

ROSBREED

Enabling marker-assisted breeding in Rosaceae

Infinium SNP genotyping in *Prunus*

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Outline of Presentation

- ❖ Peach SNP array design
- ❖ Peach SNP array evaluation
- ❖ Cherry SNP chip array design
- ❖ Cherry SNP chip evaluation

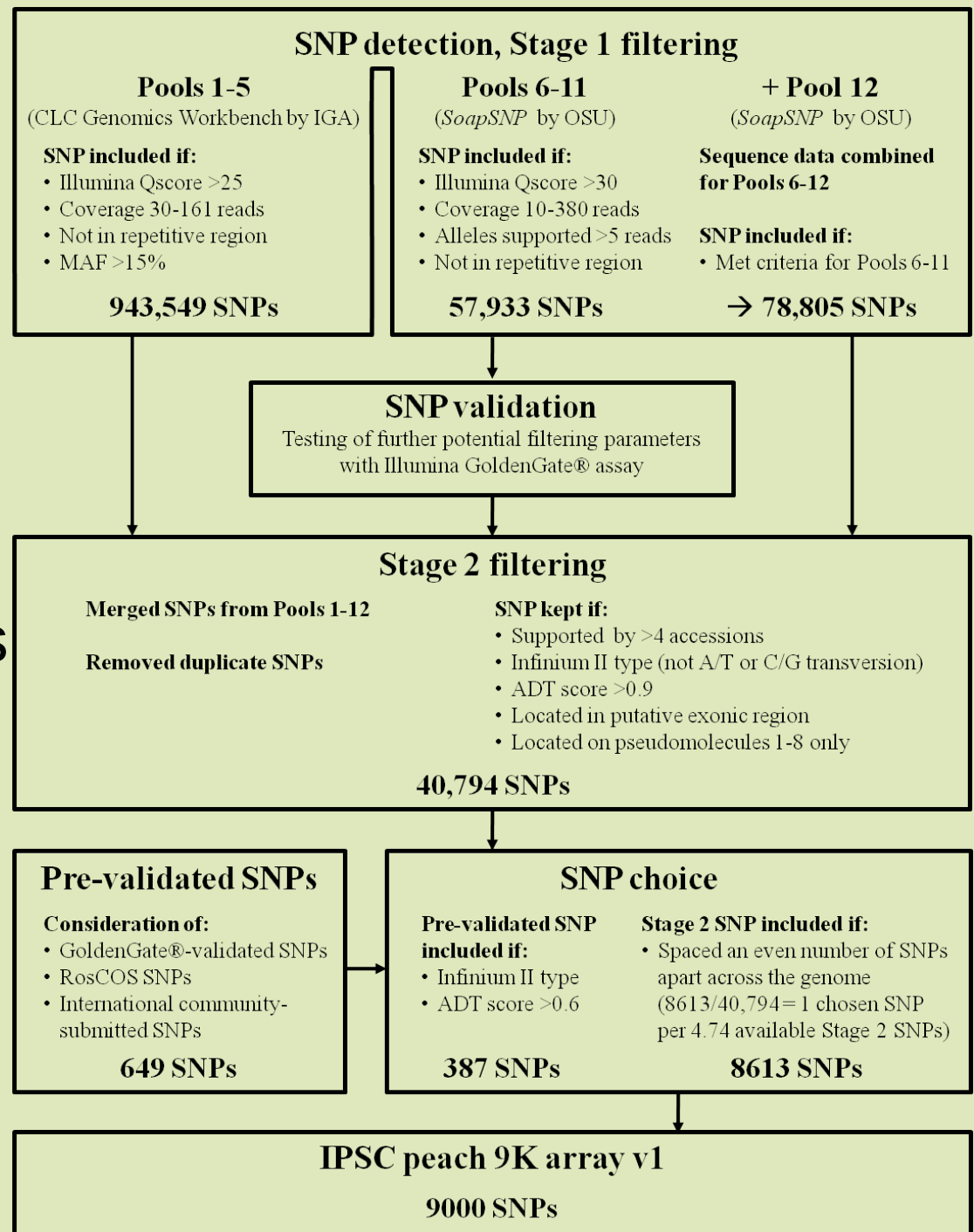


9,000 SNPs

International Peach SNP Consortium
peach 9K SNP array v1



Workflow of SNP Detection through Validation to Choice of SNPs for the final array



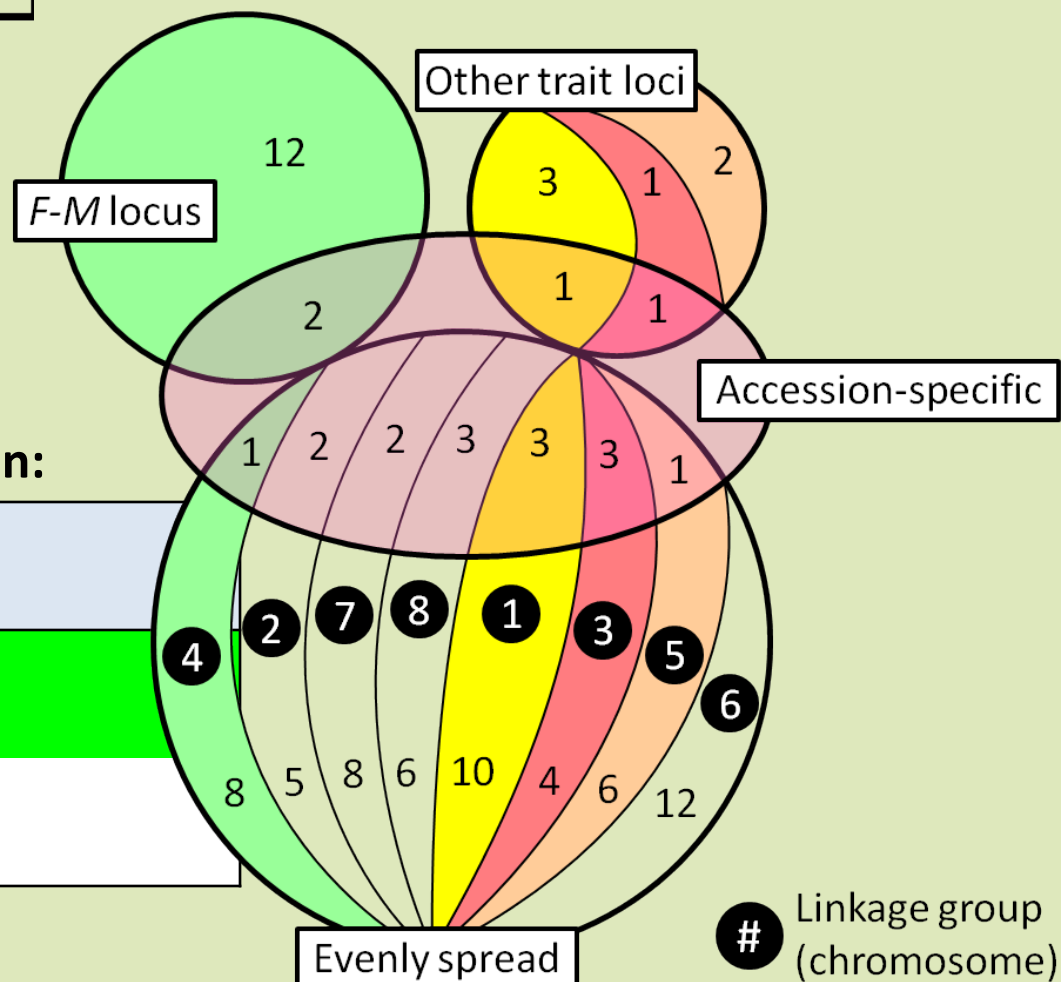
SNP validation

Testing of further potential filtering parameters
with Illumina GoldenGate® assay

