BC Breeding Program Update

MICHAEL DOSSETT – BCBC, RIDC, BCSGA

Thank You!

- **RIDC, BCBC, BCSGA, LMHIA, WRRC, Littau Harvester**
- **Georgia Kliever, Gosia Zdanowicz, Carol Koch, Rob Hildebrandt, Chaim Kempler, Rishi Burlakoti, Jim Nicholson**
- **Eric Gerbrandt , Carolyn Teasdale, Mark Sweeney, Karina Sakalauskas, Siva Sabaratnam, Tom Baumann, Jason Smith, Mike Makara, Rudi Janzen, Berry Haven Farm, Jordan Alamwhala, Amrit Brar**
- **Amanda Herfst, Ariel Brown, Meghan Samoyloff, Katie Galliazzo, Celia Stewart, Mark Schmidt, Aleesha Jones, Joanna Zhu, Angel Chu, Aiyana Gagnon-Bounaix, Richard Kunze, Hongjie Zhang, Jeremy Poortvliet, Shayne Oberhoffner, Leah Hamm, Karen Fech**
- **Agriculture and Agri-Food Canada (AAFC)**

Anyone else I may have inadvertently left off!

CAP Breeding Activities…

Activity 2: Berry Germplasm Development for the Fraser Valley

Activity 3: Berry Cultivar Finishing for the Fraser Valley

Activity 4: Raspberry Redomestication

Approximately: 55% Blueberry, 40% raspberry, 5% strawberry

- Blueberry: Fruit quality - especially firmness and bruising
- Raspberry: Machine harvestability, root rot tolerance, earliness
- Strawberry: Day-neutral alternatives to Albion

Breeding Timeline…

Year 1 - Make crosses, plant seedlings

Years 3,4 - Evaluate seedlings, make and propagate selections

Years 6,7 - Begin evaluation of selections

Year 8 or so - Grower trials

Year ~15 – Release cultivar

2019 Blueberries By The Numbers…

>8,000 seedlings from 2018 crosses finishing in gallon pots

61 new crosses – germination already started

Evaluated ~6,000 seedlings in field; >70 new selections made

Harvested/evaluated 90 plots in yield trials

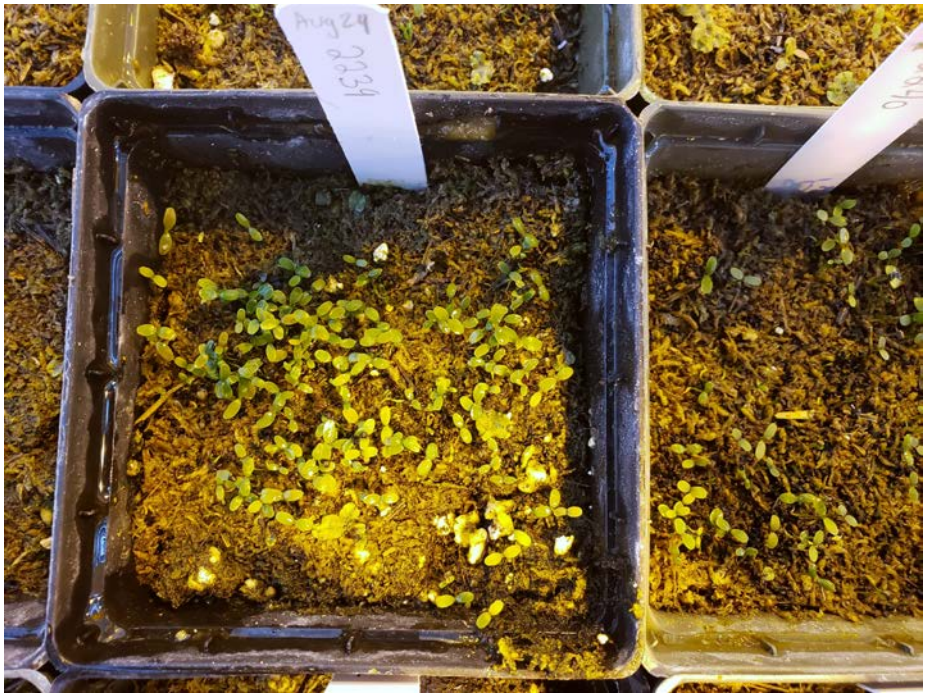
Flagged for grower trial:

- BC 14-40-158
- BC 14-40-14
- BC 18-18-154
- BC 18-19-51
- BC 18-19-127

For 2020:

BC 12-6-8

BC 14-8-76




12
BC 12-6-8

BC 14-40-158

Upright, narrow, vase-shaped bush

Early-midseason – Bluecrop, maybe slightly earlier

Medium-sized, medium blue colour, very good flavour

Firmness similar to ‘Draper’

Sets **a lot** of flower buds, pruning will probably be important


BC 1667.164


BC 17-34-98


BC 17-13-2


BC 1667.119

Progra

- Develop vari rkets
  - Machine-h (#3)
  - Firmer fruit
  - Span seaso
  - Shock and
  - Improved t
  - Improved r seases

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Breeding Trait Priorities of the Blueberry Industry in the United States and Canada

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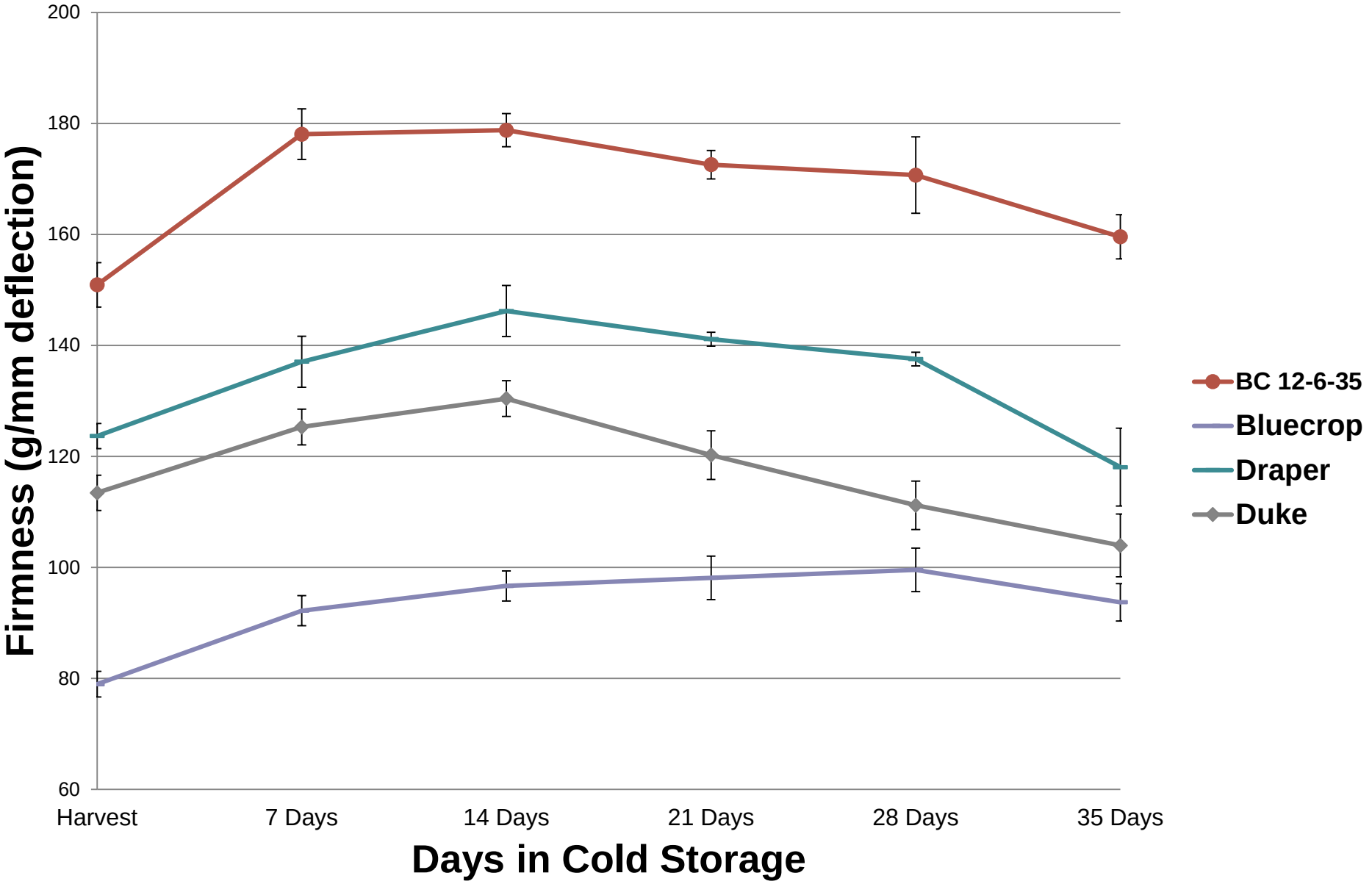
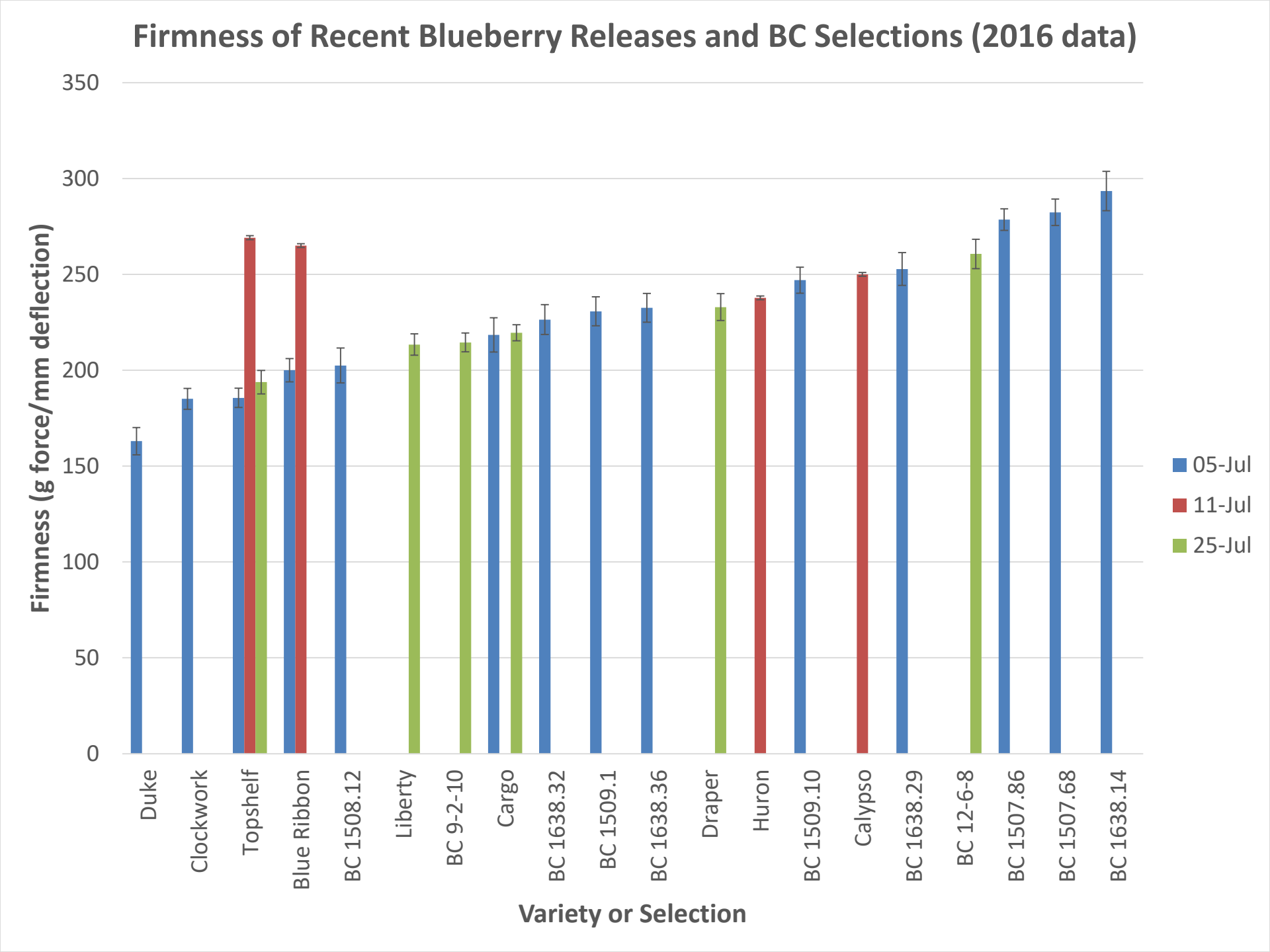
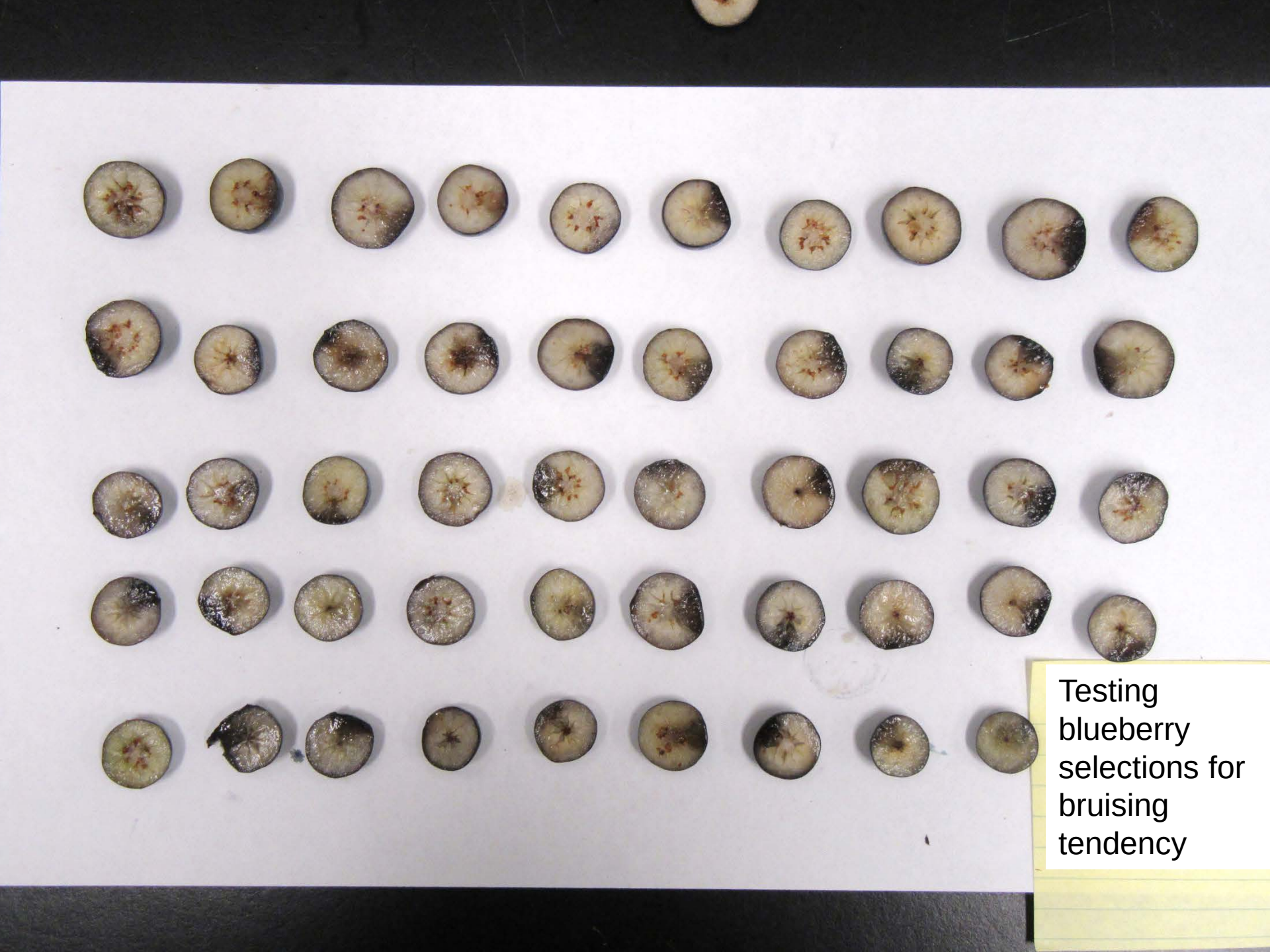
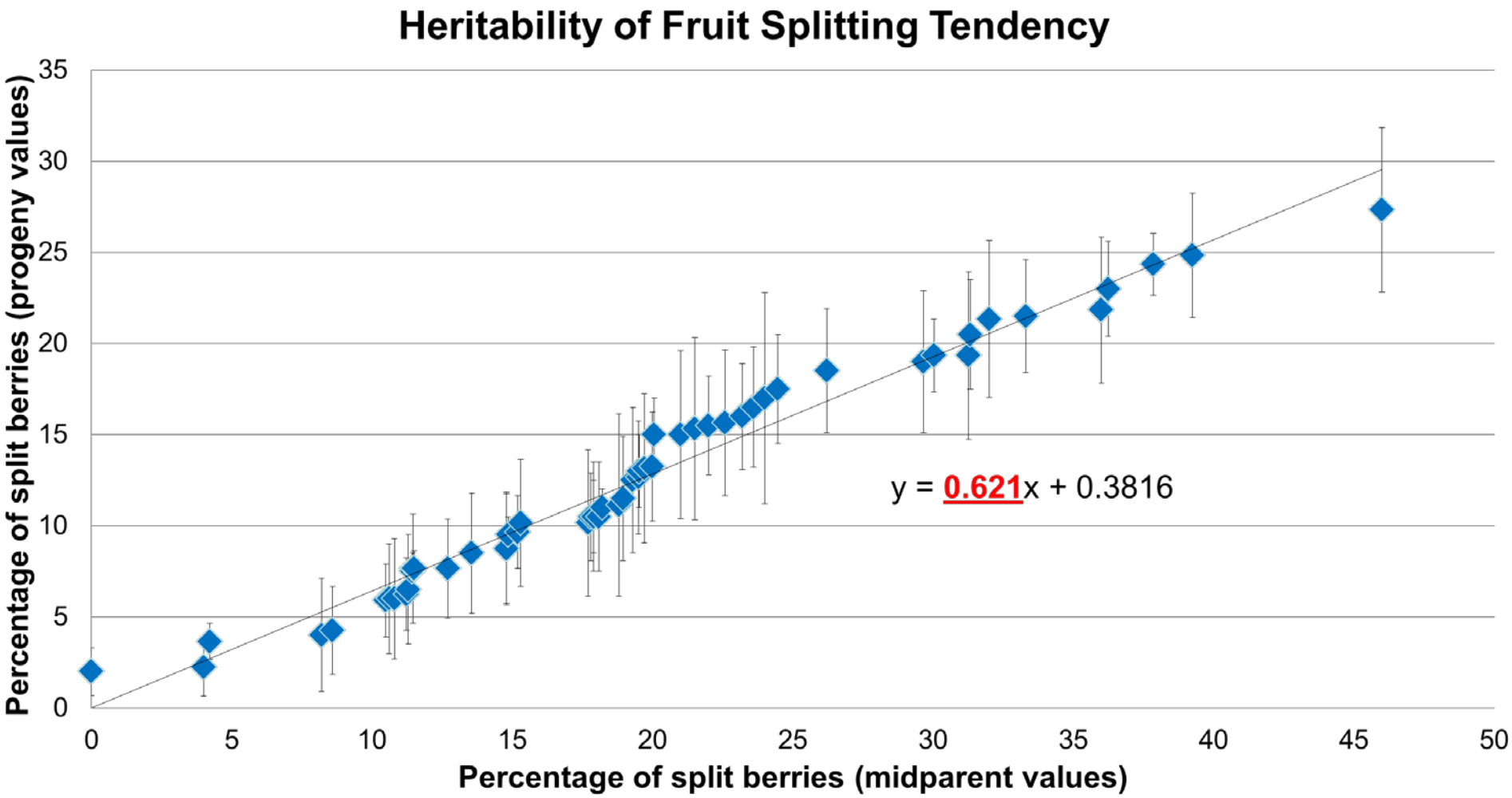
Firmness After Cold Storage of Hand-harvested Blueberry Fruit




