

# **Plant Collecting Expedition for Berry Crop Species through Southeastern and Midwestern United States June and July 2007**



## **Glassy Mountain, South Carolina**

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# **Plant Collecting Expedition for Berry Crops through the Southeastern and Midwestern United States, June and July 2007**

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We greatly appreciate Michael Dossett for the time and effort he made in researching plant locations and making contacts for both parts of this expedition.

## Executive Summary



Black raspberries, *R. occidentalis* from Nebraska National Forest southwest of Chadron.

This collecting trip has two parts. The first occurred from 31 May through 9 June 2007. On that trip Kim Hummer and Michael Dossett collected temperate berry, nut and specialty crop genetic resources through Southeastern United States. They traveled 2015 miles through NC, SC, GA, AL, and MS. and collected 69 total samples of nine genera and 28 taxa (species and subspecies). On part two of the collecting trip, which occurred from 7 to 14 July 2007, Chad Finn and Michael Dossett collected temperate small fruits and specialty crop genetic resources across the Great Plains. They traveled 2585 miles through five states (MO, KS, NE, SD, and MN) and collected 57 total samples of eight genera and 16 taxa. The primary target species on both trips was black raspberries (*Rubus occidentalis* L). Forty-four accessions of that species were collected. A second goal was accomplished by obtaining a sample of the rare hairy blueberry (*Vaccinium hirsutum* Buckley) from the mountains of northern Georgia. Besides the small fruit genera, *Fragaria*, *Ribes*, *Rubus*, and *Vaccinium*, *Amelanchier*, *Asimina*, *Corylus*, *Humulus*, and *Sambucus* were obtained. A hard freeze occurred in the southeastern and Midwestern states on in early April, prior to the collecting trip. Tips of many shrubs in the states visited showed dieback due to freeze injury, however, the plants were vigorously recovering by the time of the trips. Wild black raspberries were not found in North Carolina, but those in the northern mountains of South Carolina and Georgia had sufficient berries for collection in most localities. Samples of black raspberries were obtained only from northeastern Alabama, not at locations further south and west. The black raspberries were fairly easy to find in the riparian habitats of the Great Plains, although the timing of the trip was toward the late part of the season especially in Kansas and southern Nebraska. Most black raspberries were ripe and in some cases only past-ripe fruit remained. During the trip 51 total voucher samples were collected and prepared. Samples were deposited to the National Arboretum Herbarium. Duplicates were deposited in Oregon State University Herbarium, and the herbarium at the University of North Carolina, Chapel Hill.

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## Part I – Southeastern United States

31 May through 9 June 2007

### Participants:

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**Hardwood forest near Stumphouse Mountain, South Carolina**

### **Summary**

This expedition occurred from 31 May through 9 June 2007. On this trip Kim Hummer and Michael Dossett collected temperate small fruit, nut and specialty crop genetic resources through the Southeastern United States. They traveled 2015 miles through 5 states (NC, SC, GA, AL, MS) and collected 69 total samples of 9 genera and 28 taxa (species and subspecies) (Appendix Table 1). The primary target species was black raspberries (*Rubus occidentalis*). Fifteen samples of this species were collected locations in South Carolina, Georgia, and Alabama. This species was associated with limestone outcroppings and was found only in recently disturbed areas. It was found on steep slopes near the road or near paths where sunlight could beam down through the hardwood (mostly tulip tree, oak, and hickory with some pine) forests. Unfortunately this species occurred less frequently than expected. It was not found in the North Carolina or South Carolina piedmont localities of previously gathered living or herbarium specimens. The species was found in the northwestern mountains of South Carolina and was frequent in the mountains of Northern Georgia. In Alabama, it was only found in the Northeastern part of the state, not further south or west. Some of the diversity observed in this species included differences in drupelet hairiness, thorniness, how easily the fruit released from the receptacle, and ripening time. Five other *Rubus* species were collected. Eight species of blueberries were collected, including a rare “hairy blueberry” (*Vaccinium hirsutum*) and the tree blueberry (*V.*

*arboreum*). These two species were in full flower while the other blueberries had past bloom and had green, unripe to ripe fruit. Three taxa of native strawberries were collected, including two subspecies of *Fragaria virginiana* and one *F. vesca*. Samples of the dwarf pawpaw, *Asimina parvifolia*, the hazelnut, *Corylus americana*, and a relative of the strawberry introduced from Asia, *Duchesnea indica*, were also obtained.

### **Travelog May-June 2007**

#### Thursday 31 May 2007

Kim Hummer flew down from Beltsville, Maryland, vicinity and met Michael Dossett at the airport in Raleigh, North Carolina, at about 9:30 PM. A car was rented for the trip. Lodging was at Hampton Inn, Cary, NC.

#### Friday 1 June 2007

The team drove to University of North Carolina at Chapel Hill Botany Department, where they met :

Dr. Carol Ann McCormick, the curator for the Herbarium  
University of North Carolina Herbarium Phone: 919.962.6931  
North Carolina Botanical Garden Fax: 919.962.6930  
CB#3280 Coker Hall  
University of North Carolina Email: [mccormick@unc.edu](mailto:mccormick@unc.edu)  
Chapel Hill, NC 27599-3280

Where they borrowed a plant press for voucher specimens and looked up locality data for target species *Rubus occidentalis* and *Vaccinium hirsutum*

They drove to Duke Forest on State Road (SR) 1730 also known as Whitfield Road and collected HDF-001 *Rubus argutus* along the edge of the road. Michael Dossett views the floricanes of this first sample.



They drove to Johnston Mill Nature Preserve vicinity and collected HDF-002, *Duchesnea indica*, an introduced Asian species that has naturalized in the eastern US.

They drove near Zebulon, North Carolina, in Wake County and collected HDF-003 *Vaccinium corymbosum* tetraploid along a sewer right-of-way off Worthington Road.

They drove to Croatan National Forest near Pollocksville, North Carolina, off Route 17 on SR1004, Island Creek Road, along the edge of the road where they collected HDF 004 *Fragaria virginiana* subsp *virginiana*, and HDF-005 *Rubus trivialis*.



*Fragaria virginiana* subsp. *virginiana*



*Rubus trivialis*, reddish leaves and stems. Typical of this species in North Carolina.

This prostrate plant had very red stems, leaves and many bristles on the canes. It almost looked like *R. phoenocolasius*. Dr. Jim Ballington mentioned that *R. trivialis* of North Carolina commonly has red pigments in stems, bristles and leaves. They drove south to Wilmington, North Carolina, and with lodging at the Sleep Inn.

Saturday 2 June 2007

Kim and Michael met up with a group of blueberry breeders who were being hosted by Dr. James Ballington (contact information). He took the group to the North Carolina State University Experiment Station at Ideal Farm, Castle Haynes, North Carolina



At the farm they collected samples HDF-006 through HDF-014. In a drainage ditch on the Ideal farm there were three examples of *Rubus* – a *Rubus trivialis* (Left in photos), *Rubus cuneifolius* (Right in photos above) and a *Rubus cuneifolius* that had introgressed with *trivialis*. (Middle in photos above).

The introgressed sample had erect canes like the *R. cuneifolius*, but they were red stemmed like the *R. trivialis* and the leaves were shaped like the *trivialis*. The introgressed leaves did not have as much tomentum as did the *R. cuneifolius* leaves. The introgressed fruits were

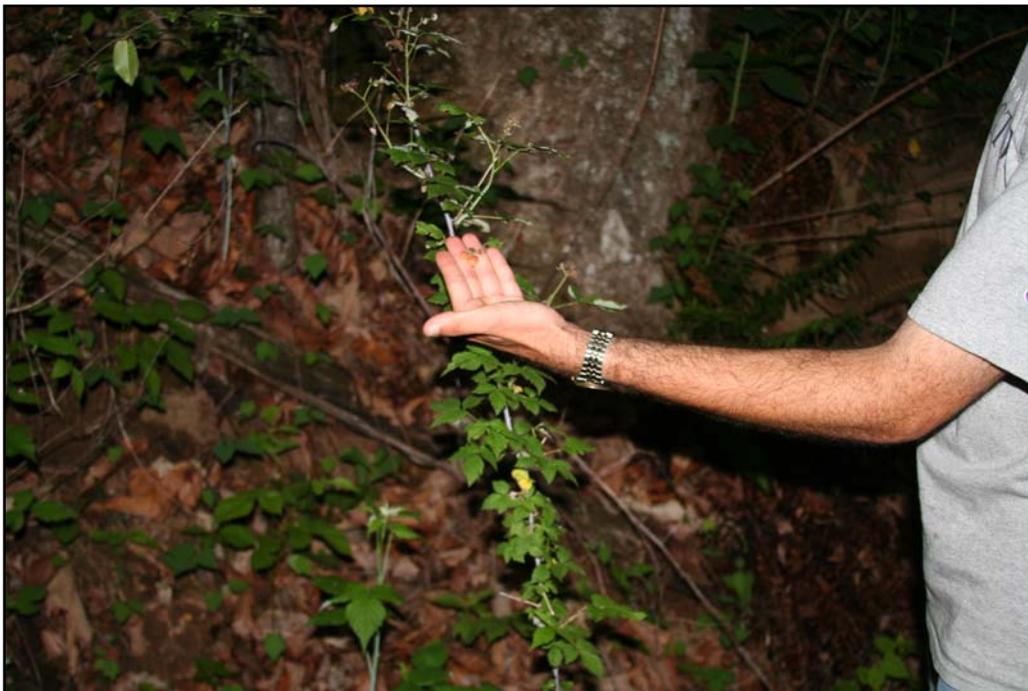
ripening at the time that the *R. trivialis* were ripening but the hybrid fruits were larger than the parental *R. trivialis*. *R. cuneifolius* was not collected because no fruits were present.

