

2012 Collection Trip

Iowa, Illinois and Indiana

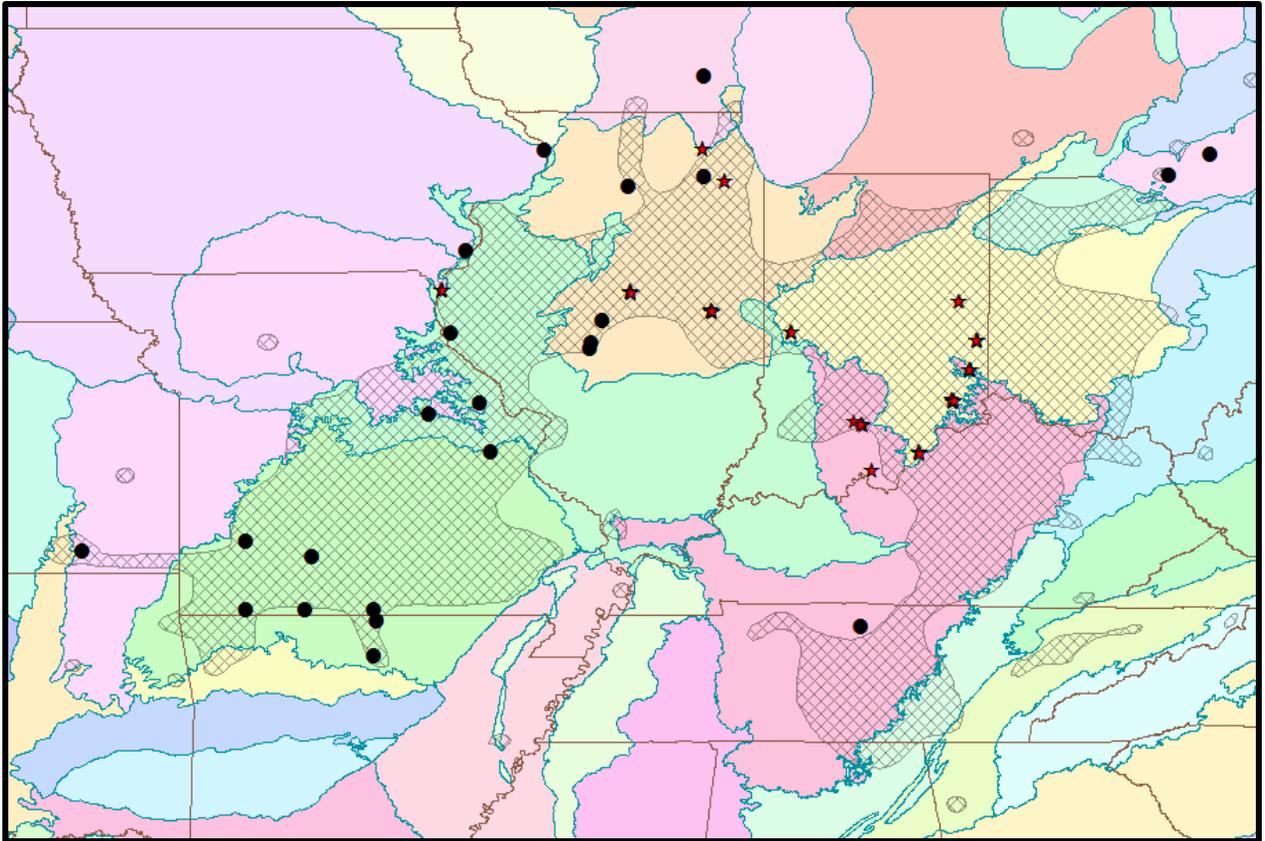


United States Department of Agriculture



July 20-27, 2012

NC7 *Fraxinus quadrangulata* Sites



● Past accessions

★ 2012 accessions

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Introduction

The USDA-ARS Plant Introduction Station (Ames, IA) completed a collection trip to Iowa, Illinois, and Indiana 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)
- **Jonathan D. Mahoney**, Biological Science Aide, USDA-ARS Plant Introduction Station, Ames, IA (right)



Objectives:

- Identify and collect *Fraxinus quadrangulata* populations and potentially other NPGS genera in Iowa, Illinois, and Indiana 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 *Fraxinus quadrangulata* germplasm

