

Curtailing Invasive Species in Gardens Through Genetic Sterilization and Genomic Research

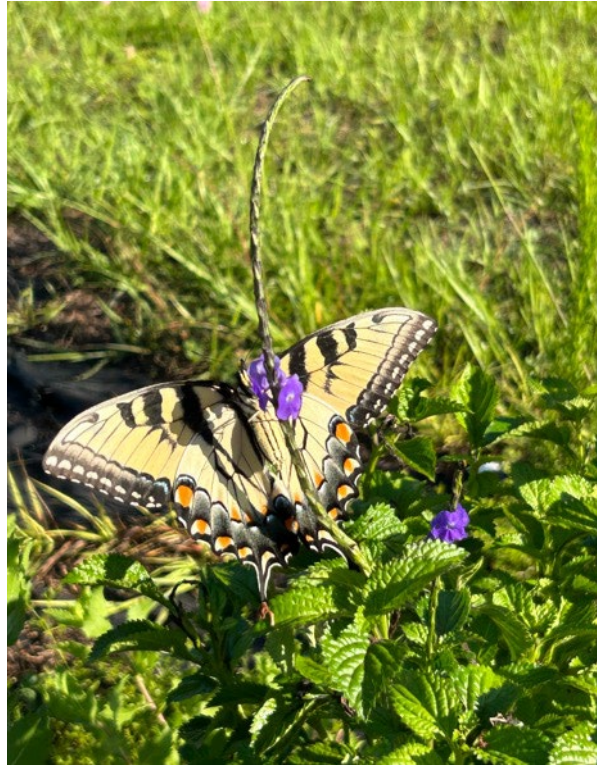
Brooks Parrish, Sandra Wilson,
and Zhanao Deng



X172



Are all invasive plants unattractive?



Find less invasive alternatives

HORTSCIENCE 44(7):1842–1849. 2009.

Seed Production and Viability of Eight Porterweed Selections Grown in Northern and Southern Florida

Sandra B. Wilson¹

Indian River Research and Education Center, Fort Pierce, FL 34945

Gary W. Knox

North Florida Research and Education Center, 155 Research Road, Quincy, FL 32351

Keona L. Muller

Indian River Research and Education Center, Fort Pierce, FL 34945

Rosanna Freyre

P.O. Box 110670, Gainesville, FL 32611

Zhanao Deng

Gulf Coast Research and Education Center, 14625 CR 672, Wimauma, FL 33598

Landscape Performance and Fruiting of 12 Privet Selections Grown in Northern and Southern Florida

Sandra B. Wilson^{1,2,4}, **Gary W. Knox**^{1,3}, **Keona L. Nolan**^{1,2}, and **James Aldrich**^{1,3}



horticulturae



Brief Report

Landscape and Fruit Evaluation of Three Privet (*Ligustrum* sp.) Cultivars in Florida

Julia J. Rycyna^{1,*}, **Sandra B. Wilson**¹, **Zhanao Deng**², **Basil V. Iannone III**³ and **Gary W. Knox**⁴

¹ Department of Environmental Horticulture, Institute of Food and Agricultural Sciences, University of Florida, Gainesville, FL 32611, USA; sbwilson@ufl.edu

² Gulf Coast Research and Education Center, Department of Environmental Horticulture, Institute of Food and Agricultural Sciences, University of Florida, Wimauma, FL 33598, USA; zdeng@ufl.edu

³ School of Forest, Fisheries and Geomatics Sciences, University of Florida, Gainesville, FL 32611, USA; biannone@ufl.edu

⁴ Department of Environmental Horticulture, North Florida Research and Education Center, Institute of Food and Agricultural Sciences, University of Florida, Quincy, FL 32351, USA

* Correspondence: juliarycyna@ufl.edu

Summary of 26 Heavenly Bamboo Selections Evaluated for Invasive Potential in Florida

Sandra B. Wilson¹, **Julia Rycyna**¹, **Zhanao Deng**², and **Gary Knox**³

Create new sterile cultivars

HORTSCIENCE 47(1):132–137. 2012.

UF-T3 and UF-T4: Two Sterile *Lantana camara* Cultivars

David M. Czarnecki II¹

University of Florida/IFAS, Environmental Horticulture Department, Gulf Coast Research and Education Center, 14625 County Road 672, Wimauma, FL 33598

Sandra B. Wilson²

University of Florida/IFAS, Environmental Horticulture Department, Indian River Research and Education Center, 2199 South Rock Road, Fort Pierce, FL 34945

Gary W. Knox²

University of Florida/IFAS, Environmental Horticulture Department, North Florida Research and Education Center, 155 Research Road, Quincy, FL 32351

Rosanna Freyre³

University of Florida/IFAS, Environmental Horticulture Department, Gainesville, FL 32611

Zhanao Deng^{4,5}

University of Florida/IFAS, Environmental Horticulture Department, Gulf Coast Research and Education Center, 14625 County Road 672, Wimauma, FL 33598

HORTSCIENCE 52(4):652–657. 2017. doi: 10.21273/HORTSCI11840-17

Infertile *Lantana camara* Cultivars UF-1011-2 and UF-1013A-2A

Zhanao Deng³

University of Florida, IFAS, Environmental Horticulture Department, Gulf Coast Research and Education Center, 14625 County Road 672, Wimauma, FL 33598

Sandra B. Wilson

University of Florida, Environmental Horticulture Department, P.O. Box 110675, Gainesville, FL 32611

Xiaobao Ying

University of Florida, IFAS, Environmental Horticulture Department, Gulf Coast Research and Education Center, 14625 County Road 672, Wimauma, FL 33598

David M. Czarnecki II^{1,2}

University of Florida, IFAS, Environmental Horticulture Department, Gulf Coast Research and Education Center, 14625 County Road 672, Wimauma, FL 33598

HORTSCIENCE 55(6):953–958. 2020. <https://doi.org/10.21273/HORTSCI14911-20>

‘UF-1013-1’: An Infertile Cultivar of *Lantana camara*

Zhanao Deng

Institute of Food and Agricultural Sciences, Environmental Horticulture Department, Gulf Coast Research and Education Center, University of Florida, 14625 County Road 672, Wimauma, FL 33598

Sandra B. Wilson

Environmental Horticulture Department, University of Florida, P.O. Box 110675, Gainesville, FL 32611

Xiaobao Ying

Institute of Food and Agricultural Sciences, Environmental Horticulture Department, Gulf Coast Research and Education Center, University of Florida, 14625 County Road 672, Wimauma, FL 33598

Chunxian Chen

U.S. Department of Agriculture, Agricultural Research Service, Fruit and Tree Nut Research Laboratory, 21 Dunbar Road, Byron, GA 31008

Rosanna Freyre and Victor Zayas

Environmental Horticulture Department, University of Florida, P.O. Box 110675, Gainesville, FL 32611

David M. Czarnecki II

Institute of Food and Agricultural Sciences, Environmental Horticulture Department, Gulf Coast Research and Education Center, University of Florida, 14625 County Road 672, Wimauma, FL 33598