Sunday 3 June 2007

Kim and Michael drove from Wilmington, North Carolina, through Lumberton, North Carolina, Little Rock, South Carolina. They collected *R. argutus* 1 m NW of Lumberton off US Rt. 301 and I-95. They checked for *Rubus occidentalis* along the way with no luck. Finally they reached Glassy Mountain, S. C. towards the end of the evening. On the map a housing development is described with roads up the mountain.



They drove up Glassy Mountain Road, County Road 118, where it became un-navigable and parked at a locked gate. At that location they walked up about 1 mile and walked down the last road to the right before Road 118 was blocked off. There they collected their first observation of *Rubus occidentalis* although night was setting in.



*Rubus occidentalis*, L. florivane at Glassy Mountain, South Carolina, June 4, 2007.

They finished up at Traveler's Rest, South Carolina for lodging at Hampton Inn.

Monday 4 June 2007

In the morning they collected *Rubus flagellaris* at a lot next to the Hampton Inn (Greenville County). They returned to Glassy Mountain for additional collecting. They collected HDF-019 *R. occidentalis* from the side of the Glassy Mountain Road (County Road 118). This

black raspberry had visual symptoms of virus infection. They also collected *Rubus flagellaris*, and *Vaccinium stamineum* and *V. pallidum* from Glassy Mountain. A sample of *Epigaea repens* (trailing arbutus) was collected from that location as well. Highway 11 was closed for a stretch due to a tanker accident.



They obtained HDF-024 *Fragaria virginiana* from SR 178 about 5 miles north of Highway 11. Then drove on to Stumphouse Mountain near Walhalla, South Carolina, in Oconee County, off Highway SR 178, Moorefield Memorial Highway, and collected near the tunnels. *Vaccinium pallidum*, *V. stamineum*, *Amelanchier arborea* (HDF-027), and *Fragaria vesca* subsp. *americana* (HDF-028). They then drove to Rich Mountain, South Carolina. On that mountain they found HDF-029 *R.*

*occidentalis* and collected from several locations near the edge of the road. They drove to Toccoa, Georgia for lodging.

#### Tuesday 5 June 2007

Kim and Michael drove to Clayton, Georgia, and drove along War Woman Road. They collected *Rubus occidentalis* and HDF-033 *Fragaria virginiana* subsp. *virginiana* near William Bartram Trail at the crossing of War Woman Road (near CCC Camp F-6). They drove as far as the intersection of the junction with Henry Page Road, and collected additional samples of *Rubus occidentalis*. They drove Highway 76, westward from Clayton and collected *Rubus occidentalis*. They drove to Hutson Road in Union County along Highway 19/129 in Union County, south of Blairesville and collected HDF-036 *Rubus occidentalis* at mile marker 9. They drove to Blue Ridge Mt Road and Forest Service Road 42 and collected HDF-037 *Corylus americana*. They collected HDF-039 *R. occidentalis* plants but no fruit was ripe at this elevation (2,956'). They drove along FS 42 and collected 1 mile before Hawk Mountain Road and collected HDF-40 *Rubus allegheniensis*. They drove down FS 58, Winding Stair Gap Road and collected near Chester Creek near Winding Stair Gap.

They found HDF-041, *Vaccinium hirsutum*, *F. virginiana* subsp. *virginiana*, *F. vesca* subsp. *americana*, *V. stamineum*, and HDF-045 *R. hispidus* at this location. *Vaccinium hirsutum*, the hairy blueberry, has pubescent fruits, flowers, pedicels, leaves, and petioles. This species is late blooming and was in flower when the site was visited. Kim is pictured holding a branch of *V. hirsutum*. This plant is low in stature because the highway crew had mowed the vegetation near the roadway. The plants out of the mowing zone in the woodland edge grew to 2.5 m tall.



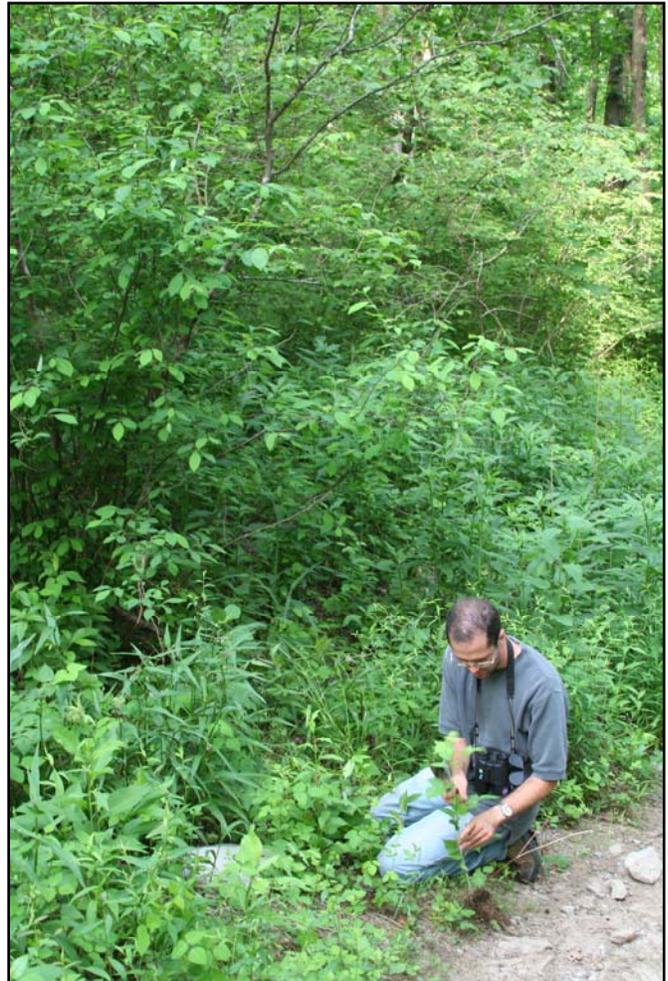


HDF- 41 *Vaccinium hirsutum* at Winding Stair Gap Road near Chester Creek, Georgia.

They drove to Dahlonega, Georgia, for lodging

Wednesday 6 June 2007

They drove west of Dahlonega along Route 52, Dawson County, Georgia, and collected HDF -046 *Rubus occidentalis*. They drove to Amicalola Falls, Georgia, and collected glaucous and pubescent forms of *V. stamineum* as well as HDF-049 *V. pallidum* above the falls on the Appalachian Trail. They drove on to Jasper, Georgia, and collected HDF-050 *Rubus occidentalis* on Highway 136 east of Jasper. They drove into Alabama and collected HDF 052 *V. arboreum* and HDF -053 *Amelanchier arborea* near Mentone, Alabama, on State Road 117, 0.9 miles west of GA state line in DeKalb County. They drove on to Gadsden, Alabama, for lodging.



Thursday 7 June 2007  
The drove south on 431 to Anniston, Alabama to meet  
Dr. Dan Spalding  
Curator of Collections  
800 Museum Drive  
PO Box 1587  
Anniston, Alabama 36202-1587  
Phone 256.237.6766  
Fax 256.237.6776  
dspaulding@annistonmuseum.org



They discussed collecting localities in Alabama with Dan, who curates the Museum of Natural History. Dan led Kim and Michael on a tour of the Museum woodland paths and described the plant materials present. They collected HDF-054 *Asimina parvifolia*, HDF-055 *Vaccinium arboreum*, and HDF-056 *Vaccinium corymbosum*. Dan gave them collection locality information for *Rubus occidentalis* in Alabama. Black raspberries do not grow on the acidic soils of the area. This species has very limited distribution on limestone outcroppings. It can be occasionally found near railroad beds where limestone has been laid to solidify the tracks. It's also located where limestone outcroppings occur.



American pawpaw, *Asimina triloba* (L.) Dunal with unripe fruit on the grounds of the Anniston Museum of Natural History, 7 June 2007. (HDF 54). This species had to have been *A. triloba* because the leaves were obovate-oblong – rather than the more ovate leaf shape of *A. parviflora* (Michx.) Dunal. The fruits were very young and small in June.



Kim and Michael drove to two of these sites, Claremont Springs Road near Talladega Creek and Keener (north of Gadsden) both locations near the railroad tracks. Although black raspberry specimens had been collected in recent years, no *Rubus occidentalis* was found at either location. *Rubus argutus* was present but fruit were green to red. *Sambucus canadensis* was lining the drainage ditches of the roadways in this part of Alabama. Near Keener, in Etowah County, they collected HDF-058 *Rubus argutus*, HDF-059 *V. pallidum* and HDF-060 *V. arboretum*. *Vaccinium arboretum*, photo at left, is another late blooming blueberry, and was in flower at the locations visited.

They returned to Gadsden for lodging at Rodeway Inn.

Kim is holding HDF-060 *Vaccinium arboretum* leaves on a shrub near Keener, Alabama.

#### Friday 8 June 2007

In the morning Kim and Michael returned to Mentone, Alabama, for a collecting site that Dan Spaulding had mentioned. On Route 117 in Dekalb County east of Valley Head they found an occurrence of HDF-061 *Rubus occidentalis*. This plant was growing on an open edge of the road in indirect western sun. Only two crowns were present with one lateral of the floricate having immature fruit. They collected one crown (HDF-061) leaving the other for the local seed bank. Each of these collection sites were near rocky limestone

outcroppings. Also Dr. Spaulding had previously collected *R. occidentalis* along railroad tresses where limestone had been placed to stabilize the location of the tracks.



Limestone outcropping near Kenner, Alabama. *R. occidentalis* was not found at this location.

They began seeing canes of *Rubus occidentalis* along the road towards Mentone. About 1 mile out from the town of Mentone, there were black raspberry canes on the south side of the very curvy road. They stopped in Mentone and found that the hickory- oak-tulip tree woods around town were rich in *Vaccinium* and *Rubus*.

