Preserving Biodiversity using local ecotypes in Maryland

Propagating Local Ecotype Native Species (LENS) from local native seed

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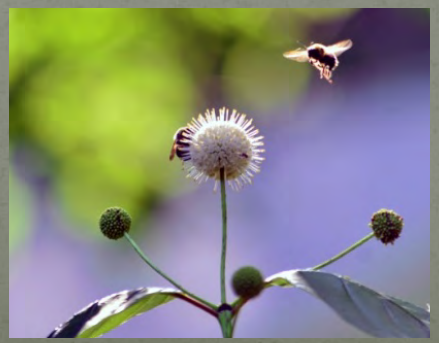
Maryland Experiences with Local Ecotype Native Species (LENS)

1. Is preserving local biodiversity a lost cause?
2. Mixing it up!
   - Are we loosing the LENS?
3. Finding, storing, germinating and propagating MDs LENS
4. A Maryland LENS growers' perspective



Where have all the flowers gone?
from Maryland

Long time ….. passing

Why Maryland perennials are declining?

- Farms, fairways, freeways
- Built environments
- Introduced species
- Fire prevention
- Weed and animal control, or not

Gone to …… graveyards

Where to find Maryland perennials

Native species refugia

- **Powerline corridors**
- **Forest/meadows in State Parks**
- **Natural preserves: barrens, dunes and tidal swamps**
- **Roadsides and byways**
- **Graveyards and gardens**

Mostly refugia are managed, mowed and manipulated

Soldiers Delight Natural Environment Area

When will they ever learn?
Preserving the "hard to find" MD perennials

- **~80% of MD native biodiversity need meadows, the remainder are in the forests – the meadows are almost gone – so are the meadow species**
- **RIP 21 species of MD Butterflies**
- **Mixing it up with seed; dilution; recognizing what we are doing!**

Eutrochium fistulosum

Example: Monarch Way Station's Seed Kits

For gardens east of the Rocky Mountains kits contain the following species:

- **MILKWEED HOST**
  - butterfly milkweed (*Asclepias tuberosa*)
  - common milkweed (*Asclepias syriaca*)
  - swamp milkweed (*Asclepias incarnata*)

- **GENERAL NECTAR PLANTS**
  - Indian blanket (*Gaillardia pulchella*)
  - purple coneflower (*Echinacea purpurea*)
  - joepyeweed (*Eupatorium purpureum*)
  - scarlet sage (*Salvia coccinea*)
  - Mexican sunflower (*Tithonia rotundifolia*)
  - zinnia, dahlia mix (*Zinnia elegans*)

Asclepias tuberosa

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- GENERAL NECTAR PLANTS (not native in MD)
  - Indian blanket (*Gaillardia pulchella*)
  - purple coneflower (*Echinacea purpurea*)
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  - scarlet sage (*Salvia coccinea*)
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Asclepias tuberosa

Seed kits and other seeds supplies for wildflowers

Most native seed comes from several large commercial suppliers (Burpee, Ernst, others)

2 million of these NRCS packets go nationwide

1000s of these Florida tropical milkweed packets go nationwide!
MDs next invasive species

Seed kits and other seeds supplies for wildflowers

Most native seed comes from several large commercial suppliers (Burpee, Ernst, others)

Not MD native

What about widespread native species?

Can local ecotypes be recognized?

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MDs next invasive species

Can local ecotypes be recognized?

