## Privet, Pollination and Preservation: Teaching about Conservation



State Botanical Garden of Georgia UNIVERSITY OF GEORGIA

Cora Keber, Director of Education
Athens, GA





## The Facilities...

- Administration Callaway Building (1974)
- Alice Hand Callaway Visitor Center and Conservatory (1984 renovated in 2009 and 2011)
- Cecil B. Day Chapel (1984)
- Garden Club of Georgia Headquarters (1998)
- Horticulture Complex (2010)
- Mimsie Lanier Center for Native Plant Studies (2013)

## The Services...

- Conservation
- Education
- Experience
- FRIENDS Membership
- Grounds Management
- Horticulture
- Professional Training
- Visitor Services





# Privet, Pollination and Preservation: Teaching about Conservation

- Eco-Health Field Trip
- Connect to Protect
- Certificate in Native Plants
- Plants and Pollinators Specialization





#### Chinese Privet, Ligustrum sinense

- Introduced into the US in 1852 as an ornamental shrub
- Evergreen; does well in sun or shade; prolific seed producer; seeds dispersed by birds, small mammals, and probably water; sprouts readily after cutting
- Has invaded 59% of the Oconee River floodplain (Ward 2002)





## Checkpoint #2: Floodplain invaded with Chinese Privet



## Checkpoint #3: Floodplain Privet Removal Site





## The Challenge

- Remove the Privet and prevent it from dominating the site again in the future
- Manage the landscape to increase native plant and animal biodiversity, with species appropriate to a southeastern Piedmont floodplain habitat
- Restore the recreational, aesthetic, and educational value of the site
- Use the floodplain as a demonstration site for Privet eradication and floodplain management techniques

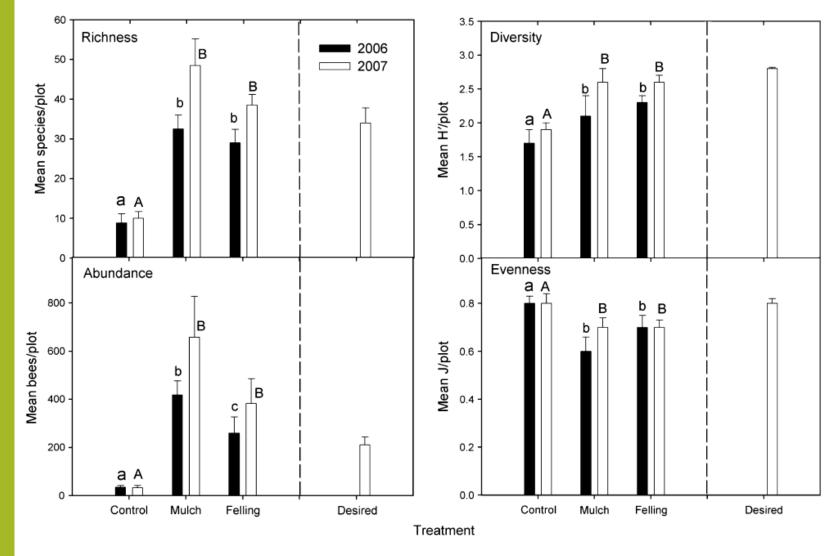


Fig. 1. Mean species richness, total abundance, Shannon diversity and evenness of bees on 2 ha plots of mature riparian forest where Chinese privet was removed by hand-felling or mulching in October 2005 followed by a ground level foliar herbicide application in November 2006. Bars of the same colour with the same letter are not significantly different (REGWO, P < 0.05).

Research conducted by Forest Service Researcher Jim Hanula at several plots throughout the Piedmont including the State Botanical Garden from 2005-2007.

Hanula, Jim and Scott Horn (2011). "Removing an invasive shrub (Chinese privet) increases native bee diversity and abundance in riparian forests of the southeastern United States." *Insect Conservation and Diversity* 4, 275-283.

### Pollinator Response

- After two years, there were 4-5 times more bee species in privet-free areas, and bee abundance increased dramatically
- 3 times as many butterfly species were caught on mulched plots and 7 times as many individuals







#### **Air Quality Report!**

You and your partners are in charge of measuring Air Quality. Air is such an important abiotic factor for plants, animals, and people! With the experiments below you'll get to investigate air quality, temperature, and complete a tree inventory.

