

Virtual Cool Finds! Supplementing rare plant sightings with citizen science



Sam Betar, K Barone, J. Bonner, B. Cassel, I. Colon, S. Davison, P. Miranda, R. Patty, J. Scott, P. Squire, G. Steward L. Stricek, C. Wilkins, O. Wright, N.Z. Muth. **Juniata College, Huntingdon, PA**



Background & Rationale

- “Cool Finds” is a regular program of the PA Botany Symposium that solicits and highlights exceptional plant observations (stick around for Cool Finds at 3pm today)
- Cool Finds can help share information and excitement about PA plants!!!
- Cool Finds can help inform our understanding, ranking, and management of rare plants
- we used citizen-scientist data uploaded to iNaturalist to supplement Cool Finds for the current PA Botany Symposium

Methods

- we applied filters within iNaturalist to find observations of PA threatened and endangered plant species as described in Figure 1 (right)
- * we applied a custom “expert criterion” process to retain only those observations for which the observer or identifier had other verified identifications of each species
- ** for practical purposes, we excluded (five) species with > 50 observations from our “expert criterion” filter

Figure 2. Five species submitted to Cool Finds were also on our list of 71 iNaturalist-added species.

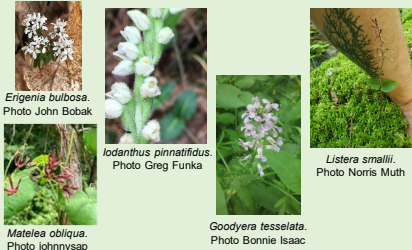


Figure 1

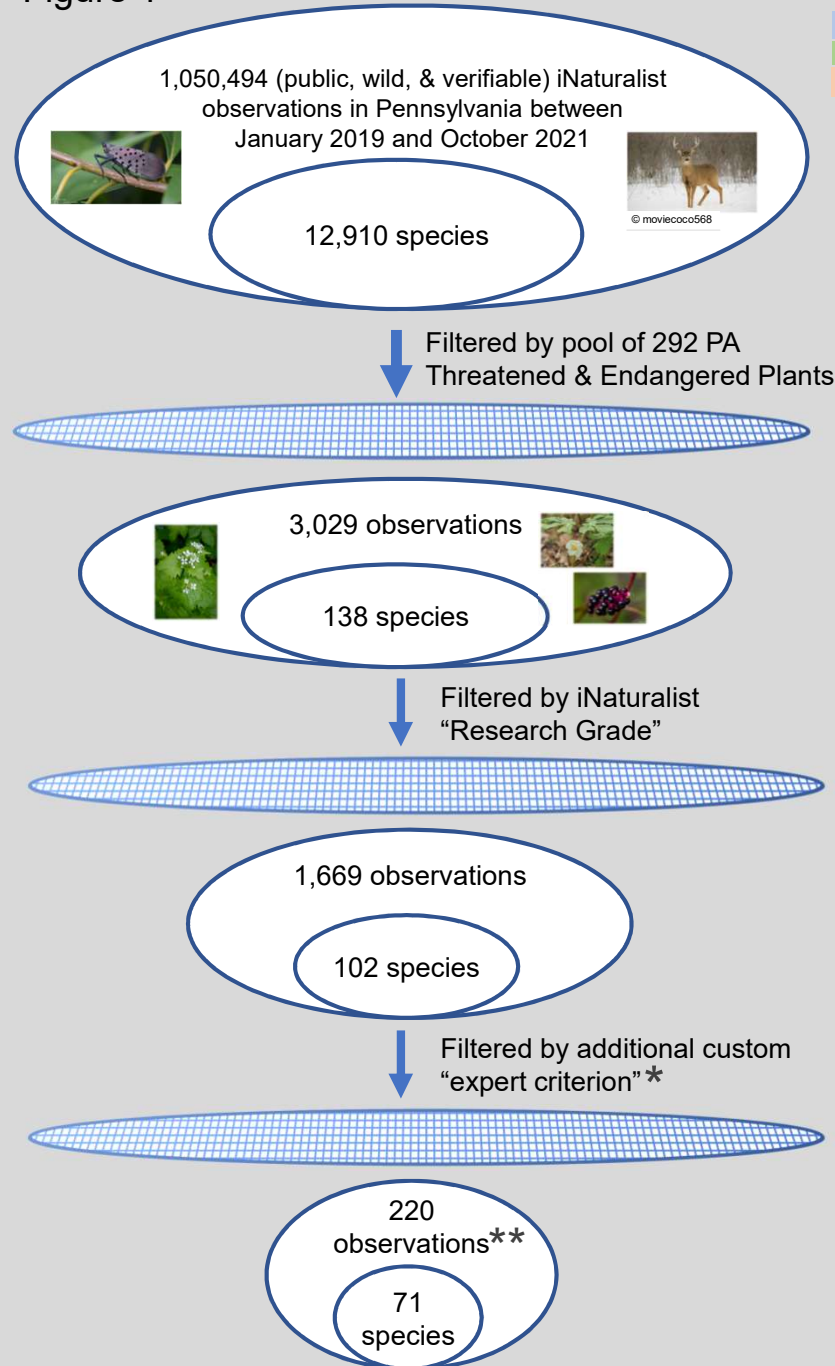
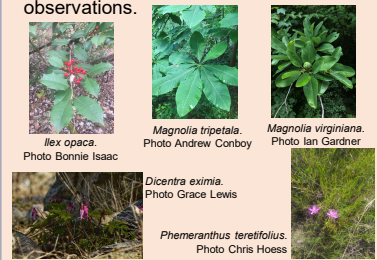


