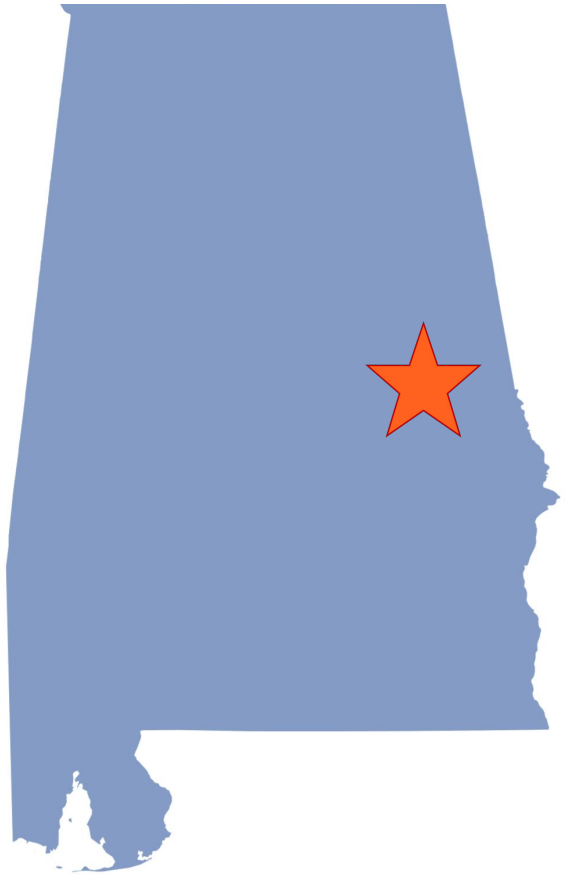
Small Fruit Breeding at Auburn University

Sushan Ru

Auburn University

January 7, 2022

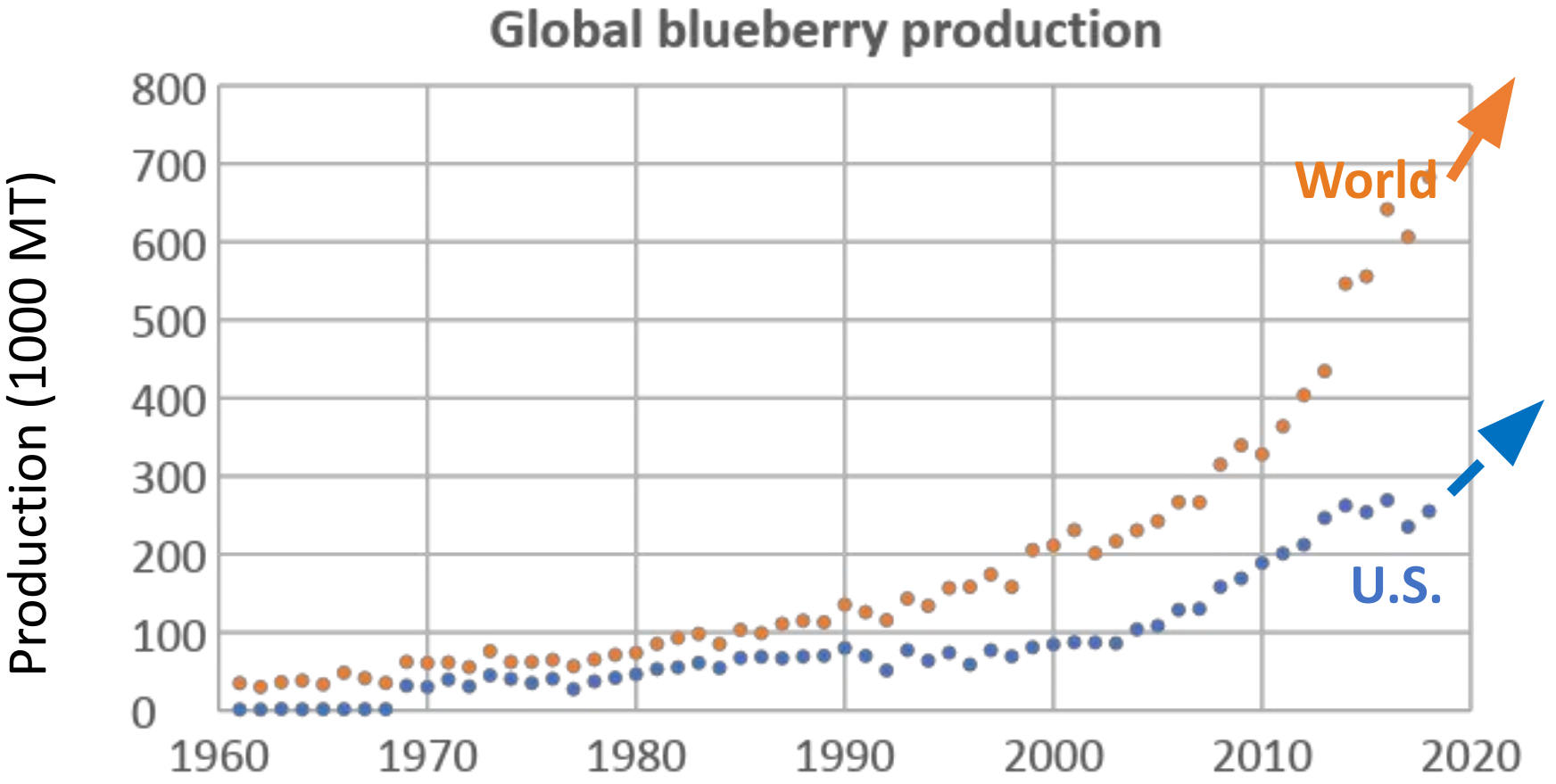
Small Fruit Breeding Program at Auburn University

