



Vegetable Gardening for the Public

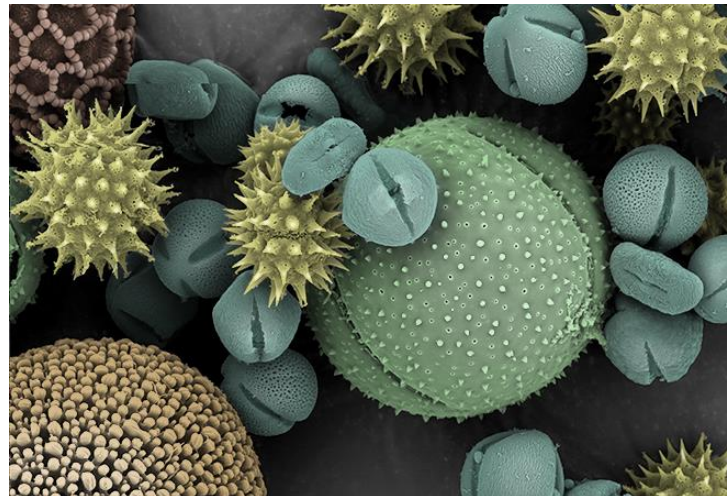
Master Gardener Conference 2015

Gabrielle Milch



Objectives

- Help progression of public classes and perceived need for future
- Learn about pollination in vegetable gardens
- Better understand bee protection practices



Vegetable Gardening

Introduction

Background and Survey

What to teach next?

Importance of Pollinators

Vegetable Garden Care

School and Community Gardening

What are you interested in teaching?



Seminole County Facts

2010- Population 424,422 people
168,845 household, 18,539 businesses

344 square miles

7 Cities

Water Supply- 6.4 billion gallons supplied 43,515 customer accounts

Solid Waste- 55,000 tons a year yard waste 66,000 Waste Customers

Landfill 240 acres- 275,000 tons a year

Active Master Gardeners 49

Select a City in Seminole County:





Questions



What Level Of Vegetable Gardener Are You?

1) Expert 2) Intermediate 3) Beginner

How many classes have you attended?

What is the Importance of attracting pollinators to your vegetable gardens?

How do you control insect pests?

How do you tell others about vegetable gardening?

What do you think people want to know about vegetable gardening?

Seminole County Vegetable Gardening Classes

Started in 2008

Taught By Master Gardeners

Over 1000 attendees

6-10 Classes per year (Spring/ February and Fall/ August)

General Vegetable Gardening, Seed Starting, Container and Raised Beds,

Organic Methods; Hydroponics, Advanced- Soil Building, Fruit Trees,

Edible Landscapes

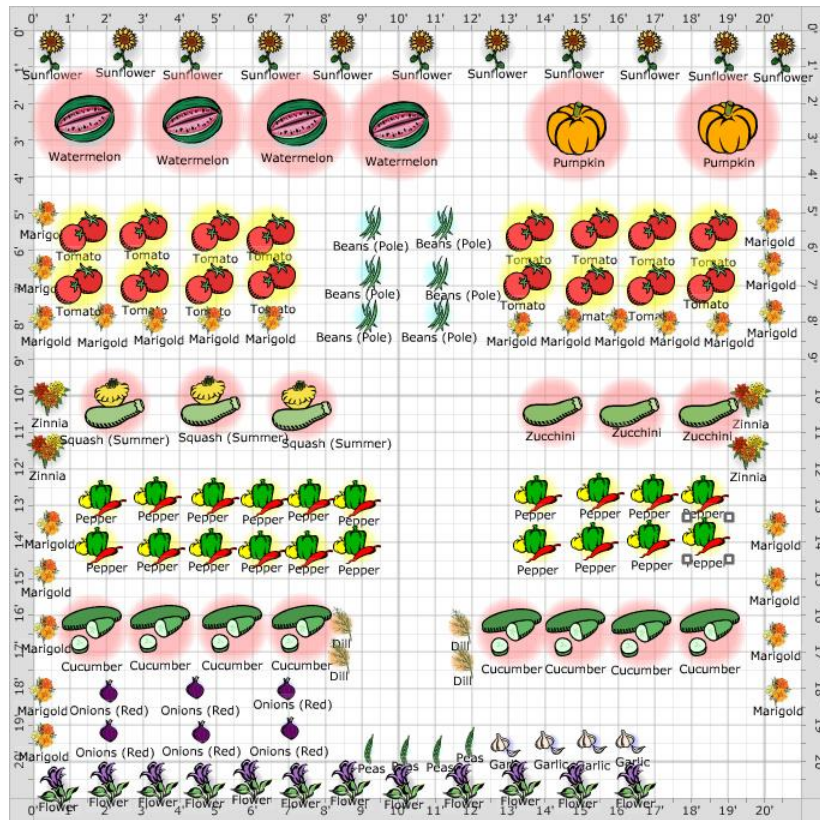
What next?



