

# ROSBREED

Enabling marker-assisted breeding in Rosaceae

## Socio-Economics Preliminary Results

Breeders Survey & Apple Variety Choices Based  
on National Household-level Data

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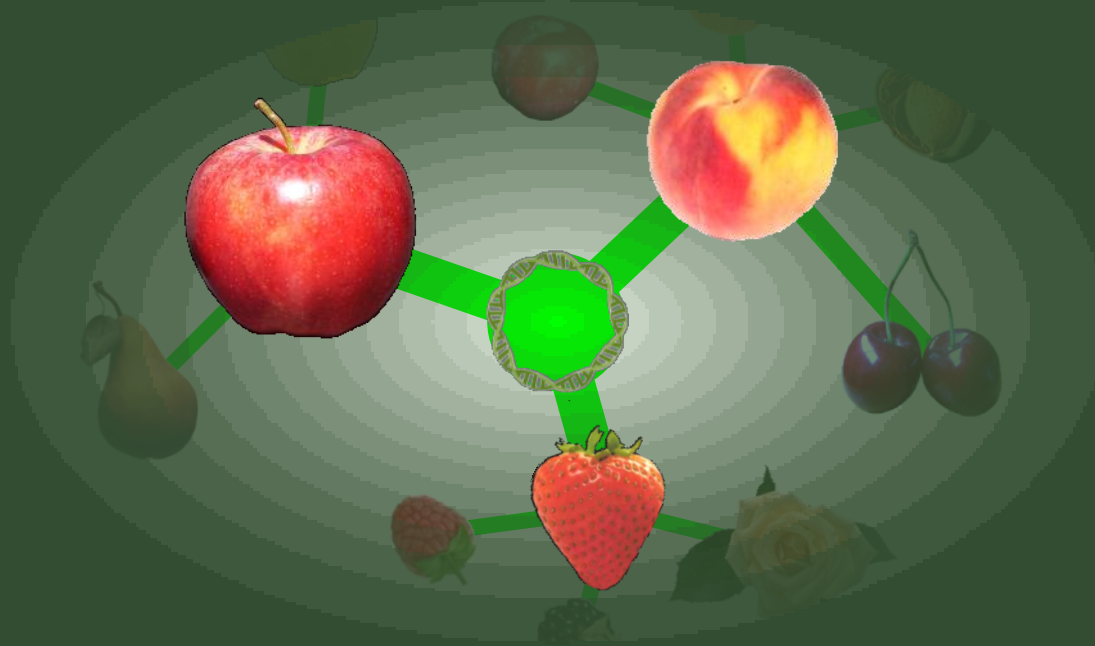
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## Outline of Presentation

- ❖ Summary statistics
- ❖ Marker assisted technology
- ❖ Relative importance of genetic traits for five crops
- ❖ Apple variety choices based on national household-level data



# Summary Statistics

# Breeders Web Survey

Qualtrics.com

1. What crop(s) are you currently breeding? Please check all that apply.

<input type="checkbox"/> Strawberry	<input type="checkbox"/> Plum Scion
<input checked="" type="checkbox"/> Apple Scion	<input type="checkbox"/> Plum Rootstock
<input checked="" type="checkbox"/> Apple Rootstock	<input type="checkbox"/> Apricot Scion
<input type="checkbox"/> Pear Scion	<input type="checkbox"/> Apricot Rootstock
<input type="checkbox"/> Pear Rootstock	<input type="checkbox"/> Almond Scion
<input type="checkbox"/> Tart Cherry Scion	<input type="checkbox"/> Almond Rootstock
<input type="checkbox"/> Tart Cherry Rootstock	<input type="checkbox"/> Blackberry
<input type="checkbox"/> Sweet Cherry Scion	<input type="checkbox"/> Red Raspberry
<input type="checkbox"/> Sweet Cherry Rootstock	<input type="checkbox"/> Black Raspberry
<input type="checkbox"/> Peach Scion	<input type="checkbox"/> Rose
<input type="checkbox"/> Peach Rootstock	