Today's Roadmap



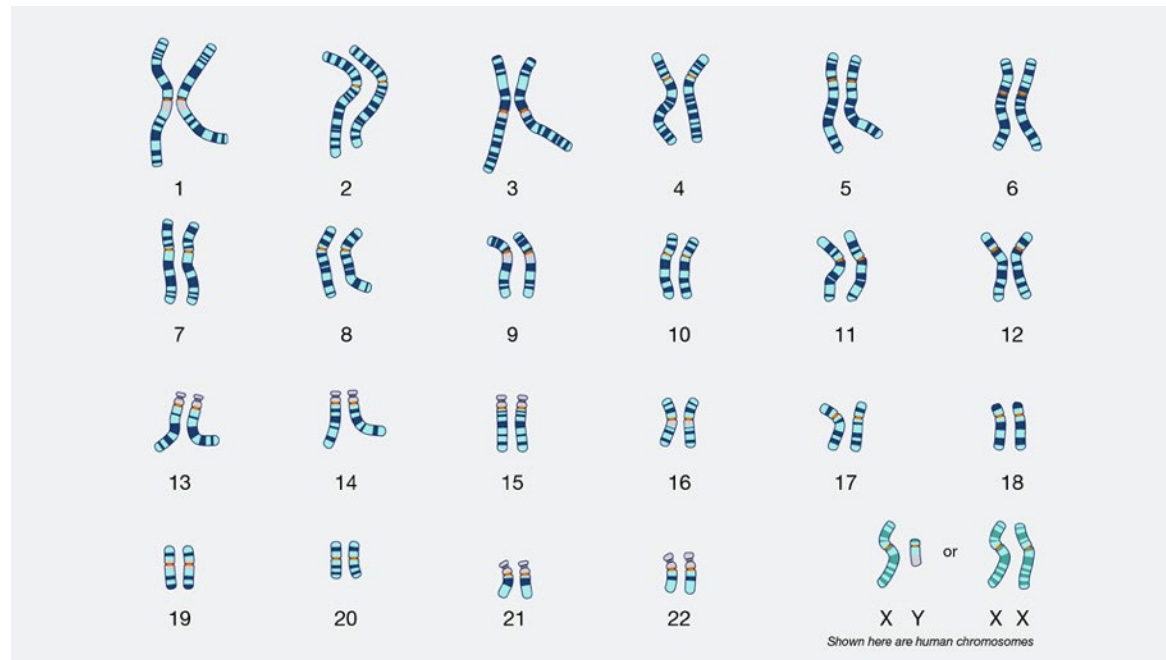
**Lantana
Breeding**

**Lantana
Genomics**

**Porterweed
Breeding**

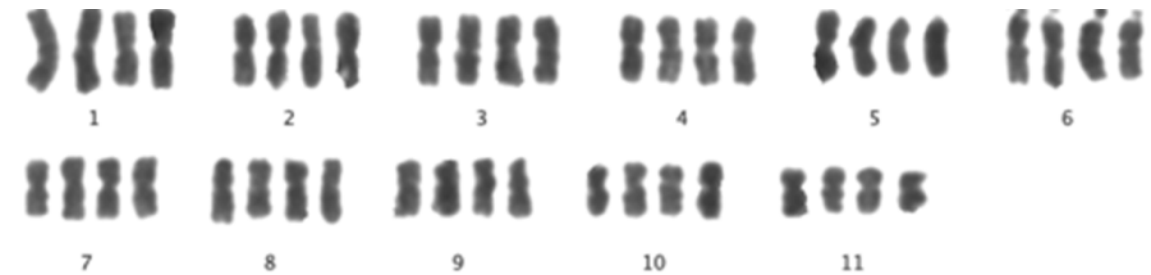
What is ploidy?

- The number of complete sets of chromosomes (DNA) an organism has in non gametophytic cells.



National Human Genome Research Institute

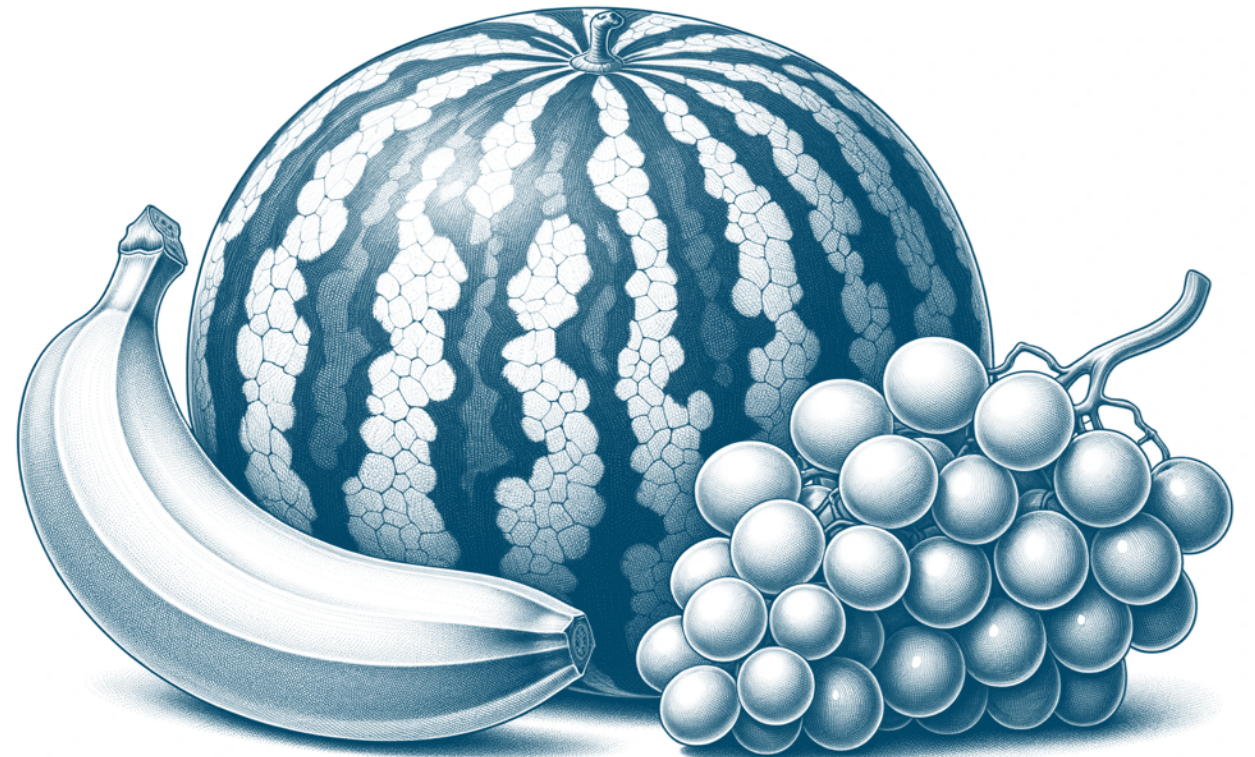
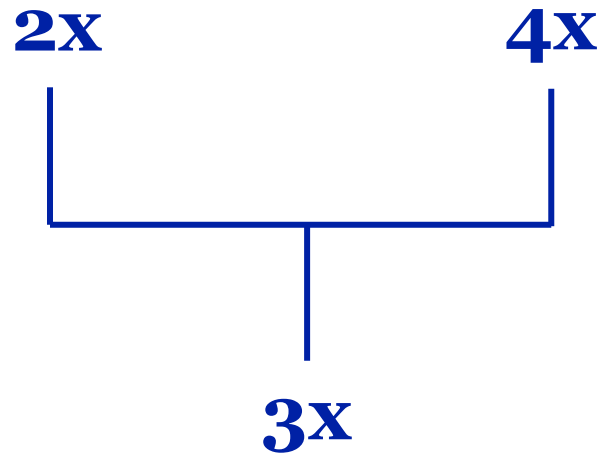
Human (Diploid)