In the beginning.....



What Shall We Grow?



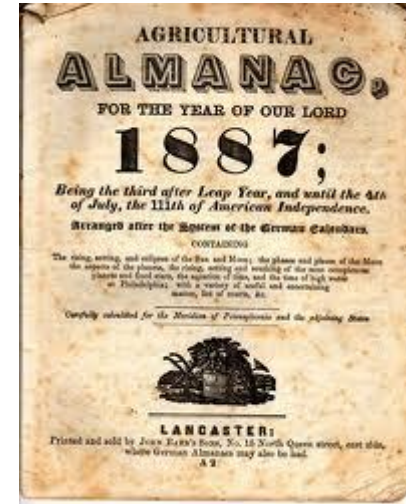
Timing

Planting to Harvest Times

Staggering Plantings

Days to Harvest

Solarization





Keys to Success!

- **A sunny, well-drained site**
- **Improve soil with organic matter**
- **Timely planting and harvesting to avoid insect and disease problem (Use the Florida Vegetable Gardening Guide!)**
- **Use varieties adapted to Florida**
- **Care “as needed”**

Good Bugs Balance



Pollinators

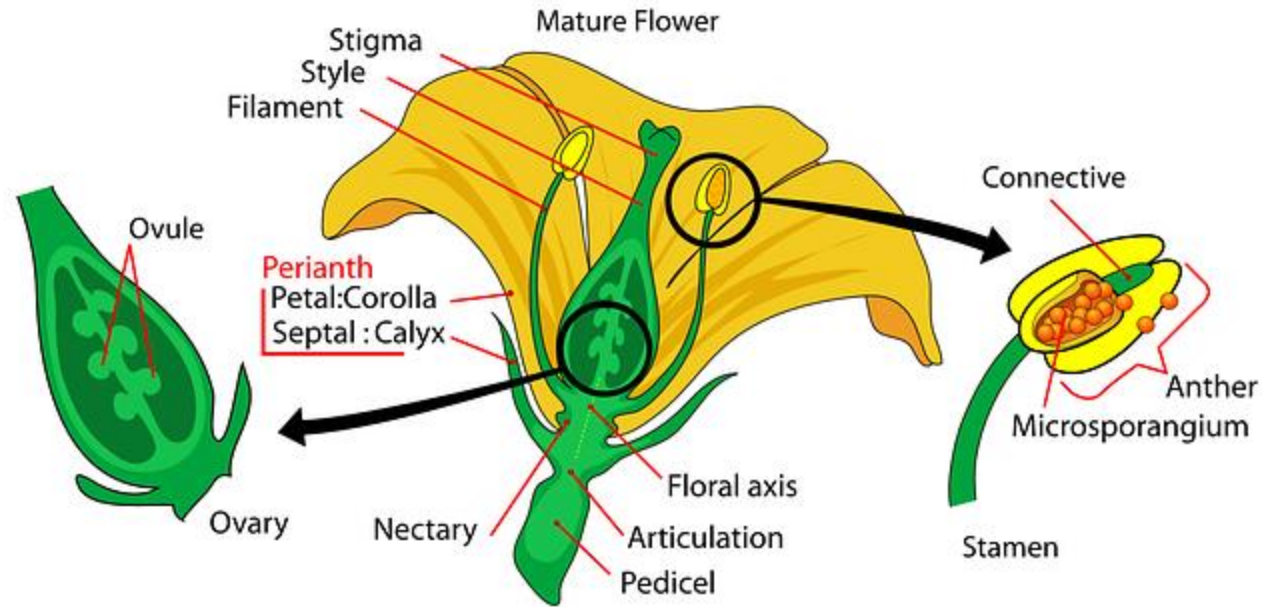
Bees

Wasps

Butterflies and Moths



Overview of Pollination



Tomato

Blossom Drop

Lack of pollination

Stress

Nutritional, Environmental or Combo

The flowers must be pollinated within 50 hours or they will drop off.



What if there are no bees?

Male and female Flowers

Must be identified and pollen must be transferred by direct touch.

Best done in morning right after blooms open.
One male flower can be used in several attempts.

Isn't it easier to plant plants to attract bees?



