Project Update:
Fresh market potential and value-added opportunities of Montana-grown cold-hardy small fruits and berries

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- Consumer Study
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  - Focus Group Discussion
- Initial Grower Survey
- Future Plans

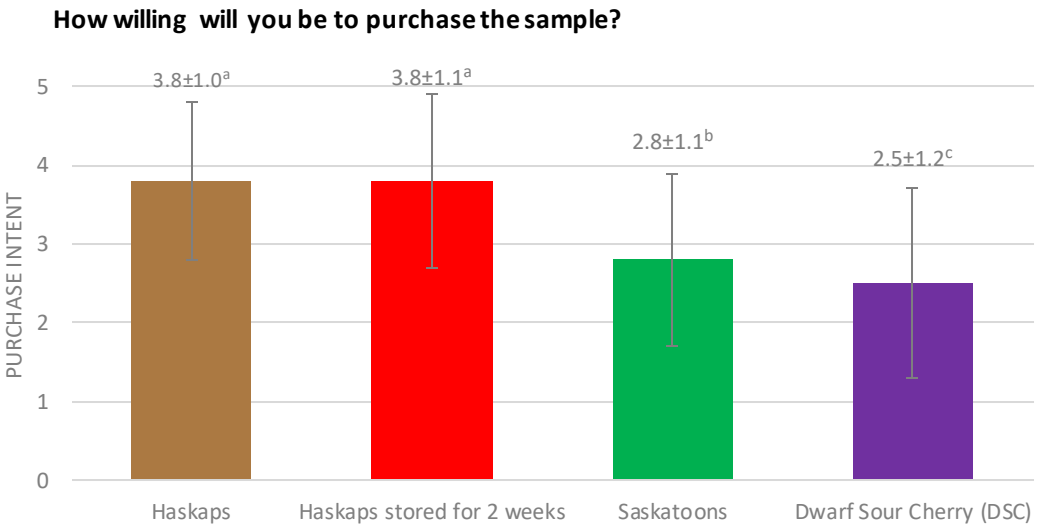
Are you a berry or small fruit grower? We'd like to learn more about your farm! Scan the QR code below to take our 5-minute survey!

Consumer Sensory Testing & Focus Group (FG) Discussion

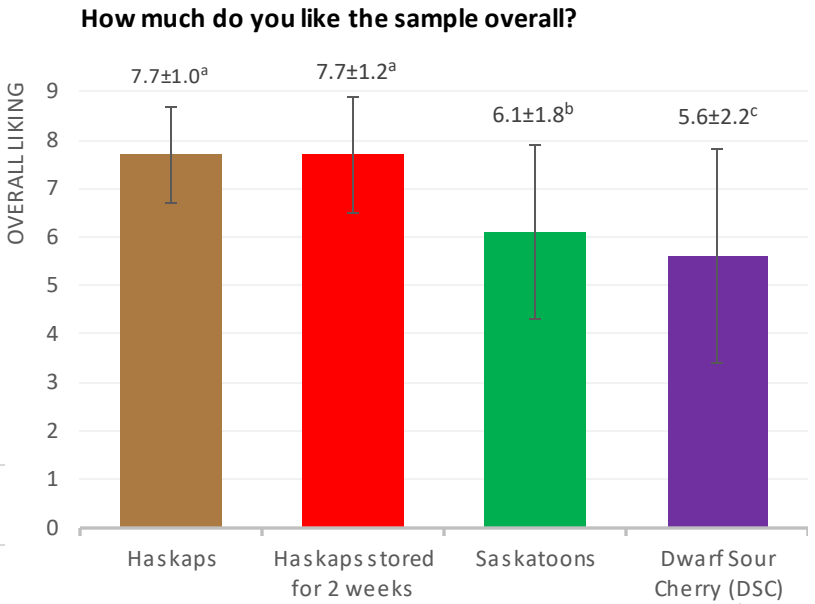
- Four groups of fruit & berry samples were evaluated by 115 subscribers from the Western Montana Growers Co-Operative, WMGC (Missoula, MT). Fruit samples were provided to WMGC community supported agriculture members who signed up to participate in these taste tests over the course of four weeks. The samples included:
  - Haskaps
  - Haskaps stored for 2 weeks
  - Saskatoons
  - Dwarf Sour Cherries
- 10 subscribers further participated in an FG to get a wider understanding on their opinions & beliefs for these sample types.