Collection Trip Plan

Friday, 20 July 2012

Malchow Mounds State Preserve – Des Moines County, IA

Highway 61 near Keokuk, Iowa – Lee County, IA

Harper-Rector Woods Preserve – Fulton County, IL

Saturday, 21 July 2012

Funks Grove – McLean County, IL

Trelease and Brownfield Woods – Champaign County, IL

Sunday, 22 July 2012

Turkey Run State Park – Parke County, IN

Salt Creek – Lawrence County, IN

Monday, 23 July 2012

Indian Creek – Harrison County, IN

Charlestown State Park – Clark County, IN

Tuesday, 24 July 2012

Verasilles State Park – Ripley County, IN

Lick Creek Summit Nature Preserve – Wayne County, IN

Wednesday, 25 July 2012

Davis-Purdue Forest – Randolph County, IN

Kokiwanee Nature Preserve – Wabash County, IN

Bock Nature Preserve – Kosciusko County, IN

Harrold Property – Whitley County, IN

Thursday, 26 July 2012

Bendix Woods Nature Preserve – St. Joseph County, IN

Waterfall Glen Forest Preserve – DuPage County, IL

Trout Park Forest Preserve – Kane County, IL

Friday, 27 July 2012

Starved Rock State Park – LaSalle County, IL

Collection Trip Daily Log

Friday, 20 July 2012

An early morning departure out of Ames, Iowa allowed time to search for blue ash at multiple locations. Our first site targeted was Malchow Mounds State Preserve in Des Moines County Iowa. This area did not reveal any *Fraxinus quadrangulata*, however nice specimens of *Quercus muhlenbergii* and *Gymnocladus dioicus* were noted. Information from Iowa's state botanist, John Pearson, indicated the presence of blue ash at this site. Although this site seems to contain feasible topographic features and plant associates common to blue ash, the abundance of blue ash is perhaps very low.

The second site located along highway 61 bridge near Keokuk, Iowa in Lee County resulted in the sampling of seven specimens. Samaras were mature and ready to harvest. Specimens were scattered throughout south and southwest-facing, very steep slopes (Fig. 1) and growing in close association with *Quercus muhlenbergii* and *Asimina triloba*.

The last site for the day, located at Harper-Rector Woods in Fulton County Illinois, was targeted in response to a floristic survey in 1998 that mentioned *F. quadrangulata* along the Spoon River Watershed. After exploring this area, no specimens of blue ash were found. It is possible that blue ash may be present, but the dense amount of understory and the presence of relatively deep soils would suggest the abundance of blue ash to be extremely low. It is also possible that this species may be more abundant either up or downstream. A mature population (15-20 specimens) of *Gymnocladus dioicus* was noted (40.49397, -90.3318). It was also interesting to run across a handful of *Sassafras albidum* seedlings growing along the banks of the Spoon River.



Fig. 1 Habitat along Twin Rivers Dr., Keokuk, Iowa.

Collection Trip Daily Log

Saturday, 21 July 2012

Funks Grove resulted in the successful harvest of 13 specimens, one of which is currently listed as the Illinois state champion (Fig. 2). This site is somewhat unique in comparison to typical blue ash sites as the topography is very flat, with relatively deep soils that would normally be considered moist (area currently under severe drought).

Some specimens were easy to harvest as they were open grown. Other specimens at Funks Grove were very old and mature, averaging 3-4 feet in diameter, towering well over 100 feet in height, and growing within a dense forest canopy. These specimens could be close to 300-400 years old. Due to the extreme height and age of these specimens, it was quite difficult to actually see if seeds were present. It was not uncommon for the lowest branch to be 60-80' from the ground. Therefore, three seed samples were collected from the ground (Fig. 3). These samples will be "flagged" in GRIN to indicate samples may include genetics from more than one mother tree, as all other samples only represent material from a single mother tree. Close plant associates included *Asimina triloba*, *Quercus muhlenbergii*, and *Allium tricoccum*.



Fig. 2 State champion *F. quadrangulata* - Funks Grove near Bloomington, Illinois.



Fig. 3 Sampling from the ground.

Collection Trip Daily Log

Saturday, 21 July 2012 (cont'd)

We did observe numerous seeds on the ground that had been opened and the embryo removed/eaten (Fig. 4). It is unknown as to what animal(s) might be feeding on blue ash seeds. We were able to distinguish and separate out seeds as well as conduct a simple “firmness” test to ensure that high quality, viable seeds were being collected from the ground. Thankfully these tactics were only employed for three trees, while all other collections were obtained by clipping fruiting clusters via pole pruners or the pocket chainsaw.