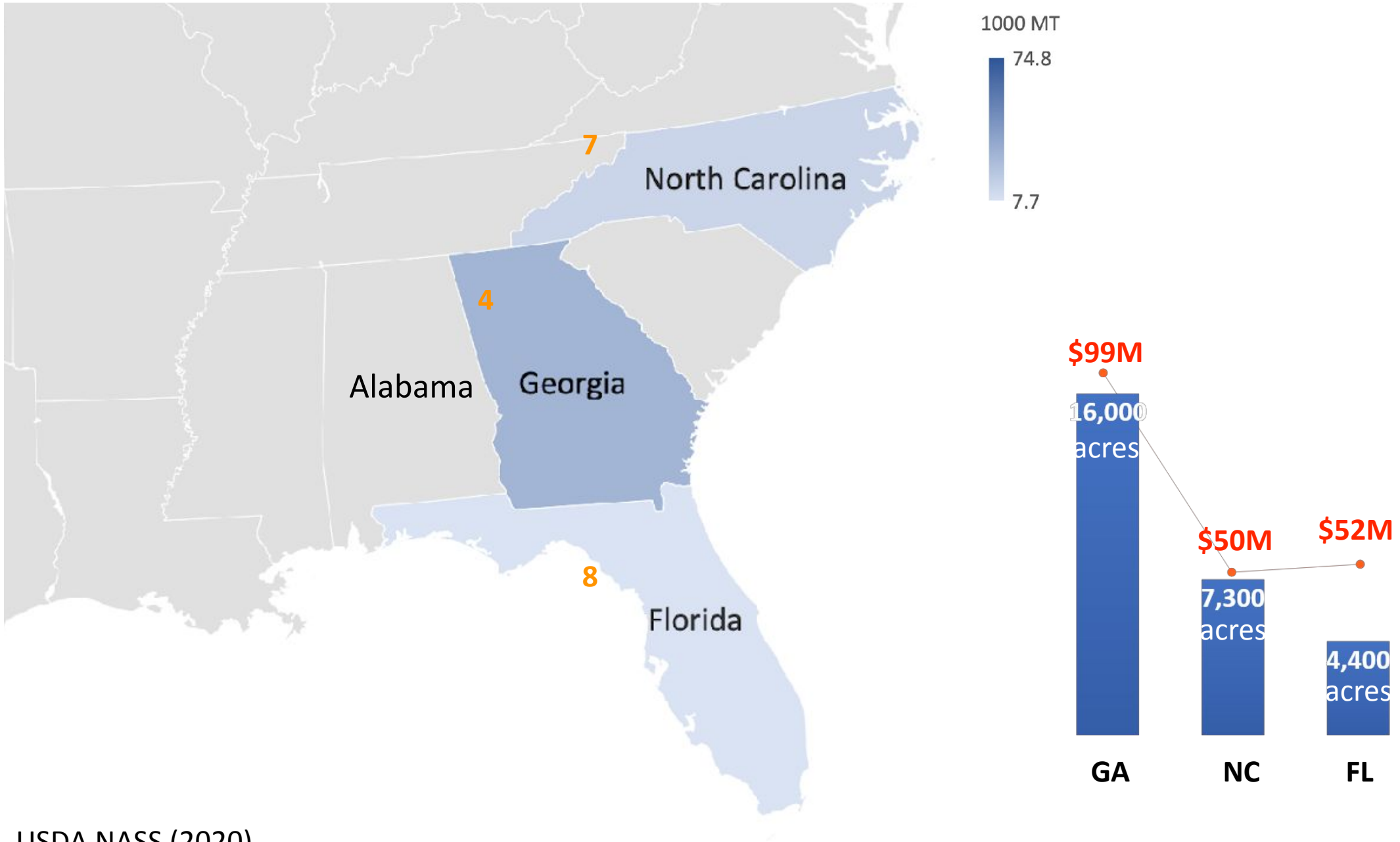


- Established in April 2021
- Aims to develop elite blueberry cultivars for Alabama and potentially nearby regions

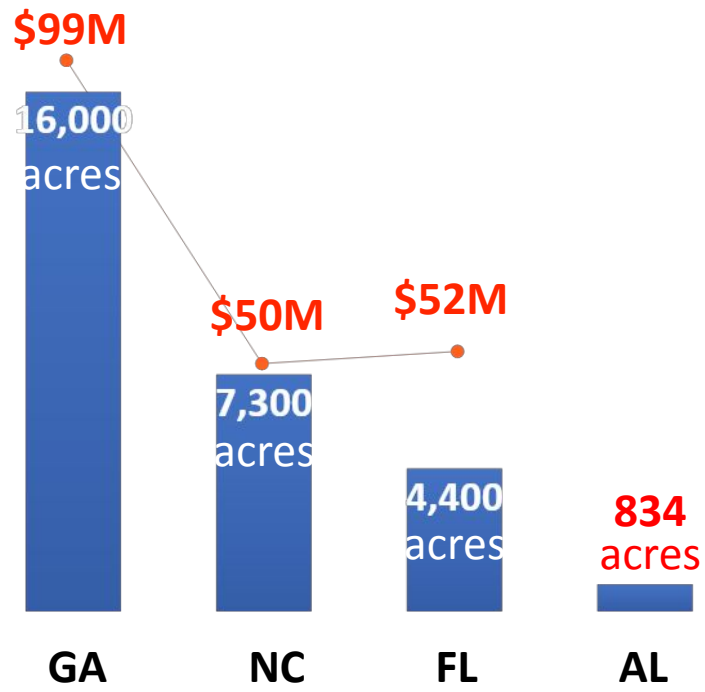
Super fruit:

Antioxidants
Anthocyanins
Dietary fibers
Phenolic acids



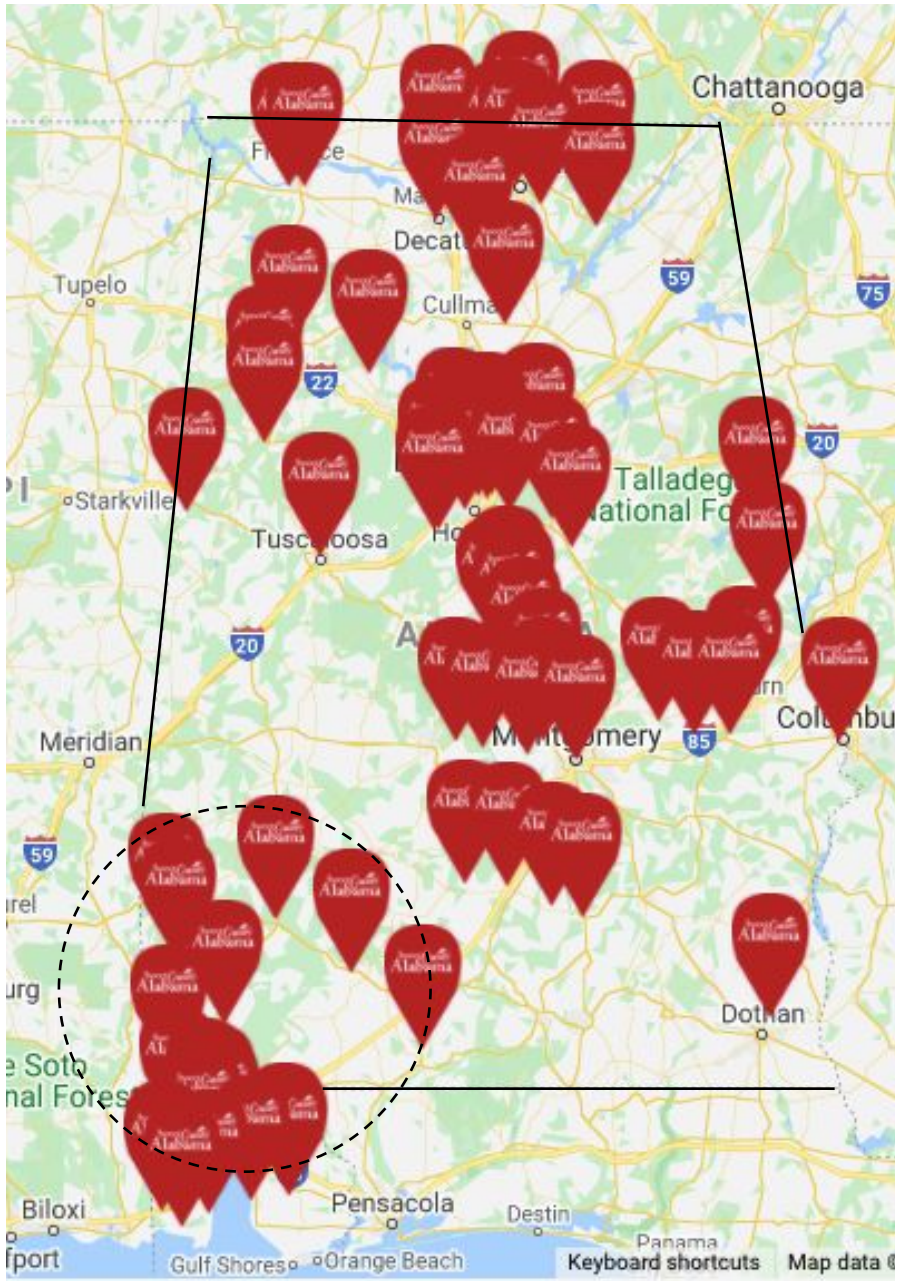


USDA NASS (2020)



USDA NASS (2020)