Overall liking & purchase intent results

- **Haskaps & haskaps stored for 2 weeks** had significantly higher OL and PI than Saskatoons & DSC.



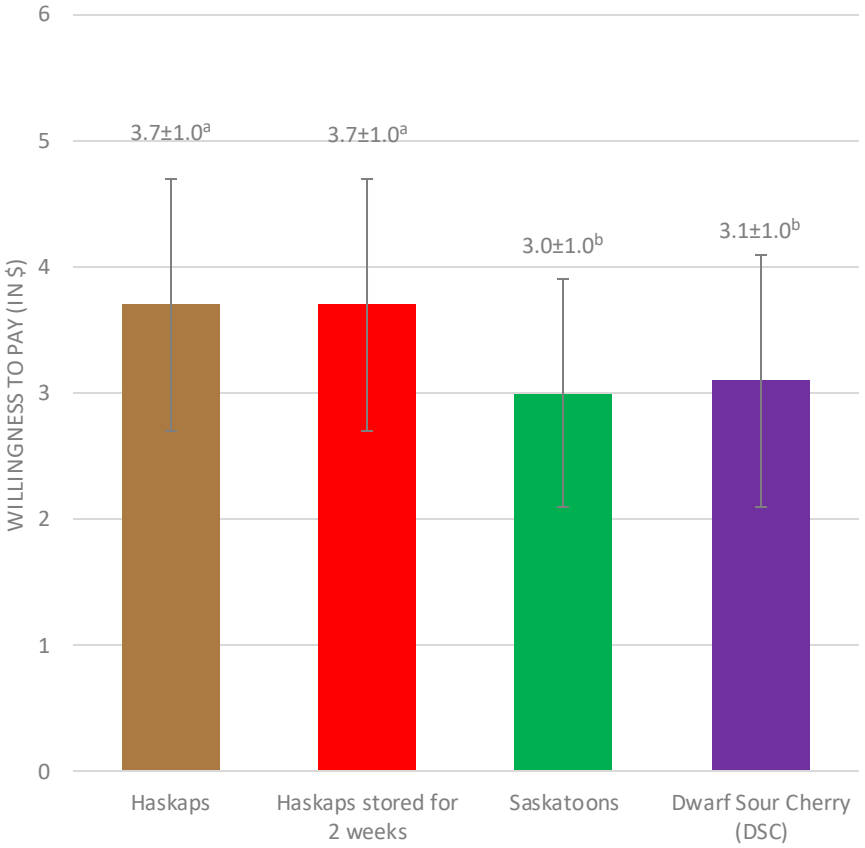
Purchase intent of fruit samples on 5-point scale (1-definitely will not buy, 5-definitely will buy)



Overall liking of fruit samples on 9-point hedonic scale (1-dislike extremely, 9-like extremely)

[abc] Samples with the same letter code are not significantly different based on least significant difference test (α=0.05).

