



# 2023 HQG Brewing Trial Results

8/18/23

## Goal of Brewing Trials (3rd year!)

To identify hop varieties that express desirable and unique flavor attributes in beer, along with positive analytical and agronomic metrics.

# Testing Details



- May 8th at CBC Nashville
- Partnered with BA
- Sample Ox
- 8 Advanced lines
  - Supply Chain Meetup
  - 113 avg tasters per sample
  - Liking + CATA
- 4 Elite Lines
  - Quality Meetup
  - 94 avg tasters per sample
  - Liking + CATA

9 pt Liking Scale		NPS Category
9	Like Extremely	Promoters
8	Like Very Much	
7	Like Moderately	
6	Like Slightly	Passives
5	Neither Like or Dislike	
4	Dislike Slightly	Detractors
3	Dislike Moderately	
2	Dislike Very Much	
1	Dislike Extremely	

FLAVORS
Stone Fruit
Herbal
Vegetal
Citrus
Apple/Pear
Berry/Currant
Floral
Melon
Grassy
Spicy
Woody
Sweet Aromatic
Tropical

# Sample Key

Crop Year	Hop	Status	Brewery	Cup Sticker	Color
2022	HQ2015004-002	Advanced	Firestone Walker	Red	
2022	HQ2015004-006	Advanced	Firestone Walker	Green	
2022	HQ2015024-001	Advanced	Firestone Walker	Blue	
2022	HQ2015024-002	Advanced	Firestone Walker	Pink	
2022	HQ2015025-008	Advanced	Firestone Walker	Yellow	
2022	HQ2015027-001	Advanced	Firestone Walker	Black	
2022	HQ2015035-039	Advanced	Firestone Walker	Orange	
2022	HQ2015025-028	Advanced	Firestone Walker	Purple	



Thank you  
Firestone!

