

# **2012 Collection Trip**

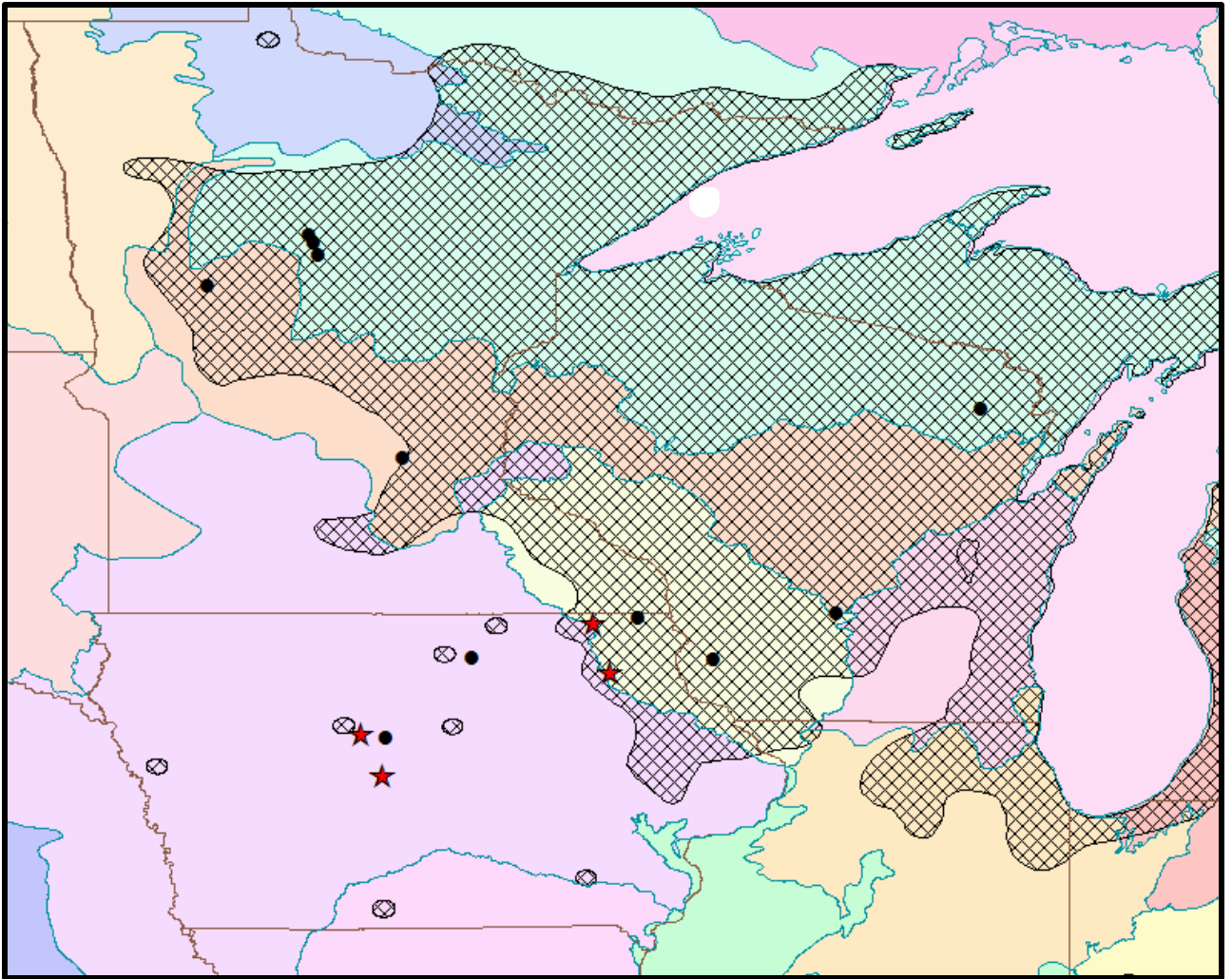
## **Iowa – *Cornus rugosa***



United States Department of Agriculture

**July 13-16, 2012**

# NC7 *Cornus rugosa* Sites



- Past accessions
- ★ 2012 accessions

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# Introduction

The USDA-ARS Plant Introduction Station (Ames, IA) completed a collection trip throughout eastern Iowa in 2012. Funding was supported by the USDA Plant Exploration Program, which is coordinated by the Plant Exchange Office, National Germplasm Resources Laboratory, USDA-ARS, Beltsville, Maryland. Participants included:

