UNIVERSITY OF ILLINOIS EXTENSION

GROWING A NEW GENERATION OF ILLINOIS FRUIT AND VEGETABLE FARMERS

POLLINATION

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July 2014

Illinois Migrant Council

new ILLINOIS fruit & vegetable FARMERS

Class Objectives

-Learn about Illinois Pollinators

-Parts of the flower

-Greater understanding of the biology of Pollination

-The value of pollination in fruit and vegetable crops

-Poorly pollinated vegetables

-Honey Bees

-The Other Bees

-Pollinatarium

-Bee Spotter

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Pollination Facts

-Many plants cannot reproduce without the help of pollinators.

-The plants they pollinate provide food for humans and wildlife.

-75% of plants are pollinated by animals.

-1/3 of our food depends on pollinator/plant interactions.

-130 food crops in the United States.

-Pollinators include many bees, butterflies, some moths, beetles, flies, birds and a few bats.

-Pollination is estimated to be worth 15 billion in crop value.

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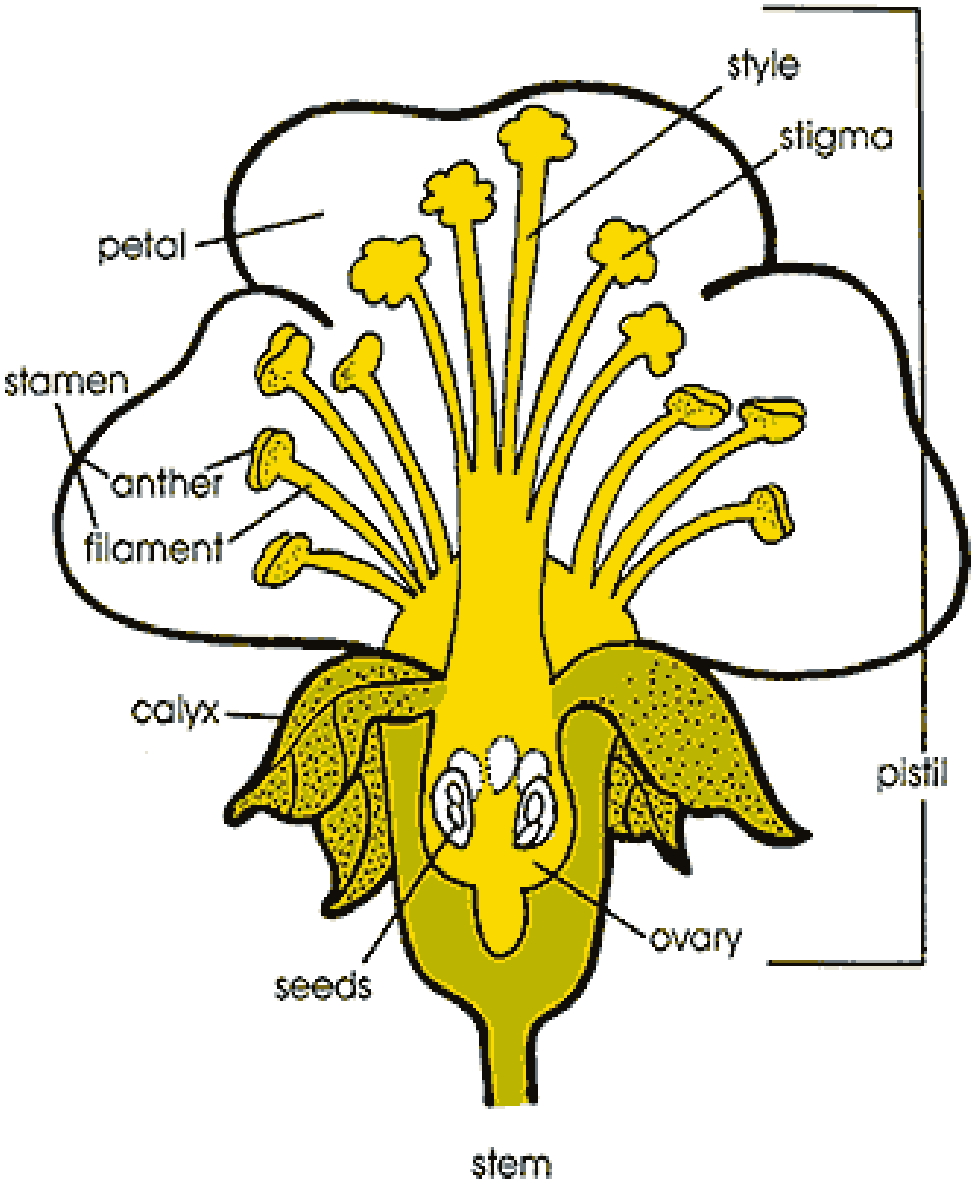

A particular flower can either be male or female or both depending on the plant.

