

Southwest 2024 Potato Collecting Report

Species. *Solanum jamesii* (jam) and *S. fendleri* (fen)

Location. Primarily Sandia Mountains near Albuquerque, NM

Timing. Friday August 16th – Friday August 23rd

Collections. Eight new jam germplasm samples given collection numbers BB 438-445. A new jam site was discovered at the edge of the Malpais where a leaf sample for DNA was taken. After returning from the trip, arrangements were made with Carolyn Whiting at Big Bend National Park to collect and mail silica-dried tissue samples of fen DNA from two sites along Lost Mine trail posted in iNaturalist 2016, 2017, 2023.

Participants. John Bamberg (JB), Ingrid Bamberg (IB) of US Potato Genebank (USPG).

Summary logistics and research interests. By air MSN to ABQ. Convenience of lodging at a single hotel in Albuquerque because every day except one was spent in the nearby Sandia Mountains. That day we drove a loop W to Grants and then S to Datil and Magdalena to observe condition of plants at previously known collection sites and look (unsuccessfully) at iNaturalist reported jam sites near San Mateo.

Site significance, previous observations and collections. An emphasis on Albuquerque was proposed in the Future Work section of last year's expedition report. This year presented a new collecting concept. Albuquerque is a major travel hub with 560K people—one would think the nearby Sandia Mountains with a popular ski run would be well botanized. Indeed, most of the trails along which we found jam were heavily used. Why are all unambiguous jam sites here only recently reported as iNaturalist posts—the earliest in 2013 and most later than 2020? It suggests a tremendous increase in efficiency of discovering where wild potato plants grow now that the many amateur botanists hiking trails for fun throughout every season have the technology in their pockets to snap and post verifiable pictures of potatoes at exact coordinates recorded on their cell phones. Perhaps we should expect a rapid expansion of known potato sites everywhere across the USA wild potato range. (see Appendix for a preliminary report on Aug 26th).

Map-based scouting, rainfall, and other preparations. Rainfall was monitored in advance through the AHPS (Advanced Hydrologic Prediction Service) of National Weather Service, suggesting there had been adequate moisture for the potatoes to emerge. We used, for the first time, custom maps in GoogleMaps spotted with 15 sites near Albuquerque we wanted to visit, all within a circle of about 8 miles radius from Tybee Top on the crest (see Appendix). One additional collection was reported in iNaturalist (*gwatcherofb-2024*) at Lat/Lon: 35.14917, -106.3453 on August 25th, just after we returned. We also used the AllTrails app with downloaded trails in case there was no internet on the trail. Thus, cellphone maps and location records were exclusively used this trip—we brought no other computer.

Costs. Funding of \$7500 was provided by USDA/ARS Plant Exploration Office, Beltsville. IB costs were privately contributed.

Future work in the area. National Park land cannot presently be collected as germplasm, but getting leaf samples for DNA would tell us if genetic diversity there is novel.

Deposit of records, germplasm and files. US Potato Genebank, 4312 State Hwy 42 North, Sturgeon Bay, WI, 54235. 920-559-2006. john.bamberg@usda.gov. Query individual PI records in GRIN, and

additional data and pictures are usually available in iNaturalist and SEINET. Detailed trip log, GPS track and Waypoints files, and additional photos and miscellaneous notes are available from USPG.

Permits. USFS affirms fellow USDA scientists in ARS are cooperating agents who need no formal permit.

Daily Itinerary. Previous collection references given as six-digit PI numbers. Most other site references are their iNaturalist italicized author name with the year sighted suffix.

Friday Aug 16th. Drive to Madison and fly to ABQ, arriving after midnight. First night at Sleep Inn Airport, then transfer to Fairfield on York and Gibson.

Saturday Aug 17th. Sedillo triangle intersection (*go_outside-2021*) and nearby church cemetery. Dry. Looked along S ditch of 66 near gas station before crossing N over 40. Tried to get to *stking-2020* but no public access. To Stagecoach Road intersection *jzatt-2022* for **COLLECTION #1**. Looked along Frost road at Roberts road and tried to get to Meadowlark lane site *roomthilly-2022*. Private with dogs. Down 14 to Ribs Barbeque for lunch. Back to 536 and to Sulphur Canyon and Cienega campground. **COLLECTION #2** at parking lot and up trail to *Miguel1958-2023* for **COLLECTION #3**.