Part 1: Air Quality and Temperature -- Using your thermometer fill in the table below with temperature.

	Checkpoint #1	Checkpoint #2	Checkpoint #3
Air Temperature			

**Part 2: Tree Investigation** -- Choose the four largest trees near the checkpoint and measure their trunk circumference. Fill in your data in the table below.

Checkpoint #1	Circumference (cm)	Checkpoint #2	Circumference (cm)	Checkpoint #3	Circumference (cm)
Tree #1		Tree #1		Tree #1	
Tree #2		Tree #2		Tree #2	
Tree #3		Tree #3		Tree #3	
Tree #4		Tree #4		Tree #4	

**REFLECTION** -- How does the amount of tree and plant growth affect the air temperature in an ecosystem? What does air temperature tell you about the kinds of plants that grow in an ecosystem?



**Soil Report!** Your job as *Soil Scientists* is to explore the world beneath our feet. Complete the four tasks below to explore the different kinds of soils here at the botanical garden.

#### Part 1: Soil Smudge

At each checkpoint take a pinch of topsoil from the ground. Smudge the soil gently back and forth on the paper, until you get a color showing. Refer to the soil color card, and record the name of the color that your smudge is closest to.

#### **Part 2: Soil Temperature**

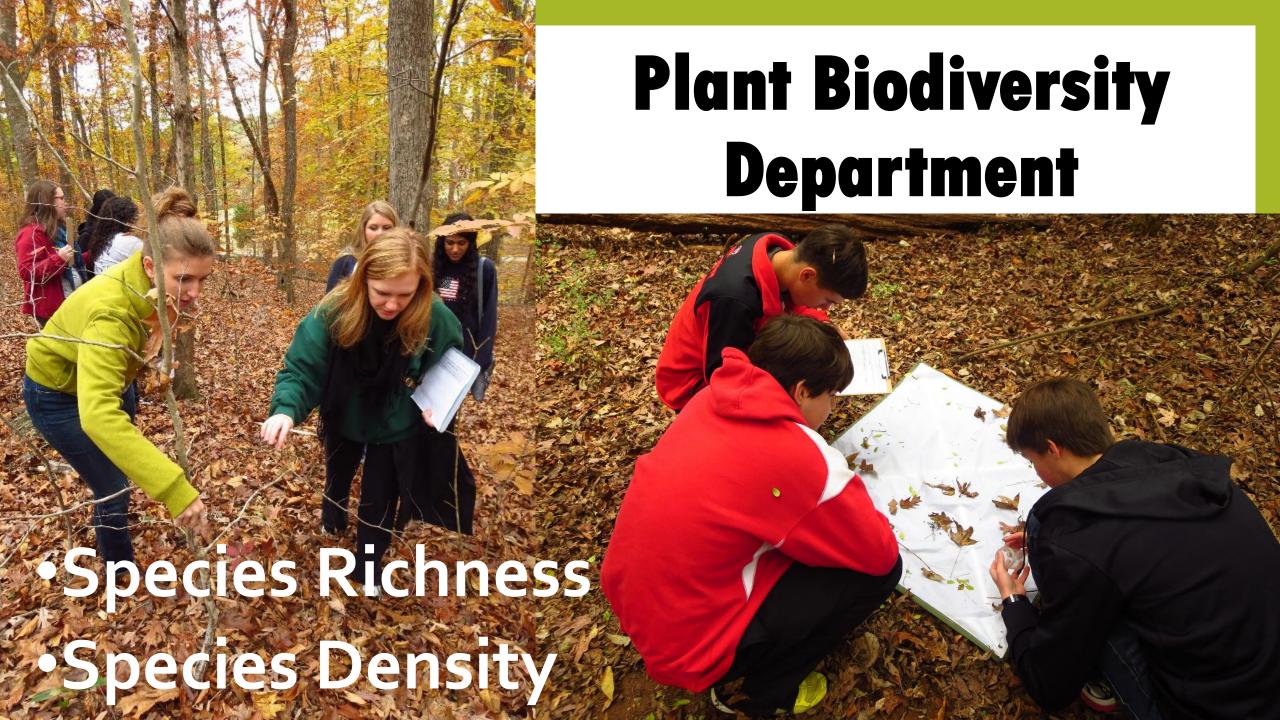
At each checkpoint determine the soil temperature by sticking the thermometer into the ground. Wait until the needle stops moving and record the temperature in the chart below.