They observed 3-4 m tall HDF-062 *Vaccinium corymbosum* with ripe fruit, HDF-064 *V. stamineum* (glabrous form –with dark green leaves and pendulous glaucous fruits), and the low growing *V. pallidum* without fruit as understory shrubs in the forest.



HDF -062 *Vaccinium corymbosum* with ripe fruit.



HDF – 066 *Rubus occidentalis* primocanes in the midst of staghorn sumac seedlings

The HDF-066 *Rubus occidentalis* was present in each of the stages of fruit ripeness – from green to black. Birds may have been collecting ripe fruit but there were sufficient to collect an open population of ripe fruit to bring back for seed extraction. One crown was collected that seemed to have the latest fruit in development. No virus symptoms were visible on the plants but large colonies of aphids were present – so the plants are assumed to be virus positive.



Aphids on black raspberry primocanes at Mentone, Alabama.



*Rubus occidentalis* floricanes with fruit beginning to ripen. Primocane developing on right.

They drove west out of Mentone to seek a collecting locality that was mentioned in a Herbarium specimen. This specimen was at an unnamed waterfall in 1967. Unfortunately the roads that were present on the map led only to private property locations and they could not reach the limestone outcropping near the falls. On their return they drove through Needmore, Alabama, where they observed HDF-067 *Fragaria virginiana* subsp. *grayana* growing on the edge of Route 7 under the city welcome sign. No inflorescences or fruits were observed – but the strawberry colony was thriving and about 7 meters wide.

They drove west to Tupelo, Mississippi, for lodging.

Saturday 9 June 2007

From Tupelo, they drove near Potts Camp off highway 78 and collected *Vaccinium arboreum* (HDF-68) and *V. tenellum* (HDF-69) from the understory of a hickory-oak forest. They finished by collecting *Rubus argutus* open pollinated fruit (HDF-70) from Chewalla Lake, Holly Springs National Forest. They drove to Memphis, Tennessee, and returned to Portland, Oregon, through Minneapolis, Minnesota.

## Conclusions for part 1

*Rubus occidentalis* was associated with limestone outcroppings, steep slopes, recently disturbed areas, and open sunlight at the edges of hardwood forests. It was common in the mountainous sections of the southeast and not easily found in the Piedmont regions of either North or South Carolina. In some localities *R. occidentalis* had apparently been replaced (taken over) by *Rubus argutus* or kudzu, *Pueraria montana* (Lour.) Merr. var. *lobata* (Willd.) Maesen & S. M. Almeida.

Early June was the appropriate time to collect ripe fruits for *R. occidentalis* at most of the localities through South Carolina, Georgia, and Alabama. In the highest spots, at > 2,000' elevation, the fruits were green and were estimated to finish ripen during the first week in July. In most of the locations of lower elevation either the primary fruit was ripe – or the majority of fruit on the raceme were ripe.

In early April 2007, air temperatures dropped to 17° F for three consecutive nights. We saw evidence of this freeze in tip damage of most of the tree and shrub species including *Quercus nigra*, *Carya*, *Rhododendron*, *Oxydendron arboreum*, *Kalmia latifolia*, and many others throughout the southeastern mountains. *Rubus argutus* and *R. occidentalis* primocanes were killed back and were brown. At the time of our trip, most of the woody plants had pushed new growth. The *Rubus* had forced healthy new primocanes.

*Rubus trivialis* as seen throughout the southeastern states was highly variable. In North Carolina stems and leaves were reddish with bristles. In locations further west stems and petioles were green with less bristles. We observed variable leaf shape, fruit (drupelet) size, fruit ripening, and thorniness

*Rubus occidentalis* at every locality had aphids (*Amphorophora agathonica*). Plants at most of the localities had visual leaf virus symptoms. Many aphid colonies were observed on the primocane stems. We wondered if – because the black raspberries were infrequent in some localities – if the *R. argutus* were harboring the aphids when *R. occidentalis* was not present. We observed mealybugs on *Vaccinium corymbosum* in Alabama.

The cultivated blueberries in fields of Castle Hayne, North Carolina, had many viruses including stunt and red ringspot.

*Vaccinium stamineum* was highly variable for pubescence of the stems, petioles and leaves. We observed a continuum of plants from glabrous to very pubescent. Some fruit of *V. stamineum* had glandular hairs on the skin.

*Vaccinium arboreum* and *Vaccinium hirsutum* were about 1 month later to flower than other *Vaccinium* – such as *V. corymbosum*, *V. pallidum*, *V. tenellum* and *V. stamineum*.

We were about 2 to 3 weeks early for collection of ripe *Vaccinium* fruit.

## Part II – Great Plains

7 July through 14 July 2007

### Participants:

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### **Summary**

On part two of the collecting trip, which occurred from 7 July through 14 July 2007, Chad Finn and Michael Dossett collected temperate small fruit, and specialty crop genetic resources across the Great Plains. They traveled 2585 miles through five states (MO, KS, NE, SD, MN) and collected 57 total samples of eight genera and 16 taxa (Appendix Table 1). The primary target species was black raspberries



(*R. occidentalis*). This species was collected from 29 locations across four of the states visited. It was closely associated with riparian growth along rivers and streams as well as some lakes, often in disturbed sites along the edge of the road or maintained grassy areas. In contrast to the first trip, *R. occidentalis* was generally not difficult to locate in appropriate habitats and was found near most places where previous herbarium records indicate a historical presence. It was interesting to note, however, that while *R. occidentalis* was found growing in close proximity with red raspberry *R. strigosus* in many locations in eastern South Dakota and Minnesota, there was a rather sudden shift from one taxa to the other as one traveled north from the Pine Ridge area of Nebraska into the Black Hills of South Dakota. In addition to red and black raspberry, one species of blackberry was collected, five species of *Ribes*, pawpaw (*Asimina triloba*), strawberries (*Fragaria virginiana* and *F. vesca*), serviceberry (*Amelanchier alnifolia*) and elderberry (*Sambucus canadensis*).

### **Travelog July 2007**

#### Saturday 7 July 2007

Chad and Michael flew from Portland, Oregon to Kansas City, Missouri where they rented a car for the trip. Because it was only about 5:30 PM it was decided to head to the first collection area to look for plants. They stopped first at Kerry Roberts Park, in Bonner Springs, near the outskirts of Kansas City, KS where they found a large population of *R. occidentalis* (HDF-71) in an un-mowed area. The plants had been browsed heavily by deer and well past the main fruiting season, however a small sample of dried and late ripening fruit was found. Heading west they then stopped at the Leavenworth County State Fishing

Lake where they were unable to find *R. occidentalis* but did encounter *R. argutus*, a blackberry, with ripening fruit (HDF-72). They continued west to Perry Lake, in Jefferson County, where they found large populations of *R. occidentalis* next to the road, and collected dried and late ripening fruit in the fading daylight. They then drove to Topeka for dinner and lodging.

#### Sunday 8 July 2007

Chad and Michael headed west on I-70 from Wichita and stopped at a rest area to look for plants. Here they collected *Ribes missouriense* and a *Prunus* sp. (HDF-74, 75) before heading back on the road. They stopped along Hendricks Creek near the town of Alma and found *R. occidentalis* at locations described from herbarium vouchers collected in the 1960s. They also found and collected wild hops (*Humulus lupulus*) here before continuing west toward Manhattan. At Pottawatomie County State Fishing Lake #2 they collected *R. occidentalis* and *Asimina triloba* (HDF-78,79) and then continued SW to Fort Riley Military Reservation where they collected more *R. occidentalis* and *H. lupulus* from two locations (HDF-80 – HDF-82). They continued west on I-70 to Salina and then headed south to Coronado Heights. This is a large sandstone outcrop with a variety of interesting flora where they were told *R. occidentalis* could be found. Despite extensive searches of the area no target taxa were located at this location so they continued northward on I-35 (hwy 81) and stopped at the Saline County State Fishing Lake briefly with no success before stopping at the Ottawa County State Fishing Lake near Minneapolis, KS. Here, they found a very large population of *R. occidentalis* from which they collected fruit as well as DNA samples and a clonal specimen with non-glaucous canes (HDF-83, 84). They also noted that the plants here were very erect and much less prostrate than what they had seen elsewhere so far on the trip. They continued north and then west to Red Cloud, Nebraska where they spent the night. It was here that they realized they did not have the GPS which must have been left in Kansas at the last stop. Due to the time and distance involved in going back to retrieve it as well as the low likelihood of success, they decided to continue without it.



Monday 9 July 2007

Chad and Michael found *R. occidentalis* at a location previously described from herbarium records just east of Red Cloud, Nebraska near the town of Amboy. They also collected *Ribes missouriense* at this same location (HDF-85, 86). Just south of Red Cloud, they also found *R. occidentalis* but with very little fruit. The plants at this location, however, had canes which were nearly thornless though the leaf petioles still contained thorns. They collected cuttings (HDF-87) from these plants before heading north. They collected *R. occidentalis* at three state recreation areas in south-central and central Nebraska as well as another sample of *Ribes missouriense* while they followed this route (HDF-88 – HDF-91). In addition they found black raspberry near the town of Ord, Nebraska, at a location found in herbarium records. Only two ripe fruit were found here with very few floricanes present so no collection was made. In the evening, they found a large population of *R. occidentalis* at a Nebraska National Forest campground near Halsey, Nebraska with many ripe fruit (HDF-92). They continued northward to Valentine Nebraska, where they found more *R. occidentalis* and *H. lupulus* (HDF-93, 94) before settling in for the night.