Sunday Aug 18th. Hope Church on Juan Tabo Blvd and Bristol Coffee on Comanche. Then to site *wwench-2020* at SE intersection of Comanche and Tramway. Very dry. Embudito trail to *miguel1958-2022* for **COLLECTION #4**. Taj Palace lunch on Eubank. Scout Pino trailhead location. Scout La Luz trailhead location and find site *selenac-2021* for **COLLECTION #5**.

Monday Aug 19th. Pino trail site *roomthilly-2013b* for **COLLECTION #6**. Taste of India lunch.

Tuesday Aug 20nd. To Grants, Cole Mine Campground (585118 site, quite dry), then San Mateo fen Ross McCauley SEINet site, 704874, and *Sonnybamberg-2024a* on Horace Mesa Road, buy orchid potting mix in Grants, to San Mateo town and unsuccessfully look for jam on Road 456 at *christopherrustay-2022* and *Miguel1958-2022*. Back to Milan and Grants to Malpais down 117 to Narrows campground and picnic area at 34.8376 x -107.9121 (**DNA sample #1**), to Techado and 603 looking several roadside places until 60 at Pie Town and E to Baldwin Camp 691559 near Datil (no plants at all), then Datil Well Campground 701934 with a few plants easily found, supper at Datil. Not enough daylight left to go to five iNaturalist sites at E end of Meadow Road about 20m SW of Datil near Horse Mountain. Saw a few plants N (686449) and S (701935) roadside rests on 60 to W of Magdalena. Gas at Socorro, to ABQ lodging late.

Wednesday Aug 21st. Up Piedra Lisa Trail finding 9 places along trail combined into **COLLECTION #7**. Curry Leaf Indian lunch. Organizing, documenting, repotting collections and planning final day.

Thursday Aug 22nd. Back to Embudito Trail to unsuccessfully look at near site at N loop (*roomthilly-2013*). Satellite Coffee. To Bernalillo and Las Huertas campground **COLLECTION #8** (new site as *Sonnybamberg-2024b*). Range restaurant for lunch. Walmart for boxing supplies. Dust storm when returning to hotel, found good box in dumpster to just fit 3x3 quart freezer boxes holding live transplants.

Friday Aug 23th. Pack up, make partitions for box. Wash and gas truck. Check out. Taj Mahal lunch. Satellite Coffee, sun plants, return truck and wheels up from ABQ at 5:12PM. Stay with family in Madison.

Table 1. List of Germplasm Collections

All are new germplasm. Site #8 has not been previously reported to our knowledge.