***Lantana depressa var depressa* (Tetraploid)**

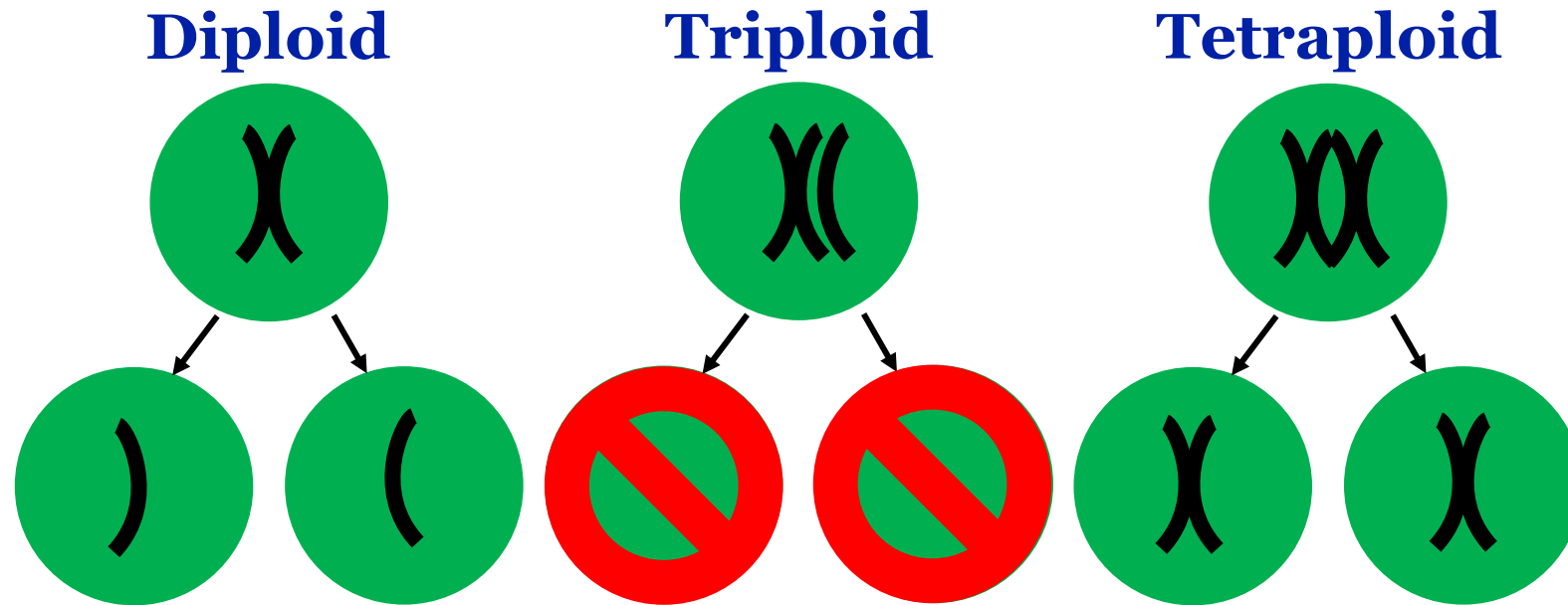
Can we have an odd ploidy?

Interploidy Cross Pollination



Why is a triploid sterile?