Tuesday 10 July 2007

Chad and Michael headed west from Valentine toward Chadron. They stopped at Metcalf State Wildlife Management Area along the way because of an herbarium record from that location in 1974. After visiting the site, however, they decided that without further information on the exact location it would be difficult to find. They collected fruit of *Ribes aureum* subsp. *villosum* (HDF-95) and continued west toward Chadron. They collected a large sample of fruit from a population of *R. occidentalis* near the State Park south of Chadron as well as *H. lupulus* (HDF-96 – HDF-98A) and *Ribes americanum* (HDF-96 – HDF-98B) before heading back in to town to meet with Steve Rolfsmeier, author of *The Flora of Nebraska* for information on more locations.

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Based on this visit they next went to East Ash Creek Canyon along the Pine Ridge Trail in the Nebraska National Forest southwest of Chadron. Here they found *Ribes oxycanthoides*, *F. vesca*, *R. occidentale* and a small population of *R. strigosus* (HDF-099 – HDF-101). From there, they headed north into the Black Hills of South Dakota. After collecting *F. virginiana* and *R. strigosus* (HDF-102,103) in Custer State Park, they continued to Spearfish, South Dakota, for food and lodging.

#### Wednesday 11 July 2007

Chad and Michael spent the morning searching for *R. occidentale* at a location near Spearfish, South Dakota without success despite good map information from an herbarium voucher in the collection at Black Hills State University. Despite not finding *R. occidentale* at this location or elsewhere in the Black Hills, they did collect a variety of other interesting accessions. A serviceberry identified as *Amelanchier alnifolia* was found in this area as were many wild strawberries (*F. virginiana*) and some *R. strigosus* with very well formed fruit and good flavor (HDF-104 – HDF-106). They headed east on I-90 until they reached the Missouri River. They searched a number of parks and recreation areas along the river and dammed lakes without finding any taxa of interest until late in the evening when they found a small population of *R. occidentale* (HDF-107) at Pease Creek State Recreation Area in Charles Mix County, South Dakota. They were able to find only a very small number of dried fruit at this location before they drove to Yankton for lodging.



Thursday 12 July 2007

Chad and Michael drove to Lewis and Clark State Park in Yankton, South Dakota where they found large populations of *R. occidentalis* but noted difficulty in finding floricanes or fruit due to heavy grazing by deer (HDF-108). They also found *H. lupulus* (HDF-109) there before heading east toward Vermillion where they stopped at Clay County Park and found another population of *R. occidentalis* (HDF-110). They continued to Union Grove State Park where again another large population of *R. occidentalis* was located (HDF-111). They then headed north to Newton Hills State Park where they collected *R. strigosus* and *R. occidentalis* (HDF-112,113) and then to Perry Nature Area and Arrowhead Park in East Sioux Falls where they found *Ribes triste* and *R. occidentalis* (HDF-114,115). Continuing northward, they stopped briefly at Palisades State Park where they found *R. occidentalis* (HDF-116) but no fruit before stopping for the night in Brookings, South Dakota with Dr. Anne Fennell (S. Dakota State Univ. Horticulture, Forestry, Landscape and Parks Department). We consulted with Dr. Fennell on fruit crops and germplasm in the region.



Friday 13 July 2007

Chad and Michael went to Oakwood Lakes State Park in NW Brookings County where they found *R. missouriense*, and *R. occidentalis* (HDF-117,118). They continued northward along the edge of this plateau region looking for *R. occidentalis* at several State Parks and Recreation Areas along this series of lakes. While they did not find *R. occidentalis* at any of these locations they did collect *Sambucus canadensis* (HDF-119) along the route, and *R. strigosus* (HDF-120) at Waubay National Wildlife Refuge. Due to a lack of success along this route, a lack of herbarium information from North Dakota and the time of day it was decided to start heading east rather than continuing northward into North Dakota. Soon after

dropping down to the river valley from this plateau region, they began finding populations of *R. occidentalis* again at Big Stone Lake State Park (HDF-122) and Big Stone National Wildlife Refuge in Minnesota (HDF-123) where they also collected leaf tissue for DNA extraction. At Big Stone National Wildlife Refuge they observed populations growing in open prairie areas away from the riparian zones they had previously encountered as well as from sandstone outcrops. They also observed one plant which appeared to have fruit developing on its primocanes, a very unusual trait in *R. occidentalis*. They stopped briefly at Monson Lake State Park but did not find any *R. occidentalis* so they continued on to Belgrade, Minnesota, for food and lodging with Jeff and Anne Roguske.

Saturday 14 July 2007



Chad and Michael collected *R. strigosus* and *R. occidentalis* (HDF-124,125) near Sibley State Park before heading to Minneapolis to catch their flight back to Oregon. Along the way they also stopped at a rest area along I-94 near Hasty, Minnesota where they found *R. occidentalis* growing. There were scattered plants at the rest area from which they collected fruit (HDF-126) including one that had unusual leaf morphology from which they collected an herbarium voucher. They then returned to Portland, Oregon.



## Conclusions for Part II

*Rubus occidentalis* was generally not difficult to find in appropriate habitat in most locations, however it was not always obvious why it was absent from some areas. For instance, the riparian area along the reservoirs along the Missouri River in South Dakota would seem to be ideal habitats for *R. occidentalis*, however, while fruit was occasionally found in this habitat, it was not generally found.

In contrast to the first trip, aphids were not observed on most populations of *R. occidentalis*, however mealy bugs appeared to be widespread and common on this taxon.

Our ability to find floricanes (and therefore, ripe fruit) was hindered by heavy pressure from deer grazing in many areas.

While we felt our seed collection was very good, fruit should have been more plentiful 10-14 days earlier. The ripening period for *R. occidentalis* throughout the range we covered on this trip seemed to be very similar. While we recognize that the trip took a week, we felt like we were at or near the end of the ripening period throughout most of the trip.

*R. occidentalis* was the predominant *Rubus* species we saw on this trip. While there were occasional blackberry patches and *R. strigosus* became very common in the northern part of the collection region, *R. occidentalis* was predominant elsewhere.

We did not find *Fragaria virginiana* in Kansas even though the ecosystems we were traveling in would seem to support it.

*Vaccinium* species were not found on this trip.

## Herbarium samples

Fifty-one herbarium samples were prepared as voucher specimens for 25 accessions. Samples will be deposited at the National Arboretum Herbarium, with duplicates of some going to the Oregon State University Herbarium, and University of North Carolina at Chapel Hill.

## References

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- Rand-McNally. 2005. The Road Atlas '05. Rand McNally. Skokie, Illinois
- Stearn, W. T. 1992. "Botanical Latin," 4th edition, Portland OR, Timber Press, Inc.
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**Table 1. Expense Details**

<b>Type of Charges</b>	<b>Subtotal</b>	<b>SE Total</b>	<b>MW total</b>
<b>Flight Charges</b>			
Kim Hummer May 29 – June 9		1202.00	
Travel transaction fee		29.99	
Michael Dossett airfare May 31 – June 9		860.10	
Travel transaction fee		29.95	
Lodging		697.18	
M&IE (9.5 days)		406.75	
Michael Dossett airfare July 7 – July 14			533.85
Travel transaction fee			59.90
M&IE (7.5 days)			330.00
Chad Finn airfare July 7 – July 14			533.80
Travel transaction fee			59.90
Dulles Airport Limousine Charges (Kim)		45.00	0
Car rental return		624.03	1,000
Amicolala Falls Park, Georgia 6/6/2007		3.00	
Portland Airport Parking		72.00	
Mileage – Corvallis to Portland Airport		77.60	
<b>Gasoline charges</b>			
1 June 2007 Wilmington, NC	41.50		
3 June 2007 Fountain Inn, SC	43.67		
4 June 2007 Toccoa, Georgia	33.01		
6 June 2007 Jasper, Georgia	37.71		
7 June 2007 Attalia, Alabama	49.58		
9 June 2007 Belden, Mississippi	43.86		
9 June 2007 Memphis, TN (top off)	13.14		
7.69 mpg		262.47	
<b>Shipping Charges</b>			
5 June 2007 Federal Express			
5 June 2007 Box (Mail It) from Toccoa, GA	4.06		
6 June 2007 UPS Store, Dahlonega, GA	108.06	112.12	
<b>Miscellaneous Charges</b>			
27 May collection book binding	9.99		
28 May shipping tape	2.35		
1 June 2007 paper towels, ice	6.16		
4 June 2007 ice, band aids	3.98		
5 June 2007 water, paper towels	1.50		
6 June 2007 storage bags	1.12		
6 June 2007 box, ice	4.41		
15 June 2007 collection book binding	6.23		
		35.74	
<b>Total cost</b>		2386.35	2,517.45

**Table 2. Species collected**

Species collected	Number of accessions		
	Southeast	Midwest	Total
<i>Amelanchier alnifolia</i> (Nutt.) Nutt.	0	1	1
<i>A. arborea</i> (F. Michx.) Fernald	2	0	2
<i>Asimina triloba</i> (L.) Dunal	1	1	2
<i>Corylus americana</i> Marshall	1	0	1
<i>Duchesnea indica</i> (Andrews) Focke	1	0	1
<i>Epigaea repens</i> L.	1	0	1
<i>F. vesca</i> subsp. <i>americana</i> (Porter) Staudt	2	0	2
<i>F. virginiana</i> subsp. <i>grayana</i> (Vilm. ex J. Gay) Staudt	2	0	2
<i>F. virginiana</i> subsp. <i>virginiana</i>	5	2	7
<i>Humulus lupulus</i> var. <i>pubescens</i>	0	5	5
<i>Ribes americanum</i>	0	2	2
<i>R. aureum</i> var. <i>villosum</i>	0	1	1
<i>R. missouriensis</i>	0	5	5
<i>R. triste</i>	0	1	1
<i>Rubus allegheniensis</i> Porter	1	0	1
<i>R. argutus</i> Link	4	1	5
<i>R. cuneifolius</i> Pursh introgressed with <i>R. trivialis</i> L.	1	0	1
<i>R. flagellaris</i> Willd.	2	0	2
<i>R. hispidus</i> L.	1	0	1
<i>R. occidentalis</i> L.	15	29	44
<i>R. strigosus</i>	0	6	6
<i>R. trivialis</i> Michx.	2	0	2
<i>Sambucus canadensis</i>	0	2	2
<i>Styrax americana</i> Lam.	1	0	1
<i>Vaccinium arboreum</i> Marshall	6	0	6
<i>V. corymbosum</i>	4	0	4
<i>V. hirsutum</i> Buckley	1	0	1
<i>V. hybrid</i> (cultivated)	4	0	4
<i>V. pallidum</i> Aiton	4	0	4
<i>V. stamineum</i> L.	6	0	6
<i>V. tenellum</i> Aiton	2	0	2
<i>V. virgatum</i> Aiton	1	0	1
Total	70	56	126

