

# Blueberry Breeding @ UF Florida Blueberry Growers Association 

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October 26 2017. Plant City, FL.


Making Information about Cultivars available to our producers! www.blueberrybreeding.com

## 2016 World Production Growth Predictions



- 2016 global production 591,000 metric tons
- United States $41 \%$ fresh and $83 \%$ processed market
- United States utilize 68\% of global production
- Consumption in North America, Europe, and Asia
- Production doubled (US), tripled (EU) and quadrupled (APAC) since 2008


## Monthly Global Production and Florida

Total Global Production


- Florida window


## Florida Market Window - 2014



- FL window is dynamic with weather - Experience from 2015 and 2016


## UF Blueberry Breeding Program Test Sites



## UF Blueberry Cultivar Development Timeline

Activity



$\begin{array}{llllllllll}\text { Year } & \text { Yr 1 } & \text { Yr 3 } & \text { Yr 5 } & \text { Yr 7 } & \text { Yr9 } & \text { Yr 11 } & \text { Yr 13 } & \text { Yr }\end{array}$

- High density seedling plantings for rapid first evaluation
- Growers-Cooperators early in the breeding cycle
- Large number of cultivars released historically!


## UF-IFAS Blueberry Releases (2004-2016)

| Release Year | Variety | FL <br> Outlook | Notes |
| :---: | :---: | :---: | :---: |
| 2004 | Springhigh | Decreasing | Early season alternative but Marketers do not want fruit |
| 2005 | Primadonna | Stable | Early season, but difficult to achieve full crop potential |
|  | Snowchaser | Minor | Very early but fruit quality often not ideal |
|  | Sweetcrisp | Decreasing | More acreage in Georgia than FL |
| 2007 | Farthing | Increasing | Widely planted north of I-4 |
|  | Scintilla | Decreasing | Plant longevity is an issue |
| 2009 | Bobolink | Minor | Has not been widely adopted |
|  | Chickadee | Increasing | Interest in very low-chill areas in Central Florida |
|  | Flicker | Decreasing | Anthracnose problems in Central Florida |
|  | Kestrel | Increasing | Interesting in very low-chill areas in Central Florida |
|  | Meadowlark | Stable | Widely planted north of I-4, Xylella an issue |
|  | Raven | Minor | Has not been widely adopted |
| 2013 | Indigocrisp | Increasing | Planting increasing Gainesville-north, standing water an issue |
| 2015 | Arcadia | Increasing | Great yield in Central-South FL |
|  | Avanti | Increasing | Planting increasing in Central-South FL |
|  | Endura | Increasing | Good Yield in Central-South FL |
| 2016 | Keecrisp | Increasing | High fruit quality (Crunchy), North Florida |
|  | Patrecia | Increasing | Large early fruit, North FL. Possible Springhigh replacement |

## HOW THE BREEDING PROGRAM CAN HELP OUR FL PRODUCERS?

1. By developing cultivars that can have higher yield, better quality, and appropriated timing of production to maximize producer profit.
2. By developing cultivars that decrease the cost of production and/or harvesting, thus maximize producer profit.

## Average Historical Cost \% Establishment and Maintenance

Spraying cost has increased tremendously due to new pests. Example: SWD!!


## Strategic goal: Develop cultivars with lower soil amendment requirements.

Most studies shown that soil amendment is needed for yield.

Most studies have been done with already released cultivars

Selection for this trait will be explored at the seedling stage to observe whether variation exist and thus start selecting for it!

Exploring wild species. Based on Grafting results!

Working with Faculty specialists in this area from UF.

## Strategic goal: Develop cultivars with lower spraying requirements; disease/pest tolerant/resistant

Strategy 1: We will select and use as parents, long lasting experimental lines, >90\% plot survival after 8-9 years in the field with good yield.

Strategy 2: Are we able to screen for pests/diseases?

Working in collaboration with UF plant pathologist and entomologist to develop protocols for screening of economically important diseases/pests.

Goal will be to create a cultivar catalog for the different levels of resistance observed

## Average Historical Harvesting Cost \% per Flat



## Machine Harvest

- Producers can machine harve and market the product fresh decreasing labor costs and increasing profit margins.
- Strategically the program will continue developing cultivars with the right:

Firmness,
Detachment strength,
Stem length, and
Bush architecture ideal for machine harvest!!

IEW: in 2017 season we machine harvested three new cultivars

## Machine Harvesting Triangle



## Blueberry production in Florida



- Florida is an extremely challenging environment for blueberry production
humidity - heat - disease - soil - flooding - pests
- Establishment of a planting is a high cost enterprise. \$33K per acre spent by year 2.
- Plantings in FL last 7 years on average!

|  | Price (\$/LB) |  |
| :--- | :---: | :---: |
| Average Yield (Lb/A) | $\$ 3.7$ | $\$ 4.9$ |
| $6000 \mathrm{Lb} / \mathrm{A}$ | $>15$ Years | Year 7 |
| $8000 \mathrm{Lb} / \mathrm{A}$ | Year 11 | Year 5 |

- Profitability is tied to the length of production (Singerman et al. 2017. EDIS Publication)


## Selections Approved for Release as Cultivars 2017

## Production for Fresh Market during Florida harvesting window

Magnus (04-213)* - Early production of large fruit for hand harvest in FL window for fresh fruit market. Not firm enough for machine. Expecting over 8 years of high yield. Earlier than Star and Emerald. Recommended for CentralNorth Florida.