- **Jeffrey D. Carstens**, Agricultural Science Research Technician, USDA-ARS Plant Introduction Station, Ames, IA (left)
- **Andrew P. Schmitz**, Director of Horticulture, Brenton Arboretum, Dallas Center, IA (right)



## Objectives:

- Identify and collect *Cornus rugosa* populations and potentially other NPGS genera in Iowa during 2012.
- Store and backup collections at the USDA-ARS Plant Introduction Station and the National Center for Genetic Resources Preservation in Fort Collins, Colorado, respectively
- Ultimately conserve and preserve genetic diversity of *Cornus rugosa* germplasm

# Collection Trip Plan

## **Thursday, 12 July 2012**

Ledges State Park – Boone County, IA

Dolliver Memorial State Park – Webster County, IA

## **Friday, 13 July 2012**

Pilot Knob State Park – Hancock County, IA

Bluffton Fir State Preserve – Winneshiek County, IA

## **Saturday, 14 July 2012**

Echo Valley State Park – Fayette County, IA

Kepler Palisades State Park – Cedar County, IA

## **Sunday, 15 July 2012**

Cedar Valley County Park – Cedar County, IA

Clemmons Creek Wildlife Management Area – Washington County, IA

Brinton Timbers State Preserve – Washington County, IA

## **Monday, 16 July 2012**

Cedar Bluffs State Preserve – Mahaska County, IA

# Collection Trip Daily Log

## Thursday, 12 July 2012

Thorough exploration was executed along both Davis and Peas Creek throughout Ledges State Park. Only three patches (located at 41.99646, -93.88380; 41.99712, -93.88200, and 41.99377, -93.88624) of *Cornus rugosa* were found along Peas Creek on very steep, north-facing slopes. Unfortunately specimens were not bearing any fruits. Patches were separated by a minimum of 180 yards (Fig. 1). Considering *C. rugosa* is self-incompatible, the extremely low population size at this site, lack of appropriate habitat, and the substantial distance between individual plants, fruit production is unlikely. After announcing my concerns to the Iowa Department of Natural Resources State Botanist John Pearson, I was granted permission to harvest a single root sucker from each patch for long-term preservation. Specimens at this site seem to be restricted to very steep slopes, most likely to escape foraging by deer. The far southwest patch looked very healthy mostly likely a response from a felled *Tilia americana*. This patch may persist for a number of years. The other two plantings are under heavy competition (*Acer saccharum* and *Ostrya virginiana*) and would not expect them to persist much longer.



Fig. 1 Locations of *C. rugosa* at Ledges State Park (Boone County, Iowa).

# Collection Trip Daily Log

## Thursday, 12 July 2012 (cont'd)

Exploration at Dolliver Memorial State Park exhibited a similar situation as noted in Ledges State Park. Again, no fruit production was noted, but a total of four patches were found (Fig. 2). The closest two patches were approximately 230 yards apart. Flowering only occurred on one specimen (2 cymes noted), which is not surprising considering the densely shaded conditions that all plants were growing under. All specimens were growing on very steep, north-facing slopes. Common associates included *Cornus alternifolia*, *Amelanchier laevis*, *Carpinus caroliniana*, *Diervilla lonicera*, and *Corylus americana*. A few *Prunus pensylvanica* and one, very large *Dirca palustris* were also observed. It was also fun to run across two, very small goat prairies supporting a number of *Echinacea pallida*, *Dalea purpurea*, and *Amorpha canescens*. A very small number of sweet clover plants were starting to invade this area. We also received permission to remove a single sucker from three of the four patches at this site for long-term preservation.



Fig. 2 Locations of *C. rugosa* at Dolliver Memorial State Park (Webster County, Iowa).

# Collection Trip Daily Log

**Friday, 13 July 2012**

In the mid-1980's, William C. Watson completed a floristic survey of Pilot Knob State Park documenting the presence of *C. rugosa* in "mesic upland forest". This survey was published in The Journal of the Iowa Academy of Science 96(1): 06-13, 1989, The Vascular Flora of Pilot Knob State Preserve. Immediately upon arrival, it seemed logical to conclude/assume that the habitat at this site was no longer appropriate for *C. rugosa*. The abundance of *Rhamnus cathartica* was overwhelming and most likely outcompeting a number of other native species. Unfortunately, detailed collection information was not obtained until after the trip. Trying to believe that *C. rugosa* was once documented at this site after physically visiting the site prompted further investigation to determine exactly where the species was most recently collected. The herbarium specimen held at the Northern Iowa University Herbarium vouchered by W. Watson indicated *C. rugosa* at NE 1/4 Sec. 4 T97N R23W - East of Pilot Knob Lake (area circled in red – Fig. 3). The areas circled in black (Fig. 3) were explored, focusing on north and east-facing slopes. An additional trip back to explore areas east of Pilot Knob Lake may be productive in finding *C. rugosa* specimen(s).