WC IPA

95% Rahr 2-row, 5% Cara-Pils

149F 45 min, 159F 30min, 168F Mash out

CTZ Boil Start

OG: 14.5 FG: 2.3p at dry hop

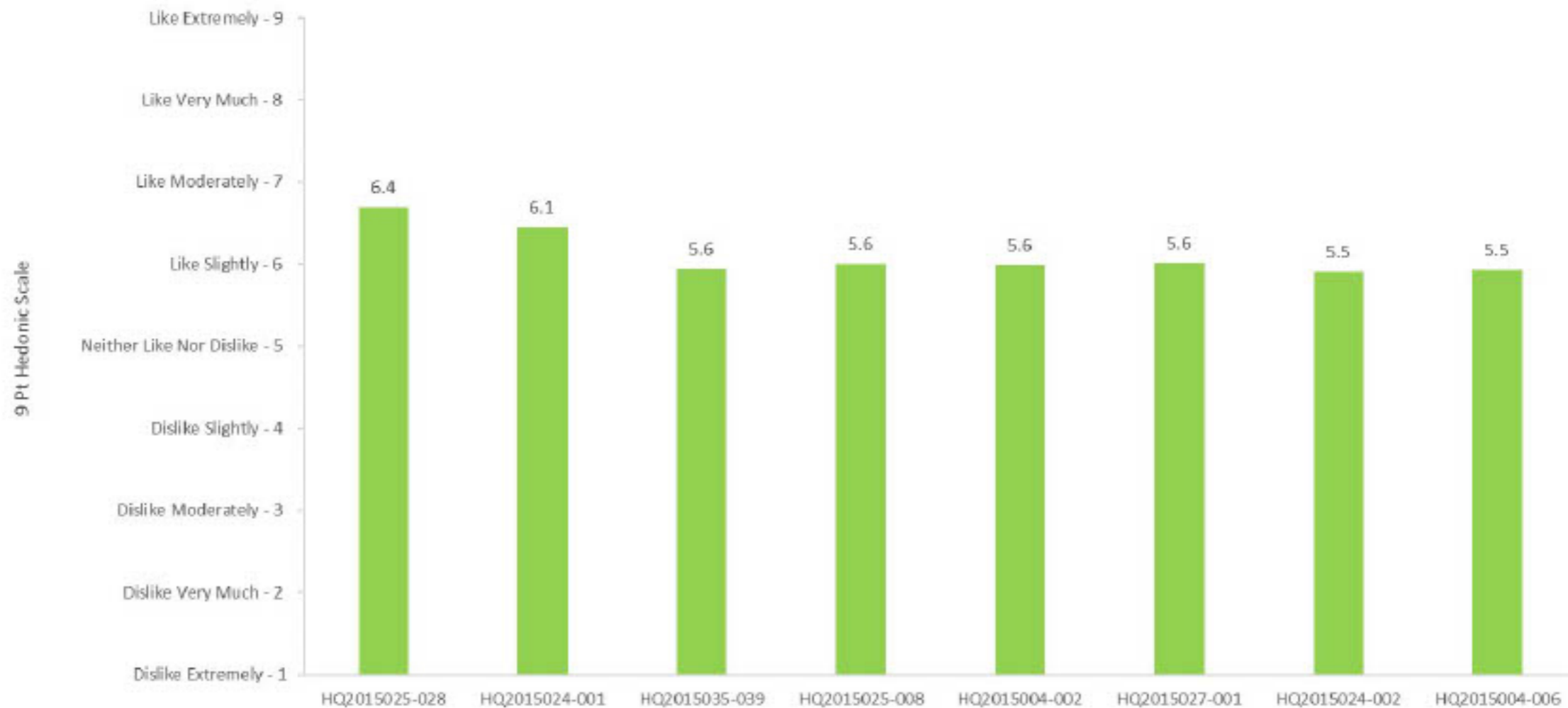
2#/bbl dry hop

# Advanced Results



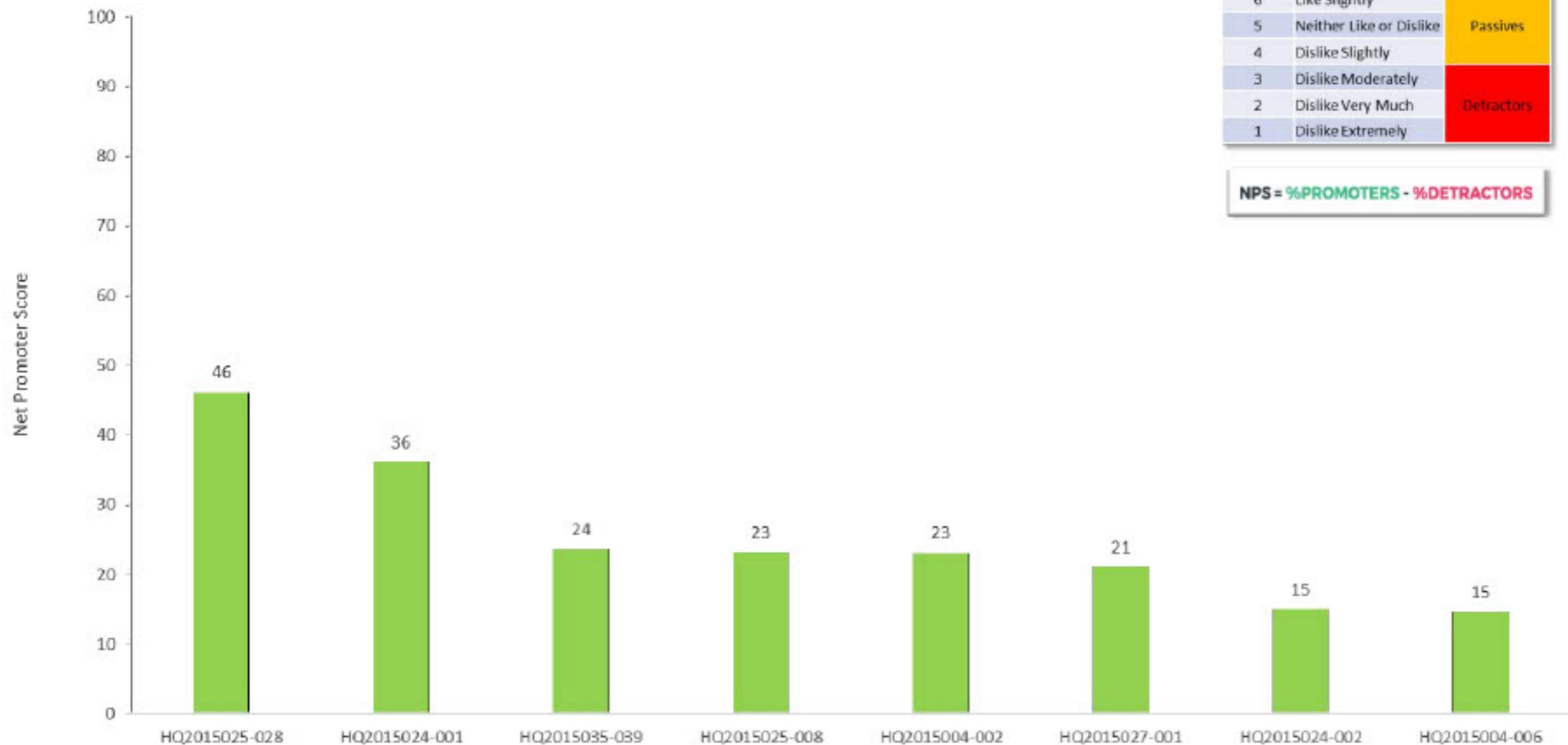
Pull up app to  
see your results!

