

# Performance of Fire Blight– Resistant Pears

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**Advent of the Ironclads?**

# Pear Challenges:

1. European varieties are fire blight susceptible
2. Large, non-precocious trees
  - Blight susceptible seedling rootstocks
  - “Plant pears for your heirs”.

# Fire Blight

- ▶ Devastating disease of pear
- ▶ Contributor to declines in eastern US pear acreage
- ▶ 1 control option: strep
- ▶ High risk crop



# Fire Blight Resistant Varieties

- ▶ New blight resistant varieties available
  - USDA breeding program at Kearneysville, WV,
  - Canadian breeding program at Vineland.
- ▶ Fruit maturity range: August – October
  - Reported to be dessert quality
  - Winter varieties reported to store well
- ▶ Performance in Pennsylvania?

# Varieties in Trial:

	Variety	Blight resistance	No. of trees
1.	Anjou	no	15
2.	Bartlett	no	20
3.	Harrow Sweet	yes	14
4.	Sunrise	yes	15
5.	Blakes Pride	yes	15
6.	Magness	yes	12
7.	Gem	yes	10
8.	Harrow Delight	yes	14
9.	US84907-069	yes	15
10.	Shenandoah	yes	18
11.	US84907-166	yes	15
12.	US84909-391	yes	15
13.	Potomac	yes	15

# Pear Rootstock and Spacing:

- ▶ OHxF 87: best all-around pear rootstock in Pacific Northwest trials:
  - Some tree size control
  - Good precocity
  - Total yield, fruit size
  - Freedom from suckering
  - Resistant to fire blight.
- ▶ WSU Extension recommends 6' x 14' spacing

# NY Pear Rootstock & System Trials

## W. NY trials:

- ▶ Pears successfully managed in intensive plantings
- ▶ Smaller trees at close spacing than at wide spacing
- ▶ Tree densities: 518, 908, or 2178 trees / A
- ▶ OHxF 87 again among best rootstocks in trials.

# Pear Systems

- ▶ Similar growth habit to apple
  - Strong apical dominance
  - Upright branch angles
- ▶ Adapts well to cone shaped canopy
  - Central leader/ vertical axis/ spindle
  - Limb spreading beneficial
- ▶ Two systems demonstrated:



# Vertical Axis

- ▶ Spacing: 6' x 14'
  - 518 TPA
- ▶ Familiar: same tree training as apple
- ▶ Moderate size control:
  - rootstock,
  - early cropping



# Bi Axis

- ▶ Spacing: 4' x 12'
  - 908 TPA
- ▶ Two leaders per tree
- ▶ Easy to create a narrow tree wall
- ▶ Size control from
  - Rootstock
  - Early cropping
  - Splits vigor / 2 leaders
  - Close spacing