96 SNPs screened via
GoldenGate on 160 peach
accessions

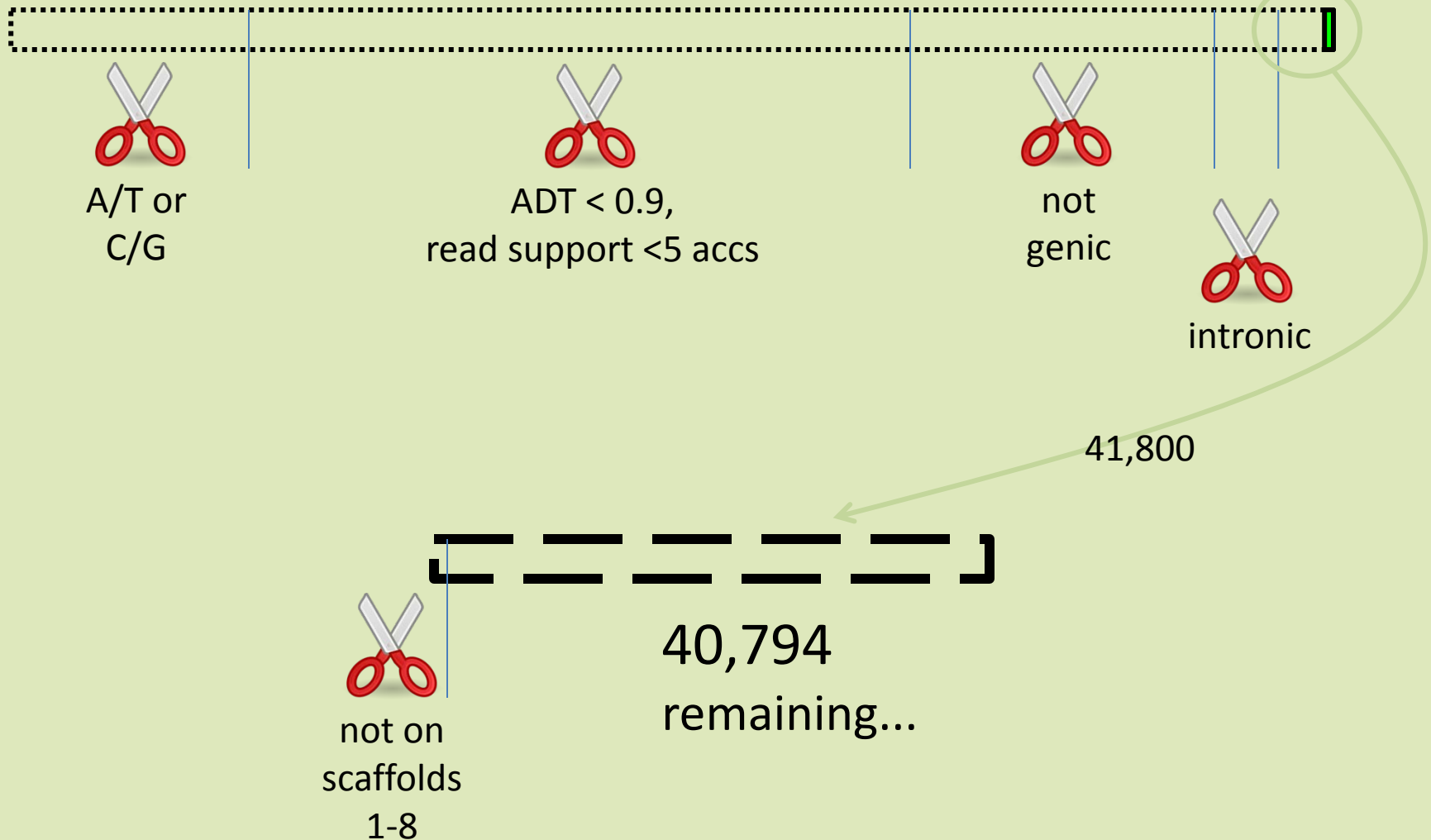
Results of the GoldenGate validation:

SNP parameter	Total	Polymorphism proportion
Exonic	30	77%
Intronic	19	74%
UTR	16	50%
Intergenic	31	32%



CHOICE of 9,000 SNPs for final array

1,000,000 SNPs -----> 9,000 SNPs



649 “pre-validated”

- 55 GoldenGate validated
- 453 RosCOS
- 108 Drupomics (Ignazio Verde)
- 33 Chile (Herman Silva)



A/T or C/G,
ADT <0.6

387 included

- 45 GoldenGate validated
- 225 RosCOS
- 87 Drupomics (Ignazio Verde)
- 30 Chile (Herman Silva)

9,000 SNPs

8,144 SNPs on array

Out of 40,794 Stage 2 SNPs 8,613, spaced at one per
~5 SNPs were chosen along 8 pseudomolecules

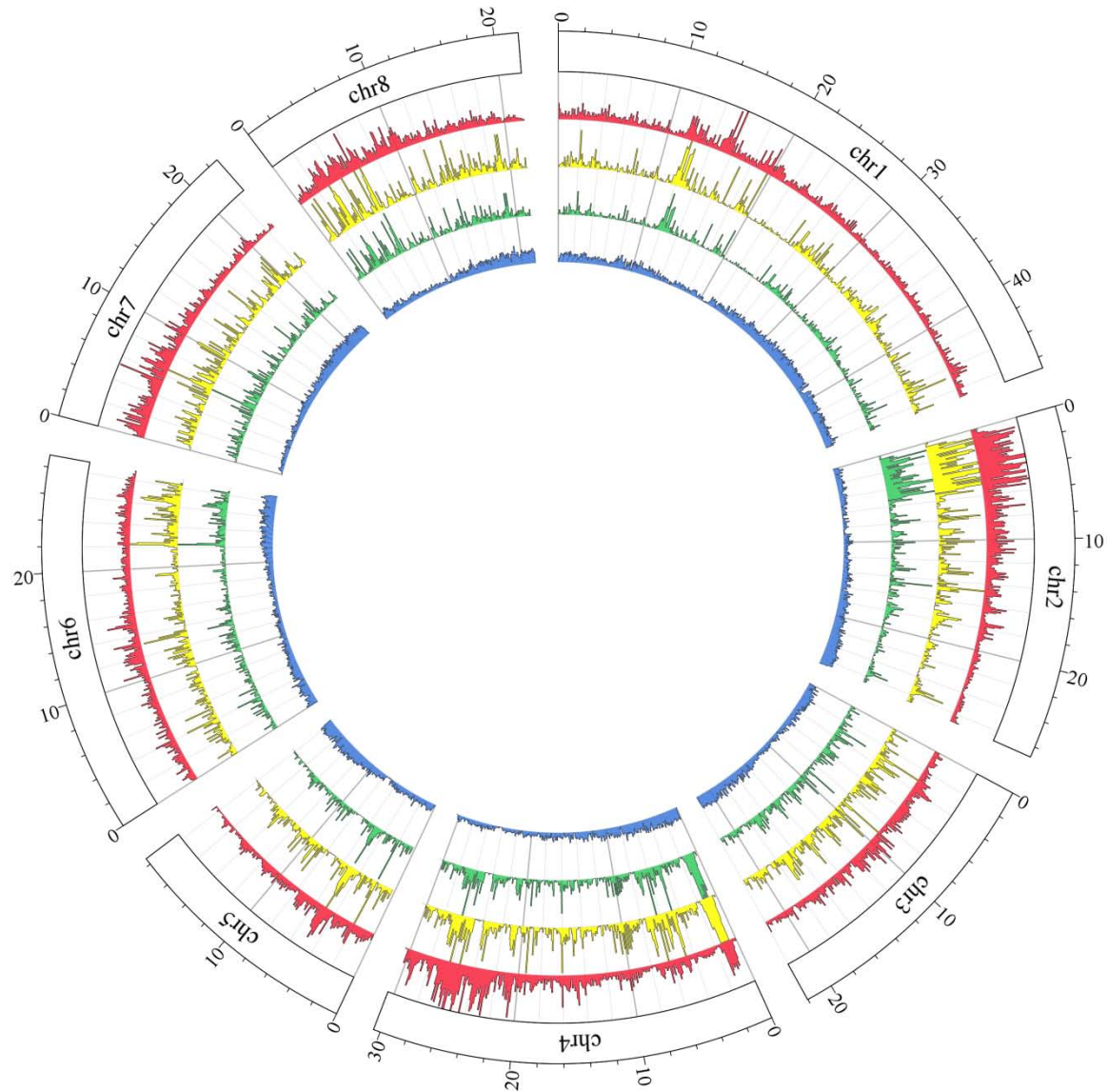
Distribution of SNPs along the Peach v1.0 pseudomolecules

