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Plant Growth Regulators for Pecan Orchards

Western Pecan Growers Association
Conference March 6, 2017

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Introduction

Definition of Plant Growth Regulators

Compounds (other than nutrients) that, in *small* amounts, promote or inhibit physiological processes in plants

Also known as "Plant Hormones" and "Phytohormones"

5 Major Classes of Naturally-Occurring PGRs

- Auxins
- Gibberellins
- Cytokinins
- Abscisic Acid
- Ethylene

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www.plantcaretoday.com

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Gibberellic acid increased size of ‘Crimson’ table grapes (Fidelibus & Vasquez, University of California). Photo from articles.extension.org

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Increased cotton yield in drought conditions using cytokinins. (https://www.ars.usda.gov)

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Abscisic acid inhibits shoot growth.

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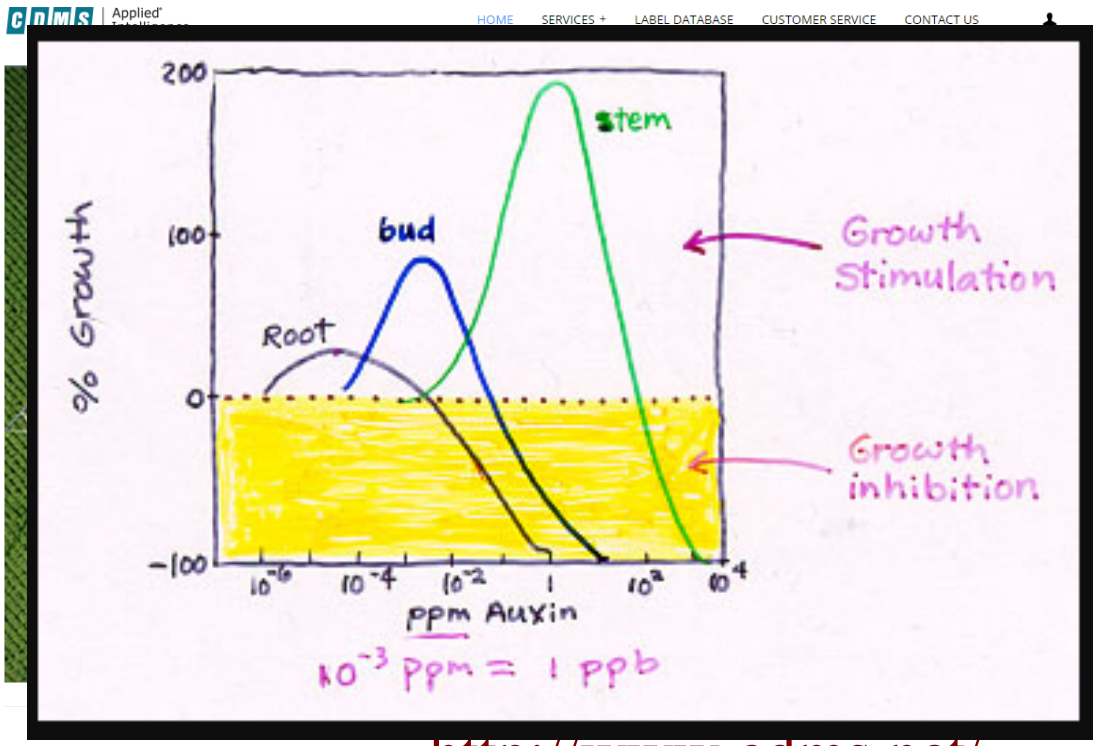
Untreated apple blossoms in Michigan State University study on fruit thinning to control alternate bearing. Photo from www.msu.edu

Three Warnings!

1. PGRs do not have single functions in plants.
2. PGRs do not act alone in the plant.

   finely balanced ratios

3. **ALWAYS** check product labels and state registration!



http://www.cdms.net/

From North Dakota State University (https://www.ndsu.edu)

PGR Research for Pecan Production

HortScience 46(6):870–877. 2011.

