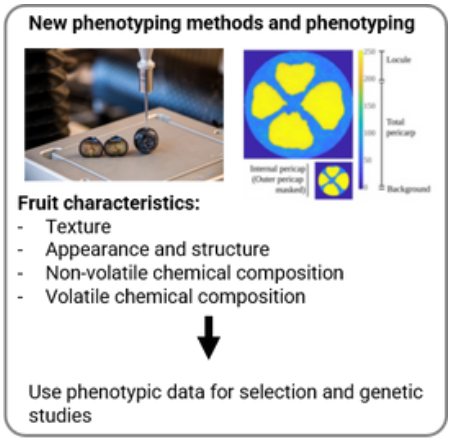
VacCAP

IMPROVING FRUIT QUALITY

ISSUE 12 | JULY 2025

BLUEBERRY PHENOTYPING, GENETICS, DNA MARKERS, AND FRUIT QUALITY

VacCAP Objectives 2 and 3 aimed to establish phenomics and DNA based strategies to select for improved fruit quality.



Phenotyping Fruit Characteristics

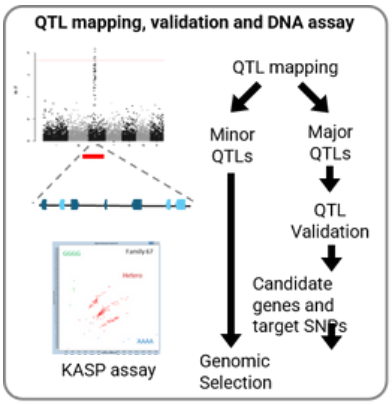
Phenotyping Team

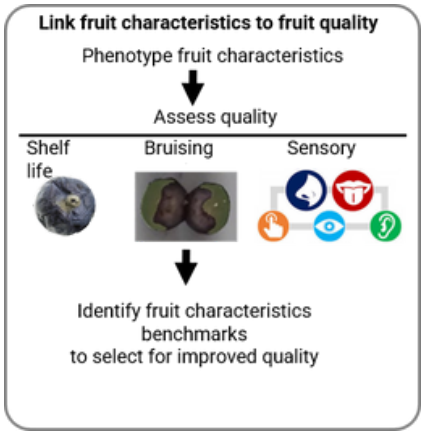
Develop new and more accurate phenotyping methods to evaluate fruit characteristics, including texture, non-volatile chemical composition, volatile chemical composition and appearance. Use phenotyping data to perform genetic studies, and select breeding lines with improved characteristics.

Perform marker traits association analysis to understand the genetic mechanisms controlling fruit characteristics. Based on results of genetic studies, initiate efforts to develop DNA assay and genomic prediction models .

Genetics and DNA Markers for Fruit Characteristics

Statistical Genetics Team





Associate Fruit Characteristics to Fruit Quality

Fruit Quality Team

Identify fruit characteristics (e.g. texture parameters) that contribute to quality attributes such as shelf-life, bruising and consumer purchasing behavior. Use these fruit characteristics to select breeding lines with improved quality attributes.

ACCOMPLISHMENTS IN GENETIC DISCOVERY AND PHENOTYPING

OUTCOMES ARE

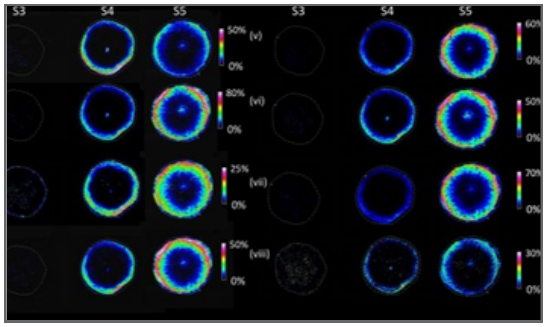
- Developed accurate phenotyping methods to evaluate fruit characteristics
- Elucidated the genetic mechanisms controlling several fruit characteristics
- Developed a DNA marker for marker-assisted selection
- Identified fruit characteristics parameters that contribute to improve fruit quality
- Advance selection of blueberry breeding lines with improved quality

ADVANCING PHENOTYPING FOR FRUIT CHARACTERISTICS

- *Developed accurate and/or high-throughput phenotyping methods to evaluate blueberry fruit, assessing:*
  - *chemical composition (Brix, titratable acidity, pH, sugars, amino acids, flavonoids and anthocyanin)*
  - *fruit appearance (size and internal bruising)*
  - *texture and associated shelf-life indicators including wrinkling and weight loss*
- *Created a QR barcode system to manage samples across core labs.*
- *Developed trait ontologies for blueberry to standardize phenotypic analyses across studies.*
- *Made methods available to the* Vaccinium *community, with some already implemented or in the early stages of implementation by stakeholders.*

CHEMICAL COMPOSITION

We have established cost effective and accurate methods for evaluating Brix, acidity, anthocyanins, flavonoids, and other primary metabolites like sugars and amino acids. These traits are important quality characteristics in blueberries because they influence their taste, flavor perception, and potential health benefits.



