Best practices for grafting southern highbush blueberries

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Benefits of sparkleberry rootstocks:

- Increase yield without reducing fruit quality in low input systems (Casamali et al., 2016; Heller et al., 2023)
- Tree-like growth habit
- Increase tolerance to bacterial leaf scorch *(Xylella fastidiosa)* (Darnell et al., 2020)
- Reduce the need for pine bark (Casamali et al., 2016; Darnell et al., 2019)
- Increase plant longevity

Why are rootstocks not used in blueberry as they are in many perennial fruit crops?

Grafted blueberries:

- There is little information on how to produce grafted blueberry nursery plants
- Grafting adds to the cost of nursery plants
- The multi-cane plant structure of blueberry does not lend itself to grafting

V. arboreum propagation challenges:

- *V. arboreum* has very low rooting success from softwood cuttings (Li et al., 2021)
- Rooting percentage is not affected by application of IBA (Bowerman et al., 2013)
- Limited grafting success

Propagation from cuttings

Objective:

- Assess propagation success from soft wood cuttings of sparkleberry and hybrid rootstocks

Hypothesis:

- Softwood cuttings of hybrid rootstocks exhibit higher rooting success than softwood cuttings of sparkleberry.

Plant material June

- Fifteen genotypes:
  - ‘Sentinel’ SHB
  - Sparkleberry
  - 12 F1 hybrids
  - BC1

Plant material August

- Ten genotypes:
  - ‘Sentinel’ SHB
  - Sparkleberry
  - 8 F1 hybrids

Rooting success

Dead

Callus

Callus + Roots

Roots

Photos: Valentina Goles

Root length and Leaf retention

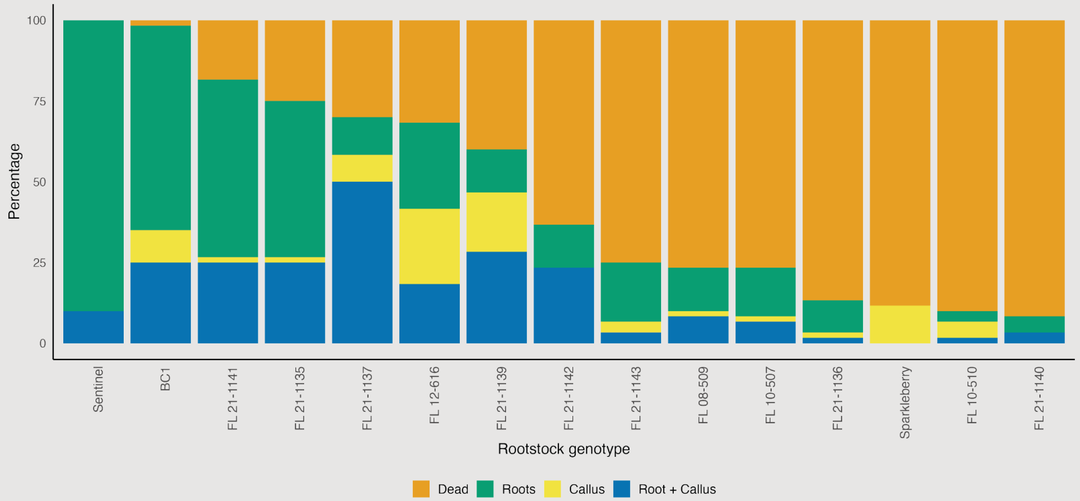
- Root length with Rhizovision software
- Leaf retention with ImageJ software