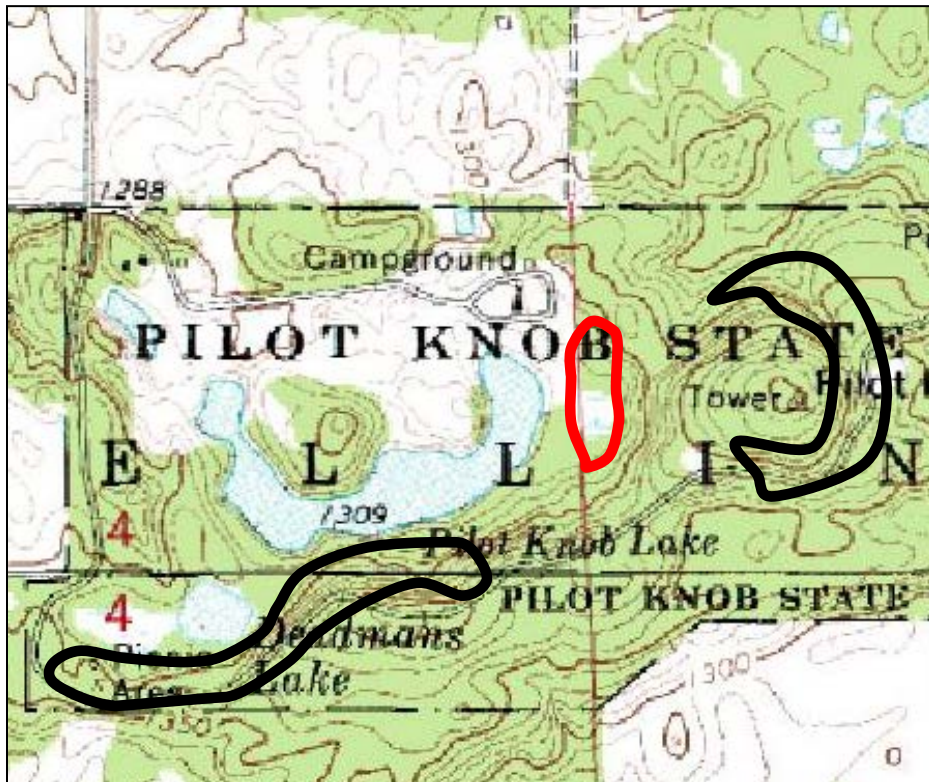


Fig. 3 Areas explored (circled in black) and area documenting *C. rugosa* at Pilot Knob S.P.



# Collection Trip Daily Log

## Friday, 13 July 2012 (cont'd)

While driving to our next site, we noticed a nice population of *Staphylea trifolia* (vouchered), *Fraxinus nigra* (vouchered), and *Cornus alternifolia* (vouchered and harvested) along the roadside (King's Road) adjacent to the Turkey River Wildlife Management Area just south of Cresco, Iowa. This was an interesting site due to a number of *Fraxinus nigra* (typically a floodplain species) growing in close association with *Juniperus virginiana*. This would be a relatively easy site to collect *Fraxinus nigra* in the future. Additional interesting associates included *Quercus ellipsoidalis*. Our final site targeted was Bluffton Fir State Preserve near Bluffton, Iowa. Before arriving at the preserve, a couple plants were noted along W. Ravine Road and Chimney Rock Road and added to the sample harvested at Bluffton Fir State Preserve. This population based sample encompasses approximately a two mile stretch along the Upper Iowa River. Plant associates included *Diervilla lonicera*, *Viburnum opulus* var. *americanum*, *Cornus alternifolia*, *Pinus strobus*, and *Abies balsamea*. Fruiting plants were identified by using binoculars and then accessed via walking through the river making efficient use of our time (Figure 4).



