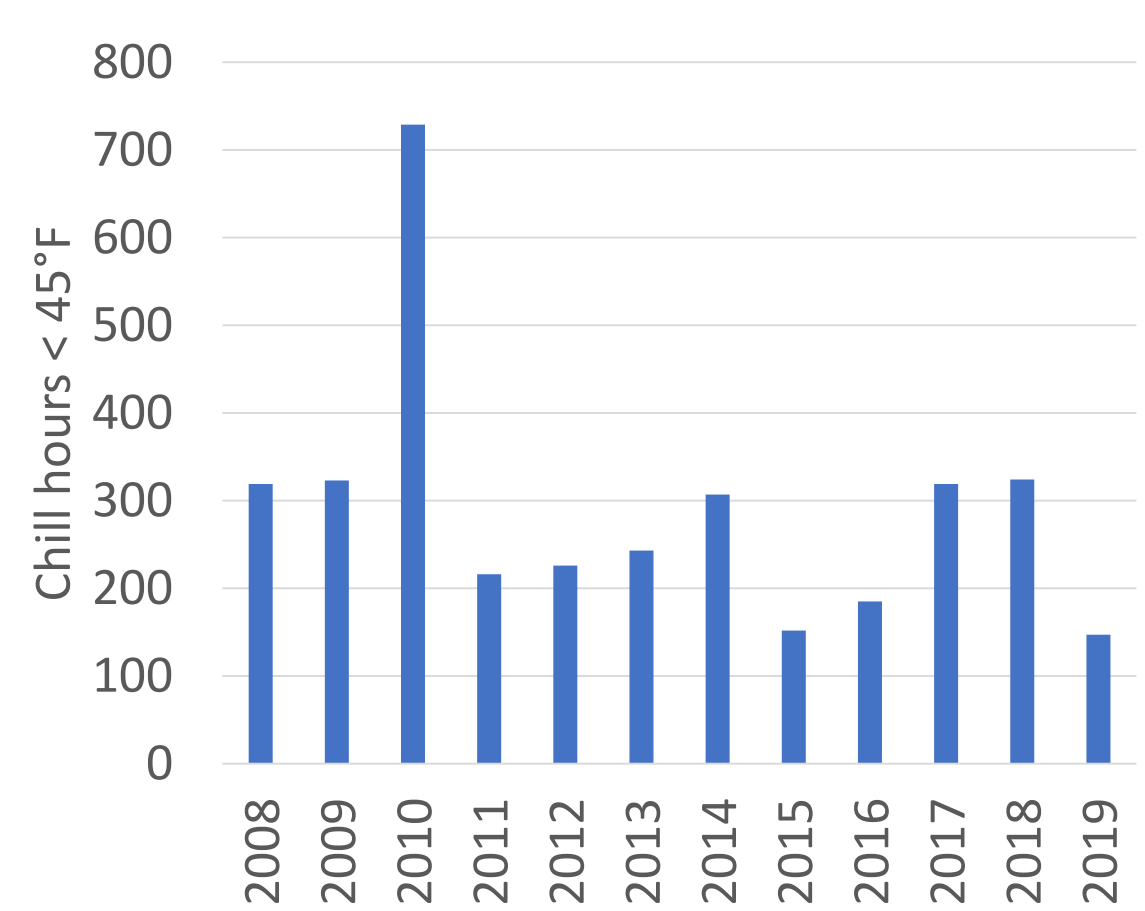
### Defoliant

- Leaf abscission induces the accumulation of ROS, which is a promoter for dormancy release in perennial crops (Beauvieux et al., 2018).
- Defoliant activate flowering-related genes: *COC1*, *COC2*, *AP1*, and *AP2* (Zhang et al., 2015).