Male flowers have only male flower parts – stamens only

Female flowers have female flower parts only -- pistil.

Perfect Flowers have both male and female parts .

Apples fall into this category.

Some plants have male and female flowers on separate plants. The term dioecious – two houses – is used to describe them. Asparagus fall in this category.

SQUASH MONOECIOUS FLOWERS

PHOTO BY KATHERINE ELLIS

Male Flower

Female Flower

Pollination: any activity (wind or insect or birds) that leads to the transfer of pollen grains from the stamen to the stigma of a flower is pollination.

Fertilization: begins when a compatible pollen grain gets attached to the stigma. The pollen grain grows along the style until it joins with the undeveloped seeds contained within the ovary of the flower. Their transformation into viable seeds will trigger all the structures surrounding them to also begin to develop to form what we call a fruit.

Self incompatible: requiring pollen from a genetically different, but closely related plant for fertilization of seed to occur. Apples, crabapples, some plums and blueberries, some grapes and hazelnuts can never be must be can not be pollinated by their own species.

Pollinizers: plant varieties whose pollen is used in crosspollination. In apple orchards, crab apple varieties are used as pollinizer for their long bloom period. Crab apples are used as pollinizers with varieties such as Jonathan, Golden Delicious.

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Self-pollinating Tomatoes

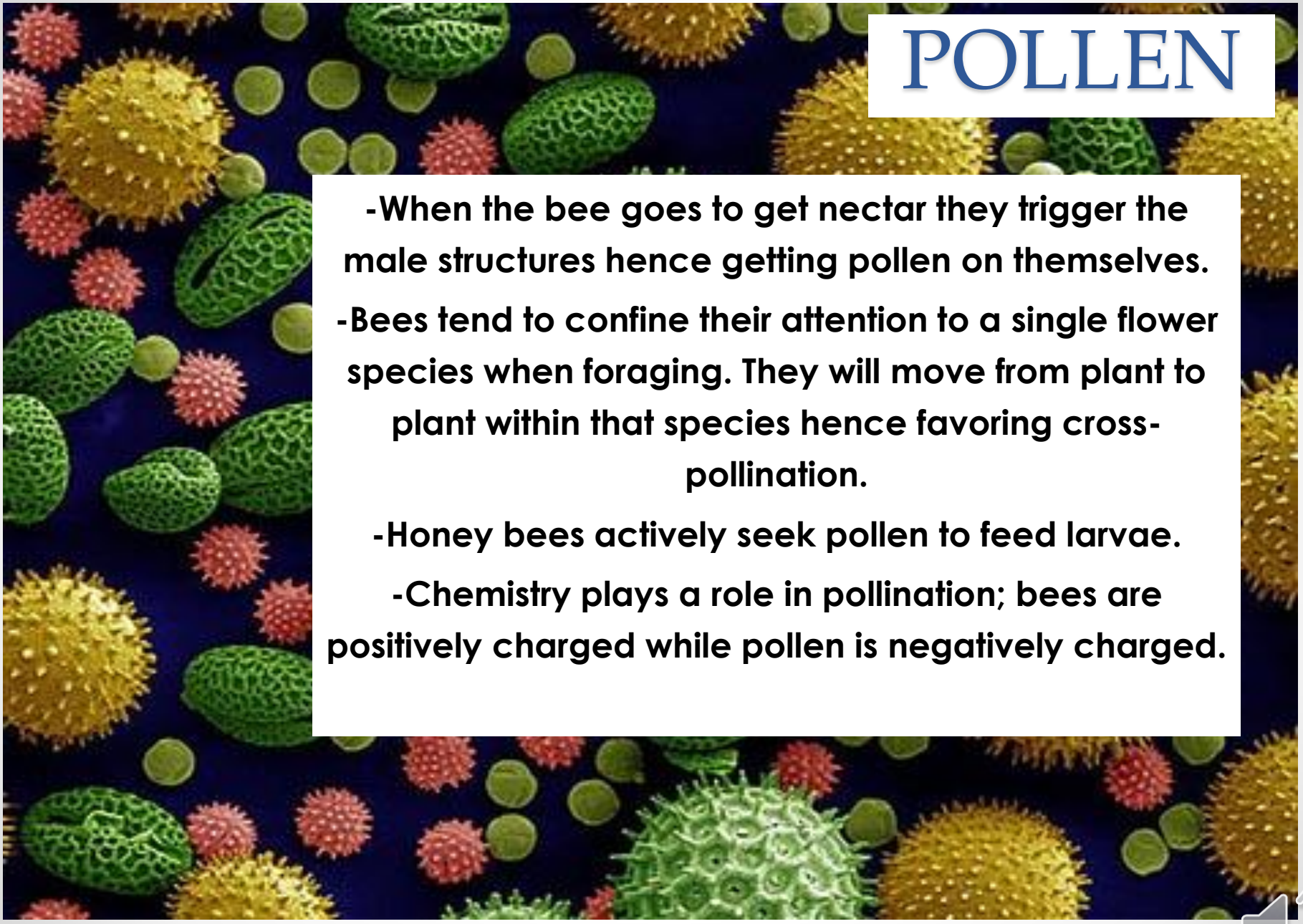
developing specialized structure or methods that prevent cross-pollination.