Fig. 4 Bluffton Fir State Preserve (Winneshiek County, Iowa).

# Collection Trip Daily Log

## Saturday, 14 July 2012

After approximately four hours of exploration throughout Echo Valley State Park, a total of four specimens of *C. rugosa* were found. Fortunately, fruit production was present and a small sample was obtained from three specimens. Specimens were only found on steep rocky and/or gravelly soils (Fig. 5).



Fig. 5 Echo Valley State Park (Fayette County, Iowa).

*Lonicera reticulata* was infrequently noticed throughout this park as well as *Taxus canadensis*. This site would be an excellent site for sampling *Fraxinus nigra* (vouchered). Before leaving, a single plant of *Diervilla lonicera* was sampled. It will be interesting to determine if seeds are viable considering the timing of harvest was so early in the season.

The next site targeted was Kepler – Palisades State Park near Cedar Rapids, Iowa. It seemed like appropriate habitat for *C. rugosa* (extreme, north-facing slopes), but soil conditions seemed too dry (plant associates noted included *Ostrya virginiana*, *Juniperus virginiana*, *Amorpha canescens*, and *Pedicularis canadensis*). However, a small harvest from *Cornus alternifolia* was made nearby along with a voucher of *Cornus drummondii*. Before leaving, a very large population of *Staphylea trifolia* was vouchered along Marietta Quarry Road as a future population to sample.

# Collection Trip Daily Log

## Sunday, 15 July 2012

Pinicon Ridge County Park and Cedar Valley County Park also seemed like appropriate habitat for collecting *C. rugosa*. Both locations contained rocky, steep east-facing slopes. Time was spent focusing only on areas with appropriate aspect and sufficient light needed for fruit production. Both sites were experiencing drought conditions and the abundance of other woody plants creating dense shade was overwhelming. A number of woody invasives (e.g. *Rosa multiflora* and *Lonicera maackia*) and also other woody underbrush (e.g. *Rubus* sp. and *Ribes* sp.) made exploration difficult and slow. While exploring Cedar Valley County Park, a seed sample and voucher of *Carex grayi* was obtained. While traveling to our next site, it was easy to spot severe Japanese Beetle feeding on *Tilia cordata* (Fig. 6) from a considerable distance. 2012 was a remarkable year for the outbreak of this ornamental plant pest throughout Iowa.



Fig. 6 Japanese beetle feeding on *Tilia cordata* (highway planting).

Our next site at Clemmons Creek Wildlife Management Area was interesting as we walked through a floodplain forest dominated by *Aesculus glabra* (heavily fruiting) and also the occasional *Betula nigra*. A voucher of *Spiraea alba* was made and also a seed sample and voucher of *Carex grayi*. Additional exploration resulted in the collection of *Prunus serotina*. Unfortunately, no *C. rugosa* were found. A fair amount of north-facing slopes were found, but the grade was possibly not steep enough (allowed deer foraging) and shade from other woody plants was dense.

# Collection Trip Daily Log

## Sunday, 15 July 2012 (cont'd)

Since few collections were made for the day, we decided to continue on and start exploring Brinton Timbers southwest of Washington, Iowa. This area was of good to excellent quality with a few *Cornus alternifolia* noted on a north-facing slope and also a handful of *Fraxinus nigra* (vouchered) in the floodplains. This area contained a huge population of *Corylus americana* common to field edges and also a number of specimens fruiting under dense shade. Again, no *C. rugosa* were found.

## Monday, 16 July 2012

Our last site for the day was Cedar Bluffs State Preserve near Oskaloosa, Iowa. This site was an amazing site because of the extreme geological variation and numerous box canyons and hollows. There were numerous *Cornus alternifolia* throughout the area along with scattered specimens of *Amelanchier laevis* and *Viburnum rafenesquianum*. A few fruits of pagoda dogwood were sampled in order to fill a large gap (south central Iowa) in the current collection. Considering the number of hollows and box canyons (suitable for *C. rugosa*) that were explored in detail revealing no specimens, it is highly unlikely that this species still exists at this location. Shortly before finishing exploration, a nice, mature population (20-30 specimens) of *Gymnocladus dioicus* were noted.

# Trip Summary

Out of eleven sites targeted, only four sites resulted in the successful acquisition of *Cornus rugosa* germplasm. As one looks at the native range of *C. rugosa* found on page 2 of this report, the areas explored represent the extreme southwest range of this species. It would be expected to have greater success in finding and collecting *C. rugosa* germplasm further north and/or east.

