Autumn is the Season for Seeds – DELEP/BTA Seed Collecting Trips in 2012

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As the heat of the Arizona summer begins to wane and the monsoon is winding down, summer-flowering legume fruits are ripening, heralding the advent of the autumn seed collecting season. Thanks to generous rains in many areas of southern and eastern Arizona during the summer of 2012, prospects appeared good for collecting seeds from a variety of legume species. With vehicles loaded down with camping gear, plant presses, envelopes and seed bags, GPS units, collecting permits and various books to aid in identifying plants, intrepid staff members and volunteers from DELEP and BTA set out on a series of seed collecting trips around the state. Goals of these trips included collecting seeds of native Arizona legumes that are not yet present in the seed bank, and making additional collections of species already in the seed bank but from localities where we have not previously collected. Detailed information is recorded on each collection site for later entry into a database. Herbarium voucher specimens are collected to verify the identity of the plants from which the seeds are collected. These are deposited at the University of Arizona herbarium with duplicates sent to the Arizona State University herbarium. When collecting seeds we are careful to avoid damaging the plants and take only a small fraction of the seeds that are available in order to avoid negatively impacting a plant population.

For the first trip, from September 17-19, we headed for the Chiricahua Mountains in the far southeastern part of Cochise County. The Chiricahuas are an extensive mountain range with a rich flora that includes many species of legumes that have wider distributions in Mexico and reach the northern limits of their ranges in southeastern Arizona. Chihuahuan desertscrub and grassland communities occur at the base of the Chiricahuas while the southernmost spruce-fir forests in North America are found on the highest peaks in the range. Many of the mountain ranges in Arizona including the Chiricahuas, have experienced large wildfires over the past decade, due in part to the prolonged drought that has gripped the region. In some areas, extensive damage to the vegetation was apparent with all of the trees killed. In many other areas, the fire had burned through low on the ground sparing most of the trees, while reducing the fuel load and helping to cycle nutrients back into the soil. It was heartening to see the vigorous regrowth present in many burned areas. The monsoon rains had arrived late in the Chiricahuas this year. The vegetation was lush, but many plants were still flowering and had green fruits that were not fully developed. We based our operations out of the American Museum of Natural History’s Southwest Research Station (SWRS). The SWRS is a favorite destination for biologists and others interested in natural history the world over. Participants on this trip were BTA staff members Cathy Babcock, Tammy Knight, Lacey Pacheco, Jeff Payne, and from DELEP, Matt Johnson.
On the way from Tucson to the Chiricahuaas, we stopped to check a 1936 record of *Pomaria jamesii* near Dragoon. Cathy promptly located several plants growing within 100 feet of where we had stopped. This population has obviously found a location to its liking and has persisted through the intervening years. The plants had not flowered or fruited recently, but it was worthwhile to have verified that they were still there. We continued on to the SWRS, arriving just in time for dinner. The following morning after breakfast and a brief look at some of the native legumes growing near the SWRS, we were off towards the high country. At a stop a short distance west of the SWRS, we explored along a creek that was flowing from the recent rains. The vegetation is oak-pine-juniper woodland with a diverse understory of shrubs and herbaceous plants. Among the legume species we found were *Amorpha fruticosa*, *Calliandra humilis*, *Dalea* sp., *Desmodium batocaulon*, *Desmodium grahamii*, *Melilotus officinalis* (naturalized), *Mimosa biuncifera*, *Phaseolus maculatus*, *Rhynchosia senna* var. *texana* and *Vicia pulchella*. No ripe seeds were available but this site illustrates the diversity of legumes that can be found in a small area. Further on, we found some seeds on *Indigofera sphaerocarpa* that grew in an extensive population along the road.

We were treated to spectacular displays of wildflowers. We recorded GPS coordinates for several plants including two species of *Dalea*, for a later return trip. After lunch at Rustler Park in the shade of the mixed-conifer forest, we set out to see what was growing here. We found seeds on *Trifolium* and *Vicia pulchella*, and had an encounter with a curious deer that showed no concern for our presence. We also found a species of *Lupinus* but this had flowered and seeded earlier in the year. One of the interesting plants found here is *Iris missouriensis*. This is the only native iris in the southwestern U.S., and has beautiful blue flowers. The plants were abundantly seeded and a small seed sample was collected for evaluation at BTA. On our return trip, we traveled through the small settlement of Paradise and then headed for Portal. Small plants of at least two *Desmodium* species carpeted the sides of the road in many places. Along a south-facing limestone slope, we found ripe seeds on *Acacia constricta*. This hot, dry exposure had many plants characteristic of the Chihuahuan Desert. Before departing for home on Wednesday morning, we scouted another area near the SWRS. Among the legumes that we found were *Chamaecrista nictitans* var. *mensalis*, *Clitoria mariana*, *Cologania angustifolia*, *Coursetia caribea* var. *sericea*, *Crotalaria pumila*, at least two species of *Dalea*, four species of *Desmodium*, *Indigofera sphaerocarpa*, *Mimosa biuncifera*, *Phaseolus acutifolius*, *Rynchosia senna* var. *texana* and *Senna hirsuta* var. *glaberrima*.