PI 706429. BB 438. <i>S. jamesii</i> . United States. New Mexico. Bernalillo County. Sandia Mountains. Near Albuquerque. E from Albuquerque to 14 and N to San Antonio then E on Frost to Stagecoach Jct road. Site of iNaturalist record jzatt-2022. Corner of Stagecoach Junction and Stagecoach Junction Place roads. At WGS N35.164643° x W106.321735° and 6650 ft. Stagecoach jzatt-2022. Collection #1. August 17, 2024. Over 50 scattered plants, small, green, healthy, no flowering. Dry sandy roadside ditch in open or under small pines and junipers in fenceline. Collected live plants and mother tubers.
PI 706430. BB 439. <i>S. jamesii</i> . United States. New Mexico. Bernalillo County. Sandia Mountains. Cibola National Forest. Near Albuquerque. E from Albuquerque to 14 and N to San Antonio then W to Sandia Park and Cienega picnic grounds and trailhead. About 500ft W of Cienega trailhead parking lot on W bank of creekbed. At WGS N35.169247° x W106.384397° and 7530 ft. Cienega campground. Collection #2. August 17, 2024. About 15 plants, small and green. In moist brown sandy soil under thick leaf mulch under brush. Collected live plants and mother tubers.
PI 706431. BB 440. <i>S. jamesii</i> . United States. New Mexico. Bernalillo County. Sandia Mountains. Cibola National Forest. Near Albuquerque. E from Albuquerque to 14 and N to San Antonio then W to Sandia Park and Cienega picnic grounds and about one-half mile up Cienega trail 148. Along trail. At WGS N35.168980° x W106.388478° and 7700 ft. Cienega Up miguel1958-2023. Collection #3. August 17, 2024. Many green plants small to nearly flowering. In moist brown sandy soil under thick leaf mulch and especially under oak brush. Collected live plants and mother tubers.
PI 706432. BB 441. <i>S. jamesii</i> . United States. New Mexico. Bernalillo County. Sandia Mountains. Cibola National Forest. Near Albuquerque. From 40 up Tramline Blvd 556 and E on Montgomery road to Glenwood road and Embudito trailhead. About one mile in, along S trail fork that runs along Embudito Creek to near site of iNaturalist miguel1958-2022. At WGS N35.133026° x W106.468920° and 6740 ft. Embudito miguel1958-2022. Collection #4. August 18, 2024. About 10 plants, green, to 12 inches and with Colorado Potato beetle. In shade in moist brown sandy soil under thick leaf mulch and especially under oak brush. Collected live plants and mother tubers.
PI 706433. BB 442. <i>S. jamesii</i> . United States. New Mexico. Sandoval County. Sandia Mountains. Cibola National Forest. Near Albuquerque. From 40 N on Tramline Blvd 556 and NE on paved FR333 to La Luz trailhead parking lot. About 100ft E of edge of La Luz trail parking lot near iNaturalist Selenac-2021 about 30ft W of concrete structure, just off S side of trail. At WGS N35.219669° x W106.480370° and 7065 ft. Luz selenac-2021. Collection #5. August 18, 2024. About 20 plants, small and some wilted. Open except when under cactus in dry sandy soil. Collected live plants and mother tubers.
PI 706434. BB 443. <i>S. jamesii</i> . United States. New Mexico. Sandoval County. Sandia Mountains. Cibola National Forest. Near Albuquerque. From 40 N on Tramline Blvd 556 and E on Simms Park road to Pino trailhead parking lot. About 1.5 miles E on Pino trail along N side of trail. About 200ft W of iNaturalist site roomthilly-2013b. At WGS N35.165936° x W106.446410° and 7050 ft. Pino roomthilly-2013b. Collection #6. August 19, 2024. About 30 green plants up to 6 inches, some with flower buds and Colorado Potato beetle. Shade of oak brush in thick duff usually in moist brown soil. Collected live plants and mother tubers.
PI 706435. BB 444. <i>S. jamesii</i> . United States. New Mexico. Sandoval County. Sandia Mountains. Cibola National Forest. Near Albuquerque. From 40 N on Tramline Blvd 556 and NE on paved FR333 then about one-half mile on unpaved FR333 to Piedra Lisa trailhead parking lot. Nine places along about 2 miles of hiking trail distance and 1000ft elevation gain to iNaturalist site aeberardi-2012 at 35.24312 x -106.47514 and 8050ft. Coordinates for closest plants, only about 1000ft from parking lot, given for GRIN record. At WGS N35.223701° x W106.481551° and 7000 ft. Piedra Lisa aeberardi-2021+. Collection #7. August 21, 2024. Many plants in localized clusters, usually small and green, rarely bigger with a flower. With Colorado Potato beetle and tomato hornworm. Under shade of trees and brush in duff or among rocks. Collected live plants and mother tubers.
PI 706436. BB 445. <i>S. jamesii</i> . United States. New Mexico. Sandoval County. Sandia Mountains. Cibola National Forest. Near Albuquerque. From Bernalillo E to Placitas and gravel 165 S to Las Huertas picnic grounds. E side of hiking trail which is W of the S parking lot. At WGS N35.233985° x W106.412463° and 7660 ft. Las Huertas sonnybamberg-2024b. Collection #8. August 22, 2024. Many plants mostly in one spot along E edge of trail. Small to 12 inch plants, green, some flowering. Under shade of trees and brush in rich black mulch soil under duff. Collected live plants and tubers.

