

Caneberries and Tunnels

What works and what does not work
in our research trials

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25th Annual SE Vegetable and Fruit Expo

December 1, 2010

Myrtle Beach, SC

Elephant in
the room?



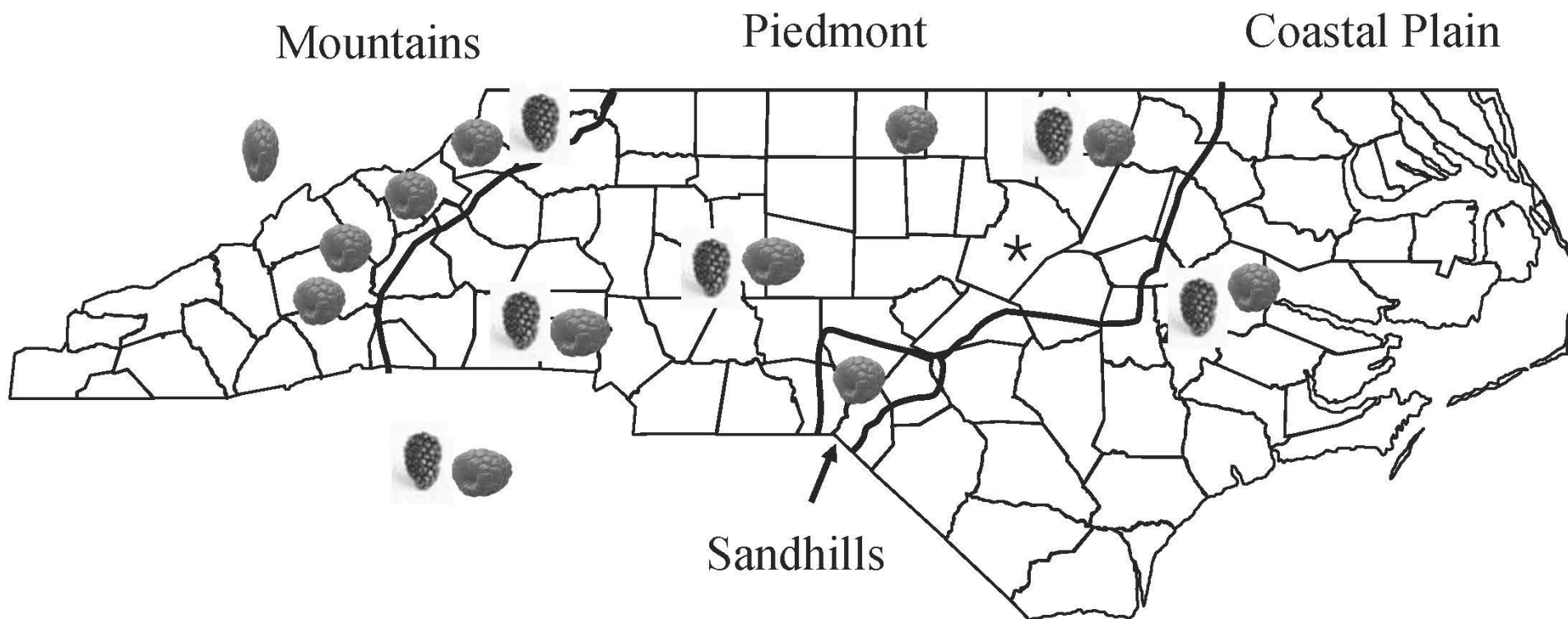
Raspberries in SE NC?

- Lewis farm Driscoll proprietary cultivars
- Driscoll (SweetBriar) raspberry breeding program since 1980's?
- Driscoll varieties do well many locations around the world
- NC breeding program...working on adaptation

NC State University Breeding/Cultural Practices Research Program

- 5 Research Stations
 - Replicated trials
 - 2 in 2004 (MR and LS), 24 since 2005
 - Tunnels
 - 0 in 2004, 3 in 2009
- On-farm trials
 - Testing advanced selections
 - Season Extension with row covers and tunnels

Caneberry Trials in NC



Our Trials

- Tunnels v Outside
- Primocane-fruiting raspberry, floricanne-fruiting raspberry, floricanne-fruiting blackberry
- 5 locations (primarily Piedmont RS today)
- Total, marketable, berry wt, post harvest

