

Using *Vaccinium arboreum* (sparkleberry) to increase soil adaptation and mechanical harvest efficiency of blueberry

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Blueberry industry in FL

- Southern highbush blueberry
- Based on *V. corymbosum*
- Hybrids with wild species native to the southeastern U.S.
- *V. elliotii* / *V. darrowii* / *V. virgatum*



UF breeding program

Jim Olmstead



- Flavor
- Crisp texture
- Winter chilling requirement
- **Soil adaptation**
- **Mechanical harvesting**

Soil adaptation



Blueberry soils

- Acidic
- High organic matter
- NH_4



Mineral soils

- $\text{pH} > 6.0$
- Low organic matter
- Accumulate NO_3 over NH_4





NH_4



NO_3



Most FL soils require amendments to be suitable for crop production



Bark beds



Bark incorporated into soil



Incorporated bark with ground cloth

Pine bark increases organic matter, decreases soil pH, maintains N in NH_4 form
Greatly increases establishment costs of SHB planting in Florida

**Q1. Are there *Vaccinium* species
native to higher pH (nitrate
predominant N form), low om soils,
where amendments wouldn't be
needed?**

UF breeding program

Flavor

Crisp texture

Winter chilling requirement

Soil adaptation

Mechanical harvesting

Mechanical harvesting



Photo: J. Williamson

Harvesting

Hand-harvested

- Expensive
- Labor intensive
- Low availability









Q1. Are there *Vaccinium* species native to higher pH (nitrate predominant N form), low om soils, where amendments wouldn't be needed?

Q2. Are there *Vaccinium* species that have an architecture more adaptable to mechanical harvesting?