Tabel 2. New sites observed and collected as DNA only

Short site name -- iNaturalist record -- Collection number	Date	species	GRIN or lat/lon Reference	notes
Narrows picnic area <i>sonnybamberg-2024c</i> -- DNA #1	Aug 20	jam	N34.8376 x W107.9121	Small scattered plants under large pines among brush, leaf mulch and grass
Lost Mine Trail e.g. <i>pcatling-20230</i> Big Bend, TX -- DNA #2	Sept 15	fen	N29.27014° x W103.27022°	Collected by Carolyn Whiting

APPENDIX: A short preliminary report on the 2024 potato collecting trip

August 26, 2024

We met the goal of identifying a place close to a major airport/city (ABQ) where one could find *S. jamesii* like one can see the other potato species, *S. fendleri*, a short drive from Tucson on a good paved road.

We also went to Sandia Mts because, despite being very close to a major city, with lots of heavily-used hiking trails, there have been no potato reports there until recently in iNaturalist. We looked there ourselves in 1998 and some in 2019 without success.

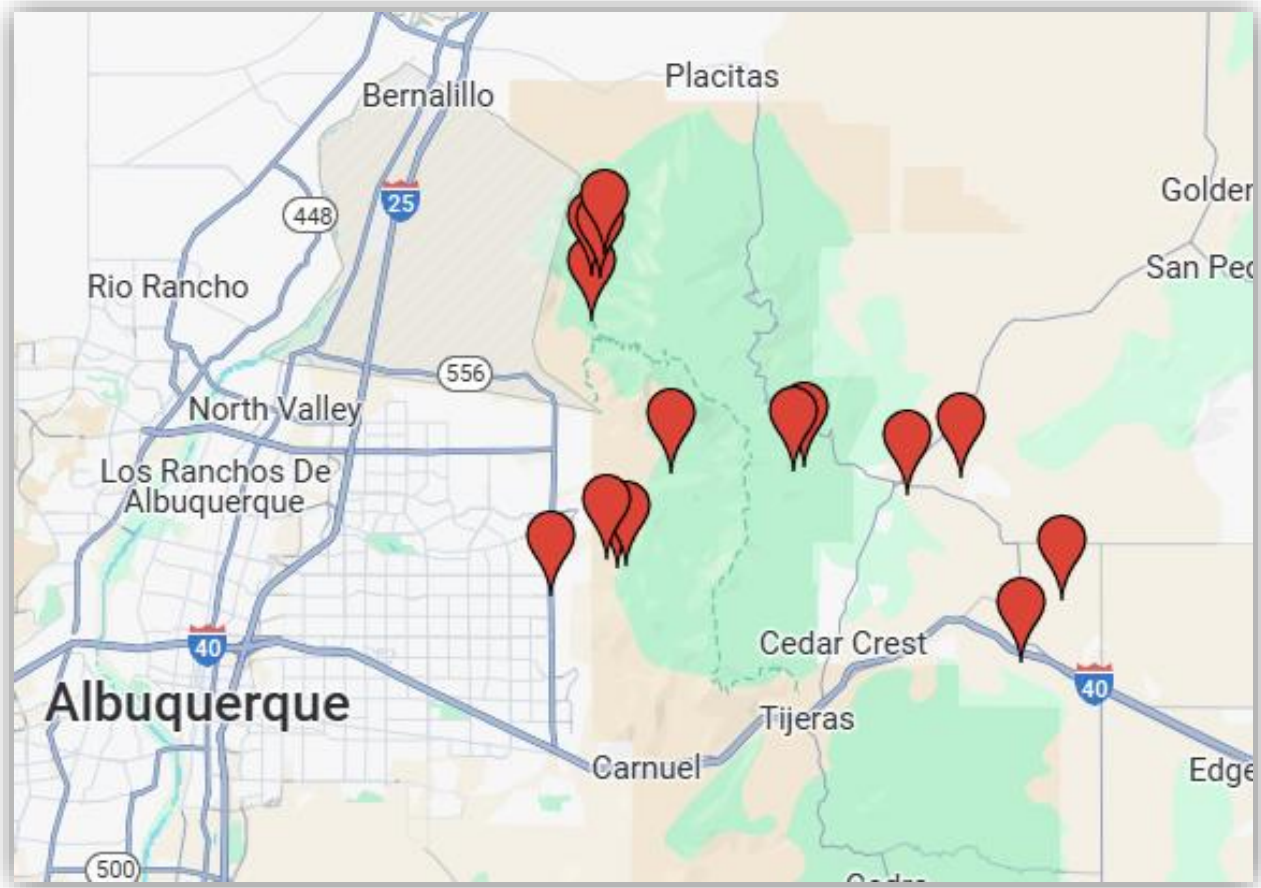
If you look for documented previous sightings in the area (Sandia Mountains near ABQ), SEINet and GBIF are not current like iNaturalist. Maybe this is a lesson for other types of data we wish we had... best results from a “crowd” approach updated in real time. This has only recently become possible for finding wild potato because every hiker who sees an odd plant with a showy white flower can take a pic with his cellphone, verify with Google, and immediately upload it with exact coordinates. What a contrast to herbarium specimens.