Replicated Field Trials





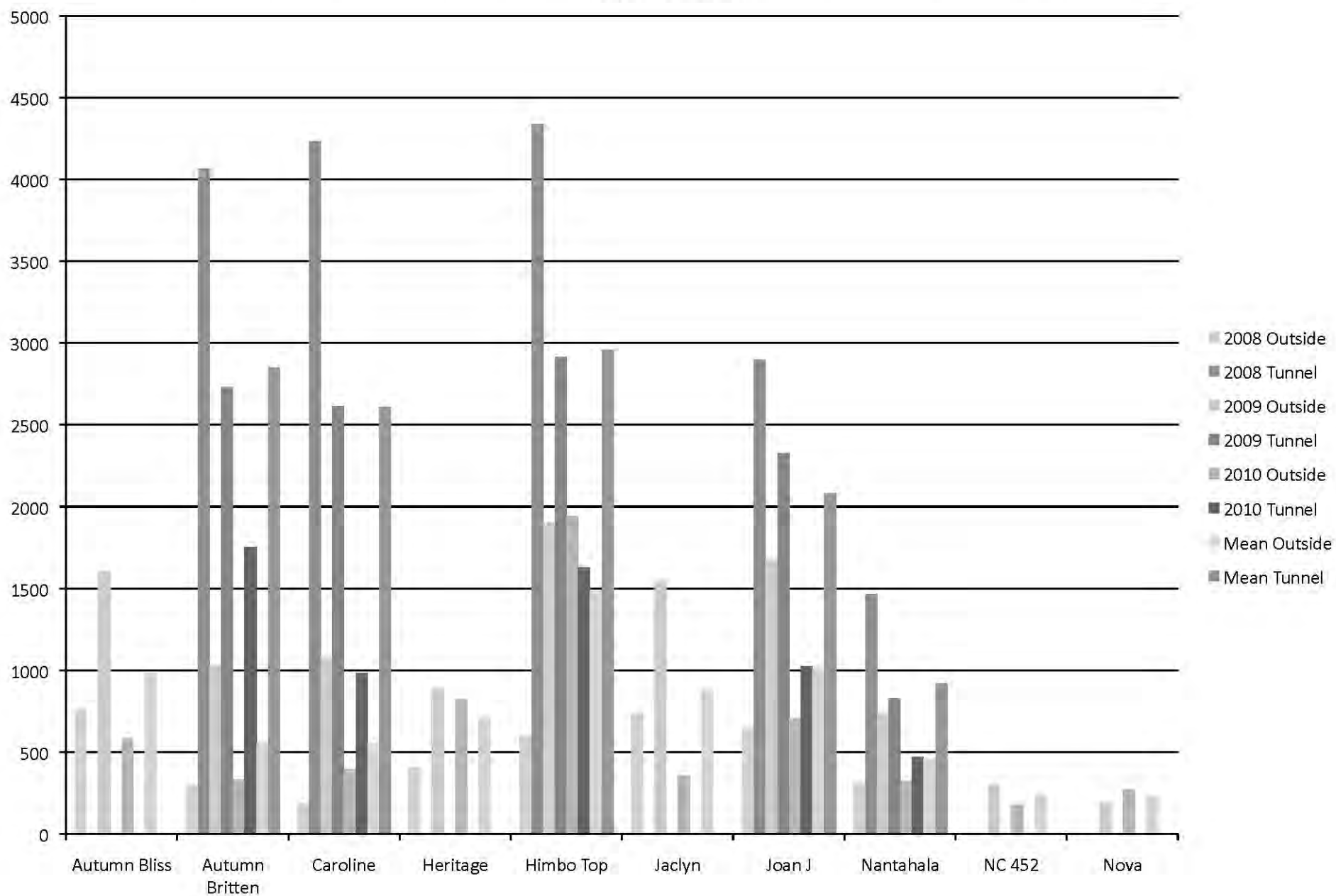
Raspberries



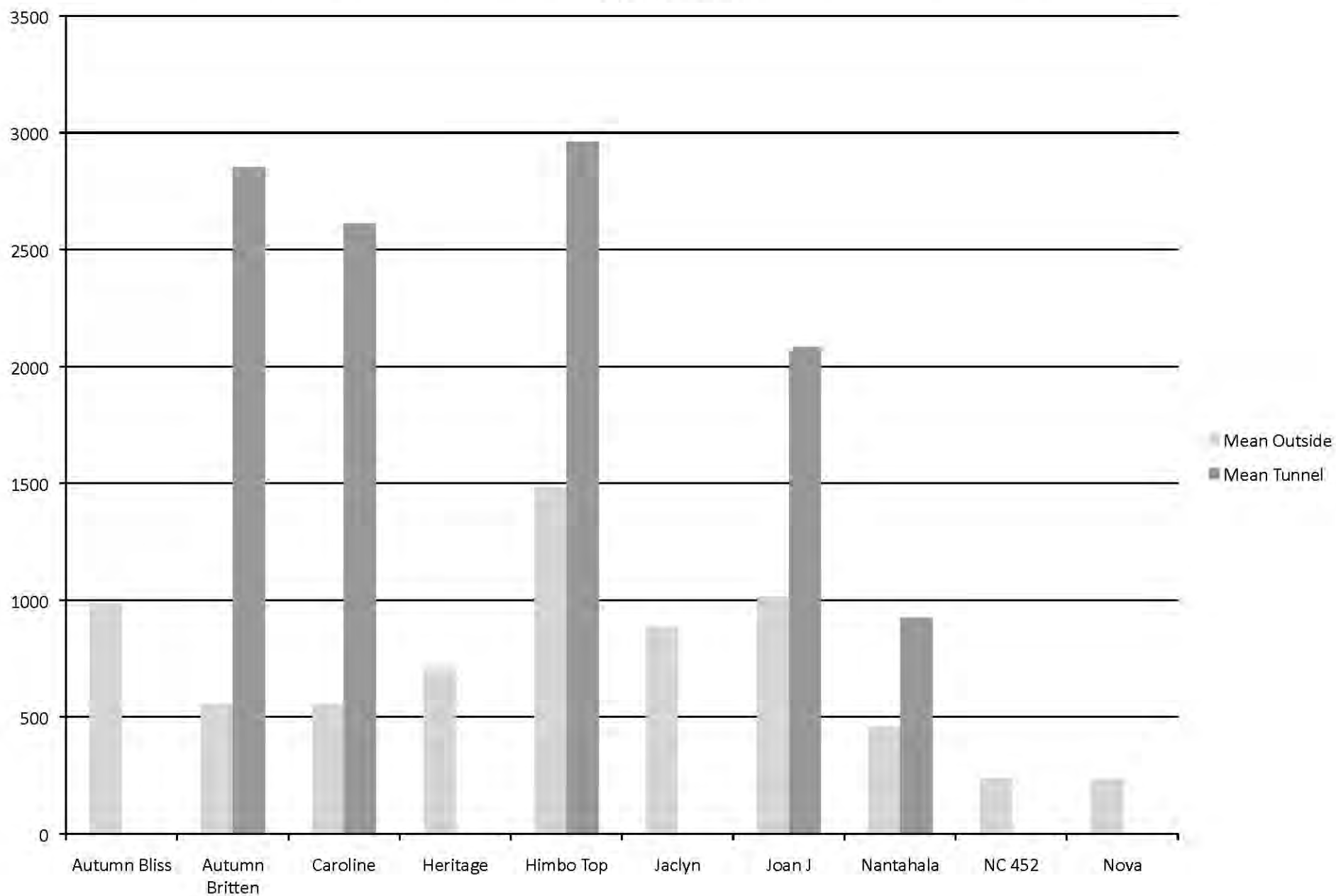
PF Raspberry

- Prune to ground each winter
- Fruit is produced in “fall”
- Most common type for large commercial harvest

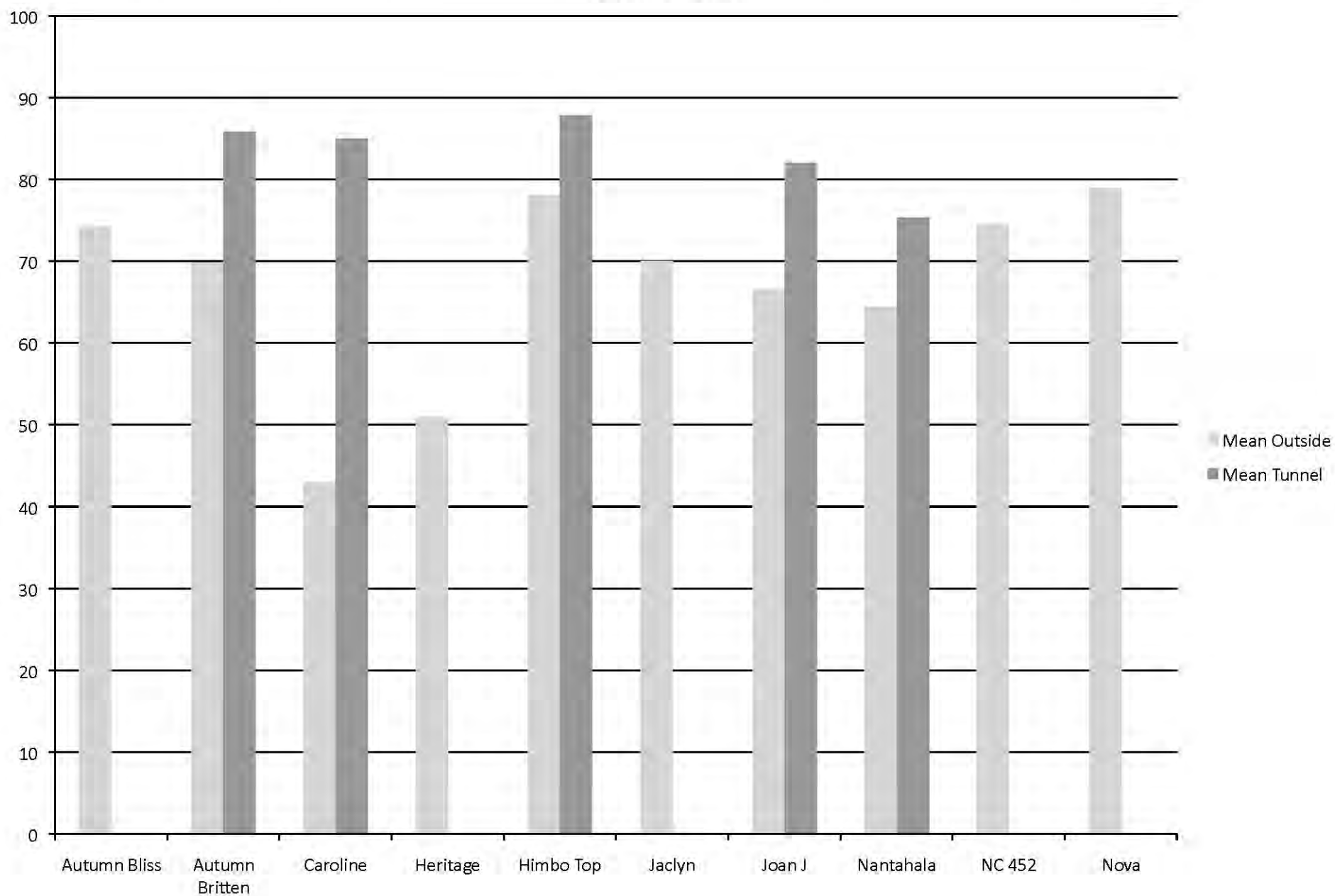
Piedmont Primocane Fruiting Raspberry Marketable Yield (g/plant) 2008-2010



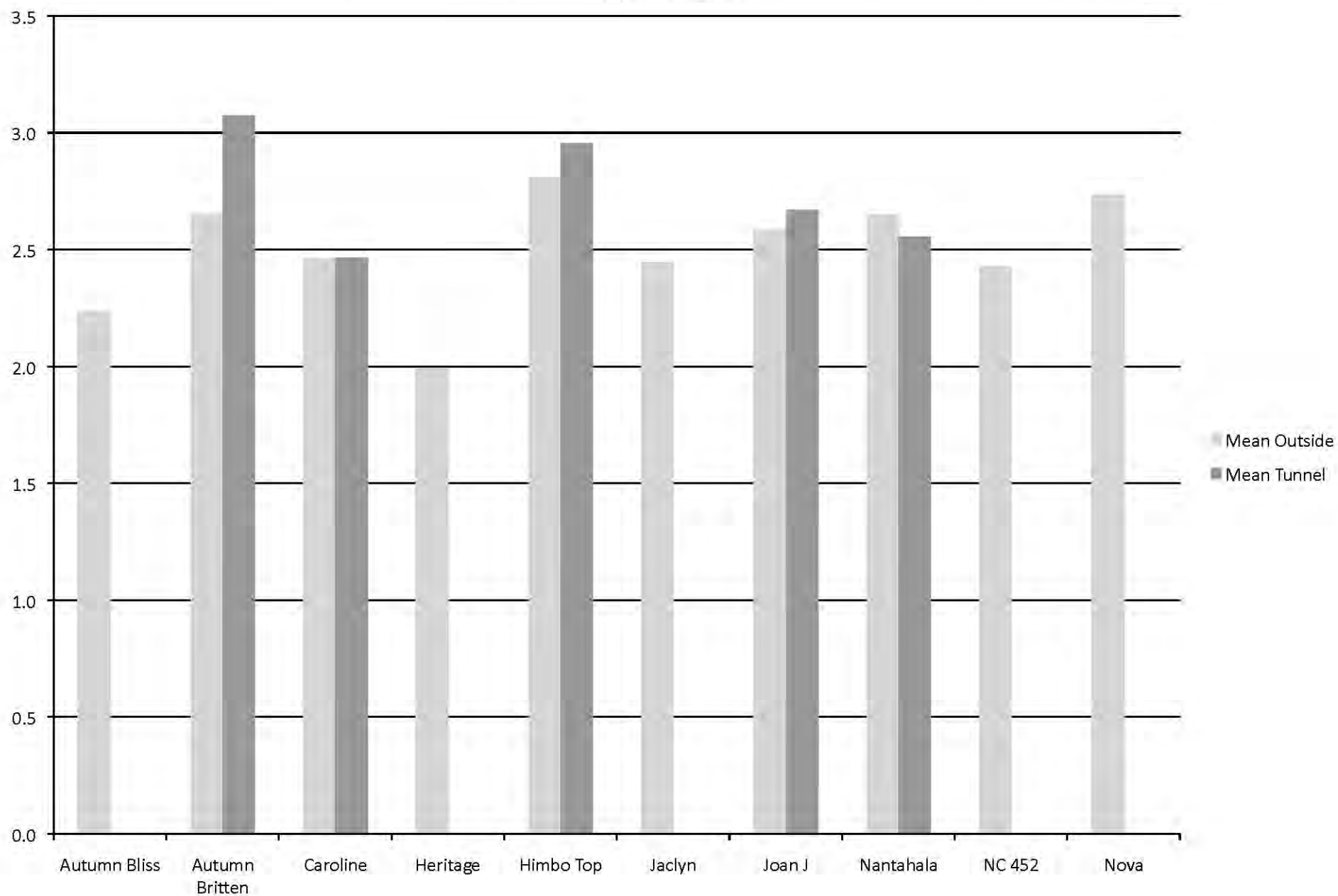
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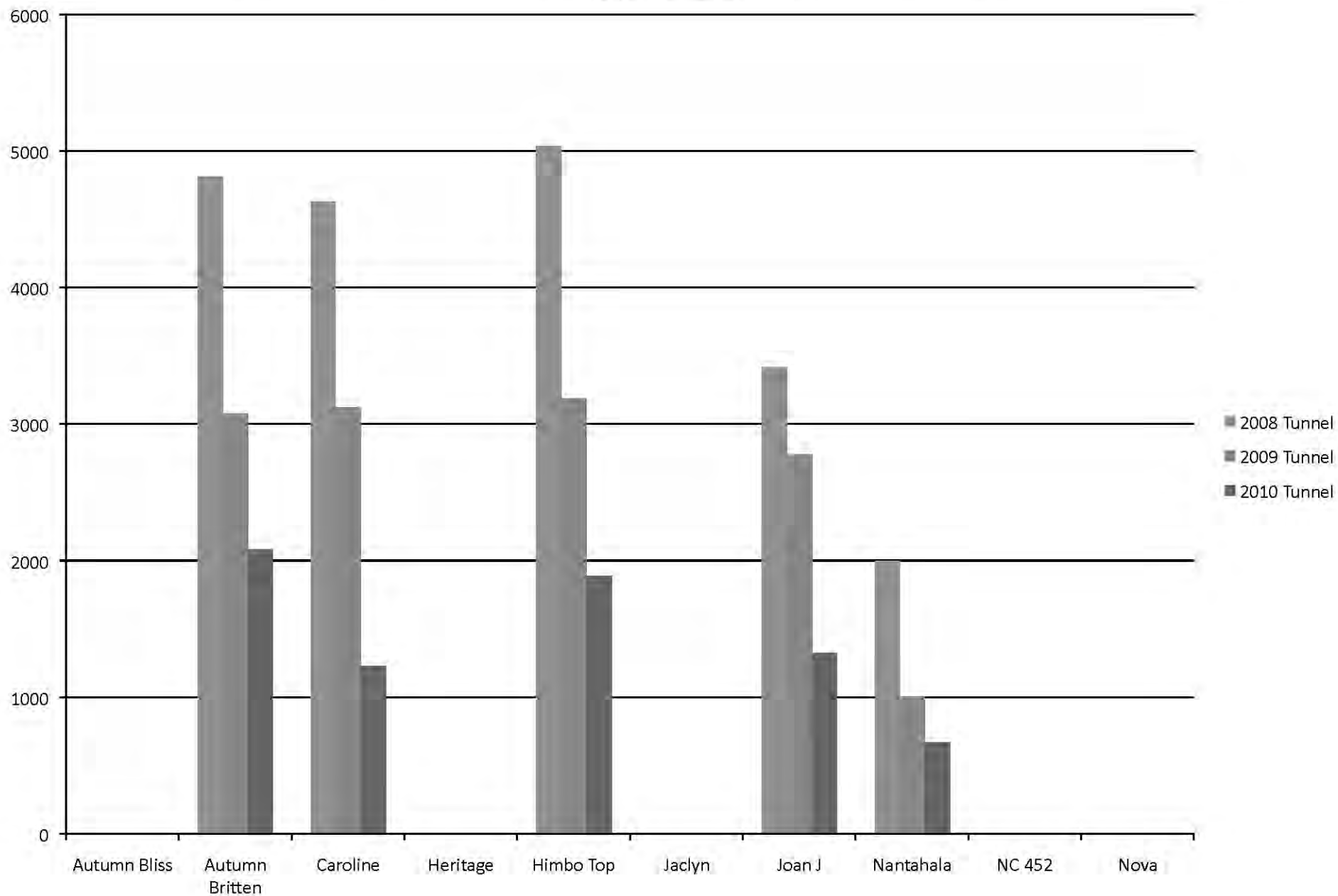
Piedmont Primocane Fruiting Raspberry Percent Marketable Yield of Total, 2008-2010