2. What are the target production region(s)? E.g., U.S. Pacific Northwest

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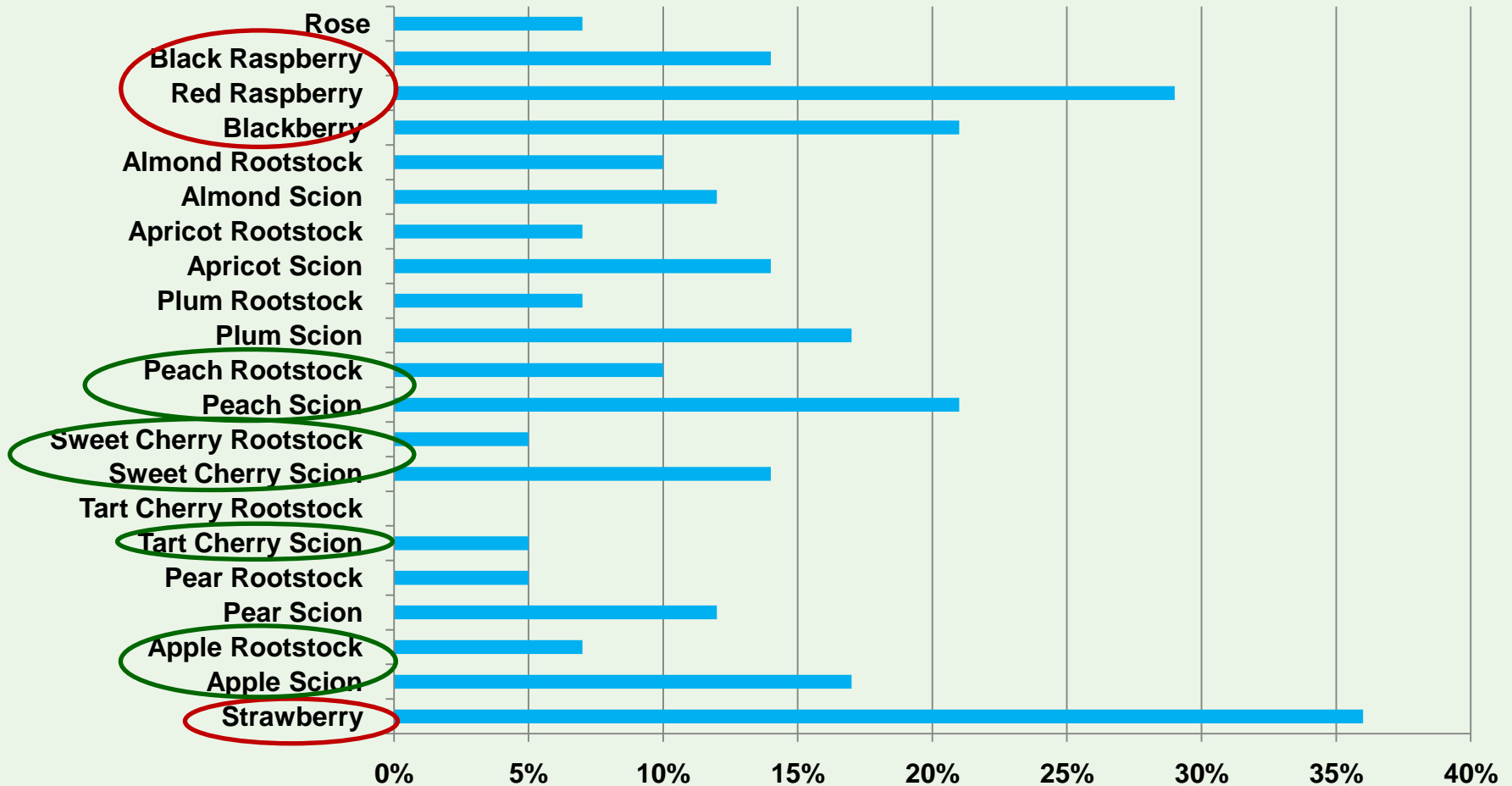
Rosaceae breeders population in US and Canada 60

