

Pollinator Habitat by Design

Mass. State Grange Gardens
University of Massachusetts
Agricultural Learning Center
911 North Pleasant St., Amherst

Why establish bee forages?

Stephen J. Herbert
Stockbridge School of Agriculture
University of Massachusetts Amherst

My Great Grand Parents



Why Honey?

“The only reason for being a bee that I know of is making honey....and the only reason for making honey is so I can eat it.”

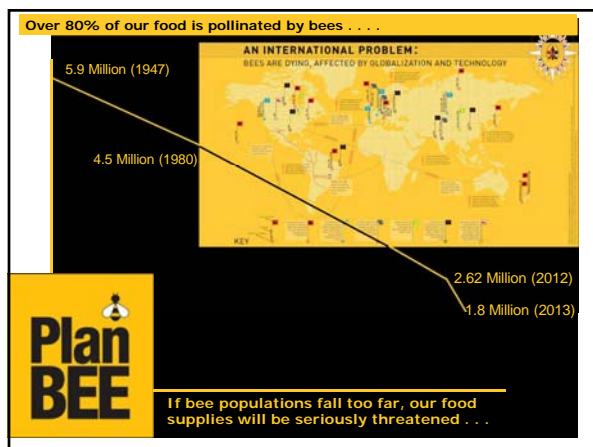
~ Winnie the Pooh



How Much Honey Does a Bee Make in Her Lifetime?

**1/12
Teaspoon**

Why establish bee forages?



We Need Bees

“ If the bee disappeared off the surface of the globe, then man would only have four years of life left.”

~ Albert Einstein

>80% of the Earth's food system relies on pollinators to exist.

How can we save the bees?

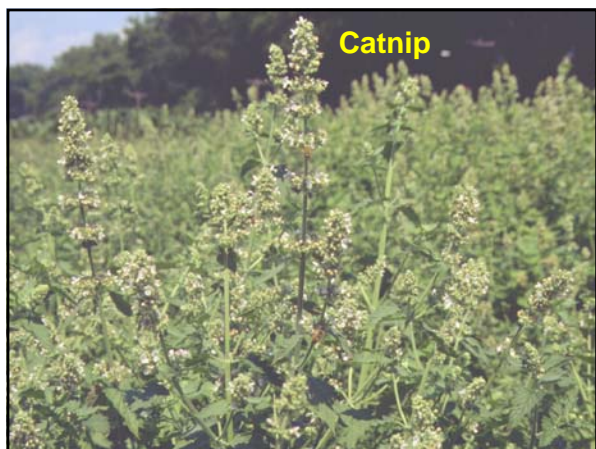
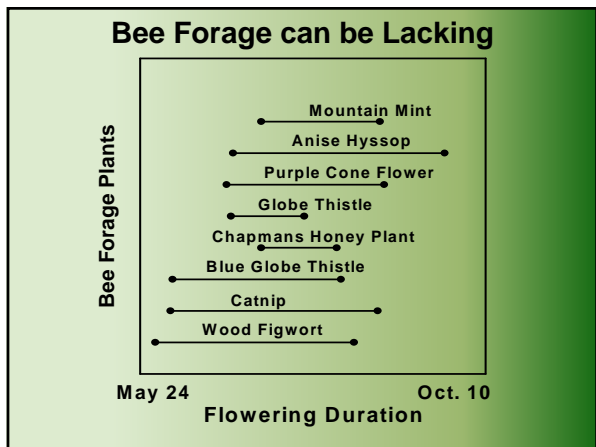
- Discover the reason(s) for the bee colony decline.
- Ban certain offending pesticides.
- Encourage other pollinating insects.
- Grow bee forage for season-long nectar supply.

Bee Forage is Lacking

- Changes in farm practices
 - earlier harvest of hay crops
 - use of herbicides to eradicate weeds
 - loss of farm land to urbanization
- Lack of season-long nectar flow
 - early July to late August little or no nectar from native species