For our second trip, from September 25-27, we converged in force on Lyman Lake State Park, located north of Springerville, in southern Apache County. We visited this area twice in 2011 and had found a number of legumes with seeds, and others that had not yet ripened their fruits. This time our group included BTA/DELEP director Mark Siegwarth, BTA staff members Cathy Babcock, Lorrie Polley and Kim Stone, volunteer Marceline Vandewater, and from DELEP, Matt Johnson, Kirsten Lake and her canine friend, Peeka. Upon arrival, we scouted areas where we had seen legumes the previous year. The following morning, we set out to visit several localities where particular species we were seeking had been recorded. The first site, near Greer, was at over 8200 feet elevation in a Ponderosa pine forest. We located a few plants...
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*Vicia pulchella* (T. Knight)

*Chamaecrista nictitans var. mensalis* (T. Knight)

*Phaseolus maculatus* (T. Knight)

*Mimosa biuncifera* (T. Knight)

*Cologania angustifolia* (T. Knight)

*Dalea formosa* (T. Knight)

*Indigofera sphaerocarpa* (T. Knight)
Desert Plants

of two of the species that we were looking for, a *Lathyrus* and a *Lupinus*, but these did not have seeds. However, we did find four species of *Astragalus*, all likely new for the DELEP seed bank, with abundant ripe fruits. This is an oft repeated experience when collecting seeds, where a target species is not found or lacks seeds, while other, unexpected species provide abundant seeds.

Next we drove to a site south of Springerville that we had visited the previous year. This is a small canyon with pinyon-juniper woodland on the basalt-strewn slopes and a stream lined with thickets of shrubby willows in the canyon bottom. At this location a variety of legumes including two species of *Astragalus*, *Calliandra humilis var. reticulata*, *Glycyrrhiza lepidota* and *Vicia americana* occurred. This year, we found ripe fruits on both of the *Astragalus* species, which were still flowering during our 2011 visit. We were also able to collect additional seeds from the large population of *Glycyrrhiza*. This New World licorice has distinctive, bur-like fruits. The species is uncommon in Arizona, but abundant at this site where it spreads by stems arising from the roots. After checking another location without finding either species reported from that site, we continued south towards Alpine. A stop at a gully revealed several non-fruiting legumes and an abundant *Trifolium* species that had substantial quantities of seeds. West of Alpine are extensive areas of high elevation forests and meadows. Some areas had suffered damage from recent fires but much of the forest was healthy. We located two *Trifolium* species as the daylight was fading, and enjoyed a few wild raspberries. As we headed back to the highway in the gathering dusk, we passed a herd of elk grazing in a meadow, escorted by two males with impressive antlers.

The following morning we made collections of *Hoffmannseggia glauca*, hog potato, at Lyman Lake State Park. This species is somewhat of a weed around the campground. When we were here in 2011, the plants were still flowering and had abundant green fruits, but none were ripe. This year, most fruits were ripe and many were falling from the plants. While collecting the *Hoffmannseggia*, Mark found a superficially similar looking plant but with the remnant of a tightly coiled fruit. This was obviously not one of the *Hoffmannseggia* plants. Moments later, Kirsten came across another similar plant with abundant maturing fruits. This was the elusive *Pomaria jamesii* that we had seen in southeastern Arizona the previous week. A short time later, as we returned to the cabins where we had stayed, Mark found another plant of *Pomaria jamesii* just outside of the restroom building. A search revealed more plants including several in flower and with ripe fruits. These plants are sufficiently cryptic that we had been walking past them for two days without noticing them!

For our third trip, from October 1-3, we set our sights on Graham County to explore the Pinaleño Mountains. The group, with Mark Siegwarth, Cathy Babcock, Jeff Payne, Lorrie Polley, Kim Stone, volunteers Martha Johnson and Gary Selinger, and Matt Johnson met at Roper Lake State Park, just south of Safford. Rains had been generous and the desert was carpeted with ephemeral plants, many still in flower. A hike along the nature trail revealed few legumes in fruit. The desert vegetation is dominated by *Larrea tridentata* with *Acacia constricta*, *Acacia greggii* and *Prosopis velutina* being the most conspicuous legumes. Some of the *Acacia constricta* had produced quantities of fruits so we made a collection from this species.

The following morning, we set off for the Pinaleño Mountains which rise more than 7000 feet above the surrounding desert. Mt. Graham, at 10,713 feet elevation, is the highest point in Arizona south of the Mogollon Rim. Though the Pinaleño’s had also suffered from a major wildfire, much of the forest remained intact.