Willingness-to-pay results

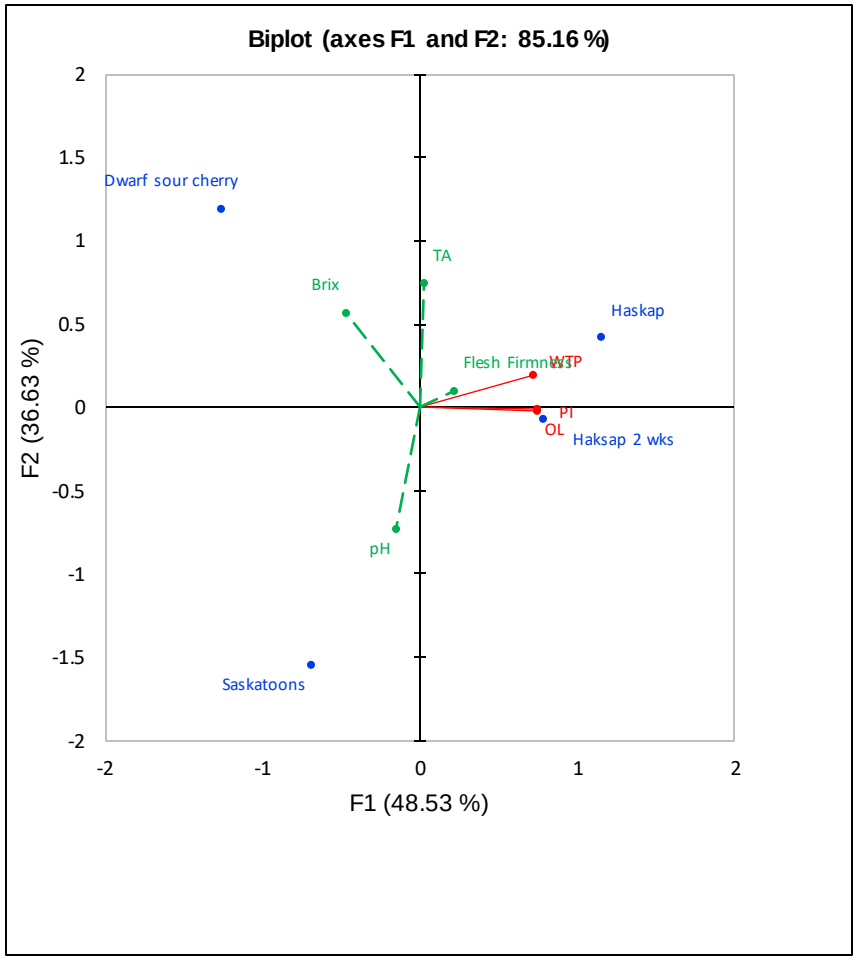


Willingness-to-pay on 5-point scale for a 6 oz container (in $)

[ab] Samples with the same letter code are not significantly different based on least significant difference test (α=0.05).

On average, consumers were **willing-to-pay significantly more** ($p<0.0001$) for a 6 oz container of **fresh or 2-weeks stored haskap**, than for saskatoons or DSC.

Consumer v/s Instrumental Data



Principal component biplot of consumer sensory testing and instrumental data

- OL, PI and WTP were positively correlated **($p<0.05$)**.
- Consumers were willing to pay more, have higher purchase intent for products with greater taste acceptance.

