Primocane management and plant spacing in ‘Columbia Star’: plant performance and net returns

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OREGON RASPBERRY & BLACKBERRY COMMISSION

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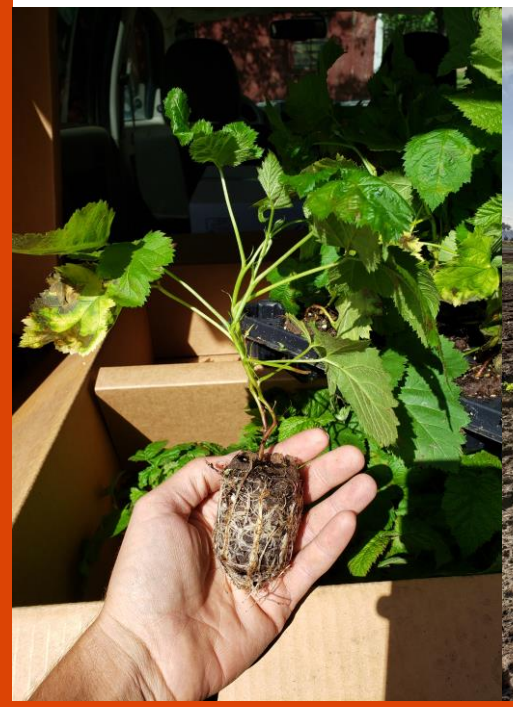
Objectives

- Determine the impact of plant spacing, primocane management, and pruning/training methods on
  - Yield
  - Fruit quality
  - Plant growth
  - Labor requirements

Establishment

- 0.4 acre, planted in fall 2019 (replants in spring 2020 as needed, funding from NCSFR)
- Drip irrigation, fertigation
- Maintained bare soil between rows (tillage, herbicides)