Distribution of
SNPs from pool 1-
5 (943,549) in
100Kb window .
 $y=0-2000$

Distribution of
Stage 2 SNPs
(40,794) in 100Kb
window . $y=0-100$

Distribution of
9,000 SNPs in
100Kb window .
 $y=0-30$

Proportion of
predicted CDS bp
in 100Kb window



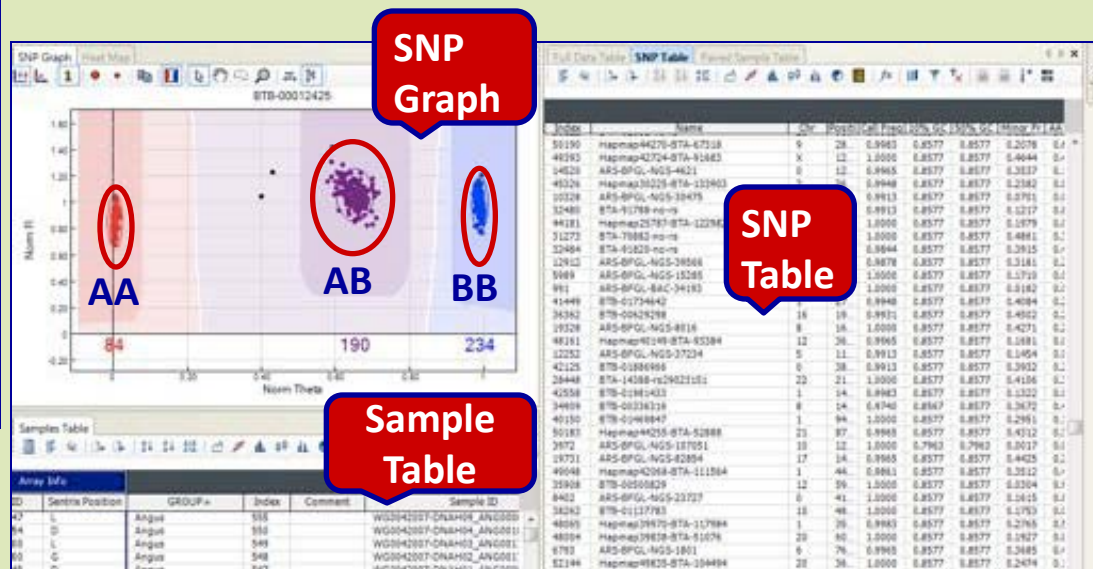
Evaluation

Infinium iSelect® HD Custom Genotyping

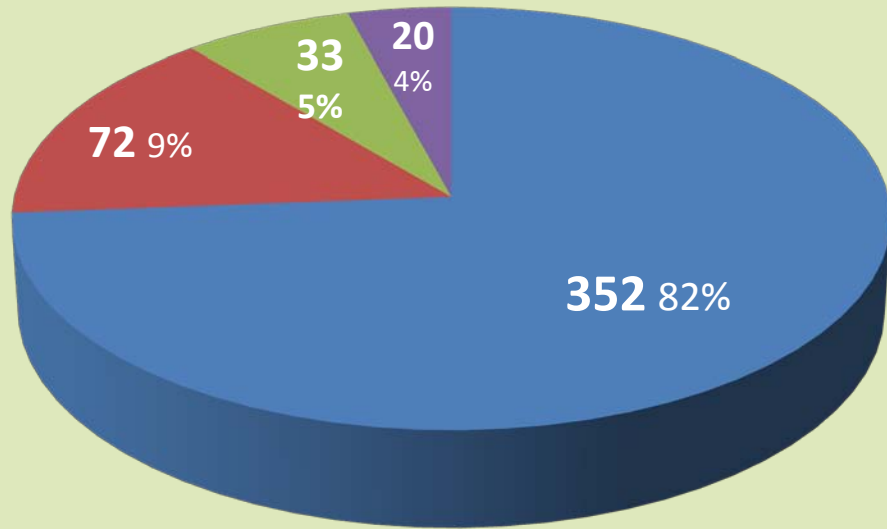
- 24 samples per chip



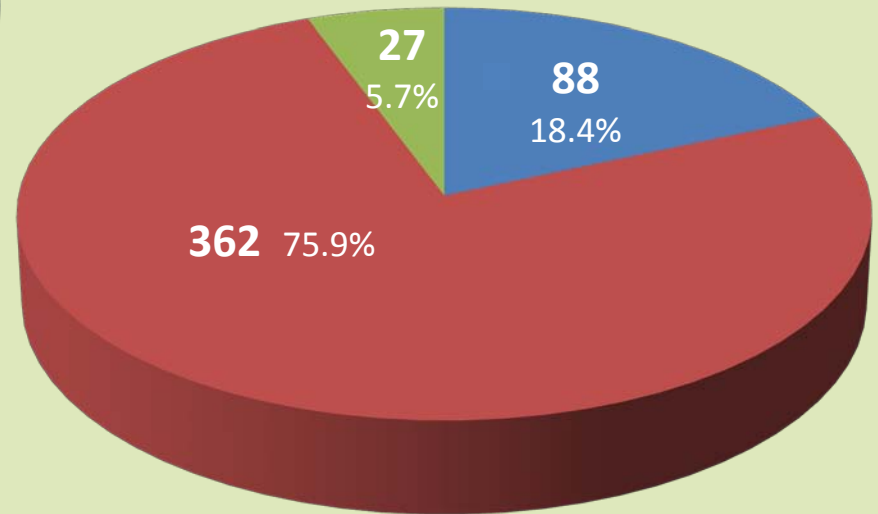
iScan



US material used to evaluate peach 9K Infinium® II array. Peach related samples include *Prunus davidiana* and *P. mira*; Almond related samples include *P. argentea* and *P. scoparia*