### Objective

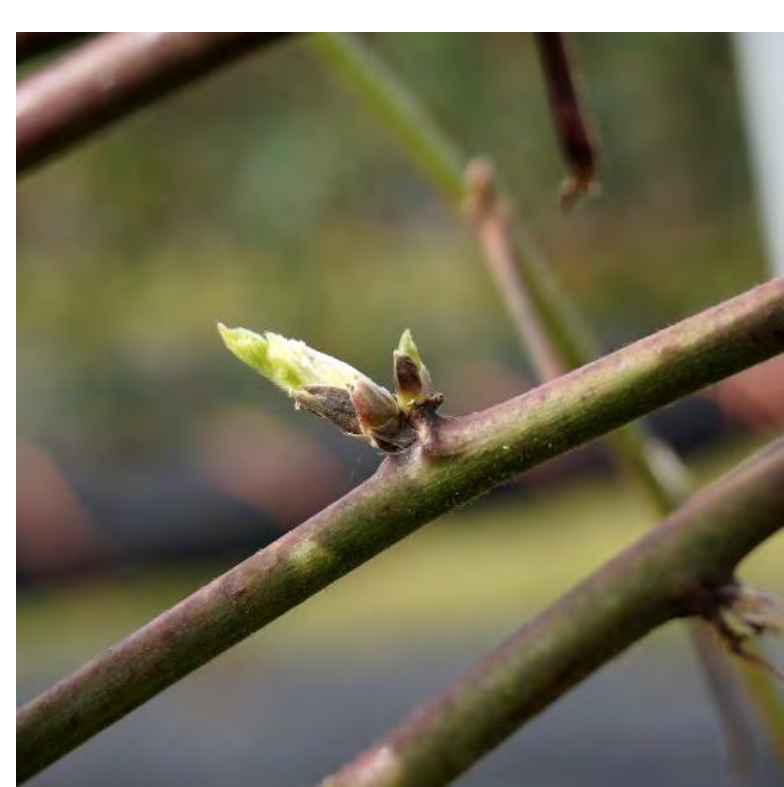
- Examine bud break induction effects of defoliant on blackberry grown under inadequate chilling conditions.

## LOW CHILLING IN FLORIDA

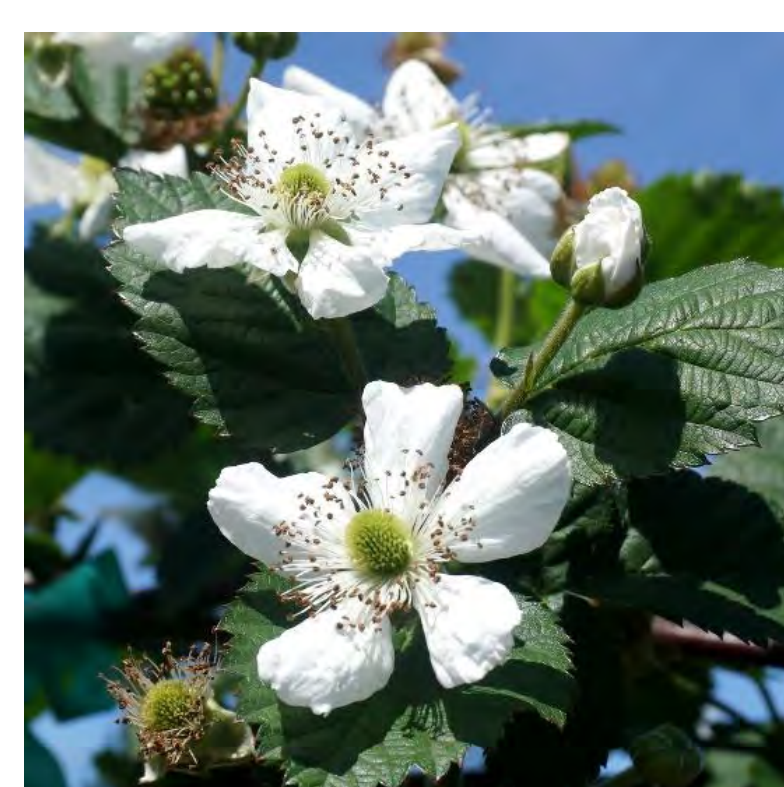


- Chill hours in FL are low and variable across years and locations. The main period for chill hour accumulation occur between Jan to March.

## EARLIER PHENOLOGY



Late Feb.