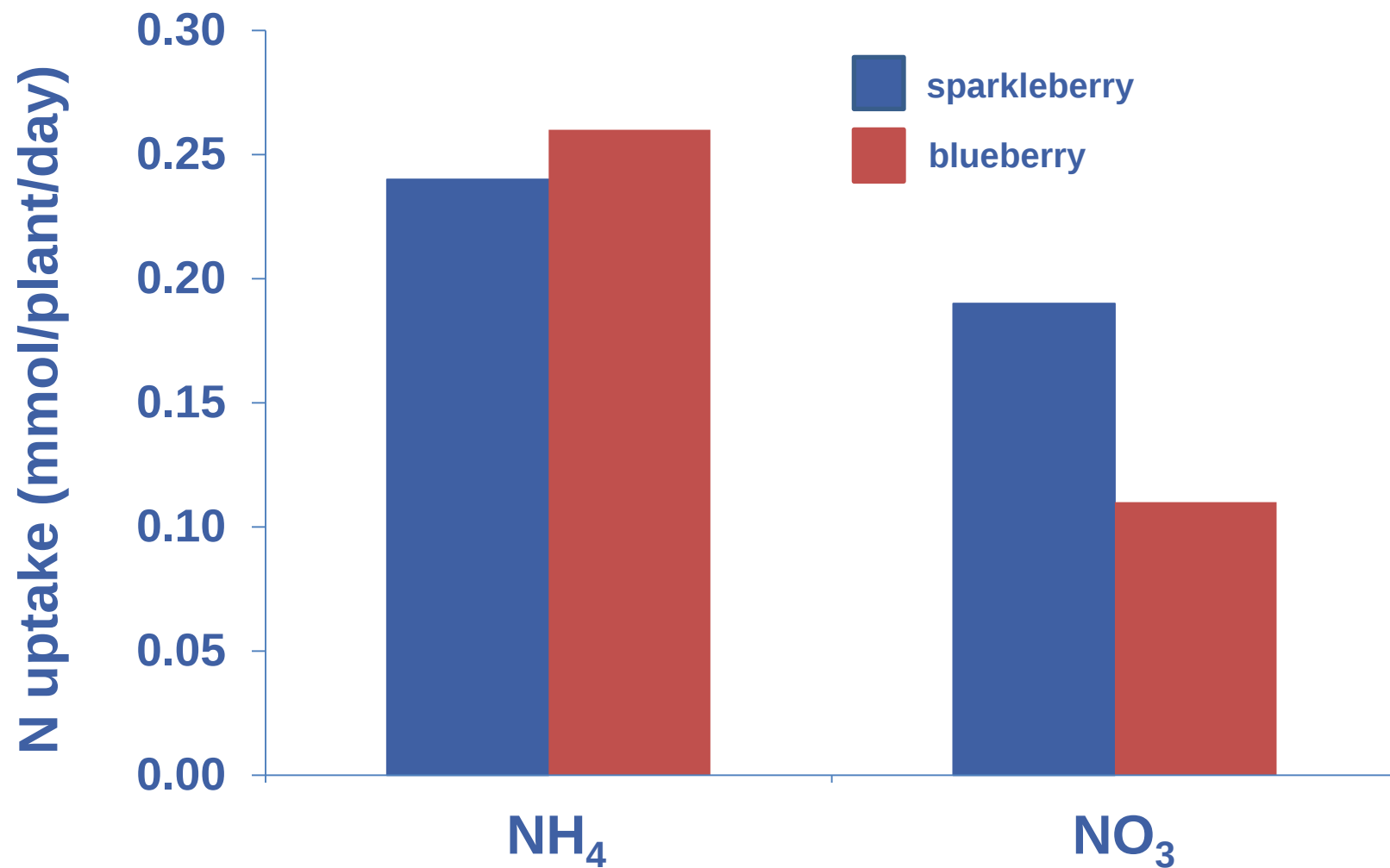
Vaccinium arboreum

“Sparkleberry”

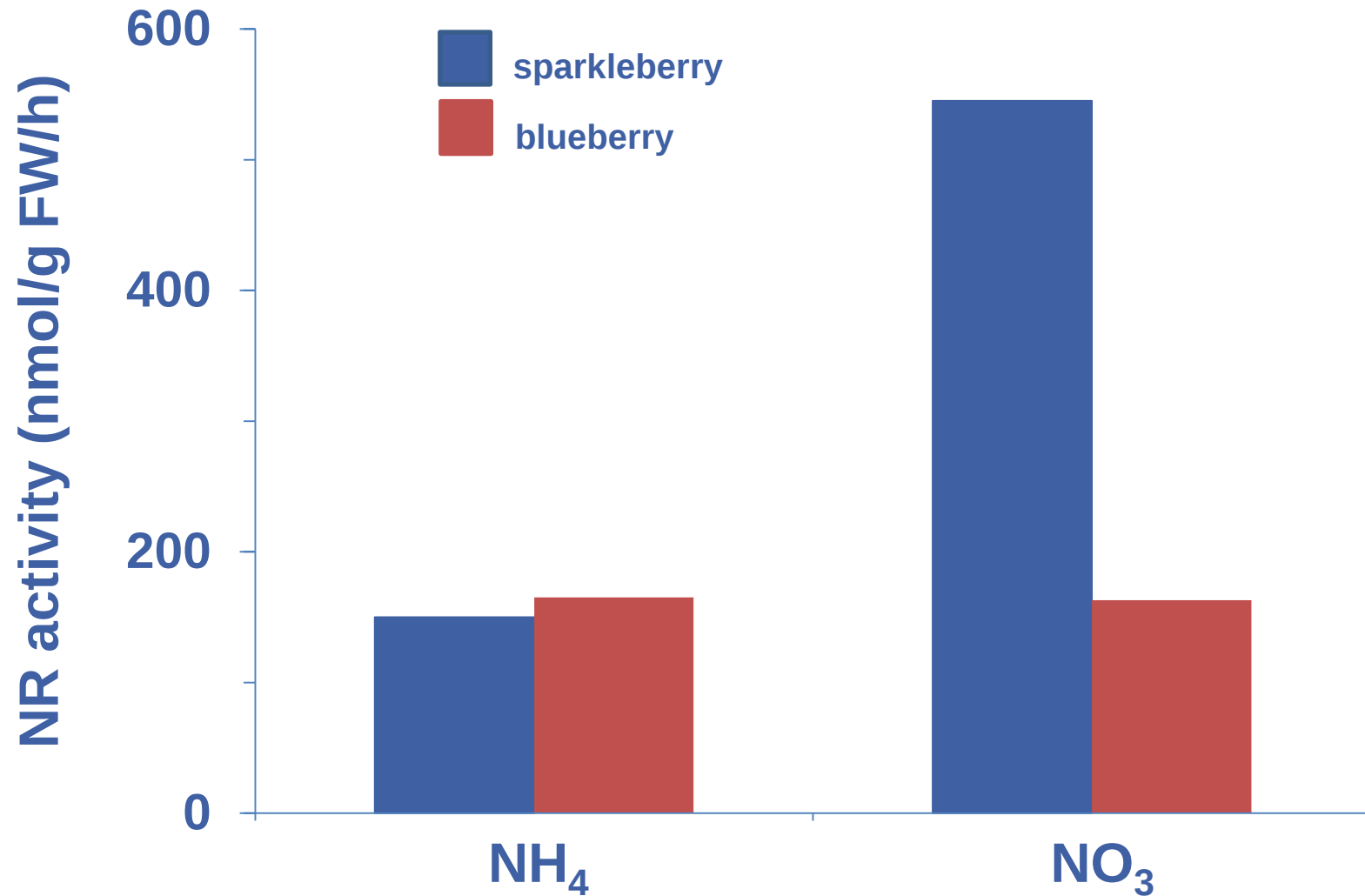
- Native to the southeastern US
- Tree-like growth habit
- Deep root system – drought tolerant
- Tolerates low organic matter soil, pH up to 6.5
- N primarily in NO_3 form



