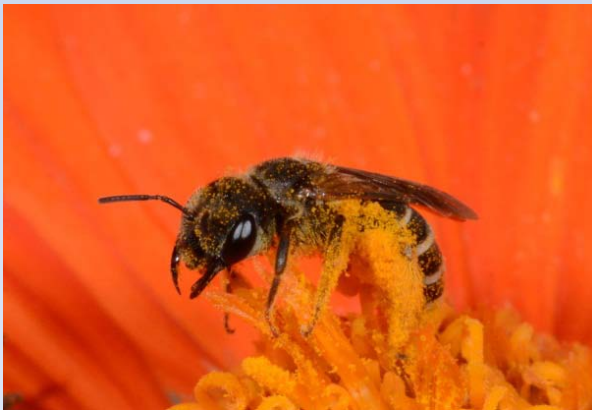


Diversity, Conservation and Enhancement of Lowcountry Pollinators

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Halictus poeyi



Ammophila sp. wasp

Insect pollinated plants are the basis of our food, economic stability and overall well-being

- 75% of all flowering plants on earth rely on pollinators in order to set seed or fruit.
- The value of pollinator services from native bees is worth about 3 billion dollars per year.
- 185 Species of pollinators are considered threatened or extinct.



Andrena sp.



Anthophila sp.



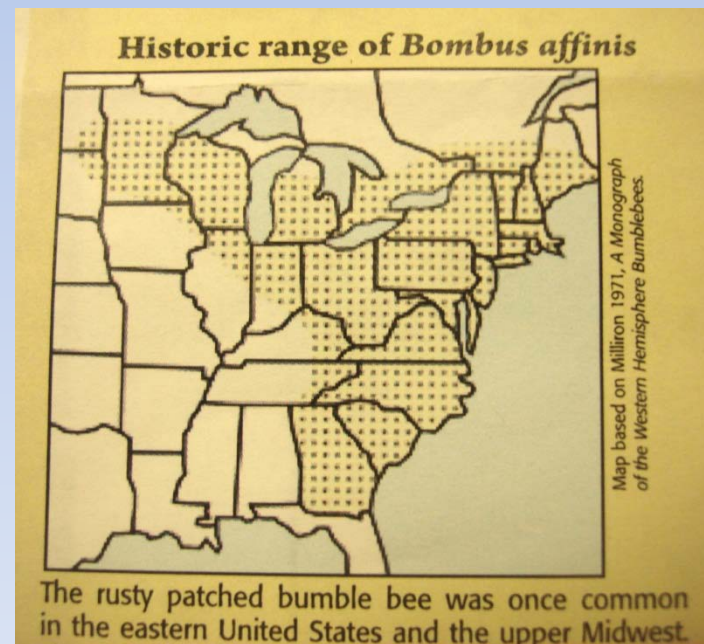
Bombus pensylvanicus

Pollinator surveys have begun to document diversity and relative abundance of pollinating species on wild and cultivated plants that grow in the South Carolina Lowcountry.

We also were specifically looking for *Bombus affinis*, the rusty patched bumble bee, whose numbers are in serious decline.



Photo by Johanna James-Heinz



Four major factors account for most of the decline in pollinators

- Habitat loss or fragmentation
- Degradation of remaining habitat
- Pesticide poisoning
- Spread of diseases and/or parasites



Flowering times



- **March - April**

Dandelion, Camellia, Eastern red bud, Wild radish, Reversed clover, White clover, Cut-leaved evening primrose, Henbit, Fleabane, Wood sorrel, Trailing blackberry, Pear, Hispid buttercup

- **May - June**

Fleabane, Verbena, White clover, White sweet clover, Crimson clover, Privet, Morning glory, Lilly turf, Fleabane, Coriander, Partridge pea, Luffa, Lantana

- **July - August**

Firewheel, White clover, Verbena, Brown-eyed Susan, Crepe myrtle, Partridge pea, Meadow beauty, Cosmos, Thistle, Mexican sunflower, Butterfly guarra, Holly, Privet, Groundsel bush, Luffa, Lantana

Pollinating Species

According to frequency observed

(1 = most frequently observed, 3 = least frequently observed)