Photos: Valentina Goles

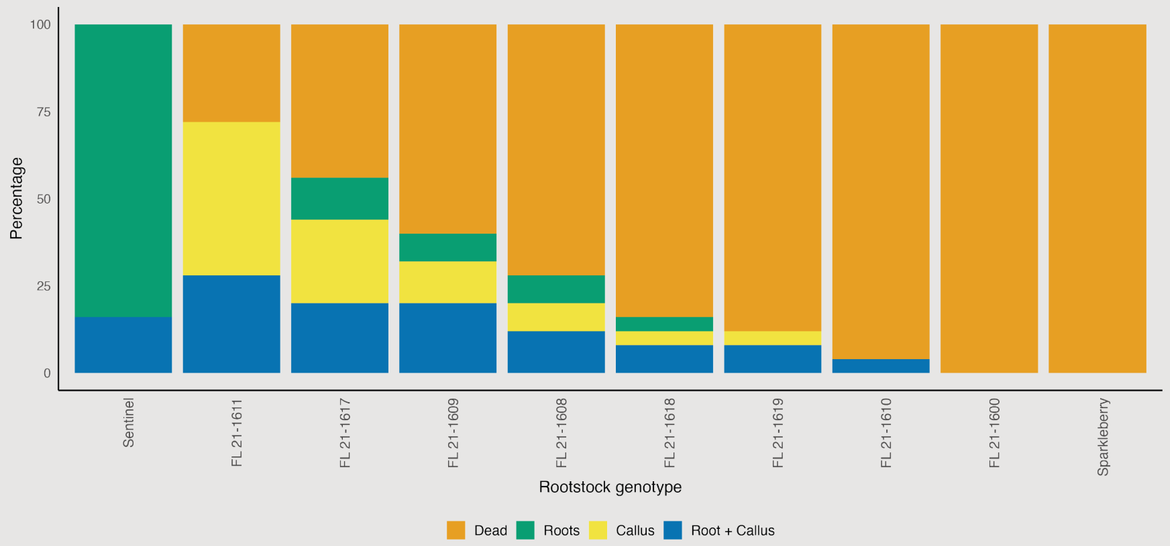
Timeline

Activity	Days											
	0	10	20	30	40	50	60	70	80	90	100	110
Collect & stick												
Harvest & root scanning												

Rooting success June



Rooting success August



Graft timing

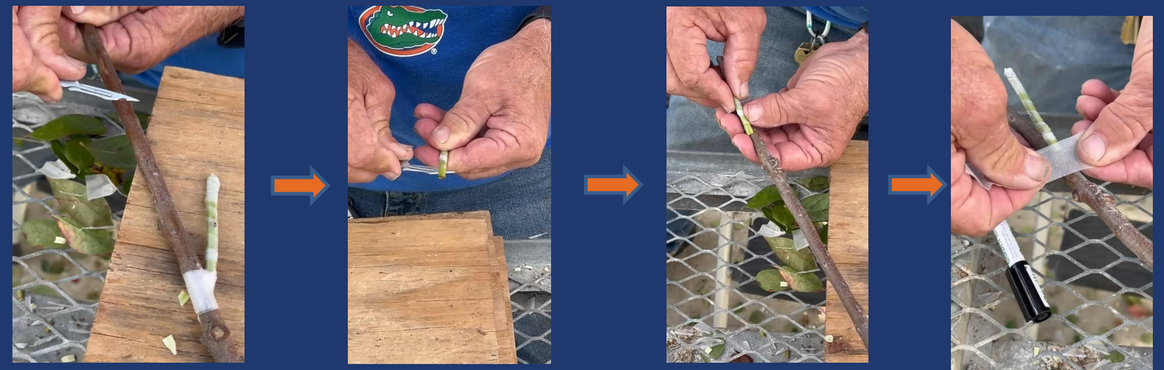
Objectives:

- Assess graft compatibility of SHB with sparkleberry, SHB x sparkleberry hybrid rootstocks.
- Identify the optimal seasonal timing to produce grafted blueberry liners.

Plant material

Time of grafting	Scions	Rootstocks
February	'Albus'	FL 12 -616
March		FL 21-1137
		FL 21-1142
September	'Sentinel'	FL 21-1141
November		BC1
		Sparkleberry

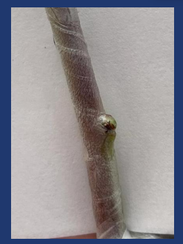
Grafting technique



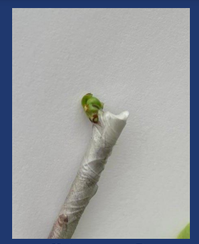
Timeline

Activity	Weeks															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15-25	26
Grafting																
Bud Development																
Pruning																
Transplant																

Bud development scale


Stage 0


Stage 1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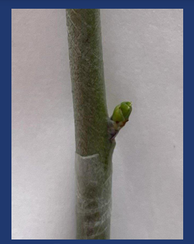
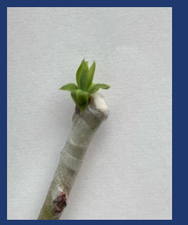
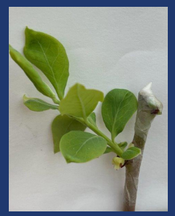