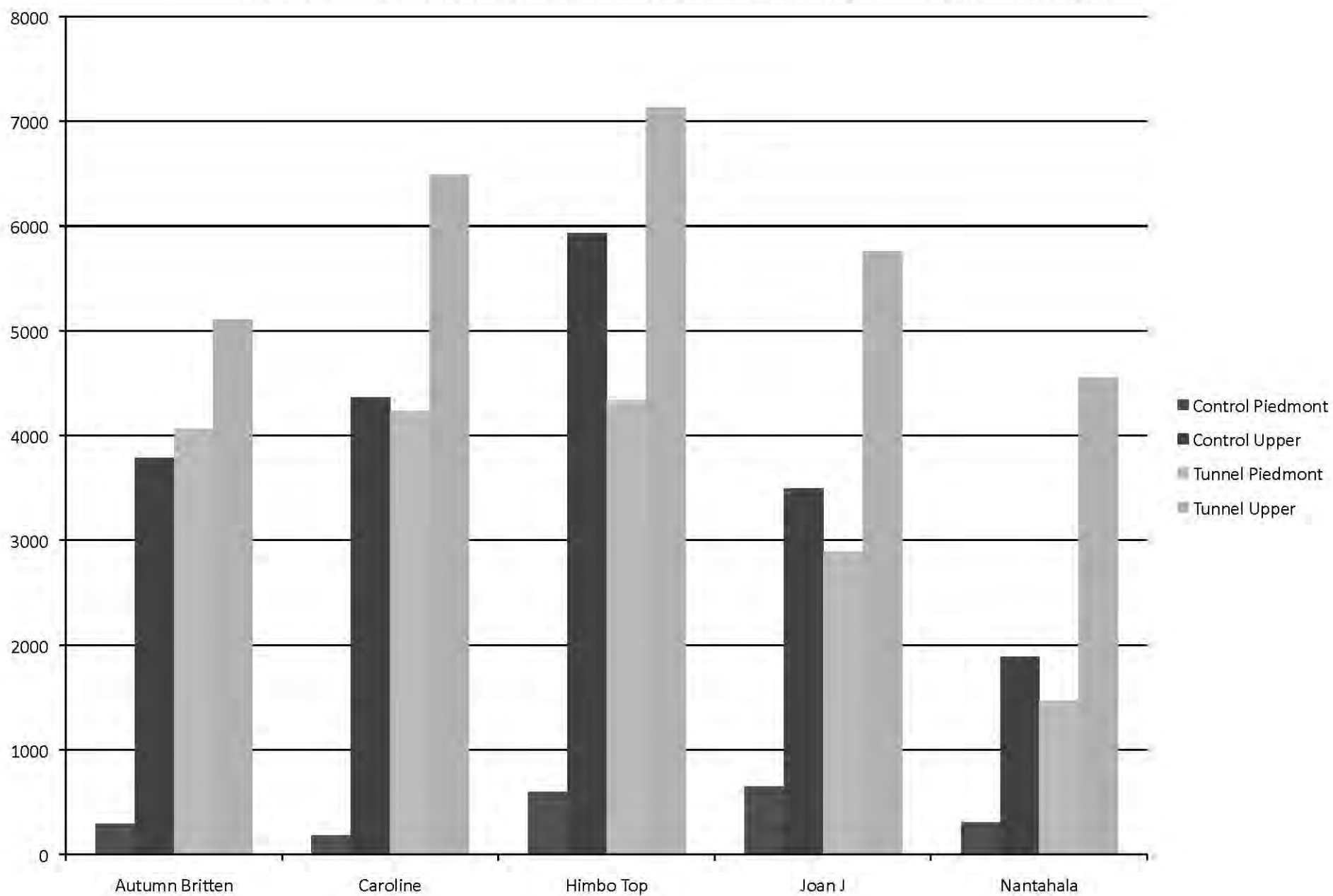
Piedmont Primocane Fruiting Raspberry Average Berry Weight (g) 2008-2010



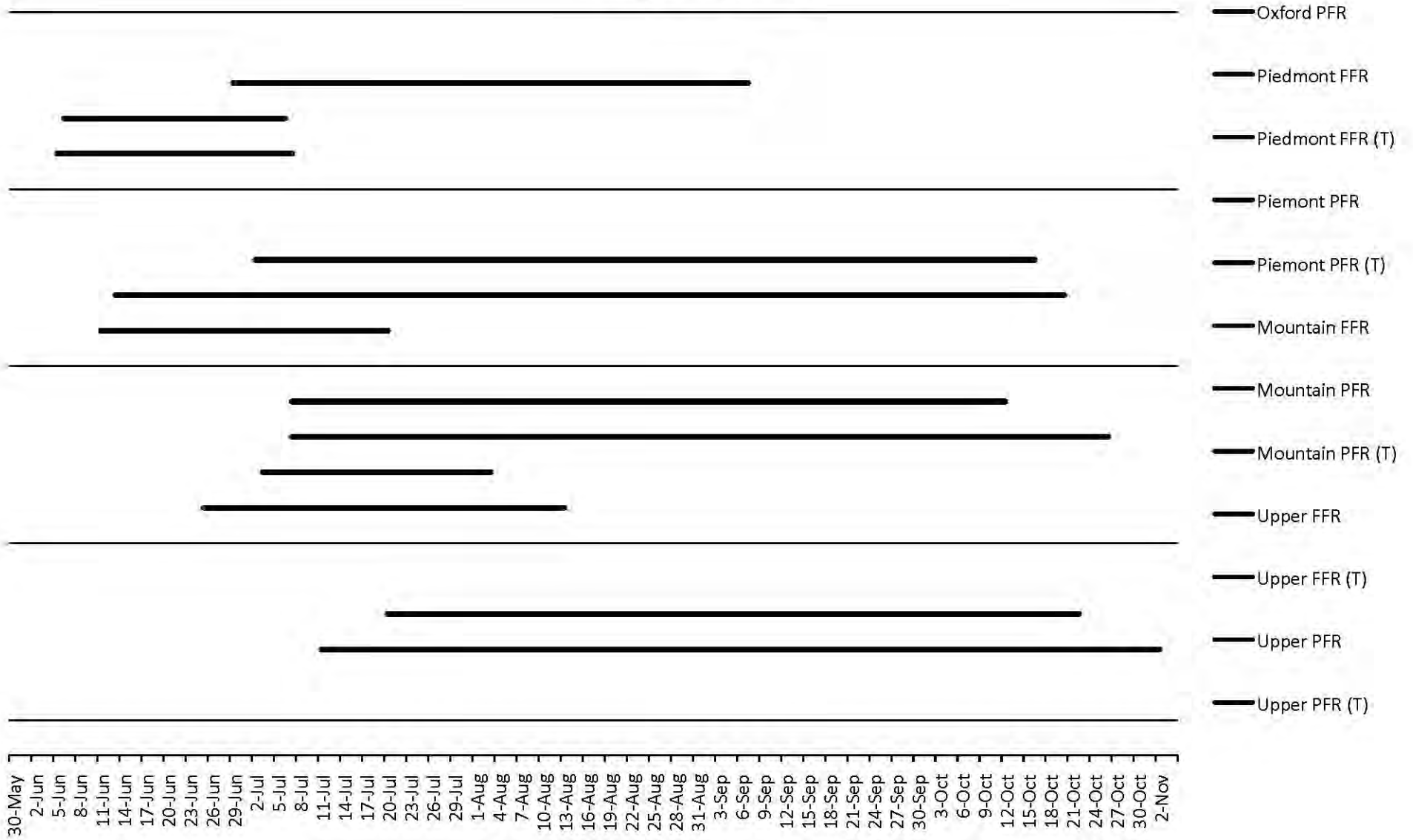
Piedmont Primocane Fruiting Raspberry Total Yield (g/plant) 2008-2010