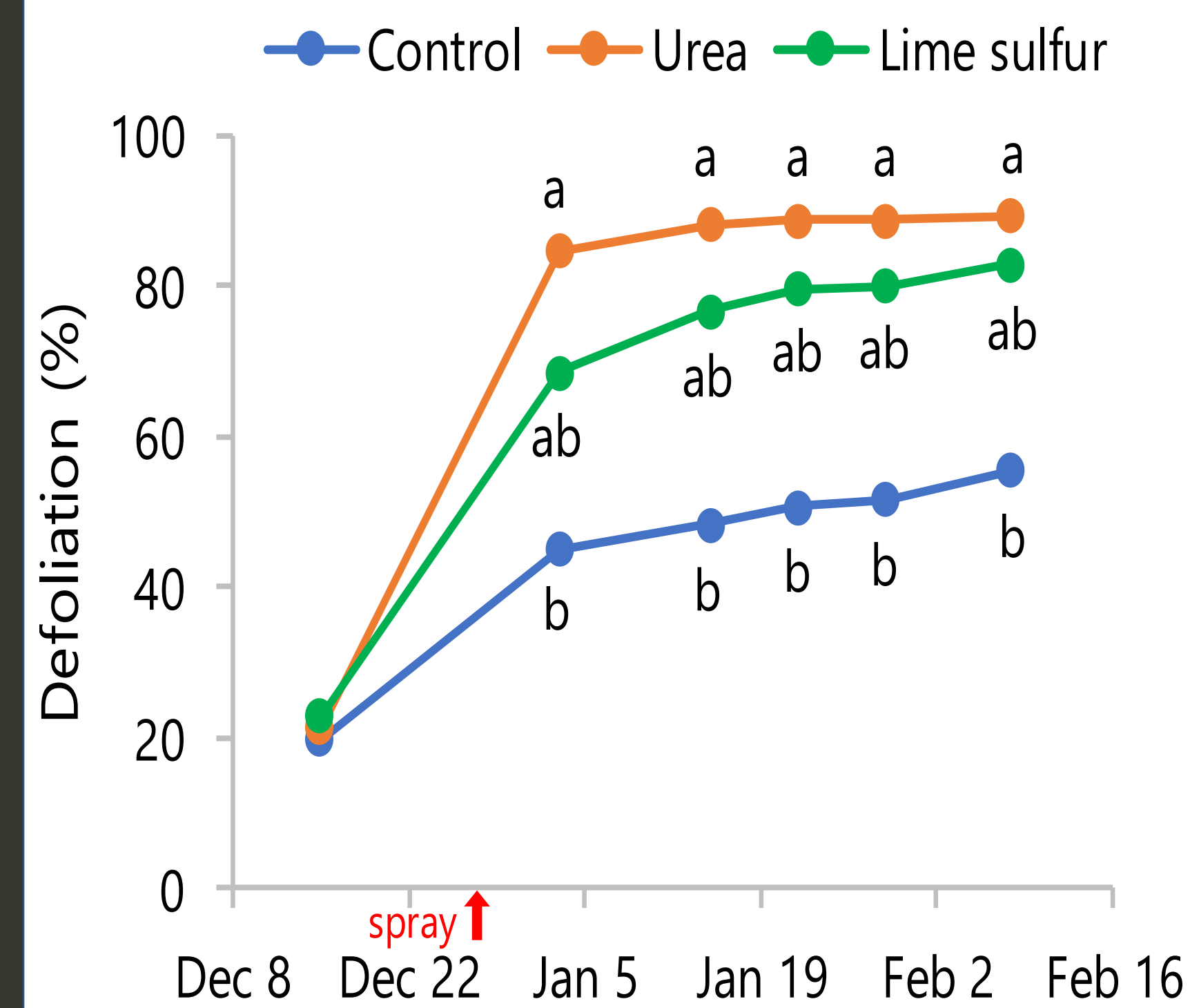
Early Apr.