Our last site for the day at Trelease and Brownfield Woods in Champaign County Illinois contained a number of fruiting specimens also on relatively deep, moist soils and flat topography. There did not seem to be any close plant associates with *F. quadrangulata* at this site. Specimens were scattered and infrequent.



Fig. 4 Example of a consumed seed.

Collection Trip Daily Log

Sunday, 22 July 2012

Turkey Run State Park (Parke County) was a neat site considering its floral diversity. We were only able to locate five specimens to sample. Finding additional specimens would take substantial time. Specimens were widely scattered throughout the park rather than found as small, localized populations. It was fun to find the occasional *Dirca palustris*, numerous *Hydrangea arborescens*, and a few *Tsuga canadensis*.

Areas around Salt Creek (around Bedford, Indiana - Lawrence County) were not extremely productive. One site adjacent to Stumphole Bridge originally identified as a good site for blue ash via local district forester was recently logged, leaving no reproductive ash specimens to harvest. Additional time was focused around Devil's Backbone (southeast of Bedford) where four specimens were sampled on both south and north facing slopes.

Approximately 30 specimens were found, but seed producing trees were impossible to find. A small population of *Gymnocladus dioicus* (in fruit) was identified at the bottom (south side) of Devil's Backbone.

Collection Trip Daily Log

Monday, 23 July 2012

A local forester identified areas near and around Harrison-Crawford forest that contained blue ash. Unfortunately, majority of the specimens found did not have seeds, but small quantities of seeds were obtained from three specimens. Seeds at this site seemed old and weathered and easily shattered if slightly disturbed (Fig.5).



Fig. 5 Seed quality at Harrison-Crawford Forest (left) and quality of seeds commonly found throughout trip (right).

Areas along highway 62 near the bridge of highway 462 (steep south-facing slopes) seemed to contain the greatest concentration of blue ash. This area would be a good location to resample *F. quadrangulata* in the future and also to potentially target a collection of *Cornus florida*.

The next site at Charlestown State Park was a great place to harvest blue ash as a number of open-grown trees were being managed on a glade near the front entrance. An additional localized population was noted just off trailhead #1. Both of these areas were identified as good locations for blue ash by Dick Maxwell (Indiana), William Thomas (Indiana), and David Taylor (Indiana University Southeast). Seeds were abundant and quality was excellent. *Blephilia ciliata* and *Quercus muhlenbergii* were abundant and close associates at this site. A total of 8 specimens were sampled.

Collection Trip Daily Log

Tuesday, 24 July 2012

Exploration at Versailles State Park resulted in sampling 12 trees, most of which were located on fairly steep slopes near the southwest portion of the park. Close associates included *Acer saccharum*, *Quercus muhlenbergii*, and *Aesculus glabra*. Majority of the trees were well over 100 feet in height.

While driving to Lick Creek Summit Preserve a nice population of blue ash was noticed along highway 52 near Cummins Road just west of Brookville, IN (Fig. 6). It took a relatively short period of time to obtain 8 samples (roadside).



Fig. 6 Large population of blue ash in this area – Brookville, IN (bottom-right corner). Specimens seemed somewhat restricted to steep slopes.

Our last site at Lick Creek Summit State Nature Preserve was excellent and resulted in the sampling of 7 trees. Specimens were also sampled on private property (permission granted) owned by Dan Arndt and David Jetmore. It was a nice surprise to find a large population of *Viburnum molle* (vouchered), which were persisting and fruiting under dense shade.

Collection Trip Daily Log

Wednesday, 25 July 2012

Our first site at Davis-Purdue Forest was targeted due to an old herbarium specimen. Surprisingly, a total of four specimens of blue ash were found, two had seed and therefore harvested. It was interesting to note a number of *Fraxinus nigra* (vouchered) scattered throughout the area. Only one *F. nigra* specimen was large enough to be potentially reproductive.

The Kokiwanee Nature Preserve was an excellent site for finding large, mature blue ash, however all specimens were dead or dying (Fig. 7). It was easy to identify the EAB “D” shaped holes, characteristic of Buprestid beetles, which covered the bark of these large trees (Fig. 8). A number of small seedlings were scattered along the ridges and slopes (southwest-facing). Hopefully these small specimens may escape initial attack via EAB. At Bock Nature Preserve, we noted approximately 15 (most likely reproductive) blue ash that looked healthy, but were not bearing seeds. This site may be somewhat isolated from the Emerald Ash Borer (EAB), for the next couple of years, presenting the opportunity to obtain germplasm in the near future. Obtaining a collection from the northeastern portion of Indiana would fill a huge gap in the current collection maintained at NCRPIS. Thanks to the ACRES property staff for identifying locations of blue ash at Bock and Kokiwanee Preserves.