Pollination- 8 or More Visits



Insect-Borne Pollination

Broccoli, squashes, eggplants, okra, brussel sprouts, cucumbers, watermelons, cantalopes

Air Borne pollinators

Beets, carrots, celery, corn, onions, spinach

Self- Pollinators

Beans, Endive, Tomatoes



Bees Relationships With Plants

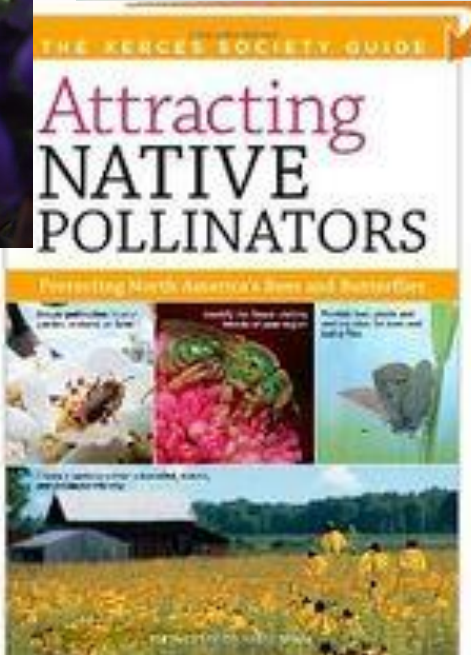
Pollination

Food Source

Pollen – Protein

Nectar- Carbohydrates

Nesting Materials



Planting for Pollinators- Bees



Start Simple

Select 3-5 flowering species for each season-

- African Blue Basil
- Blanket Flower
- Coreopsis (many varieties)
- Dotted Horsemint
- Penta's
- Milkweed's



Planting Insectaries



Other Factors

Leave bare spot in soil for habitat.

Provide water source.

Use pesticides properly



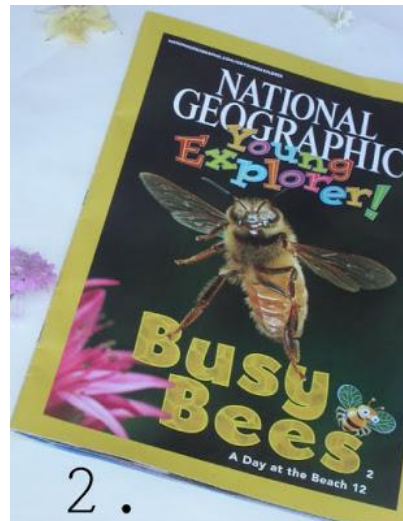
Why All The Fuss?

Habitat Destruction

Miss-use of Pesticides

Colony Collapse Disorder (CCD)

“Killer Bees”- Africanized



National Pollinators Awareness Week



Master Gardeners

Master BeeKeeper Program

Local Non-Profits Partnership

UCF Public History Center

Friends of SCPS Environmental Studies Center

Florida Native Plant Society- Cuplet Fern Chapter

Local Nursery

South Seminole Farm and Nursery

Bee's Honey, Bumble, Africanized



Honey Bee
Apis mellifera



Native Bees of Florida

There have been at least 316 individual species of bee identified in Florida.

These include individuals from the following families:

[Colletidae](#) (26 taxa)

[Melittidae](#) (2 taxa)

[Andrenidae](#) (63 taxa)

[Halictidae](#) (66 taxa)

[Megachilidae](#) (72 taxa)

[Apidae](#) (87 taxa)

The majority of these bees are solitary and nearly 80% are ground-nesting. Most are specialist pollinators, meaning they only visit very specific species of plants.

Support the Local Diversity of Bees

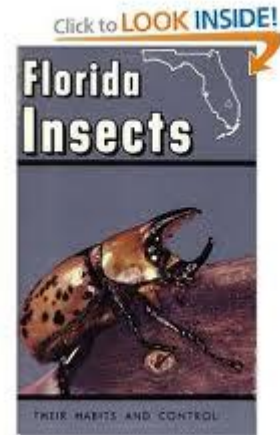


Solitary Bee Homes

Untreated wood only!



Pests



Proper Identification of Problem
Integrated Pest Management (IPM)
Scouting
Soil, Leaves, Fruits



Pest Control

Organic or Conventional
Integrated Pest Management
What's the best time to spray?



Minimizing Exposure to Pesticides

Select Specific Chemical- Acute or Chronic

Spray Proper Timing- Label is Law!