In fact, another lesson from this year is that since your phone has a good GPS and can download AllTrails and Google my Maps, you hardly need a separate Garmin GPS. I didn't even take a laptop this time.

So maybe the new power of reporting mentioned above means potato has not been much reported in the Sandias because it is very rare and only at the exact spots documented? We thought that for the first couple of days, since we only found potato exactly where iNaturalist had reported them. But eventually we found seven spots along a very popular trail on the west side (Piedra Lisa) where only two had been previously reported, one great site less than 1,000 ft from the trailhead. Then we found a beautiful showy colony right on the edge of the trail less than 500 ft from the parking lot of a big elaborate picnic grounds on the NE side of the crest where no potatoes have ever been reported (Las Huertas). How do we explain that?

You'd think after 32 years of exploration there would be no more big surprises. But the report of a huge population of jam at Canyonlands last year, the recent report of fen in the San Mateos (80 miles outside of the previously known range), and now the unexpected abundance in the Sandias (we got 8 new collections) makes you wonder how many more years of exploration might be worthwhile. Never the less, we plan to do a comprehensive DNA assessment this year to identify an optimum core, answer questions of fen/jam hybridity at sympatric sites, evidence of introgression from the related big-tuber *S. cardiophyllum* forms in Mexico (perhaps brought up by ancient people). Then write a 30-year summary of collecting, research and breeding with these two USA potato species.

Appendix: Reported new sites by iNaturalist. None in this area in GRIN or SIENet.