N uptake in sparkleberry vs blueberry



Nitrate reduction in sparkleberry vs blueberry



**NO₃ uptake and assimilation in
sparkleberry is greater than in blueberry**

**Can we use sparkleberry to increase
adaptation of blueberry to more mineral
soils?**

Sparkleberry has a tree-like architecture

**And increase mechanical harvesting
potential?**



Grafted vs Own-rooted



Pine bark amended vs non-amended soil



Meadowlark & Farthing grafted Summer 2010. Field planted May 2011

2-yr-old 'Meadowlark' SHB



Grafted



Own-rooted

Leaf nutrient concentration – Summer 2012

		N*	P	K	Mg	Ca	B	Fe*
Cultivar	Trt	%	%	%	%	%	ppm	ppm
M'lark	Own/Soil	1.56	0.10 a	0.57	0.14	0.66	49.17 ab	51.00
	Own/Bark	1.50	0.09 b	0.49	0.15	0.72	58.83 a	47.50
	Graft/Soil	1.49	0.10 a	0.56	0.15	0.67	45.67 b	48.00
	Graft/Bark	1.52	0.10 a	0.55	0.14	0.69	48.17 ab	45.17
Farthing	Own/Soil	1.61	0.09	0.52	0.16	0.72	50.50 a	48.83
	Own/Bark	1.57	0.09	0.52	0.16	0.73	45.17 b	48.83
	Graft/Soil	1.67	0.10	0.56	0.15	0.71	48.33 ab	49.17
	Graft/Bark	1.64	0.10	0.57	0.15	0.69	49.83 a	48.67

Sufficiency ranges:
(Hart et al., 2006)