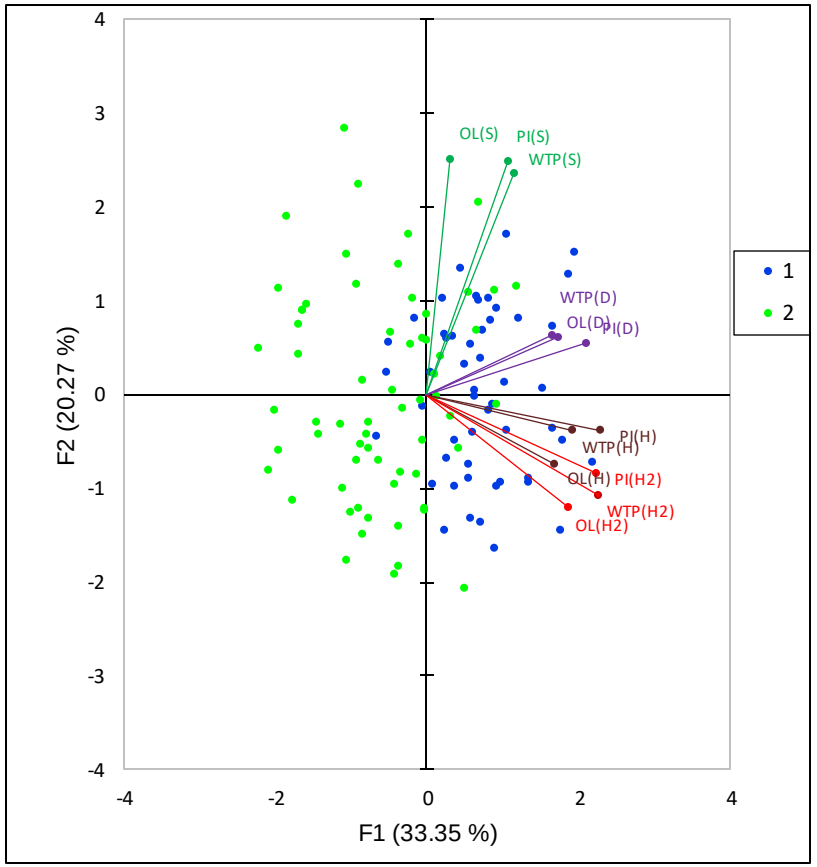
Internal Preference Mapping Results

- Participants in Cluster 1 scored significantly higher for OL, PI and WTP for DSC. A parallel instrumental study suggests this could be owed to the significantly higher °Brix in the cherries.

	Overall Liking (OL)		Purchase Intent (PI)		Willingness to Pay (WTP) (True price label) adj. for 6 oz ($2-6)	
	Cluster 1	Cluster 2	Cluster 1	Cluster 2	Cluster 1	Cluster 2
Haskaps	8.0±0.8^{aA}	7.4±1.1^{aB}	4.3±0.8^{aA}	3.4±1.0^{aB}	4.2±1.0^{aA}	3.4±0.9^{aB}
Haskaps stored for 2 weeks	8.2±0.6^{aA}	7.3±1.4^{aB}	4.3±0.8^{aA}	3.4±1.2^{aB}	4.1±0.9^{aA}	3.4±1.0^{aB}
Saskatoons	6.1±1.6^{cA}	6.1±2.0^{bA}	2.9±1.0^{bA}	2.7±1.2^{bA}	3.2±0.9^{cA}	2.9±1.0^{bA}
Dwarf Sour Cherries	7.5±0.9^{bA}	4.0±1.6^{cB}	3.2±1.0^{bA}	1.9±1.0^{cB}	3.7±0.8^{bA}	2.7±0.9^{bB}

^{ABC} Samples with the same letter code in any row are not significantly different , as per Welch's test (which shows the difference between clusters for the same fruit)

^{abc} Samples with the same letter code in any column are not significantly different, using one-way ANOVA (which shows the difference between fruits by a cluster)



Principal component biplot of clusters by color based on the consumer testing. Agglomerative hierarchical cluster revealed two clusters.
OL = Overall liking; WTP = Willingness-to-pay; PI = Purchase intent
S = Saskatoons; D = Dwarf Sour Cherries; H = Haskaps; H2 = Haskaps stored for weeks.

Instrument Study Results

Average instrumental scores and standard deviation (Titrable Acidity (TA%), Flesh Firmness, Brix and pH)

Fruit Variety	Bulk Titrable Acidity on 10 fruits[1] (g acid/L)	Flesh Firmness (N)	°Brix	pH
Haskaps	22.0±5.8[a]	0.9±0.4[a]	14.1±1.9[bc]	3.3±0.30[bc]
Haskaps stored for 2 weeks	14.0±1.2[b]	0.3±0.2[c]	14.7±1.4[b]	3.4±0.03[b]
Saskatoons	4.5±0.4[c]	0.5±0.2[b]	13.9±1.4[c]	4.0±0.03[a]
Dwarf Sour Cherry	25.7±2.2[a]	0.5±0.2[b]	17.3±2.4[a]	3.2±0.01[c]