Primocane fruiting raspberry second year marketable yield data at the Piedmont and Upper Mountain research stations by treatment



Harvest Season at four NC Research Stations (T=High Tunnel) Raspberry only



Post Harvest PF Raspberry

Ratings (1-5)

LOCATION	Cultivar	Ave berry wt (g)	Berry darkness	Berry shivel	Weight loss (%)	Moldy berries (%)	Leaky (%)	Soft (%)	OVERALL rating
OUTSIDE									
MR	HimboTop	2.9	1.9	1.2	1.7	27.5	53.4	63.5	-44.3
LS	A. Britten	4	2.4	1.4	2.5	37.5	44.3	51.6	-33.5
LS	HimboTop	4.2	1.9	1.4	2.3	26.7	47.9	57.9	-32.5
LS	Caroline	3.4	2.3	1.1	2.3	12.4	21.6	56.1	9.9
LS	Joan J	4.4	2.9	1.1	1.9	22	27.6	37.8	12.7
LS	Nantahala	3.4	1.9	1.2	1.7	16.8	21.2	35.9	26.1
LS	Nova	4.2	1.9	0.7	1.9	10	9.6	27.7	52.7
SALS	HimboTop	2.7	1.8	1.1	1.8	19.1	44.6	62.8	-26.5
TUNNEL									
LS	HimboTop	4.1	1.5	1.1	2.2	14.6	46.5	55.7	-16.8
LS	A. Britten	3.8	2.5	1.3	2	12.7	49.1	45.9	-7.8
LS	Caroline	2.8	2.8	1.2	1.1	23.4	25.9	53.2	-2.5
LS	Nantahala	4	1.9	1	0.9	30.7	13.1	51.4	4.8
LS	Joan J	4.5	2.4	1.3	1.9	10.2	33.5	46.4	10
MR	HimboTop	2.7	1.5	2.9	1.7	9.9	46	72.9	-28.7
MR	NC452	3.8	2.1	0.9	2.2	0	43.8	59.6	-3.4
MR	Nantahala	3.3	1.4	1	1.5	0	35.8	39	25.2
SALS	HimboTop	1.9	1.9	1.3	3.5	13.1	52.1	70.3	-35.5
SALS	Joan J	1.8	3	2.3	3.7	14.4	27.3	56.3	2

Overall rating is $100 - \text{sum}(\text{moldy} + \text{leaky} + \text{soft})$

Marketable rating is $100 - (\text{sum}(\text{moldy} + \text{leaky} + \text{soft})/3)$

Courtesy Dr. Penny Perkins-Veazie

PF raspberries and tunnels

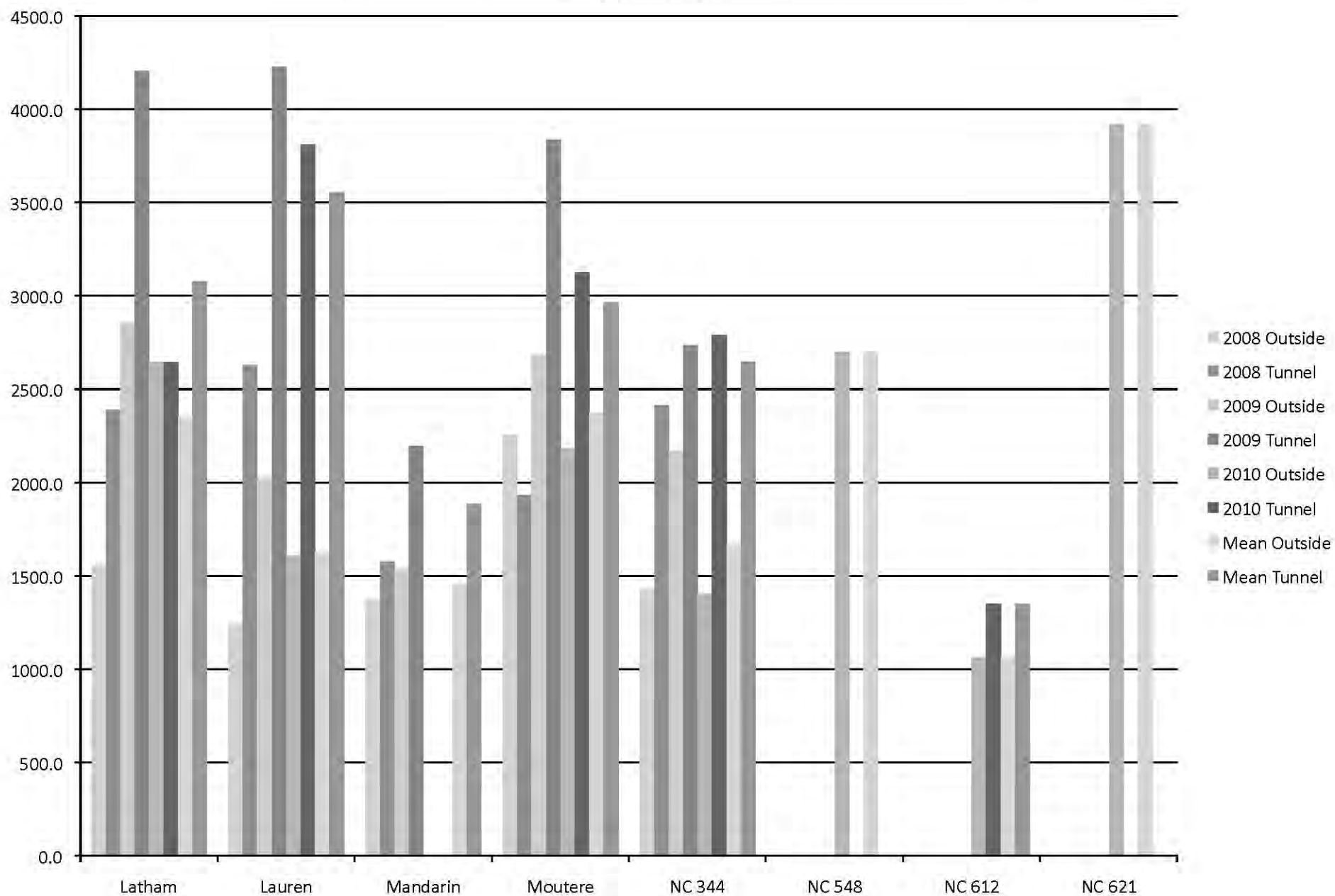
What works and not?

- Tunnels increase marketable yield
- 2nd year highest, then decline
- % marketable in tunnels higher than outside
- Yield bump, due to more berries, not bigger berries
- Tunnels extend season on both ends
- Autumn Britten, Joan J, Caroline and Himbo Top highest yields
- Caroline, Joan J, Nantahala and Nova best PH
 - tunnel effect unknown on specific cvs
 - Tunnel berries less decay and less leak

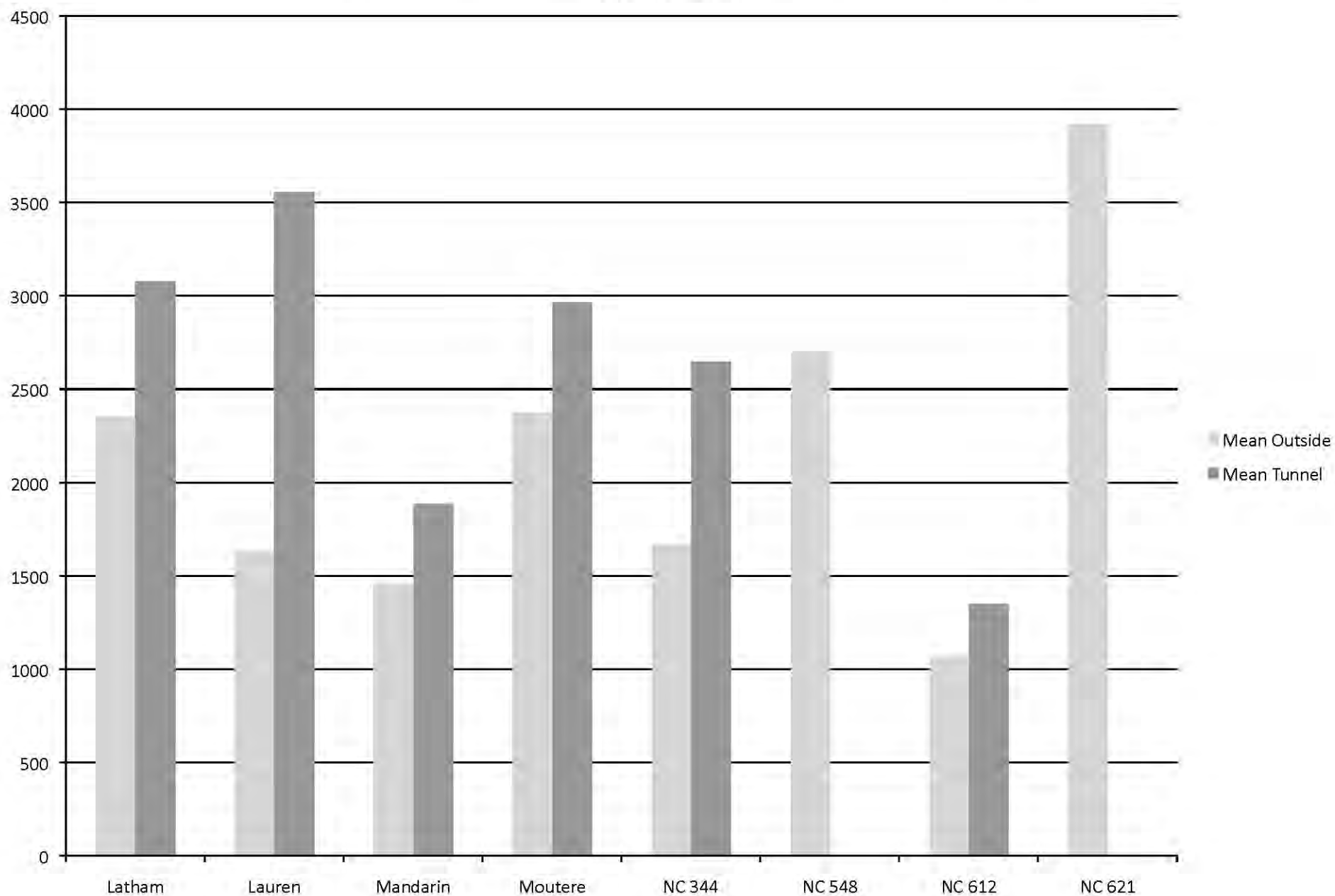
Floricanne-fruiting raspberries

- Canes live for 2 years, fruit produced in 2nd year
- Season is earlier than primocane fruiting types