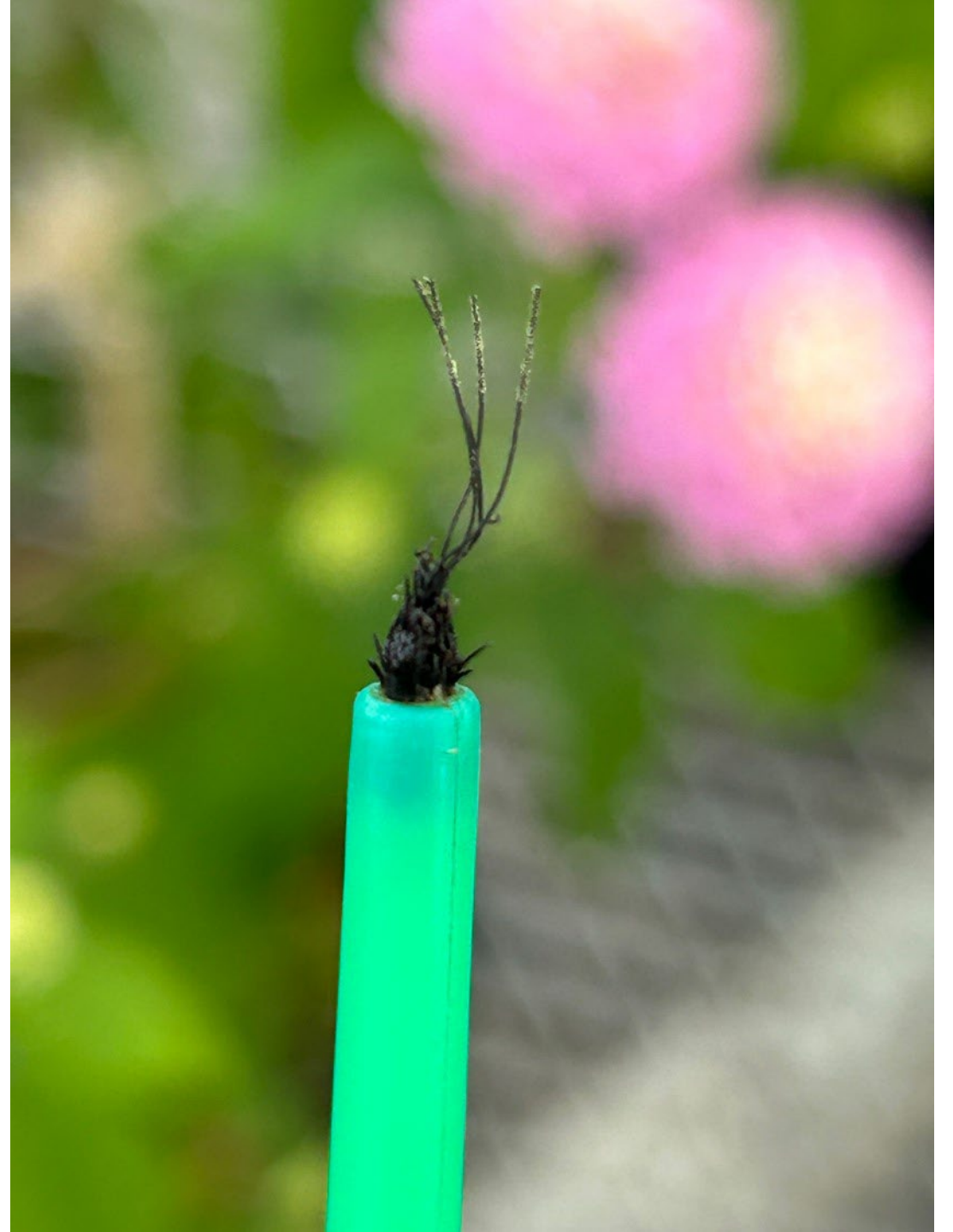
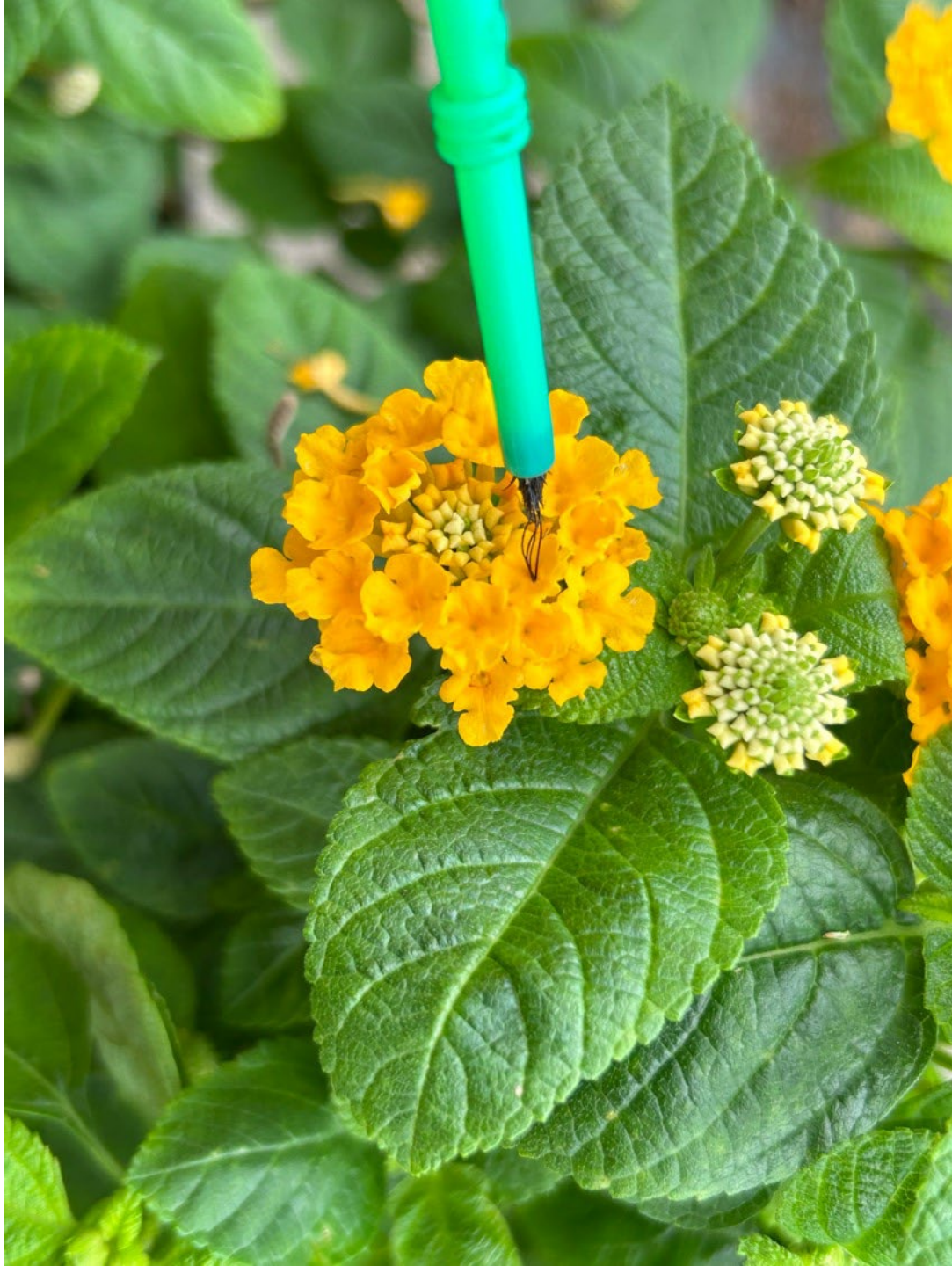
Half of our chromosomes come from each parent