2017 Census of Agriculture Data



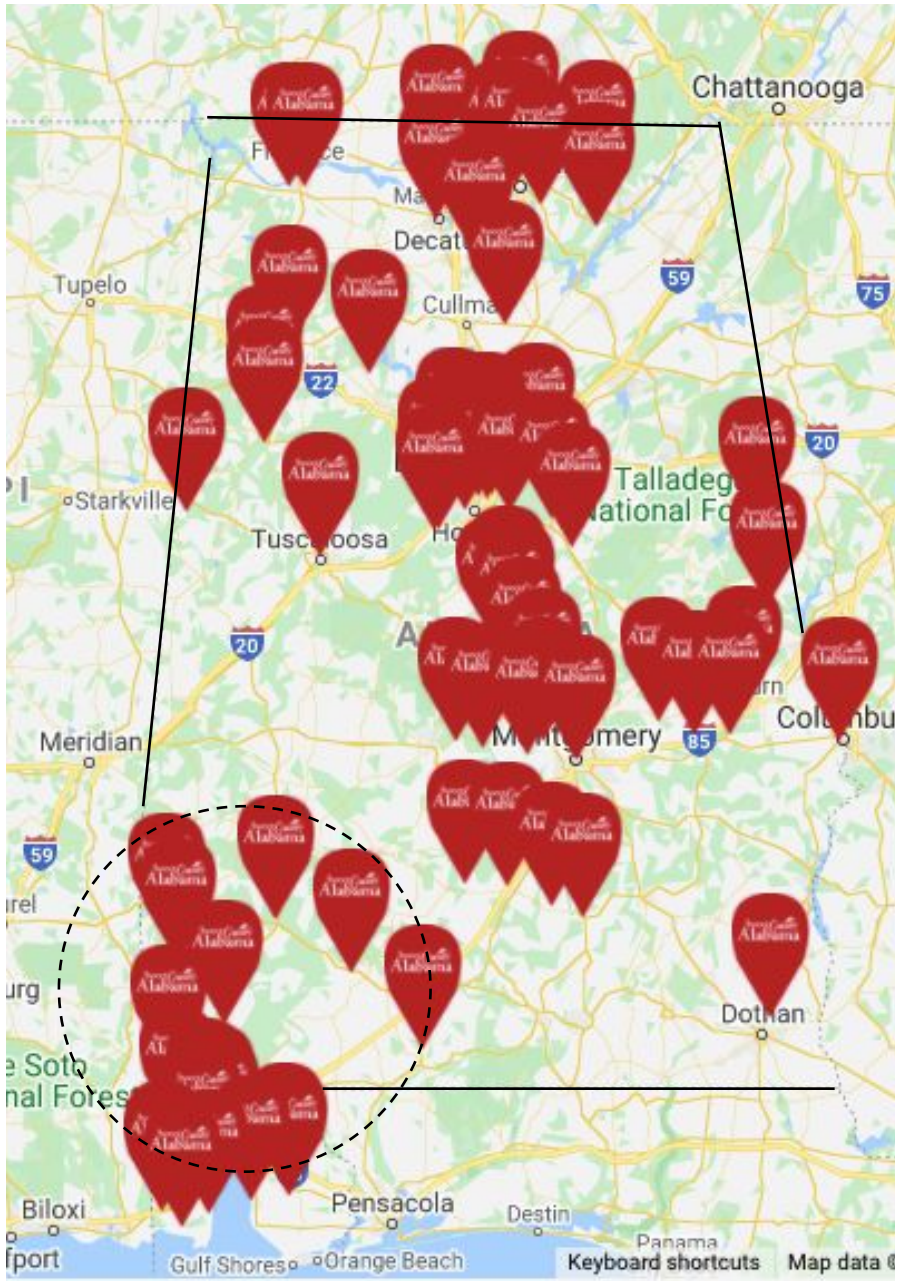
https://www.sweetgrownalabama.org/

Blueberry production in Alabama

- 834 acres, 536 farms (~1.6 acres/farm)
- Retail/U-Pick
- Rabbiteye

Petals from the Past Farm
Jemison, AL, 2021

Rabbiteye
V. Virgatum Reade



https://www.sweetgrownalabama.org/

Hardiness zone

Challenges of growing southern highbush in Alabama

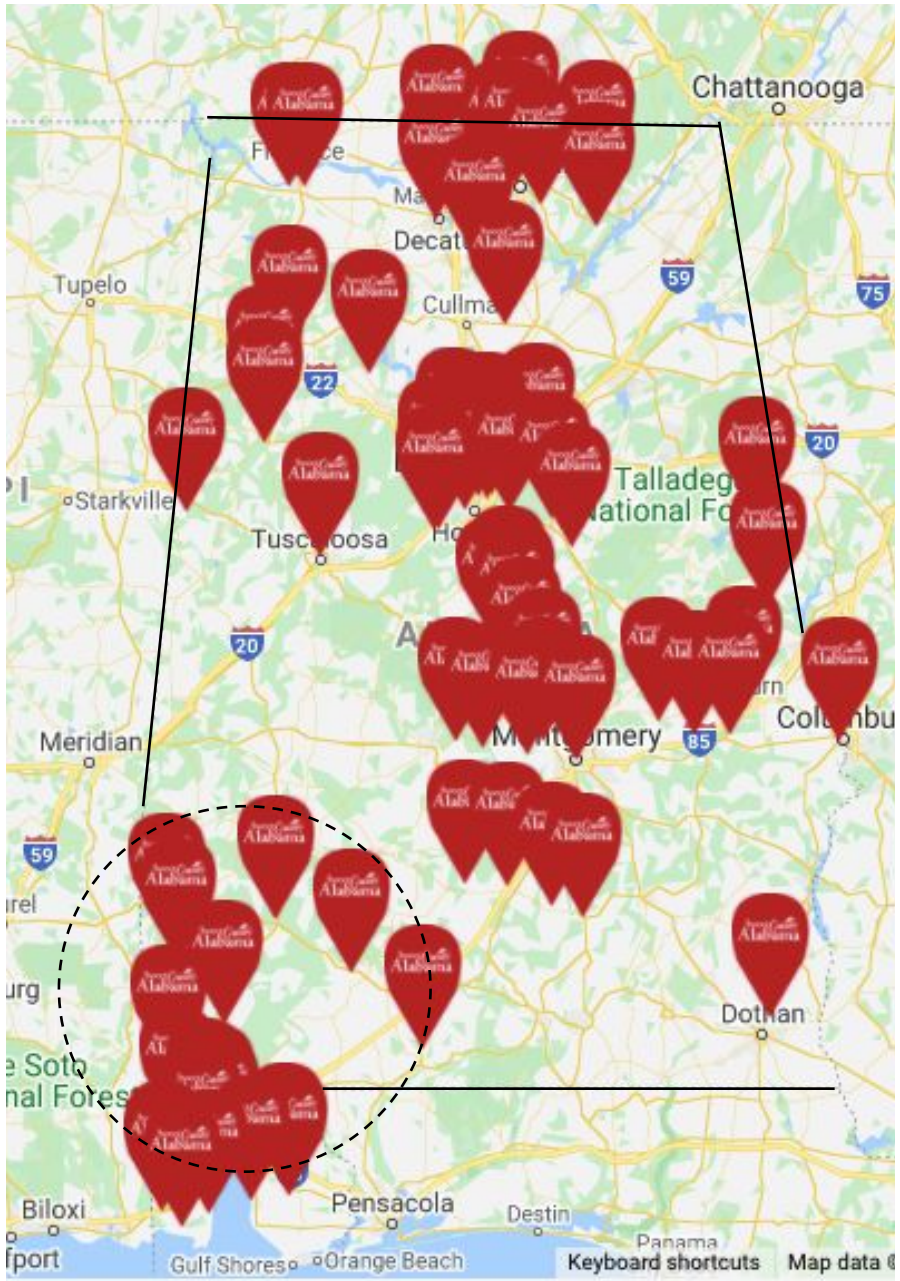
- Spring frost

Number of days < 28℉

	Jan	Feb	Mar
Central AL	12 ± 5	7 ± 4	2 ± 2
Southern AL	9 ± 6	4 ± 3	1 ± 1

Weather data from 2000 – 2021 (AWIS Weather Service)