Firmness of Recent Blueberry Releases and BC Selections (2016 data)
Firmness (g force/mm deflection)
350
300
250
200
150
100
50
0
Duke
Clockwork
Topshelf
Blue Ribbon
BC 1508.12
Liberty
BC 9-2-10
Cargo
BC 1638.32
BC 1509.1
BC 1638.36
Draper
Huron
BC 1509.10
Calypso
BC 1638.29
BC 12-6-8
BC 1507.86
BC 1507.68
BC 1638.14
Variety or Selection
05-Jul
11-Jul
25-Jul


Testing
blueberry
selections for
bruising
tendency

Heritability of Fruit Splitting Tendency



Longer Term Blueberry Projects

Continuing to collect firmness, bruising and splitting tendency data on breeding program selections

Identify genetic regions associated with firmness, bruising resistance and splitting tendency

Identify genetic markers linked to BShV susceptibility as well as flower bud initiation

Markers/feasibility for breeding to avoid Green Fruit Drop (‘Draper’ Drop)?

Pathology collaborations focused on Botrytis and Pseudomonas

2019 Raspberries By The Numbers…

~3700 seedlings planted from 2018 crosses

89 new crosses – germination complete

Evaluated ~4,300 seedlings in field; >80 new selections made

Harvested/evaluated 160 yield trial plots; made ~250 eliminations

Bulking for grower trial:

- BC 10-71-27
- BC 10-79-33
- BC 10-84-9
- BC 1653.7

Other Raspberry Projects…

Mapping resistance to Phytophthora root rot, aphids, and RBDV

- Speed up process of reliably identifying resistant selections and parents
- Combine different sources of resistance to improve durability
- Identify correlations and linkages with other traits

Tools to Aid in Selection for Factors Impacting Crop Longevity

Other Raspberry Projects…

Understanding genetic structure of earliness and yield components

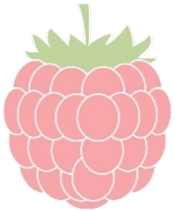
- Earliness and yield appear to be negatively correlated
- Identify yield components NOT negatively correlated with earliness
- Identify outlier genotypes for use as parents

Develop Strategies for Improving Yield and Earliness Simultaneously

Other Raspberry Projects…

Collecting data on fruit quality parameters over range of germplasm

- Firmness, Fruit Size, Color, Brix, pH, Titratable Acidity, (anthocyanins?)
- Identify potential parents to consider in future
- Better understand trait heritability
- Prepare for future genomics work (Genome-Wide Association Study)

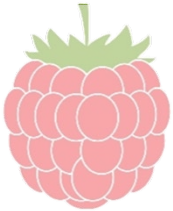


<u>Data Will Inform Breeding Strategy While Setting Up for Potential Future Work.</u>

Other Raspberry Projects…

Developing economic models for raspberry breeding and selection

- Revisit assumptions about drivers of profitability
- Identify traits that are most easily manipulated to improve bottom line
- Quantify how a new release will be helpful to producers



<u>Improve the Economic Equation for Growers</u>

2019 Strawberries By The Numbers…

No new seedlings in 2019

Evaluated ~3,500 seedlings in field; 18 new selections made

New large yield trial established

Bulking for trials:

- BC 10-2-1

Questions?

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