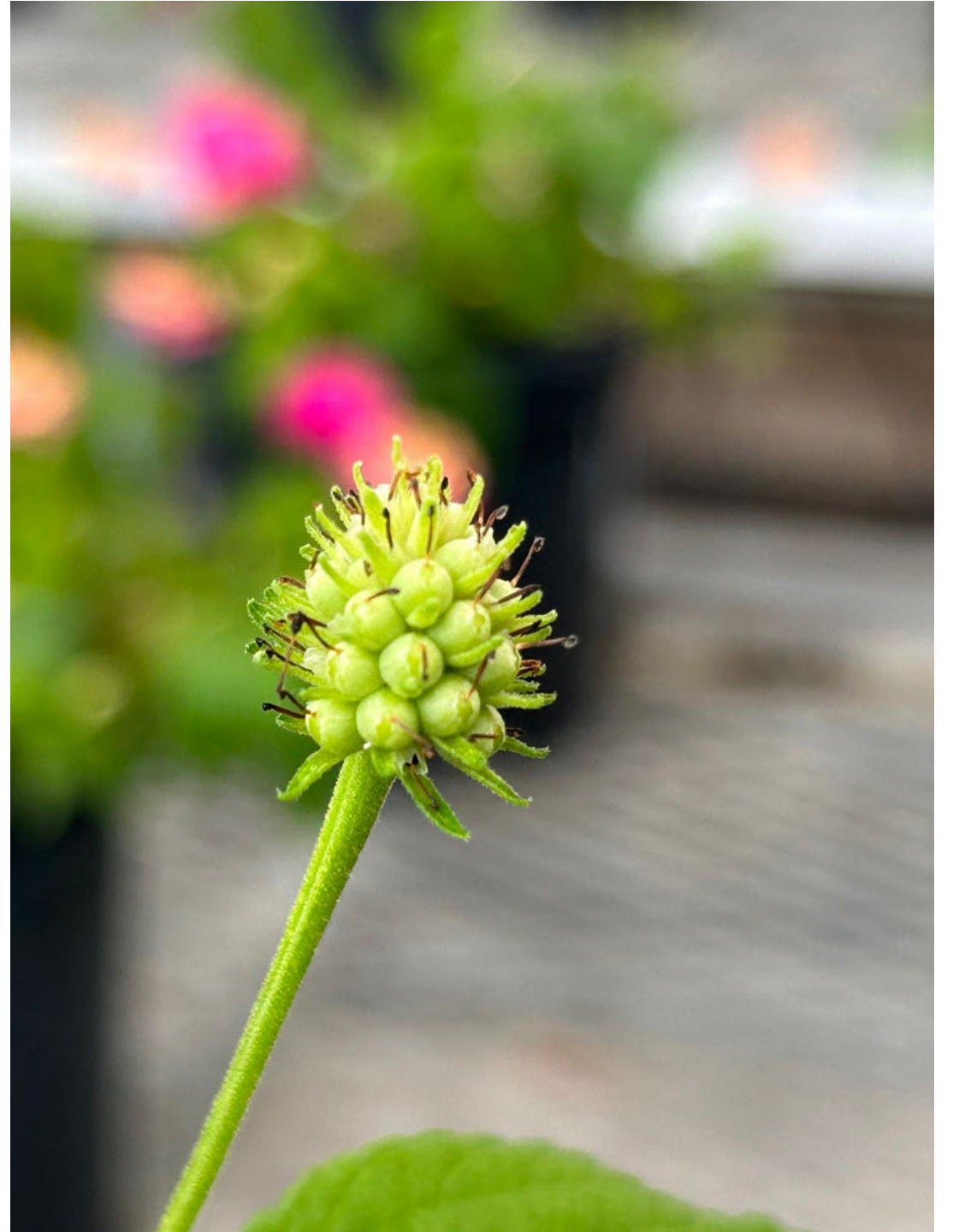


Program overview

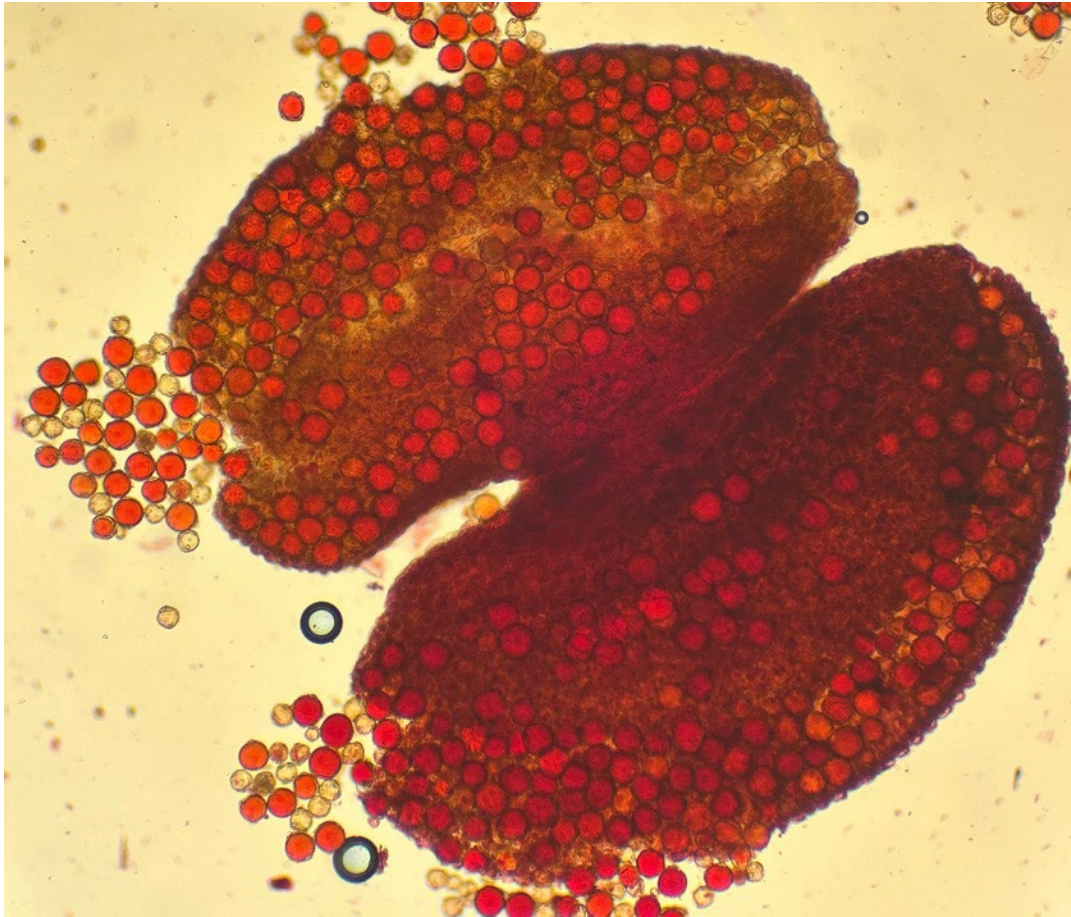
- Established in 2004 by Dr. Zhanao Deng
- Goal to produce sterile *Lantana camara* cultivars for Florida
- First cultivars released in 2012



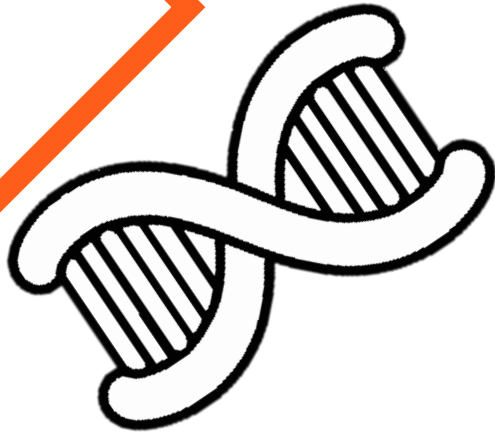




Replicated trials to evaluate sterility!