Frequency rating = 1

Common
Eastern bumble
bee –

*Bombus
impatiens*



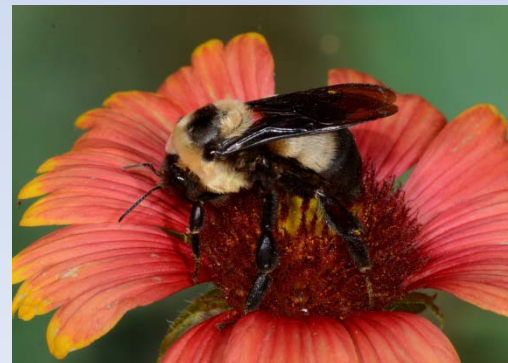
American
bumble bee –

*Bombus
pennsylvanicus*



Southern plains
bumble bee –

*Bombus
fraternus*



Pollinating Species

According to Frequency Observed

(1 = most frequently observed, 3 = least frequently observed)

Frequency rating = 1

Southern Carpenter Bee –
Xylocopa micans



Eastern Carpenter Bee –
Xylocopa virginica





Southern Carpenter Bee, *Xylocopa micans* (male)

Pollinating Species

According to Frequency Observed

(1 = most frequently observed, 3 = least frequently observed)

Frequency rating = 1



Western Honey Bee, *Apis mellifera*

Pollinating Species

According to Frequency Observed

(1 = most frequently observed, 3 = least frequently observed)

Frequency rating = 2



Cellophane bee -
Colletes sp. (Colletidae)



Sweat bees –
Halictus poeyi (Halictidae)



Leaf-cutter bees -
Megachile spp. (Megachilidae)



Mason bees –
Osmia sp. (Megachilidae)

Frequency rating 3



Cuckoo wasp (Chrysidinae)



Sweat bee (*Augochlorella* sp.)

Pollinating Species

According to frequency observed
(1 = most frequently observed, 3 = least
frequently observed)

Frequency rating = 3



Blue mud wasp (*Chalybrion californicum*)



Scoliid wasp (*Campsomeris* sp.)

Pollinating Species

According to frequency observed

(1 = most frequently observed, 3 = least frequently observed)

Frequency rating = 3



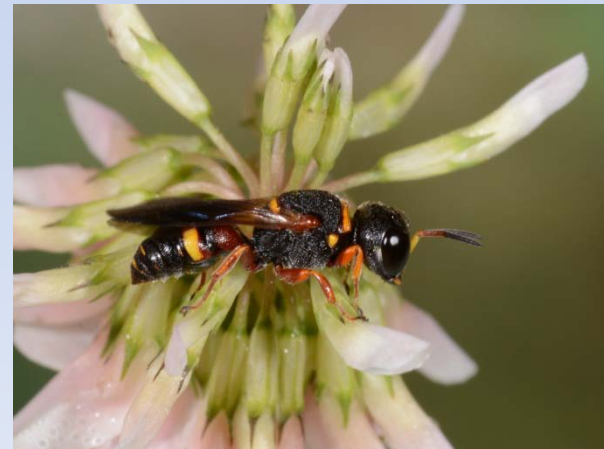
Potter and Mason wasps -
Pachodernys erynnis (Vespidae)



Paper wasp - *Polistes dorsalis*



Trogomorpha trogoformis (Ichneumonidae)



Crabronina sp. (Crabronidae)

Frequency rating 2 - 3



Orange sulphur



Cloudless sulphur



Silver spotted skipper



Gulf fritillary

Frequency rating 2 - 3



Long-tailed skipper (*Urbanis proteus*)



American lady (*Vanessa virginiensis*)