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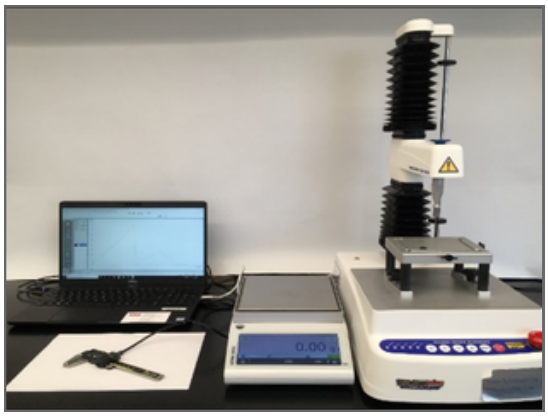
For sugar evaluation, we used Near-Infrared Spectroscopy (NIRS), which has proven to be a reliable and rapid method for predicting sucrose, glucose, fructose, and total soluble sugar levels in blueberry fruits (Perkins-Veazie et al., 2023). Our analysis across various blueberry germplasm samples revealed that fructose and glucose are predominant sugars, while sucrose is present in a very limited amount. We also developed rapid tests using handheld meters to evaluate acidity and Brix as proxies of organic acids and sugars, respectively. A comparison of the rapid tests with more accurate methods (HPLC) showed that soluble solids content (SSC or Brix) does not always correlate with sugar content, while titratable acidity (TA) is the best proxy for organic acids. Fruit pH, on the other hand, has a low correlation with organic acids.

Mass spectrometry imaging was used to quantify anthocyanin, flavonoids, and primary metabolites (e.g. sugars and amino acids) in blueberry fruits (Dare et al., 2022). Our spatial segmentation analysis suggests that ripening progresses from the skin into the flesh of the fruit. Overall, these new methods provide a deeper understanding of blueberry chemical composition and ripening, while offering more accurate and efficient strategies to phenotype germplasm in breeding programs with the overall aim of improving fruit quality for consumers.



TEXTURE, SIZE, AND SHELF LIFE INDICATORS

We established an integrated system to evaluate mechanical texture, fruit size, and correlate them with quality attributes like shelf life and sensorial texture.

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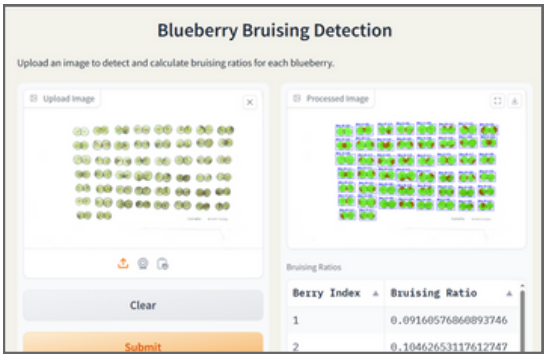
Texture analysis was performed using the TA.XTPlus Texture Analyzer (Stable Micro Systems, Hamilton, MA, USA) and was integrated with a high-precision scale, digital caliper, and programmed to input visual phenotypic data to assess shelf-life indicators. This integrated system measures 17 texture parameters, fruit weight and diameter (a proxy for size), scar diameter, and two shelf-life indicators (presence of mold and rate of wrinkle/shrivel) (Oh et al., 2024). This methodology has been used in four studies to understand the link with fruit quality and identify parameters that can be used in breeding programs (see page 10).

A macro developed for this system is available for use by breeding programs and it has already been transferred to several programs for implementation. Handheld tools were also tested, and some parameters were highly correlated with those measured by the texture analyzer (Giongo et al., 2022). For more information about the texture analysis system, see this VacCAP How to video, and webinars 1, 2.

INTERNAL BRUISING

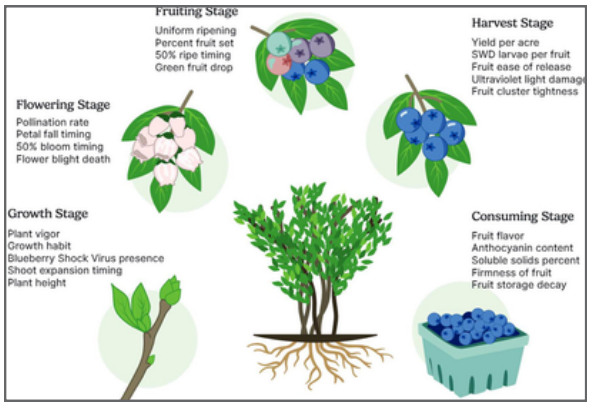
We established a rapid method to quantify internal bruising in blueberries. Dr. Tan leveraged image analysis and deep learning models to assess internal bruising (Ni et al., 2022; Tan et al., 2025).

The method achieved moderate-to-high accuracy, and with over three years of data, it was able to clearly differentiate cultivars with low bruising ratios from those with moderate-to-high bruising ratios. Cultivars within the lowest bruising ratios included those with crisp texture, like 'Indigocrisp' and 'Keecrisp'.



Blueberry bruising detection web app.

The method is integrated into a user-friendly computer interface that is accessible to potential users here. For more information about this work see this VacCAP webinar.



CROP ONTOLOGY

In collaboration with Breeding Insight, the project contributed to developing a blueberry Crop Ontology to standardize phenotyping for breeding and research programs (Hislop et al., 2024).

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A total of 83 traits were classified into nine categorical groups. This ontology has been integrated into the Genome Database for *Vaccinium* species platform and Breeding Management System. To facilitate comparison of data across locations, programs, and years, we encourage adopting the trait ontology and contributing to its development.

The blueberry crop ontology can be searched using the Trait Descriptor Search.

If researchers would like to request that traits be added or adjusted in the ontology, they can submit their requests through here.

SAMPLE MANAGEMENT

A QR barcode system was developed to manage samples across core labs.

This system enables tracking of fruit and leaf samples from harvest through processing, including downstream assays such as DNA extraction, genotyping, and fruit quality evaluation. For more information about the QR code system see this VacCAP How to video.