Example: LENS diversity in the thicket bean *Phaseolus polystachios* assessed from 120 AFLPs

Kisha & Egan, *in Prep.*

Using the remnant flora
finding perennial seed

- Most landscapes have been modified or are secondary regrowth
- Most species require considerable researching and searching
- Historical personal knowledge is largely lost
  - Use of herbarium records
  - Little use yet of searching for remnant habitats from aerial photography

Experiences with declining species

Easy: Matrix species are mostly still common

Tricky: Many MD species are thought to be more common than they really are

Difficult: Most MD species that are S3 have fewer viable sites remaining than anticipated

Storing perennial plant propagules

Seed sorting

- Handling: let dry or not
  - seed lacking endosperm
  - seed with much endosperm
- Cold long-term storage 4C (40F)

Some species are easier to propagate by : bulbs, corms, rhizomes, cuttings

Experiences with declining species

Easy: natural cycle; viability upward of 5 years

Tricky: few species do not like dry cold; endospermic ephemeral seed short-lived *Phacelia, Hydrophyllum*

Difficult: *Sarracenia, Aralia, Panax*

Germinating perennial seed

Imitating nature's way:

- Stratification warm, cold, alternating
- Immediate sow endospermic seed
- Scarification legumes
- Simulated burning, smoke infusion?
- Surface or covered sow

Experiences with declining species

Easy: most are surprisingly easy - *Liatris, Coreopsis, Asclepias, Lupinus, Sabatia, Lobelia purberula, Chrysopsis*

Tricky: some *Helianthus* spp., *Hypoxis*

Difficult: *Sarracenia, Gentiana*

Propagating perennial seedlings

Once past seedling stages problems

- **Micro-nutrients, soil biota deficiencies**
- **Moisture and drainage**
- **Propagation in specialized beds**
- **Mites, aphids, larvae**

Experiences with declining species

Easy: not many e.g. *Scrophularia, Sedum*

Tricky: *Asclepias* spp., *Liatris*, *Coreopsis, Ionactis, Chelone*

Difficult: particularly deep sand and ultramafic species *Lupinus*, *Sabatia*, *Gentiana*

Experience : Growers of LENS from seed

Labor intensive and limited production requires volunteers to make the plants

- **Commercial for-profit businesses** - not viable unless supplemented by large restoration projects; need several years ramp-up time for large quantities
- **County-supported programs using volunteers** – needs Directors to value of local native biodiversity over introductions from easily accessible distant seed sources
- **Nonprofit organizations using volunteers** – tend to be smaller operations with volunteer-hours limiting production