**Table 3. Herbarium vouchers prepared**

Collection no.	Plant name	Amt of vouchers
19	<i>Rubus occidentalis</i> Glassy Mountain primocane	5
19	<i>Rubus occidentalis</i> Glassy Mountain floricate	4
61	<i>Rubus occidentalis</i> Mentone primocane	4
61	<i>Rubus occidentalis</i> Mentone floricate	1
29	<i>Rubus occidentalis</i> Rich Mountain primocane	2
29	<i>Rubus occidentalis</i> Rich Mountain floricate	3
13	<i>Vaccinium tenellum</i> Willmington	4
41	<i>Vaccinium hirsutum</i> Winding Stair Gap Rd	2
105	<i>Amelanchier alnifolia</i> South Dakota	1
101	<i>Rubus strigosus</i> Nebraska	1
97	<i>Ribes americanum</i> Nebraska	1
95	<i>Ribes aureum</i> var. <i>villosum</i>	1
89	<i>Ribes missouriensis</i> Nebraska	1
79	<i>Asimina triloba</i> (veg. only)	1
86	<i>Ribes missouriensis</i>	1
106	<i>Rubus strigosus</i> South Dakota primocane, floricate	2
112	<i>Rubus strigosus</i> South Dakota primocane, floricate	2
77	<i>Humulus lupulus</i> var. <i>pubescens</i>	1
113	<i>Rubus occidentalis</i> primocane	1
126	<i>Rubus occidentalis</i> primocane oblique primocane petiolate basal leaflets	1
76	<i>Rubus occidentalis</i> primocane	1
83	<i>Rubus occidentalis</i> primocane and floricate	2
88	<i>Rubus occidentalis</i> primocane floricate	3
96	<i>Rubus occidentalis</i> primocane, floricate	2
90	<i>Rubus occidentalis</i> primocane, floricate	4
	TOTAL SAMPLES	51

Herbarium voucher specimens were deposited in the Herbarium of the National Arboretum, University of North Carolina Herbarium, University of South Carolina Herbarium, and Oregon State University Herbarium.

**Table 4. Collection number, NCGR number, and plant species collected**

<b>Sample #</b>	<b>Corvallis Local Number</b>	<b>Cultivar or Local Name</b>
<b>HDF-2007-001</b>	CRUB 2357.001	<i>Rubus argutus</i> Whitfield Road
<b>HDF-2007-002</b>	CDUC 0013.000 CDUC 0013.001	<i>Duchesnea indica</i> Johnston Mill
<b>HDF-2007-003</b>	CVAC 1759.001	<i>Vaccinium corymbosum</i> , tetraploid
<b>HDF-2007-004</b>	CFRA 1914.001	<i>Fragaria virginiana</i> subsp. <i>virginiana</i> Pollocksville
<b>HDF-2007-005</b>	CRUB 2358.001	<i>Rubus trivialis</i> red form
<b>HDF-2007-006</b>	CVAC 1760.001	<i>Vaccinium corymbosum</i> US 75
<b>HDF-2007-007</b>	CVAC 1761.001	<i>Vaccinium corymbosum</i> US 74
<b>HDF-2007-008</b>	CVAC 1762.001	<i>Vaccinium corymbosum</i> NC-SL-12- L
<b>HDF-2007-009</b>	CRUB 2359.001	<i>R. cuneifolius</i> introgressed with <i>R. trivialis</i>
<b>HDF-2007-010</b>	CRUB 2360.000	<i>Rubus trivialis</i> Ideal farm
<b>HDF-2007-011</b>	CVAC 1763.001	<i>Vaccinium virgatum</i> Castle Hayne
<b>HDF-2007-012</b>	CVAC 1764.001	<i>Vaccinium arboreum</i> Wahoo Willys
<b>HDF-2007-013</b>	CVAC 1766.001	<i>Vaccinium tenellum</i> Wahoo Willy's
<b>HDF-2007-014</b>	CVAC 1765.001	<i>Vaccinium corymbosum</i> US 508
<b>HDF-2007-015</b>	CRUB 2361.000	<i>Rubus argutus</i> Lumberton
<b>HDF-2007-016</b>	CVAC 1767.001	<i>Vaccinium corymbosum</i> tetraploid
<b>HDF-2007-017</b>	CRUB 2362.000 CRUB 2362.001	<i>Rubus occidentalis</i> Glassy Mountain 1
<b>HDF-2007-018</b>	CRUB 2363.001	<i>Rubus flagellaris</i> traveler's rest
<b>HDF-2007-019</b>	CRUB 2364.000 CRUB 2364.001	<i>Rubus occidentalis</i> Glassy Mountain 2
<b>HDF-2007-020</b>	CRUB 2365.000	<i>Rubus flagellaris</i> Glassy Mountain
<b>HDF-2007-021</b>	CVAC 1768.001	<i>Vaccinium stamineum</i> Glassy Mountain
<b>HDF-2007-022</b>	CVAC 1769.001	<i>Vaccinium pallidum</i> Glassy Mountain
<b>HDF-2007-023</b>	CEPI 0001.001	Trailing Arbutus - not for inventory - landscape
<b>HDF-2007-024</b>	CFRA 1915.001	<i>Fragaria virginiana</i> subsp. <i>virginiana</i> Glassy Mountain
<b>HDF-2007-025</b>	CVAC 1770.001	<i>Vaccinium pallidum</i> Stumphouse Mountain
<b>HDF-2007-026</b>	CVAC 1771.001	<i>Vaccinium stamineum</i> Stumphouse Mountain
<b>HDF-2007-027</b>	CAME 0246.001	<i>Amelanchier arborea</i> Stumphouse Mountain
<b>HDF-2007-028</b>	CFRA 1916.001	<i>Fragaria virginiana</i> subsp. <i>virginiana</i> Stumphouse Mountain
<b>HDF-2007-029</b>	CRUB 2366.000 CRUB 2366.001	<i>Rubus occidentalis</i> Rich Mountain 1
<b>HDF-2007-030</b>	CRUB 2367.000	<i>Rubus occidentalis</i> Rich Mountain 2
<b>HDF-2007-031</b>	CRUB 2368.000 CRUB 2368.001	<i>Rubus occidentalis</i> Warwoman Road
<b>HDF-2007-032</b>	CRUB 2369.000	<i>Rubus occidentalis</i> William Bartram Trail x Warwoman road

<b>HDF-2007-033</b>	CFRA 1918.001	<i>Fragaria virginiana</i> subsp. <i>virginiana</i> Warwoman Road
<b>HDF-2007-034</b>	CRUB 2370.000 CRUB 2370.001	<i>Rubus occidentalis</i> Henry Page road
<b>HDF-2007-035</b>	CRUB 2371.000	<i>Rubus occidentalis</i> Clayton
<b>HDF-2007-036</b>	CRUB 2372.000 CRUB 2372.001	<i>Rubus occidentalis</i> Hutson Road
<b>HDF-2007-037</b>	CCOR0882.001	<i>Corylus americana</i> Blue Ridge Mt. Road
<b>HDF-2007-038</b>		taxonomy incorrect
<b>HDF-2007-039</b>	CRUB 2373.001	<i>Rubus occidentalis</i> Blue Ridge Mt. Road
<b>HDF-2007-040</b>	CRUB 2374.001	<i>Rubus allegheniensis</i> Hawk Mt. Road
<b>HDF-2007-041</b>	CVAC 1773.001	<i>Vaccinium hirsutum</i> Winding Stair Gap Road
<b>HDF-2007-042</b>	CFRA 1921.001	<i>Fragaria virginiana</i> subsp. <i>virginiana</i>
<b>HDF-2007-043</b>	CFRA 1919.001	<i>Fragaria virginiana</i> subsp. <i>virginiana</i>
<b>HDF-2007-044</b>	CVAC 1774.001	<i>Vaccinium stamineum</i>
<b>HDF-2007-045</b>	CRUB 2375.001	<i>Rubus hispidus</i> Winding Stair Gap Road
<b>HDF-2007-046</b>	CRUB 2382.000	<i>Rubus occidentalis</i> Dahlonga
<b>HDF-2007-047</b>	CVAC 1775.001	<i>Vaccinium stamineum</i> - hairy form Amicalola Falls
<b>HDF-2007-048</b>	CVAC 1776.001	<i>Vaccinium stamineum</i> Amicalola Falls
<b>HDF-2007-049</b>	CVAC 1777.001	<i>Vaccinium pallidum</i> Amicalola Falls
<b>HDF-2007-050</b>	CRUB 2376.001	<i>Rubus occidentalis</i> Jasper
<b>HDF-2007-051</b>	CVAC 1786.001	<i>Vaccinium arboreum</i> Jasper
<b>HDF-2007-052</b>	CVAC 1778.001	<i>Vaccinium arboreum</i> Mentone
<b>HDF-2007-053</b>	CAME 0245.001	<i>Amelanchier arborea</i> Mentone
<b>HDF-2007-054</b>	CASI 0079.001	<i>Asimina triloba</i> Anniston
<b>HDF-2007-055</b>	CVAC 1779.001	<i>Vaccinium arboreum</i> Anniston
<b>HDF-2007-056</b>	CVAC 1787.001	<i>Vaccinium corymbosum</i> tetraploid
<b>HDF-2007-057</b>	DEAD	DEAD do not log in
<b>HDF-2007-058</b>	CRUB 2377.001	<i>Rubus argutus</i> Keener
<b>HDF-2007-059</b>	CVAC 1780.001	<i>Vaccinium palidum</i> Scenic
<b>HDF-2007-060</b>	CVAC 1781.001	<i>Vaccinium arboreum</i> Valley Head
<b>HDF-2007-061</b>	CRUB 2378.001	<i>Rubus occidentalis</i> Valley Head
<b>HDF-2007-062</b>	CVAC 1782.000	<i>Vaccinium corymbosum</i> Mentone
<b>HDF-2007-063</b>	CRUB 2379.000	<i>Rubus occidentalis</i> Mentone
<b>HDF-2007-064</b>	CVAC 1783.001	<i>Vaccinium stamineum</i> glabrous form
<b>HDF-2007-065</b>	CFRA 1920.001	<i>Fragaria virginiana grayana</i> Mentone
<b>HDF-2007-066</b>	CRUB 2380.001	<i>Rubus occidentalis</i> Mentone late
<b>HDF-2007-067</b>	CFRA 1917.001	<i>Fragaria virginiana</i> subsp. <i>grayana</i>
<b>HDF-2007-068</b>	CVAC 1784.001	<i>Vaccinium arboreum</i> Potts Camp
<b>HDF-2007-069</b>	CVAC 1785.001	<i>Vaccinium tenellum</i> Potts Camp