In addition to acquiring four collections of *C. rugosa*, three collections of *C. alternifolia* were obtained representing gaps in the current collection. Two seed samples of *Carex grayi* and one seed sample each of *Prunus serotina* and *Diervilla lonicera* were also obtained.

This trip provided an excellent opportunity to identify and potentially collect *C. rugosa* growing on the edge and outside its native range. A number of these collections would represent disjunct populations. Commonalities of habitat (e.g. extremely steep north and/or east-facing slopes) and plant associates (e.g. *Cornus alternifolia*, *Amelanchier laevis*, *Diervilla lonicera*, and *Taxus canadensis*) were noted.

Harvesting of *C. rugosa* in Iowa typically occurs around the first week in August. It was key to execute this trip the second week of July as all specimens harvested were at or slightly past peak maturity. During the later part of April, Iowa experienced a relatively harsh, late freeze. For the sites we explored, fruit production was very limited possibly a response to the late freeze, but it is also possible that seed production is poor due to the lack of genetic diversity (small quantity of specimens found in nature). *Cornus* in general, are self-incompatible, so without good transfer of pollen from separate individual specimens, seed production is unlikely warranting additional focus on preserving *C. rugosa*, specifically in Iowa. In addition, deer browsing and competition from invasive species is most likely limiting the success and persistence of this species. Only one collection of *C. rugosa* represented a bulk seed sample from 9 specimens. All other collections were based on three plant samples. All of this information clearly exemplifies the rarity of this species in the areas we explored.

# Alphabetical List of Germplasm Collected

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<u>Taxonomy</u>	<u>Collection #</u>	<u>Locality</u>
Carex grayi	JDC/CG/2012/021/414	Cedar County, IA
Carex grayi	JDC/CG/2012/022/415	Washington County, IA
Cornus alternifolia	JDC/CA/2012/019/412	Linn County, IA
Cornus alternifolia	JDC/CA/2012/026/419	Mahaska County, IA
Cornus alternifolia	JDC/CA/2012/013/406	Howard County, IA
Cornus rugosa	JDC/CR/2012/005/398	Webster County, IA
Cornus rugosa	JDC/CR/2012/006/399	Boone County, IA
Cornus rugosa	JDC/CR/2012/014/407	Winneshiek County, IA
Cornus rugosa	JDC/CR/2012/017/410	Fayette County, IA
Diervilla lonicera	JDC/DL/2012/018/411	Fayette County, IA
Prunus serotina	JDC/PS/2012/024/417	Washington County, IA

# Alphabetical List of Vouchers Collected

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<u>Taxonomy</u>	<u>Collection #</u>	<u>Locality</u>
Carex grayi	JDC/CG/2012/021/414	Cedar County, IA
Carex grayi	JDC/CG/2012/022/415	Washington County, IA
Carex lupulina	not assigned	Hancock County, IA
Cornus alternifolia	JDC/CA/2012/019/412	Linn County, IA
Cornus alternifolia	JDC/CA/2012/026/419	Mahaska County, IA
Cornus alternifolia	JDC/CA/2012/013/406	Howard County, IA
Cornus drummondii	JDC/CD/2012/020/413	Linn County, IA
Cornus rugosa	JDC/CR/2012/005/398	Webster County, IA
Cornus rugosa	JDC/CR/2012/006/399	Boone County, IA
Cornus rugosa	JDC/CR/2012/014/407	Winneshiek County, IA
Cornus rugosa	JDC/CR/2012/017/410	Fayette County, IA
Diervilla lonicera	JDC/DL/2012/018/411	Fayette County, IA
Fraxinus nigra	JDC/FN/2012/010/403	Hancock County, IA
Fraxinus nigra	JDC/FN/2012/012/405	Howard County, IA
Fraxinus nigra	JDC/FN/2012/016/409	Fayette County, IA
Fraxinus nigra	JDC/FN/2012/025/418	Washington County, IA
Fraxinus nigra	JDC/FN/2012/027/420	Mahaska County, IA
Spiraea alba	JDC/SA/2012/023/416	Washington County, IA
Staphylea trifolia	JDC/ST/2012/011/404	Howard County, IA
Staphylea trifolia	not assigned	Linn County, IA
Viburnum americanum	JDC/VT/2012/015/408	Winneshiek County, IA