

# Planting Pollinator Habitat – Species Selection, Site Prep, Planting and Maintenance





# Native Bees

4,000+ native bee species in North America  
Over 250 species in northern New England

Native bees are effective pollinators  
Most are generalists, some specialists



# Nesting Sites





# Food Resources











Drawn by Heidi Natura, Conservation Research Institute





# Our First Meadow







July 21, 2011





Aug., 2012











# Site Selection

- Away from pesticide drift
- Open space with full sun
- Poor soil is ok
- At least 20' x 20'
- Viewed from a distance





# Site Preparation

- ✓ **Spend** an entire season
- ✓ **Use Best Methods**

Tillage?

Herbicide?

Smothering?

Solarization?





# Site Preparation

**Smothering (light exclusion)**  
black plastic

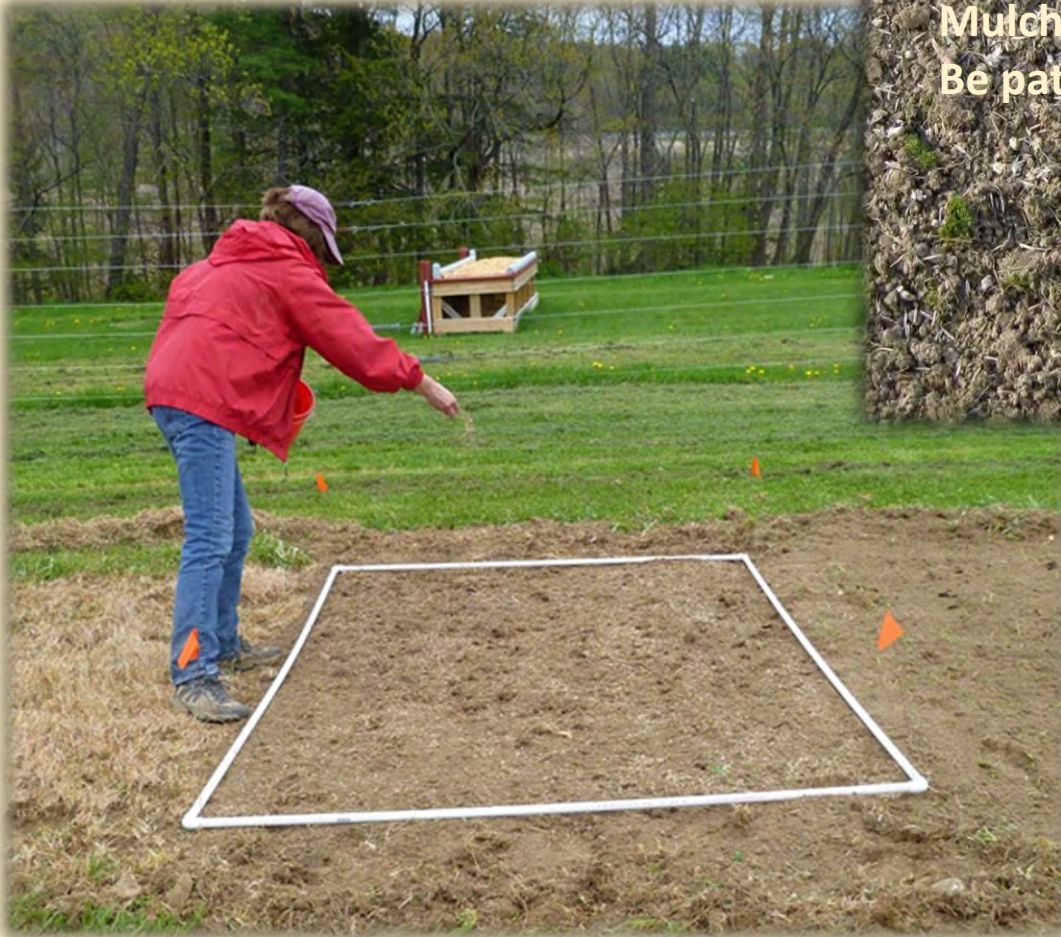
**Solarization (heat treatment)**  
clear plastic





# Seeding

Mix seed with moist carrier.  
Distribute evenly by hand or use seeder.  
Roll for good seed-soil contact.  
Mulch lightly.  
Be patient.