## Overall Liking



# Advanced Results

## Net Promoter Score



9 pt Liking Scale		NPS Category
9	Like Extremely	Promoters
8	Like Very Much	
7	Like Moderately	
6	Like Slightly	Passives
5	Neither Like or Dislike	
4	Dislike Slightly	Detractors
3	Dislike Moderately	
2	Dislike Very Much	
1	Dislike Extremely	

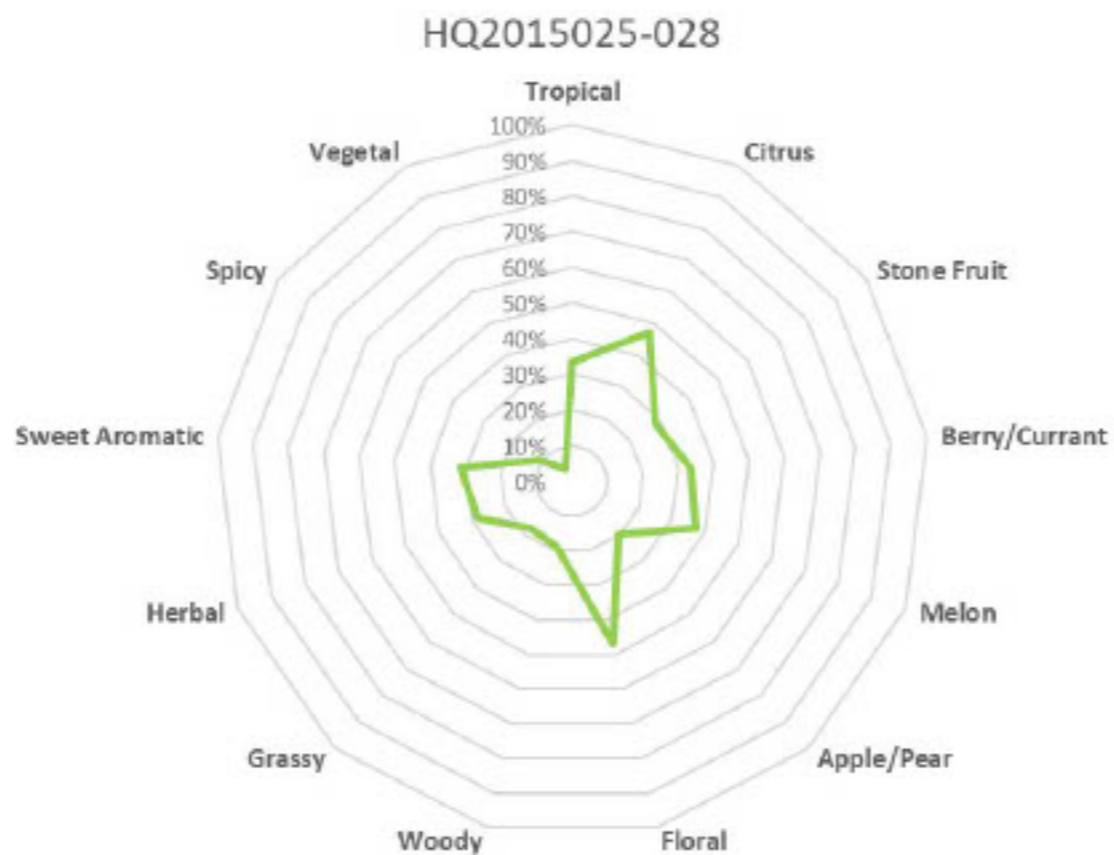
**NPS = %PROMOTERS - %DETRACTORS**

Flavor Attributes	HQ2015025 -028 "Purple"	HQ2015024 -001 "Blue"	HQ2015035 -039 "Orange"	HQ2015025 -008 "Yellow"	HQ2015004 -002 "Red"	HQ2015027 -001 "Black"	HQ2015024 -002 "Pink"	HQ2015004 -006 "Green"
Tropical	33%	41%	32%	32%	38%	25%	27%	22%
Citrus	47%	41%	50%	33%	31%	39%	38%	29%
Stone Fruit	28%	19%	23%	18%	29%	21%	27%	27%
Berry/Currant	33%	30%	20%	13%	17%	26%	18%	11%
Melon	37%	37%	29%	32%	27%	27%	19%	28%
Apple/Pear	20%	20%	15%	22%	13%	31%	17%	29%
Floral	47%	17%	19%	28%	21%	19%	25%	20%
Woody	19%	12%	17%	36%	31%	26%	33%	22%
Grassy	18%	25%	25%	18%	27%	19%	32%	30%
Herbal	28%	32%	27%	40%	27%	29%	38%	34%
Sweet Aromatic	31%	29%	22%	16%	18%	25%	19%	17%
Spicy	11%	18%	14%	21%	32%	20%	23%	15%
Vegetal	4%	8%	33%	18%	28%	17%	28%	18%