1.7-2.0
%

0.10-0.40
%

0.41-0.70
%

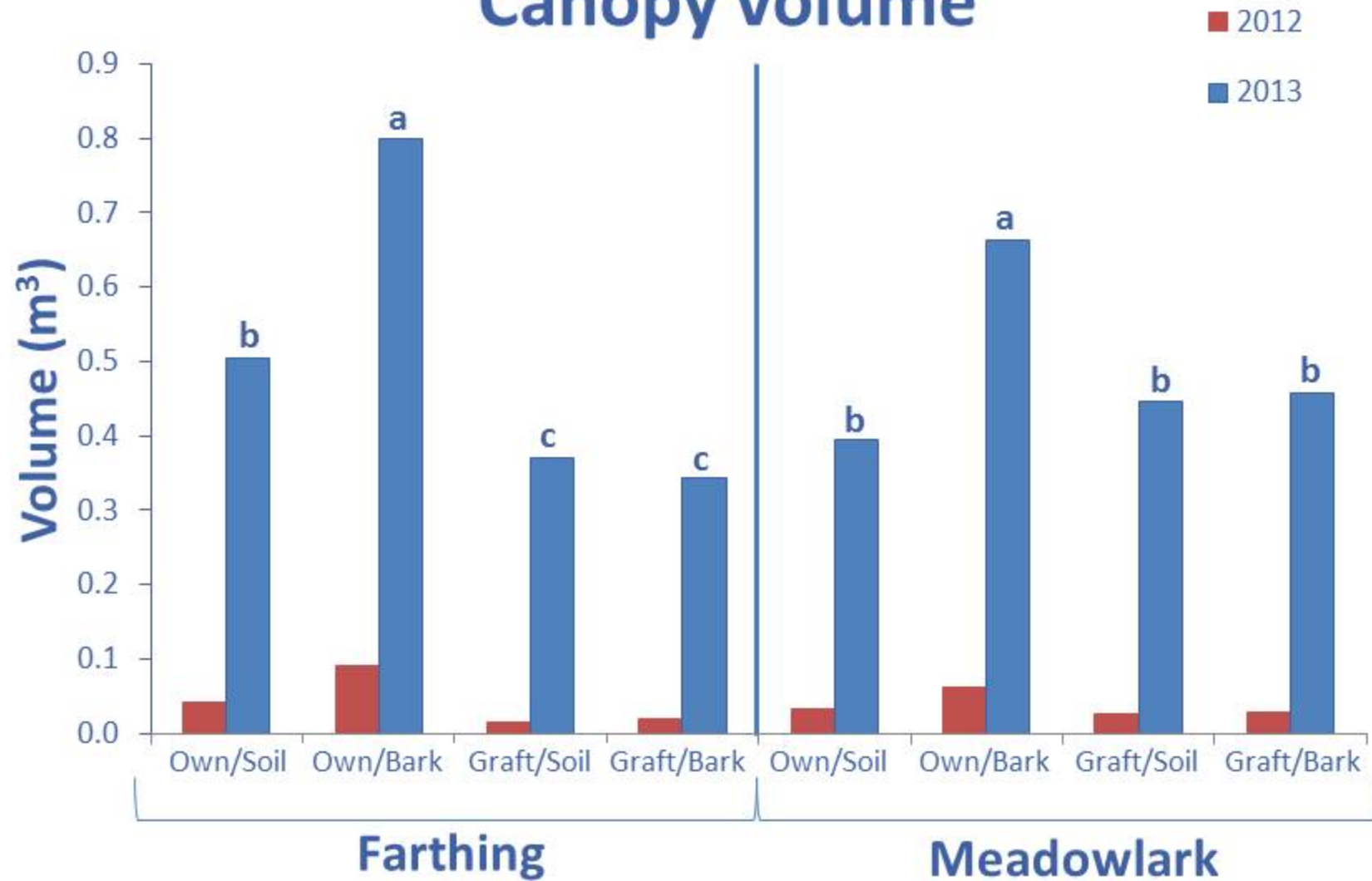
0.13-0.25
%

0.41-0.80
%