Breeders who responded 41

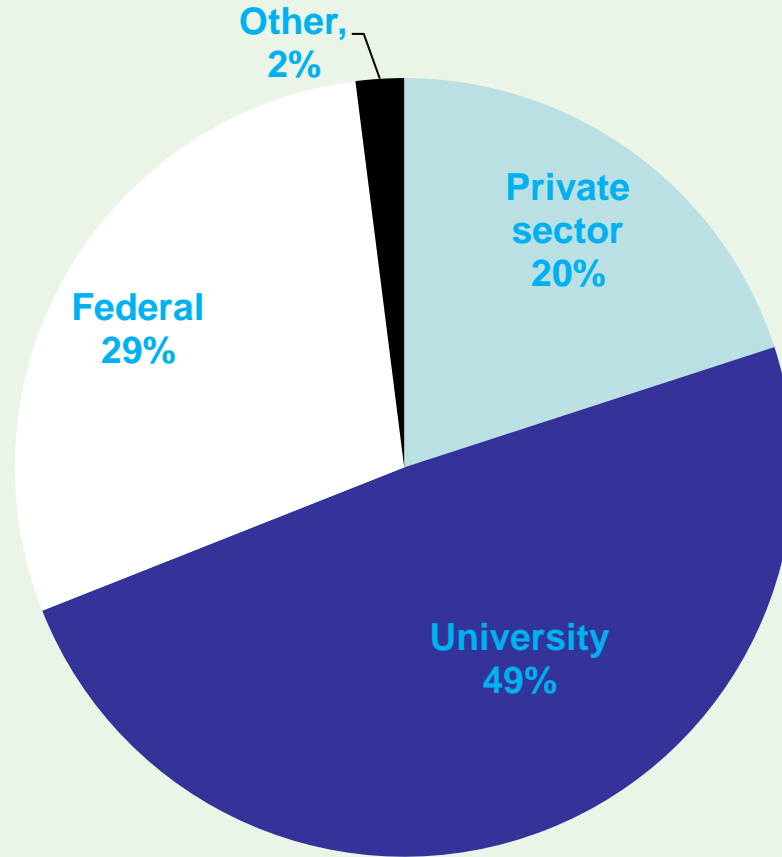
Usable responses 39



# What crop(s) are you currently breeding?



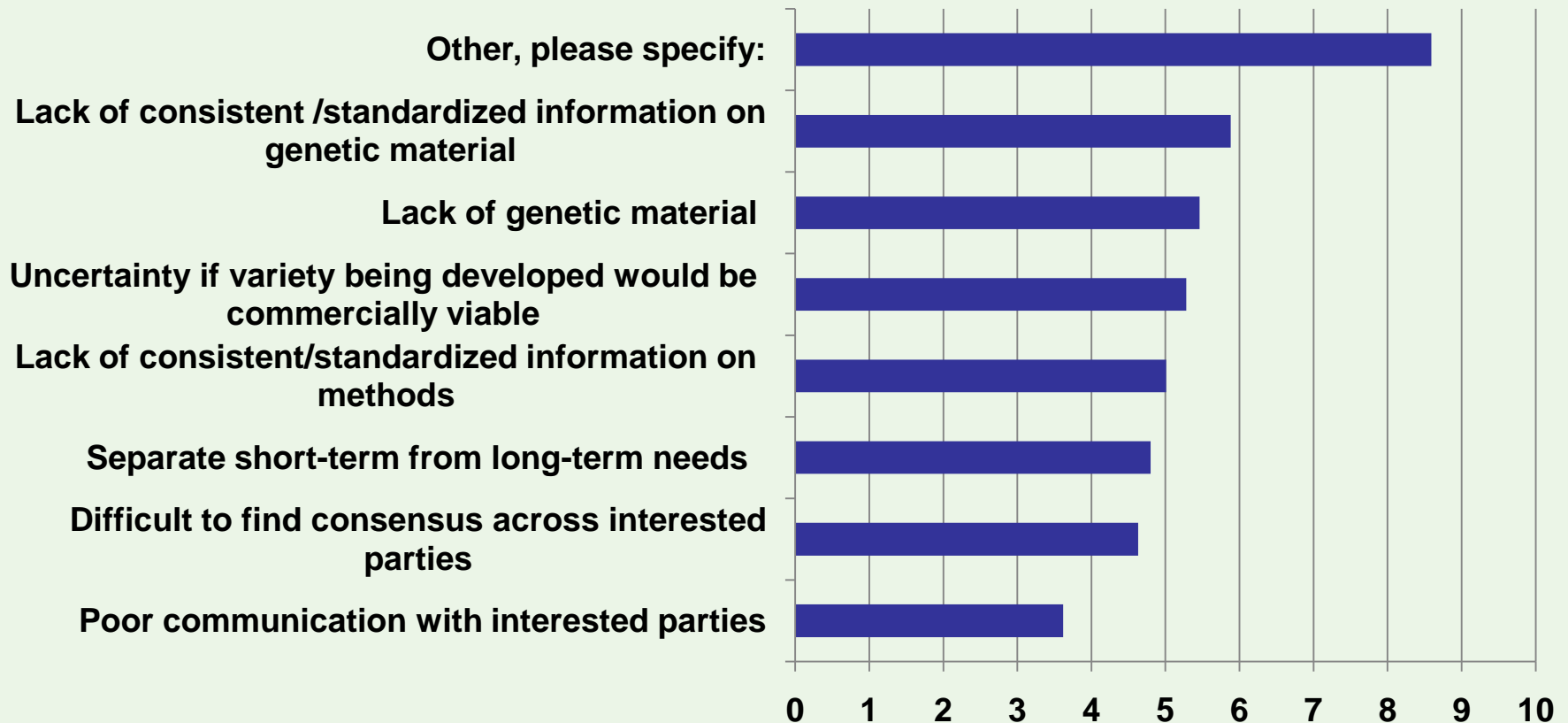
# What type of organization are you working at as a breeder?



