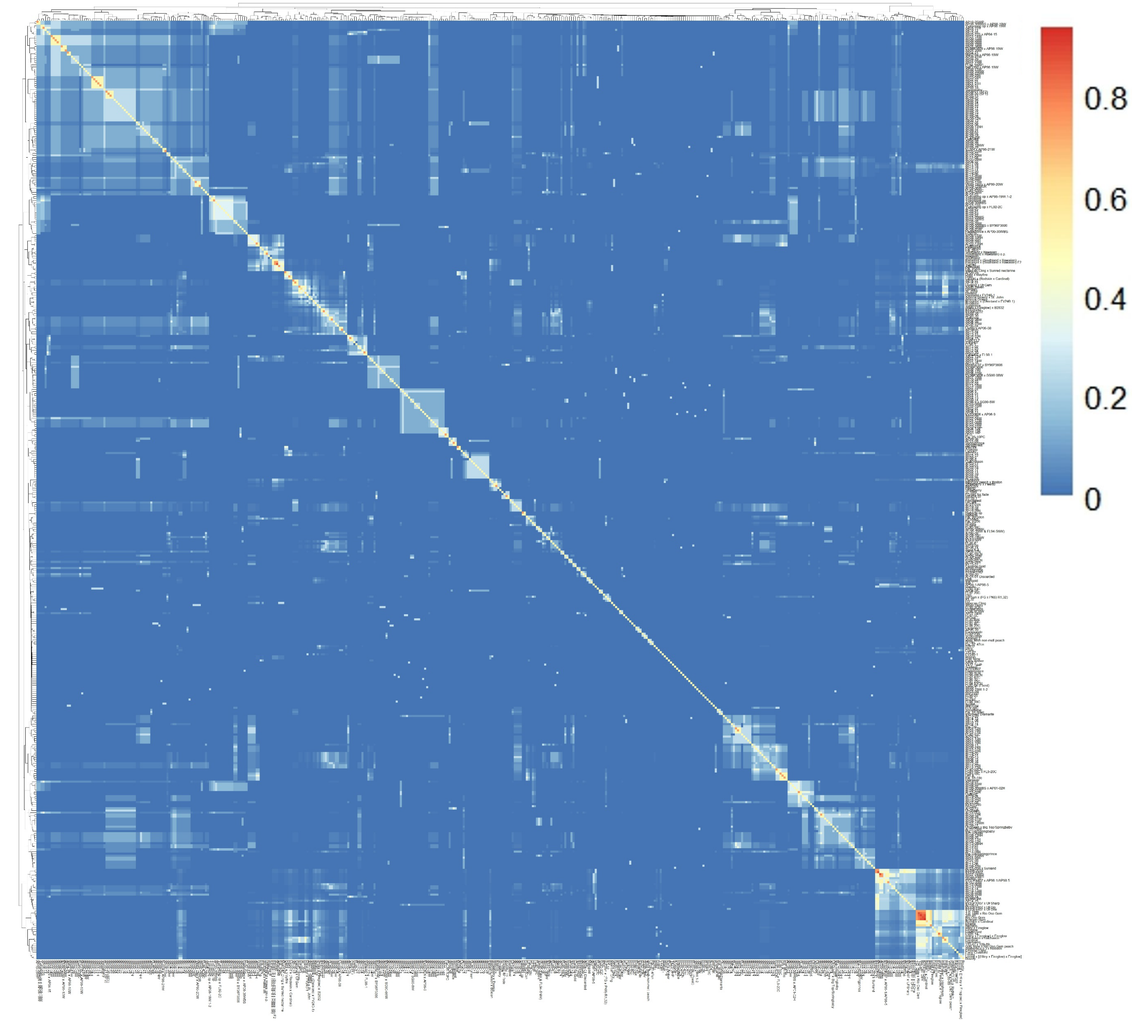
UNIVERSITY OF GEORGIA
College of Agricultural & Environmental Sciences

Chavez Lab

Pedigree Database and Historical Phenotypic Evaluations of the Moderate Chill Peach UGA-UF-USDA Breeding Program

McCann, C.[1], P. Conner[2,3], J.X. Chaparro[4], T.G. Beckman[5], and D.J. Chavez[1,6].

[1]Institute of Plant Breeding Genetics, and Genomics. University of Georgia, Griffin, GA 30223. [2]Institute of Plant Breeding Genetics, and Genomics. University of Georgia, Tifton, GA 31793.
[3]Department of Horticulture. University of Georgia, Tifton, GA 31793. [4]Horticultural Sciences Department. University of Florida, Gainesville, FL 32611.
[5]Southeastern Fruit and Tree Nut Research Laboratory. USDA-ARS, Byron, GA 31008. [6]Department of Horticulture. University of Georgia, Griffin, GA 30223.



Background and Methodology

- **The Cooperative Regional Moderate Chill Peach Variety Development project commenced in 1986**
  - USDA-ARS (Byron, GA), the University of Georgia (Griffin, GA) and the University of Florida (Gainesville, FL).
  - **Goal** : To develop new peach and nectarine varieties adapted to the lower coastal plain of the southeastern United States.
- Pedigree records and phenotypic data have been recorded since the beginning of the project, but never consolidated and mined to aid with the breeding process.

- **The purpose of this project** is to use this data to better understand our breeding germplasm through pedigree visualization and data analyses.
- Different pedigree analyses software will be tested.
  - RIBD R package for calculation of pedigree statistics
  - Helium for pedigree visualization
  - BLUP/REML software for potential phenotypic evaluation

Case 1: OP = Self

- Mean Kinship Coefficient
  - **0.006362**
- # of Inbred Individuals
  - **252 out of 1130**
- % Inbred Individuals
  - **22%**

Case 2: OP = Outcross

- Mean Kinship Coefficient
  - **0.002935**
- # of Inbred Individuals
  - **47 out of 1130**
- % Inbred Individuals
  - **4%**

Conclusion

The UGA-UF-USDA peach breeding program has a relatively low level of inbreeding compared to similar studies (Sobierajski et al. 2023; Scorza et al. 1985).

Inbreeding was higher in Case 1, when we assume self pollination. Accurate accounts of crosses are integral in making these measurements as reliable as possible. Understanding the relatedness of individuals through the pedigree and kinship map allow us to avoid using closely-related individuals in breeding. Some accessions have been used as parents more often in the breeding program. It is imperative to continue the introduction of new germplasm in the program to mitigate any potential issues with inbreeding.

Personal Website

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Acknowledgments

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Citations

Sobierajski, Graciela da Rocha, Gabriel Constantino Blain, and Carina Oliveira Anoni. 2023. "Inbreeding and Founder Cultivars Contributions in Low Chill Requirement Peaches and Nectarines". Crop Breeding and Applied Biotechnology 23 (4): e46262347. https://doi.org/10.1590/1984-70332023v23n4a42.

Scorza, Ralph, Shawn A. Mehlenbacher, and Gary W. Lightner. "Inbreeding and coancestry of freestone peach cultivars of the eastern United States and implications for peach germplasm improvement." Journal of the American Society for Horticultural science 110, no. 4 (1985): 547-552.