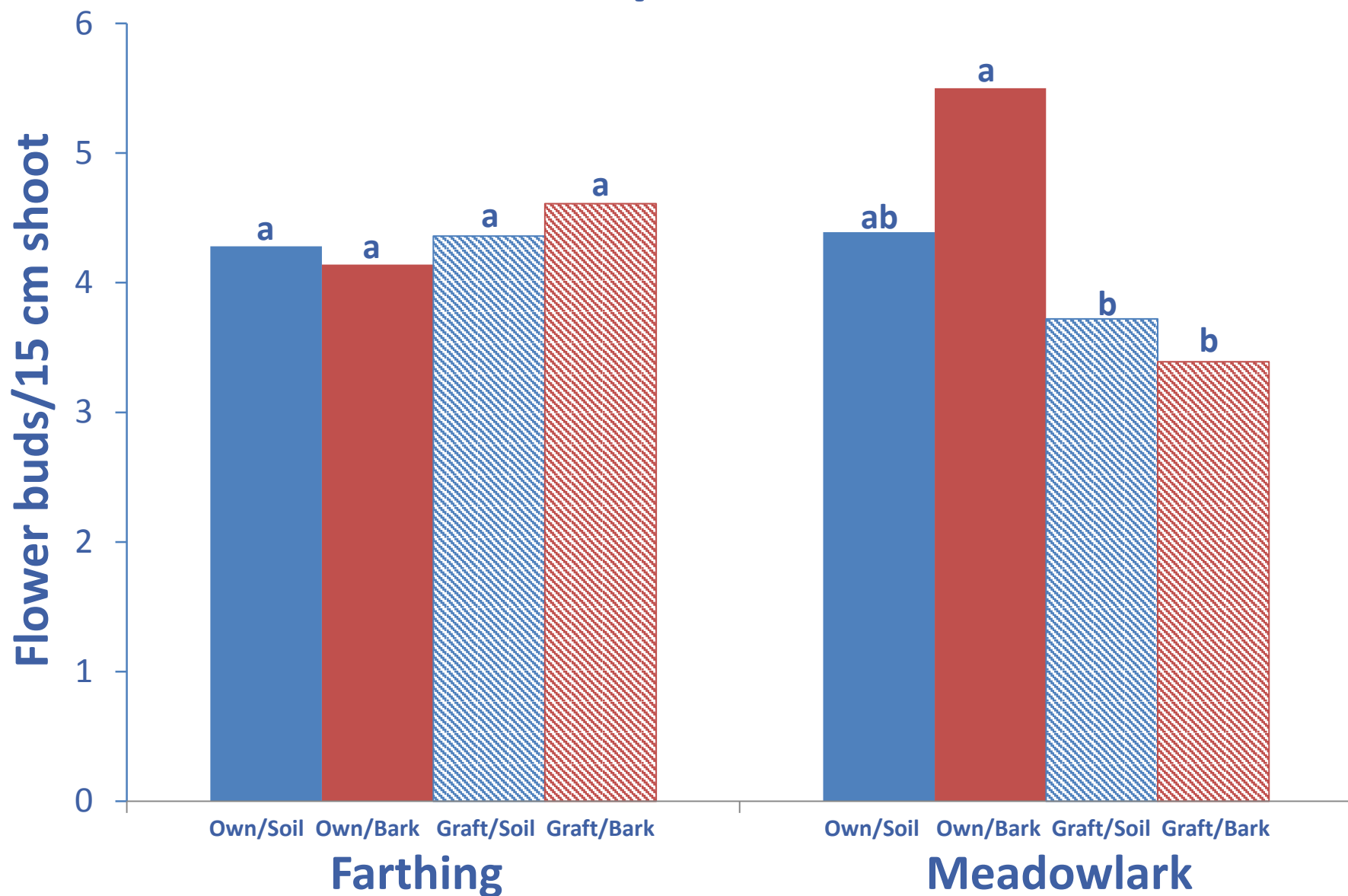
31-80
ppm

61-200
ppm

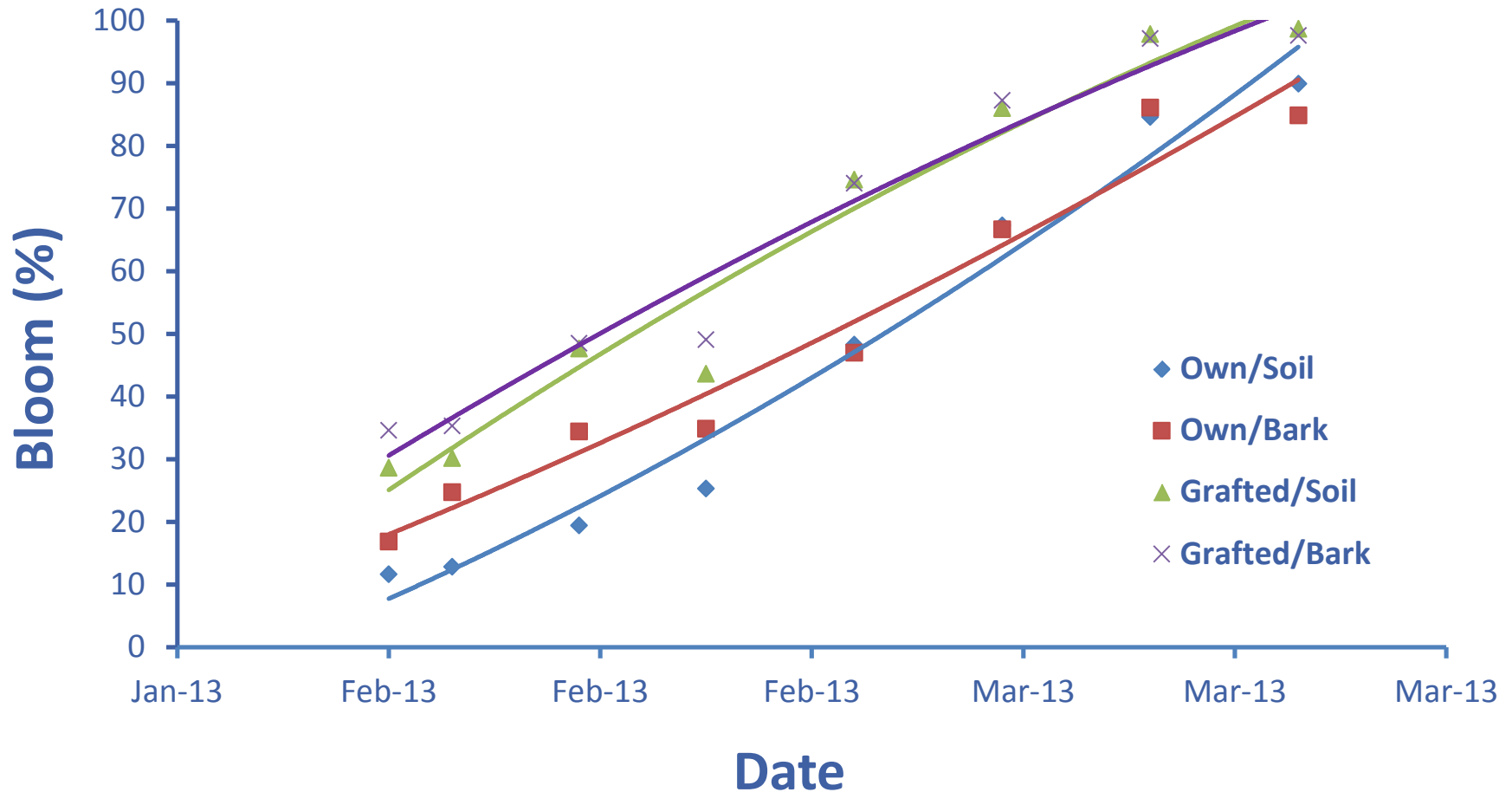
Canopy volume