**Year 2**

**Year 1**



**Year 3**







# Using Plugs or Transplants

## ✓ Advantages

- Faster establishment
- More competitive with weeds
- More species diversity
- Some flower the first year

## ✓ Disadvantages

- More work
- Need water
- Expensive
- Availability/minimum orders







**Weed control year 1**



**Seeded plots**

**(14 months later)**

**Plugged plots**

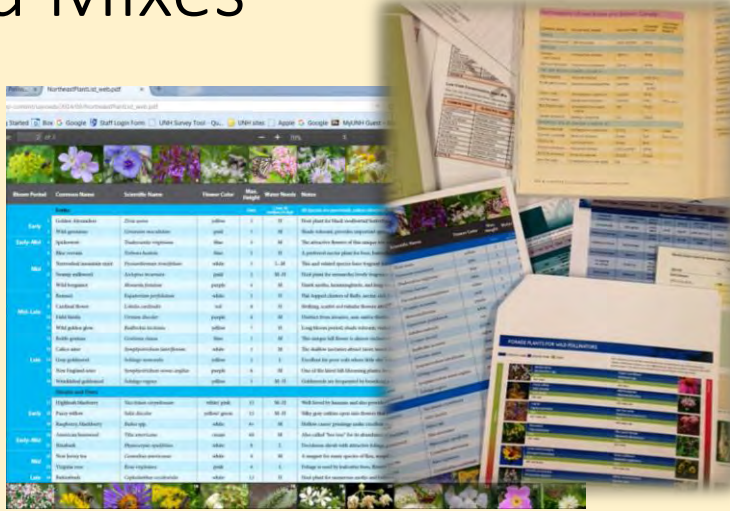


**No weed control year 1**





# Species Selection/ Seed Mixes



Recommended seed list for trial on medium to dry sites in NH

	UNH custom Mix	Basic Mix	Options
Wildflowers (60-70% of mix by wt.)	Med-Dry Soils	for Med-Dry soils	(choices or additions)
<i>Agastache foeniculum</i>	Lavender Hyssop	X	
<i>Aquilegia canadensis</i>	Red Columbine		X
<i>Asclepias syriaca</i>	Common Milkweed	X	
<i>Asclepias tuberosa</i>	Butterfly Milkweed		X
<i>Coreopsis lanceolata</i>	Lanceleaf Coreopsis	X	
<i>Echinacea pallida</i>	Pale Purple Coneflower		X
<i>Echinacea purpurea</i>	Purple Coneflower	X	
<i>Eupatorium perfoliatum</i>	Boneset		X
<i>Eutrochium purpureum</i>	Sweet Joe Pye	X	
<i>Heliopsis helianthoides</i>	Oxeye Sunflower	X	
<i>Liatris spicata</i>	Dense Blazing Star	X	
<i>Liatris pycnostachya</i>	Prairie Blazingstar		X
<i>Monarda fistulosa</i>	Wild Bergamot	X	
<i>Oligoneuron rigidum</i>	Stiff Goldenrod	X	
<i>Solidago speciosa</i>	Showy Goldenrod		X
<i>Ratibida pinnata</i>	Yellow coneflower	X	
<i>Rudbeckia hirta</i>	Black Eyed Susan	X	
<i>Symphotrichum laeve</i>	Smooth Blue Aster		X
<i>Symphotrichum novae-angliae</i>	New England Aster	X	
<i>Vernonia noveboriensis</i>	New York Ironweed		X
<b>Grasses (30-40% of mix by wt.)</b>			
<i>Elymus canadensis</i>	Canada Wildrye	X	
<i>Elymus virginicus</i>	Virginia Wildrye		X
<i>Shizachyrium scoparium</i>	Little Bluestem	X	
<i>Sorghastrum nutans</i>	Indian Grass	X	





# Commercial Wildflower Mixes

- 17-25 wildflower species plus 3-5 native grasses
- Average seeding rate = 13 lbs/A or 0.3 lbs/1000ft<sup>2</sup>  
Average seed cost = \$1450/acre or \$49/1000 ft<sup>2</sup>
- Average plug cost \$1.13
  - @ 1 per square feet = \$1130/1000ft<sup>2</sup>
  - @ 1 per 4 square feet = \$282/1000ft<sup>2</sup>