# Importance of interested parties that influence your decision (1-10 scale, mean value)

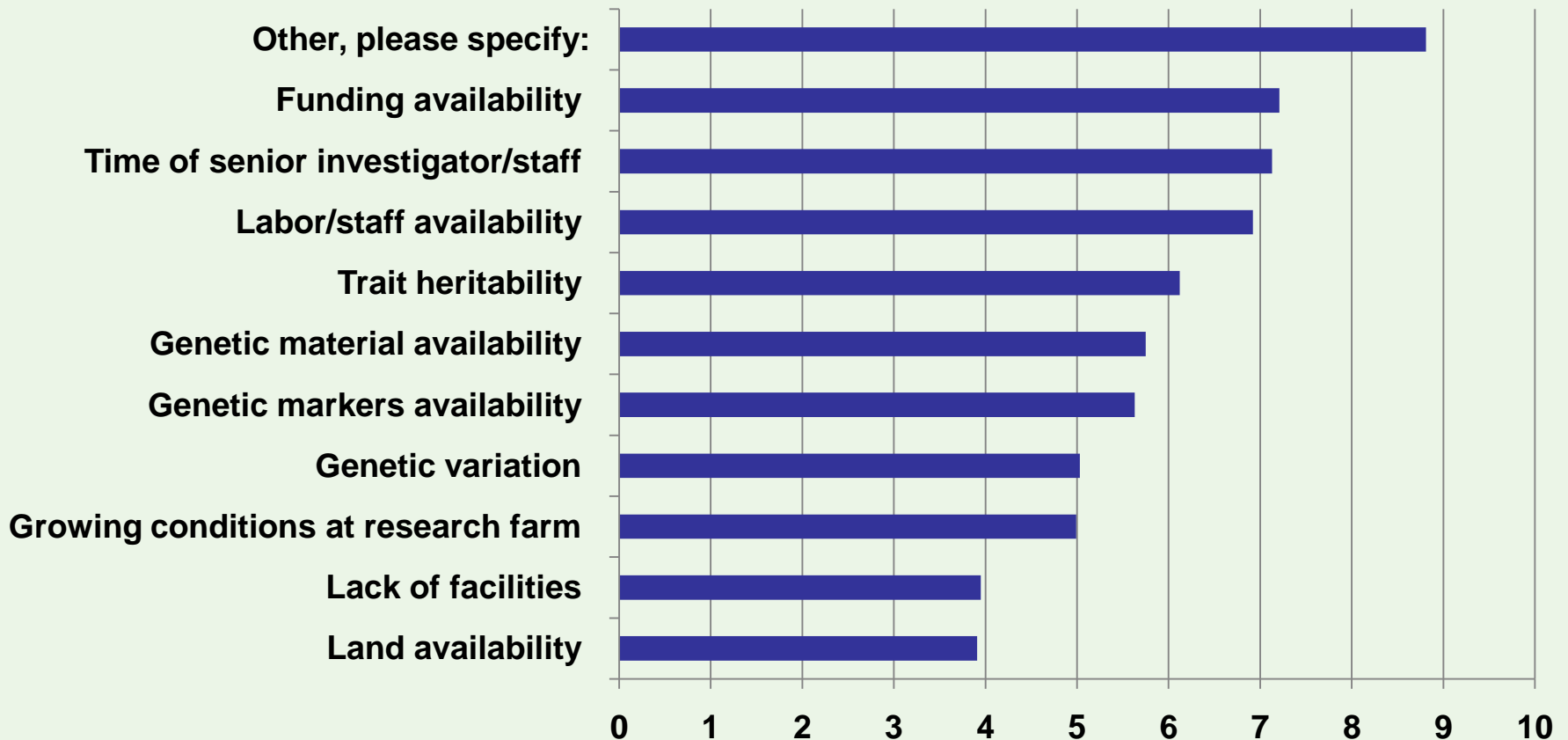


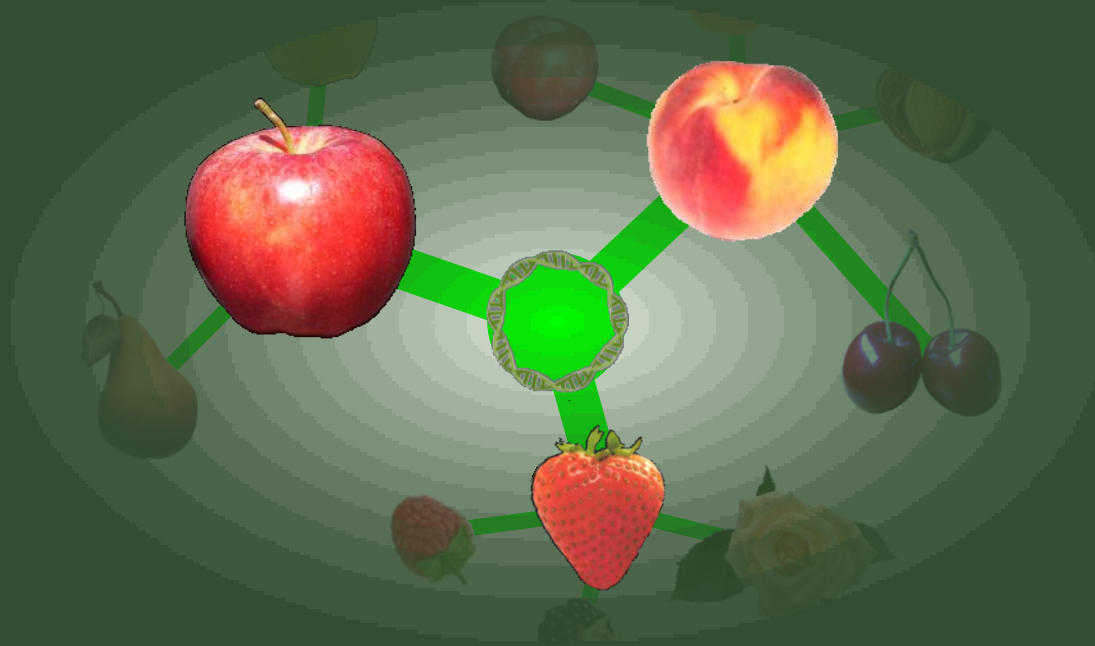
# Challenges faced when determining priorities(1-10 scale, mean value)