**How Many
Flowers *Do* Bees
Tap to Make *One*
Pound of Honey?**


**2
Million**

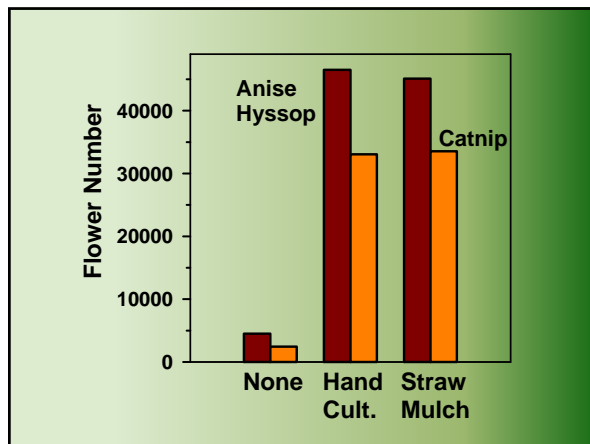
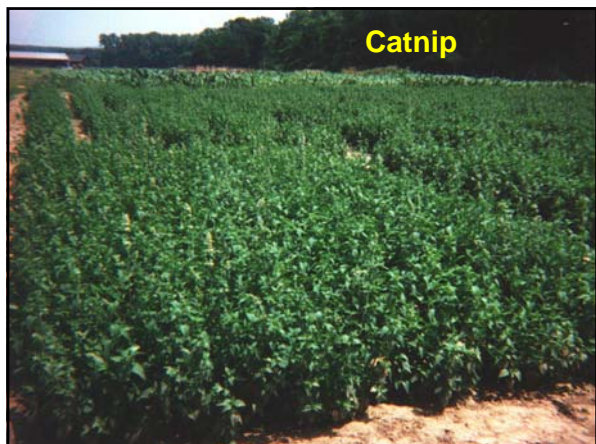




Flower Number is Important

- Maximize flower number by increasing plant density per acre.
- Provide optimum growing conditions.
- Control weeds.





Results

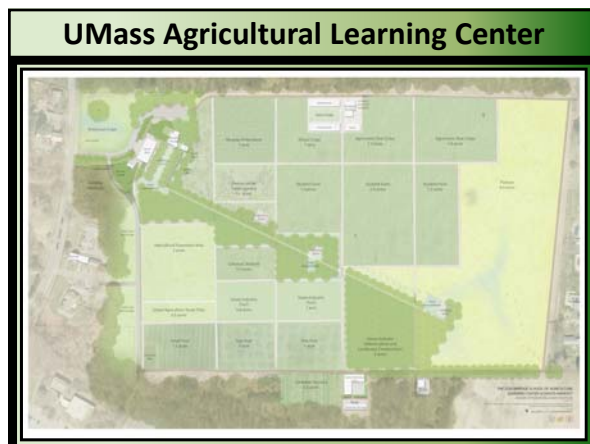
- Most of the bee forages flowered in the year of establishment.
- The main exception were globe thistles *Echinops species*.
- Wood figwort commenced flowering earliest on or about May 24, and continued for several weeks.
- Other species commenced flowering at varying dates and had variable flower durations.

Conclusion

- Figwort, anise hyssop, catnip, and globe thistles were heavily worked by bees and other pollinating insects.
- They showed good potential for developing a overlapping fixed-land nectar producing system.
- Buffers can be planted with plants to attract pollinating and other beneficial insects.

UMass Bee Forage Project

- Bee and butterfly gardens with multiple species and planting systems/combinations have been established in summer-fall 2014.
- Located at the Agricultural Learning Center at 911 North Pleasant Street, Amherst.
- Supported and in cooperation with the Massachusetts State Grange.





How *Do* Bees Communicate with each Other?

By Dancing



- Sequential Flowering in Grange Symbol**
- March; 0.10 m; *Eranthis cilicica*; Winter aconite
 - March; 0.13 m; *Crocus ancyrensis*; 'Golden bunch' crocus
 - March; 0.15 m; *Eranthis hyemalis*; Winter aconite
 - March; 0.15 m; *Iris danfordiae*; Dwarf iris
 - March; 0.15 m; *Iris reticulata*; Dwarf iris
 - March; 0.23 m; *Chionodoxa forbesii*; Glory-of-the-snow
 - April; 0.13 m; *Crocus vernalis*; Spring crocus
 - April; 0.20 m; *Galanthus woronowii*; Snowdrop
 - April; 0.20 m; *Scilla siberica* Haw.; Wood squill
 - April; 0.46 m; *Nepeta x faassenii*; Catmint 'Early bird'
 - April; 0.61 m; *Geranium maculatum*2; Wild geranium

- Sequential Flowering in Grange Symbol**
- May; 0.76 m; *Nepeta racemosa*; Catmint 'Walkers Low'
 - May; 0.91 m; *Zizia aurea* (L.); Golden Alexanders
 - June; 0.91 m; *Echinacea paradoxa*; Yellow coneflower
 - June; 1.22 m; *Agastache foeniculum*; Anise hyssop
 - July; 1.22 m; *Lobelia cardinalis*; Cardinal flower
 - August; 1.52 m; *Helenium autumnale*; Sneezeweed
 - August; 1.52 m; *Solidago odora*; Sweet goldenrod
 - Sept.; 1.52 m; *Symphotrichum cordifolium*; Heartleaf aster
 - October; 1.82 m; *Vernonia noveboracensis*; NY Ironweed
- (Note: Plant flowering month and plant height 0.1m (4inches) to 1.82m (6ft))