Stagecoach Collection #1



Cienega camp Collection #2 and Cienega Up Collection #3



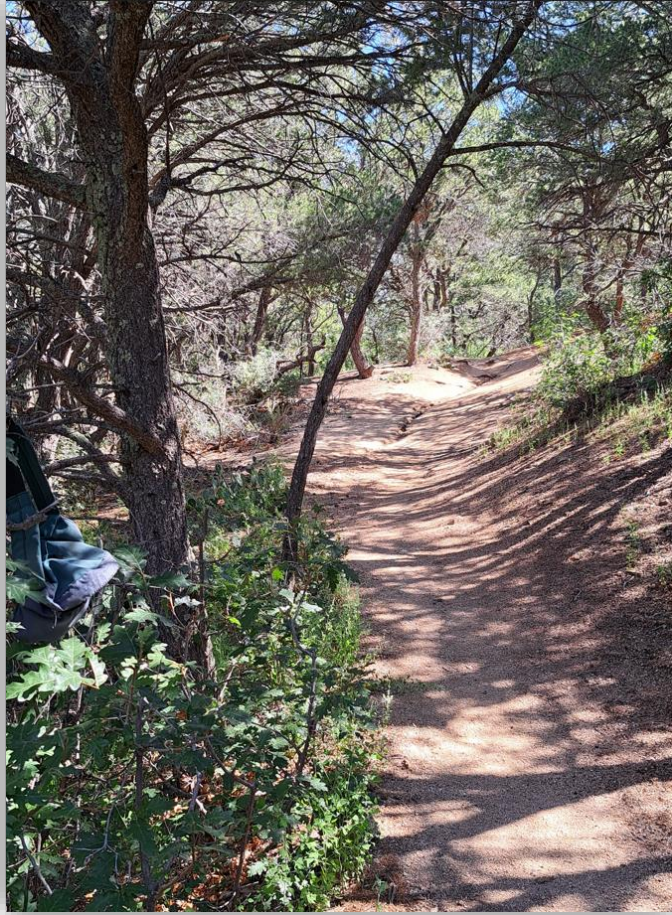
Embudito Trail Collection #4



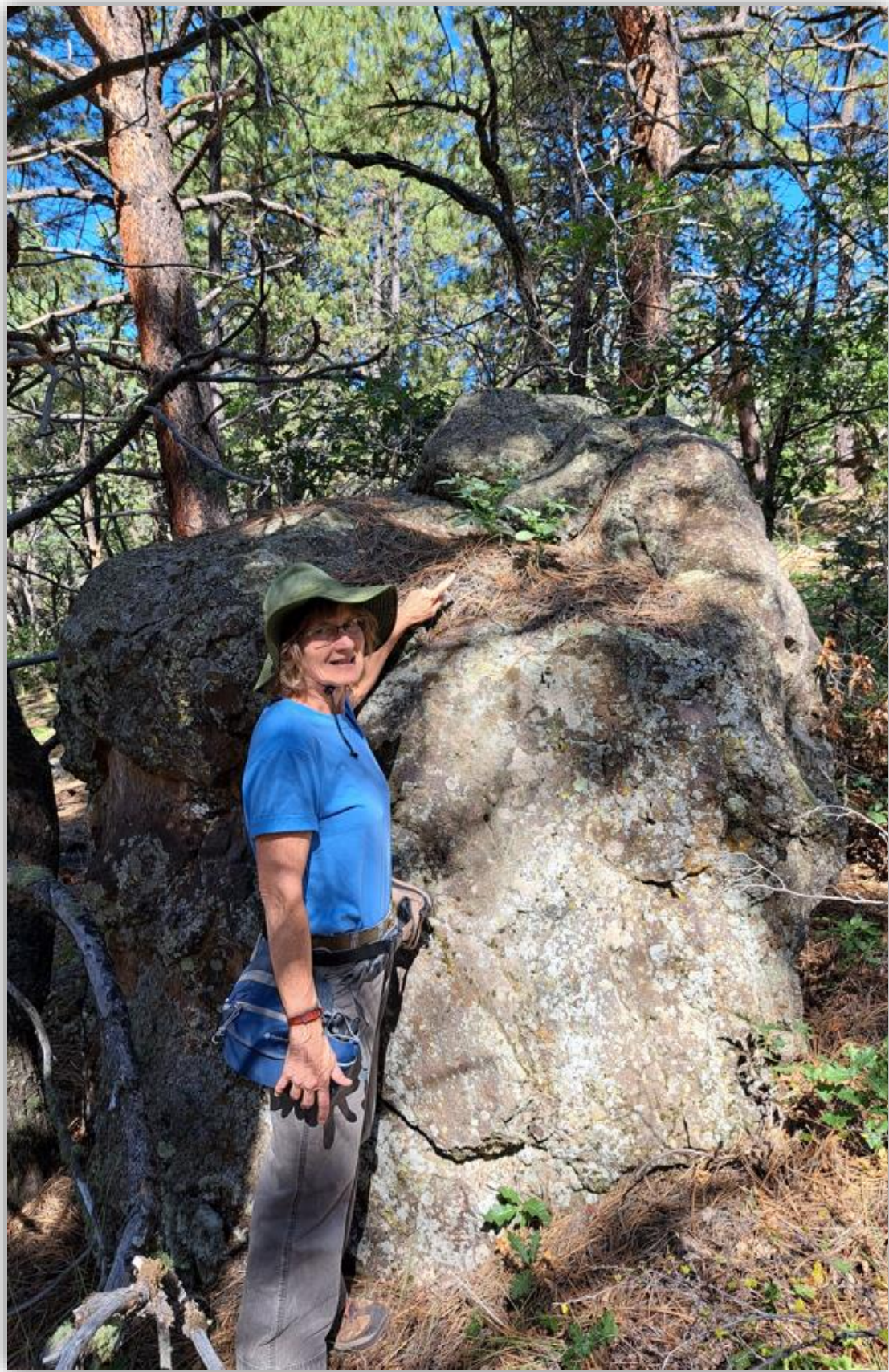
La Luz trailhead Collection #5.