Stop Using “Dusts” Pesticides

Destroys: Gut, Fertility, Smell & Direction, Brain Function

Notify Local Bee Keepers

Remove Dead Bees



Definitions: Acute and Chronic Toxicity

Toxicity - the ability of a substance (pesticide) to produce adverse effects on an organism and its normal function.

acute toxicity – systemic damage as a result of a single or short-term exposure to the chemical (lethal)

chronic toxicity – harmful effects produced by long-term and/or repeated exposure to pesticides that may impact survival, growth, or reproduction of individual (sub-lethal)

residual toxicity – a pesticide that has residues that are expected to cause non-target organism mortality

LD50 – the lethal dose that kills 50% of the test organisms



New Labeling Law

Environmental Hazards

This product is toxic to fish, aquatic invertebrates, small mammals, birds and bees. Do not apply directly to water, or to areas where surface water is present, or to intertidal areas below the mean high water mark. Drift and runoff from treated areas may be hazardous to aquatic organisms in water adjacent to treated areas. Do not contaminate water when disposing of equipment washwaters or rinsate. This product is highly toxic to bees exposed to direct treatment or residues on blooming crops or weeds. Do not apply this product or allow it to drift to blooming crops or weeds if bees are visiting the treatment area.

BEE ICON




This “bee icon” and accompanying advisory statements will appear in the “Directions for Use” section of the label. The icon will alert pesticide applicators that special advisories apply to the product’s use in order to protect bees.


THE NEW EPA BEE ADVISORY BOX

On EPA's new and strengthened pesticide label to protect pollinators

PROTECTION OF POLLINATORS



APPLICATION RESTRICTIONS EXIST FOR THIS PRODUCT BECAUSE OF RISK TO BEES AND OTHER INSECT POLLINATORS. FOLLOW APPLICATION RESTRICTIONS FOUND IN THE DIRECTIONS FOR USE TO PROTECT POLLINATORS.

Look for the bee hazard icon  in the Directions for Use for each application site for specific use restrictions and instructions to protect bees and other insect pollinators.

This product can kill bees and other insect pollinators.
Bees and other insect pollinators will forage on plants when they flower, shed pollen, or produce nectar.

Bees and other insect pollinators can be exposed to this pesticide from:

- Direct contact during foliar applications, or contact with residues on plant surfaces after foliar applications
- Ingestion of residues in nectar and pollen when the pesticide is applied as a seed treatment, soil, tree injection, as well as foliar applications.

When Using This Product Take Steps To:

- Minimize exposure of this product to bees and other insect pollinators when they are foraging on pollinator attractive plants around the application site.
- Minimize drift of this product on to beehives or to off-site pollinator attractive habitat. Drift of this product onto beehives can result in bee kills.

Information on protecting bees and other insect pollinators may be found at the Pesticide Environmental Stewardship website at:
<http://pesticidestewardship.org/pollinatorprotection/Pages/default.aspx>

Pesticide incidents (for example, bee kills) should immediately be reported to the state/tribal lead agency. For contact information for your state/tribe, go to: www.aapco.org. Pesticide incidents can also be reported to the National Pesticide Information Center at: www.npic.orst.edu or directly to EPA at: beekill@epa.gov

Alerts users to separate restrictions on the label. These prohibit certain pesticide use when bees are present.



The new bee icon helps signal the pesticide's potential hazard to bees.

Makes clear that pesticide products can kill bees and pollinators.

Bees are often present and foraging when plants and trees flower. EPA's new label makes it clear that pesticides cannot be applied until all petals have fallen.

Warns users that direct contact and ingestion could harm pollinators. EPA is working with beekeepers, growers, pesticide companies, and others to advance pesticide management practices.

Highlights the importance of avoiding drift. Sometimes, wind can cause pesticides to drift to new areas and can cause bee kills.

The science says that there are many causes for a decline in pollinator health, including pesticide exposure. EPA's new label will help protect pollinators.



Read EPA's new and strengthened label requirements: <http://go.usa.gov/jHH4>

Pollinator Protection Label Warnings



Credit: Susan E. Ellis
Littleladiesofthehive.com

Toxicity Group	Precautionary Statement if Extended Residual Toxicity is Displayed	Precautionary Statement if Extended Residual Toxicity is not Displayed
I Product contains any active ingredient with acute LD ₅₀ of 2 micrograms/bee or less	<i>This product is highly toxic to bees exposed to direct treatment or residues on blooming crops or weeds. Do not apply this product or allow it to drift to blooming crops or weeds if bees are visiting the treatment area.</i>	<i>This product is highly toxic to bees exposed to direct treatment on blooming crops or weeds. Do not apply this product or allow it to drift to blooming crops or weeds while bees are actively visiting the treatment area.</i>
II Product contains any active ingredient(s) with acute LD ₅₀ of greater than 2 micrograms/bee but less than 11 micrograms/bee.	<i>This product is toxic to bees exposed to direct treatment or residues on blooming crops or weeds. Do not apply this product if bees are visiting the treatment area.</i>	<i>This product is toxic to bees exposed to direct treatment. Do not apply this product while bees are actively visiting the treatment area.</i>
III All others.	No bee caution required.	No bee caution required.