Golden Alexanders

Zizia aurea (L.) W.D.J. Koch

- Family: Apiaceae
- Flowering Time: May-June
- Flower Color: Yellow
- Growth Habit: Perennial
- Zones: 3-8
- Environment: Full sun to part shade
- Plant Height: 1.50 to 3.00 feet
- Spread: 1.50 to 2.00 feet
- Tolerates: Deer, Drought, Shallow- Rocky soil
- Water: Dry to Medium
- Maintenance: Medium
- Native Range: Eastern Canada-Southern United States
- Other uses: Naturalize, Rain Garden



Cardinal Flower

Lobelia cardinalis L.

- Family: Campanulaceae
- Flowering Time: July-September
- Flower Color: Scarlet red, White
- Growth Habit: Perennial
- Zones: 3-9
- Environment: Full sun to part shade
- Plant Height: 2.00 to 4.00 feet
- Spread: 1.00 to 2.00 feet
- Tolerates: Rabbit, Deer, Wet Soil
- Water: Medium to wet
- Maintenance: Low
- Native Range: North America
- Other uses: Naturalize, Rain Garden



Catmint

Nepeta x faassenii Bergmans

- Family: Lamiaceae
- Flowering Time: May-September
- Flower Color: Purple
- Growth Habit: Herbaceous Perennial
- Zones: 3-8
- Environment: Full sun to part shade
- Plant Height: 1 to 2 feet
- Spread: 1.5 to 3 feet
- Tolerates: Deer, Drought, Shallow- Rocky soil, Air Pollution
- Water: Dry to Medium
- Maintenance: Low
- Native Range: Turkey, Caucasus, Middle East
- Other uses: Showy, Fragrant



Wild Bee Species Observed at the ALC

Andrenidae - Mining bees

Andrena asteris Robertson, 1891

Andrena braccata Viereck, 1907

Apidae - Bees

Bombus bimaculatus Cresson, 1863; Two-spotted bumble bee

Bombus fervidus (Fabricius, 1798); Yellow bumble bee

Bombus griseocollis (DeGeer, 1773); Brown-belted bumble bee

Bombus impatiens Cresson, 1863; Comm. eastern bumble bee

Bombus perplexus; Perplexing bumble bee

Bombus vagans Smith, 1854; Vagrant bumble bee

Ceratina calcarata Robertson, 1900; Small carpenter bee

Melissodes desponsa Smith, 1854; Thistle long-horned bee

Peponapis pruinosa (Say, 1837); Squash bee

Xylocopa virginica (Linnaeus, 1771); Eastern carpenter bee

Wild Bee Species Observed at the ALC

Colletidae - Plaster and masked bees

Hylaeus leptoccephalus (Morawitz, 1871); Slender-faced

Halictidae - Sweat bees masked bee

Agapostemon texanus Cresson, 1872; Green sweat bee

Agapostemon virescens (Fabricius, 1775)

Augochlora pura (Say, 1837)

Augochlorella aurata (Smith, 1853)

Halictus confusus Smith, 1853

Halictus ligatus Say, 1837; Sweat bee

Halictus rubicundus (Christ, 1791)

Lasioglossum leucozonium (Schrank, 1781)

Lasioglossum oenotherae (Stevens, 1920)

Sphecodes mandibularis Cresson, 1872

Wild Bee Species Observed at the ALC

Megachilidae - Mason and leaf-cutter, and carder bees

Anthidium oblongatum (Illiger, 1806)

Megachile mendica Cresson, 1878; Flat-tailed leaf-cutter bee

(Note: 32 butterfly species were also observed at the ALC)



Other Pollinator Gardens at the ALC

- Northeastern U.S. Roadside Native Mix without Grasses (ERNMX-125; Ernst Seeds, Meadville PA). (Ernst Seed seed-mix category-id=20)
- Low-growing Wildflower & Grass Mix (ERNMX-156; Ernst Seeds, Meadville PA) (Ernst Seed seed-mix category-id=40)
- Butterfly & Hummingbird Garden Mix (ERNMX-179; Ernst Seeds, Meadville PA) (Ernst Seed seed-mix category-id=58)
- Butterfly and hummingbird hedgerow container stock and transplants – 25 miscellaneous species and sources.

How Far Does a Hive of Bees Fly to Bring you a Pound of Honey?

55,000 Miles