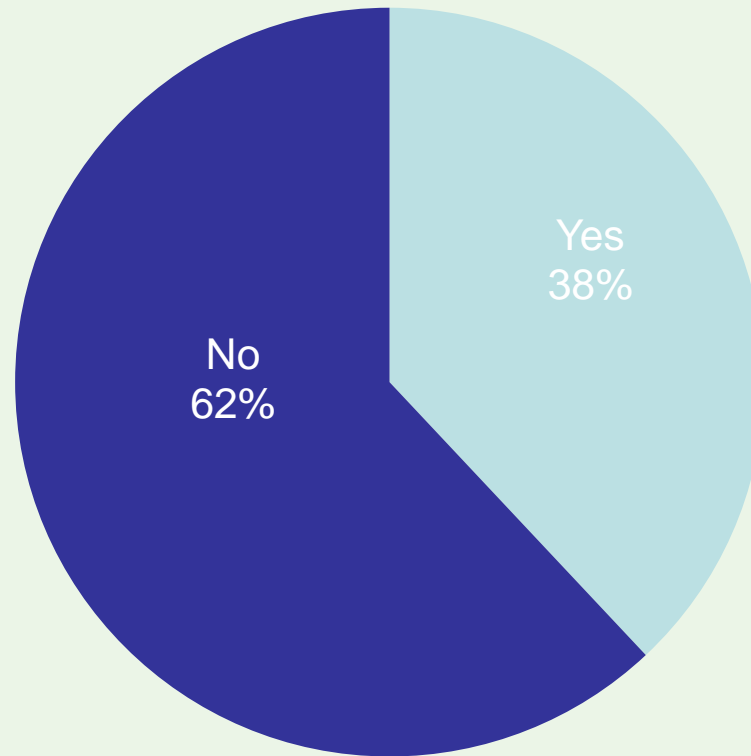
# Challenges faced when implementing priorities (1-10 scale, mean value)