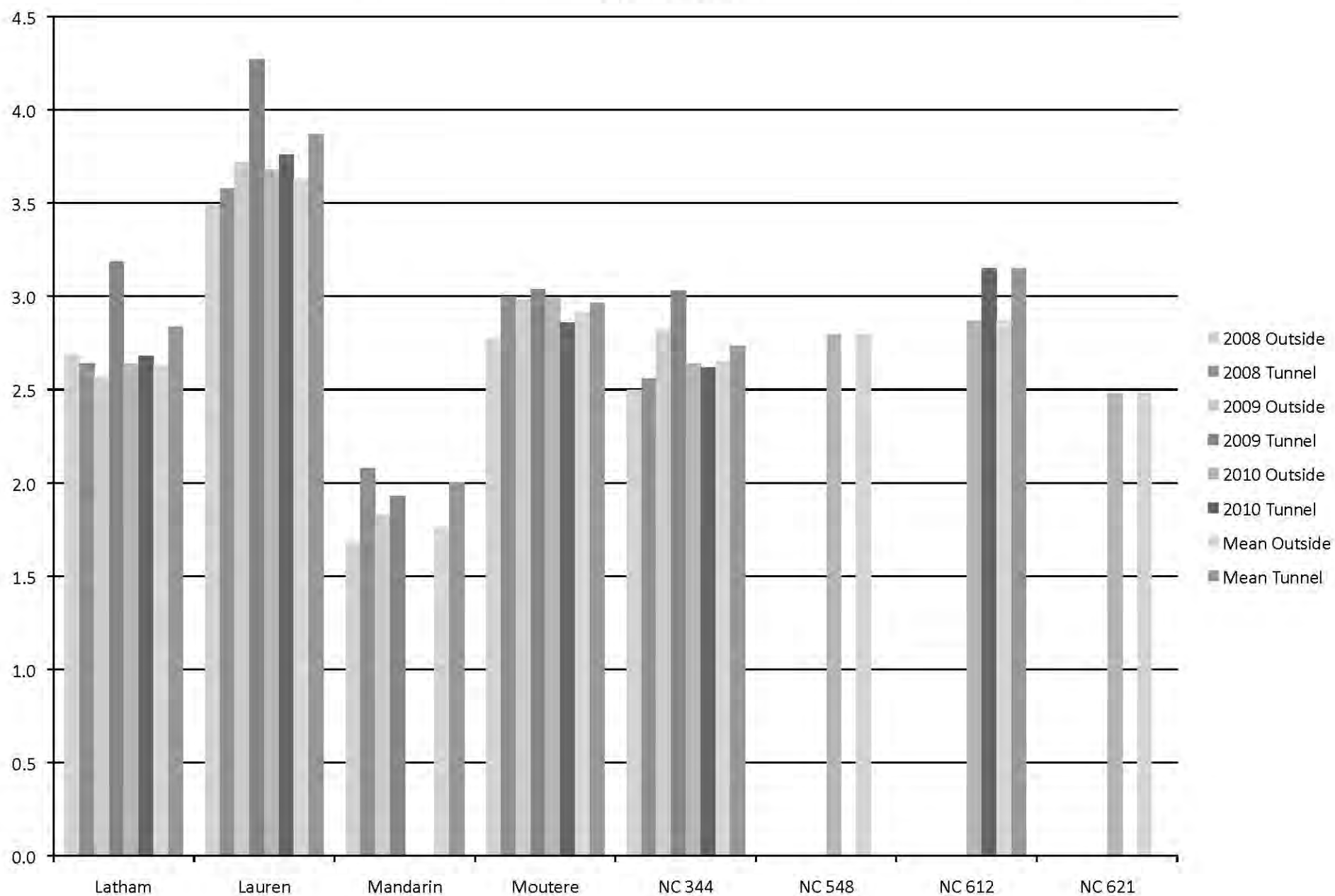
Piedmont Floricane Fruiting Raspberry Marketable Yield (g/plant) 2008-2010



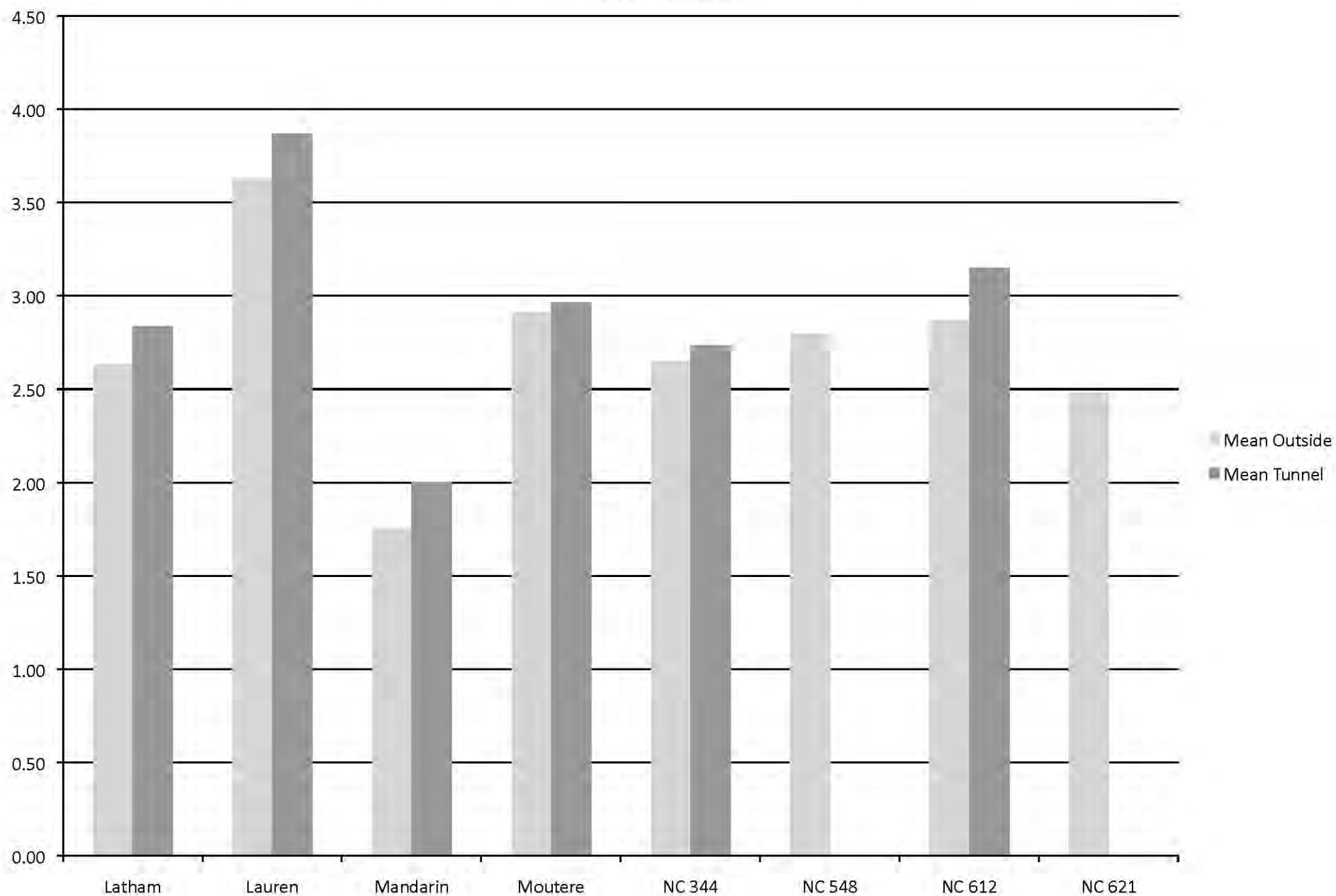
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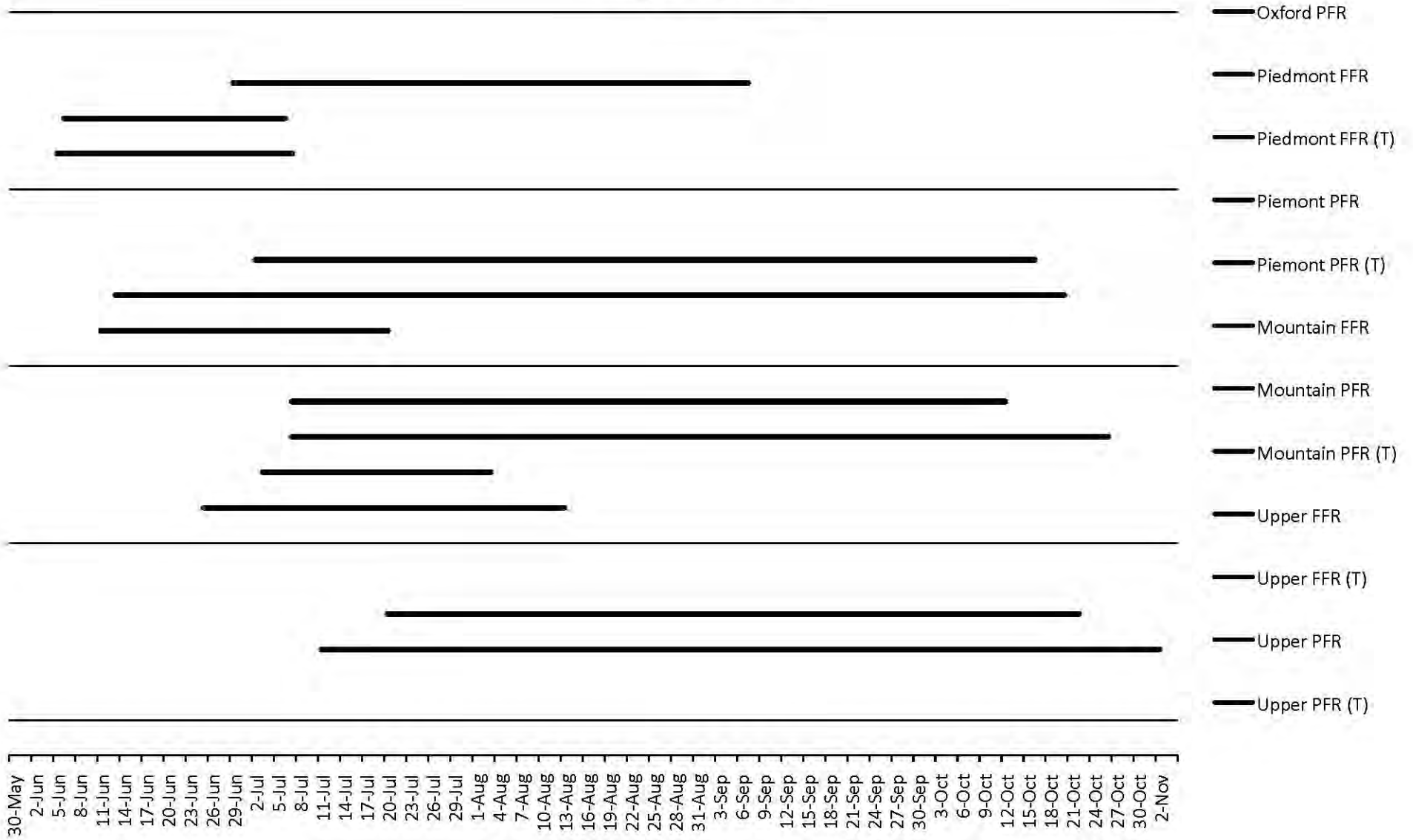
Piedmont Floricane Fruiting Raspberry Average Berry Weight (g) 2008-2010