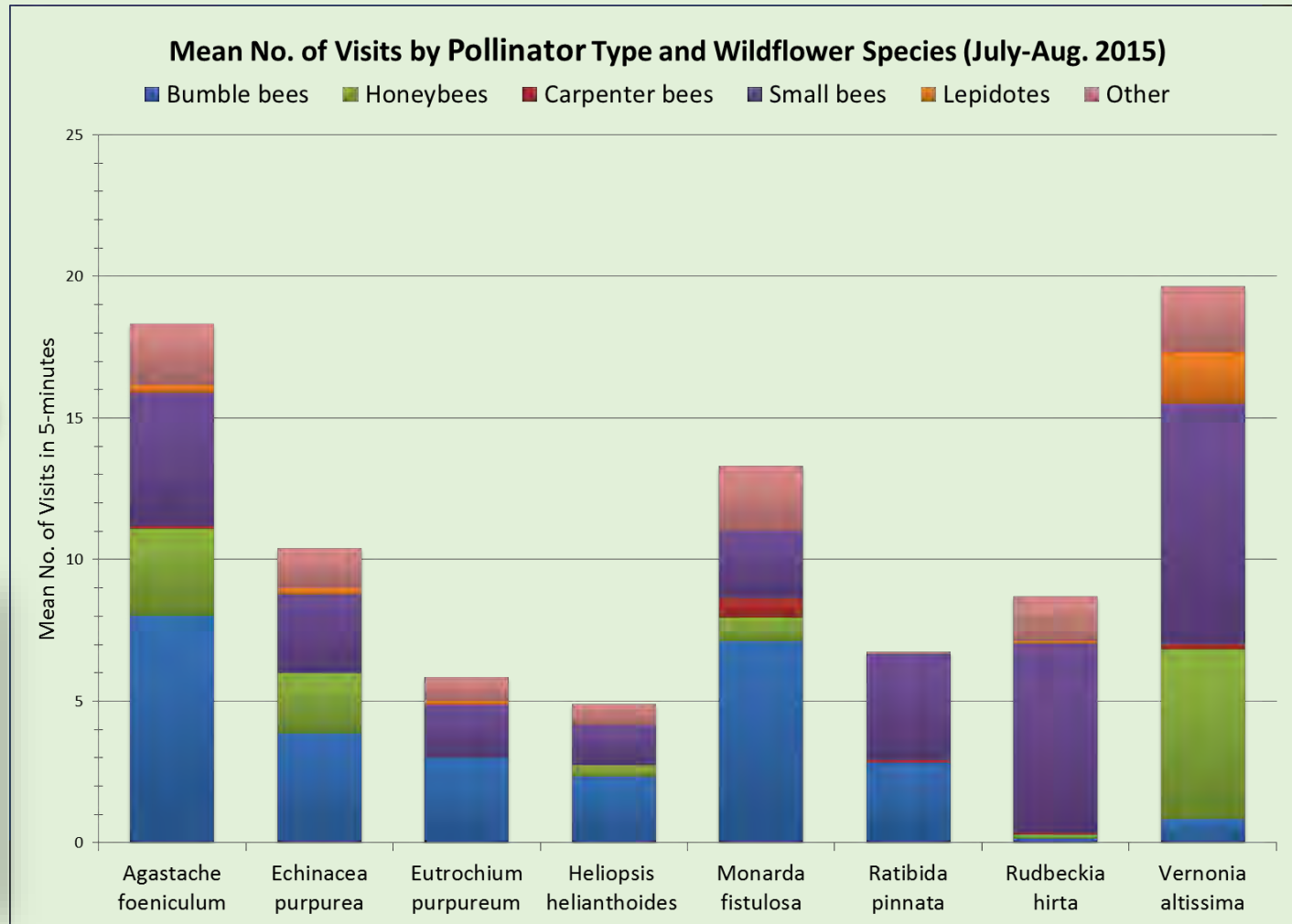








# Monitoring Pollinator Preferences





# Maintaining the Meadow

## Year 1

Mid-summer mowing to cut back weeds before they go to seed; mow high (4-6")

No water, fertilizer, sprays are needed.





# Maintaining the Meadow

## Year 3+

Mow in late fall – every other year?

Leave the debris

Cut out invasive plants by hand





# Make it part of your Farmscape





# Take it to your Landscape



[Ento.psu.edu/pollinators/public-outreach/cert/](http://Ento.psu.edu/pollinators/public-outreach/cert/)





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  - > **Wildflower Meadows**
    - Pollinator Habitat
    - Wildflower Guide
- Pesticide Safety Education Program
- Problem Diagnosis and Testing Services

# Wildflower Meadows



**Why Wildflower Meadows?** They are beautiful and tie your landscape in to the surrounding environment. Adding even a small area of native wildflowers and meadow grasses to your property provides habitat for pollinators, birds, and other wildlife, serves as an infiltration area for storm water, and prevents soil erosion, making them valuable components of sustainable landscapes. Once properly planted and maintained over a season or two, they require almost no inputs of water, fertilizer, or energy. Compare this to a well-manicured lawn, which needs frequent watering, annual fertilization, and heavy use of pollution-producing mowers and lawn trimmers.