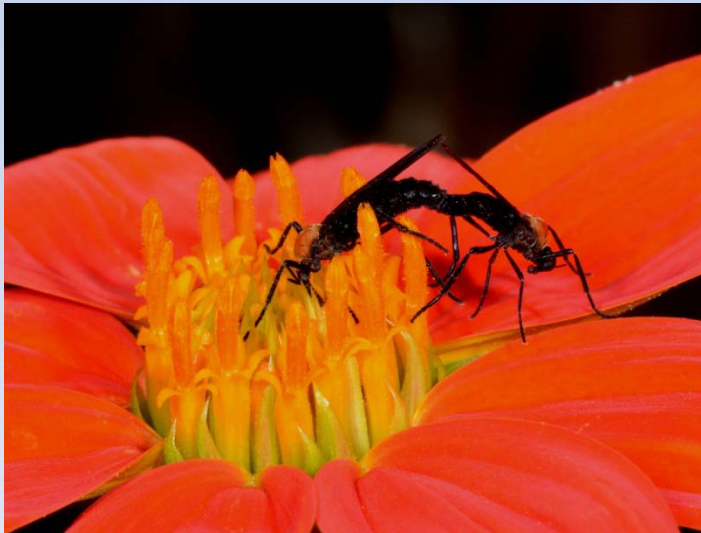
Lesser known pollinators



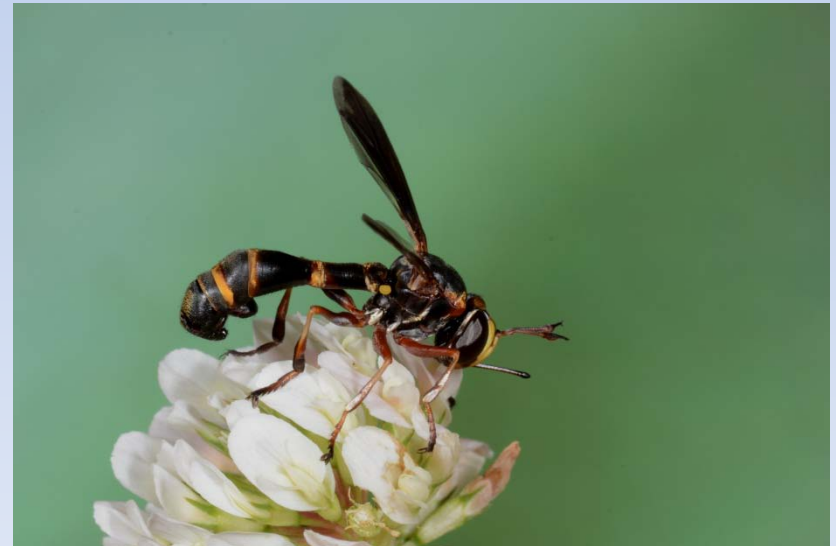
Exoprosopa brevirostris
(Bombyliidae – Bee fly)



Palpada vinetorum (Syrphidae – Hover fly)



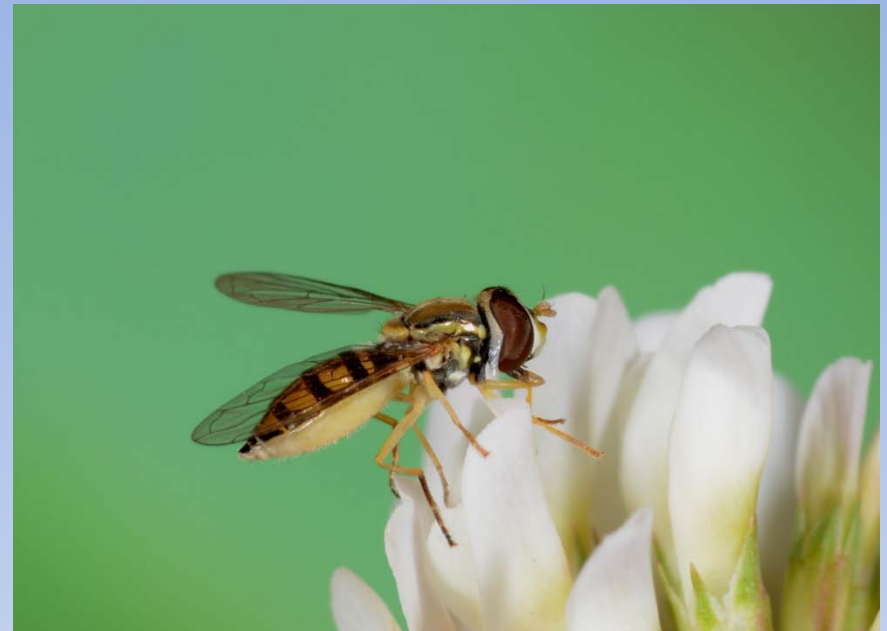
Plecia nearctica (Lovebugs)