Piedmont Floricane Fruiting Raspberry Average Berry Weight (g) 2008-2010



Harvest Season at four NC Research Stations (T=High Tunnel) Raspberry only



Post Harvest FF Raspberry

Ratings (1-5)

LOCATION	Cultivar	Ave berry wt (g)	Berry darkness	Berry shrivel	Weight loss (%)	Moldy berries (%)	Leaky (%)	Soft (%)	OVERALL rating
OUTSIDE									
SALS	Lauren	4	1.5	1.4	2.5	24.3	40.4	53.4	-18.1
SALS	NC605	2.9	2.4	1	2.4	23.6	28.7	49.3	-1.6
SALS	Moutere	2.9	1.7	2.3	2.3	10.2	30	39.4	20.5
SALS	NC621	3.1	0.6	2.8	4.5	2.6	21.9	52.1	23.5
SALS	NC638	3	1.3	0.9	3	16.8	18	32	33.2
SALS	NC548	3.3	1.7	1.1	2.2	18.3	12.2	30.2	39.3
TUNNEL									
SALS	Latham	2.8	2.1	1.5	2.7	9.8	29.4	53.2	7.7
SALS	NC344	3.1	1.9	2.8	2.6	19.1	23.9	31.9	25
SALS	NC612	2	2.5	2	4.4	15.7	21.7	51.4	11.2

Overall rating is $100 - \text{sum}(\text{moldy} + \text{leaky} + \text{soft})$

Marketable rating is $100 - (\text{sum}(\text{moldy} + \text{leaky} + \text{soft})/3)$

Courtesy Dr. Penny Perkins-Veazie

Floricanne Fruiting raspberries

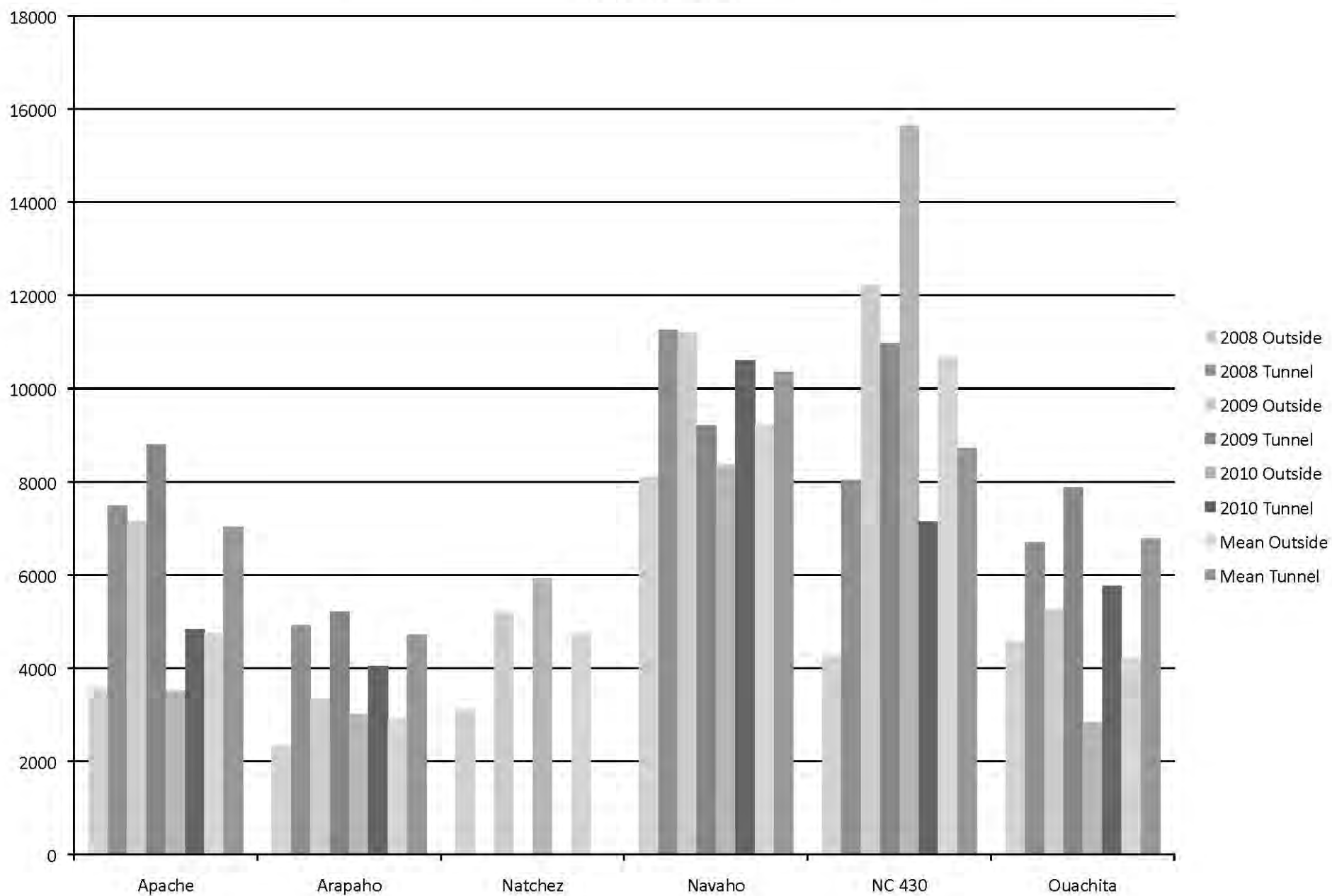
What works and not?

- Tunnels increase yield
- Berry weight “no difference”
- Yield bump do to more berries
- Moutere, Latham, NC 344, NC 612, NC 638, NC 548 best PH
 - tunnel effect unknown on specific cvs
 - Tunnel berries less decay and less leak
- Moutere, Latham, NC 621, NC 344 highest yields