Tomatoes are self-pollinating because the stigma of a tomato flower grows through a sheath of anthers.

Peaches, some plums and nectarines are self pollinating

Wind pollinated corn

The male flower is the tassel at the top of the plant, so the pollen must fall onto the silk attached to the kernel if it is to develop.



POLLEN

-When the bee goes to get nectar they trigger the male structures hence getting pollen on themselves.

-Bees tend to confine their attention to a single flower species when foraging. They will move from plant to plant within that species hence favoring cross-pollination.

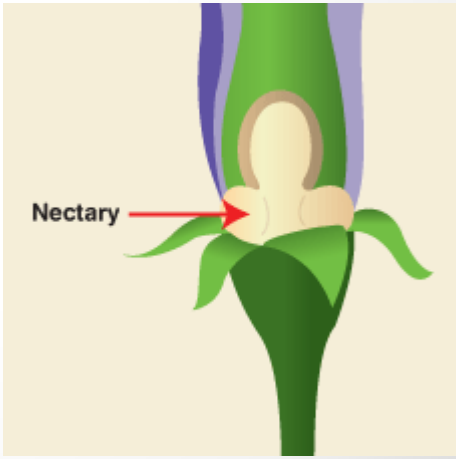
-Honey bees actively seek pollen to feed larvae.

-Chemistry plays a role in pollination; bees are positively charged while pollen is negatively charged.

Dartmouth Electron Microscope Facility

NECTAR

- Nectar is a sweet liquid made in special glands called nectaries that are found on flowering plants.
- Nectaries are most often found by the base of a flower's petals.
- Nectar is the reward given to insects and small animals for their help with pollination.
- Nectar is the base ingredient of honey.



Must be pollinated by bees to produce fruit and seed

Apple

Blackberry

Blueberry

Cherry

Cucumber

Cantaloupe

Pear

Persimmon

Pumpkins

Raspberry

Squash

Sunflower

Watermelon

Can not be pollinated by their own pollen

Bee Spotter

Pollinators will Increase Yield

- Apricot
- Eggplant
- Grapes
- Lima Bean
- Nectarine
- Okra
- Peach
- Pepper
- Strawberry