Pino trail Collection #6.



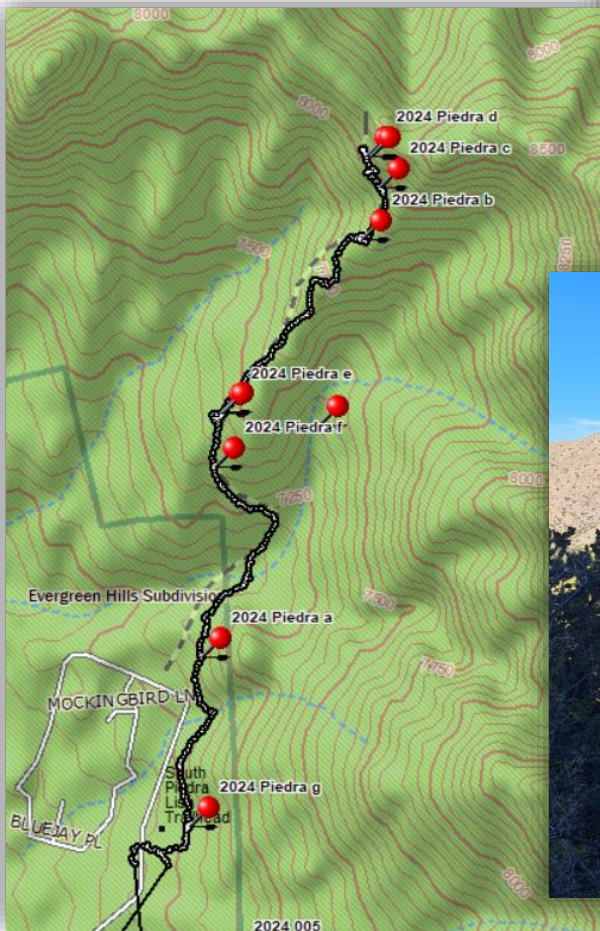
McCauley 1746 fen atop boulder at site 704874 in San Mateo mountains



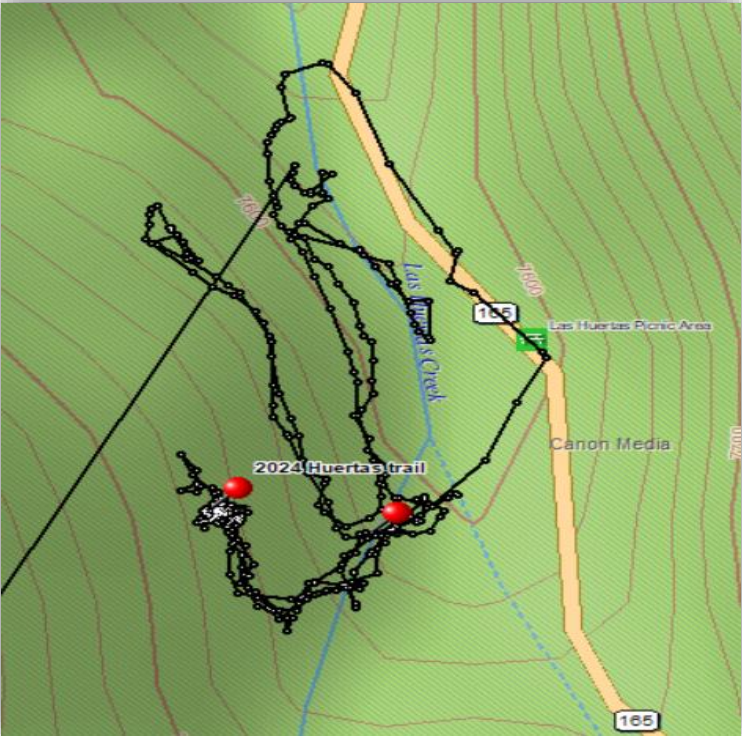
Picnic Table pad at Magdalena N site 686449 at roadside rest stop.



Piedra Lisa trail Collection #7



Las Huertas Collection #8



Plants boxed for return flight to USPG



Big Bend National Park Lost Mine trail leaf DNA sampling