Physoconops brachyrhynchus (Thick-headed fly)



Physocephala tibialis – (Thick-headed fly)



Toxomerus marginatus (Hover fly)



Palpada albifrons (Hover fly)



Odontosciara nigra (Dark-winged fungus gnat)



Nemognatha sp. (Blister beetles)



Epicauta strigosa (Blister beetle)



Spangled flower beetle




Tumbling flower beetle

Conclusions

- Over 100 species of pollinating species were found and photographed.
- Dozens of lesser know pollinators were found and photo-documented.
- The role that each species plays in pollination is still unknown.
- Bumble bees and carpenter bees were the most abundant groups of pollinators and were probably the most efficient pollinators.
- Some pollinators were also plant feeders.
- Honey bees were present on some of the flowers during certain times but not during cloudy or cool weather.
- No rusty patched bumble bees were found.

There are not enough native flowering plants that bloom during the growing season in our urban and agricultural landscapes to support bees.

A stylized silhouette of a mountain range in a darker shade of teal, located at the bottom right of the slide.

Encouraging Pollinators and Other Beneficial Species

Use local native plants

Choose several colors of flowers

Plant flowers in clumps

Have a diversity of plants that flower all season



Representative Plants that Support Beneficial Species

Bachelor's button

Hairy vetch

Black-eyed Susan

Lavender

Borage

Purple coneflower

Buckwheat

Spotted bee balm

Clover

Sweet alyssum

Dill

Yarrow

Fever few

Zinnia

Golden Alexanders

Walter's aster



Provide bee nest boxes

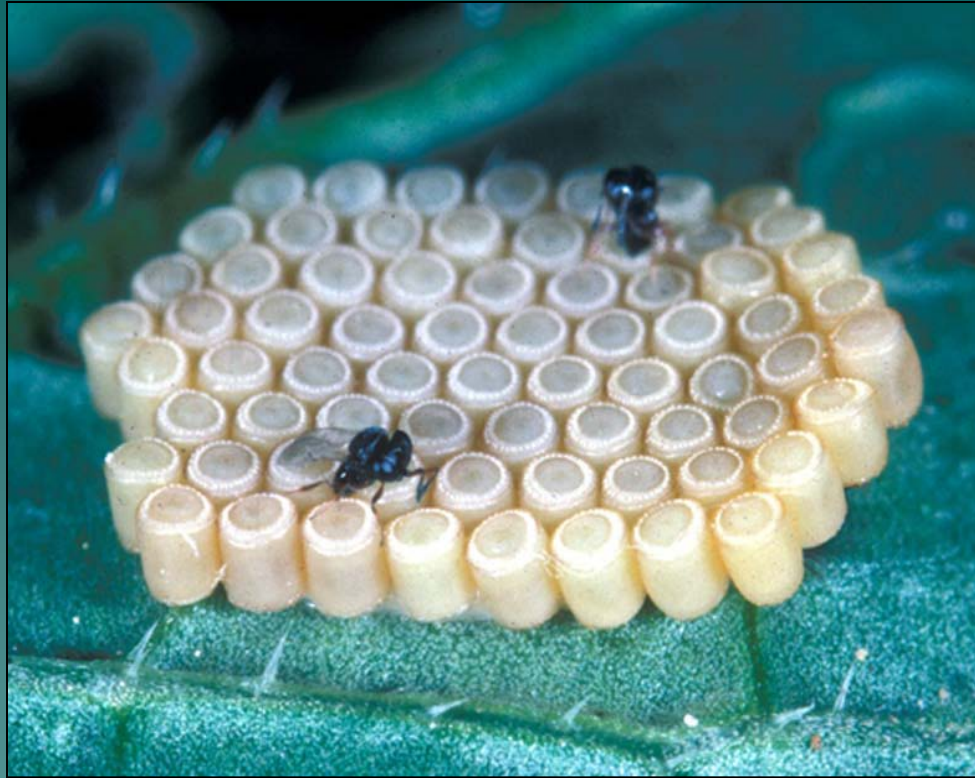
Programs that encourage and protect native pollinators also enhance other beneficial species, particularly parasitoids and predators.

Insect parasitoids are more effective (lay more eggs and live longer) when nectar sources are available.