# Objectives:

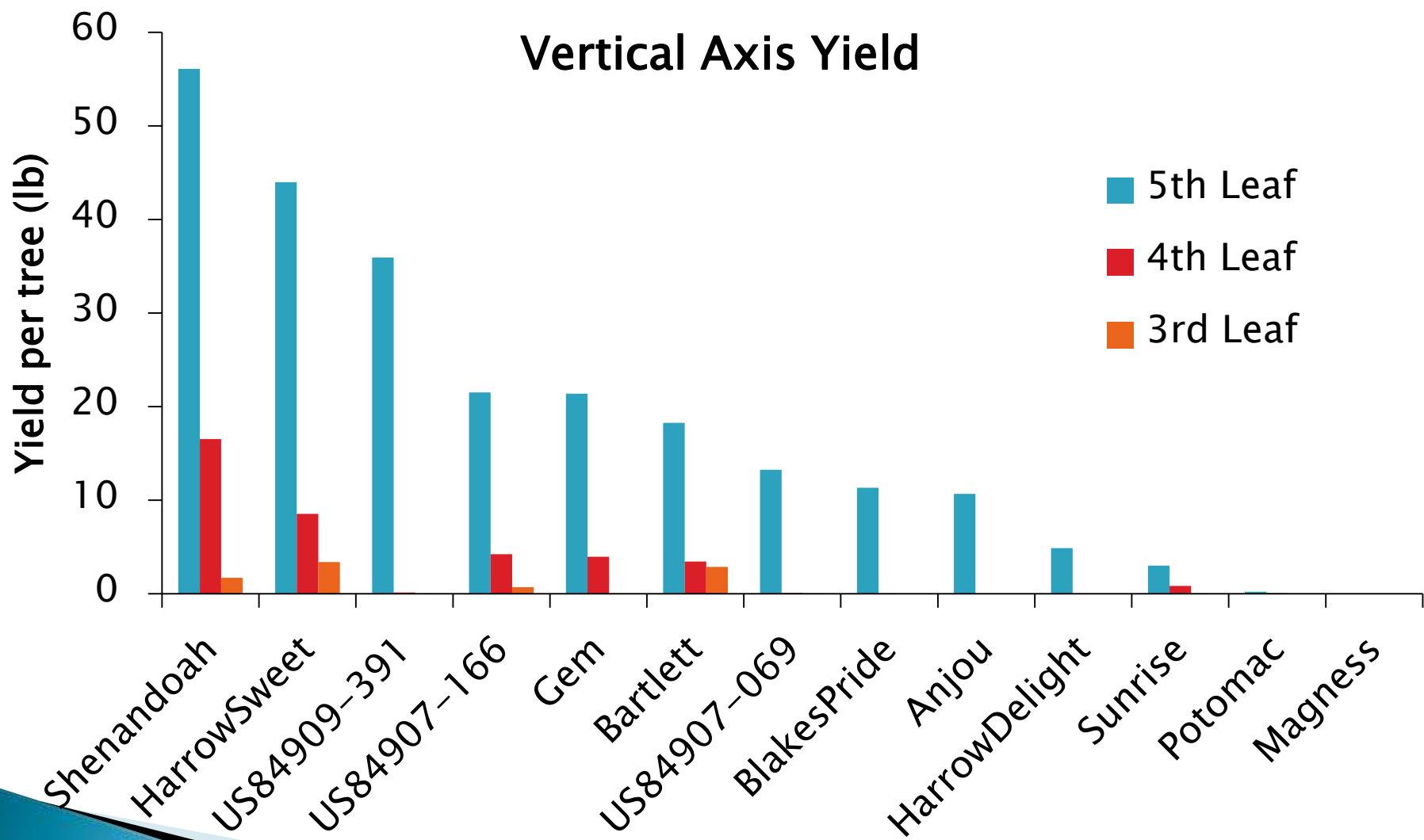
1. Demonstrate feasibility of intensive pear production
  - Vertical axis at 6' x 14' (518 trees / A)
  - Bi axis at 4' x 12' (908 trees / A)
  - Simple 4-wire vertical trellis is used for both systems.
2. Assess survival, precocity, yield, fruit quality and fruit size of 11 fire blight resistant pear varieties
  - On FB-resistant & semi-dwarf OHxF 87
  - Compared to fresh market standards: Bartlett, Anjou
  - Sensory panel, chemical and physical analysis.