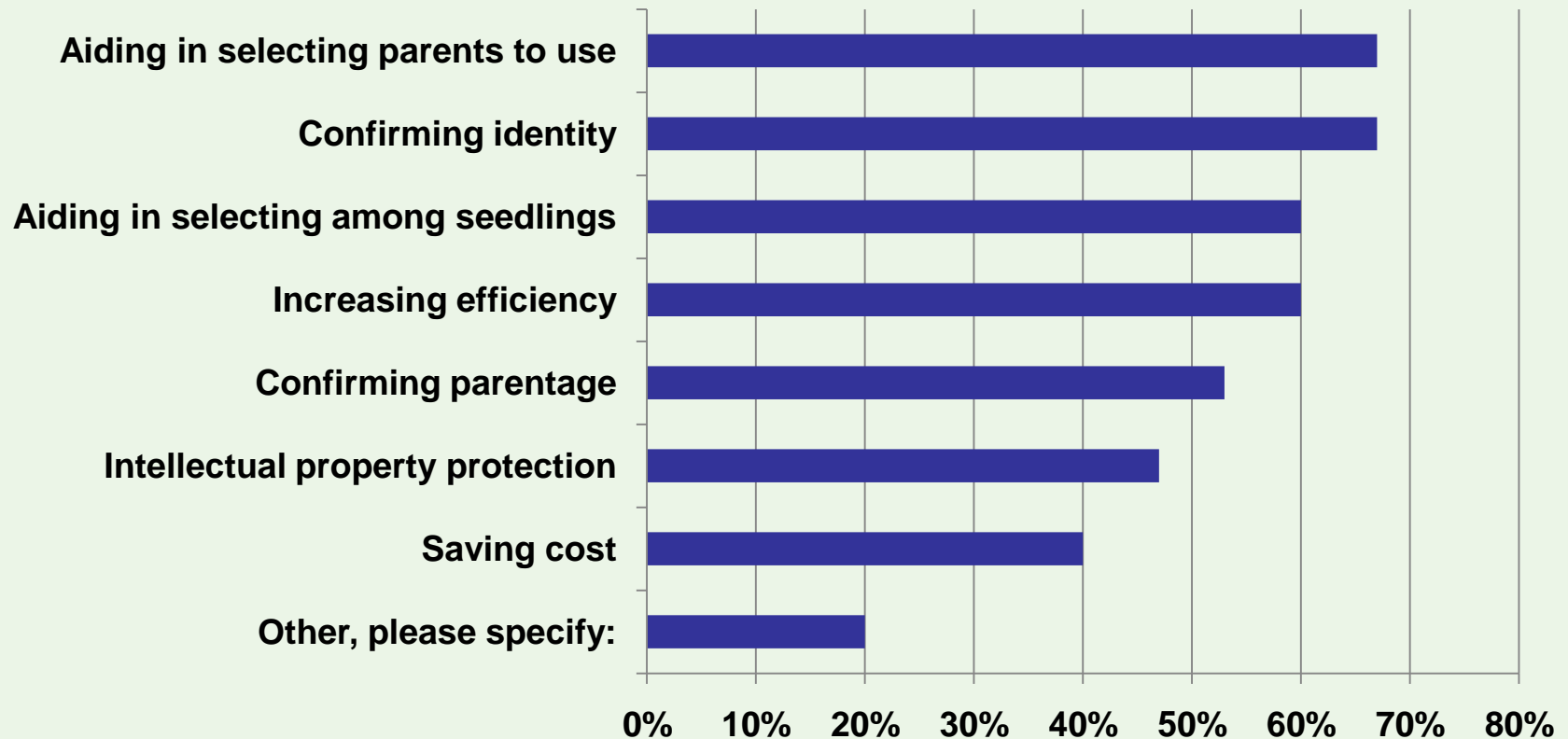


# Marker Assisted Technology

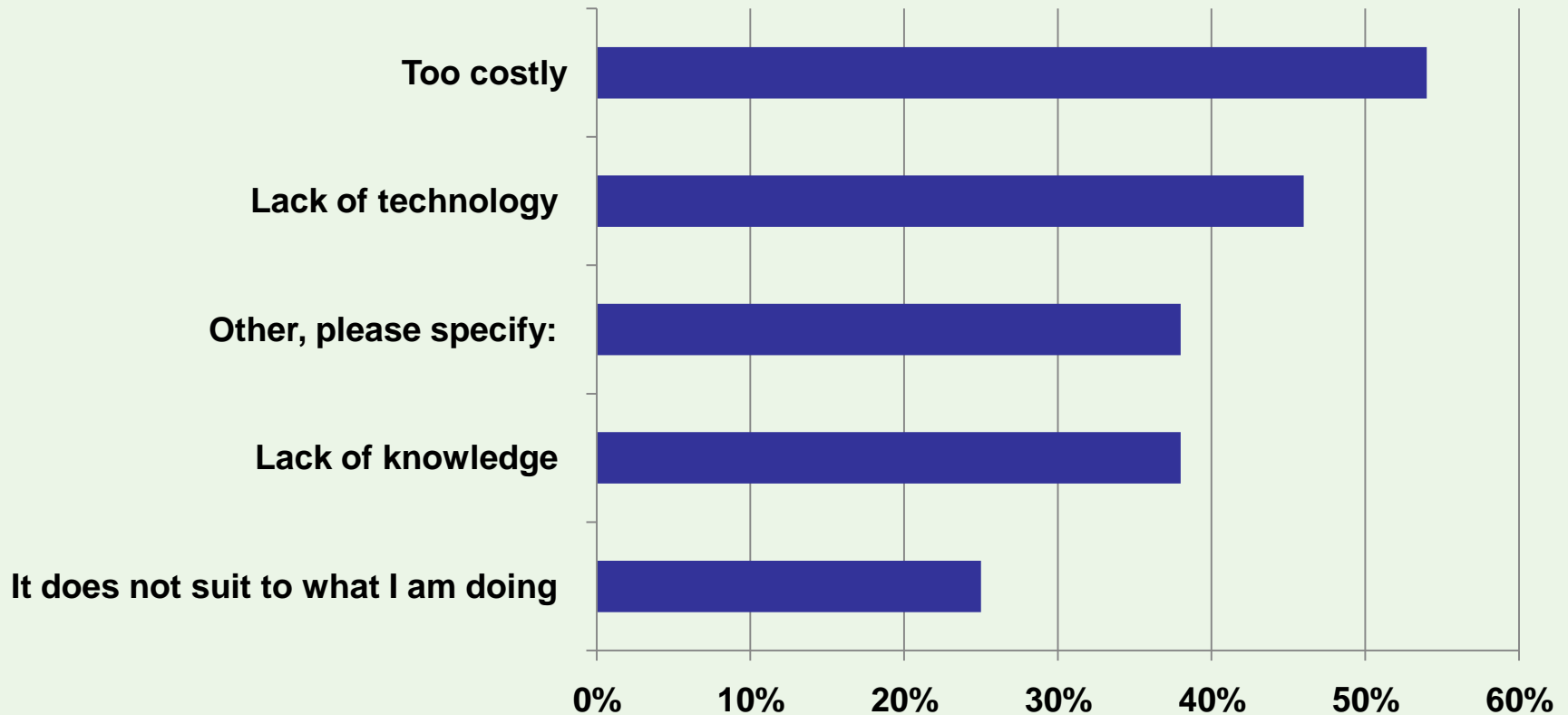
# Use marker assisted technology

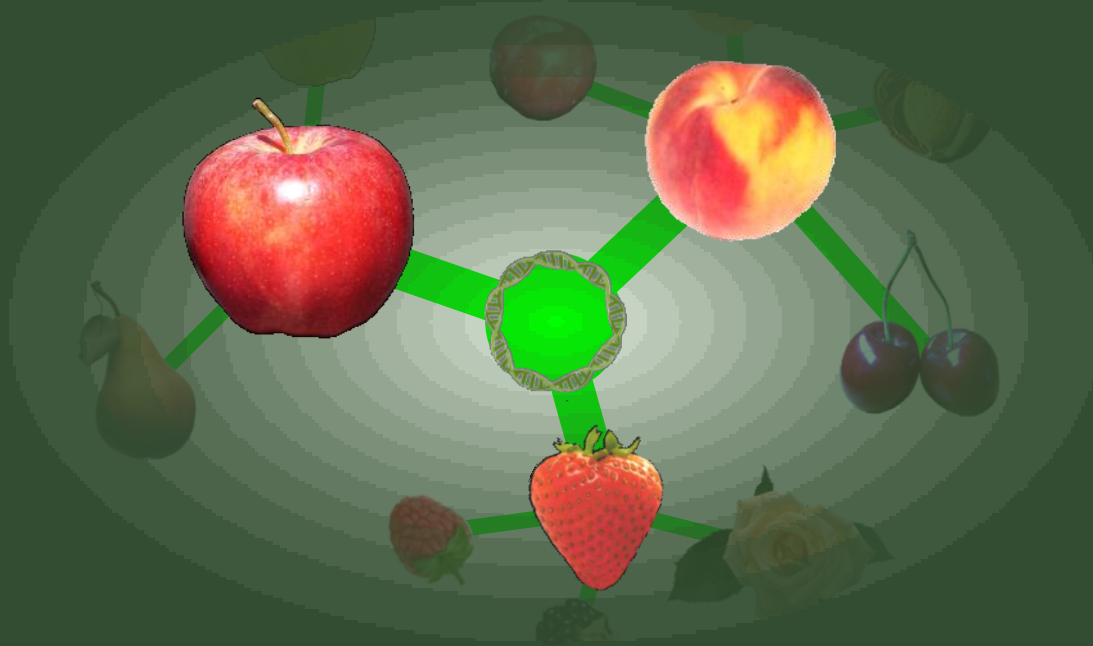


# Reason for using marker-assisted breeding technology



# Reasons for NOT using marker-assisted breeding technology





# Relative Importance of Genetic Traits for Five Crops

# Highest ranked traits: Apple

Apple Scion			Apple Rootstock		
Trait Name	Rank	Likelihood	Trait Name	Rank	Likelihood
Fruit crispness	5.00	96.40	Bearing precocity	5.00	96.00
Fruit juiciness	5.00	96.00	Dwarfing	5.00	96.00
Consistent quality during storage	5.00	88.00	Fire blight	5.00	96.00
Shelf-life	5.00	87.00	Productivity	5.00	95.00
Acid/sugar balance	4.75	84.50	Plant vigor	5.00	95.00
Flavor	4.75	79.25	Root rot	5.00	95.00
Storage disorders	4.60	89.20	Winter hardiness	4.00	78.00
Fruit firmness	4.60	79.20	Rooting ability	4.00	71.00
Fire blight	4.60	69.00	Production consistency	4.00	70.00
Sweetness	4.40	71.20	Suckering	4.00	59.00



# Highest ranked traits: Sweet and Tart Cherry

Sweet Cherry Scion			Tart Cherry Scion		
Trait Name	Rank	Likelihood	Trait Name	Rank	Likelihood
Fruit firmness	5.00	100.00	Fruit firmness	5.00	100.00