ADVANCING GENETIC DISCOVERY AND MOLECULAR BREEDING FOR FRUIT CHARACTERISTICS

- *Completed seven genetic studies for fruit characteristics, identified over 1,500 QTLs and SNPs associated with target traits. Key findings include:*
  - *Major and stable (highly heritable) QTLs control pH, titratable acidity, organic acid, anthocyanin, chlorogenic acid, and volatile content.*
  - *At least 24 of these QTLs were validated across different genetic stocks, making them suitable targets for designing DNA assays for marker-assisted selection strategies.*
  - *Fruit size, sugar content, and texture showed moderate-to-high heritability with complex genetic control, suggesting genomic and phenomic selection are the best strategies for selecting these traits.*

- *Found that organic acid content data, rather than pH and titratable acidity data, were more effective at detecting QTL associated with acidity.*

- *Integrated QTL data with new high-quality genomes to identify candidate genes for anthocyanin and volatiles traits. Verified the function of genes involved in anthocyanin acylation.*

- *Developed the first DNA assay for eucalyptol, a volatile compound associated with consumer dislike of blueberries.*

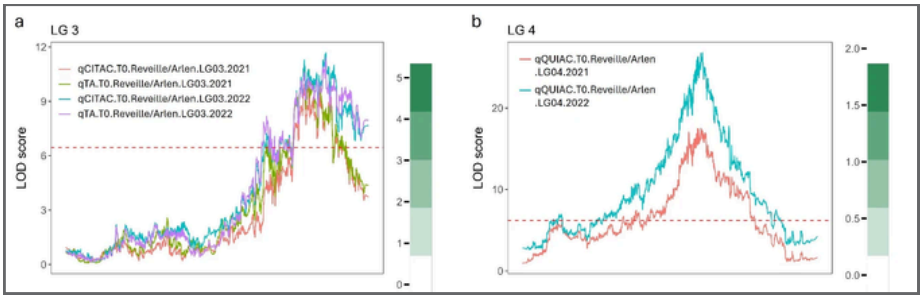
Table 1. Summary of QTLs/SNPs associated with fruit characteristics detected in the VacCAP project.

	Trait	# QTL/SNPs	# Major and Stable QTLs	# Validated QTLs	DNA markers or gernomic selection models	Reccomended MAB strategy and traits
Blueberry						
FC-Chem	Anthocyanins	704	4	2	-	MAS, Acylation
	Chlorogenic acid	439	1	1	-	MAS, Chlorogenic acid
	Organic acids	21	3	-	-	MAS, Citric, quinic, shikimic acid
	pH	15	1	1	-	MAS, pH
	TA	15	2	1	-	MAS, TA
	Volatiles	30	-	20	1	MAS Terpene
	SSC	8	0	-	-	GS
	Sugars	0	0	-	-	GS, Frutctones, Glucose
FC-Appearance	Size	19	1	-	-	GS, Size, weight or dimaeter
FC-Texture	Texture	305	0	-	1	GS, YM20, DFM, FM
Disease	Anthracnose fruit rot resistance	3			-	MAS, Fruit rot resistance
Total		1559				

ORGANIC ACIDS AND SUGARS

Organic acids and sugars determine the perception of sourness and sweetness in blueberry fruits, which are the most important attributes for consumer preference.

Two genetic studies on organic acids and sugars revealed that the variation in organic acids is much higher than that for sugars in blueberry fruits, with total organic acid content being the primary driver of the sugar-to-acid ratio (Mengist et al., 2021, Oh et al., 2025). Organic acids are controlled by major and stable QTLs, which can be targeted for identifying candidate genes and developing DNA assays for marker-assisted selection. In contrast, sugar content exhibits more quantitative genetic control, suggesting phenomic or genomic selection would be better strategies for selecting for these traits.



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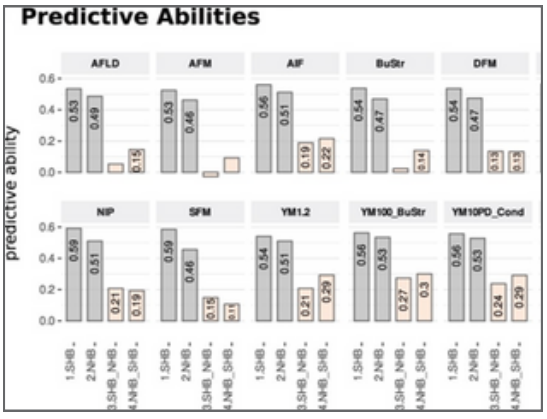

SIZE AND TEXTURE

Size and texture are important attributes that contribute to consumer preferences in blueberries. Early work on fruit size showed that blueberry fruit volume, surface area, and weight are highly correlated and can serve as proxies of fruit size (Mengist et al., 2020).