The Swift Trail rises quickly from the desert lowlands through grassland, oak woodland, pine-oak woodland and pine forest to mixed-conifer forest. The highest elevations of the range support spruce-fir forest. These diverse plant communities support many species of legumes. Plants of *Vicia pulchella* greeted us along the road and provided us with a collection of seeds. A *Lupinus* species did not have any fruits. After lunch in a mountain meadow, we
located a diminutive *Trifolium* species growing in a narrow band between the open meadow and the deep shade of the spruce and fir trees. The tiny fruits of this clover were often obscured by other plants and required considerable diligence on hands and knees to locate them. Exploring a nearby area of pine and fir forest turned up *Thermopsis montana*. These plants flower in the late spring and early summer, and the fruits were already gone this year. We recorded GPS coordinates for a future visit. Further on, a species of *Lathyrus* was locally abundant along the roadside. Like a number of legumes, the fruits of this species are elastically dehiscent, quickly shattering and releasing their seeds as they dry and coil, making it a challenge to collect significant numbers of seeds. Near Riggs Lake, we found an abundantly seeded *Lotus* species, as well as more *Lathyrus* and *Vicia pulchella*. As we drove back along the road that hugs the side of the range, vistas opened up to reveal sweeping panoramas of southeastern Arizona with distant mountain ranges, inspiring thoughts of the botanical treasures that grow in their canyons and on their slopes.

On Wednesday morning we set out to explore an area northeast of Safford that Martha and Gary had previously visited. This rocky desert area supports low vegetation dominated by *Larrea tridentata*. Here we found the widespread blue palo verde, *Parkinsonia florida*, of the Sonoran Desert growing as a shrub to only five feet tall. The species is at the limit of its range here and all of the plants had suffered from the severe freeze of February 2011 with considerable die-back to their stems and with some plants killed outright. *Senna covesii* is abundant and had produced a bumper crop of seeds this year. A surprising find at this site was the Arizona queen of the night, *Peniocereus greggii*. Jeff located the first plant, with a bright red fruit, growing in a creosote bush. A search revealed a total of 15 plants in an area of less than
two acres. We undoubtedly missed many others, as this species is extremely well camouflaged and difficult to spot when not in fruit. This was an unexpected location to find this species due to the rocky soil. It typically grows in deep alluvial soils. We made another collection of *Acacia constricta* on our way back to the highway. As the company parted ways, we all took satisfaction in a successful and enjoyable adventure that yielded abundant seeds for both DELEP and BTA.

Since we were too early for many species in the Chiricahua Mountains in September, a second trip was made there from October 22-24. Cathy Babcock, Patti Baynham, Tammy Knight, Lacey Pacheco and Jeff Payne joined me for this expedition. Our timing was perfect with many legumes bearing abundant ripe fruits. After arriving at the Southwest Research Station, we set out to a nearby area in search of seeds. We were rewarded with collections of *Desmodium arizonicum*, *Desmodium batocaulon*, *Desmodium grahamii* and *Desmodium rosei* as well as *Coursetia caribea* var. *sericea*. Extensive populations of butterfly pea, *Clitoria mariana*, in this area were almost completely devoid of seeds in spite of their lush appearance.

The next day we were joined by SWRS staff members Elaine Moisan and Frank Insana, who volunteered to spend the day with us. We headed into the high country, stopping to make another collection of *Desmodium batocaulon*. While there, Patti, who had gone further up the slope than the rest of the group, came across a large population of *Tephrosia thurberi* with abundant fruits. Below Onion Saddle we relocated a population of a small annual *Dalea* species that had been flowering in September. This time the plants were drying and laden with ripe fruits. Seeds were collected from a species of *Trifolium* at Barfoot and Elaine then led us to a population of purple locoweed, *Oxytropis lambertii*. This species would make an attractive addition to gardens as a perennial wildflower, but has been implicated in livestock poisoning. A special treat was seeing a baby twin-spotted rattlesnake, *Crotalus pricei*, which Elaine found as it was crossing the road. This diminutive, high elevation rattlesnake is found in the U.S. only in the mountains of southeastern Arizona. In an extensive burned area at Onion Saddle, we found more *Oxytropis* as well as hundreds of huge plants of *Vicia pulchella* still bearing fruits. We were also able to collect some seeds of *Dalea albiflora* at this location. On our way back down the mountain we came across *Dalea versicolor*. Many of the plants were still in flower, but some stems had ripe fruits. As we set out on our homeward journey, we found a large population of *Clitoria mariana*. With diligent searching, we were able to make a modest collection of seeds of this species. In this area we also found seeds of *Mimosa grahamii* and *Desmodium psilophyllum*.

The final tally of new species from these trips will not be known until all of the herbarium specimens can be identified this winter, but we have made significant progress towards our goal of collecting seeds of those native Arizona species not yet represented in the DELEP seed bank. Seeds of numerous plants were also collected for BTA and will be grown on to add to their living collections. The herbarium voucher specimens will add to the knowledge about the distribution of these species in Arizona.

I extend my sincere appreciation to Mark Siegwarth for his strong support of these trips and to each of the BTA and DELEP staff members and the volunteers who made the success of these trips possible, and to the staffs at the Southwest Research Station, Lyman Lake and Roper Lake State Parks.