<b>HDF-2007-070</b>	CRUB 2381.000	<i>Rubus argutus</i> Chewalla Lake
<b>HDF-2007-071</b>	CRUB 2383.000	<i>Rubus occidentalis</i> Bonner Springs
<b>HDF-2007-072</b>	CRUB 2384.000	<i>Rubus argutus</i> Leavenworth County State Fishing Lake
<b>HDF-2007-073</b>	CRUB 2385.000	<i>Rubus occidentalis</i> Perry Lake
<b>HDF-2007-074</b>	CRIB 1462.000	<i>Ribes missouriense</i> Kansas
<b>HDF-2007-075</b>	No accession	<i>Prunus</i>
<b>HDF-2007-076</b>	CRUB 2386.000, 2386.001	<i>Rubus occidentalis</i> Alma
<b>HDF-2007-077</b>	CHUM 1458.001	<i>Humulus lupulus</i> var. <i>pubescens</i> Alma
<b>HDF-2007-078</b>	CRUB 2387.000	<i>Rubus occidentalis</i> Manhattan - Pottawatomie County
<b>HDF-2007-079</b>	CASI 0080.001	<i>Asimina triloba</i> Manhattan - Pottawatomie County
<b>HDF-2007-080</b>	CHUM 1459.001	<i>Humulus lupulus</i> var. <i>pubescens</i> Ogden, Fort Riley
<b>HDF-2007-081</b>	CRUB 2388.000	<i>Rubus occidentalis</i> Ogden, Fort Riley
<b>HDF-2007-082</b>	CRUB 2389.000	<i>Rubus occidentalis</i> Moon Lake, Fort Riley
<b>HDF-2007-083</b>	CRUB 2390.000	<i>Rubus occidentalis</i> Minneapolis - Ottawa County
<b>HDF-2007-084</b>	CRUB 2391.000	<i>Rubus occidentalis</i> Minneapolis - Ottawa County
<b>HDF-2007-085</b>	CRUB 2392.000	<i>Rubus occidentalis</i> Amboy, Nebraska
<b>HDF-2007-086</b>	CRIB 1463.000	<i>Ribes missouriense</i> Amboy, Nebraska
<b>HDF-2007-087</b>	CRUB 2393.000, 2393.001	<i>Rubus occidentalis</i> Red Cloud, Nebraska
<b>HDF-2007-088</b>	CRUB 2394.000	<i>Rubus occidentalis</i> St. Paul - North Loup State Recreation
<b>HDF-2007-089</b>	CRIB 1464.000	<i>Ribes missouriense</i> St. Paul
<b>HDF-2007-090</b>	CRUB 2395.000	<i>Rubus occidentalis</i> - Pibel Lake State Recreation Area
<b>HDF-2007-091</b>	CRUB 2396.000	<i>Rubus occidentalis</i> Victoria Springs State Recreation Area
<b>HDF-2007-092</b>	CRUB 2397.000	<i>Rubus occidentalis</i> Halsey - Nebraska National Forest
<b>HDF-2007-093</b>	CHUM 1460.001	<i>Humulus lupulus</i> var. <i>pubescens</i> Valentine, Nebraska
<b>HDF-2007-094</b>	CRUB 2398.000	<i>Rubus occidentalis</i> Valentine, Nebraska
<b>HDF-2007-095</b>	CRIB 1465.001	<i>Ribes aureum</i> var. <i>villosum</i> Metcalf Wildlife Management
<b>HDF-2007-096</b>	CRUB 2399.000	<i>Rubus occidentalis</i> Chadron State Park
<b>HDF-2007-097</b>	CRIB 1466.000	<i>Ribes americanum</i> Chadron State Park
<b>HDF-2007-098A</b>	CHUM 1461.001	<i>Humulus lupulus</i> var. <i>pubescens</i> Chadron State Park
<b>HDF-2007-098B</b>	CRIB 1467.000	<i>Ribes missouriensis</i> East Ash Canyon, Pine Ridge Trail
<b>HDF-2007-099</b>	CFRA 1922.001	<i>Fragaria vesca</i> East Ash Canyon, Pine

		Ridge Trail
<b>HDF-2007-100</b>	CRUB 2400.000	<i>Rubus occidentalis</i> East Ash Canyon, Pine Ridge Trail
<b>HDF-2007-101</b>	CRUB 2401.000	<i>Rubus strigosus</i> East Ash Canyon, Pine Ridge Trail
<b>HDF-2007-102</b>	CRUB 2402.000	<i>Rubus strigosus</i> Custer State Park
<b>HDF-2007-103</b>	CFRA 1923.001	<i>Fragaria virginiana</i> Custer State Park
<b>HDF-2007-104</b>	CFRA 1924.001	<i>Fragaria virginiana</i> Spearfish
<b>HDF-2007-105</b>	CAME 247.001	<i>Amelanchier alnifolia</i> Spearfish
<b>HDF-2007-106</b>	CRUB 2403.000	<i>Rubus strigosus</i> Spearfish
<b>HDF-2007-107</b>	CRUB 2404.000, 2404.001	<i>Rubus occidentalis</i> Peas Creek State Recreation Area
<b>HDF-2007-108</b>	CRUB 2405.000	<i>Rubus occidentalis</i> Lewis and Clark State Recreation Area
<b>HDF-2007-109</b>	CHUM 1462.001	<i>Humulus lupulus</i> var. <i>pubescens</i> Lewis and Clark State
<b>HDF-2007-110</b>	CRUB 2406.000	<i>Rubus occidentalis</i> Clay County Park
<b>HDF-2007-111</b>	CRUB 2407.000	<i>Rubus occidentalis</i> Union Grove State Park
<b>HDF-2007-112</b>	CRUB 2408.000	<i>Rubus strigosus</i> Newton Hills State Park
<b>HDF-2007-113</b>	CRUB 2409.000	<i>Rubus occidentalis</i> Newton Hills State Park
<b>HDF-2007-114</b>	CRIB 1468.000	<i>Ribes triste</i> East Souix Falls - Perry Nature Area
<b>HDF-2007-115</b>	CRUB 2410.000	<i>Rubus occidentalis</i> East Souix Falls
<b>HDF-2007-116</b>	CRUB 2411.000	<i>Rubus occidentalis</i> Palisades State Park
<b>HDF-2007-117</b>	CRUB 2412.000	<i>Rubus occidentalis</i> Oakwood Lakes State Park
<b>HDF-2007-118</b>	CRIB 1469.000	<i>Ribes missouriense</i> Oakwood Lakes State Park
<b>HDF-2007-119</b>	CSAM 181.001	<i>Sambucus canadensis</i> Watertown
<b>HDF-2007-120</b>	CRUB 2413.000	<i>Rubus strigosus</i> Waubay National Wildlife Refuge
<b>HDF-2007-121</b>	CRIB 1470.000	<i>Ribes americanum</i> Brown's Valley
<b>HDF-2007-122</b>	CRUB 2414.000	<i>Rubus occidentalis</i> Big Stone Lake State Park
<b>HDF-2007-123</b>	CRUB 2415.000	<i>Rubus occidentalis</i> Big Stone National Wildlife Refuge
<b>HDF-2007-124</b>	CRUB 2416.000	<i>Rubus strigosus</i> Belgrade Minnesota
<b>HDF-2007-125</b>	CRUB 2417.000	<i>Rubus occidentalis</i> Belgrade Minnesota
<b>HDF-2007-126</b>	CRUB 2418.000	<i>Rubus occidentalis</i> Hasty Minnesota