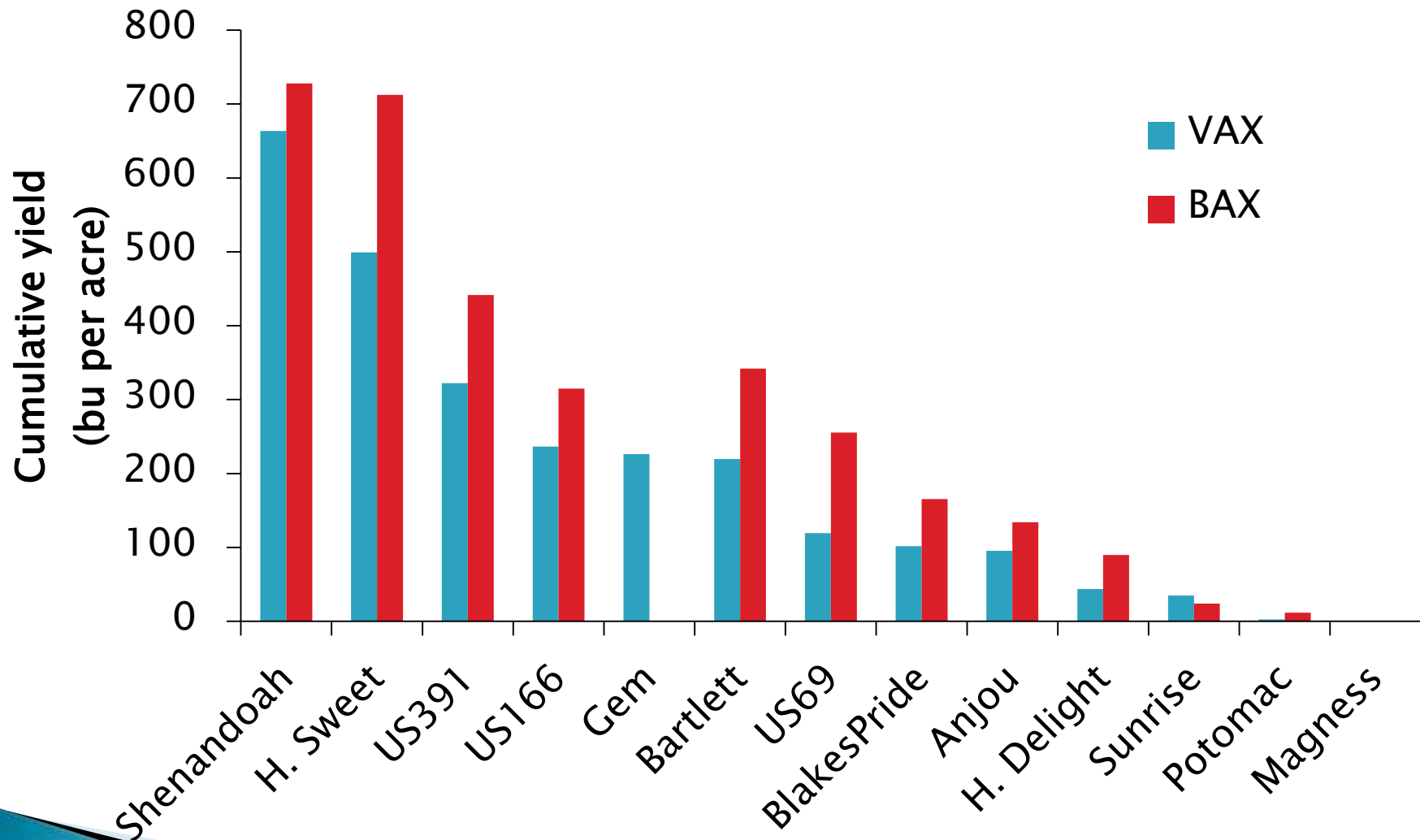
2011 Pear Variety  
Trial at FREC  
OHxF87 Rootstock  
6' x 14' spacing  
4' x 12' spacing  
4-wire trellis