Lantana Genomics





2x



4x

3x

4x

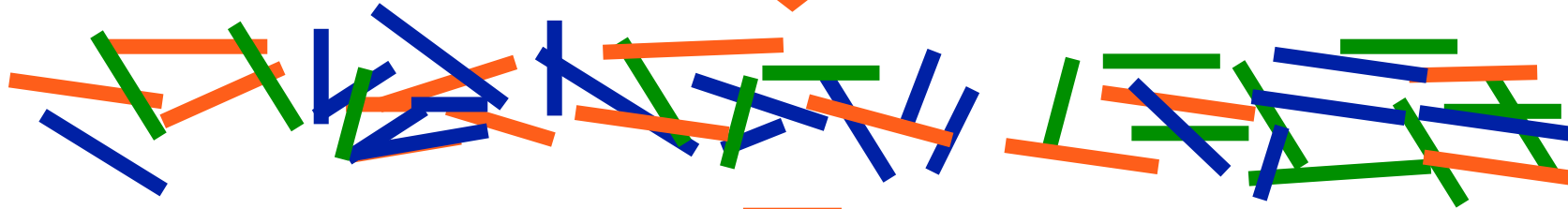
2x

**Some lantana
possess genes that
allow the plant
produce
unreduced female
gametes**

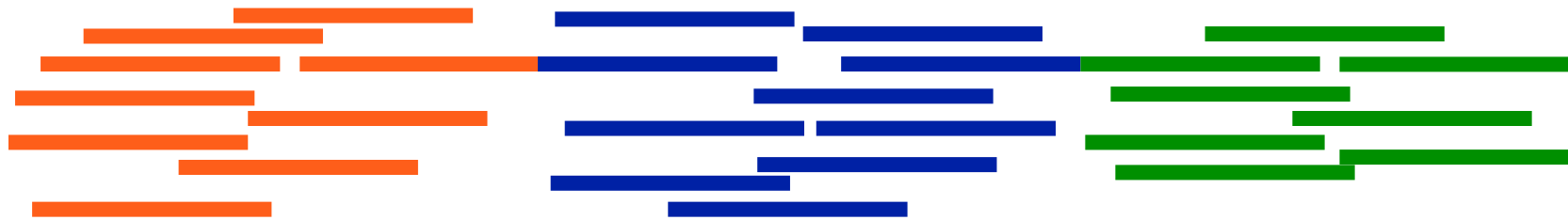
UF-T48



DNA in the Cell



**Extracted
DNA**



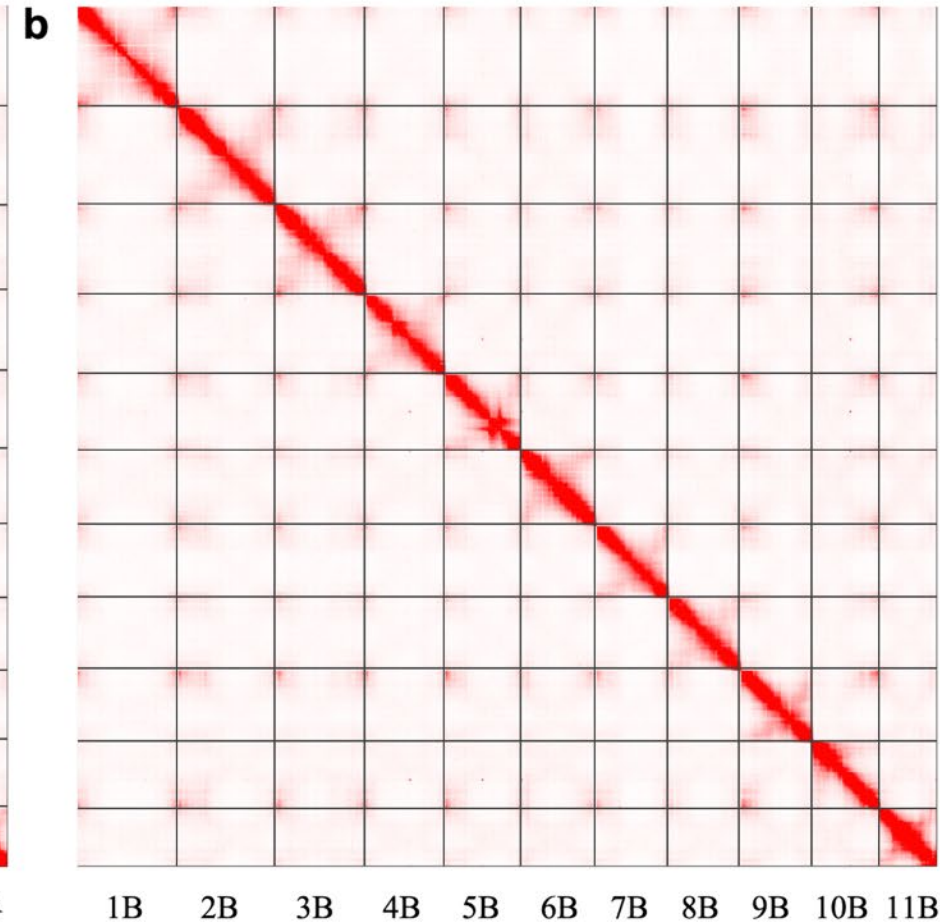
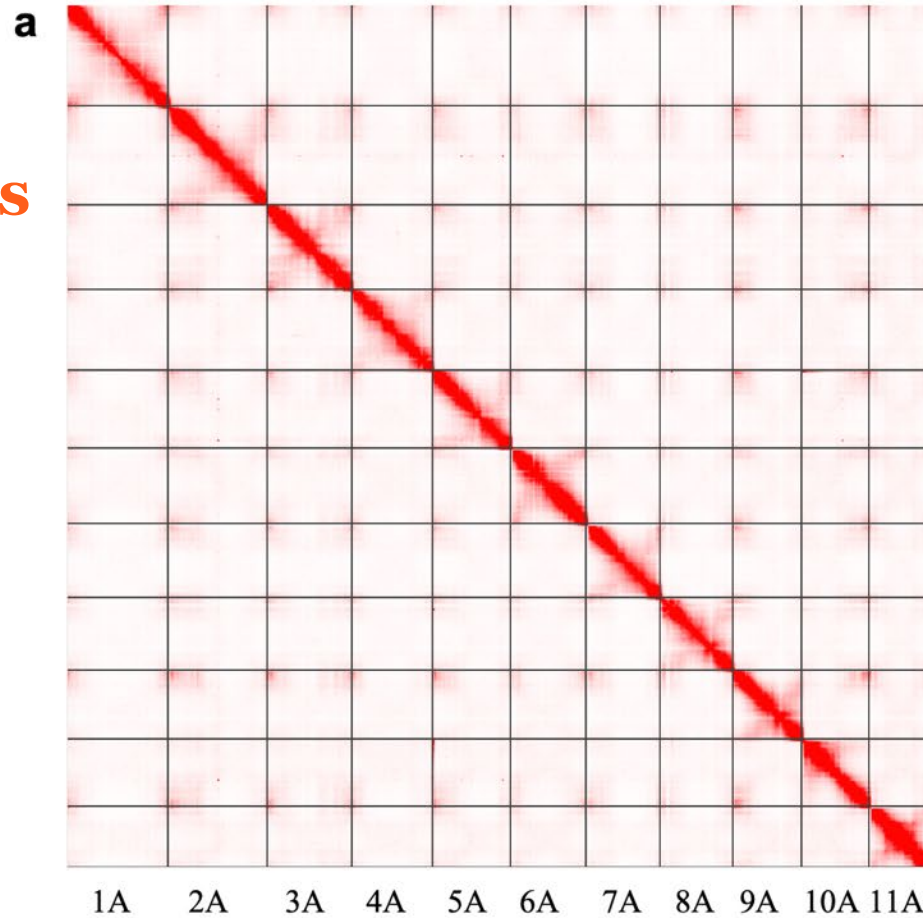
**DNA
alignment**