- Peach
- Almond
- Peach related
- Almond related

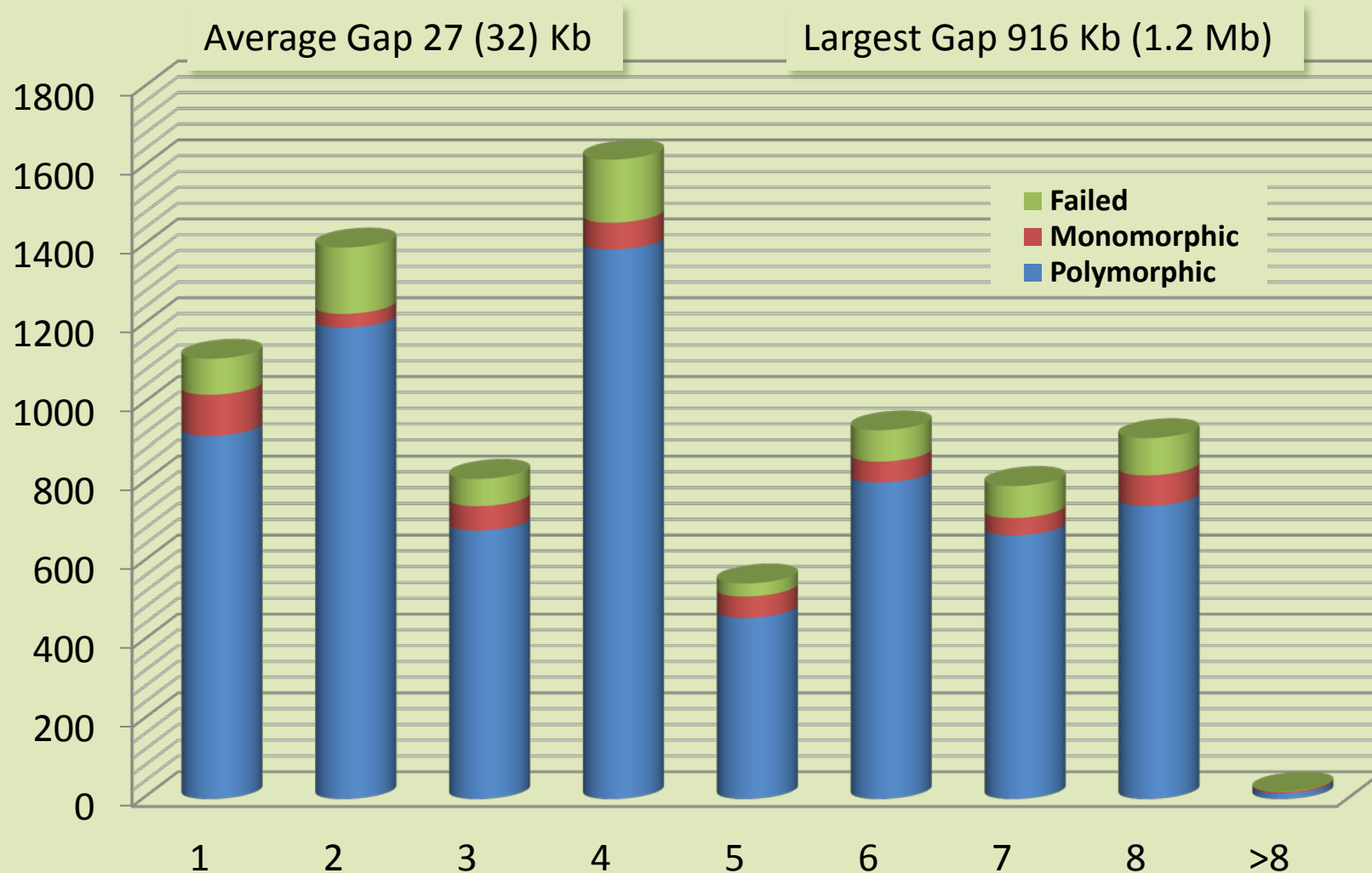


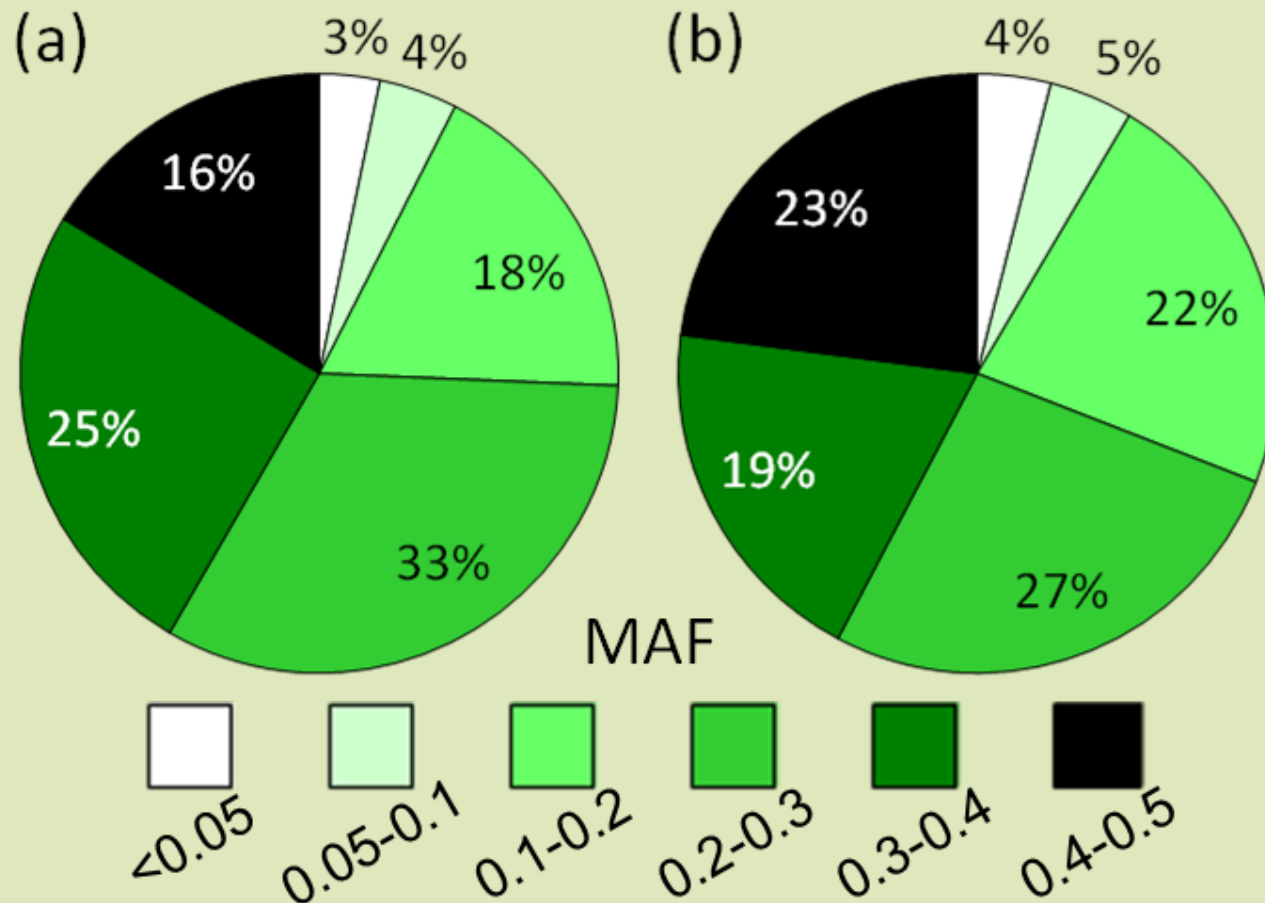
- Cultivars
- Seedlings
- Advanced selections

**EU material 90% peach 10%
peach related**

**90% peach 10% peach
related**

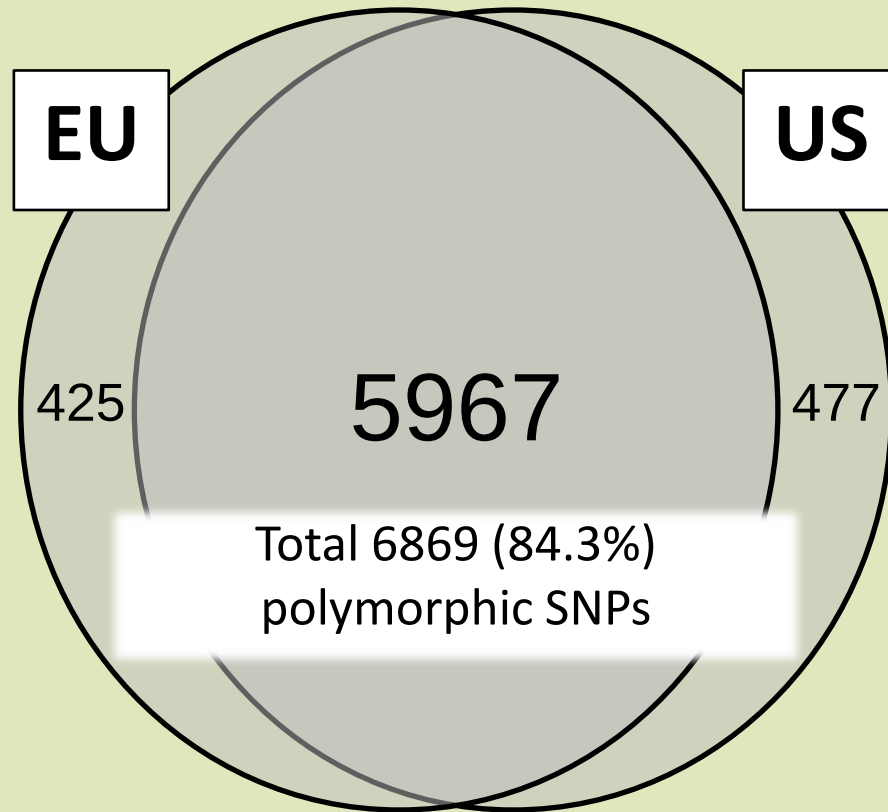
Performance of SNPs on 9K Infinium® II array (n=8144) using both EU and US data sets