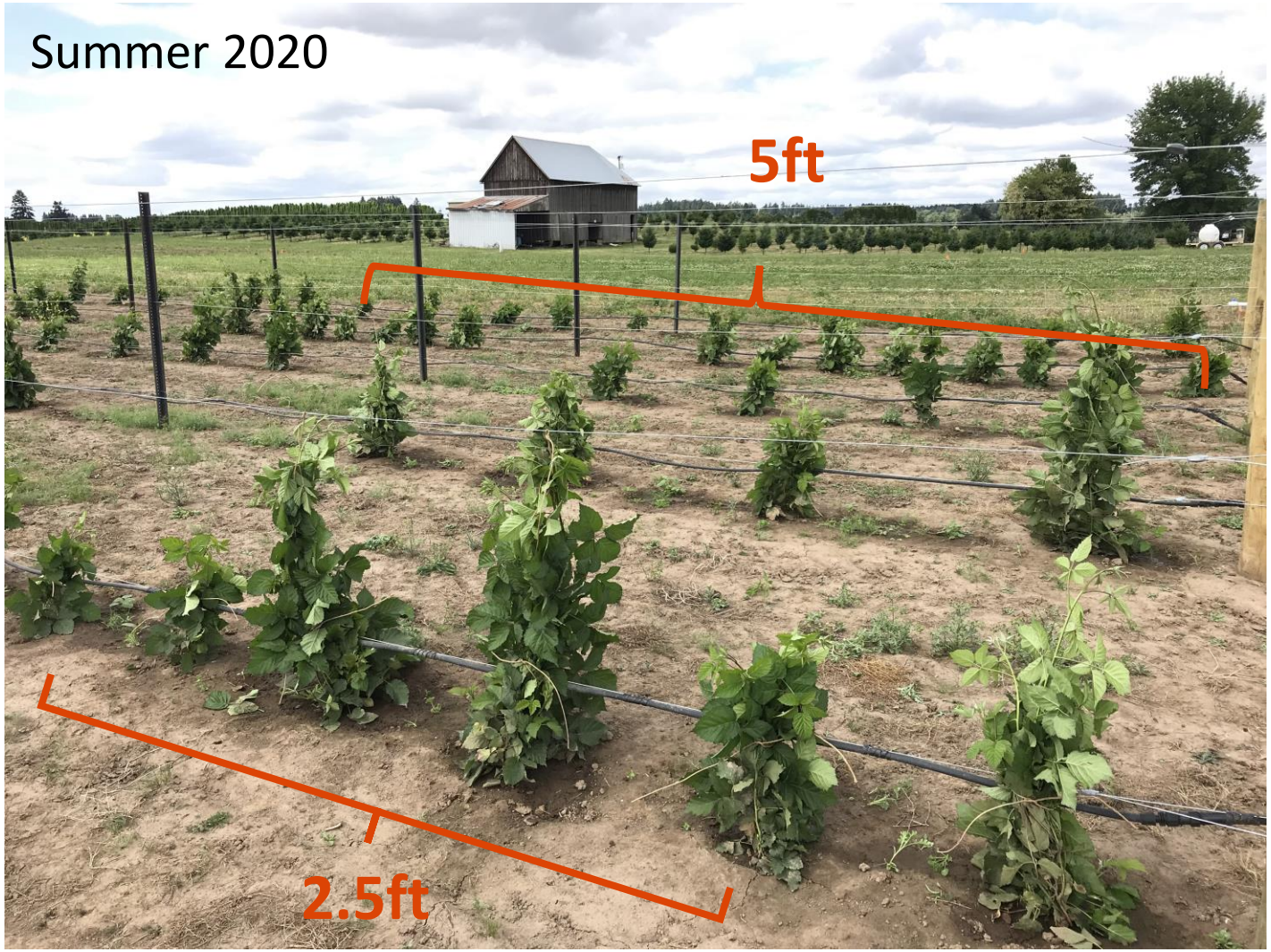


October 2019

June 2020

September 2020

Treatments: plant spacing



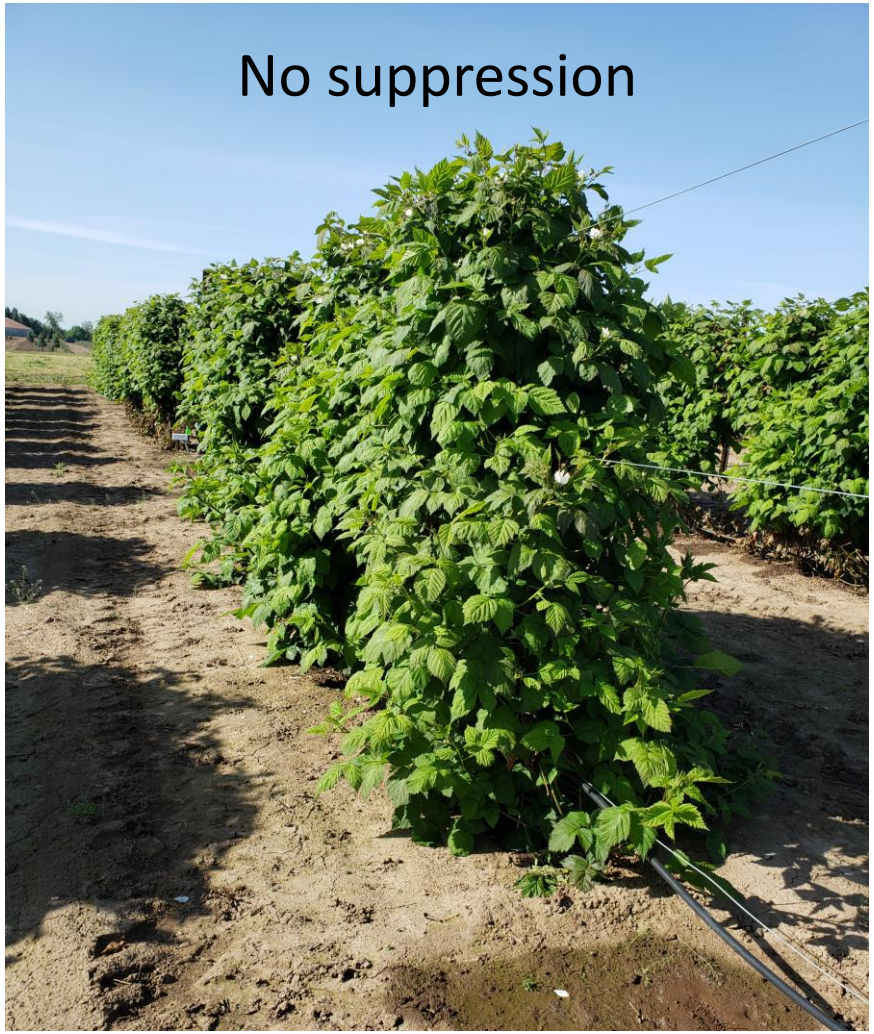
Treatments: training

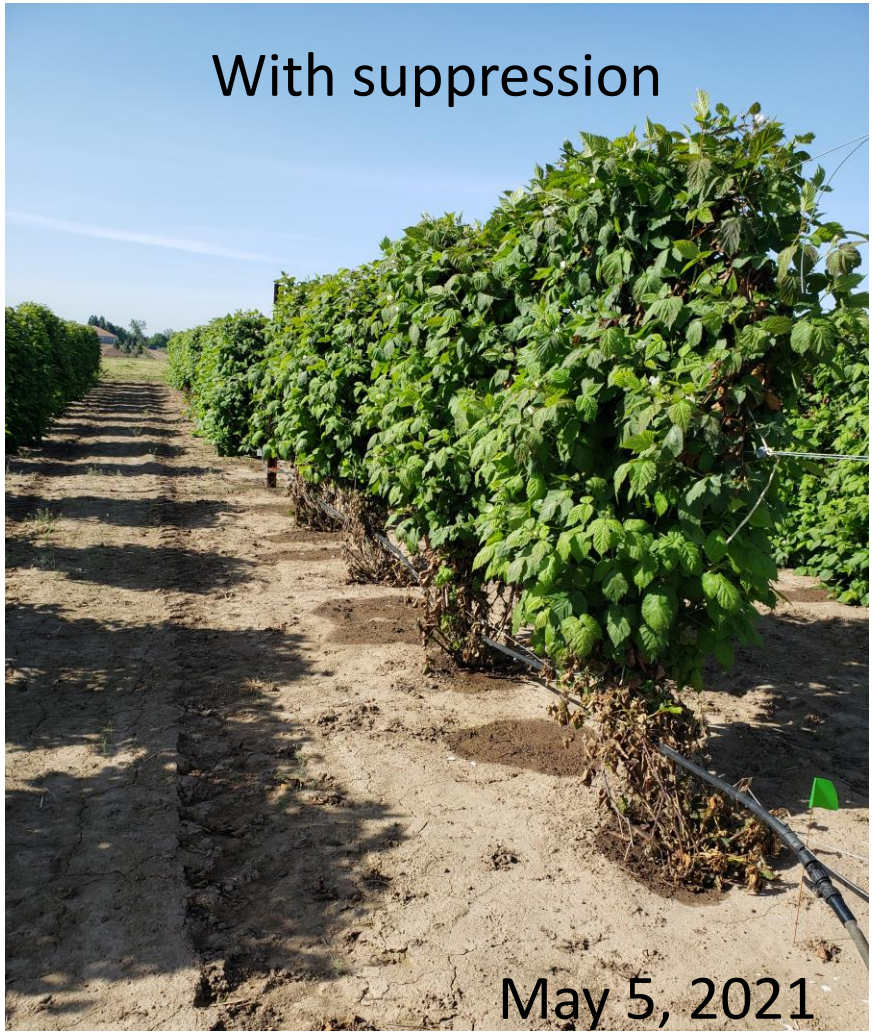
August training

New-over-old

August 17, 2021

Treatments: primocane suppression





Treatments: primocane suppression

2023 Season

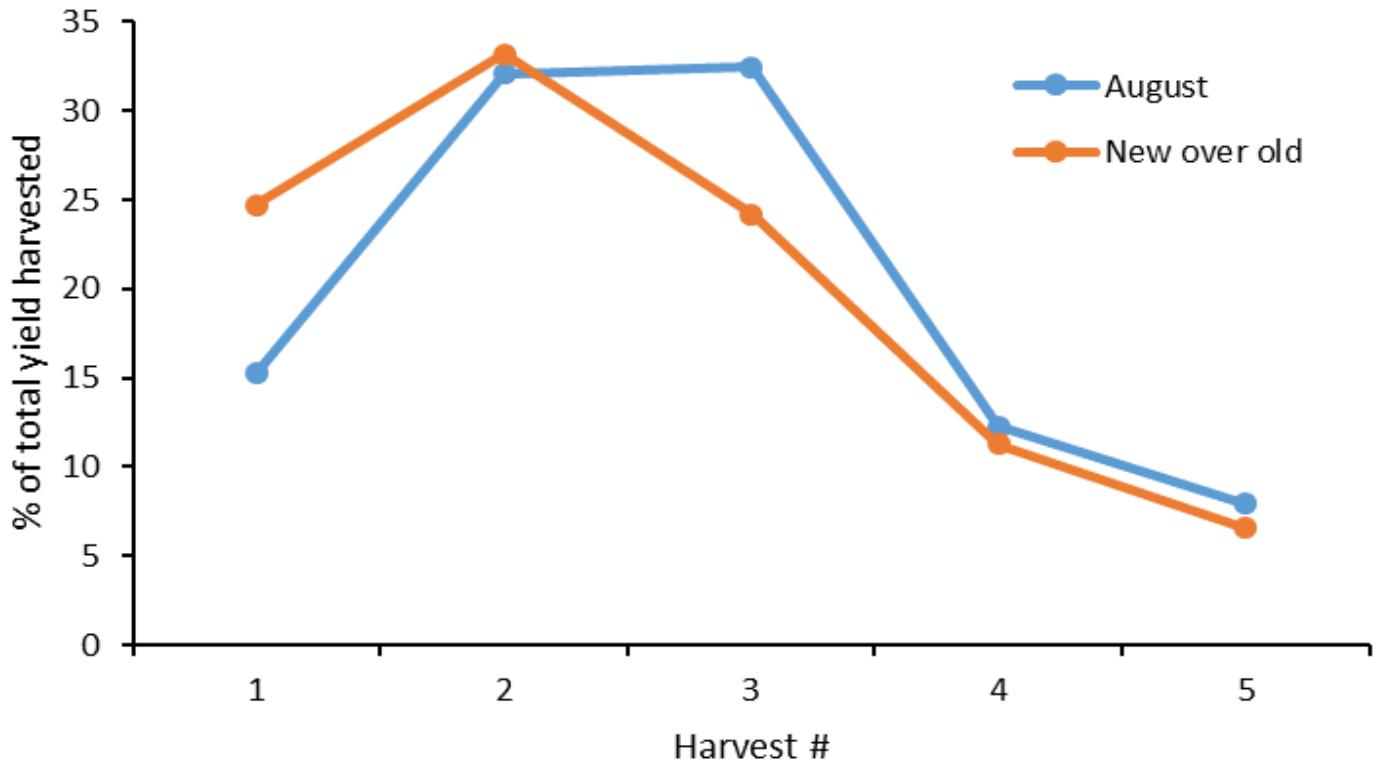
- 1 primocane suppression (May 5th, canes ~1ft tall)
- 3rd harvest year
- Caning out data
  - Fruiting lateral length, # fruit/lateral
  - Primocane length
- Labor requirements

Harvest

- June 29–July 13 (5 harvests)
- Yield
  - 5 ft spacing: 9.4 lbs/plant
  - 2.5 ft spacing: 5.1 lbs/plant