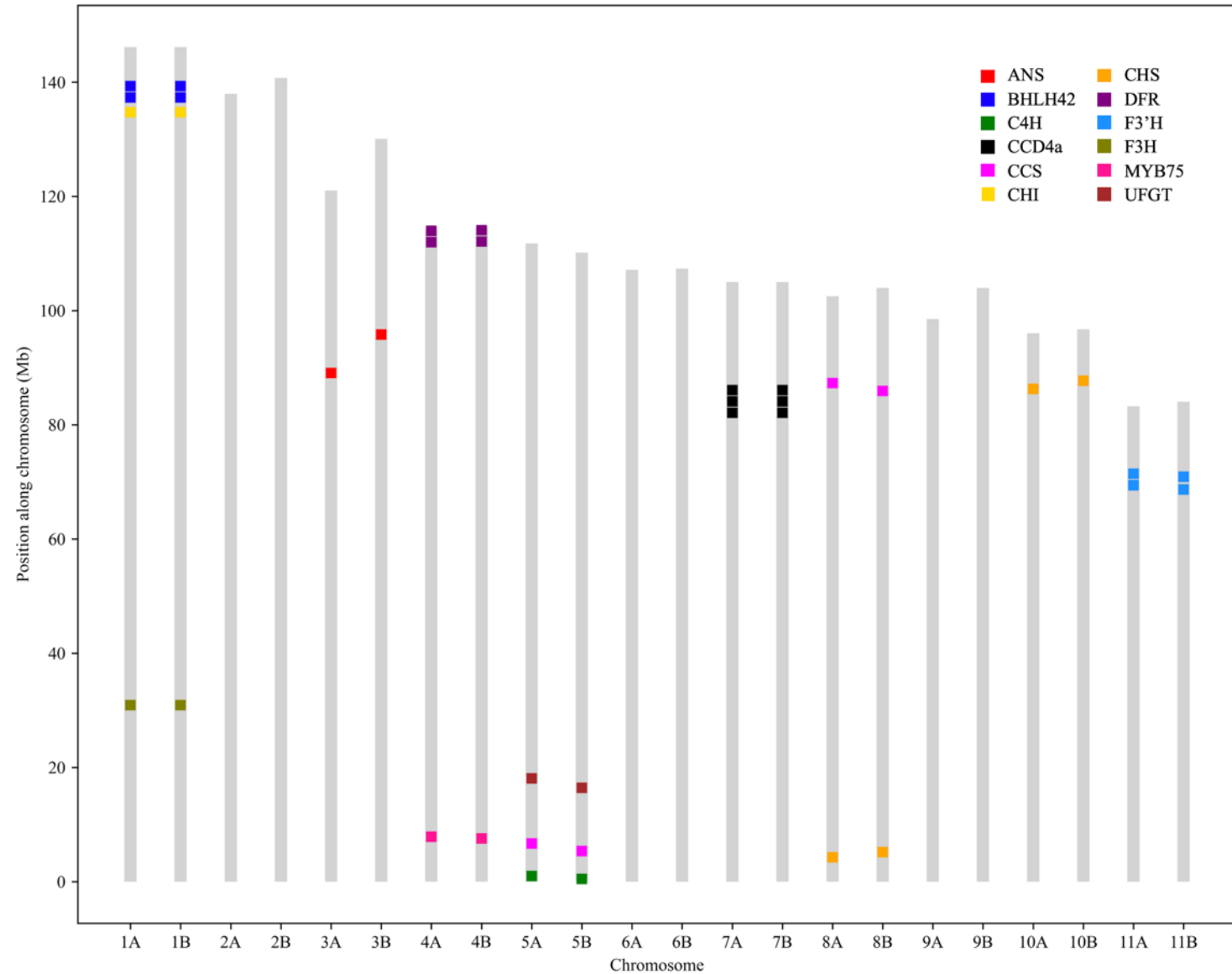
Assembled genome

Genome Assembly

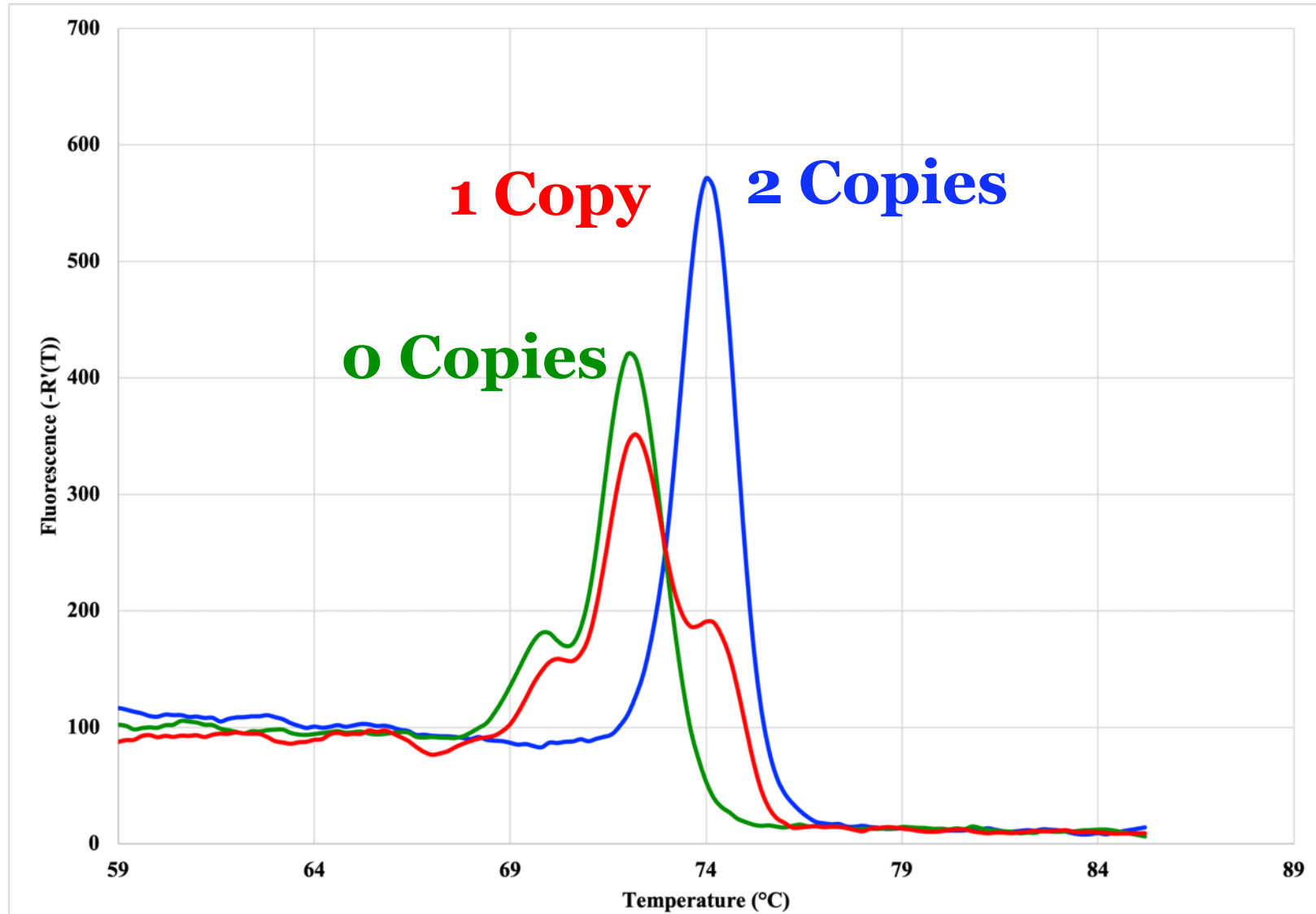
- **22 chromosomes**
- **83,775 genes**
predicted
- **High quality**
metrics



Locate genes of interest



Marker for UFG



Porterweed Breeding



Program overview

- Established in 2021 as a side project during my PhD research
- Goal to produce sterile porterweed cultivars for Florida