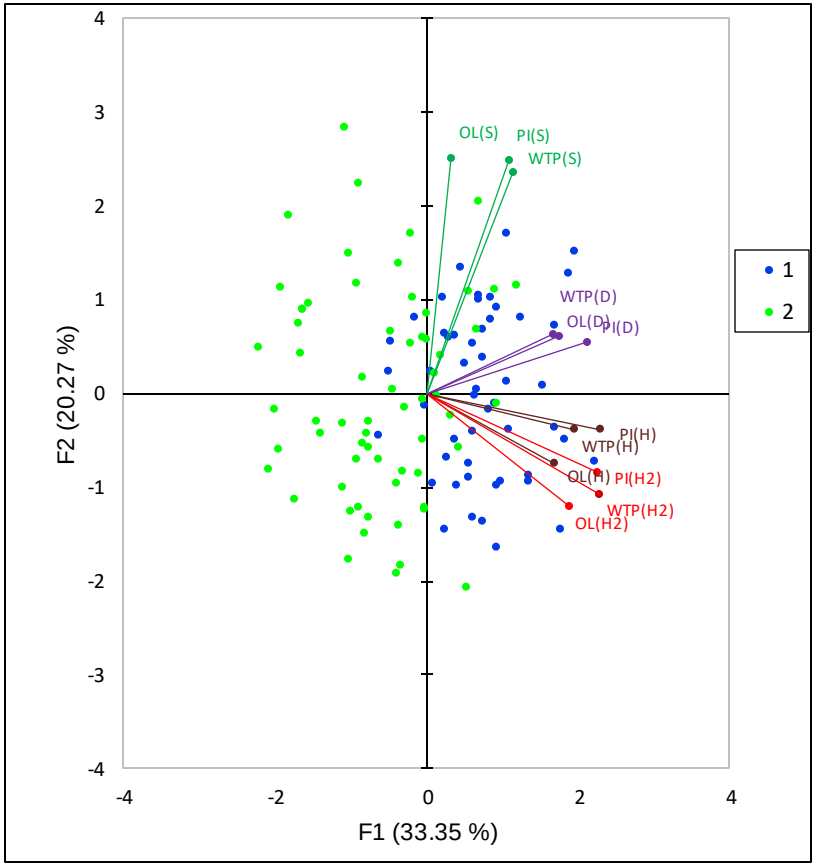
[abc] Samples with the same letter code in any column are not significantly different

[1]Note: citric acid equivalents for haskaps; malic acid equivalents for saskatoons and dwarf sour cherries

- DSC had a significantly higher °Brix than the other fruit samples. There could potentially be a preference by Cluster 1 participants for the sweetness, which is driving the higher OL, PI and WTP scores.

Internal Preference Mapping Results

- Fisher's Exact Test also showed Cluster 1 had a significantly higher proportion of individuals aged under 44 (p=0.023).



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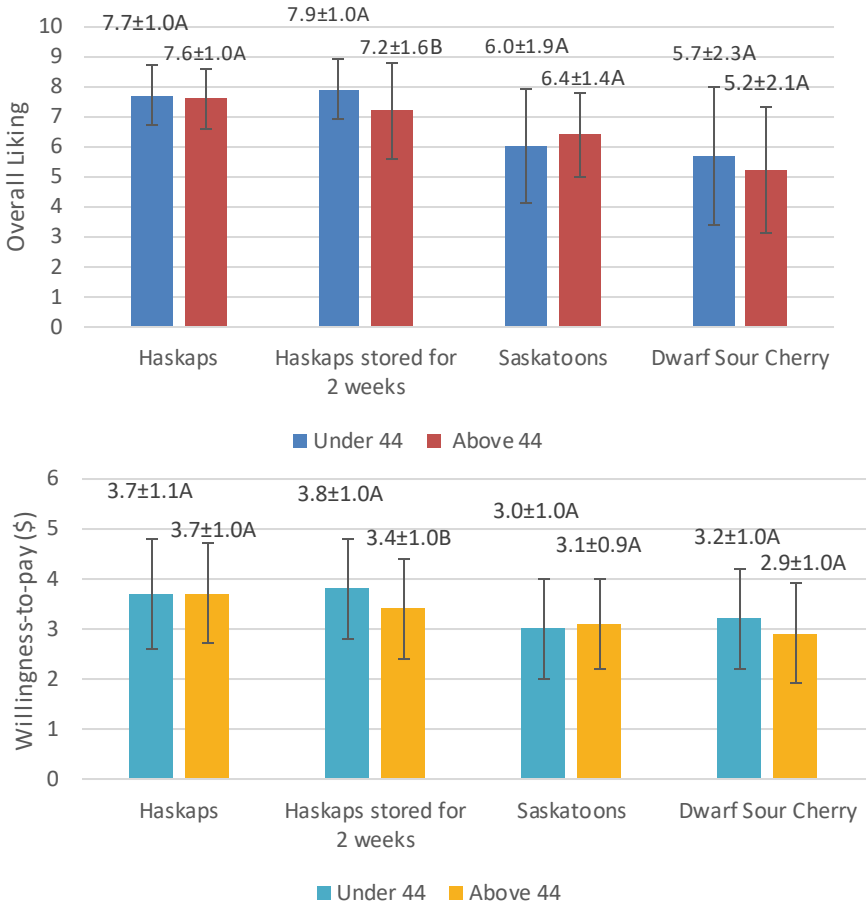
Welch's T-Test Result