\*Shown as % of tasters to identify flavor

# HQ2015025-028 - “Flower Power”

- Rub and sniff comments- “super floral, citrus, nice”
- Beer comments - “floral, melon, candy, spice, minty”
- Has the highest geraniol concentration in hops and beer

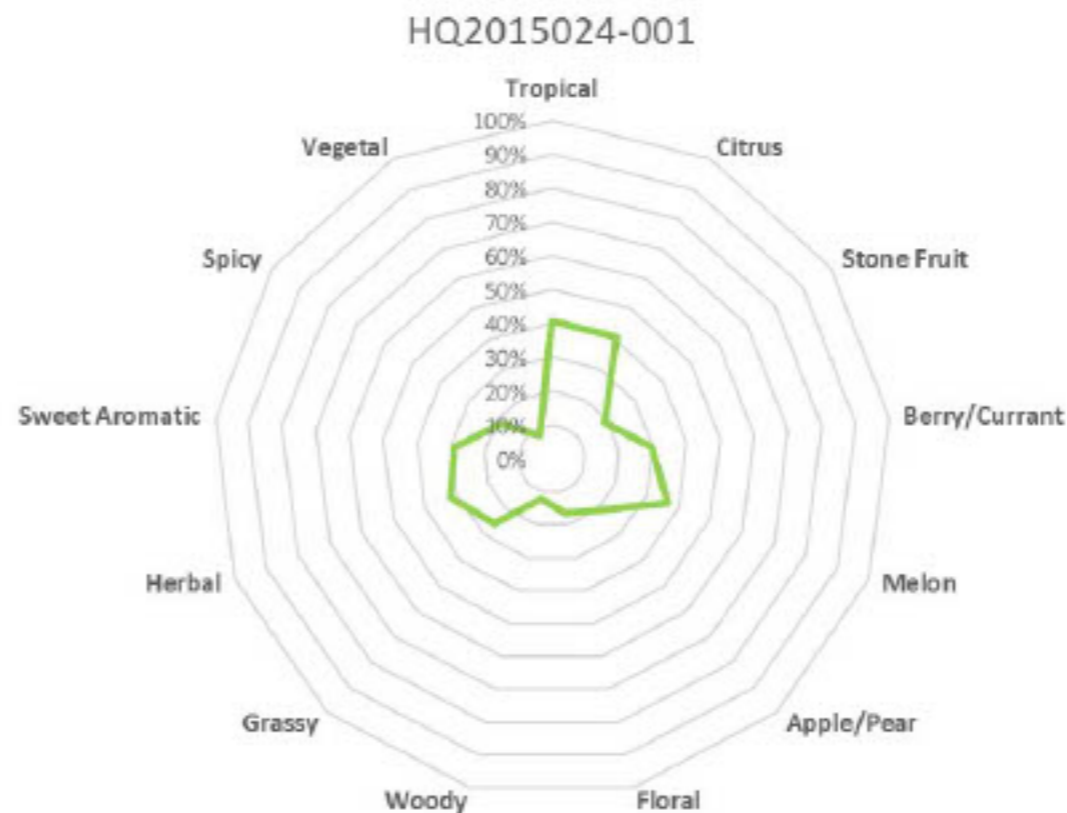


% tasters to identify	
Flavor Attributes	HQ2015025-028
Tropical	33%
Citrus	47%
Stone Fruit	28%
Berry/Currant	33%
Melon	37%
Apple/Pear	20%
Floral	47%
Woody	19%
Grassy	18%
Herbal	28%
Sweet Aromatic	31%
Spicy	11%
Vegetal	4%