Influence of Plant Bioregulators on Pecan Flowering and Implications for Regulation of Pistillate Flower Initiation

Bruce W. Wood[1]

U.S. Department of Agriculture, Agricultural Research Service, Southeastern Fruit and Tree Nut Research Laboratory, Byron, GA 31008-0087

Research Objectives

Determine effects of foliar-applied plant growth regulators in mature ‘Western’ and immature ‘Western’ and ‘Pawnee’ cultivar trees by examining:

1) return bloom in next year

2) expression of select flowering genes

Methods

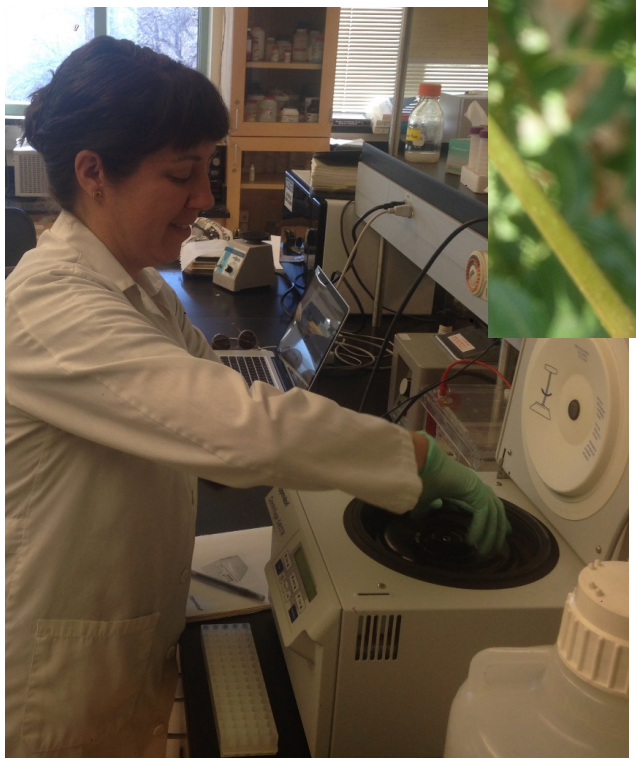
- Tree and shoot selection

  Immature trees at Leyendecker NMSU Ag Science Center
  - 4 ‘Pawnee’
  - 4 ‘Western’

  Mature trees at Dixie Farms commercial orchard
  - 6 ‘Western’
- Plant growth regulator foliar treatments
  - ProGibb 4%, Ethephon2, ReTain
  - 3 sprays in both 2014 & 2015

Methods

- Sampled leaves and buds for gene expression analyses in the lab

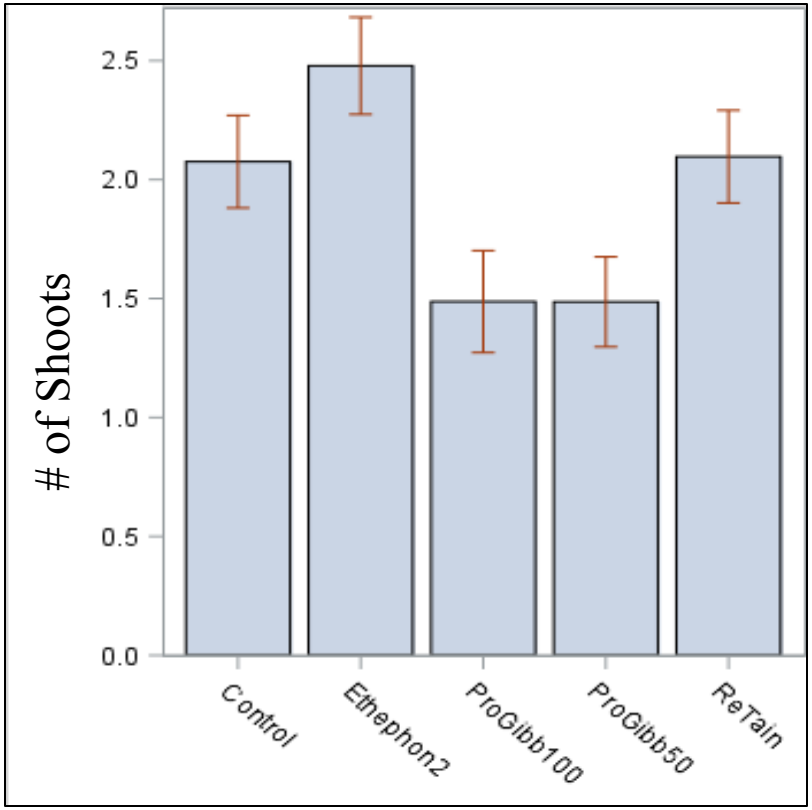


Methods

- Collected RETURN BLOOM data in Spring 2015 & 2016
  - New shoots
  - Percentage of new shoots with flowers
  - Flowers per cluster