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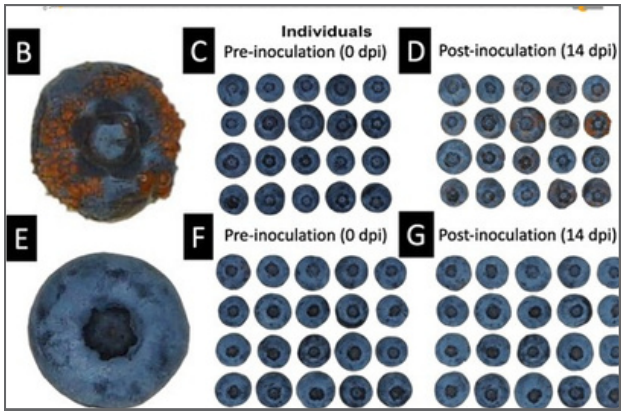
Two studies evaluated the inheritance and genetic mechanisms controlling fruit size (Mengist et al., 2021, Oh et al., 2025). The trait exhibits a relatively high level of heritability (0.6-0.74), however it appears to be under complex genetic control. One study identified a minor, stable QTL on chromosome 4, while a second study found no QTL. Similarly, texture exhibited moderate-to-high heritability and complex genetic control across two studies (Oh et al., 2025, Ferrao et al., 2024). These findings suggest that genomic or phenomic selection would be more effective strategies to select for these traits. Preliminary work on genomic selection for texture showed a moderate level of predictability but indicated that predictability across different populations (e.g., southern highbush vs northern highbush) is very low.

HEALTH-RELATED BIOACTIVE COMPOUNDS

We uncovered the genetic mechanisms and genes controlling accumulation of health-related metabolites, such as anthocyanin and chlorogenic acids, in blueberry fruit.

A locus located on blueberry chromosome 8, conserved across *Vaccinium* species, harbors multiple transcription factors (TFs) that control anthocyanin accumulation (Karppinen et al., 2021, Wu et al., 2021, Lafferty et al., 2021, Lafferty et al., 2022, Albert et al., 2023). Comparative analysis revealed that a complex pattern of duplications differentiates these TFs, explaining tissue-specific expression differences of anthocyanin in *Vaccinium* species. Other genes, such as ANS and UFGT2, are highly conserved and modulate anthocyanin production in *Vaccinium* species (Nguyen et al., 2023). Four genetic studies identified five regions of the blueberry genome controlling the accumulation of anthocyanin and chlorogenic acid in blueberry fruit. QTLs for chlorogenic acids and anthocyanin acylation on chromosome 2, and anthocyanin glycosylation on chromosome 4, were validated across populations (Montanari et al., 2022, Herniter et al., 2023, Mengist et al., 2022). Two acyltransferase genes responsible for anthocyanin acylation were identified (Mengist et al., 2025, Dare et al, 2024). This work identifies target regions and genes that can be used to develop DNA assays for marker-assisted selection. Acylation of anthocyanin pigments could increase the absorption of these health-related bioactive compounds, hence potentially enhancing the nutritional value of blueberry as a superfood.



ANTHRACNOSE RESISTANCE

Anthracnose fruit rot (AFR), caused by the fungal pathogen Colletotrichum fioriniae, is one of the most destructive and widespread fruit diseases in blueberries, affecting both yield and overall fruit quality.

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Blueberry cultivars exhibit highly variable resistance against AFR. The first genetic study for AFR identified three QTLs and candidate genes controlling resistance traits (Jacobs et al., 2023). The study also highlighted a possible interaction between secondary metabolites (e.g., anthocyanins) and pathogen resistance. Overall, the findings from these studies present an opportunity to develop DNA assay for selecting blueberries with resistance or low susceptibility to AFR.

DNA MARKERS

Efforts were initiated to develop a workflow for marker-assisted selection (MAS). This involved the development of a rapid DNA extraction protocol, testing different in-lab genotyping assays and addressing other logistics (Fig 1).

The rapid DNA extraction method was developed by modifying the protocol from Keb-Llanes et al. (2002) and adapted it for a 96-well plate extraction system (Keb-Llanes et al., 2002). The target trait for developing the first DNA assay was eucalyptol, a volatile compound associated with consumers' disliking of blueberries (Ferrao et al., 2022). The DNA assay targets a single SNP located on chromosome 2, which is associated with eucalyptol content. We tested 63 KASP markers across 374 genotypes and found that selecting homozygous dominant alleles for the target SNP resulted in a 45% cutoff for high eucalyptol individuals and selection gain of 58.3 units.

After testing both high-resolution melting curve (HRM) and KASP genotyping approaches, the KASP assay resulted in the most cost-effective and reliable method for DNA assay design (Fig 2). The KASP assay is capable of distinguishing allele dosages for the target SNP, enabling the distinction of homozygous dominant, recessive, and intermediate alleles (Fig 3).

In the University of Florida Blueberry breeding and Genomics Program, over 12,000 germinated seedlings were screened using the single marker. Based on the marker results, about 50% of the seedlings were selected and transplanted in the field for future validation and breeding. With the implementation of MAS in the breeding program, breeders expect to make selection more efficiently and effectively at an earlier stage, while developing more significant markers for important traits.