A diversity of plant species also provide better habitat for predatory insects and spiders



Micropletes demolitor parasitizing a bollworm larva.



Egg mass of a Southern Green Stinkbug being parasitized by *Trissolcus basalis*.



Encyrtid parasitoid. These small parasitoids are very susceptible to pesticides.



Hyptia sp. Evaniidae
Ensign Wasp – parasitizes eggcases of cockroaches



Southeastern blueberry bee, *Habropoda laboriosa*, visits 20,000 flowers and produces blueberries worth \$20.

Here are seven ways to make your garden a haven for native pollinators: by NRCS (National Resource Conservation Service)

1. **Use pollinator-friendly plants** in your landscape. Shrubs and trees such as dogwood, blueberry, cherry, plum, willow, and poplar provide pollen or nectar, or both, early in spring when food is scarce.
2. **Choose a mixture of plants** for spring, summer, and fall. Different flower colors, shapes, and scents will attract a wide variety of pollinators. If you have limited space, you can plant flowers in containers on a patio, balcony, and even window boxes.
3. **Reduce or eliminate pesticide use** in your landscape, or incorporate plants that attract beneficial insects for pest control. If you use pesticides, use them sparingly and responsibly.

NRCS recommendations for encouraging pollinator communities - Continued

4. **Accept some plant damage** on plants meant to provide habitat for butterfly and moth larvae.
5. **Provide clean water** for pollinators with a shallow dish, bowl, or birdbath with half-submerged stones for perches.
6. **Leave dead tree trunks**, also called “snags,” in your landscape for wood-nesting bees and beetles.
7. **Support land conservation** in your community by helping to create and maintain community gardens and green spaces to ensure that pollinators and other beneficials have appropriate habitat.



Two-spotted
long-horned bee

Information Sources

Shepard, B. M. and E. G. Farnworth. 2013. Garden Insects of South Carolina: Beneficial Species and Potential Pests. 140 pages. Published by the Lowcountry Biodiversity Foundation. www.lcbiodiversity.org

Shepard, B. M., E. G. Farnworth and K. L. McCullough. 2017. Insects and Spiders of Coastal South Carolina. 343 pages. Published by the Lowcountry Biodiversity Foundation. www.lcbiodiversity.org.

Vaughan, M., M. Shepherd, Clair Kremen and S. Black 2011. Farming for Bees: Guidelines for Providing Native Bee Habitat on Farms. Xerces Society. 44 pages. www.xerces.org

Mader, E. and M. Shepherd. Southeastern plants for native bees. Xerces Society. www.xerces.org

Mader, E. M. Shepherd, M. Vaughn, S. Black, and G. LeBuhn. 2011. Attracting native pollinators: Protecting North America's Bees and Butterflies. 372 pages. Xerces Society. www.xerces.org

Mader, E., M. Shepherd, M. Vaughn and J. Guisse. Tunnel nests for native bees. Xerces Society. www.xerces.org

Pollination: Plants for year-round bee forage. University of Georgia. Email: jbee@uga.edu



Petulant Leaf-cutter Bee (*Megachile petulans*). Photo by Sam Droege, USGS, Beltsville, MD

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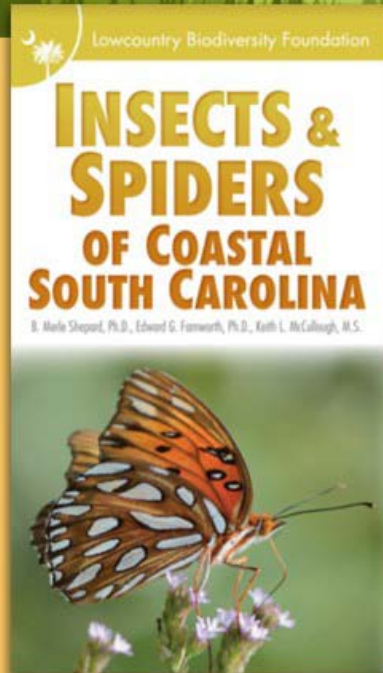
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by

B. Merle Shepard, Ph.D., Ed Farnworth, Ph.D. and Keith McCullough, M.S.

Lowcountry Biodiversity Foundation



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