# HQG2015024-001

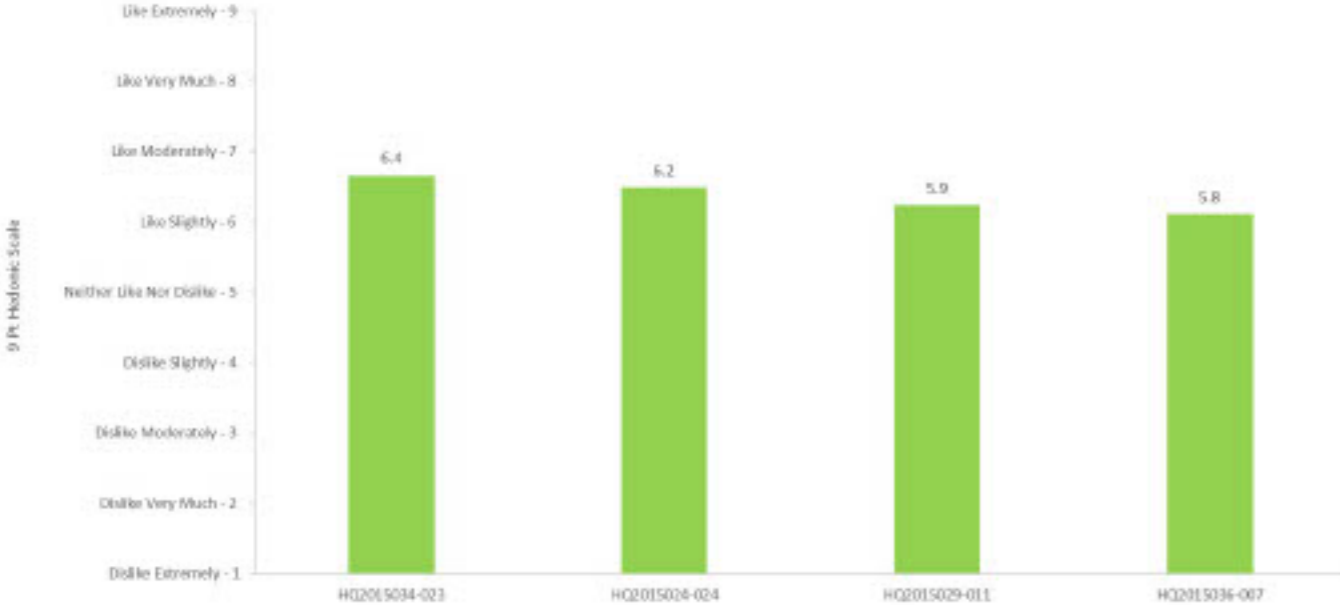
- Rub and sniff comments- “mango, tropical, melon”
- Beer comments - “melon, juicy fruit, berry”



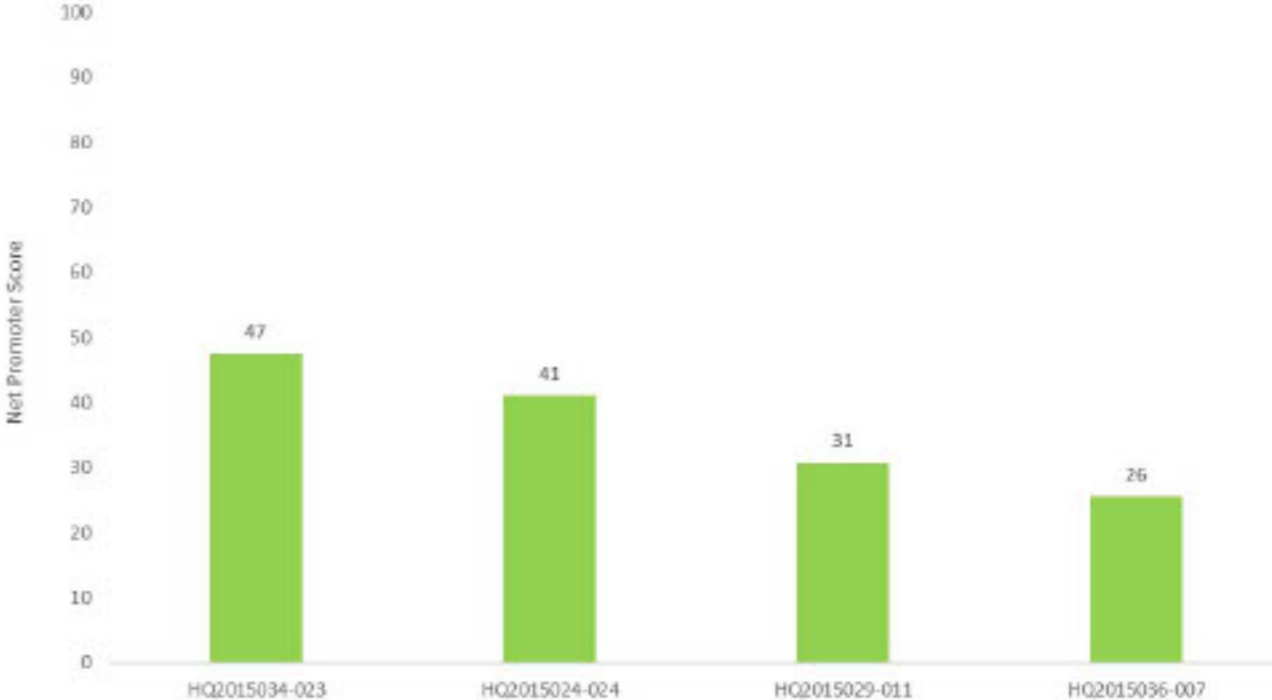
% tasters to identify	
Flavor Attributes	HQ2015024-001
Tropical	41%
Citrus	41%
Stone Fruit	19%
Berry/Currant	30%
Melon	37%
Apple/Pear	20%
Floral	17%
Woody	12%
Grassy	25%
Herbal	32%
Sweet Aromatic	29%
Spicy	18%
Vegetal	8%