# Yield / Tree



# Cumulative Yield:







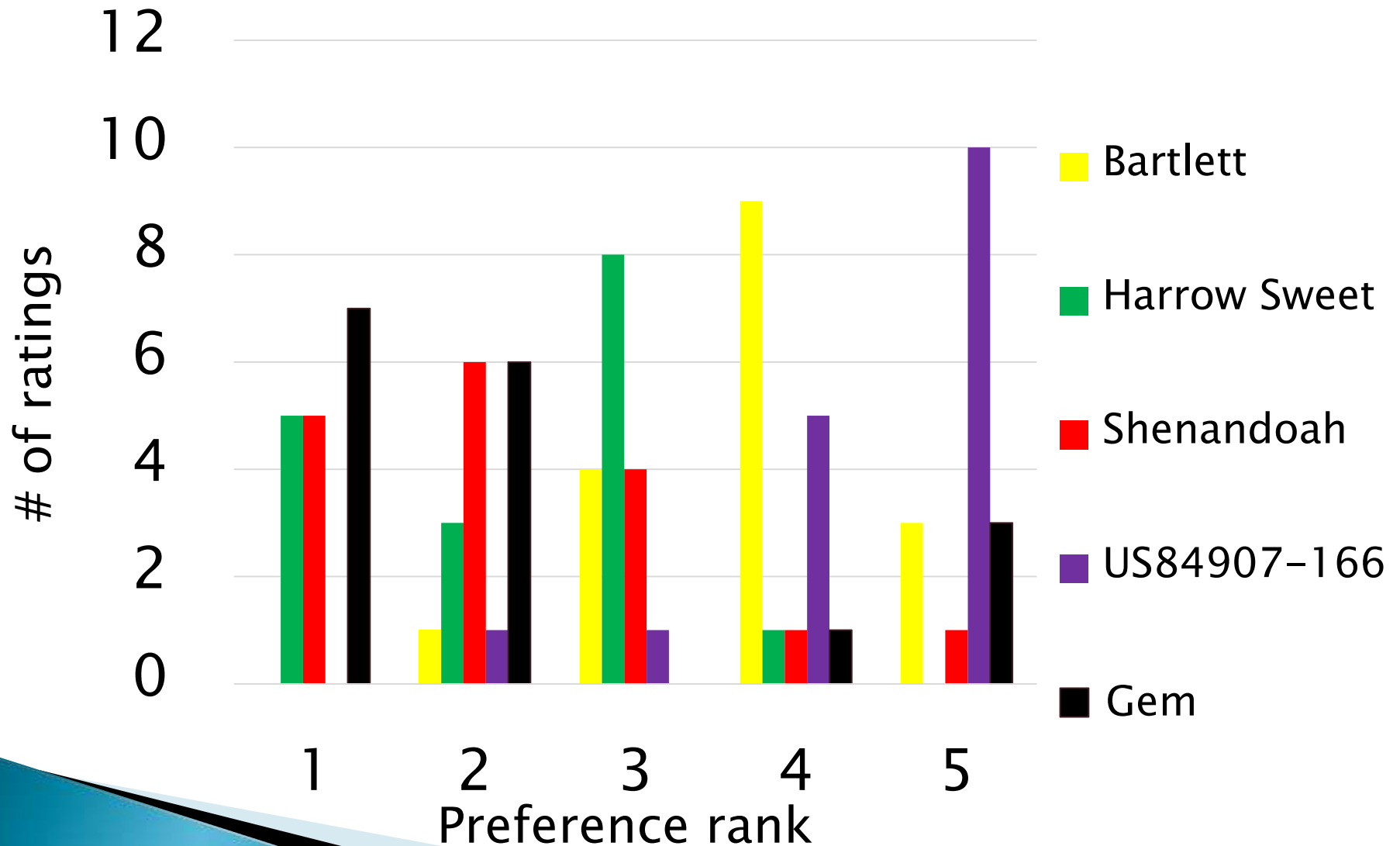
Volunteers evaluating pears.

## 4th Leaf Sampling

- 5 varieties yielded enough to test
- Fruits harvested at maturity and held in cold storage before evaluation
- Physical and chemical characteristics were measured
- Sensory Panel



# 4<sup>th</sup> Leaf Preference Ranking



## 4<sup>th</sup> Leaf Taste Panel Ratings

Likert Scale 1 = dislike extremely, 9 = like extremely

Variety	Visual Appearance	Texture	Flavor
US84907-166	6.7	5.4	4.4
Shenandoah	7.0	7.2	6.3
Harrow Sweet	4.6	7.3	7.8
Bartlett	6.1	5.6	5.9
Gem	7.1	6.6	7.4