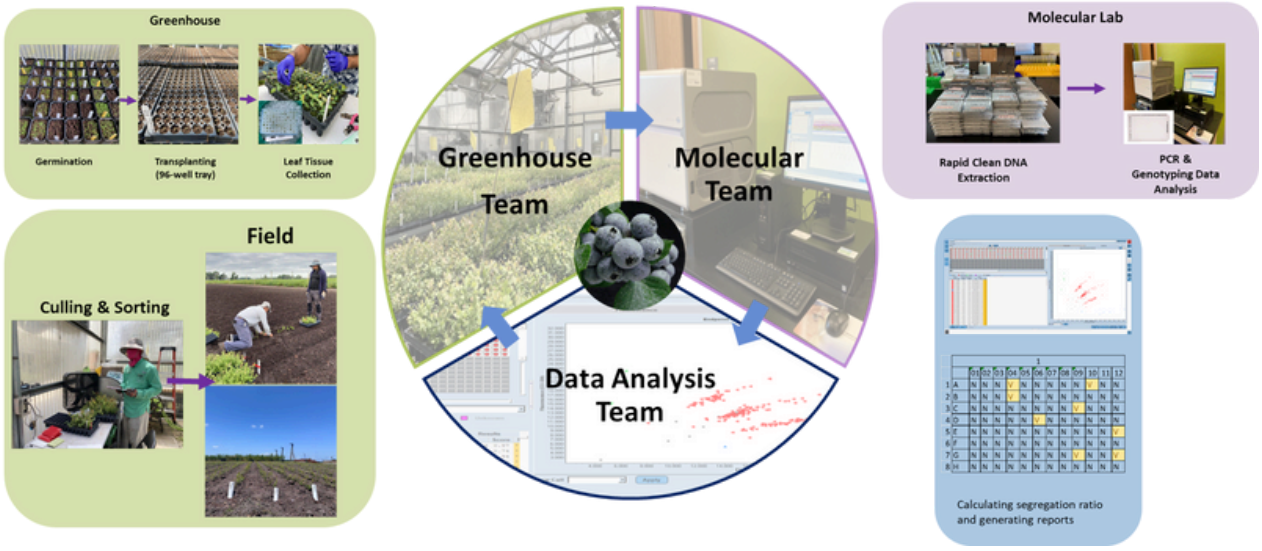


Figure1. Logistics of marker-assisted selection in the University of Florida Blueberry Breeding and Genomics program.

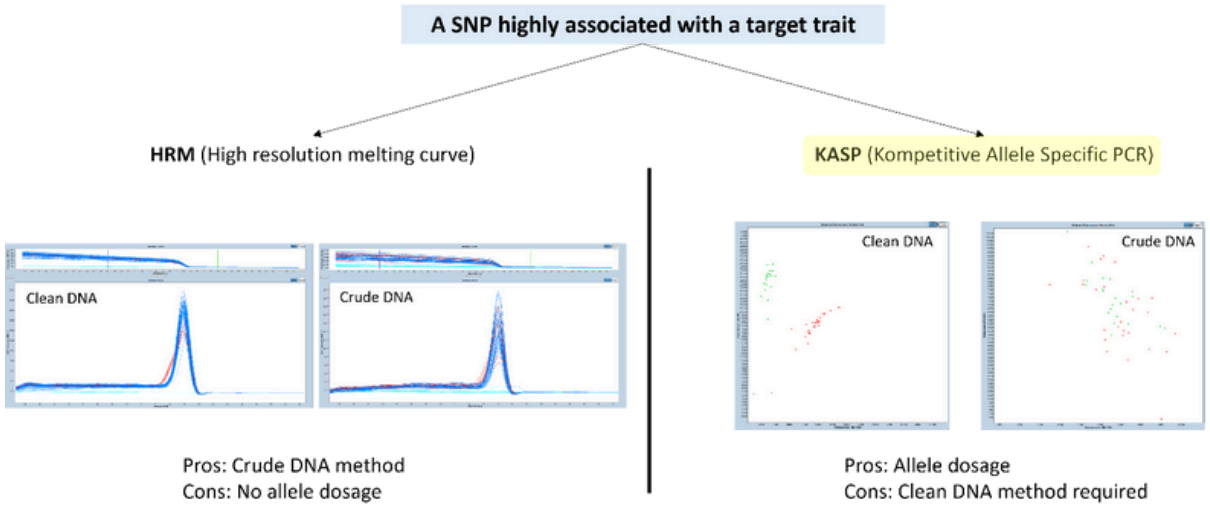


Figure 2. Testing results of two DNA assay methods for MAS implementation.

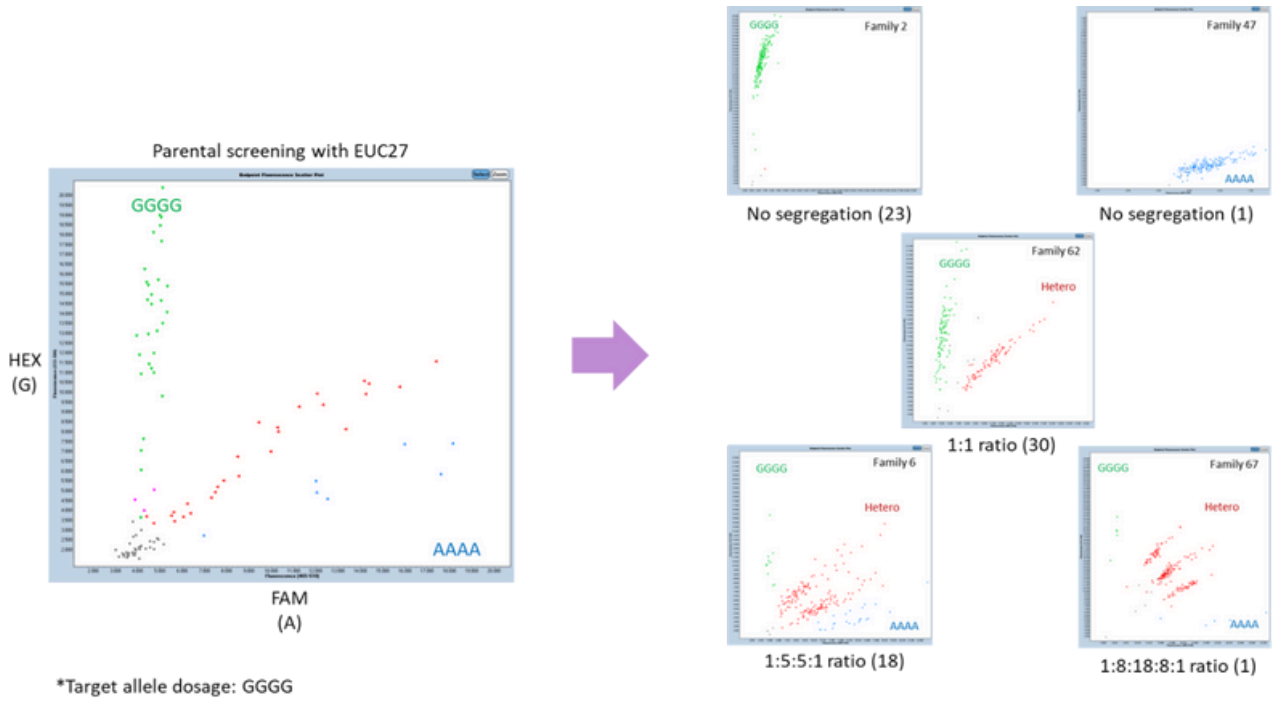
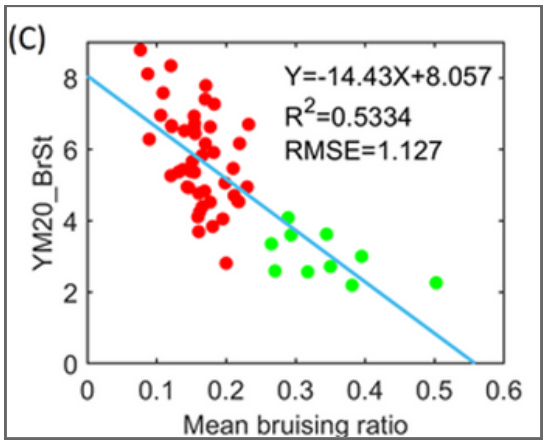