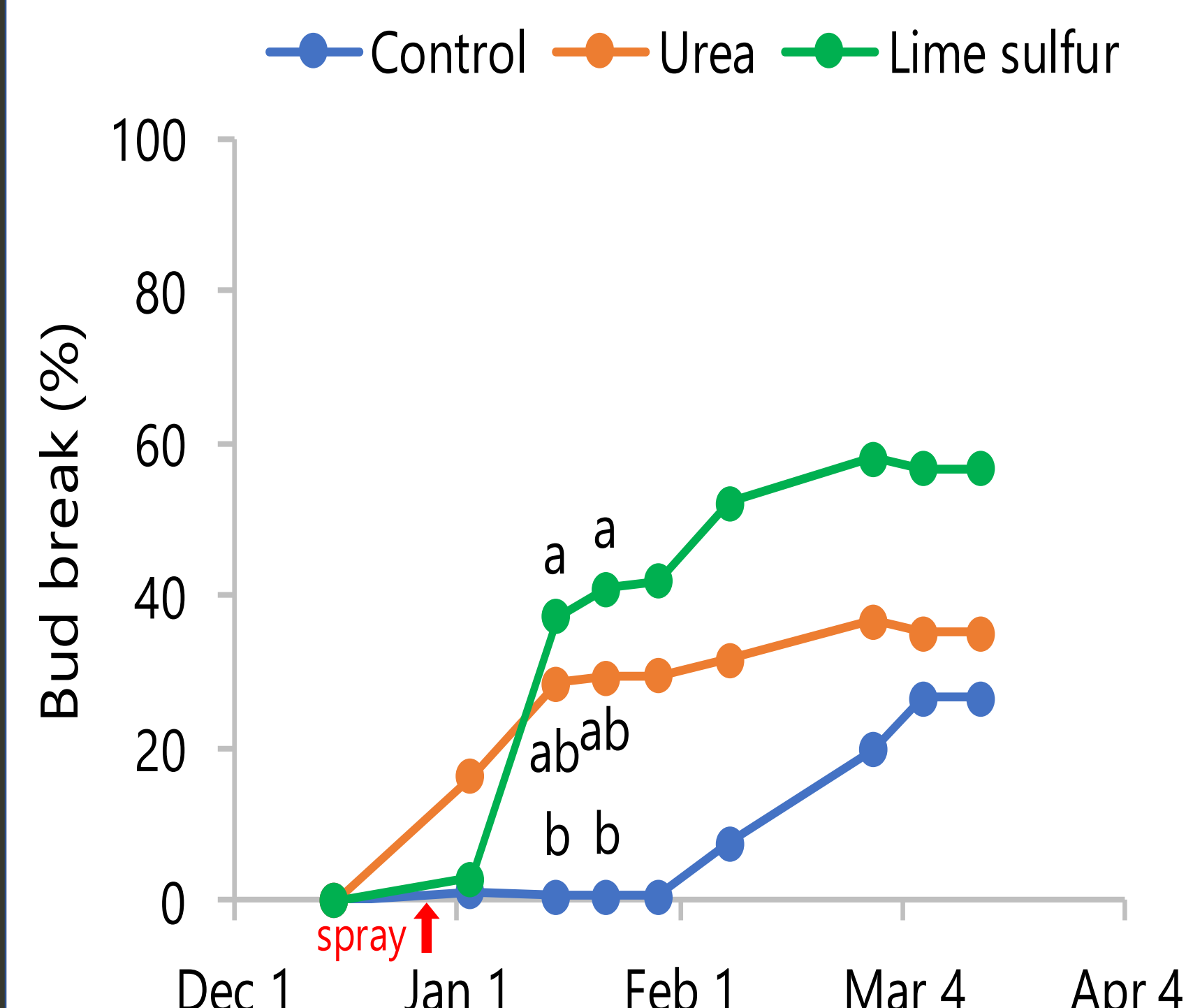
Early May

## Dec. Application

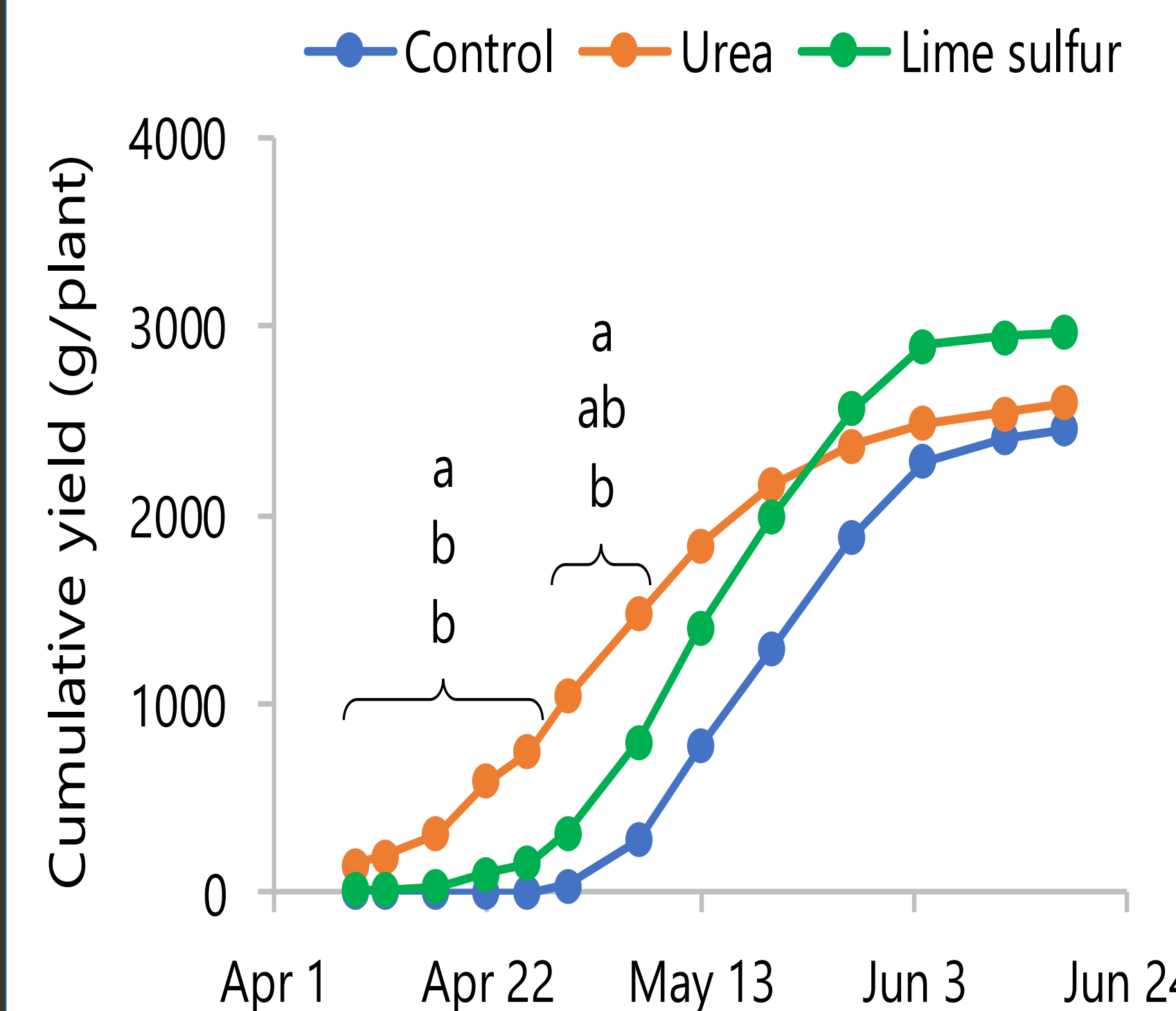
### Defoliation



### Bud break

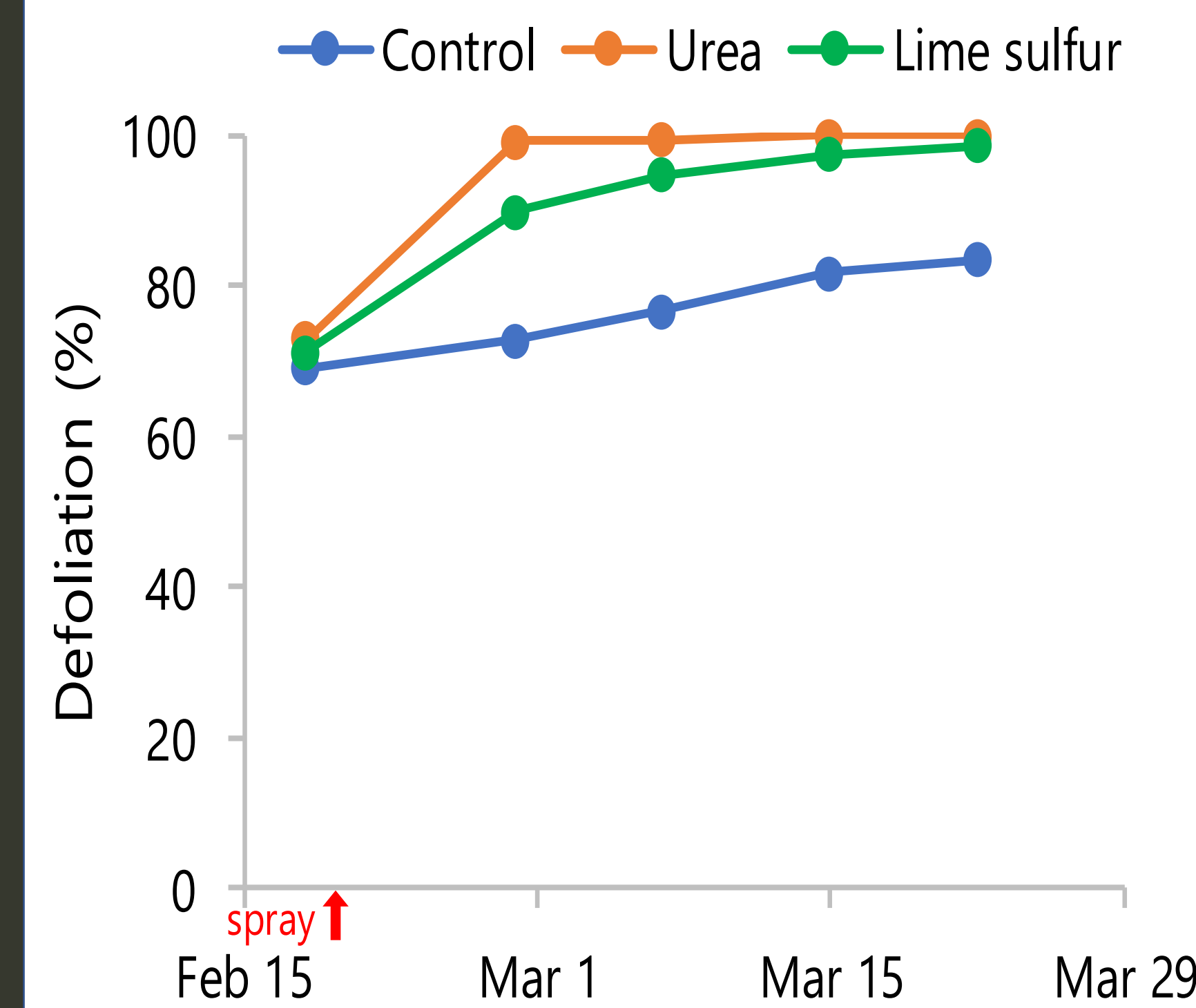


### Yield

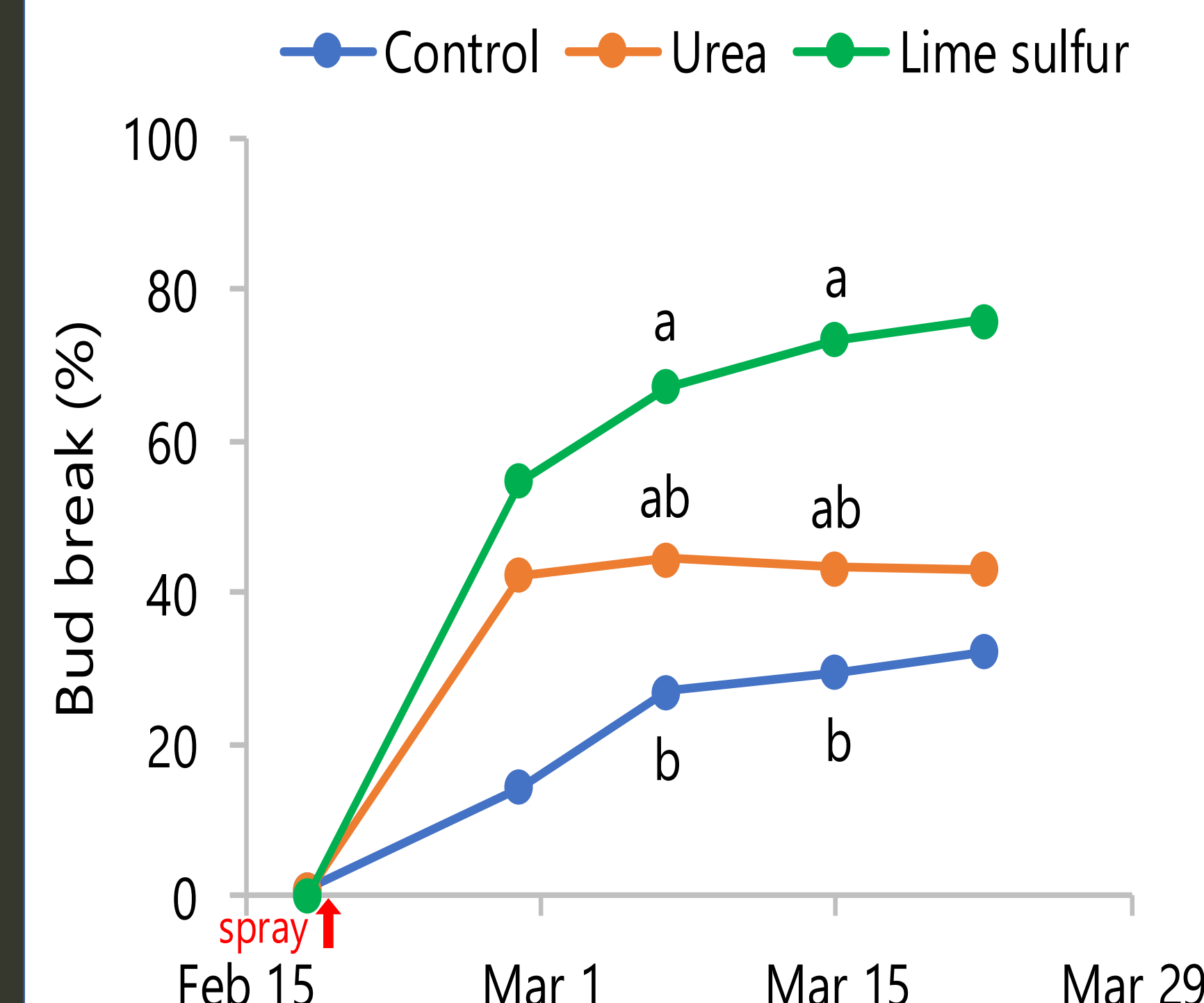


## Feb. Application

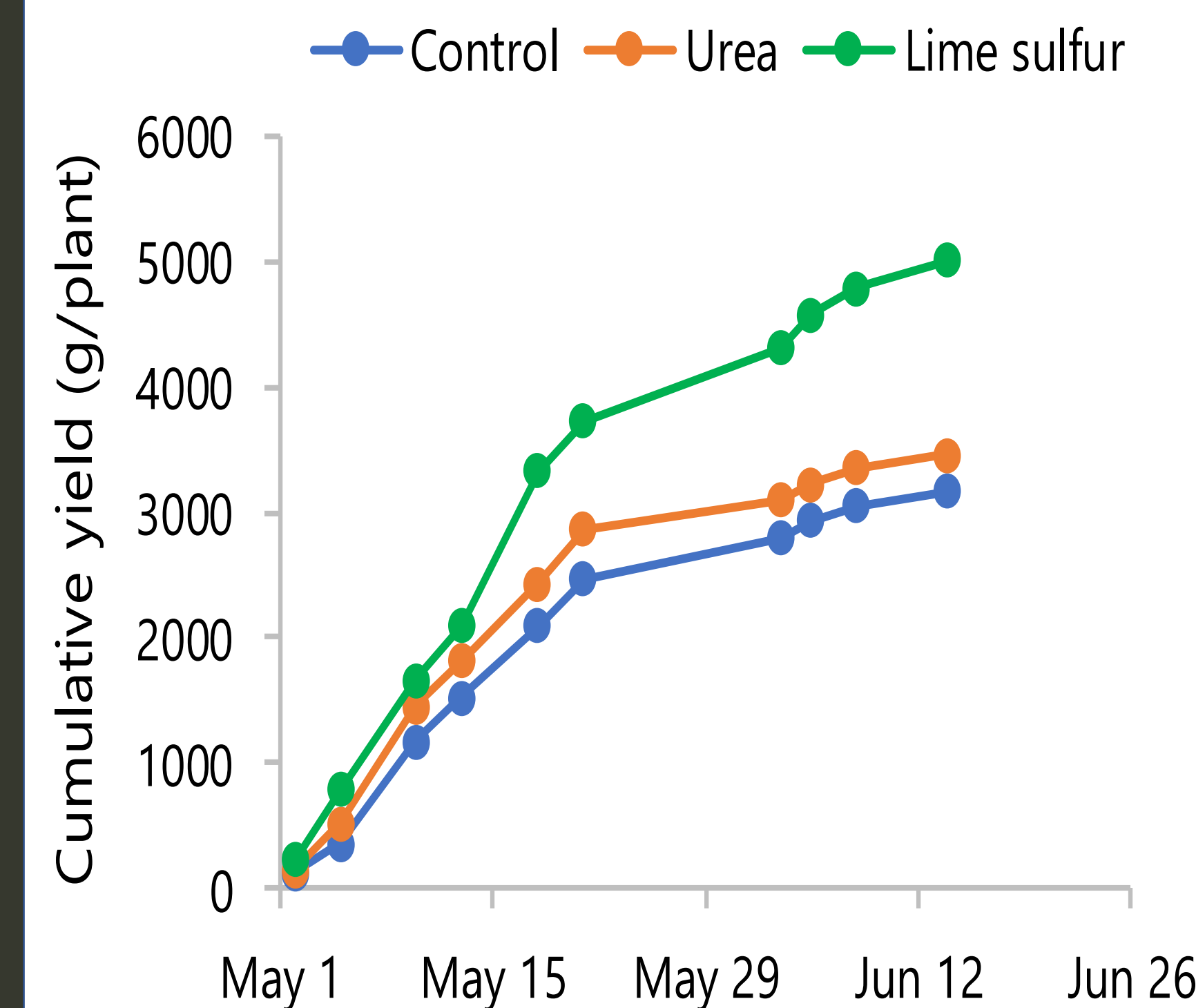
### Defoliation



### Bud break



### Yield



## METHODS

- Cultivar:** 'Natchez'