Flower buds/shoot - 2013

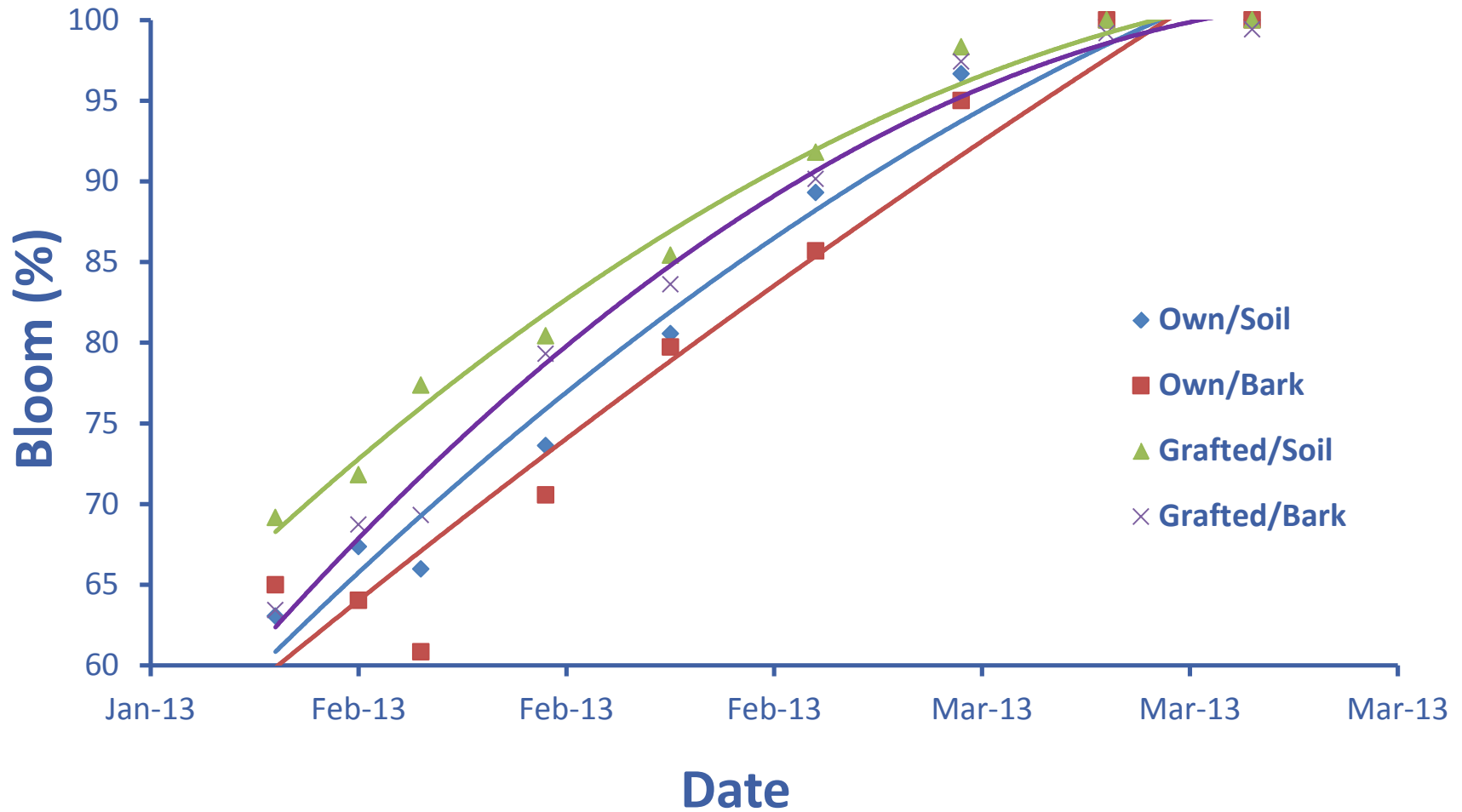


Bloom progression in 'Farthing' - 2013