#### Part 3: Water Infiltration

At each checkpoint, press a can into the ground; pour 8 ounces of water into the can and time how long it takes for water to drain into the soil. Record your findings for each checkpoint.

Check point #	Soil Smudge	Color Name	Total Infiltration Time	Has it rained in the last 24 hours?
1				
2				
3				

**REFLECTION:** Generally speaking, the darker the soil smudge, the more nutrients are contained in the soil. Which site has the most soil nutrients? What might be some reasons for this?



#### **Plant Biodiversity Report!**

Your group is in charge of investigating all of the different plants that live at each checkpoint!

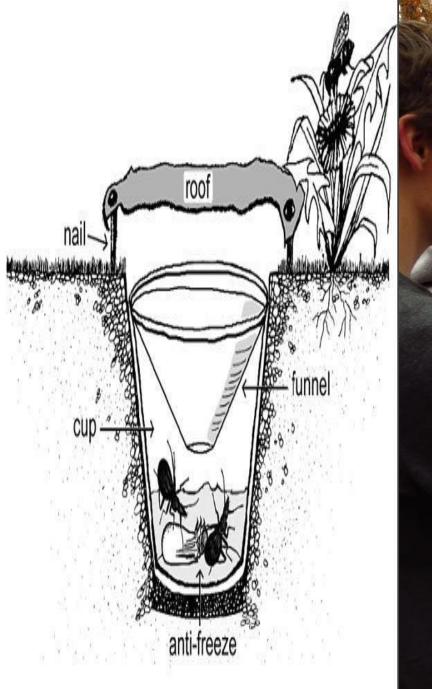
		BIODIVERSITY COUNTS (10ft x 1	Loft plot)
SITE	Description of Site	Species Richness- number of plant species	Density- total number of plants found
1			
2			
3			

**NOTES:** Description of Site: Vegetative, wooded, cemented, grassy, rocky, etc.

Species Richness: count and record the number of different plant species in your 10ft x 10ft plot

**Density:** count and record the total number of plants in your 10ft x 10ft plot.

**REFLECTION:** Which Site has higher species richness? Which has higher density? What might be some explanations for these differences?





#### **Entomology Department!**

Your job is to investigate all of the small little creatures that are crawling, flying and buzzing around us. Use the two tools described below to see what kind of bugs we have here at the botanical garden.