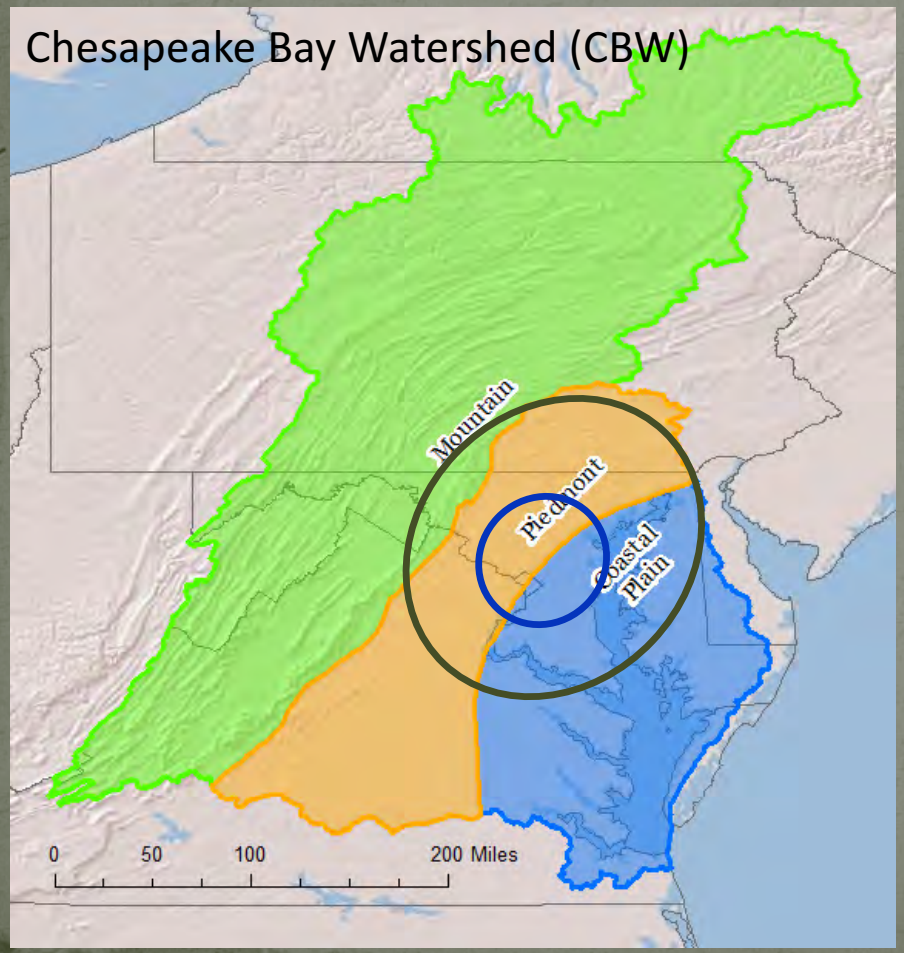

High tunnel at Pope Farm


Greenhouse at Mt. A[illegible] Mansion

Chesapeake Natives, Inc.

501(c)(3) nonprofit since 2006

at Pope Farm MPP Native Plant Nursery, Gaithersburg since 2012
at Mt. Airy Mansion Greenhouse, Rosaryville State Park since 2013



provide local ecotype species for CBW

- **Gather and store seed**
- **Stratify and germinate seed**
- **Dibbling to plugs**
- **Grow on to quarts and gallons**
- **200 spp. c.50,000q, c.5000g in 2017**

Provenance 100% from CBW, 90% from the Patuxent and lower Potomac Montgomery, Anne Arundel and Prince George's Counties

Projected annual CNI increase ~20 spp. requires considerable research and search for reliable ecotype material

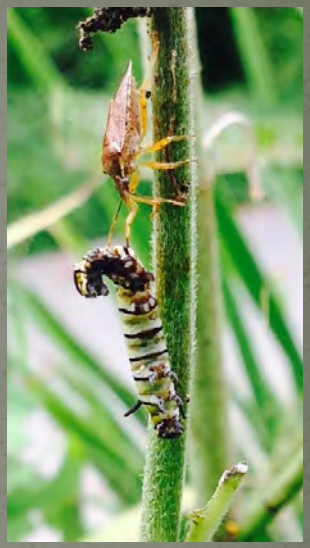
LENS growers in Maryland

High tunnel at Pope Farm

Demonstration garden at Pope Farm

- Chesapeake Natives, Inc. (c.200 perennial species)
  - 100% strictly from within CBW
- Pope Farm, Montgomery County Parks (c.150 perennial LENS)
  - All species other than ferns and woody plants
- Herring Run – Blue Water Baltimore
  - Mostly MD, also wider mid-Atlantic
- Wicklein's Water Gardens (few spp.)
  - Mostly MD, also wider mid-Atlantic
- Environmental Concern (lowland perennials, MD eastern shore)
  - Mostly eastern shore, also wider mid-Atlantic

Conclusions



1. **Is preserving local biodiversity a lost cause?**
   Not entirely. Resilience, recognition and restoration

2. **Mixing it up!**
   Species from outside the local region ARE 'alien' introductions

3. **Finding, storing, germinating, propagating LENS**
   Without help by promoting, protecting and propagating, MDs declining perennial species are on the road to extirpation

4. **A Maryland LENS growers' perspective**
   Commercial viability for species grown from seed is limited by the importance placed by the statewide marketplace

questions

The historic 1935 Lutton Solar V-Bar greenhouse at
Mount Airy Mansion, Rosaryville State Park

The preceding presentation was delivered at the

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Washington, D.C. February 13-16, 2017

This and additional presentations available at http://nativeseed.info

NATIVE SEED NETWORK

Institute for Applied Ecology