Table 1. List of 79 PA threatened & endangered plants on iNaturalist or submitted to Cool Finds since January 2019.

blue highlighted species were submitted to Cool Finds only
green highlighted species overlap on both lists (Figure 2)
orange highlighted species were reported > 50 times (Fig. 3)

Species	Common Name
<i>Aconitum recclinatum</i>	White Monkshood
<i>Actaea podocarpa</i>	Mountain Bugbane
<i>Agalinis paupercula</i>	Small-flowered False-foxglove
<i>Aristida purpurascens</i>	Arrow-feathered Three Awned
<i>Asplenium bradleyi</i>	Bradley's Spleenwort
<i>Baptisia australis</i>	Blue False-indigo
<i>Bidens beckii</i>	Beck's Water-marigold
<i>Bottonia asteroides</i>	Aster-like Bottonia
<i>Bouteloua curtipendula</i>	Tall Gramma
<i>Camassia scilloides</i>	Wild Hyacinth
<i>Cardamine pratensis</i> var. <i>palustris</i>	Cuckooflower
<i>Carex aurea</i>	golden-fruited sedge
<i>Carex eburnea</i>	Ebony Sedge
<i>Carex pauciflora</i>	Few-flowered Sedge
<i>Carex paupercula</i>	Bog Sedge
<i>Carex retrorsa</i>	Backward Sedge
<i>Carex typhina</i>	Cattail Sedge
<i>Clematis viorna</i>	Vase-vine Leather-flower
<i>Cilitoria mariana</i>	Butterfly-pea
<i>Cypripedium parviflorum</i>	yellow lady's slipper
<i>Delphinium exaltatum</i>	Tall Larkspur
<i>Dicentra eximia</i>	Wild Bleeding-hearts
<i>Dichanthelium scoparium</i>	Velvety Panic-grass
<i>Dryopteris campyloptera</i>	Mountain Wood Fern
<i>Eleocharis parvula</i>	Little-spike Spike-rush
<i>Ellisia nyctelea</i>	Ellisia
<i>Equisetum variegatum</i>	Variegated Horsetail
<i>Equisetum variegatum</i>	variegated scouring-rush
<i>Engelmia bulbosa</i>	Harbinger-of-spring
<i>Euphorbia polygonifolia</i>	Small Sea-side Spurge
<i>Euphorbia purpurea</i>	Glade Spurge
<i>Goodyera tessellata</i>	Checkered Rattlesnake-plantain
<i>Huperzia porophylla</i>	Rock Clubmoss
<i>Ilex opaca</i>	American Holly
<i>Iodanthus pinnatifidus</i>	Purple Rocket
<i>Iris cristata</i>	Crested Dwarf Iris
<i>Isotria medeoloides</i>	small whorled-pogonia
<i>Lathyrus japonicus</i>	Beach Peavine
<i>Lathyrus ochroleucus</i>	Wild-pea
<i>Listera australis</i>	Southern Twayblade
<i>Listera cordata</i>	Heart-leaved Twayblade
<i>Listera smallii</i>	Kidney-leaved Twayblade
<i>Lobelia puberula</i>	Downy Lobelia
<i>Lycopodiella appressa</i>	Southern Bog Clubmoss
<i>Lyonia mariana</i>	Stagger-bush