[AB] For each sample, the values with the same upper-case letters are not significantly different based on least significant difference test (α=0.05).

- A Welch's T-test confirmed consumers aged under 44 had significantly higher OL and WTP for the 2-week stored haskaps compared to those aged above 44. This may be associated with the significantly reduced titratable acidity of haskaps after the 2-week storage, observed as per the instrumental data analysis.

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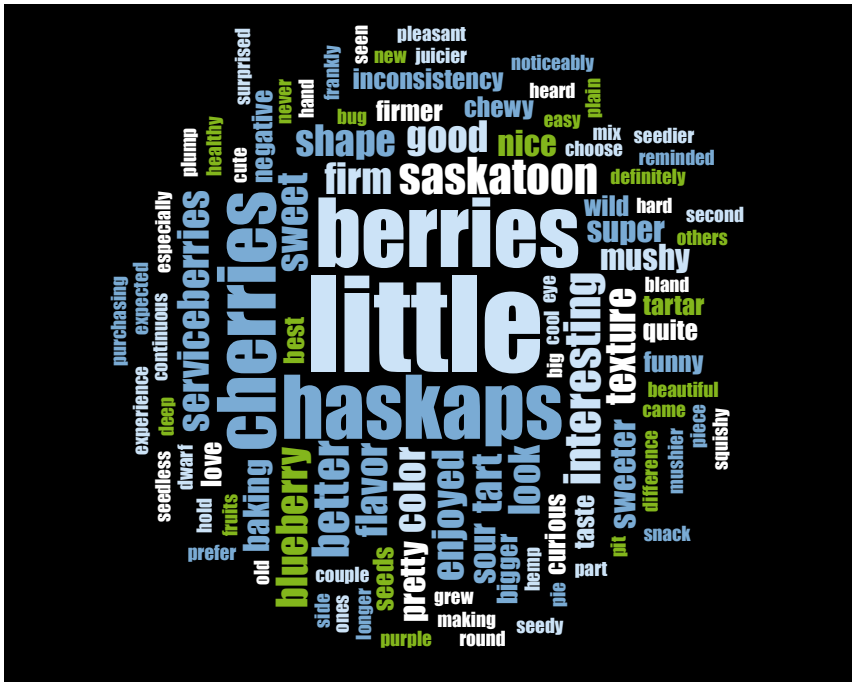
Focus Group Findings

- Dominant ideas:
  - Supporting local growers & produce
  - Sensory attributes most discussed:
    - Texture
    - Flavor
    - Colour, Shape & Size
  - Supported notion of bulk purchase
  - Future growth idea
    - Recipe inclusions
    - Pitted, dried, frozen (for convenience)



Word cloud depicting the sensory attributes discussed for studied fruit varieties