Fruit size	5.00	100.00	Fruit shape	5.00	100.00
Powdery mildew	5.00	96.00	Fruit uniformity	5.00	100.00
Extended harvest season	5.00	89.00	Pit shape and size	5.00	100.00
Self fertility	5.00	89.00	Pit splitting and fragments	5.00	100.00
Skin color	5.00	78.00	Machine harvest ability	5.00	100.00
Resistance to frost injury	5.00	73.00	Graft compatibility	5.00	100.00
Other disease-viral	5.00	44.00	Production consistency	5.00	100.00
Flavor	4.00	80.00	Skin color	5.00	56.00
Fruit juiciness	4.00	50.00	Flesh color	5.00	55.00





# Highest ranked traits: Peach

Peach Scion			
Trait Name	Rank	Likelihood	
Fruit firmness	4.88	92.25	
Fruit uniformity	4.75	85.88	
Fruit shape	4.71	83.29	
Fruit size	4.63	88.75	
Production consistency	4.63	87.50	
Sweetness	4.63	76.38	
Flavor	4.60	82.60	
Productivity	4.57	89.57	
Heat tolerance	4.57	70.57	
Soluble solids(Brix)	4.50	83.25	



# Highest ranked traits: Strawberry

Strawberry		
Trait Name	Rank	Likelihood
Flavor	4.89	94.56
Productivity	4.75	88.50
Shelf-life	4.67	83.89
Fruit size	4.60	88.70
Skin color	4.56	88.33
Extended harvest season	4.50	74.00
Production consistency	4.50	71.60
Fruit firmness	4.40	86.20
Shipping ability	4.33	81.78
Root rot	4.33	76.00