- Location:** A commercial orchard in Plant City, Florida
- Treatments:**
  - December application:** Dec. 27, 2018
  - February application:** Feb. 19, 2019

Chemical	App. rate	Spray vol
Water control	--	200 gal/acre
Urea (U)	167 lb/acre	200/gal/acre
Lime sulfur (LS)	167 lb/acre	200 gal/acre

- Experiment design:** RCBD, 4 rep with 5 plants/rep
- Data collection:** Five 2.5ft-long canes were tagged in each replicate. Record % bud break and leaf fall of tagged canes weekly from Feb to Apr.

## SUMMARY

	Urea		Lime sulfur	
	Dec	Feb	Dec	Feb
Defoliation	34%↑	NS	NS (28%↑)	NS
Bud break	NS (9%↑)	NS(11%↑)	NS (30%↑)	43%↑
Early yield (April)	25X↑	NS	NS	NS
Total yield	NS (6%↑)	NS (10%↑)	NS (20%↑)	NS (60%↑)

- Urea is highly effective in increasing early season yields when applied at the beginning of chilling accumulation (late Dec). → Good strategy for improving fruit earliness
- Lime sulfur can maximize bud break and fruit yields when applied after chilling accumulation (mid-Feb). → Good strategy to increase total season yields
- Season extension by up to 1.5 months is feasible by urea and lime sulfur, but the application timing is critical.

## SEASON EXTENSION

	Month											
	7	8	9	10	11	12	1	2	3	4	5	6
Vegetative primocane growth	[Green bar]											
Urea application						[Red bar]						
Lime sulfur application								[Red bar]				
Harvest window without defoliant												
Harvest window with urea										[Orange bar]		
Harvest window with lime sulfur											[Orange bar]	

## ACKNOWLEDGEMENTS

We thank all members at Hort. Lab at GCREC and Dustin Groom for providing plant materials and valuable inputs.