Figure 3. Images of parent and seedling screening results using a single SNP marker for eucalyptol traits.

ADVANCING UNDERSTANDING OF FRUIT QUALITY IN BLUEBERRY

- *Identified fruit characteristics associated with fruit quality in terms of shelf-life, sensorial texture, and internal bruising. Identified a set of parameters that breeders can use to select for improved quality.*
- *Advanced understanding of the cell wall composition in pulp and peel of crisp, firm, and soft blueberry cultivars at harvest.*



PREDICTING SENSORIAL TEXTURE, SHELFLIFE, AND INTERNAL BRUISING

Completed four studies to associate fruit characteristics with sensorial texture, shelf life, and bruising (Oh et al., 2024a, Oh et al., 2024b, Mengist et al., 2024, Tan 2024).

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Highlight of these studies were:

1. Multiple components contribute to mechanical texture in blueberry
2. Fruit size and chemical composition (pH, TA, sugars, organic acids) have no significant contribution to texture
3. Texture at harvest is the driver of texture after storage
4. Larger berries are correlated with lower weight loss and appearance of wrinkle/shrivel
5. Mechanical texture parameters can predict texture after storage, texture changes, weight loss, and wrinkle/shrivel with low-to-moderate accuracy, sensorial hardiness/springiness/crispness and juiciness with moderate-to-high accuracy and internal bruising with moderate accuracy.

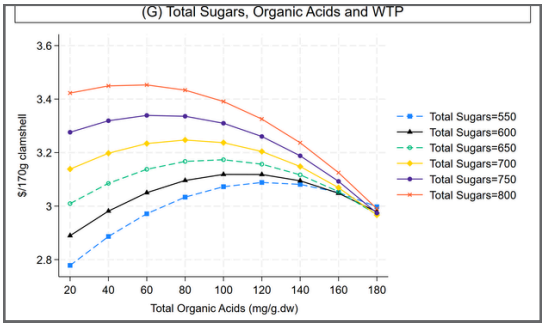
Overall, the following parameters can be used in breeding programs to select for improved fruit quality: high value for “Young’s modulus” (YM_ 20% Burst Strain), “distance to maximum force” (DFM), “Maximum Force” (FM), and large diameter. These parameters contribute towards selection for improved sensorial texture, extended shelf life, and reduced bruising, which are also likely important in machine harvesting for fresh market scenarios.

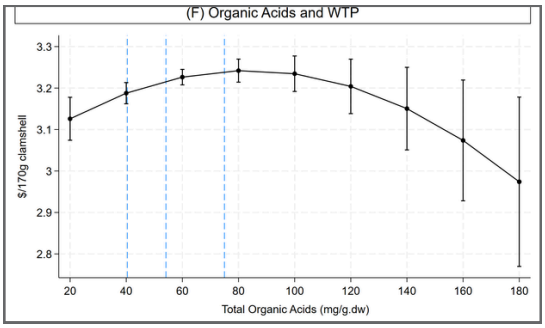
INSTRUMENTAL BENCHMARKS TO SELECT FOR IMPROVED QUALITY

Used data from a consumer study and instrumental measurements for sugars and acids to identify benchmarks to select for higher quality (Canalese et al., 2024).

Fruit pH values between 3 - 3.5 and a total sugar-to-organic acids ratio between 25 - 30 increased consumer willingness to pay. A total organic acid content higher than 80 mg/g dw reduced consumer willingness to pay while organic acid content <80 mg/g dw and higher total sugar content increased consumer willingness to pay. Fruit larger than 17 mm diameter had a positive effect of willingness to pay.