Petals from the Past Farm, Jemison, AL, 2021

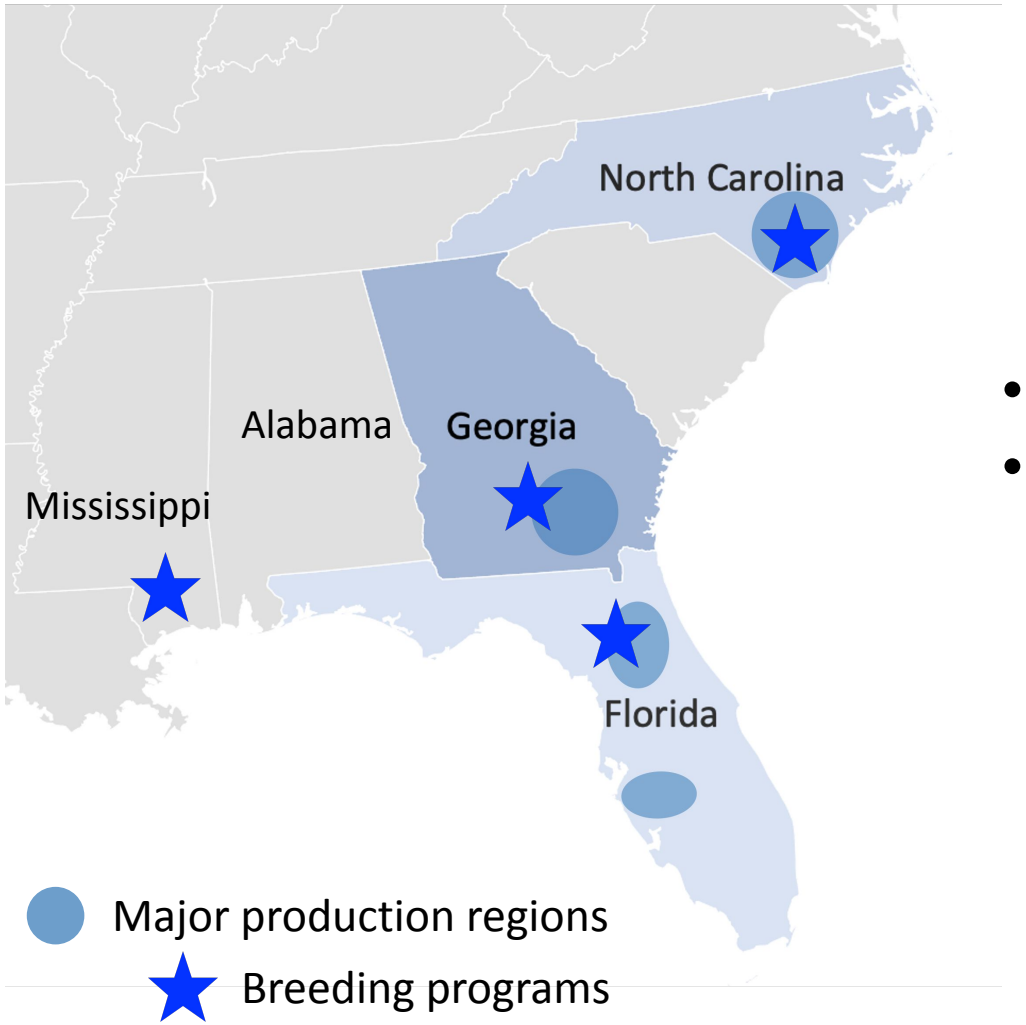


https://www.sweetgrownalabama.org/

Hardiness zone

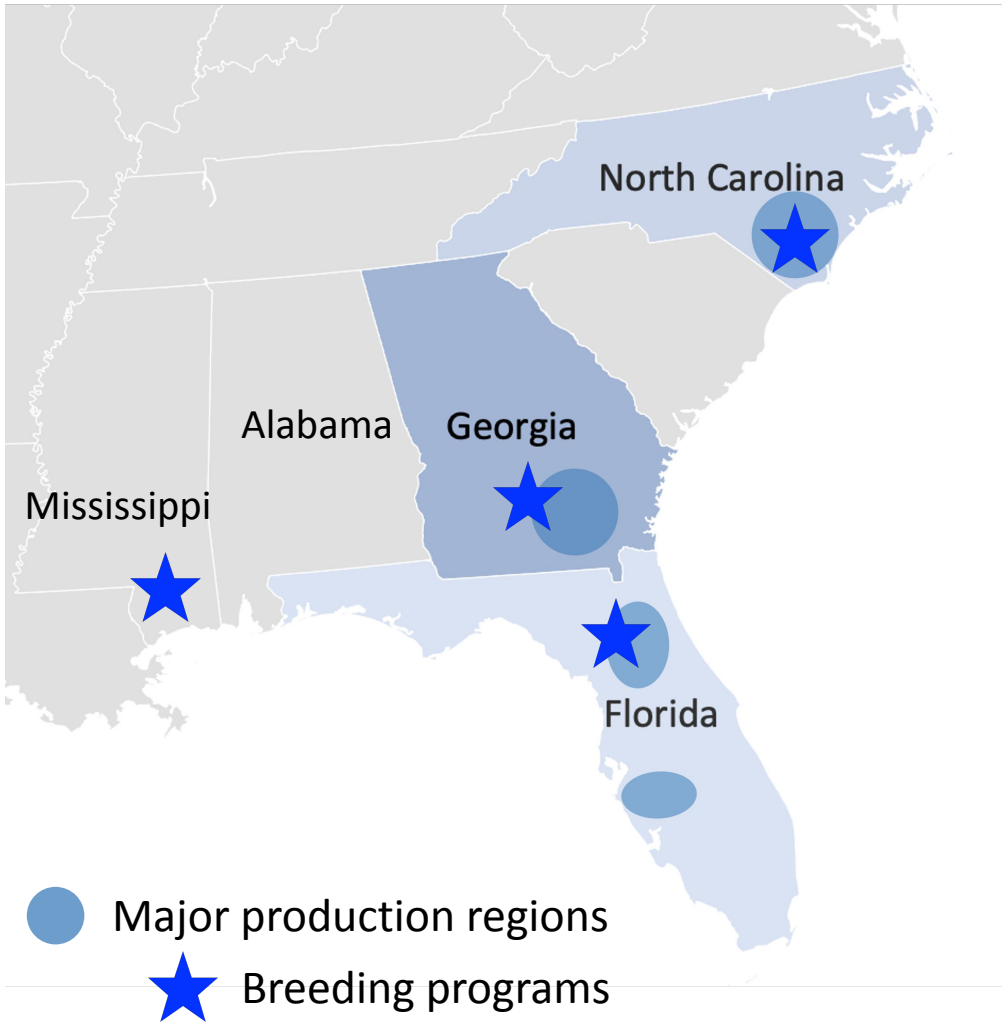
Challenges of growing southern highbush in Alabama

- Spring frost
- High pH soil & water
- Diseases



- No cultivars were developed for Alabama
- No knowledge on what cultivars perform well in Alabama

Breeding objectives



- Identify suitable cultivars and selections
- Develop new cultivars for Alabama and potentially nearby regions
- Serve both small- and large-scale producers