But, they are challenging to start successfully. Our research is identifying the most efficient and economical ways to start a meadow planting - which species work best, how to start from seed or plugs, how to prepare the site, how to address weed management, mowing, etc. Many farms, public and private land managers are very interested in planting wildflowers for bee habitat and we are monitoring bee activity in our research plots as well. [More....](#)

The following reports and fact sheets provide more information on establishing wildflower meadows and pollinator habitat

- > [Planting for Pollinators in Northern New England: Recommendations for Establishing a Wildflower Meadow](#) - a poster presentation for the First National Conference on Protecting Pollinators in Ornamental Landscapes; Oct. 12-14, 2015. Includes information on species selection, site preparation, planting, and pollinator preferences. [NEW!](#)
- > [Flowering Calendar for Wildflower Species in Southern New Hampshire](#) - use this calendar to select and combine species to provide flowers in bloom from early spring through late fall. Color bars indicate flower colors. [NEW!](#)
- > [Wildflowers for New England Meadows and Pollinator Plantings](#) - A detailed list of wildflower species that have performed well in our meadows and at other sites around NH. Use this list as a starting point for designing a wildflower meadow or pollinator garden of your own. Revised in 2015.
- > [Wildflower Identification Guide for New England Meadows](#) - An online guide for recognizing wildflowers before they bloom, from seedlings through mature plants, with lots of pictures. This will help you identify wildflowers you plant from seed, while they are still small and hard to tell apart from the



### Pollinator Favorites

The species shown (left) were the top five pollinator plants during mid to late summer (July-Aug. 2015). They are high value pollinator plants because they bloom over a long period of time and/or attract large numbers of bees when in bloom.

*Agastache foeniculum*   *Monarda fistulosa*   *Rudbeckia hirta*   *Echinacea purpurea*   *Vernonia altissima*



# extension.unh.edu/wildflower-guide

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  - Wildflower Meadows
  - Wildflower Guide
    - Species Collection
    - Characteristics
      - Clustered
      - Alternate
      - Opposite
      - Grass-like
      - Leaf Shape
      - Square / Small

**Species with clustered leaves**

These species have a cluster of leaves at ground level when they are young. As they mature, they will develop a tall stem (or multiple stems) and may or may not lose their basal cluster of leaves.

 <i>Aster ptarmicoides</i> Upland White Aster	 <i>Coreopsis lanceolata</i> Lanceleaf Tickweed	 <i>Echinacea pallida</i> Pale Purple Coneflower
 <i>Echinacea purpurea</i> Purple Coneflower	 <i>Liatris</i> spp. Blazing Star	 <i>Lobelia cardinalis</i> Cardinal Flower
 <i>Parthenium integrifolium</i> Wild Quinine	 <i>Penstemon digitalis</i> Foxglove Beardtongue	 <i>Ratibida columnifera</i> Upright Prairie Coneflower
 <i>Ratibida pinnata</i> Yellow Coneflower	 <i>Rudbeckia fulgida</i> Orange Coneflower	 <i>Rudbeckia hirta</i> Black Eyed Susan
 <i>Rudbeckia triloba</i> Brown Eyed Susan	 <i>Solidago rigida</i> Stiff Goldenrod	 <i>Solidago speciosa</i> Showy Goldenrod

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**Allium cernuum**  
Nodding Wild Onion

The newly germinated seedling looks a lot like a blade of grass.

The black oval seed coat may remain attached to the seedling for many days.

Over the next few weeks, the *Allium* seedling will develop more long thin leaves.

Each new leaf wraps around the older leaves at the base.

As *Allium cernuum* grows, the leaves become wider. New leaves emerge from the center of the plant, with the leaf surfaces facing each other.

Break a leaf in half; notice the curved cross-section and the familiar smell of onion.

You can see a paper-like "sheath" at the base of each leaf.

Over time, more clumps of leaves will grow.

*Allium cernuum* usually doesn't flower until it is at least one year old.

Long tubular flower stems grow from the center and grow taller than the leaves.

Flower buds hang down from the tips of these stems, giving the plant its common name, "Nodding Wild Onion".

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**Asclepias syriaca**  
Common Milkweed

The seedling is tall with long and rounded cotyledons (seed leaves) with veins clearly visible.

Leaves are long, pointed and somewhat leathery, with smooth edges.

Leaves develop in pairs.

Pairs of new leaves emerge upright with their upper surfaces facing each other.

The midrib (center vein) is white and clearly visible on each leaf.

Undersides of leaves are densely covered with soft hairs.

One or more thick stems develop with large leathery leaves.

Notice the distinctive veination on the leaves.

The bold simple architecture of *Asclepias syriaca* stands out among other wildflowers.

Clusters of large pink flowers develop near the top of the stem.

Large spiny seed pods develop after the flowers have passed.

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