Fruits with higher “Maximum Force” (FM) and “Young’s modulus” (YM_ 20% Burst Strain) had a higher willingness to pay





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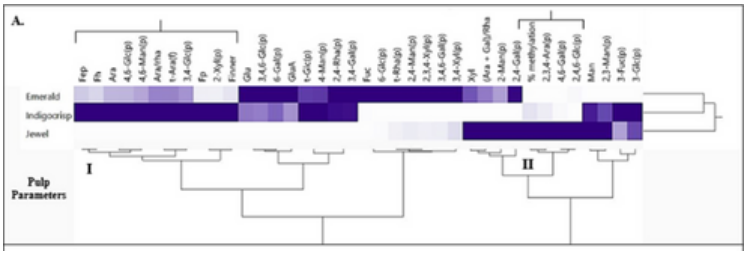
UNDERSTANDING BLUEBERRY CELL WALL COMPOSITION AND TEXTURE

Completed two studies to assess cell wall composition in crisp, firm, and soft cultivars and its changes during storage (Trandel-Hayse et al., 2023).

Differences in cell wall composition in the pulp and peel could explain differences in mechanical texture profiling. Greater abundances of arabinan and type II arabinogalactan in the pulp of the firm and crisp cultivars might contribute to the texture characteristics of these phenotypes. The storage study indicated that epidermal firmness is related to the degradation of pectin in the pulp and cellulose content in the pulp decreases with storage and is related to softening. For more information about cell wall composition analysis in blueberry, see this VacCAP webinar.



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ADVANCING BREEDING FOR FRUIT QUALITY TRAITS

- *Phenotypic data collected during the project enabled blueberry breeders to advance selections into replicated trials and to make new crosses aimed at combining multiple FQ traits. A few examples of selections from two breeding programs are illustrated below.*

USDA-OR 1739-2.
Crisp/firm, exceptional flavor

USDA-OR 1633-3.
Firm, good flavor

USDA-OR
Firm, good flavor.

USDA-OR 1735-4.
Good flavor

USDA-OR 1720-3.
Crunchy

USDA-OR 264-1.
Large size, dry scar, firm/crunchy with good shelf life.

USDA-OR 1637-8.
Firm, good flavor long shelf life.

USDA-OR 1642-6.
Firm, good flavor, long shelf life.

USDA-OR 1617-30.
Firm, large size

Advanced selections propagated in the field and in vitro at USDA-OR breeding program

USDA-OR Loarca

Pictures by Dr. Nahla Bassil, Chad Finn and Marti Pottorff

FEM A *Firm, large size, early, high sugars and good flavor.*

FEM B. *Firm, large size, uniform bloom, high sugars and yield*

FEM C. *Firm and crisp, uniform bloom, large size, high yield*

FEM D. *Firm, large size, early season, double cropping.*

FEM E. *Firm, large size, concentrated harvest, very good shelf life.*

FEM F. *Firm, uniform, late, good flavor, good shelf life.*

FEM – Italy Giongo

Pictures by Dr. Lara Giongo

IMPACT

Outcomes from Objectives 2–3 resulted in new phenotyping tools and target benchmarks to support selection for improved fruit quality in blueberry breeding programs. This information is also valuable for growers and packers aiming to enhance fruit quality in their operations. Several stakeholders have already engaged with and begun adopting these methods. The genetic studies clarified the mechanisms underlying key fruit quality traits, laying the groundwork for molecular breeding strategies. For traits such as volatiles and texture, the use of DNA markers for marker-assisted selection (MAS) and genomic selection was tested, providing direct proof of concept. As a result, research in *Vaccinium* crops is increasingly focused on identifying and characterizing genes that control fruit quality and on implementing molecular breeding approaches.

Molecular and phenotypic data have also been used to advance the selection of breeding lines with improved quality traits, representing potential new cultivar releases. In addition, the VacCAP project fostered strong collaboration among *Vaccinium* research groups, reducing redundancy and promoting complementary efforts. Collectively, these outcomes represent a critical step forward in advancing research and breeding across the growing *Vaccinium* community.

ONGOING RESEARCH

- Completing testing of an acoustic method to evaluate texture in blueberry
- Completing additional studies to understand the genetic mechanical controlling volatile, sugars and organic acid accumulation in blueberry
- Continuing development of DNA assays and genomic selection models for fruit quality traits
- Developing the next phase of the VacCAP project (VacCAP 2.0)

Testimonials From the Lab

Dr. Sushan Ru
Assistant Professor of Small Fruit Breeding and Genetics
Auburn University

How do you see the parameters associated with improved blueberry quality from VacCAP benefiting your breeding program? Do you think these parameters will help in selecting for better fruit quality?

The VacCAP project identified key traits and their optimal ranges to enhance blueberry quality, including fruit pH, organic acid content, sugar-to-organic acids ratio, and texture. Understanding consumer preferences related to these quality traits is essential for guiding future breeding efforts to improve marker acceptance for blueberries. The findings from VacCAP will help blueberry breeding programs like ours to refine and optimize breeding targets, ensuring better fruit quality and increased consumer satisfaction.

Based on what we've learned about the genetics of multiple fruit characteristics, do you think the insights gained from VacCAP will advance molecular breeding efforts for blueberry? In what ways?

VacCAP identified stable QTL associated with traits such as pH, titratable acidity, organic acid, anthocyanin and volatile content. Based on these findings, future development of DNA tests can facilitate marker-assisted selection, significantly reducing selection costs and potentially shortening breeding cycles. For traits with complex genetic architectures, such as fruit size, sugar content and texture, genomic and phenomic selection are recommended approaches. Together, these insights and tools developed by VacCAP provide valuable resources for blueberry breeding, enabling the application of appropriate molecular techniques to improve fruit quality traits more efficiently.