# Elite Results

Overall Liking - Elites



Net Promoter Score



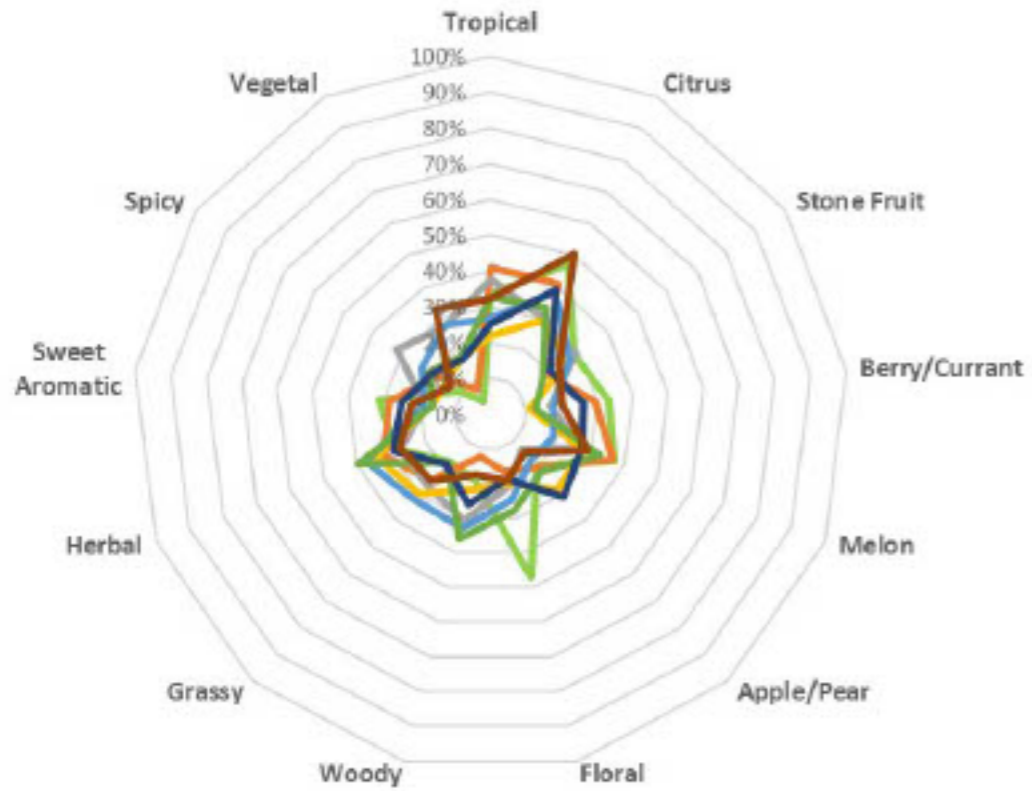
Not the same recipes. Intention was showcase the hops in different styles.

# Elite Results

- Deschutes
  - HQ2015024-024
  - HQ2015034-023
- Single Hill
  - HQ2015029-011
  - HQ2015036-007