Number found	Description
	Number found

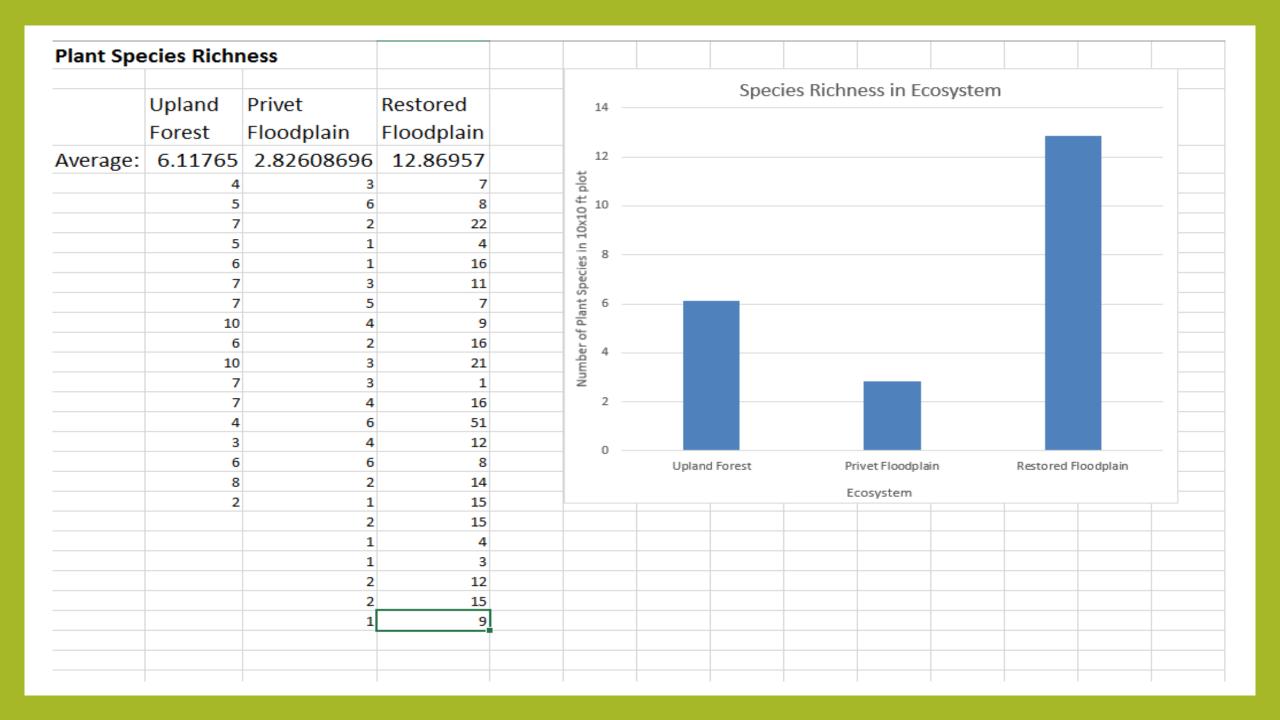
Using the beat net and looking around in the leaf litter, record the number of arthropods you find at each checkpoint.

#### **REFLECTION:**

Which Site has higher species richness? Which has higher density? What might be some explanations for these differences?

Air Temp	erature ir	Degrees Cels	sius									
	Upland	Privet	Restored	_		Avera	ige Tem	perature	in Each E	cosysten	า	
				20								
	Forest	Floodplain	Floodplain									
Average:	11.5	15.5	17.15	18								
	16	12	16	16								
	19	15	17									
	18	14	14	Sn 14								
	16	13	16	Celsius								
	13	15	14	ပ် နှ <sub>ု</sub> 12								
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		12	13				<del>-</del>		system			1
		11	15						- ,			
		11	13									

Water Infil	tration Tim	ne			
				Average Wa	ater Infiltration Time in Each Ecosystem
	Upland	Privet	Restored	4:19	
	Forest	Floodplain	Floodplain	3:50	
AVERAGE:	2:29	4:05	3:01	3:21	
	1:04	4:38	4:20		
	2:48	2:54	2:30	\$ 2:52	
	1:20	4:27	2:48	1:26 = 2:52	
	1:51	5:00	2:22	<u>=</u> 2:24 −−−−	
	7:37	5:00	5:00	<u></u>	
	3:23	5:00	3:00	E 1:55	
	1:12	1:40	0:57	ati	
		5:00		量 1:26 ———	
	0:55	4:30	2:11		
	1:44	5:00	5:00	0:57	
	2:58	0:58	5:00	0.20	
		5:00	0:09	0:28	
				0:00	
				0.00	Ecosystem
				■ Upland	Forest Privet Floodplain Restored Floodplain



<b>Bug Specie</b>	es Richnes	S										
sum of beat ne	et and pitfall tr	ap specimens										
					Ave	rage Bug	Species	Richness	in Each	Ecosyste	em	
	Upland	Privet	Restored	-	-							
	Forest	Floodplain	Floodplain	4.5								
AVERAGE:	3.4444	3	4.733333									
	5	2	5	등 등	-							
	5	4	8	£ 0								
	6	2	5	Number of Bug Species Found in 10x10 ft Plot								
	2	3	4	l l								
	0	7	11	l pun	,							
	3			- E 2.5								
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Connect to Protect is a program that provides beautiful public displays of native plants with education materials to foster an understanding of the role that natives play in maintaining biodiversity in developed landscapes of Georgia.