VacCAP has integrated more accurate phenotyping, new genotyping tools, and enhanced genomic resources. As a result, research is shifting towards identifying and characterizing candidate genes. Do you think this can benefit your breeding program? Why is this shift important for the future of breeding in blueberry?

The phenotyping tools developed by VacCAP, covering traits related to fruit chemical composition (e.g., Brix, acidity), fruit appearance (size and internal bruising), and texture and shelf life, are critical to improve the efficiency of blueberry evaluation.

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Many of these recommended phenotyping protocols have been adopted by the small fruit breeding program at Auburn University and other institutions. Standardized and optimized phenotyping protocols lay the foundation for accurate assessment of key traits, leading to a deeper understanding of the genetic architecture of these traits and allow the discovery of candidate genes or associated DNA markers.

Additionally, the genotyping platforms provided by VacCAP offer the community reliable, affordable, and standardized genetic information, accelerating gene discovery and speeding up cultivar development through marker-assisted breeding.

Has VacCAP provided new tools or opportunities that you plan to incorporate into your breeding program? How do you foresee using the data or resources generated from this project in your future breeding efforts?

We have incorporated several phenotyping and genotyping platforms from VacCAP into the small fruit breeding program at Auburn University. Looking ahead, we plan to adopt additional high-throughput phenotyping tools, such as those for measuring total sugar content and bruising. The data and resources generated by VacCAP offer valuable insights into the genetic architecture of fruit quality traits, which will guide our breeding strategies, including crossing design and the optimization of selection methods, to accelerate the development of superior blueberry cultivars.

Do you think VacCAP opened opportunities for you to collaborate with the community? Do you see any potential collaborations or partnerships that could emerge from the research and resources developed through VacCAP? How might these collaborations benefit your breeding program?

VacCAP has effectively brought together blueberry and cranberry breeders through project meetings, presentations at scientific conferences, grower meetings, and various outreach initiatives. This community building has enabled breeders to share knowledge, foster collaboration, and explore new opportunities for future projects. Notably, breeders across both crops have benefitted from exchanging insights on high-throughput phenotyping and other research advances, helping to accelerate technological progress. As a new member of this community, I have greatly benefited from these interactions by learning from fellow breeders and exchanging research ideas and breeding materials, strengthening our collective efforts toward cultivar improvement.

Testimonials From the Lab

Dr. Ye (Juliet) Chu
Assistant Professor, Blueberry Breeding
University of Georgia

How do you see the parameters associated with improved blueberry quality from VacCAP benefiting your breeding program? Do you think these parameters will help in selecting for better fruit quality?

The methodology for fruit quality measurement developed by the VacCAP project is very useful for selecting blueberries with better fruit quality. I would like to implement some of the parameters and methods in my breeding program.

Based on what we've learned about the genetics of multiple fruit characteristics, do you think the insights gained from VacCAP will advance molecular breeding efforts for blueberry? In what ways?

It is possible to use genetic markers to accelerate blueberry breeding. However, before that happen, marker validation across genetic materials will need to be performed and the genotyping platform that are breeder-friendly and cost-effective needs be established.

VacCAP has integrated more accurate phenotyping, new genotyping tools, and enhanced genomic resources. As a result, research is shifting towards identifying and characterizing candidate genes. Do you think this can benefit your breeding program? Why is this shift important for the future of breeding in blueberry?

Discovering genes controlling fruit quality traits is very important. If markers within the genes can be discovered and utilized for molecular breeding, it will greatly improve the accuracy of genotype selection in my program.

Has VacCAP provided new tools or opportunities that you plan to incorporate into your breeding program? How do you foresee using the data or resources generated from this project in your future breeding efforts?

We are already using the whole genome sequence data developed by the VacCAP project to assemble genomes and develop markers from our breeding materials.

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Do you think VacCAP opened opportunities for you to collaborate with the community? Do you see any potential collaborations or partnerships that could emerge from the research and resources developed through VacCAP? How might these collaborations benefit your breeding program?

Yes, the VacCAP research community is highly collaborative, and I am glad to be a new member and work with everyone. New collaborations will allow blueberry genetic material and technology transfer among breeding programs and minimizing redundant research efforts.

CONTRIBUTORS

Massimo Iorizzo, Project Director, North Carolina State University
Penelope Perkins-Veazie, Co-PD, North Carolina State University
David Chagné, Co-PI, Plant and Food Research Ltd
Richard Espley, Co-PI, Plant and Food Research Ltd
Lara Giongo, Co-PI, Fondazione Edmund Mach
Patricio Munoz, Co-PD, University of Florida
Felipe Ferrao, University of Florida
Jin-Hee Kim, University of Florida
Changying Li, Co-PI,University of Florida
Nahla Bassil, Co-PD, USDA-ARS NCGR
Jenyne Loarca, USDA-ARS
Patrick Edger, Co-PD, Michigan State University
Elizabeth Canales, Co-PI, Mississippi State University

DESIGN & EDITING
Josie Russo, Communications Specialist, University of Wisconsin-Madison
Amaya Atucha, Co-PD, University of Wisconsin-Madison
Lisa Wasko DeVetter, Co-PI, Washington State University
Massimo Iorizzo, Project Director, North Carolina State University

MORE RESOURCES

Recordings of all Objective 2 and 3 webinars are available on the VacCAP Project YouTube Channel. Visit www.vacciniumcap.org or follow us @VacciniumCAP on X (Twitter) to stay updated on the latest VacCAP news.