Stage 3


Stage 4

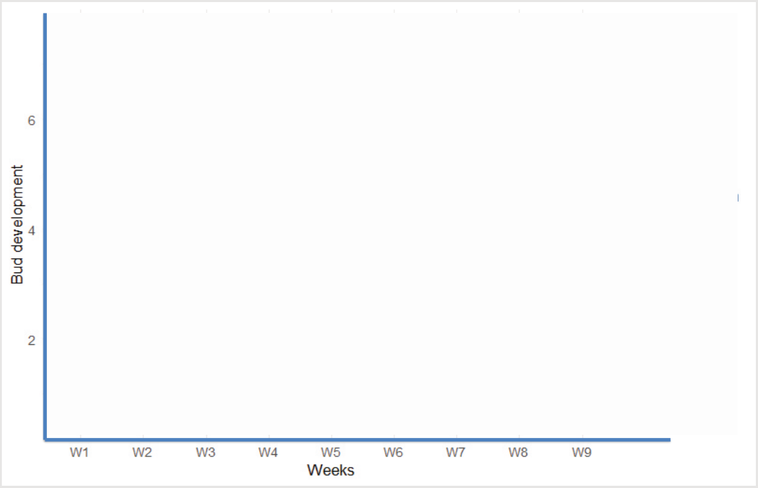

Stage 5

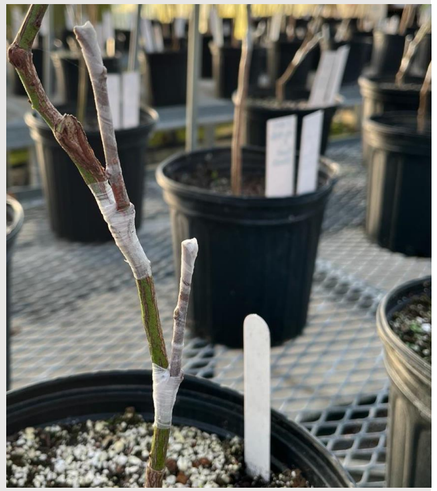

Stage 6


Stage 7


Stage 8

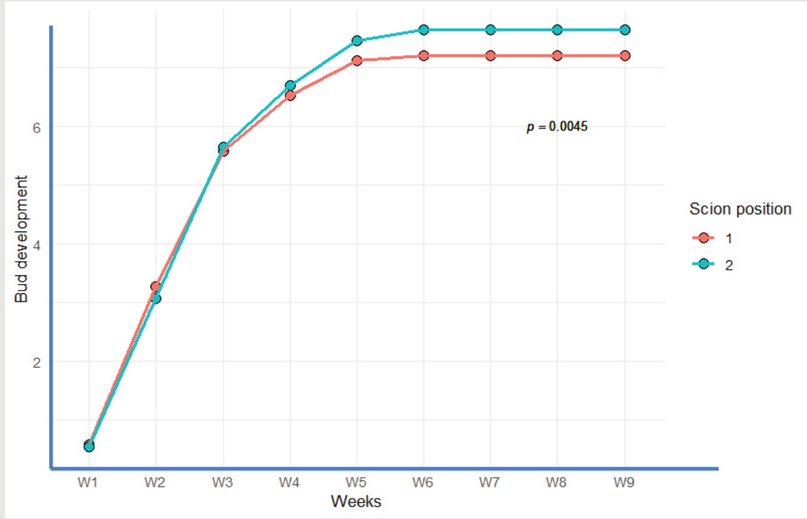
Scion closest to the crown grow faster





p-values indicate the level of statistical significance based on a t-test, with $p \leq 0.05$