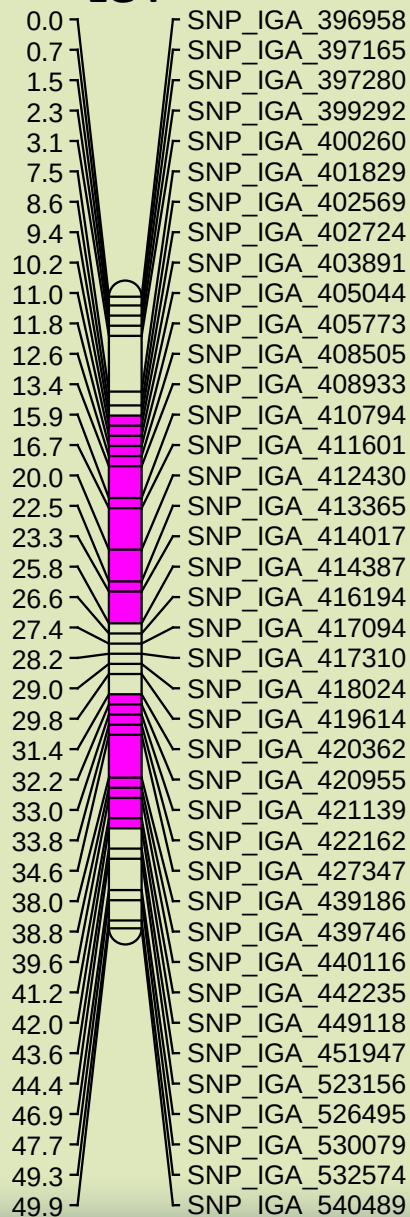


**Polymorphic SNPs Minor Allele Frequency in
EU (a) and US (b) data sets**

Polymorphic SNPs on 9K Infinium® II array (n=8144)