  - Per acre yield was not significantly different (4.3 tons/acre)

  2022 yield much higher: 7.5 tons/acre
  - NOO higher than August trained
    - 5.2 tons/acre vs 3.3 tons/acre
  - Little effect of primocane suppression

Harvest: ripening rate



Harvest

- Brix
  - No difference at 5 ft: 13.7
  - At 2.5 ft
    - August trained: 14.0
    - NOO: 12.8
  - Primo suppression—some differences but not as large
- Berry weight
  - 7.0 g NOO vs 6.6 August trained
  - No effect of spacing or primo suppression

Harvest

- Cull—generally lower in 2023
  - No effect of primo suppression: 5%
  - At 2.5 ft: 5.5% NOO, 4.3% August
  - No difference at 5 ft
- Ground losses:
  - Higher with August training than NOO at 5 ft
  - Ranged 7-10% of total fruit produced, similar to 2022

Primocane Growth

Treatment	# Primocanes/ plant	Primocane length (ft)
Plant spacing (ft)		
2.5	13	16
5	15	18
Primocane suppression (PS)		
No PS	12	19
With PS	16	16
Training		
August	16	19
New-over-old	12	16
Significance		
Spacing	0.0177	NS
PS	<.0001	0.0485
Spacing x PS	NS	NS
Training	0.0003	NS
Spacing x Training	NS	NS
PS x Training	0.0419	NS
Spacing x PS x Training	NS	NS

Floricanes

- Lateral length similar: 15”
- Berries/lateral
  - Down from 5 in 2022, averaged 4.4 in 2023
  - More with NOO (4.7) compared to August (4.1)
    - Similar trend as in past years—now significant