## Chemical Characteristics

Cultivar	Sol. Solids		
	(% Brix)	pH	% Malic Acid
Bartlett	12.7	3.85	0.32
Blakes Pride	11.4	3.76	0.28
<b>Gem</b>	<b>16.2</b>	<b>3.88</b>	<b>0.34</b>
Harrow Sweet	16.0	4.03	0.30
<b>Shenandoah</b>	<b>15.0</b>	<b>3.41</b>	<b>0.68</b>
Sunrise	12.0	4.03	0.26
US84907-069	11.8	4.32	0.16
US84907-166	11.1	3.86	0.30
<b>US84909-391</b>	<b>16.6</b>	<b>3.85</b>	<b>0.35</b>

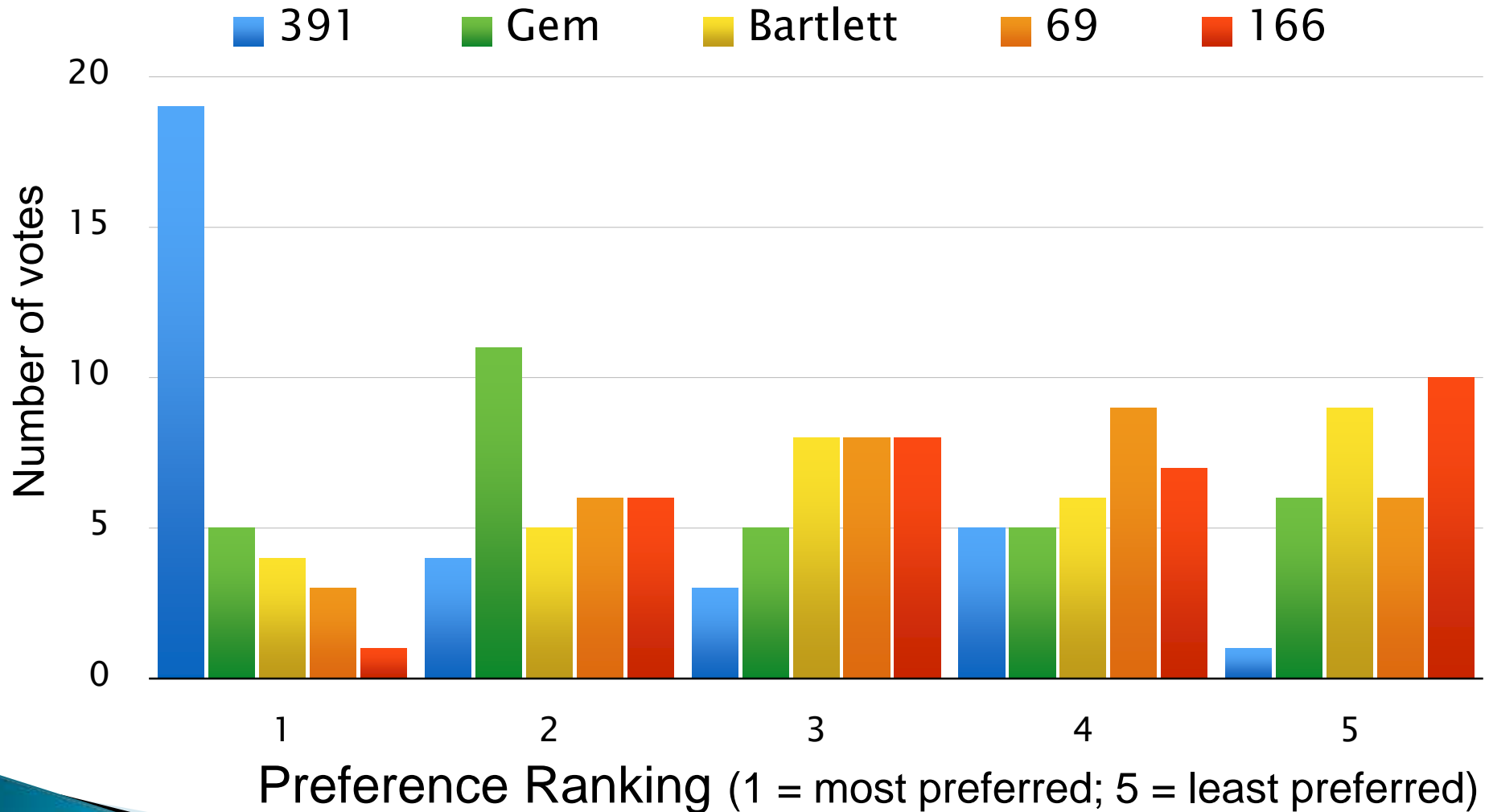
# 4th Leaf Conclusions

- Harrow Sweet and Gem scored well in flavor
- Harrow Sweet and Shenandoah scored well in texture
- 166 was ranked least preferred by 10 of 18 taste panelists
- Shenandoah, 166, and Gem had good visual appearance ratings, while Harrow Sweet did not

# 5th Leaf Sampling

- ▶ 11 varieties produced enough fruit for sensory evaluation
- ▶ Fruits were harvested at maturity and held in cold storage before evaluation
- ▶ Physical and chemical characteristics were measured
- ▶ The pears were evaluated in two tastings. Early pears were tasted first, then later pears. Bartlett in both flights.
- ▶ Sensory panel.