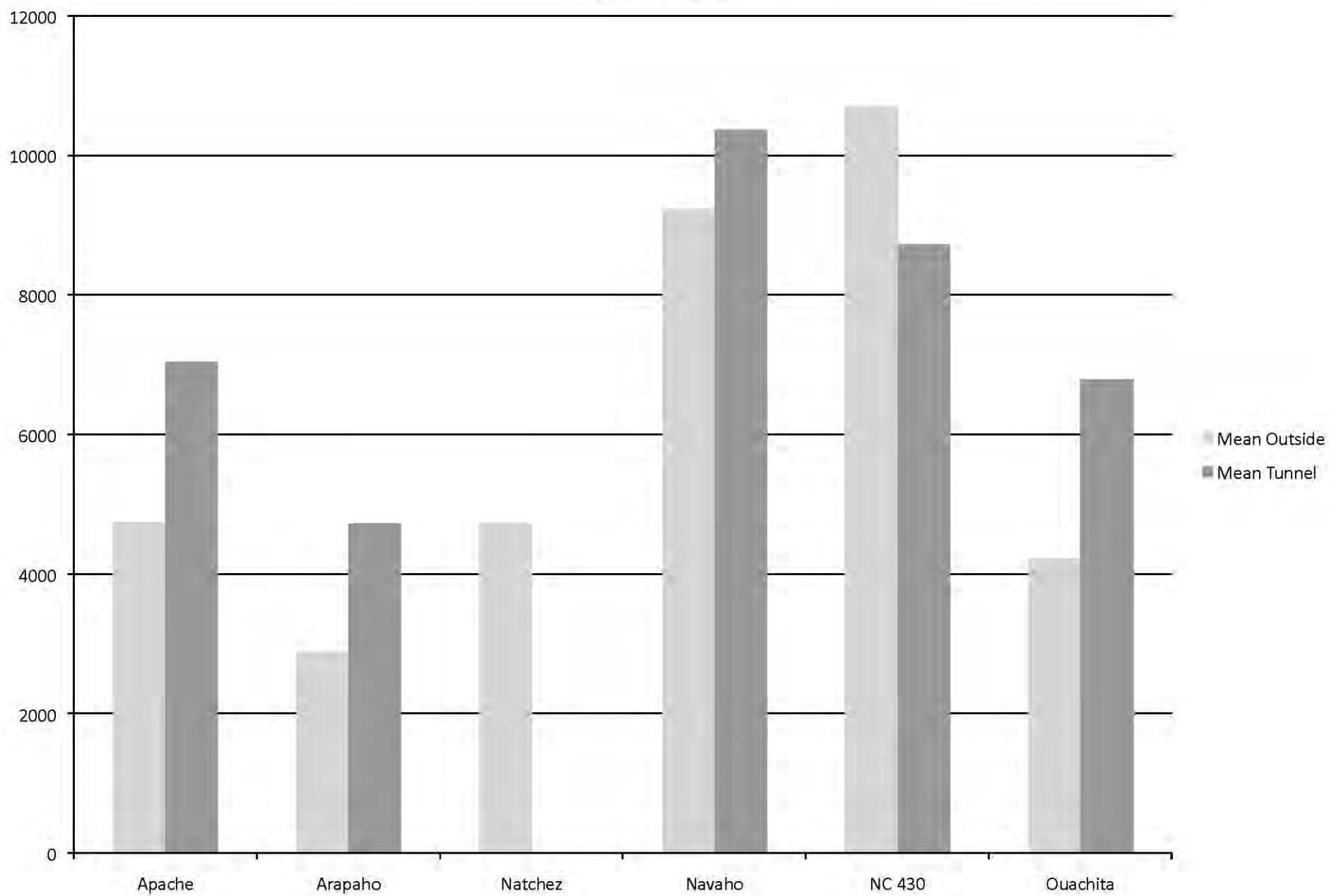
Blackberry



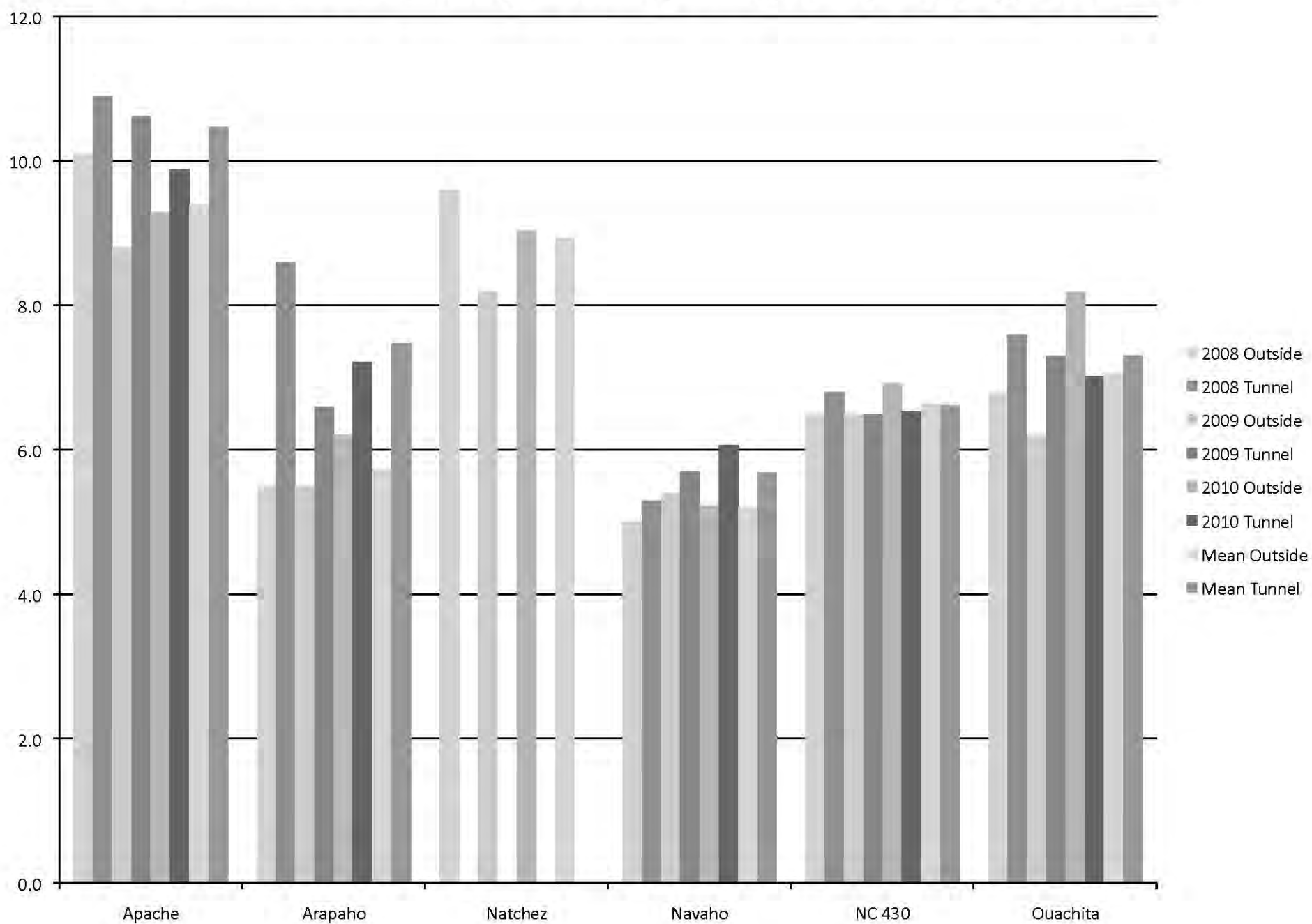
Piedmont Floricane Fruiting Blackberry Marketable Yield (g/plant) 2008-2010



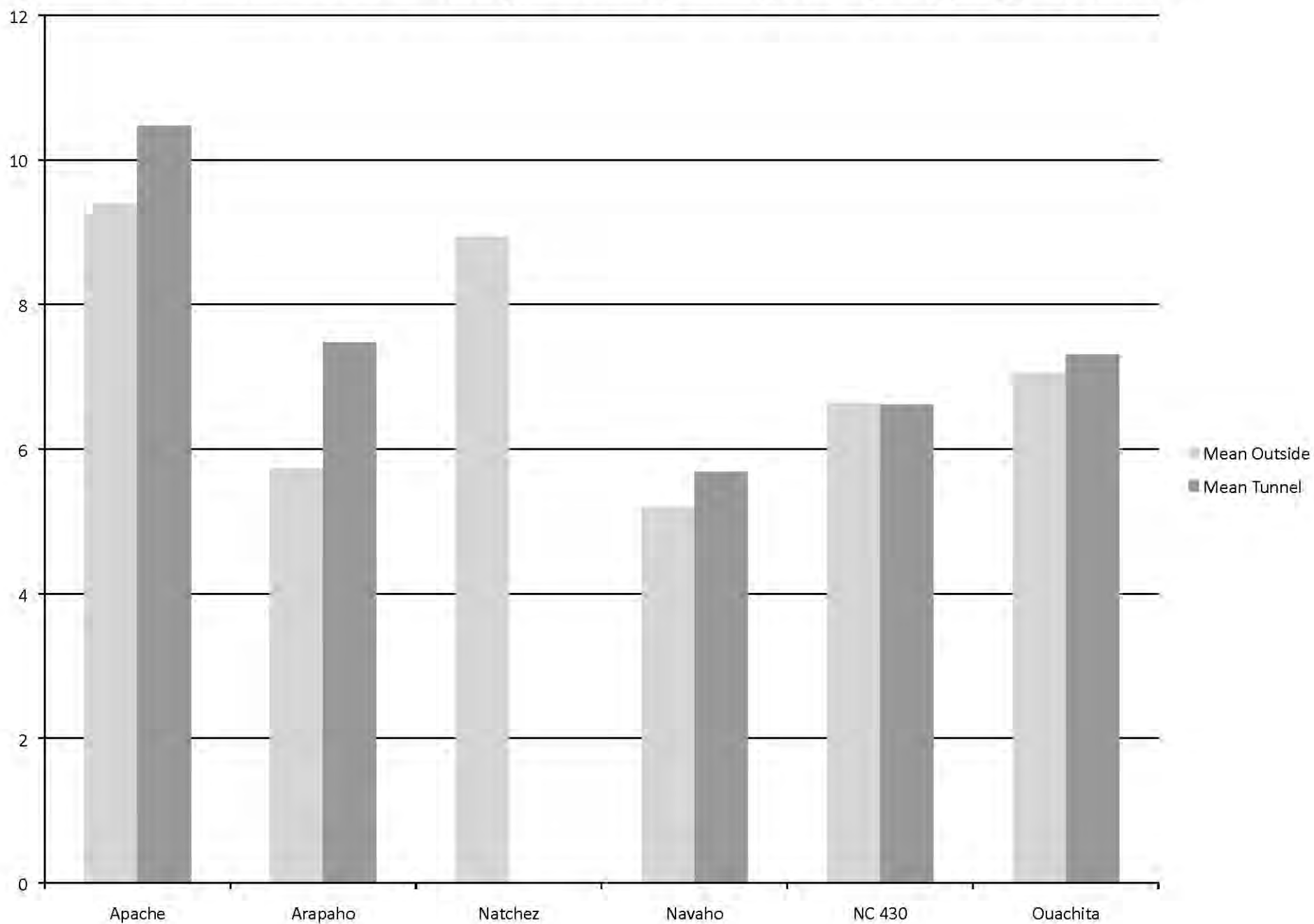
Piedmont Floricane Fruiting Blackberry Marketable Yield (g/plant) 2008-2010