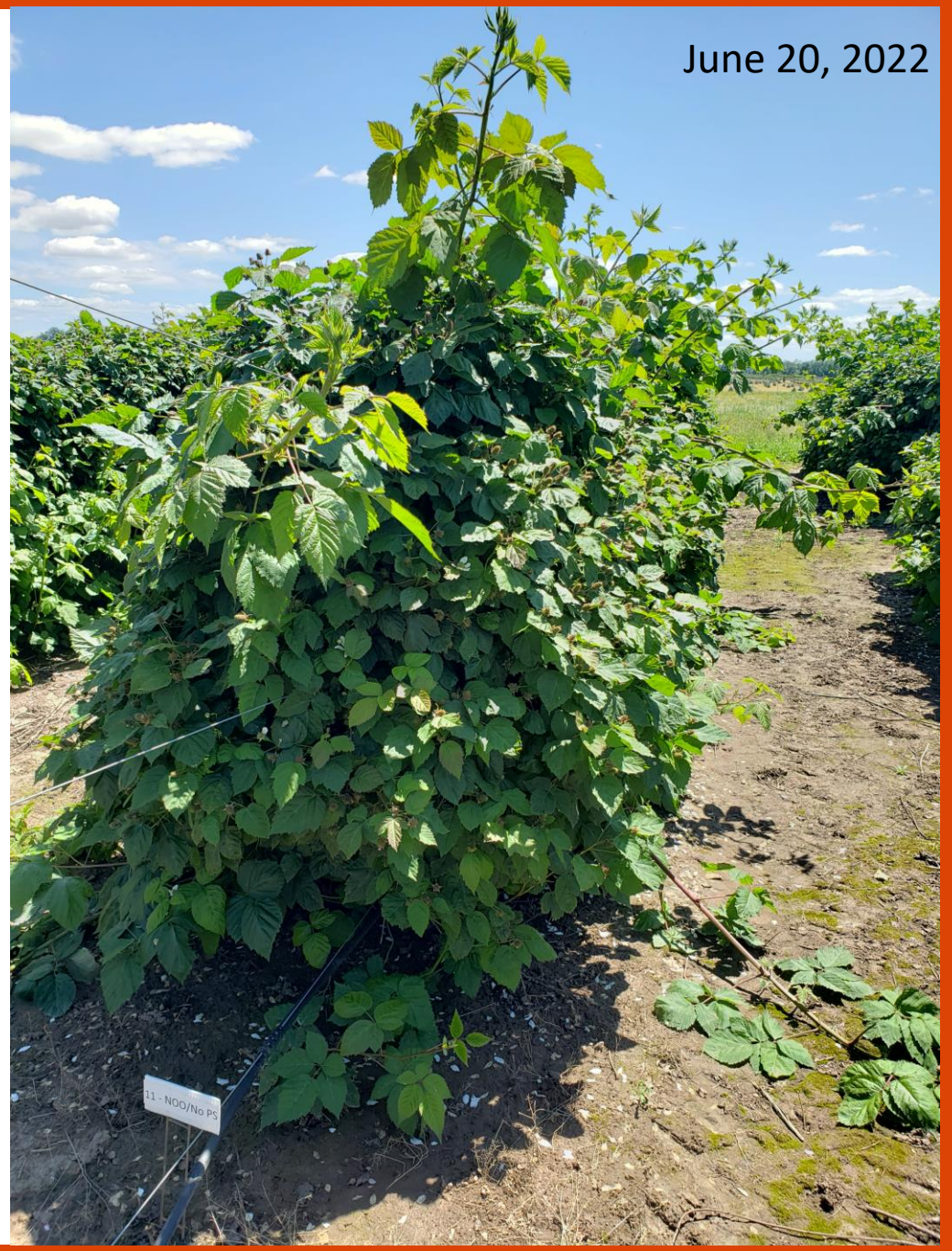

October 26, 2023

Cane training—Trends 2021-2023

- NOO takes 10-15% of the time August training requires (30% the first year—no established canopy)
- 2.5 ft spacing increases training time by ~35% for August training, similar time for NOO

Primocane suppression

- Reduced training time 20 to 50% depending on year, not as important in NOO
- Suppression reduced training time throughout the summer
  - 11 vs 28 hrs/acre in June
  - 107 vs 115 hrs/acre in August
  - Comparatively low cost to spray 1x
    - ~$58/acre



Economics

- Based on yield and labor costs for training and primocane suppression only
- In 2023, **New-over-old** saved ~$4k-6.5k/acre vs. August training and had higher yield
- Due to lower yield in 2023, cost of **August training** at 2.5 ft spacing was higher than income potential ($-1,752)
- Greatest net return: **2.5 ft with NOO**: $8,159/acre
  5 ft with NOO: $7,551/acre
- Slightly higher returns with **primocane suppression** despite similar yields because of reduced labor costs

Next steps

- Final year in 2024
- Cost/benefit analysis for years 1-4
- Potential for future research!

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Thank you!

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