# Early Tasting, 5<sup>th</sup> Leaf

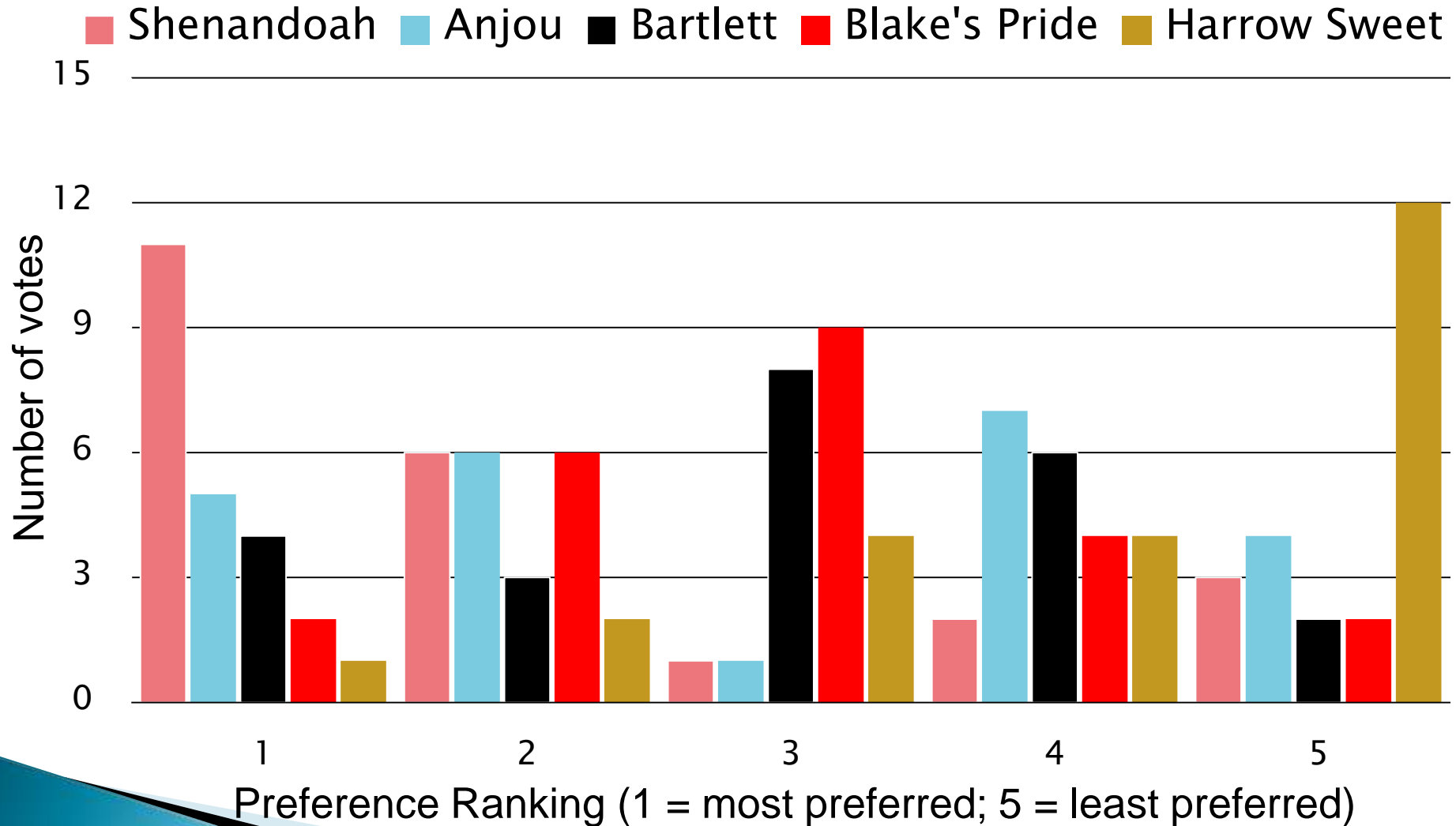


# 5<sup>th</sup> Leaf Tasting Evaluations

Likert Scale 1 = dislike extremely, 9 = like extremely

Cultivar	Visual	Texture	Flavor Intensity	Flavor Balance	Juiciness
391	7.4	6.6	7.3	7.2	7.4
Gem	8.1	6.7	6.4	6.6	6.2
Bartlett	7.1	6.3	5.6	5.7	5.4
69	7.0	5.9	5.8	5.8	5.9
166	7.0	5.8	5.0	4.9	5.0

# Late Tasting, 5<sup>th</sup> Leaf





# 5<sup>th</sup> Leaf Tasting Evaluations

Likert Scale 1 = dislike extremely, 9 = like extremely

Cultivar	Visual	Texture	Flavor Intensity	Flavor Balance	Juiciness
Shenandoah	8.0	6.9	7.3	6.5	7.6
Anjou	5.9	5.6	6.1	6.2	6.6
Bartlett	6.8	6.9	6.3	6.7	6.0
Blake's Pride	7.0	6.2	6.3	6.3	6.0
Harrow Sweet	7.2	5.4	5.2	5.2	4.0

# Chemical Characteristics

Cultivar	Soluble Solids (Brix %)	pH	Malic Acid (%)
Shenandoah	14.2	3.52	0.59
Anjou	14.6	3.81	0.27
BlakesPride	13.4	3.88	0.22
166	12.4	3.78	0.22
Bartlett	13.0	3.74	0.30
Gem	15.5	4.03	0.22
69	13.1	4.03	0.17
Potomac	16.4	3.46	0.53
HarrowSweet	15.9	4.05	0.20
HarrowDelight			
Sunrise	14.6	3.81	0.24
391	15.2	3.93	0.24



391 scored well in the early tasting.



Gem scored highest in visual appearance and was one of the highest ranking early pears.

## ► Shenandoah

- Largest pear
- “Juiciest”
- Most intensely flavored
- Highest malic acid
- Most highly preferred in late tasting







# Conclusions

- Several of the fire blight resistant pears ranked higher than Bartlett
- US84909-391 was ranked 1<sup>st</sup> in preference among the early ripening pears based on its flavor and juiciness
- Gem scored highest in visual appearance and was among the most preferred both years
- Shenandoah ranked highest in the 2<sup>nd</sup> tasting and had among the highest scores of all the pears
- Fire blight resistant pears show great promise for revitalizing the Eastern pear industry

## *Impacts:*

- ▶ Pennsylvania fruit growers should plant high quality, blight resistant pear varieties
  - On OHxF 87 rootstock, and in
  - Intensive production systems.
- ▶ We can re-establish European pears as a profitable crop
  - Contributing to diversity of fruit crops offered for sale to local consumers.

*Thank You!*

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