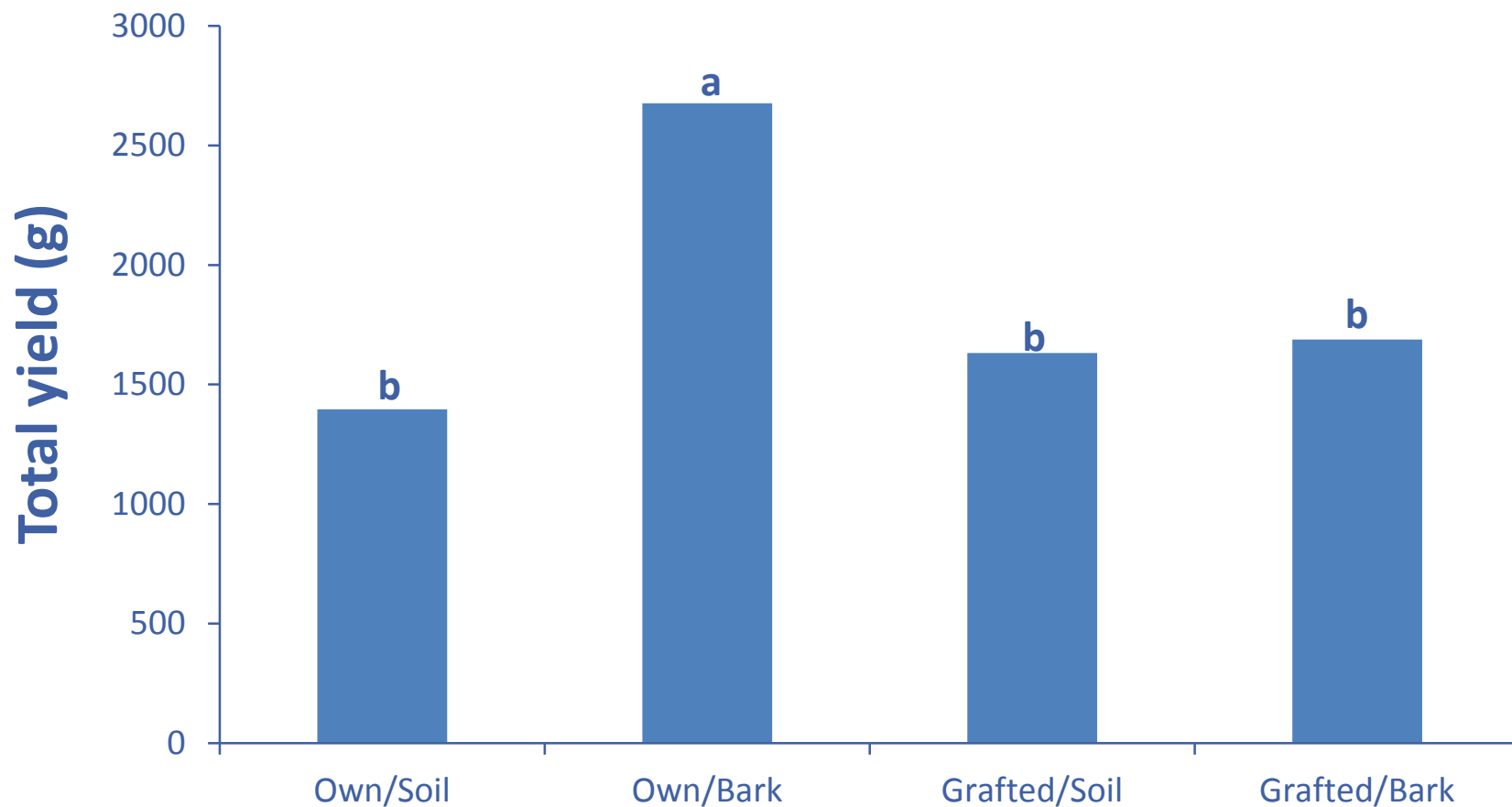
Bloom period averaged 7 days shorter in grafted compared with own-rooted 'Farthing'