Scion closest to the crown grow faster



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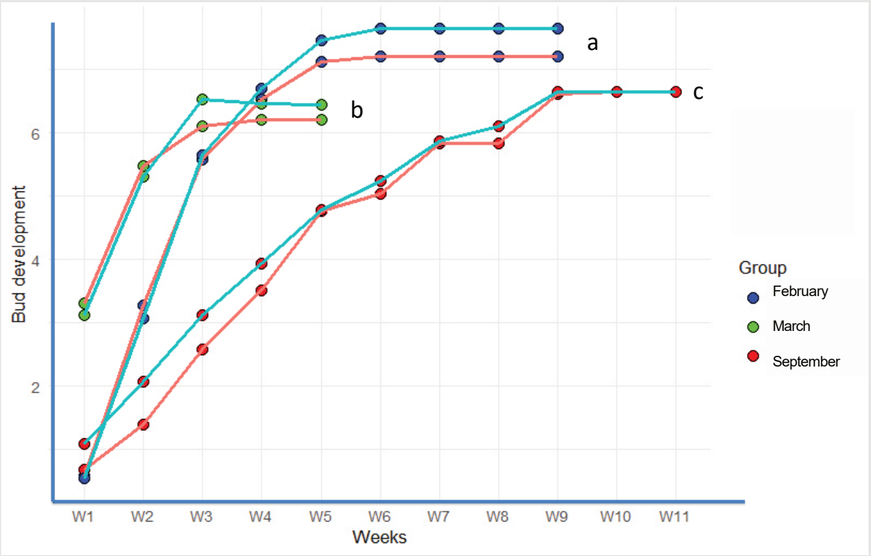
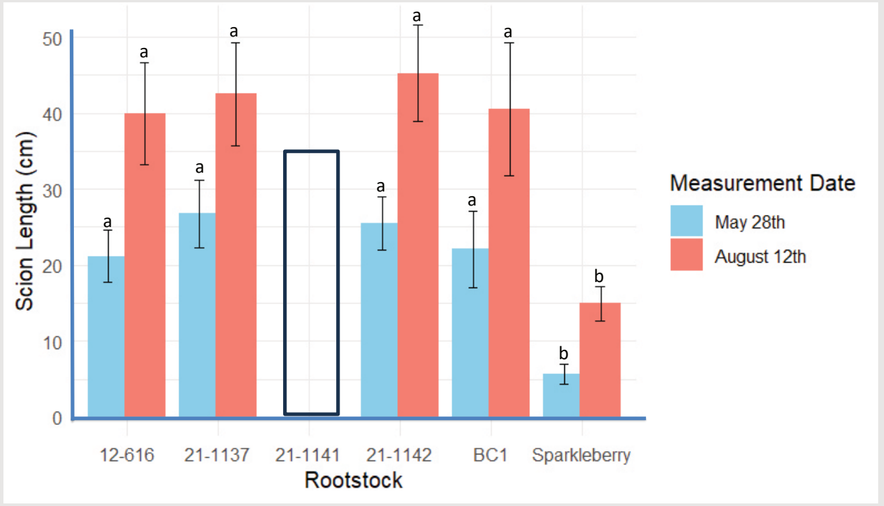
Scion closest to the crown grow faster



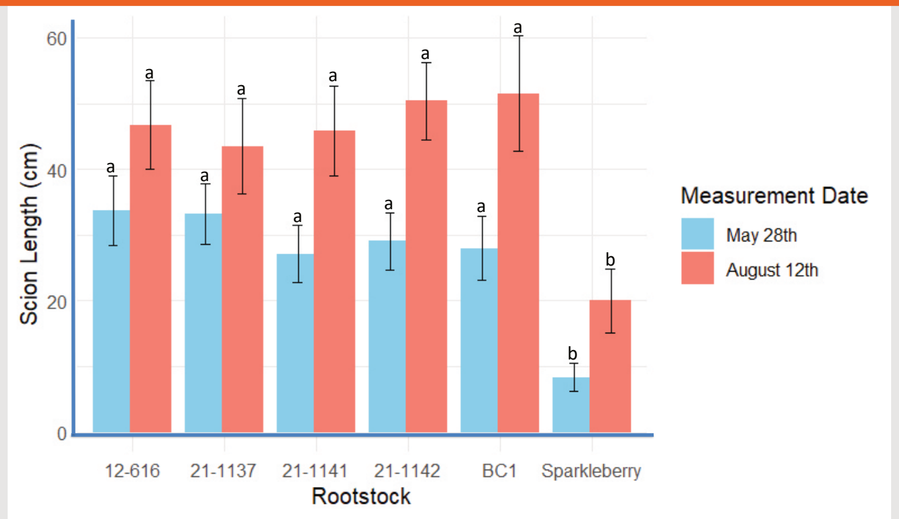
Different letters indicates significant differences based on a t-test at the 5% significance level

Scion length Albus - February



Different letters indicates significant differences based on an LSD-test at the 5% significance level

Scion length Sentinel - February



Different letters indicates significant differences based on an LSD-test at the 5% significance level

Photo: Valentina Goles

Summary

- Scions closer to the crown have faster development
- Plants that were grafted in the spring developed faster that the plants from the fall
- Scions grew faster on F1 hybrids and BC1 rootstocks compared to the sparkleberry rootstock

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Thank you!

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