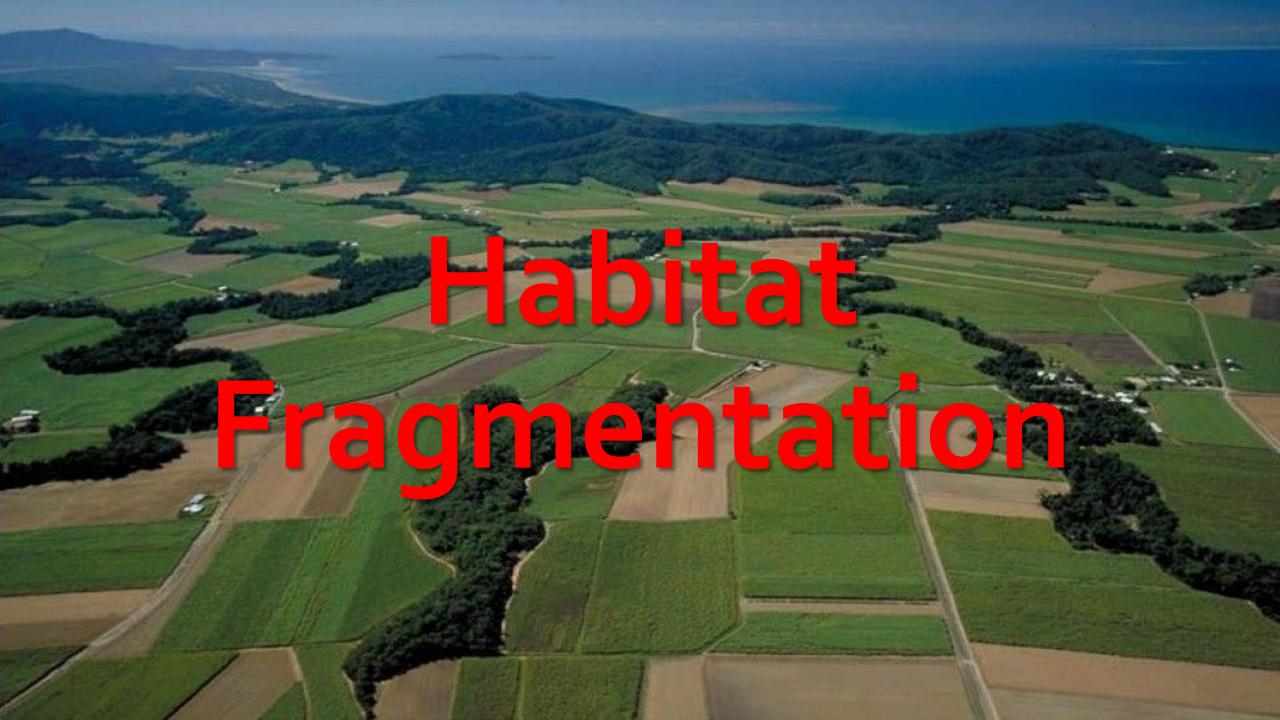
#### **OBJECTIVES**

- Support wildlife by providing nectar, pollen, food and shelter.
- Encourage schools, businesses and parks to include native plant in their landscapes.
- Provide teaching materials to inspire an appreciation for the connections between plants, animals and people.

## Why is this so important?

- Pollination services by native bees are estimated to contribute 15% combined value to the U.S. fruit, nut, vegetable and field crop production.
- Meat and dairy products that are produced from bee-pollinated crops (hay crops like alfalfa and clover) are affected by the decline of native pollinators.
- Recent declines in managed and native bee populations are potential threats to the agriculture economy.
- Service of pollinators to US economy = \$29b















#### **SUPPORTING CONCEPTS:**

- Establish a 'sense of place'
- By planting and maintaining native plant plots, native pollinators have a contiguous source of food and quality habitat for homes and reproduction.
- Pollinators are crucial to plant reproduction
- While imported honey bees are extremely important pollinators, there are many other animals that also important to pollination.
- The main native Georgia pollinators include bees, wasps, butterflies, beetles and flies. Hummingbirds and the wind are also important pollinators.
- Plants have evolved several methods to attract and sometimes even trick animals in order to encourage pollination.
- Connect to Protect plots promote biodiversity and the resultant eco-services such as food production, soil maintenance and production, pollination which are required by native animal species including humans.