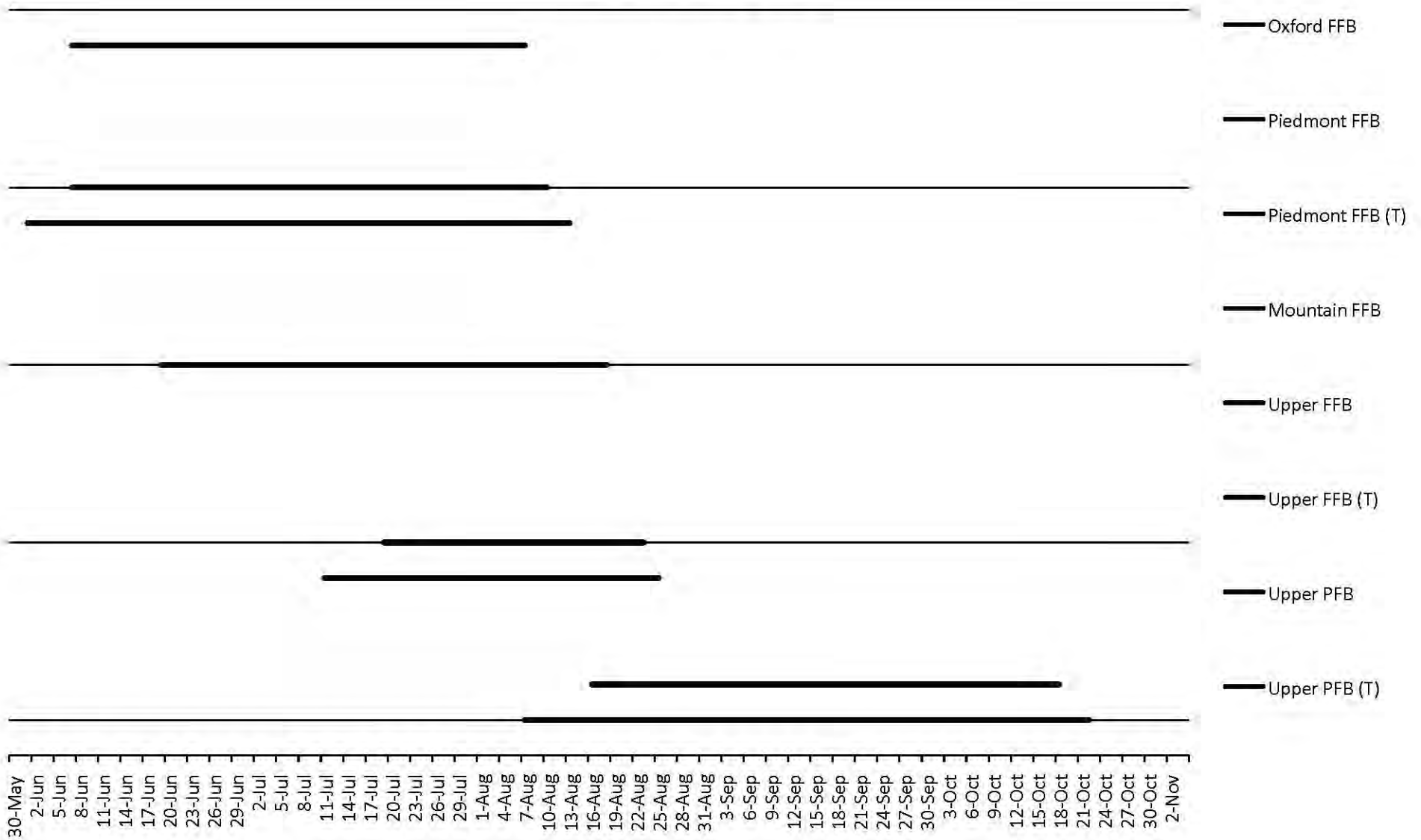
Piedmont Floricane Fruiting Blackberry Average Berry Weight (g) 2008-2010



Piedmont Floricane Fruiting Blackberry Average Berry Weight (g) 2008-2010



Harvest Season at four NC Research Stations (T=High Tunnel) Blackberry only



Blackberry Post Harvest

Cultivar	percent berries				Rating	Marketable
	Moldy	Leaky	Soft (4,5)	Red drupe	Overall	
Carolina	4.2	66.2	23.2	25.7	6.4	68.8
Chester						
Thornless	8.1	44.1	24.8	11.6	23	74.3
Apache	5.7	37.9	23.6	7.9	32.8	77.6
Black Diamond	1.9	31.3	13.4	14.5	53.4	84.5
Tupy	4.7	24.8	11.4	10.5	59	86.4
Navaho	2	13.8	15.4	5.7	68.8	89.6
NC430	3.1	12.8	12.4	12.1	71.7	90.6
Ouachita	4.1	15	7.4	7.7	73.4	91.2
Natchez	0.8	7.3	4.4	17.2	87.5	95.8
Arapaho	0.5	10	0	4.1	89.5	96.5

Overall rating is $100 - \text{sum}(\text{moldy} + \text{leaky} + \text{soft})$

Marketable rating is $100 - (\text{sum}(\text{moldy} + \text{leaky} + \text{soft})/3)$

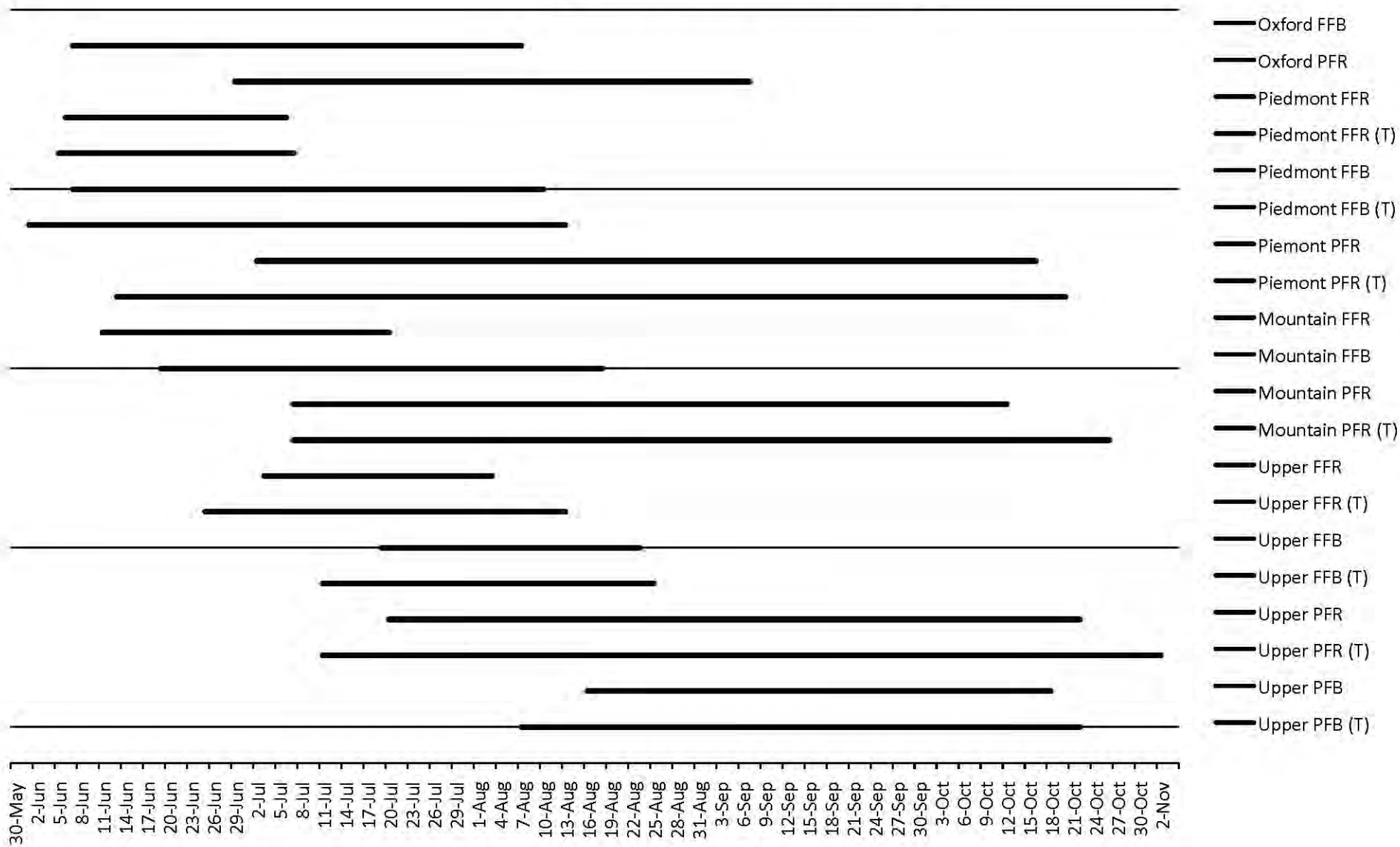
Courtesy Dr. Penny Perkins-Veazie

Blackberries

What works and not?

- Tunnels sometimes increase yield
- Berry weight no difference?
- Season extension slightly earlier?
- PH tunnel effect ?
- Navaho, NC 430, Ouachita, Natchez, Arapaho, overall best PH
- Tunnel berries lower overall than outside (data not shown)

Harvest Season at four NC Research Stations (T=High Tunnel) all Raspberries and Blackberries



When it rains...we pick



Caneberry Resources

- NC Market Ready Blackberry/Raspberry Portal
 - <http://www.ncsu.edu/enterprises/blackberries-raspberries>
- SRSFC website www.smallfruits.org
 - 2008 Southeast Regional Guides (IPM and Production Guides)
 - Newsletters (home/smallfruitnews)
- Berry Diagnostic Tool- Google
 - http://www.ncsu.edu/project/berries/diagnostic_tool/blackberry_diagnostic_tool.html
- Raspberry and Blackberry Production Guide (NRAES)
- County agents, State Extension Specialists

Thanks!



Silver shade



- Temperatures
 - Max temps higher
 - Get warmer sooner
- Light levels ($\mu\text{mol m}^{-2}\text{s}^{-1}$)
 - Plastic only: 930
 - 30% and plastic: 630
 - 40% and plastic: 429
 - Outside: 1504