# Highest ranked traits: Other berries

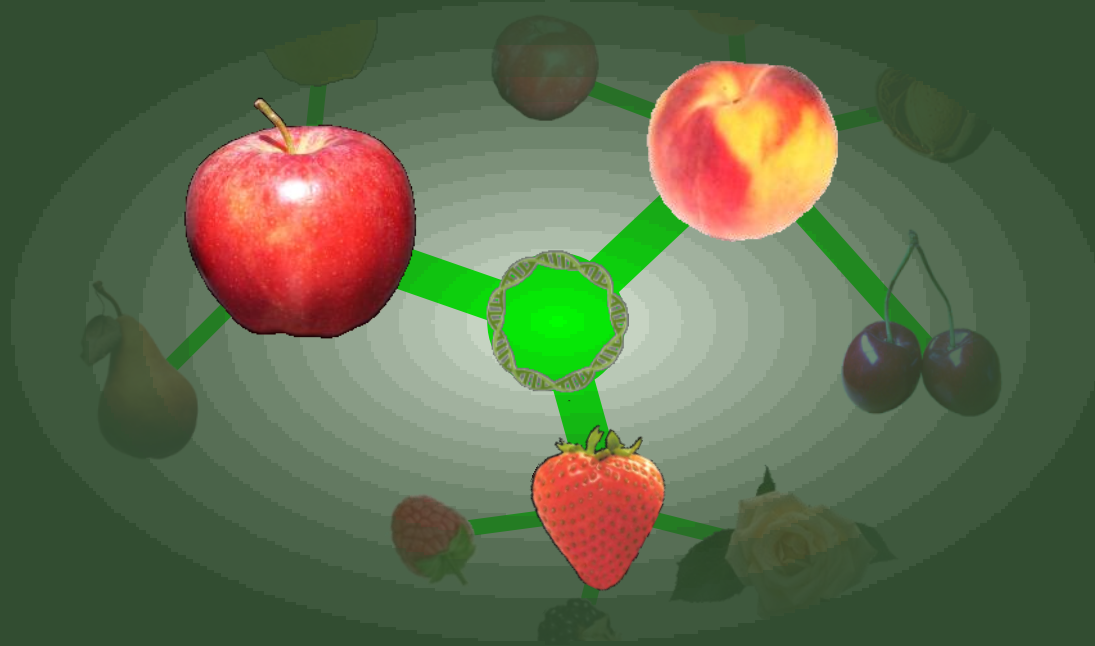
Black Raspberry			Blackberry			Red Raspberry		
Trait Name	Rank	Likelihood	Trait Name	Rank	Likelihood	Trait Name	Rank	Likelihood
Flavor	5.00	100.00	Winter hardiness	5.00	89.00	Fruit firmness	4.83	92.83
Productivity	5.00	100.00	Thornless	4.75	99.50	Flavor	4.80	88.20
Skin color	4.50	89.00	Seediness	4.67	78.33	Drupelet cohesion	4.50	85.67
Production consistency	4.50	88.50	Fruit firmness	4.50	93.00	Fruit size	4.50	84.50
Plant vigor	4.50	88.00	Flavor	4.50	92.75	Fruit uniformity	4.50	82.83
Seediness	4.50	84.50	Sweetness	4.50	90.25	Productivity	4.40	84.80
Thornless	4.50	75.00	Production consistency	4.50	90.00	Shipping ability	4.40	79.20
Machine harvest ability	4.50	58.00	Soluble solids (Brix)	4.50	89.25	Shelf-life	4.40	78.00
Fruit firmness	4.00	85.50	Titratable acidity	4.50	87.25	Winter hardiness	4.33	62.67
Fruit juiciness	4.00	79.50	Drupelet size	4.50	74.00	Skin color	4.20	76.60



# Highest ranked traits: Other crops

Apricot Scion			Plum Scion			Rose		
Trait Name	Rank	Likelihood	Trait Name	Rank	Likelihood	Trait Name	Rank	Likelihood
Fruit firmness	5.00	92.00	Productivity	5.00	90.67	Graft compatibility	5.00	93.00
Sweetness	5.00	90.00	Soluble solids (Brix)	5.00	89.33	Rose black spot Extended bloom season	5.00	100.00
Titrateable acidity	5.00	90.00	Sweetness	5.00	61.33	Winter hardiness	5.00	96.50
Soluble solids (Brix)	5.00	89.00	Fruit firmness	4.67	89.00	Other disease - fungal	5.00	65.00
Flavor	5.00	85.00	Flavor	4.67	89.00	Productivity	5.00	42.50
Aromatics/volatiles	5.00	84.00	Fruit size	4.67	81.33	Plant architecture	4.50	75.00
Extended harvest season	5.00	83.00	Production consistency Extended harvest season	4.67	80.67	Plant vigor	4.50	55.00
Heat tolerance	5.00	58.00	Pre-harvest dropping	4.50	57.50	Bearing precocity	4.50	30.00
Pre-harvest dropping	5.00	28.00	Storage disorders	4.50	50.00	Production consistency	4.50	0.00
pH	5.00	25.00						





# Apple Variety Choices Based on National Household-level Data

# What was done?

- Combine prices, household demographics, and state dependence variables, as well as regional and seasonal information to analyze household apple variety choices and purchases.



# Price and income elasticities

- Red Delicious appear to be more price sensitive than other varieties
- Higher income consumers purchase fewer apples
  - Possible substitution effect with other fruits?



Photo courtesy of Kate Evans



# Age of head of household

- Households with older heads are less likely to buy Granny Smith apples

- Crisp texture when eaten raw?



Photo courtesy of Kate Evans

- Quantities of Red Delicious and Gala are positively affected by age

- Younger consumers may be more open to new varieties



Photo courtesy of Kate Evans



# Kids present in household

- Households with children are more likely to buy RD, GS, and GD varieties



# College educated head of household

- Higher education households less likely to buy RD and GD varieties
- Higher education positively affects the quantity purchased of all varieties



# Acknowledgements



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# Questions?