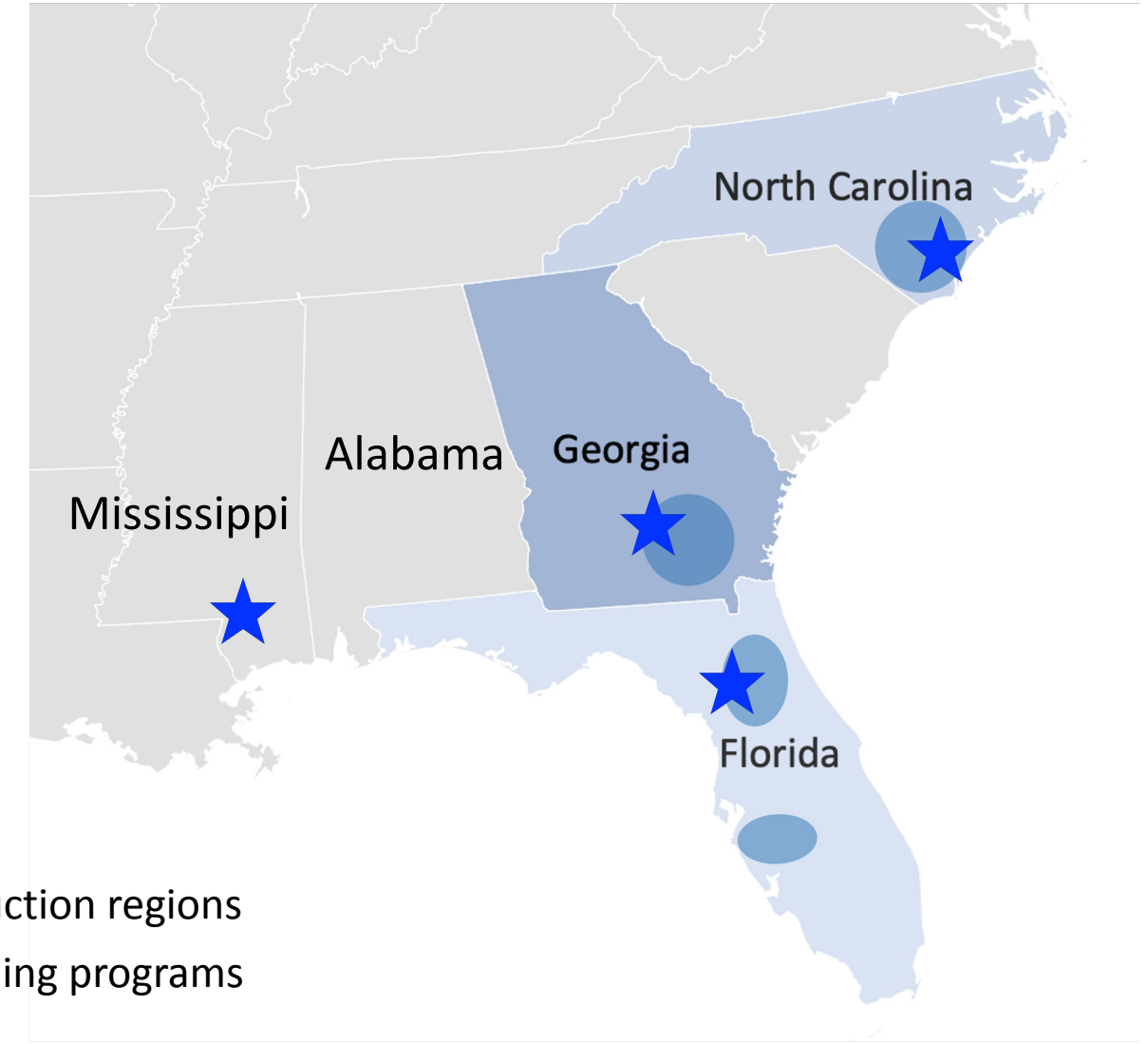
Southern highbush

- Spring frost tolerance
- Soil adaptability
- Disease resistance
- Fruit quality