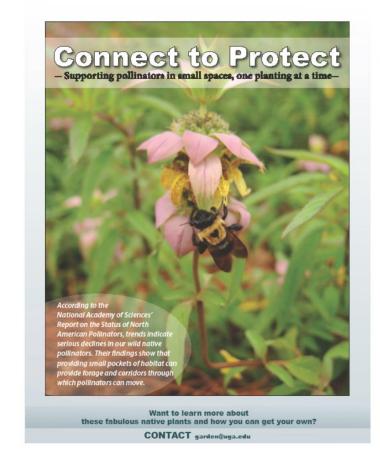
**Objective 1:** Supporting wildlife by providing nectar, pollen, food and shelter by encouraging native plant habitats amongst urban landscapes. This is accomplished through native plant material for commercial, display garden, restoration and conservation use.

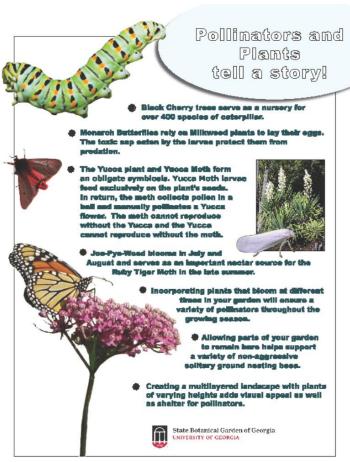




Objective 3: Provide teaching materials to inspire an appreciation for the connections between plants,

animals and people.





# In School Programs

within 15 mile radius of Athens



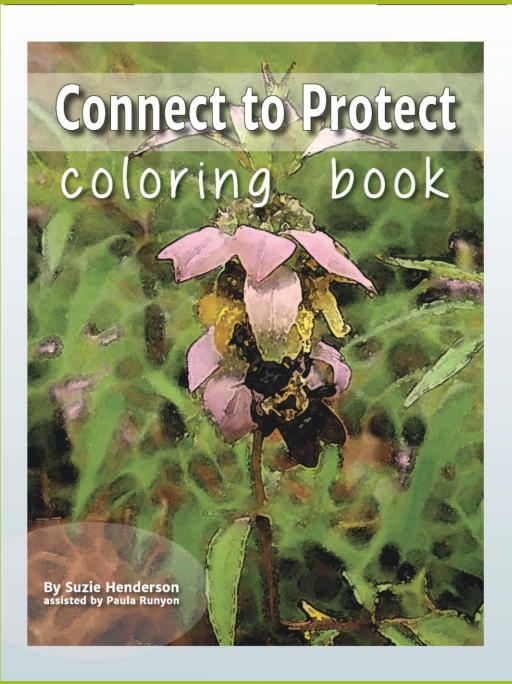
- We visit schools and conduct a 2 hour program to include
  - Pollination activities—butterfly biology, pollination relay and how pollinators communicate
  - Planting a native garden or putting together a native planter (depending on what the school wants to commit to as far as maintenance is concerned).