**Table 5. Alphabetical listing of Germplasm Collected**

<b>Cultivar or Local Name</b>	<b>Sample #</b>	<b>Corvallis Local Number</b>
<i>Amelanchier alnifolia</i> Spearfish	HDF-2007-105	CAME 247.001
<i>Amelanchier arborea</i> Mentone	HDF-2007-053	CAME 0245.001
<i>Amelanchier arborea</i> Stumphouse Mountain	HDF-2007-027	CAME 0246.001
<i>Asimina triloba</i> Anniston	HDF-2007-054	CASI 0079.001
<i>Asimina triloba</i> Manhattan - Pottawatomie County	HDF-2007-079	CASI 0080.001
<i>Corylus americana</i> Blue Ridge Mt. Road	HDF-2007-037	CCOR0882.001
DEAD do not log in (Sambucus died in transit)	HDF-2007-057	DEAD
<i>Duchesnea indica</i> Johnston Mill	HDF-2007-002	CDUC 0013.000 CDUC 0013.001
<i>Epigaea repens</i> - not for inventory - landscape	HDF-2007-023	CEPI 0001.001
<i>Fragaria vesca</i> East Ash Canyon, Pine Ridge Trail	HDF-2007-099	CFRA 1922.001
<i>Fragaria virginiana</i> Custer State Park	HDF-2007-103	CFRA 1923.001
<i>Fragaria virginiana</i> Spearfish	HDF-2007-104	CFRA 1924.001
<i>Fragaria virginiana</i> subsp. <i>grayana</i> Needmore	HDF-2007-067	CFRA 1917.001
<i>Fragaria virginiana</i> subsp. <i>virginiana</i> Stumphouse Mountain	HDF-2007-028	CFRA 1916.001
<i>Fragaria virginiana</i> subsp. <i>virginiana</i> Winding Stair – narrow leaf	HDF-2007-043	CFRA 1919.001
<i>Fragaria virginiana</i> subsp. <i>virginiana</i> Winding Stair	HDF-2007-042	CFRA 1921.001
<i>Fragaria virginiana</i> subsp. <i>virginiana</i> Glassy Mountain	HDF-2007-024	CFRA 1915.001
<i>Fragaria virginiana</i> subsp. <i>virginiana</i> Pollocksville	HDF-2007-004	CFRA 1914.001
<i>Fragaria virginiana</i> subsp. <i>virginiana</i> Warwoman Road	HDF-2007-033	CFRA 1918.001
<i>Fragaria x ananassa</i> Mentone	HDF-2007-065	CFRA 1920.001
<i>Humulus lupulus</i> var. <i>pubescens</i> Alma	HDF-2007-077	CHUM 1458.001
<i>Humulus lupulus</i> var. <i>pubescens</i> Chadron State Park	HDF-2007-098A	CHUM 1461.001
<i>Humulus lupulus</i> var. <i>pubescens</i> Lewis and Clark State	HDF-2007-109	CHUM 1462.001
<i>Humulus lupulus</i> var. <i>pubescens</i> Ogden, Fort Riley	HDF-2007-080	CHUM 1459.001
<i>Humulus lupulus</i> var. <i>pubescens</i> Valentine, Nebraska	HDF-2007-093	CHUM 1460.001
<i>Prunus</i>	HDF-2007-075	No accession
<i>Ribes americanum</i> Brown's Valley	HDF-2007-121	CRIB 1470.000
<i>Ribes americanum</i> Chadron State Park	HDF-2007-097	CRIB 1466.000
<i>Ribes aureum</i> var. <i>villosum</i> Metcalf Wildlife Management	HDF-2007-095	CRIB 1465.001
<i>Ribes missouriense</i> Amboy, Nebraska	HDF-2007-086	CRIB 1463.000
<i>Ribes missouriense</i> Kansas	HDF-2007-074	CRIB 1462.000
<i>Ribes missouriense</i> Oakwood Lakes State Park	HDF-2007-118	CRIB 1469.000
<i>Ribes missouriense</i> St. Paul	HDF-2007-089	CRIB 1464.000
<i>Ribes missouriense</i> East Ash Canyon, Pine Ridge Trail	HDF-2007-098B	CRIB 1467.000
<i>Ribes triste</i> East Souix Falls - Perry Nature Area	HDF-2007-114	CRIB 1468.000

<i>Rubus allegheniensis</i> Hawk Mt. Road	HDF-2007-040	CRUB 2374.001
<i>Rubus argutus</i> Chewalla Lake	HDF-2007-070	CRUB 2381.000
<i>Rubus argutus</i> Keener	HDF-2007-058	CRUB 2377.001
<i>Rubus argutus</i> Leavenworth County State Fishing Lake	HDF-2007-072	CRUB 2384.000
<i>Rubus argutus</i> Lumberton	HDF-2007-015	CRUB 2361.000
<i>Rubus argutus</i> Whitfield Road	HDF-2007-001	CRUB 2357.001
<i>Rubus cuneifolius</i> introgressed with <i>R. trivalis</i>	HDF-2007-009	CRUB 2359.001
<i>Rubus flagellaris</i> Glassy Mountain	HDF-2007-020	CRUB 2365.000
<i>Rubus flagellaris</i> traveler's rest	HDF-2007-018	CRUB 2363.001
<i>Rubus hispidus</i> Winding Stair Gap Road	HDF-2007-045	CRUB 2375.001
<i>Rubus occidentalis</i> - Pibel Lake State Recreation Area	HDF-2007-090	CRUB 2395.000
<i>Rubus occidentalis</i> Alma	HDF-2007-076	CRUB 2386.000 CRUB 2386.001
<i>Rubus occidentalis</i> Amboy, Nebraska	HDF-2007-085	CRUB 2392.000
<i>Rubus occidentalis</i> Belgrade Minnesota	HDF-2007-125	CRUB 2417.000
<i>Rubus occidentalis</i> Big Stone Lake State Park	HDF-2007-122	CRUB 2414.000
<i>Rubus occidentalis</i> Big Stone National Wildlife Refuge	HDF-2007-123	CRUB 2415.000
<i>Rubus occidentalis</i> Blue Ridge Mt. Road	HDF-2007-039	CRUB 2373.001
<i>Rubus occidentalis</i> Bonner Springs	HDF-2007-071	CRUB 2383.000
<i>Rubus occidentalis</i> Chadron State Park	HDF-2007-096	CRUB 2399.000
<i>Rubus occidentalis</i> Clay County Park	HDF-2007-110	CRUB 2406.000
<i>Rubus occidentalis</i> Clayton	HDF-2007-035	CRUB 2371.000
<i>Rubus occidentalis</i> Dahlonga	HDF-2007-046	CRUB 2382.000
<i>Rubus occidentalis</i> East Ash Canyon, Pine Ridge Trail	HDF-2007-100	CRUB 2400.000
<i>Rubus occidentalis</i> East Souix Falls	HDF-2007-115	CRUB 2410.000
<i>Rubus occidentalis</i> Glassy Mountain 1	HDF-2007-017	CRUB 2362.000 CRUB 2362.001
<i>Rubus occidentalis</i> Glassy Mountain 2	HDF-2007-019	CRUB 2364.000 CRUB 2364.001
<i>Rubus occidentalis</i> Halsey - Nebraska National Forest	HDF-2007-092	CRUB 2397.000
<i>Rubus occidentalis</i> Hasty Minnesota	HDF-2007-126	CRUB 2418.000
<i>Rubus occidentalis</i> Henry Page road	HDF-2007-034	CRUB 2370.000 CRUB 2370.001
<i>Rubus occidentalis</i> Hutson Road	HDF-2007-036	CRUB 2372.000 CRUB 2372.001
<i>Rubus occidentalis</i> Jasper	HDF-2007-050	CRUB 2376.001
<i>Rubus occidentalis</i> Lewis and Clark State Recreation Area	HDF-2007-108	CRUB 2405.000
<i>Rubus occidentalis</i> Manhattan - Pottawatomie County	HDF-2007-078	CRUB 2387.000
<i>Rubus occidentalis</i> Mentone	HDF-2007-063	CRUB 2379.000
<i>Rubus occidentalis</i> Mentone late	HDF-2007-066	CRUB 2380.001
<i>Rubus occidentalis</i> Minneapolis - Ottawa County	HDF-2007-083	CRUB 2390.000
<i>Rubus occidentalis</i> Minneapolis - Ottawa County	HDF-2007-084	CRUB 2391.000

<i>Rubus occidentalis</i> Moon Lake, Fort Riley	HDF-2007-082	CRUB 2389.000
<i>Rubus occidentalis</i> Newton Hills State Park	HDF-2007-113	CRUB 2409.000
<i>Rubus occidentalis</i> Oakwood Lakes State Park	HDF-2007-117	CRUB 2412.000
<i>Rubus occidentalis</i> Ogden, Fort Riley	HDF-2007-081	CRUB 2388.000
<i>Rubus occidentalis</i> Palisades State Park	HDF-2007-116	CRUB 2411.000
<i>Rubus occidentalis</i> Peas Creek State Recreation Area	HDF-2007-107	CRUB 2404.000 CRUB 2404.001
<i>Rubus occidentalis</i> Perry Lake	HDF-2007-073	CRUB 2385.000
<i>Rubus occidentalis</i> Red Cloud, Nebraska	HDF-2007-087	CRUB 2393.000 CRUB 2393.001
<i>Rubus occidentalis</i> Rich Mountain 1	HDF-2007-029	CRUB 2366.000 CRUB 2366.001
<i>Rubus occidentalis</i> Rich Mountain 2	HDF-2007-030	CRUB 2367.000
<i>Rubus occidentalis</i> St. Paul - North Loup State Recreation	HDF-2007-088	CRUB 2394.000
<i>Rubus occidentalis</i> Union Grove State Park	HDF-2007-111	CRUB 2407.000
<i>Rubus occidentalis</i> Valentine, Nebraska	HDF-2007-094	CRUB 2398.000
<i>Rubus occidentalis</i> Valley Head	HDF-2007-061	CRUB 2378.001
<i>Rubus occidentalis</i> Victoria Springs State Recreation Area	HDF-2007-091	CRUB 2396.000
<i>Rubus occidentalis</i> Warwoman Road	HDF-2007-031	CRUB 2368.000 CRUB 2368.001
<i>Rubus occidentalis</i> William Bartram Trail x Warwoman road	HDF-2007-032	CRUB 2369.000
<i>Rubus strigosus</i> Belgrade Minnesota	HDF-2007-124	CRUB 2416.000
<i>Rubus strigosus</i> Custer State Park	HDF-2007-102	CRUB 2402.000
<i>Rubus strigosus</i> East Ash Canyon, Pine Ridge Trail	HDF-2007-101	CRUB 2401.000
<i>Rubus strigosus</i> Newton Hills State Park	HDF-2007-112	CRUB 2408.000
<i>Rubus strigosus</i> Spearfish	HDF-2007-106	CRUB 2403.000
<i>Rubus strigosus</i> Waubay National Wildlife Refuge	HDF-2007-120	CRUB 2413.000
<i>Rubus trivialis</i> Ideal farm	HDF-2007-010	CRUB 2360.000
<i>Rubus trivialis</i> red form	HDF-2007-005	CRUB 2358.001
<i>Sambucus canadensis</i> Watertown	HDF-2007-119	CSAM 181.001
taxonomy incorrect	HDF-2007-038	<i>Styrax</i>
<i>Vaccinium arboreum</i> Anniston	HDF-2007-055	CVAC 1779.001
<i>Vaccinium arboreum</i> Jasper	HDF-2007-051	CVAC 1786.001
<i>Vaccinium arboreum</i> Mentone	HDF-2007-052	CVAC 1778.001
<i>Vaccinium arboreum</i> Potts Camp	HDF-2007-068	CVAC 1784.001
<i>Vaccinium arboreum</i> Valley Head	HDF-2007-060	CVAC 1781.001
<i>Vaccinium arboreum</i> Wahoo Willys	HDF-2007-012	CVAC 1764.001
<i>Vaccinium corymbosum</i> Mentone	HDF-2007-062	CVAC 1782.000
<i>Vaccinium corymbosum</i> NC-SL-12- L	HDF-2007-008	CVAC 1762.001
<i>Vaccinium corymbosum</i> tetraploid	HDF-2007-016	CVAC 1767.001
<i>Vaccinium corymbosum</i> tetraploid	HDF-2007-056	CVAC 1787.001