Rabbiteye

- Early maturity
- Fruit quality
- Disease resistance

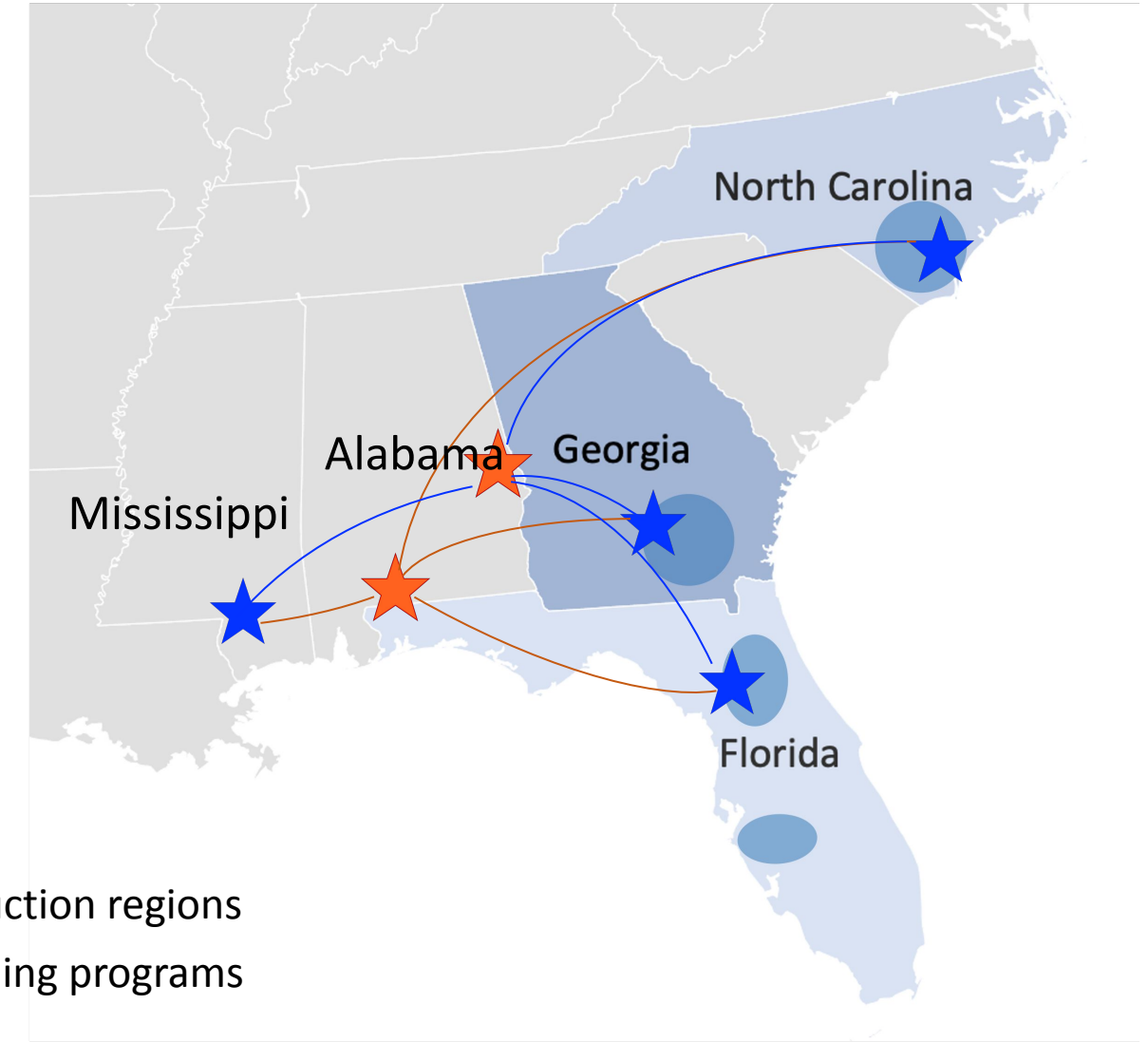
I. Multi-location cultivar evaluation



Major production regions

Breeding programs

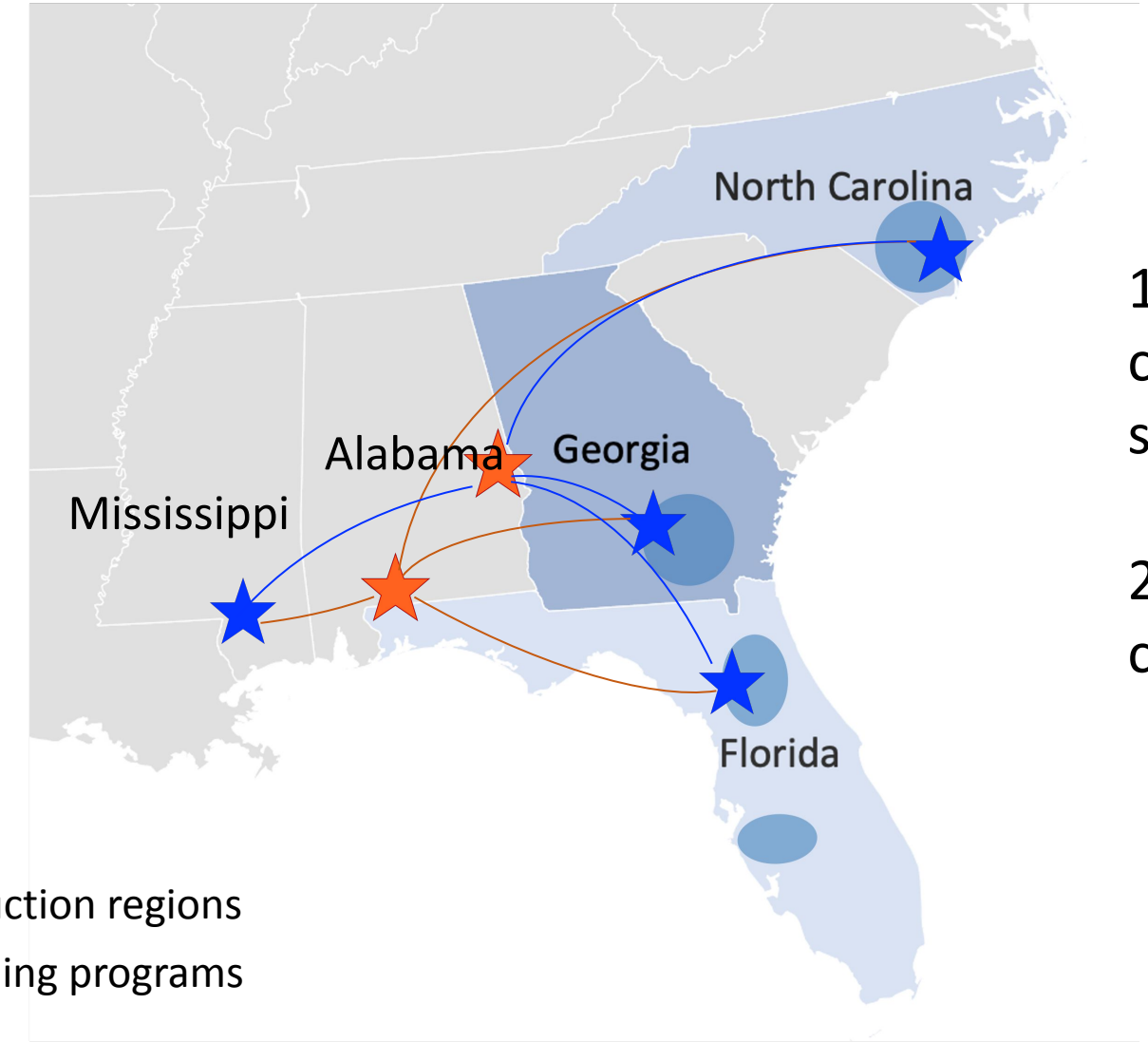
I. Multi-location cultivar evaluation



Major production regions

Breeding programs

I. Multi-location cultivar evaluation

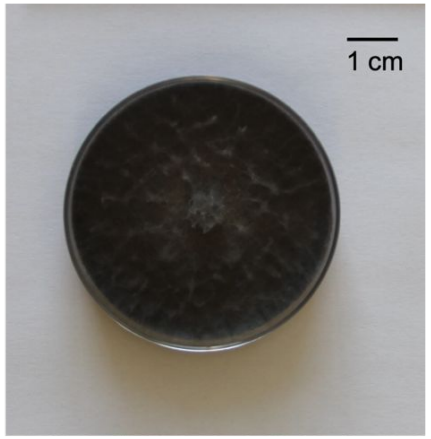


1. Identify suitable cultivars for central and southern Alabama

2. Select parents for cultivar development

II. Identify the causal pathogens of blueberry stem blight

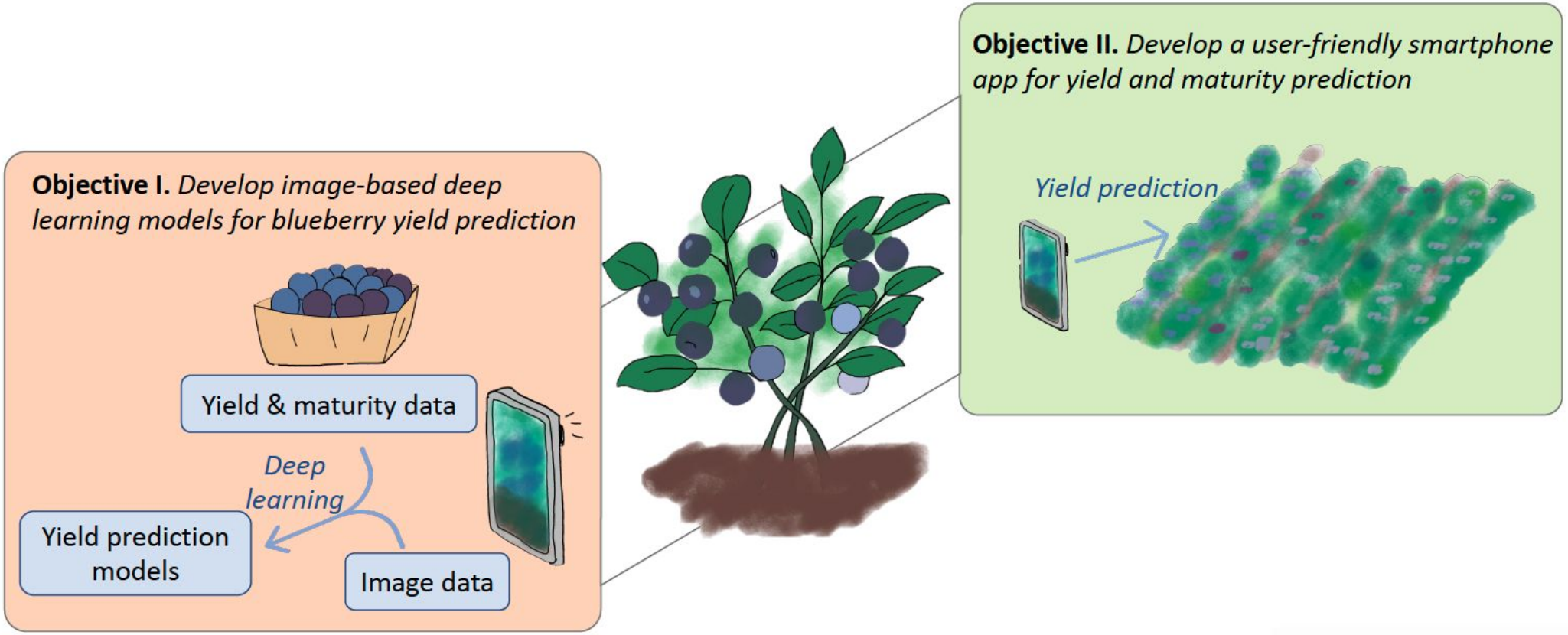
- Botryosphaeria stem blight: No. 1 disease for rabbiteye production in AL
- Little is known about species of causal pathogens
- Survey commercial blueberry farms in AL, GA and MS
- Identify causal pathogens based on morphological characteristics and DNA sequence information



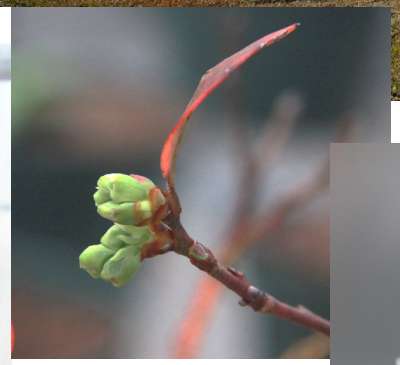
AL Sample