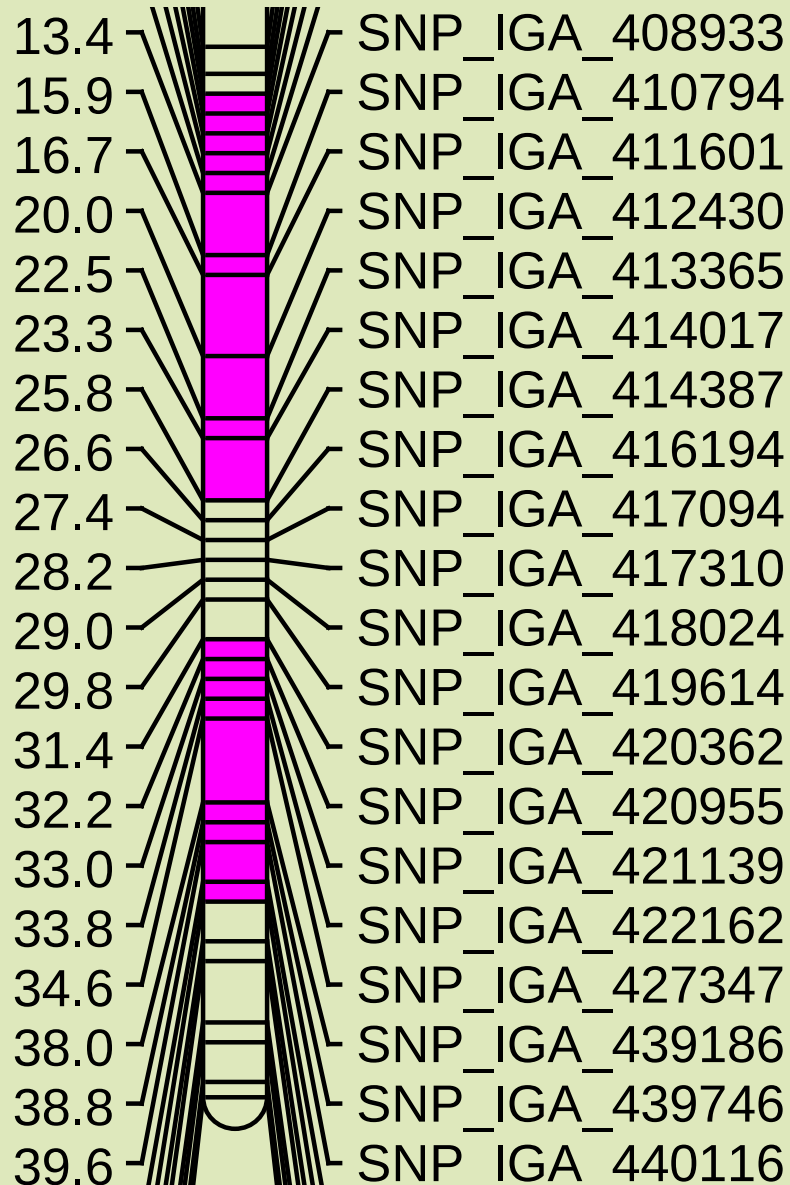


LG4



Xap.Pp.CO-4.1

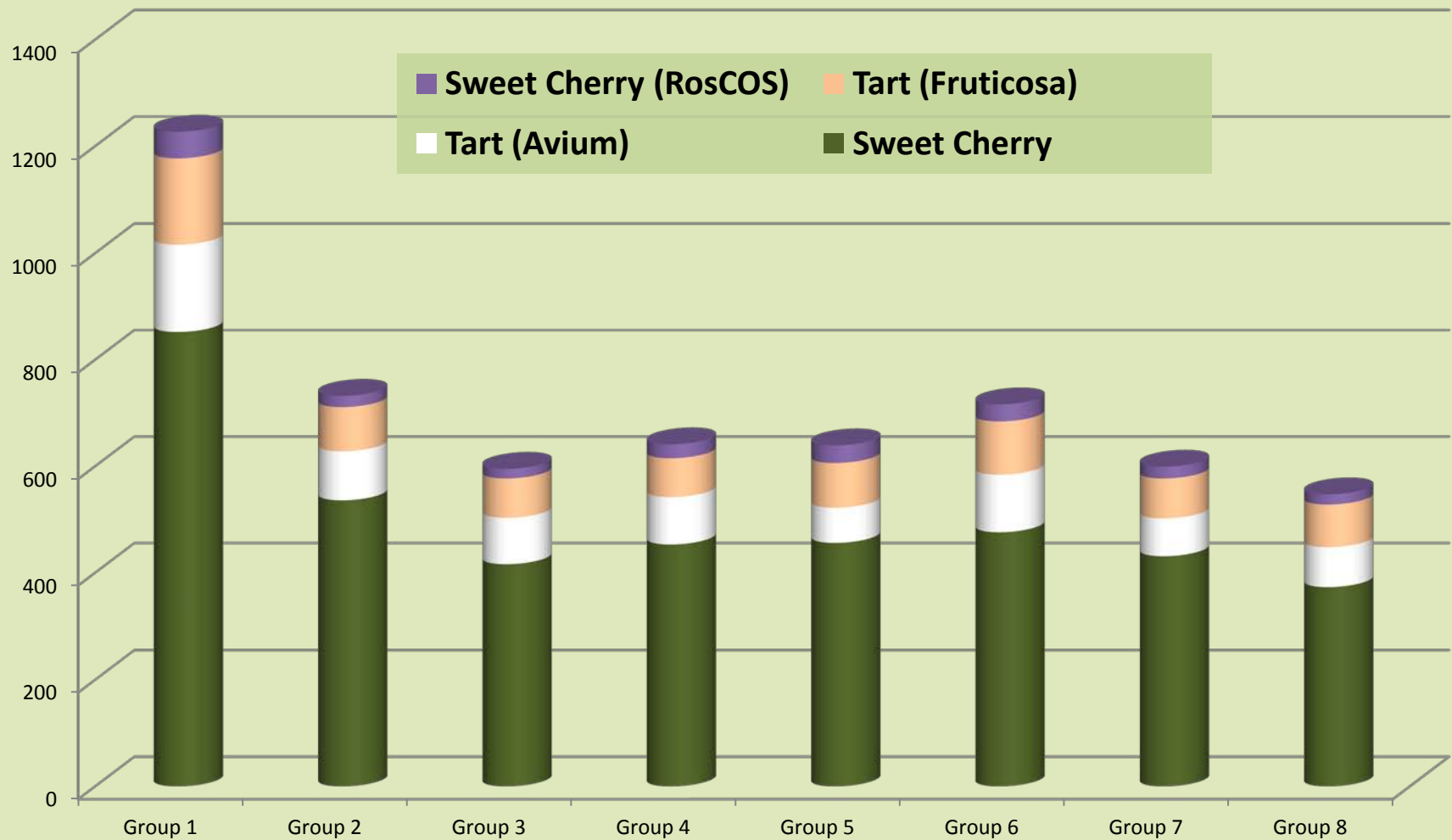
Xap.Pp.CO-4.2



Evaluation of Illumina 6K SNP array for sweet and tart Cherry

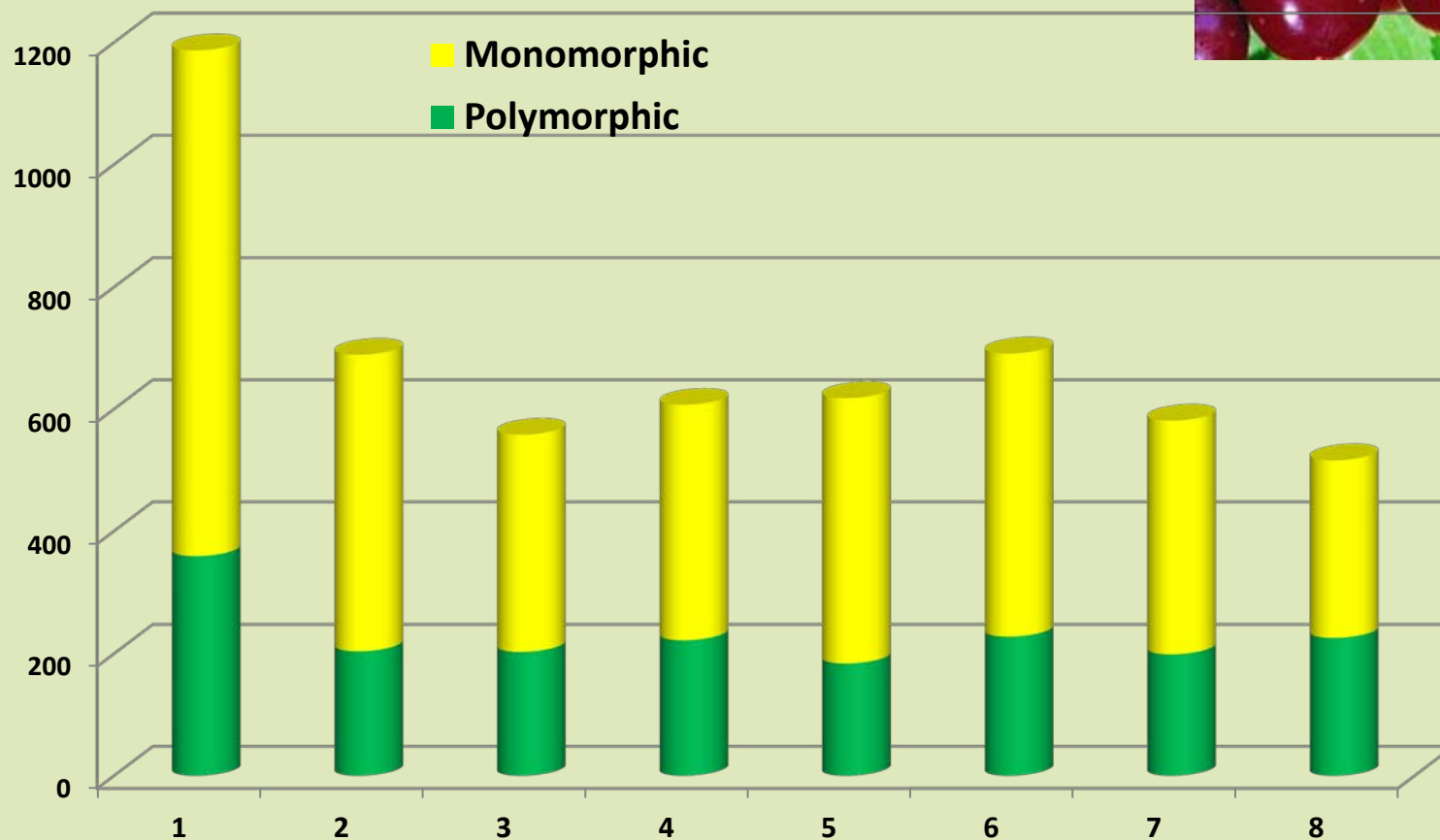


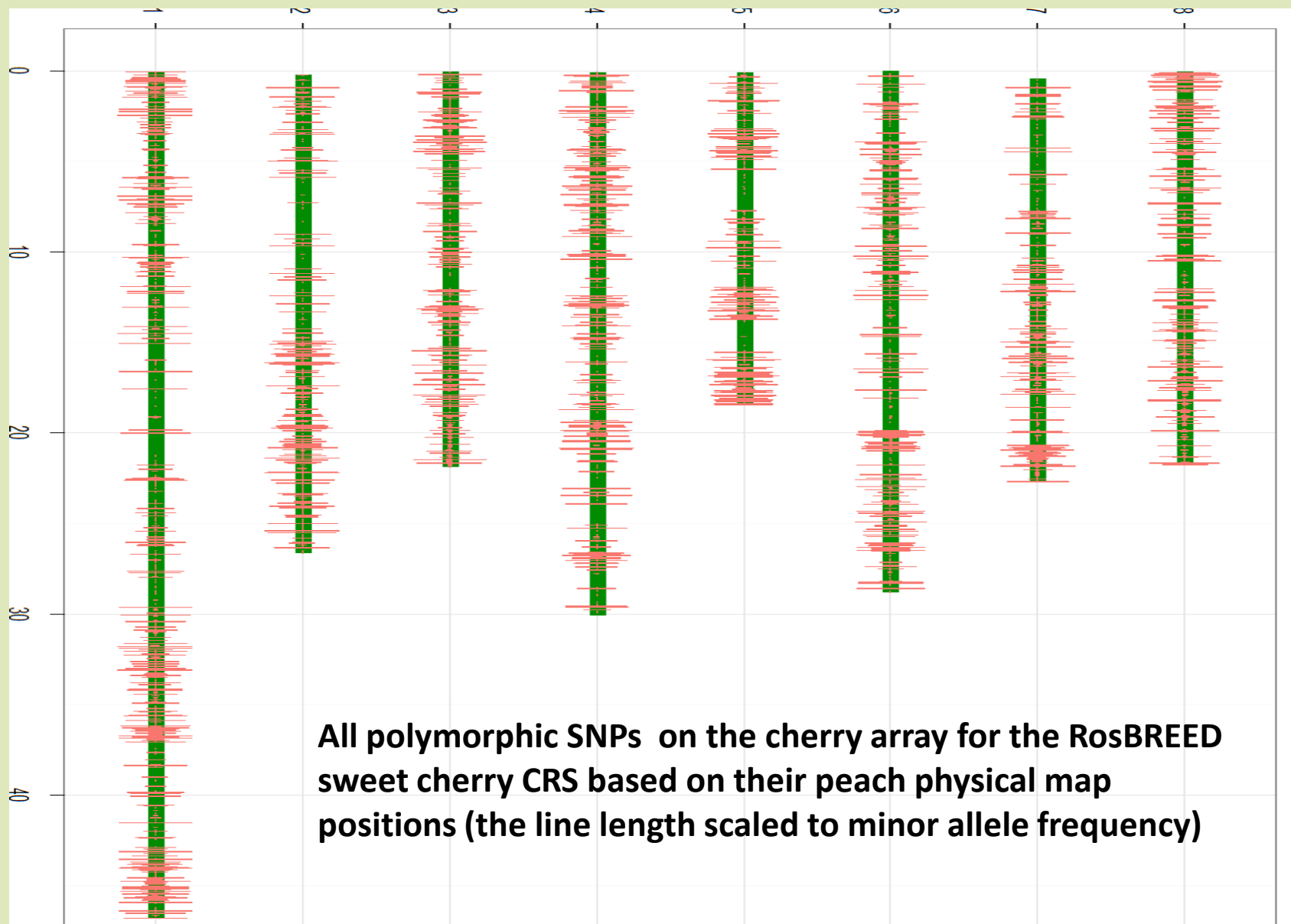
Total number of markers (n= 5696) grouped by chromosome