Credit: US EPA

http://www.epa.gov/pesticides/science/efed/policy_guidance/team_authors/terrestrial_biology_tech_team/honeybee_data_interim_guidance.htm



Routes of Exposure: Outside the Hive

Exposure is most likely to occur during foraging hours and at points of contact (foliage, pollen, nectar, water, and propolis).

Direct application (spray, dusting etc.) to foliar surfaces or exposed nectar/pollen creates an immediate route of exposure.

Systemic pesticides, which are incorporated into plant tissues, may expose field bees and hive bees to pesticide-laced foliage, nectar, pollen, and possibly propolis.

Bees can die of acute toxic exposure before returning to the nest or chronically by carrying pesticide residues back to the nest which may produce long-lasting, sub-lethal effects.



Routes of Exposure: Inside the Hive

Pesticides are used to treat invading insect pests, parasites, and pathogens of bees such as small hive beetle and Varroa mites.

coumaphos — organophosphate

tau-fluvalinate — pyrethroid

amitraz — formamidine

formic acid, hop beta acids, and thymol

Residues of many in-hive applied pesticides have been detected inside hive components, resulting in both acute and chronic bee exposure.

Credit: Lyle Buss
University of Florida



Credit: Jason Graham
University of Florida



Use Less Toxic Formulations

The formulation includes the active ingredient, mixed with inactive ingredients, to improve application and handling properties of the chemical.

microencapsulated insecticides
dusts
wetable powders
ultra-low-volume (ULV) formulation
emulsifiable concentrates
seed coatings
granular

Systemic insecticides require special consideration.

more toxic



less toxic



Resources

Bees of Florida ID Guide

<http://entnemdept.ifas.ufl.edu/hallg/melitto/intro.htm>

NE Florida's Native Bees

<http://www.floridasnativebees.com/>

UF Honey Bee Research and Extension Lab

www.Ufhoneybee.com

Florida Department of Agriculture and Consumer Services, Bee Protection Website

www.floridabeeprotection.org



Care

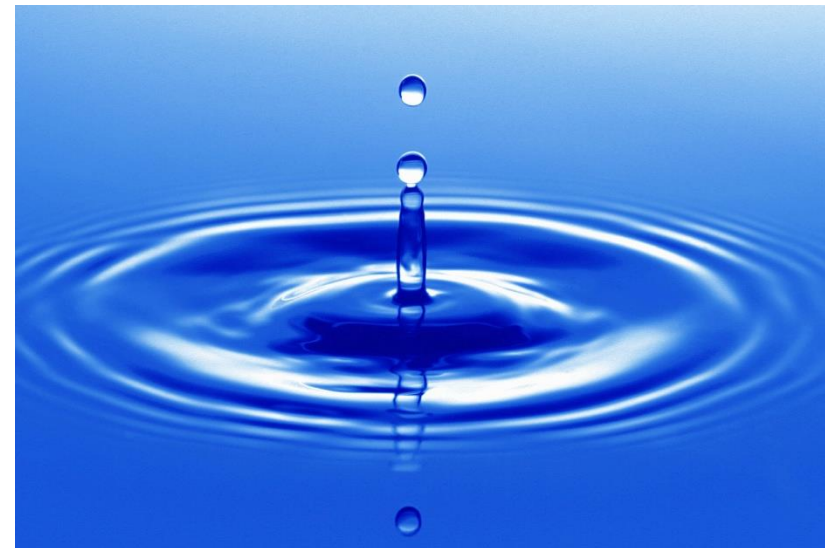
Water

Drainage, Over-watering

Light full sun, partial sun, shade

Soil

Pests



Disease Prevention & Sanitation

Bacteria and Viruses (Fungus, Mildew, Molds)

Air Circulation

Proper watering

Sanitation (Tools, Hands, Moisture)

Crop Rotation

Disease Resistant seeds



Cold Protection



Community Gardens

What functions do Master Gardeners facilitate & participate?



School Gardening



Vegetable Gardening

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What are you interested in teaching?



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"Sure it costs more. We have to squash bugs by hand."