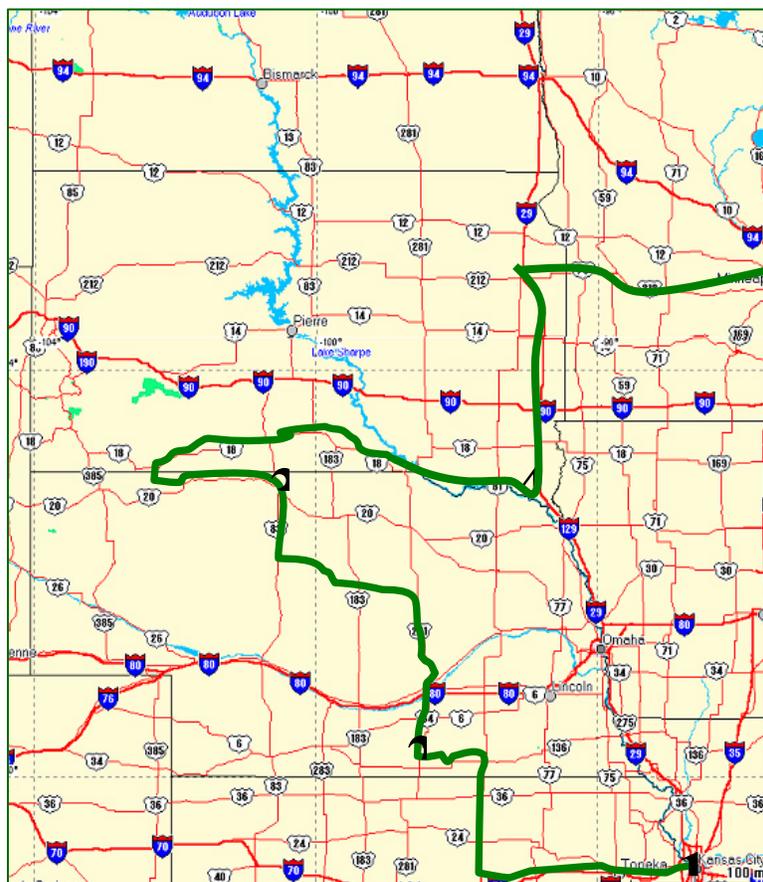
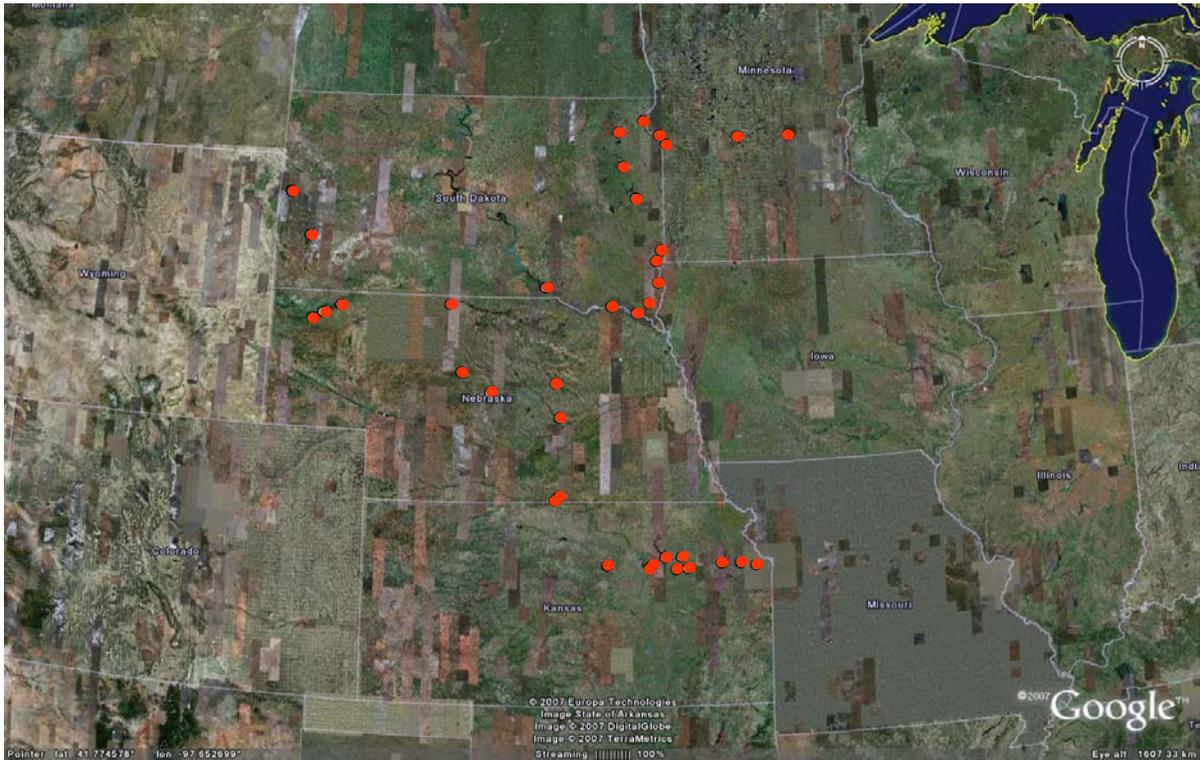
<i>Vaccinium corymbosum</i> US 508	HDF-2007-014	CVAC 1765.001
<i>Vaccinium corymbosum</i> US 74	HDF-2007-007	CVAC 1761.001
<i>Vaccinium corymbosum</i> US 75	HDF-2007-006	CVAC 1760.001
<i>Vaccinium corymbosum</i> , tetraploid	HDF-2007-003	CVAC 1759.001
<i>Vaccinium hirsutum</i> Winding Stair Gap Road	HDF-2007-041	CVAC 1773.001
<i>Vaccinium pallidum</i> Scenic	HDF-2007-059	CVAC 1780.001
<i>Vaccinium pallidum</i> Amicalola Falls	HDF-2007-049	CVAC 1777.001
<i>Vaccinium pallidum</i> Glassy Mountain	HDF2007-022	CVAC 1769.001
<i>Vaccinium pallidum</i> Stumphouse Mountain	HDF-2007-025	CVAC 1770.001
<i>Vaccinium stamineum</i> Winding Stair Gap Road	HDF-2007-044	CVAC 1774.001
<i>Vaccinium stamineum</i> - hairy form Amicalola Falls	HDF-2007-047	CVAC 1775.001
<i>Vaccinium stamineum</i> glabrous form	HDF-2007-064	CVAC 1783.001
<i>Vaccinium stamineum</i> Glassy Mountain	HDF-2007-021	CVAC 1768.001
<i>Vaccinium stamineum</i> Stumphouse Mountain	HDF-2007-026	CVAC 1771.001
<i>Vaccinium stamineum</i> Amicalola Falls	HDF-2007-048	CVAC 1776.001
<i>Vaccinium tenellum</i> Potts Camp	HDF-2007-069	CVAC 1785.001
<i>Vaccinium tenellum</i> Wahoo Willy's	HDF-2007-013	CVAC 1766.001
<i>Vaccinium virgatum</i> Castle Hayne	HDF-2007-011	CVAC 1763.001

## Appendix 1. Maps of collection localities

### A. Part 1. Collecting localities of the Southwestern states.



**B. Part 2. Collecting localities in the Midwestern states.**



## Appendix 2. Maps of black raspberry collection localities.

This USDA funded expedition allowed the collection of black raspberry, *Rubus occidentalis*, samples on the southern and western periphery of the natural range of the species. The localities enclosed within the pink boundaries were collected during summer 2007. Other dots represent localities where collaborators have collected and donated native samples to the NCGR-Corvallis, and to the black raspberry breeding program of the HCRL-Corvallis.



### **Appendix 3. Plant Collection Notes**