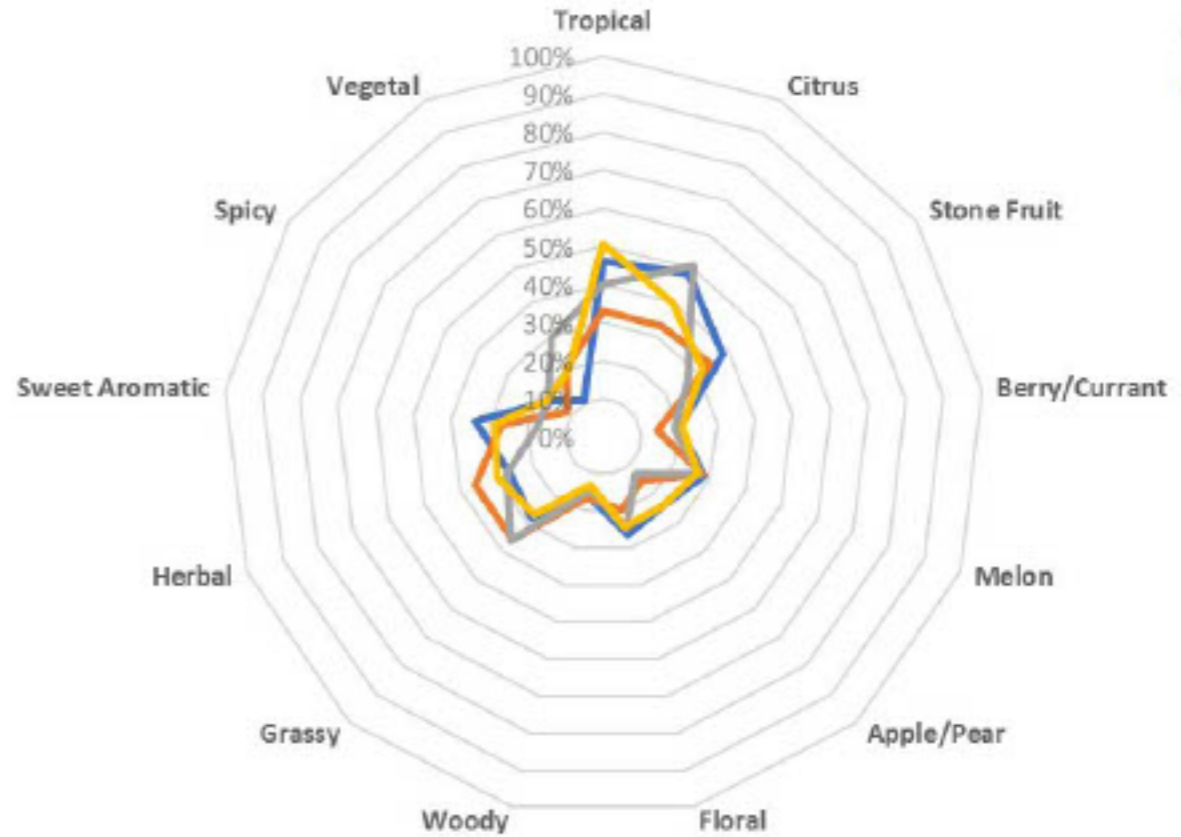
Flavor Attributes	HQ2015034-023	HQ2015024-024	HQ2015029-011	HQ2015036-007
Tropical	46%	33%	40%	51%
Citrus	48%	33%	51%	40%
Stone Fruit	38%	34%	27%	32%
Berry/Currant	20%	14%	19%	21%
Melon	28%	28%	27%	26%
Apple/Pear	24%	15%	13%	24%
Floral	26%	20%	25%	24%
Woody	16%	16%	14%	13%
Grassy	28%	36%	36%	27%
Herbal	26%	36%	27%	30%
Sweet Aromatic	34%	27%	18%	29%
Spicy	17%	11%	18%	18%
Vegetal	11%	21%	29%	20%

### Advanced Lines



- HQ2015025-028
- HQ2015024-001
- HQ2015004-002
- HQ2015004-006
- HQ2015024-002
- HQ2015025-008
- HQ2015027-001
- HQ2015035-039

### Elite Lines



- HQ2015034-023
- HQ2015024-024
- HQ2015029-011
- HQ2015036-007

# Advanced Lines–2022 Harvest

<u>Genotype</u>	<u>PM+DM</u>	<u>Trellis Height</u>	<u>Side Arms</u>	<u>Vigor</u>	<u>Aphids</u>	<u>Yield</u>	<u>Rank</u>
HQ2015004-002	2	4.9	2.65	2.2	1	570	9
HQ2015004-006	2.15	5	2.8	3.05	2	690	7
HQ2015006-019	2	4.85	2.45	2.5	1.73	380	13
HQ2015006-020	2	4.85	3	2.75	1.86	700	6
HQ2015024-001*	2.05	4.7	2.5	2.8	2	885	4
HQ2015024-002	2	4.95	4	4.4	2.41	1765	1
HQ2015024-008	2.15	4.95	3.45	3.85	3.25	1150	3
HQ2015025-008	2.05	4.7	1.95	1.9	3.2	515	11
HQ2015025-028*	2	4.5	2.5	2.35	2.35	560	10
HQ2015027-001	2	4.89	3.53	2.74	1.63	665	8
HQ2015031-002	2	4.8	3.75	2.9	2.38	1270	2
HQ2015034-034	2	5	3.06	2.71	2	400	12
HQ2015035-039	2	4.67	2.89	2.72	2.33	720	5