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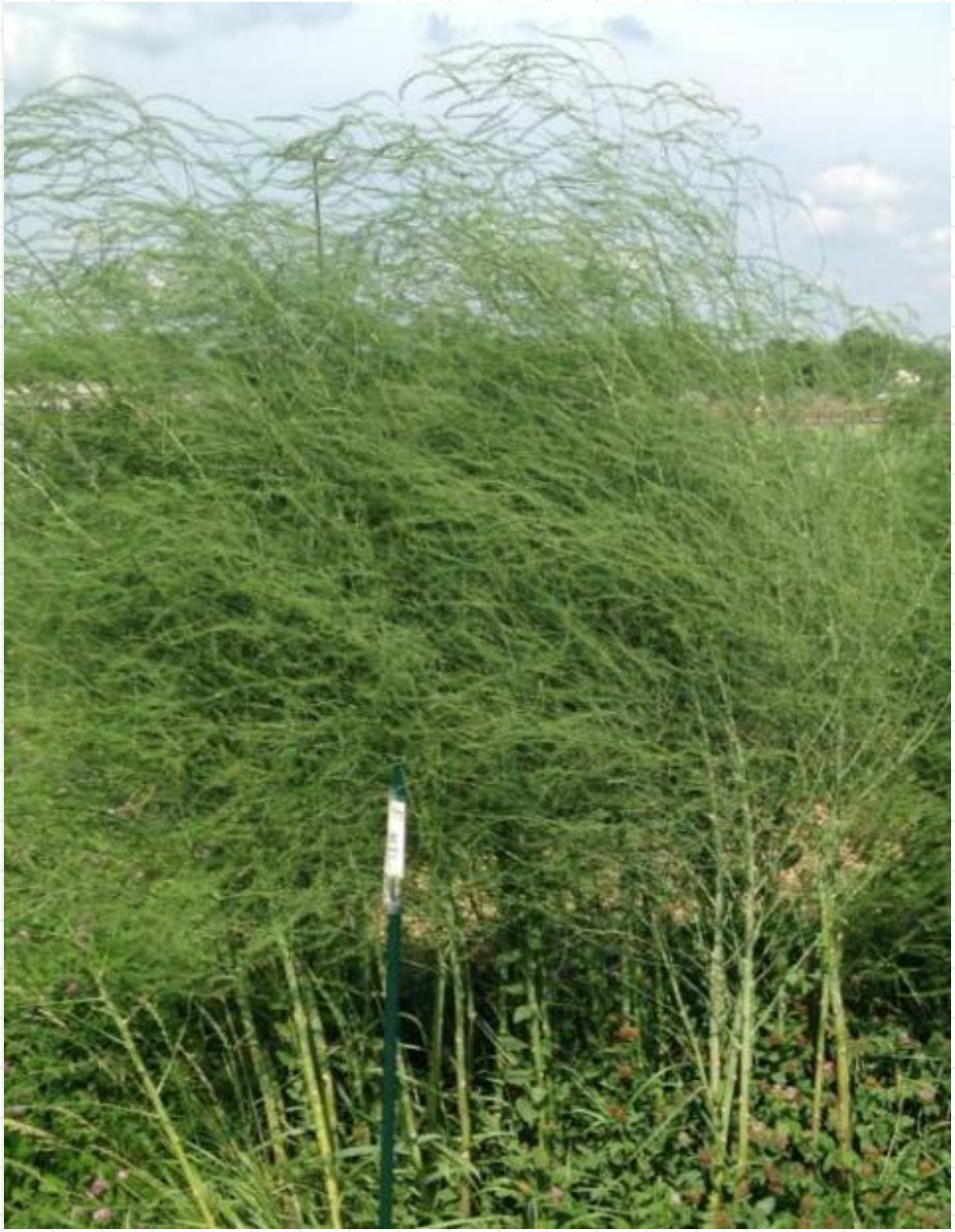

Asparagus and Horseradish

Asparagus has male and female flowers containing nectaries.

Requiring cross pollination to make seed.

Poorly Pollinated Apple

An apple will only develop all the seeds inside if it has been pollinated by several bees and fully fertilized.

If all the seeds are not fertilized, the fruit itself does not develop where the seeds are not developing. This results in poorly shaped apple of low weight.

Strawberries

Honey bee pollination greatly improves berry set, weight and shape.

In one study, there was a 439% increase in insect pollinated plots vs. those that were caged.

Berries receiving too few insect visits (need16-25) are smaller and lopsided.