The Harrold Property, maintained by Purdue University near Etna, IN, also has a number of large blue ash and also a large number of mid-sized blue ash (6” d.b.h.). Unfortunately, no seed bearing trees were found. A small portion of trees were dying most likely due to EAB. It was interesting to note numerous, mid-sized (10-20’), blue ash specimens out competing other woody species.

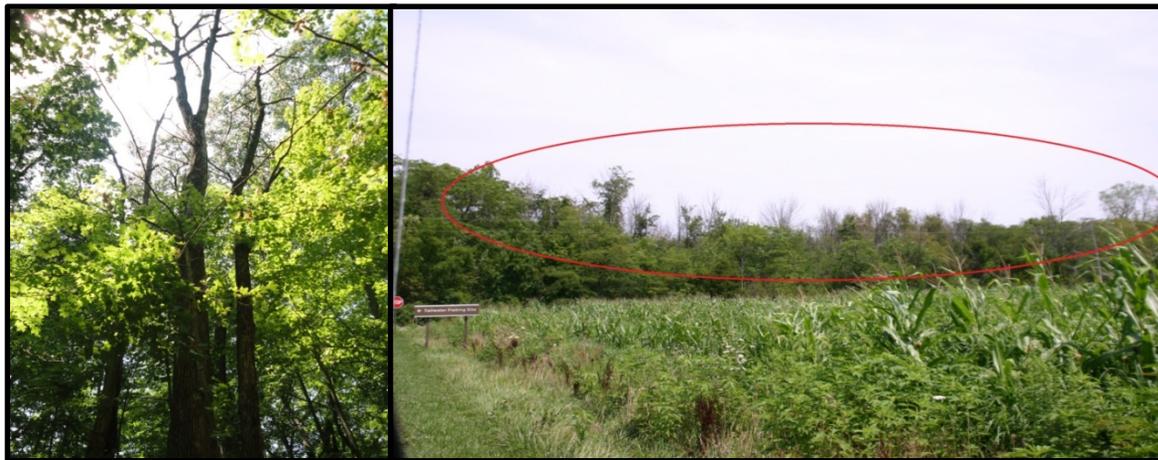


Fig. 7 Emerald Ash Borer damage at Kokiwanee Preserve (Wabash, IN).

Collection Trip Daily Log

Thursday, 26 July 2012

Bendix Woods was targeted due to an old herbarium specimen. Unfortunately, this site did not seem “typical” blue ash habitat. No specimens were noted.

Waterfall Glen Forest resulted in the harvesting of 9 specimens on very shallow soils. Specimens were growing amongst a thick understory of *Lonicera maackia*. Blue ash were very common and dominant in two areas (localized) that were identified by Scott Kobal (Forest Preserve District of DuPage County).



Fig. 8 “D”-Shaped EAB exit holes.

Our last site for the day was Trout Park Nature Preserve near Elgin, IL. This site was very interesting as it contained *F. quadrangulata*, *F. nigra*, *F. pennsylvanica*, and *F. americana* all growing together. We had to take a few seconds to verify that we were not harvesting *F. nigra*. The *F. nigra* were essentially all dead, the *F. americana* seemed to be dying, and the *F. quadrangulata* and *F. pennsylvanica* seemed unaffected. A total of 7 trees were harvested. It was cool to see a number of large specimens of *Cornus alternifolia* and also a couple specimens of *Viburnum opulus* var. *americanum*. It was not realized until later that only the southern half of this park was explored/sampled. Additional exploration may reveal additional specimens on the northern half of this preserve.

Friday, 27 July 2012

On our return to Ames, Iowa, we stopped at Starved Cave State Park (LaSalle County, Illinois) where prior reconnaissance had documented a small number of blue ash specimens. Upon inspection, majority of the mature blue ash specimens were dead and only a number of small seedlings were noted on the forest floor. We decided to voucher *Gaylussicia baccata* (black huckleberry) at this site.

Trip Summary

In total, we obtained seeds from 95 *Fraxinus quadrangulata* trees representing 14 sites (17 sites originally targeted). Only one site resulted in the sampling of only one tree. Seed production throughout Illinois and central Indiana was excellent. Majority of the blue ash trees in northeastern Indiana were dead or dying and a number of blue ash trees in southern Indiana did not have seeds.