Results

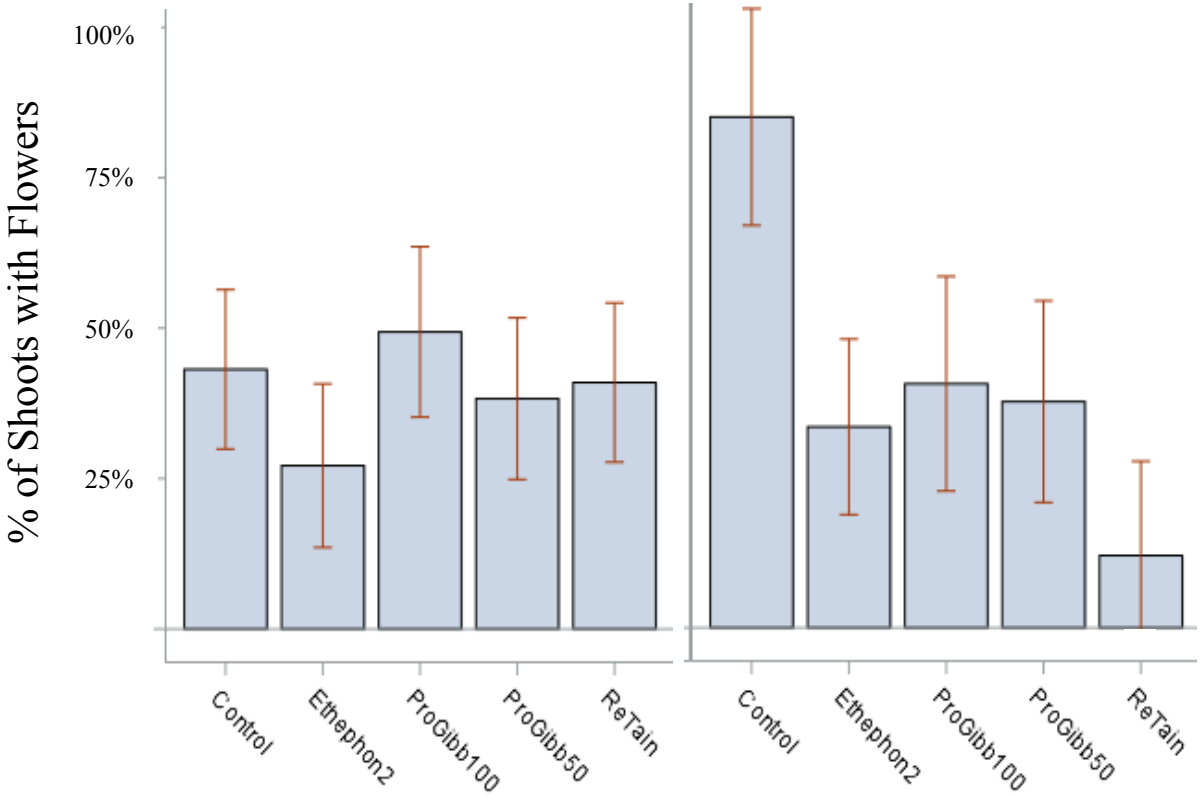
Return Bloom: Number of New Shoots in Mature 'Western'



Fruiting Status = '**on**' in previous year

Results

Return Bloom: Percentage of New Shoots with Flowers in Mature 'Western'



Fruiting Status = '**on**' in previous year

'**off**'