The process

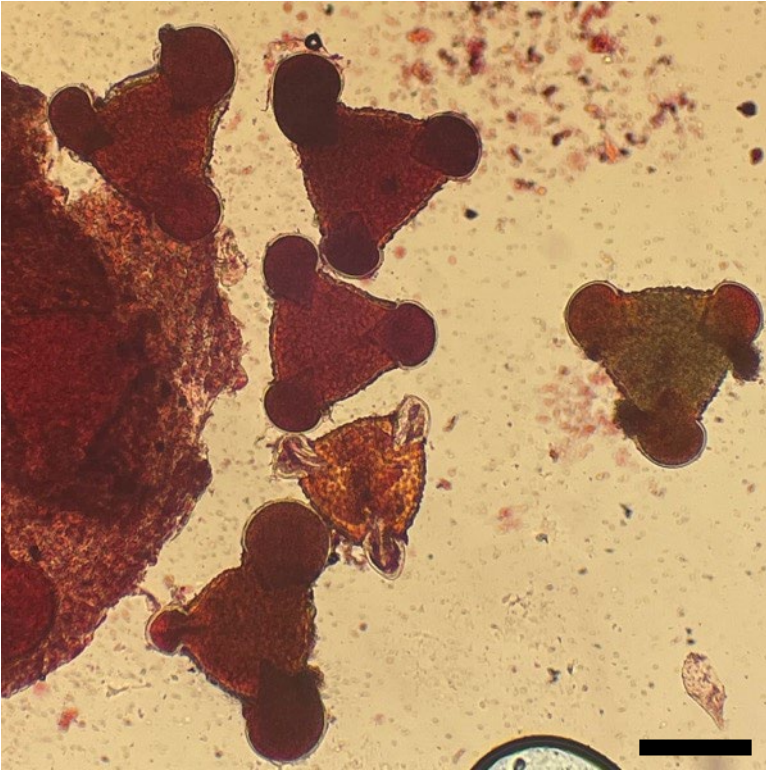
- Porterweed is also naturally a polyploid (many ploidies)
- Most of surveyed species are hexaploid (6x)
- I was only able to find 1 diploid and 1 tetraploid to work with



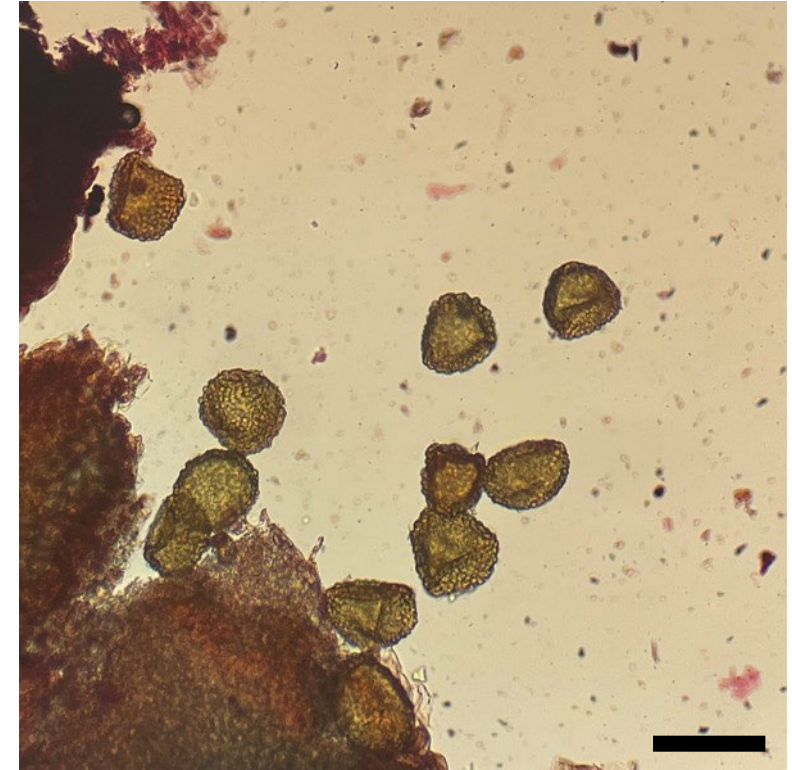
New hybrids



Pollen staining

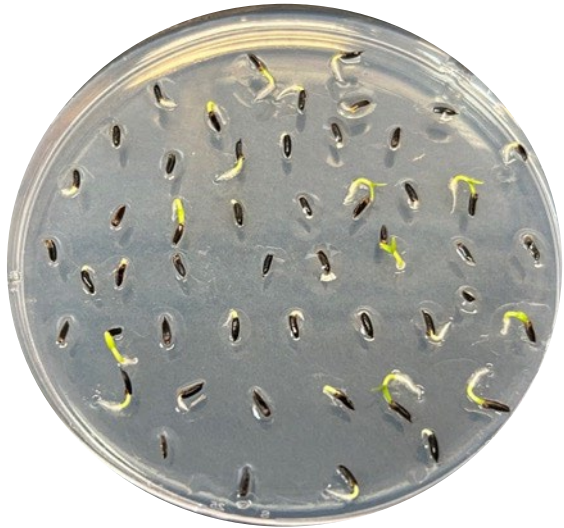
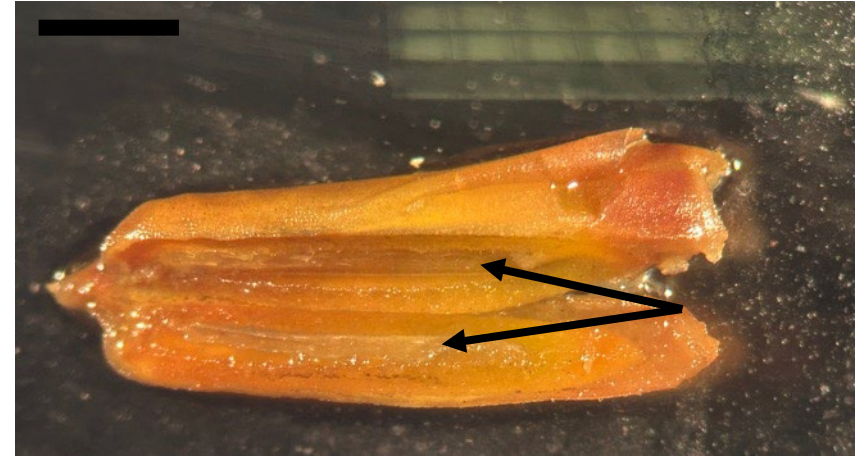
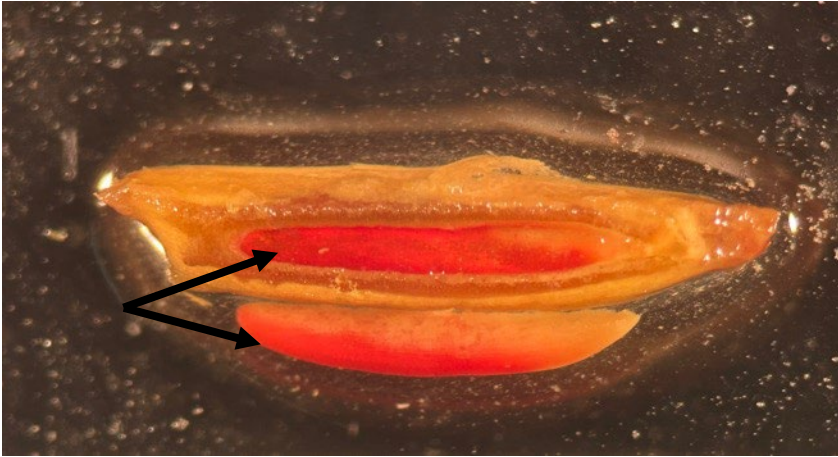


Invasive



Triploid

Germination trials



Invasive



Triploid

Thank you!