# Advanced Varieties: Free Thiol Content CY 2021 & 2022

Crop Year	Type	Customer	Date Analyzed	Sample Name	4MMP Results (ng/g)	3S4MP Results (ng/g)	3MH Results (ng/g)
2021	Whole Cone	HQG	6/5/2023	HQG2015004-006	1.97	1.03	0.04
2022	T90 Pellet	HQG	7/19/2023	HQG2015004-006	0.22	3.01	0.21
2021	T90 Pellet	HQG	6/6/2023	HQG2015024-001	0.38	24.16	0.91
2022	T90 Pellet	HQG	7/19/2023	HQG2015024-001	1.54	55.37	2.12
2021	Whole Cone	HQG	6/6/2023	HQG2015024-002	0.39	5.74	0.37
2022	T90 Pellet	HQG	7/19/2023	HQG2015024-002	0.53	4.1	1.62
2021	Whole Cone	HQG	6/6/2023	HQG2015027-001	0.2	5.41	1.06
2022	T90 Pellet	HQG	7/19/2023	HQG2015027-001	0	6.55	1.25
2021	Whole Cone	HQG	6/5/2023	HQG2015035-039	1.97	7.39	1.43
2022	T90 Pellet	HQG	7/19/2023	HQG2015035-039	0.36	7.51	2.89
2021	Whole Cone	HQG	6/6/2023	HQG2015025-028	0.73	0.96	0.44
2022	Whole Cone	HQG	7/19/2023	HQG2015025-028	0	0	0
2021	Whole Cone	HQG	6/5/2023	HQG2015004-002	7.84	11.19	0.48
2022	T90 Pellet	HQG	7/19/2023	HQG2015004-002	7.5	10.15	0.82
2021	Whole Cone	HQG	6/6/2023	HQG2015025-008	0.63	3.35	0.18
2022	Whole Cone	HQG	7/19/2023	HQG2015025-008	0.52	3.39	0

# Firestone Walker Beer Analysis: Advanced Varieties: Monoterpene Alcohols

Sample Name	Geraniol	Linalool	Grand Total
HQ2015004-002	109.35	259.74	369.09
HQ2015004-006	43.46	233.07	276.53
HQ2015024-001	176.3	404.94	581.24
HQ2015024-002	445.35	621.62	1066.97
HQ2015025-008	138.91	358.19	497.1
HQ2015025-028	798.68	856.83	1655.51
HQ2015027-001	193.03	724.86	917.89
HQ2015035-039	104.49	351.17	455.66

# Elite Varieties: Free Thiol Content CY 2021 & 2022

Crop Year	Type	Customer	Date Analyzed	Sample Name	4MMP Results (ng/g)	3S4MP Results (ng/g)	3MH Results (ng/g)
2021	Whole Cone	HQG	6/5/2023	HQG2015034-023	16.87	509.78	3.04
2022	T90 Pellet	HQG	7/19/2023	HQG2015034-023	18.85	205.28	3.9
2021	Whole Cone	HQG	6/13/2023	HQG2015024-024	16.44	191.07	3.02
2022	Whole Cone	HQG	7/19/2023	HQG2015024-024	13.25	101.65	2.29
2021	Whole Cone	HQG	6/5/2023	HQG2015029-011	31.52	15.21	2.22
2022	Whole Cone	HQG	7/25/2023	HQG2015029-011	38.74	13.07	2.64
2021	Whole Cone	HQG	6/13/2023	HQG2015036-007	5.69	11.23	0.4
2022	Whole Cone	HQG	7/25/2023	HQG2017036-007	19.96	14.24	0.38



# Rising Star: HQG2018012-001

Crop Year	Type	Customer	Date Analyzed	Sample Name	4MMP Results (ng/g)	3S4MP Results (ng/g)	3MH Results (ng/g)
2022	Whole Cone	HQG	8/11/2023	HQG2018012-001	5.64	628.38	2.56

# Elite Grow-out Yakima Update 8/18/2023

## 2nd year plantings:

HQGA1 - 024-024:  $\frac{2}{3}$  through cone formation. Normal bloom cycle. Medium Vigor. Some fusarium canker at base of bine. Some heat stress.

HQGA3 - 036-007:  $\frac{2}{3}$  through cone formation. Normal bloom cycle. Strong Vigor. Tolerant to heat stress. Some fusarium canker. Looking to be a higher yield.

## 1st year plantings:

HQGA2 - 029-011:  $\frac{1}{2}$  way up the wire. Look good for now.

HQGA4 - 034-023:  $\frac{1}{2}$  way up the wire. Look good for now.

# Elite Grow-out Idaho Update 8/18/2023

## 2nd year plantings:

HQGA1 - 024-024: Looking good. Several bales will be available.

HQGA2 - 029-011: Not as strong as #1 but will be harvested.

HQGA3 - 036-007: Big yielder. Anticipating 10+ bales as a 2nd year.

HQGA4 - 034-023: Similar to #2.

# Summary of Findings

## Advanced Lines

- Findings are less clear cut this year
- HQ2015-025-028 : most liked, high floral aromatics, high geraniol, low thiol
  - Could be replacement for Centennial?
  - Poor performer in the field. Repeat grow out at Advanced stage?
- The other 7 lines did not show much interest

## Elite Lines

- HQ2015-036-007 high yielder

## Single Hill Plots

- HQ2018-012-001: very high thiol content
  - Should we take this into multi hill plots early?

## Future Considerations

- Expand analytical testing to include monoterpene alcohols
- Determine what to do with HQ2018-012-001

**Thank you to Firestone, Deschutes, and Single Hill!**