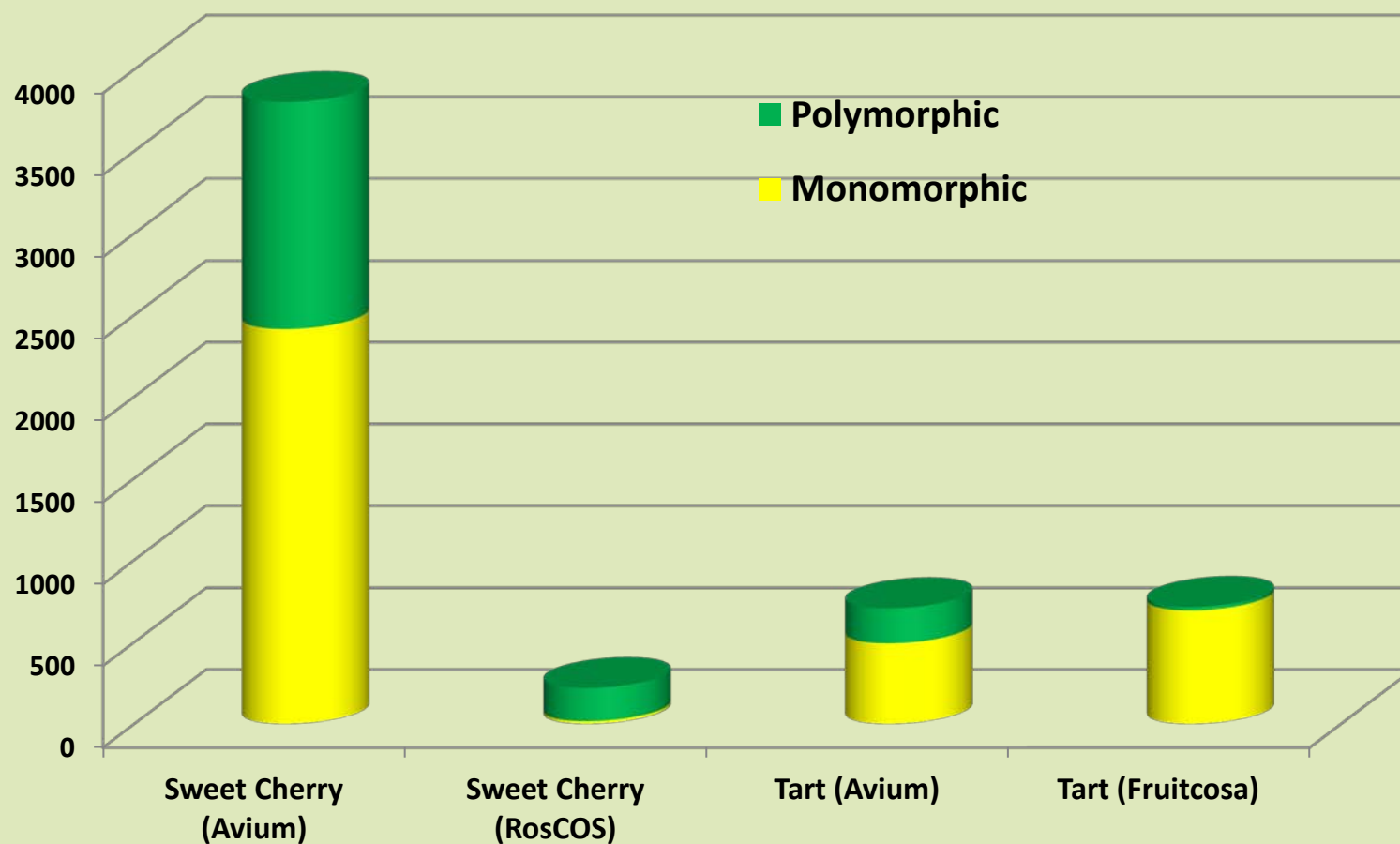
Sweet cherry

Polymorphic markers by chromosome (for all markers) based on the sweet cherry RosBREED Crop Reference Set (n=270)