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Honey Bee

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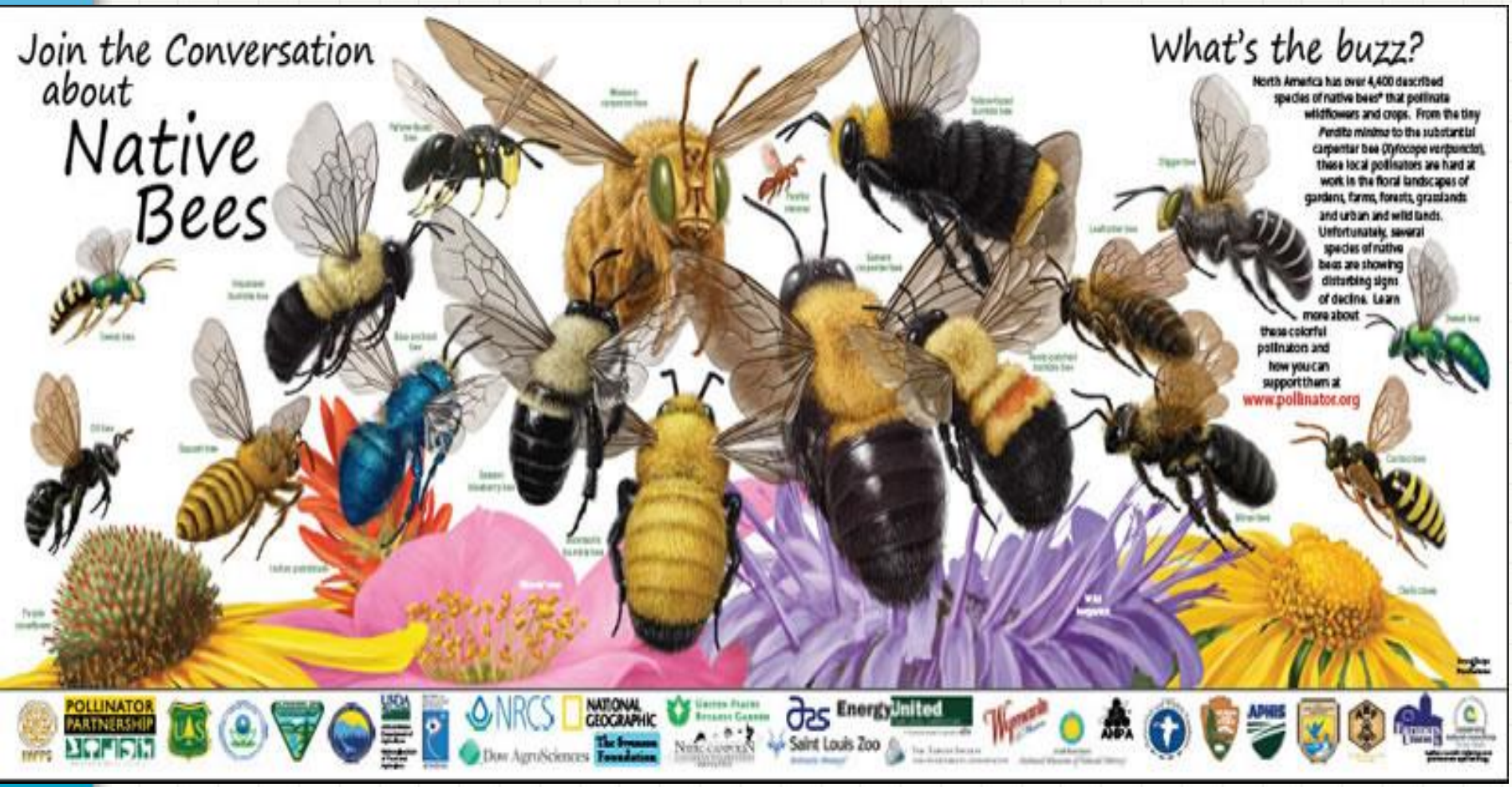

The Other Bees

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In Class Learning Objectives

-Learn Pollination Syndrome of Bees

-Information on how growers can use Honey bee colonies as pollinators

-Understanding of Colony Collapse Disorder

-Pollinator Safe Pesticide Selection

-Identifying native bees

-Culturing native bees that growers can use as pollinators

-Implementing Bumblebees

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University of Illinois Pollinatarium

Beekeeping equipment
Demonstration hive with live bees
Interactive games

http://www.life.illinois.edu/pollinatarium/

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http://beespotter.mste.illinois.edu/

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