Future Directions

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Acknowledgments

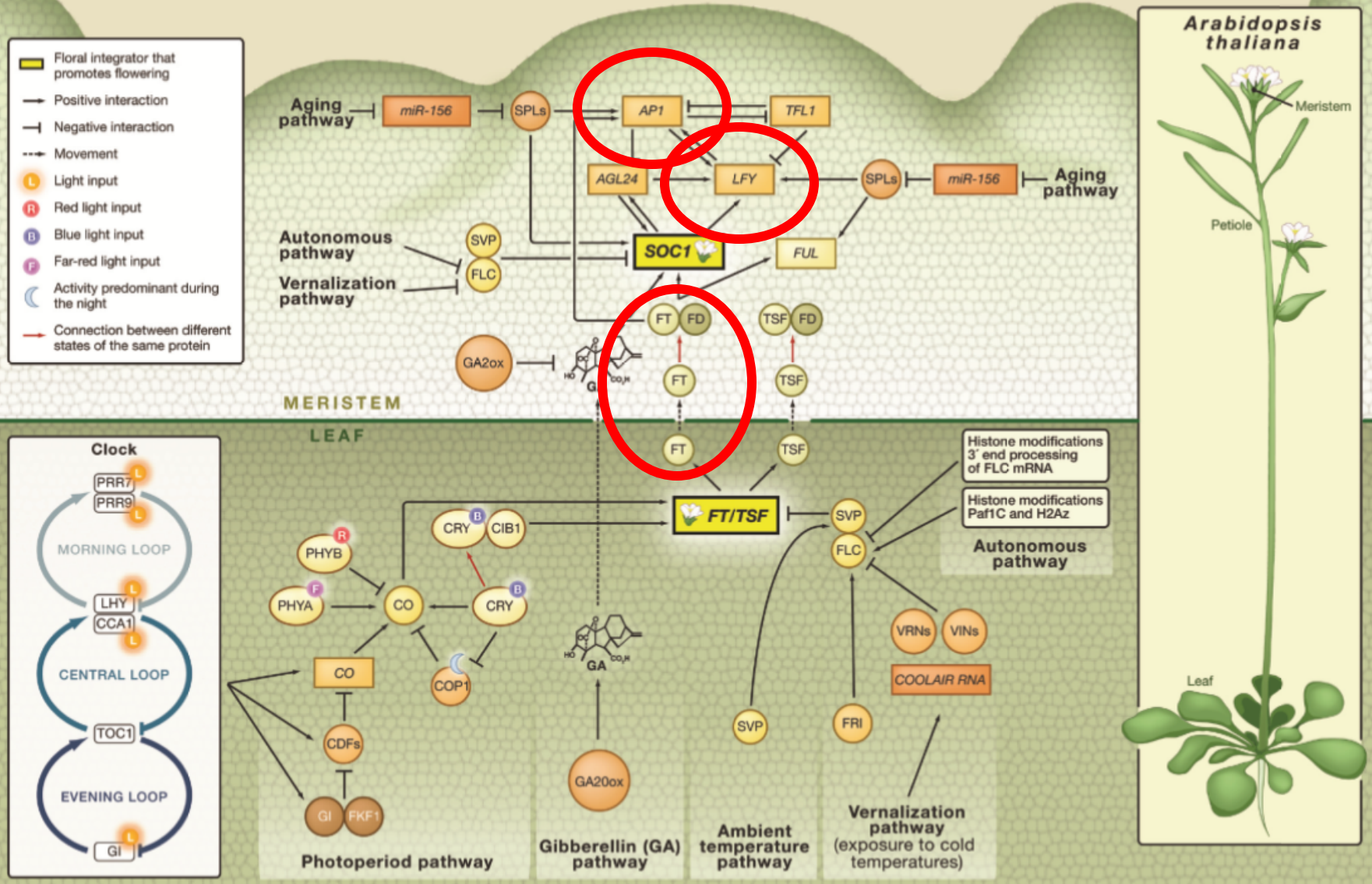
- Richard Heerema, Jennifer Randall, Rolston St. Hilaire, Champa Gopalan, Dawn VanLeeuwen
- Funding and support from Dr. Jennifer Randall and the NMDA Specialty Crop Block Grant program
- Thanks to Dave Lowry and the farm crew at the NMSU Leyendecker Research Center for their continued help in the field
- Also thanks to help from students
  - Christian Barraza, Kim Cervantes, Israel Calsoyas, Naima Khan, James Kilcrease, Jacob Lilley, Dave Lowry, Jordan Martin, Esteban Morales, Adriana Rascon, Hormat Shaghou, Joshua Sherman, Cody Runyan, Rio Stamler
- *Special thanks to Greg Daviet and Pat Gose for allowing us to conduct portions of these studies in their commercial orchards.*

550 Cell 141, April 3, 2010 ©2010 Elsevier Inc. DOI 10.1016/j.cell.2010.04.024

SnapShot: Control of Flowering in *Arabidopsis*

Fabio Fornara, Amaury de Montaigu, and George Coupland
Max Planck Institute for Plant Breeding Research, Köln 50829, Germany

Cell



See online version for legend and references.