This collection trip provided an opportunity to obtain *Fraxinus quadrangulata* germplasm from numerous populations throughout its native range. We were able to gain a sense for habitat preferences (steep slopes, shale/limestone substrate, seeps, etc.), commonalities in plant associates (*Asimina triloba*, *Aesculus glabra*, and *Quercus muhlenbergii*) across collection sites, and the overall frequency (very low) of this species in nature. Out of 14 sites that were sampled, three sites were from relatively flat terrain, including: Trelease/Brownfield Woods, Funks Grove, and Davis-Purdue Forest. All other sites sampled, were comprised of steep, gravelly slopes which typically faced south or southeast. Majority of the specimens that were sampled were found on very shallow soils (Fig. 9). One would expect this species to be very drought tolerant, however, the adaptability to compacted/anaerobic soils is not well known.

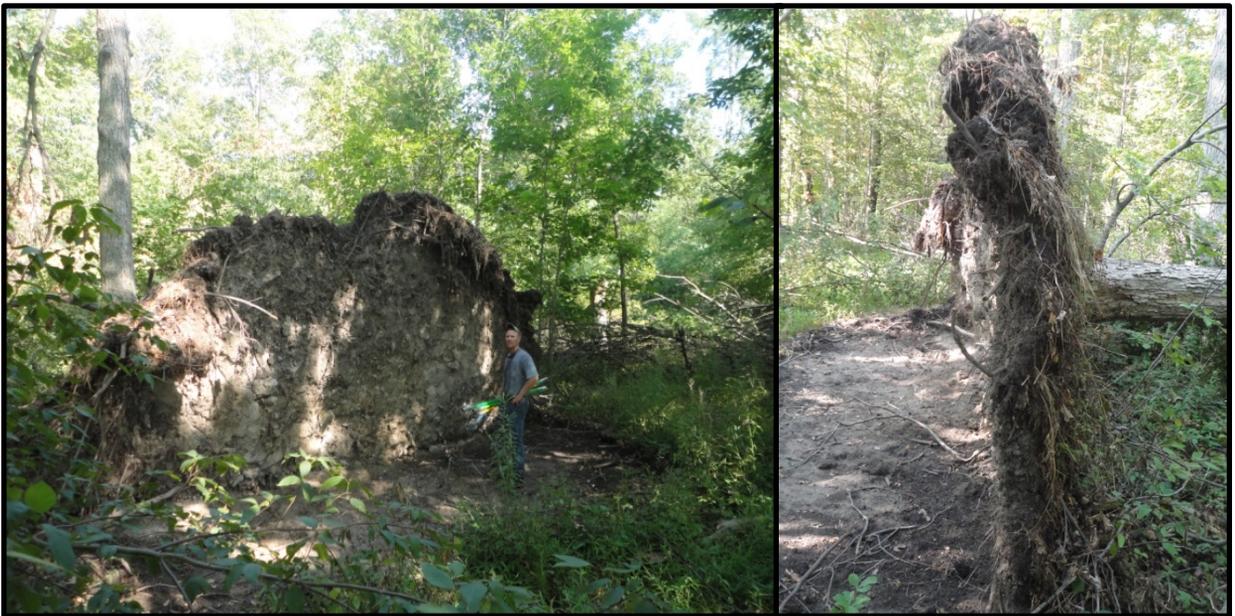


Fig. 9 Uprooted tree in shallow soils. To the right – same tree –side profile.

Trip Summary

Future blue ash collections should target populations at the Harrold Property and Bock Nature Preserve. These locations support a fair number of currently alive, mature specimens that under a normal seed production year could result in a substantial harvest. It is expected that the window of opportunity to obtain seeds from these sites is most likely limited within the next two years as EAB is nearby. Additional samples could also be potentially obtained from the Charles C. Deam Nature Preserve (Harrison-Crawford State Forest), but significant blocks of time would be needed to locate specimens as this area is extremely difficult to access.

Throughout the course of this eight day trip we encountered great obstacles to obtain *Fraxinus quadrangulata* seed. Due to the fact that *F. quadrangulata* prefers shallow, limestone soils we typically worked on considerably steep slopes, completely covered with *Lonicera maackia*. We were fortunate enough to have a RopeBoss® by SHERRILL tree® (Fig. 10) which helped prevent tangling of the throw line. We have continued adopting new tactics constantly improving our efficiency, while still obtaining quality seed in sufficient quantities.



Fig. 10 Utilization of the RopeBoss® to prevent tangling.