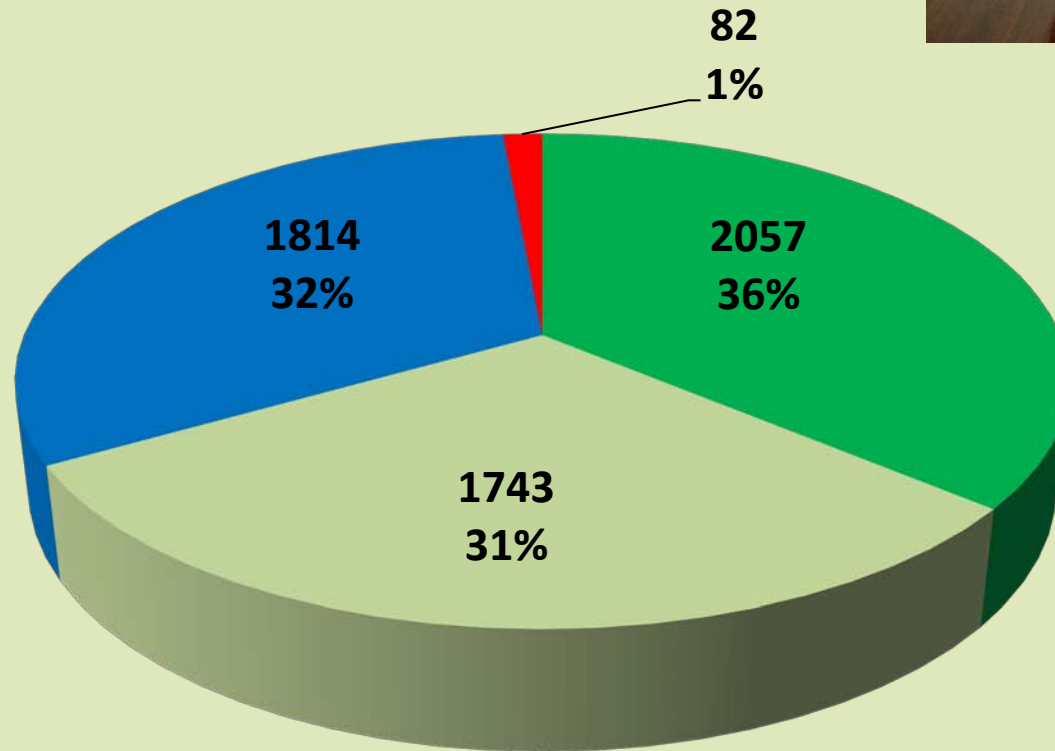


Polymorphism in Sweet Cherry by Source of SNP



Tart Cherry

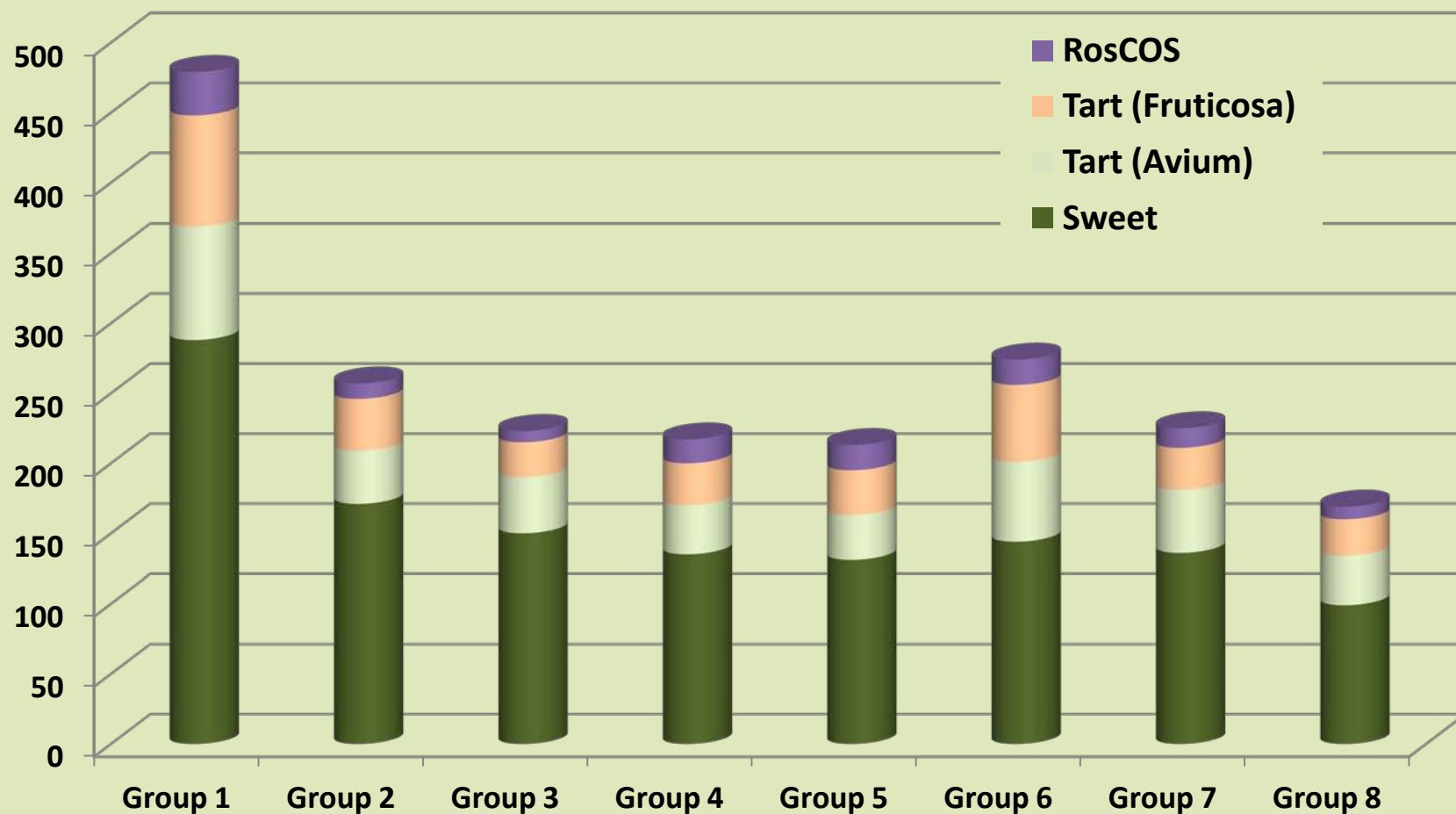
Performance of total number of SNPs from analysis of the RosBREED tart cherry crop reference set (n= 330)



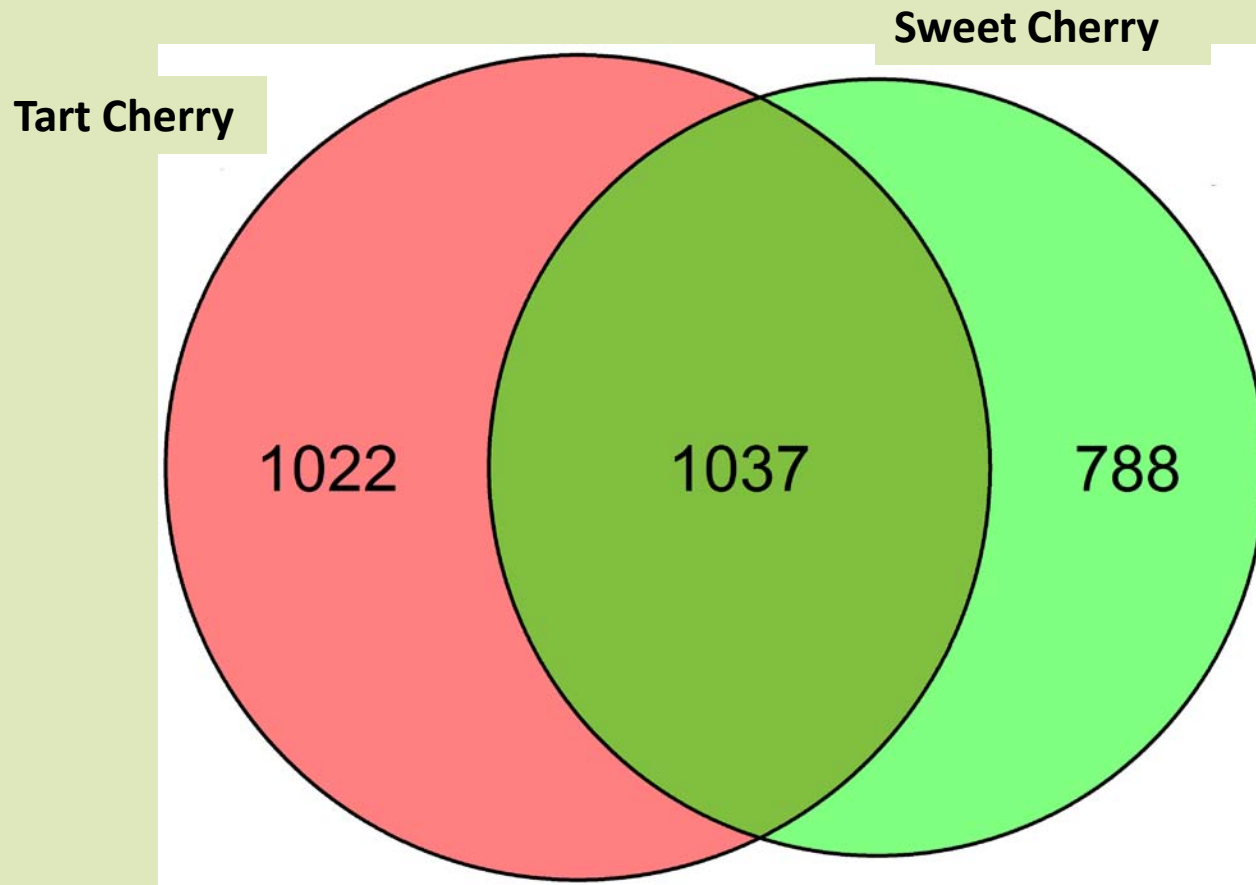
■ Polymorphic ■ Unresolved (Polymorphic) ■ Monomorphic ■ Failed



Number of polymorphic SNPs per chromosome by SNP Genome Source in the RosBREED Tart cherry Crop Reference Set (n=330)



Number of shared SNP polymorphisms for the tart cherry and sweet cherry CRS



Questions?



Acknowledgements



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