Wayne (06-354)* - Early production and high fruit yield. Not firm enough for machine harvest. Expecting over 8 years of high yield. Jewel-like but firmer! Recommended for Central-North Florida.

Optimus (08-262)* - Early production of firm, machine harvest fruit (see machine harvest data). High fruit quality. Medium size. Recommended for Central-North Florida.
*Plant Patents Pending. Licenses available in 2018 to FL nurseries. UF|IFAS

## Machine harvest April 2017

| Genotypes | Date | Lb Packed Fruit/Bush | Lb Waste | Yield/Acre (1290 bush) | Yield/Acre (1742 bush) |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Wayne | April 617 | 1.23 | 0.42 | 1,583 | 2,138 |
| Optimus | F April 617 | 1.22 | 0.28 | 1,574 | 2,125 |
| Wayne | FApril 1717 | 0.96 | 0.49 | 1,232 | 1,664 |
| Optimus | FApril 1717 | 1.75 | 0.28 | 2,258 | 3,049 |
| Wayne | FApril 2817 | 0.79 | 0.20 | 1,016 | 1,372 |
| Optimus | FApril 2817 | 0.68 | 0.08 | 876 | 1,183 |
| Packed total yield $\rightarrow$ |  |  | Wayne | 3,831 | 5,174 |
|  |  |  | Optimus | 4,708 | 6,358 |

Scenario: 1290 Plants per Acre

| Genotypes | Date | Price $\$ /$ Lb | \$ per Acre | Savings MH vs HH | Total Savings | Total Income per Acre |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Wayne | April 6 17 | 5.3 | $\$ 12,595.1$ | $\$ 0.50$ | $\$ 1,188.22$ | $\$ 13,783.4$ |
| Optimus | April 6 17 | 5.3 | $\$ 12,519.3$ | $\$ 0.50$ | $\$ 1,181.06$ | $\$ 13,700.3$ |
| Wayne | April 17 17 | 4 | $\$ 7,395.5$ | $\$ 0.50$ | $\$ 924.44$ | $\$ 8,320.0$ |
| Optimus | April 17 17 | 4 | $\$ 13,554.0$ | $\$ 0.50$ | $\$ 1,694.26$ | $\$ 15,248.3$ |
| Wayne | April 28 17 | 3.1 | $\$ 4,726.3$ | $\$ 0.50$ | $\$ 762.30$ | $\$ 5,488.6$ |
| Optimus | April 28 17 | 3.1 | $\$ 4,077.3$ | $\$ 0.50$ | $\$ 657.63$ | $\$ 4,734.9$ |


| Type of Labor | Local Labor |  | H2A Labor |  |
| :---: | :---: | :---: | :---: | :---: |
| Plants per Acre | $\mathbf{1 2 9 0}$ | 1742 | 1290 | $\mathbf{1 7 4 2}$ |
| Wayne | $\$ 1,916$ | $\$ 2,587$ | $\$ 3,448$ | $\$ 4,656$ |
| Optimus | $\$ 2,354$ | $\$ 3,179$ | $\$ 4,237$ | $\$ 5,722$ |

Assumptions Cost: Local Labor $0.85 \$ / L b ;$ H2A Labor $1.35 \$ / L b ;$ Machine $0.35 \$ / L b$

## Post-harvest Firmness 1, 4 and 8 days after hand

 picked and Machine Harvest (04/06/17)

## Fruit Weight (g)



Summary data 2011-2017
Red line $=2.0 \mathrm{~g}$ recommended minimum weight acceptability

## Firmness = Compression Force (g/mm)



Summary data 2011-2017
Red line $=150 \mathrm{~g} / \mathrm{mm}$ recommended minimum firmness acceptability

## Soluble Solid Content (\%)



Summary data 2011-2017
Red line $=10 \%$ recommended minimum Brix acceptability

## Titratable Acidity (\%)



Summary data 2011-2017 Red line $=1 \%$ recommended maximum Acidity acceptability

## Sugar/Acid Ratio



Summary data 2011-2017
Red line $=14$ recommended minimum ratio Brix/Acid acceptability


Analysis based on the extrapolation of 2 harvested representative plants during the 2014 season


Analysis based on the Extrapolation of 2 harvested representative plants during the 2015 season


Analysis based on the Extrapolation of 2 harvested representative plants during the 2016 season


Analysis based on the Extrapolation of 2 harvested representative plants during the 2016 season. Price per week is as important as yield!

## Thanks to our collaborators!!



All patented UF blueberry varieties are licensed by:
Florida Foundation Seed Producers, Inc. (FFSP)

Anyone propagating plants for personal use or sale is required to be licensed by FFSP.

Licenses are available to any nursery in Florida by contacting FFSP
http://ffsp.net, (352) 273-3656

## Learn more at www.blueberrybreeding.com

## Blueberry Breeding \& Genomics Lab

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