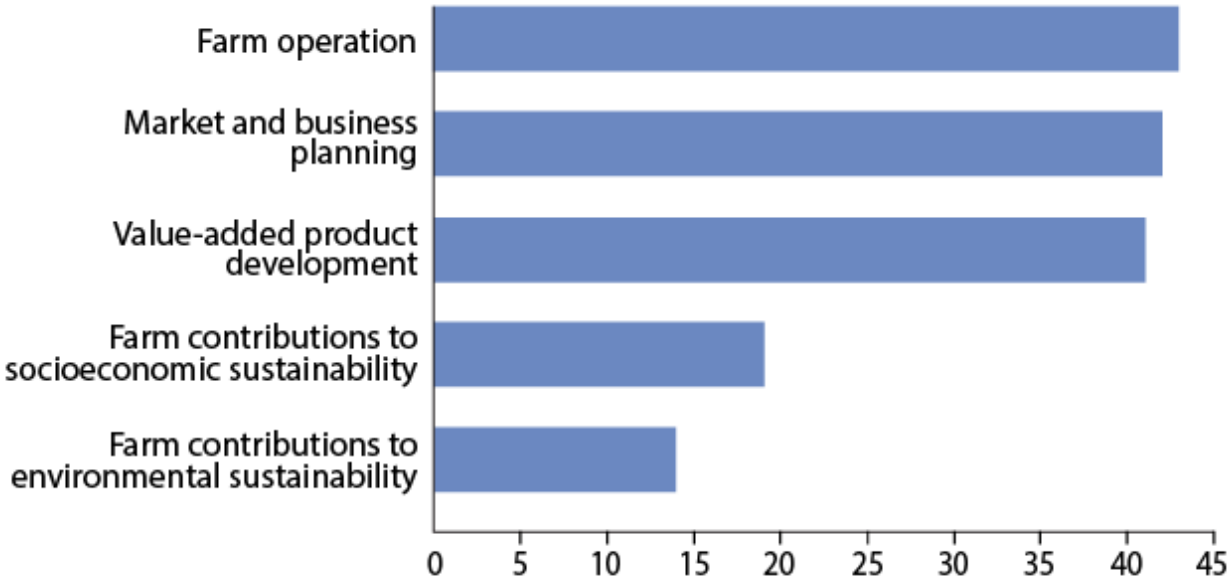
Initial Grower Survey

- Annually (since 2020), a grower survey will be sent to the **Western Small Fruit & Berry Network.**

- Last year's findings showcased in following slides.

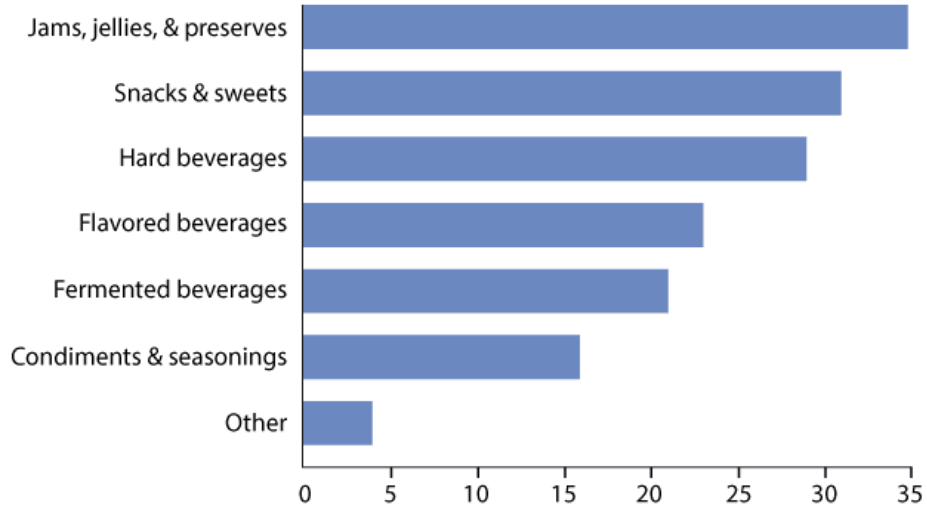
Initial Grower Survey Findings on Workshop topics

What are the top research and workshop topics on small fruits that you would be most interested in?



Initial Grower Survey Findings for Product Development

What are your top choices for the product development of small fruits?



What are the aspects which you believe to be most important in the product development of small fruits?

Future Plans

- Conduct product development work to develop value-added products utilizing some of these varieties.
  - *Specific focus on varieties which do not share good fresh-market potential.*
- Intend to recruit growers for our focus group to understand needs/concerns and challenges with implementing value-added strategies.

We'd love to hear from you ☺

For questions – Please contact us below:

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