Bloom progression in 'Meadowlark' - 2013

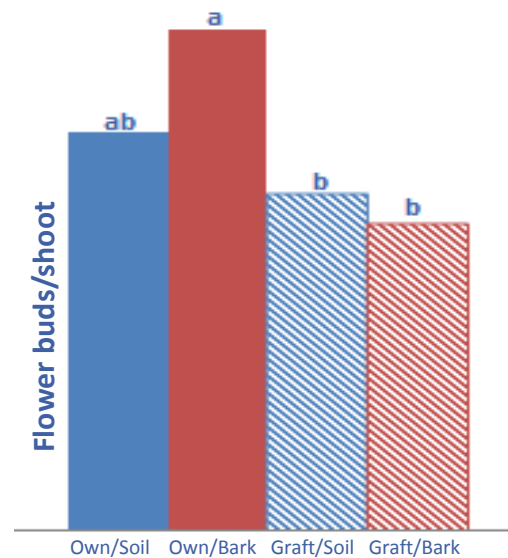
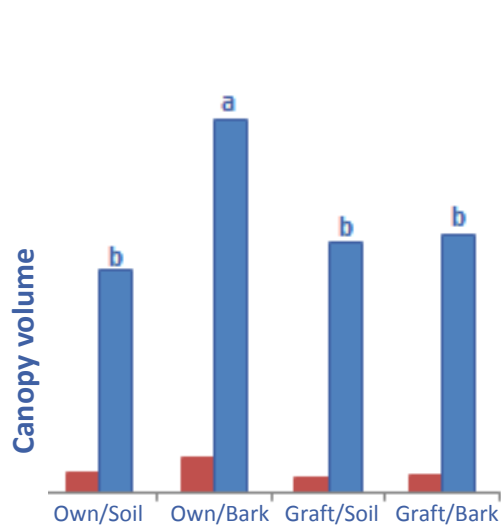
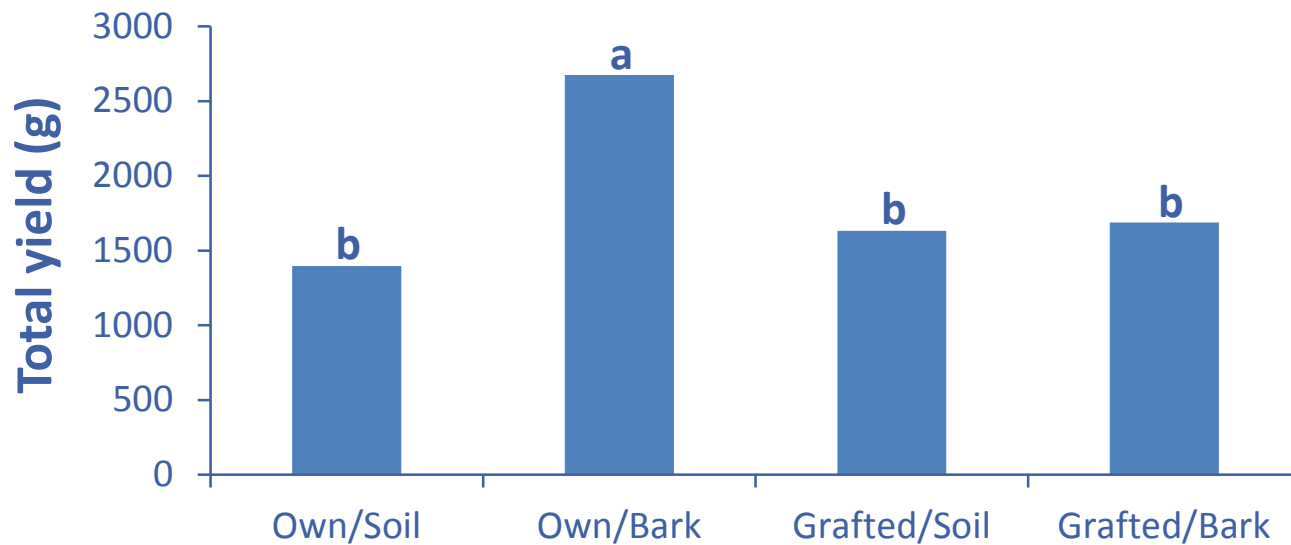


...and in 'Meadowlark'

'Meadowlark' Yield 2013



'Meadowlark' Yield 2013





- Yields in mature plantings?

Photo: J.Spiers



- Mechanical harvest ability?



- Postharvest fruit quality?





Blueberry Trees?