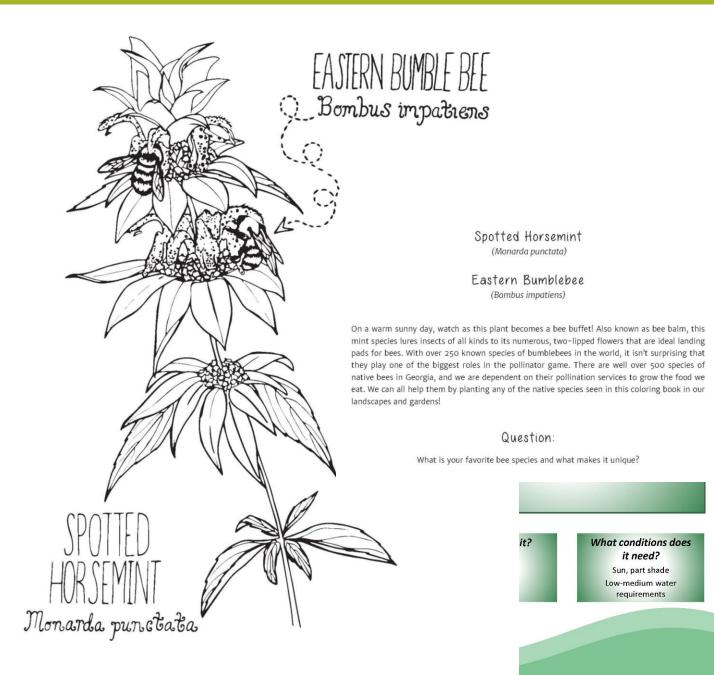














### CERTIFICATE IN NATIVE PLANTS

CNP started in 2007
First statewide location in 2010
Over 450 participants
120 Graduated

NEW in 2018
Plants and Pollinators Specialization

## CERTIFICATE IN NATIVE PLANTS

#### 4 Core Courses - 8 hours each

Basic Botany Plant Taxonomy

Natural Community/History of Georgia Plants

Plant Conservation: Protecting Botanical Diversity in the Garden and in the Wild

#### 6 Elective Courses - 4 hours each

Participants choose from a wide range of elective course offerings.

#### 16 Hours of Volunteer Service

#### 2 Field Trips

Participants complete two half-day field trips organized by the Georgia Botanical Society, Georgia Native Plant Society, or another approved organization.

### PLANTS AND POLLINATORS SPECIALIZATION

#### **Five Courses**

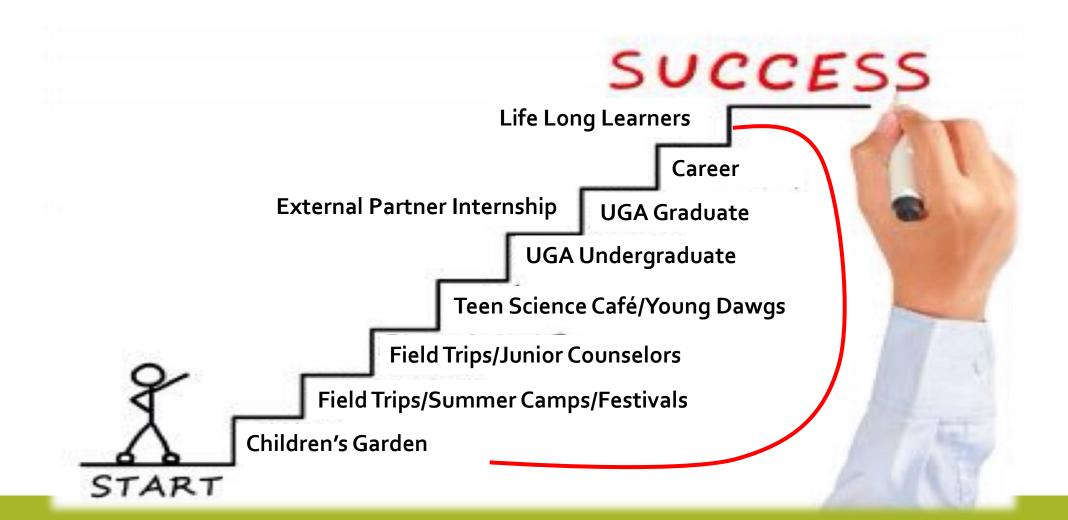
Plants, Pollinators, & Landscaping, April 21 Insect Pollinators in our Gardens, September 8 Natural History of Georgia Pollinators, September 29 Grow Your Own Prairie in North Georgia, Oct. 2018 Connect to Protect Leadership Program, Feb. 2019

#### 30 Hours of Volunteer Service

#### **Two Field Trips**

Participants complete two field trips organized by the Georgia Botanical Society, www.gabotsoc.org, Georgia Native Plant Society, www.gnps.org, or another approved organization.

## Creating the Dream Pipeline





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