It was suggested in the 2010 NCRPIS blue ash trip report to target blue ash harvesting in mid-August/early-September. However, due to the extreme drought and early, warm, spring temperatures in 2012, seeds were ready to harvest the first week in July. Only two sites (Keokuk, IA and Corydon, IN) that were sampled, seemed to have “shattering seed clusters”.

Acknowledgements

I would like to thank a number of individuals for their help and assistance in pinpointing locations for *Fraxinus quadrangulata*. Their expertise and knowledge of local flora helped make this collection trip successful.

Donald Carlson – Purdue University

David Taylor – Indiana University Southeast

William Thomas – Indiana University Southeast

Dick Maxwell – Indiana University Southeast

Robert Karrfalt – US Forest Service

Scott Kobal – Forest Preserve District of DuPage County

Jason Kissel – ACRES Land Trust

Steve Buck – University of Illinois

Angela Funk – Funks Grove

Randall Carriger – Funks Grove

John Pearson – Iowa Department of Natural Resources

Rick Phillippe – Illinois Natural History Survey

Ed Hedborn – Morton Arboretum

Michael Hoff – Whitewater Valley Land Trust

Janet Eger – Indiana Department of Natural Resources

Jayson Waterman – Indiana Department of Natural Resources

Wayne Werne - Harrison-Crawford Forest Forester

Paublo Jourdan – Ornamental Plant Germplasm Center

Alphabetical List of Germplasm Collected

<u>Taxonomy</u>	<u>Collection #</u>	<u>Locality</u>
Fraxinus quadrangulata	JDC/FQ/2012/028/421	Lee County, IA
Fraxinus quadrangulata	JDC/FQ/2012/029/422	McLean County, IL
Fraxinus quadrangulata	JDC/FQ/2012/030/423	Champaign County, IL
Fraxinus quadrangulata	JDC/FQ/2012/031/424	Parke County, IL
Fraxinus quadrangulata	JDC/FQ/2012/032/425	Lawrence County, IN
Fraxinus quadrangulata	JDC/FQ/2012/033/426	Lawrence County, IN
Fraxinus quadrangulata	JDC/FQ/2012/034/427	Harrison County, IN
Fraxinus quadrangulata	JDC/FQ/2012/035/428	Clark County, IN
Fraxinus quadrangulata	JDC/FQ/2012/036/429	Ripley County, IN
Fraxinus quadrangulata	JDC/FQ/2012/037/430	Franklin County, IN
Fraxinus quadrangulata	JDC/FQ/2012/038/431	Wayne County, IN
Fraxinus quadrangulata	JDC/FQ/2012/039/432	Randolph County, IN
Fraxinus quadrangulata	JDC/FQ/2012/041/434	DuPage County, IL
Fraxinus quadrangulata	JDC/FQ/2012/042/435	Kane County, IL

Alphabetical List of Vouchers Collected

<u>Taxonomy</u>	<u>Collection #</u>	<u>Locality</u>
Fraxinus nigra	JDC/FN/2012/040/433	Randolph County, IN
Fraxinus quadrangulata	JDC/FQ/2012/028/421	Lee County, IA
Fraxinus quadrangulata	JDC/FQ/2012/029/422	McLean County, IL
Fraxinus quadrangulata	JDC/FQ/2012/030/423	Champaign County, IL
Fraxinus quadrangulata	JDC/FQ/2012/031/424	Parke County, IN
Fraxinus quadrangulata	JDC/FQ/2012/032/425	Lawrence County, IN
Fraxinus quadrangulata	JDC/FQ/2012/034/427	Harrison County, IN
Fraxinus quadrangulata	JDC/FQ/2012/035/428	Clark County, IN
Fraxinus quadrangulata	JDC/FQ/2012/036/429	Ripley County, IN
Fraxinus quadrangulata	JDC/FQ/2012/037/430	Franklin County, IN
Fraxinus quadrangulata	JDC/FQ/2012/038/431	Wayne County, IN
Fraxinus quadrangulata	JDC/FQ/2012/039/432	Randolph County, IN
Fraxinus quadrangulata	JDC/FQ/2012/041/434	DuPage County, IL
Fraxinus quadrangulata	JDC/FQ/2012/042/435	Kane County, IL
Gaylussacia baccata	JDC/GB/2012/044/437	Lasalle County, IL
Viburnum molle	JDC/VM/2012/043/436	Wayne County, IN

Herbarium specimens were deposited at the National Arboretum, Indiana University Southeast, Morton Arboretum, and the Ada Hayden Herbarium.