Clanton, AL, Sep 2021
Botryosphaeria parva/*Neofusicoccum ribis*

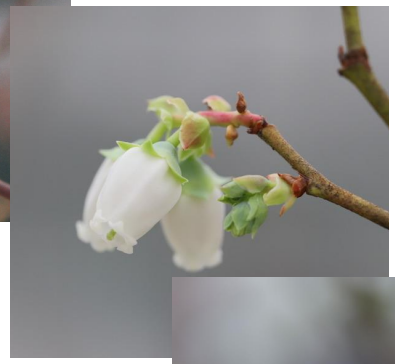
GA Sample
Hahira, GA, Sep 2021
N. kwambonambiense/*N. parvum*.

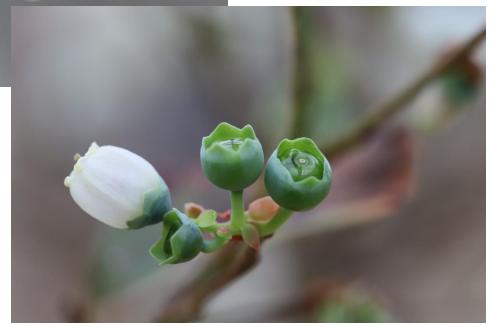
III. High-throughput yield prediction



CALIFORNIA Blueberry COMMISSION







Acknowledgement

Breeders

Dr. Ebrahiem Babiker — USDA-ARS, Poplarville, MS
Dr. Scott NeSmith — University of Georgia
Dr. Patricio Munoz, Dr. Paul Lyrene — University of Florida
Dr. Hamid Ashrafi, Jessica Spencer — North Carolina State University
Dr. Paul Sandefur — Fall Creek Farm and Nursery, Inc.

Collaborators

Dr. Yin Bao
Dr. Elina Coneva
Dr. James Spiers
Dr. Kathy Lawrence
Dr. Jonathan Oliver

Greenhouse and research station managers:
Heath Hoffman, Brad Miller, Jason Burkett

Extension specialists:
Chip East, Jacob Kelley, Edgar Vinson, David Lawrence

Growers in AL, GA, MS, FL, CA

AUBURN UNIVERSITY

CALIFORNIA Blueberry COMMISSION

FALL CREEK®