<i>Magnolia tripetala</i>	Umbrella Magnolia
<i>Magnolia virginiana</i>	Sweet Bay Magnolia
<i>Matelea obliqua</i>	Oblique Milkvine
<i>Myrica gale</i>	Sweet-gale
<i>Oenothera argillicola</i>	Shale-barren Evening-primrose
<i>Passiflora lutea</i>	Passion-flower
<i>Phemeranthus teretifolius</i>	Round-leaved Fame-flower
<i>Platanthera aquilonis</i>	Northern Green Orchid
<i>Platanthera peramoena</i>	Purple-fringeless Orchid
<i>Polygala curtisii</i>	Curtis's Milkwort
<i>Potamogeton richardsonii</i>	Red-head Pondweed
<i>Potentilla anserina</i>	Silverweed
<i>Potentilla fruticosa</i>	Shrubby Cinquefoil
<i>Potentilla paradoxa</i>	Bushy Cinquefoil
<i>Primula fassettii</i>	Fassett Jeweled Shooting-Star
<i>Prunus maritima</i>	Beach Plum
<i>Quercus falcata</i>	Southern Red Oak
<i>Ranunculus fascicularis</i>	Tufted Buttercup
<i>Ruellia humilis</i>	Fringed-leaved Petunia
<i>Ruellia strepens</i>	Limestone Petunia
<i>Scleria pauciflora</i>	Few Flowered Nutrush
<i>Sida hermaphrodita</i>	Sida
<i>Spiranthes romanzoffiana</i>	Hooded Ladies'-tresses
<i>Spiranthes vernalis</i>	Spring Ladies'-tresses
<i>Sporobolus heterolepis</i>	Prairie Dropseed
<i>Streptopus amplexifolius</i>	White Twisted-stalk
<i>Symphoricarum depauperatum</i>	Serpentine Aster
<i>Trichostema setaceum</i>	narrow-leaved blue-curtis
<i>Trifolium virginicum</i>	Kate's-mountain clover
<i>Triphora trianthophora</i>	Three birds orchid
<i>Vernonia glauca</i>	Tawny Ironweed
<i>Viburnum nudum</i>	Possum-haw
<i>Viola brittoniana</i>	Coast Violet
<i>Viola glaberrima</i>	Northern Wedge-leaved Violet

Figure 3. Species with >50 iNaturalist observations.



Results & Discussion

- we found > 220 likely credible observations of 71 PA threatened & endangered species since January 2019
- false-positive observations likely exist in our data, despite our filtering criteria
- false-negatives (e.g. rare plant observations mis-reported as a common species) exist in the database but would not be detected by our method
- are any of the most frequently reported species less imperiled than their current rankings imply?
- similar procedures could be used to focus on data for specific priority species

Figure 4. Examples of state critically imperiled (S1) species observed in this time period but not reported to Cool Finds.

