



Left Rancho la Volanta. Photo courtesy Sue Carnahan. Right View from Sierra Buenos Aires. Photo courtesy Luis Gutiérrez, Norte Photo.

Madrean Discovery Expedition to the Sierra Buenos Aires

by Thomas R. Van Devender¹, Susan D. Carnahan², and Ana L. Reina-Guerrero¹

The Sierra Buenos Aires is one of 32 mountain ranges (or complexes of several ranges) crowned by oak woodland or pine-oak forest in northeastern Sonora. These Sky Islands plus another 23 in Arizona are in the Madrean Archipelago between the northernmost Sierra Madre Occidental in Sonora and the Mogollon Rim in central Arizona. This area is part of the Mexican Pine-oak Woodlands Global Biodiversity Hotspot recognized by Conservation International in 2007. The Sierra Buenos Aires is just south of the massive Sierra de los Ajos. To the south, the Sierra la Púrica extends this Sky Island complex to Nacozari.

The Madrean Discovery Expeditions (MDE) program at GreaterGood.org documents the plants and animals in the Sonoran Sky Islands. Expeditions to the Sierra el Tigre in 2015 and the Sierra Elenita in 2016 were co-sponsored by Ajos-Bavispe Reserva Forestal Nacional y Refugio de Fauna

Silvestre, a park in the Mexican Comisión Nacional de Áreas Naturales Protegidas (CONANP) system. The Ajos-Bavispe Reserve is the sister protected area to Coronado National Forest in Arizona. In August 2016, 49 volunteer participants, including biologists, volunteers, and photographers, converged on the Sierra Buenos Aires (“good air mountain” in Spanish) to document the biodiversity. A total of 17 four-wheel-drive vehicles met in Cananea and caravanned to base camp at El Aserradero (“sawmill” in Spanish) in the Sierra Buenos Aires.

The study area was 65 km (40 mi) south of the Arizona border, just west of Douglas in the *Municipios* (‘counties’) of Bacoáchi and Fronteras. The highest peak in the Sierra Buenos Aires at 2245 m is located between Fronteras (1174 m elevation) in the Río Bavispe drainage to the east and Bacoáchi (1091 m) in the Río Sonora drainage to the west.

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Left Cardinal catchfly. Center and Right Chain fern and closeup. Photos courtesy Tom Van Devender.



Left Bellflower beardtongue (*Penstemon campanulatus*). Photo courtesy Stephen L. Minter. Right Limoncillo. Photo courtesy Sue Carnahan.

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The vegetation ranges from desert grassland up to oak woodland and pine-oak forest. Arroyo Agua Escondida flows westward from Puerto Mababi to Rancho la Volanta, while Arroyo San Vicente flows northward to join Arroyo Mababi. These canyons support riparian forests commonly with Arizona sycamore (*Platanus wrightii*) and locally Arizona alder (*Alnus oblongifolia*), bigtooth maple (*Acer grandidentatum*), and New Mexican locust (*Robinia neomexicana*). The spring at Aguaje de la Capilla in upper Arroyo el Mababi is a special place with a seepy slope covered with huge chain ferns (*Woodwardia spinulosa*) in a shady riparian deciduous forest. Most of the mountain is granite, with a few limestone areas.

The area is rich in history. Bacoáchi, a town 50 km (30 mi) southeast of Cananea, means “water snake” in the language of the Ópata Indians, a tribe that is now completely merged into the regional *mestizo* culture. The Spanish were in the area long before Mexico gained its independence in 1821. Until the 1880s, raids by Apache Indians were a constant threat.

The Spanish explorer Juan Bautista de Anza (1735-1788), born in Fronteras, led the first Spanish overland expedition to the Las Californias Province of New Spain in 1769, establishing the first Spanish settlement in California, the Presidio of San Diego, and

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Left Milkweed longhorn beetle (*Tetraopes femoratus*). Photo courtesy Charles Hedgcock. Right Milkweed (*Asclepias nyctaginifolia*). Photo courtesy Tom Van Devender.

Honoring Dr. Tom Van Devender

In October 2016, Dr. Tom Van Devender attended the X *Simposio Internacional sobre Flora Silvestre en Zonas Aridas* in Hermosillo, Sonora at the invitation of Dra. Magdalena Ortega-Nieblas. Tom represented GreaterGood.org with presentations on the Project WILDCAT predator protection program and the Madrean Discovery Expeditions database. After the presentation, Tom was honored by Jesús Sánchez-Escalante, Curator of the Universidad de Sonora Herbarium, with a slide show illustrating Tom’s nearly 50 years of field trips in Sonora, followed by the presentation of a special recognition award for his remarkable and invaluable contributions to the understanding of Sonoran natural history.

Tom is one of the most important and accomplished biologists in Arizona. He has a long-term interest in the flora and fauna of the Sonoran Desert Region, and has collected over 20,000 herbarium specimens. Many of them are deposited into the herbaria at the University of Arizona (Tucson), Universidad de Sonora (Hermosillo), and UNAM (Cd. México). He has surveyed local floras in the Sonoran Desert in the Tucson Mountains and Ironwood Forest National Monument in Arizona. He has also studied the plants in tropical forests near Alamos in southern Sonora and Mazatlán in southern Sinaloa, and in pine-oak forests near Yécora in the Sierra Madre Occidental in eastern Sonora. He and his wife Ana Lilia Reina-G. have a special interest in the flora of La Frontera, the 100 kilometer zone in northern Sonora just south of the Arizona border — especially in Chihuahuan desertscrub on limestone, desert grassland, and tropical plants at their northern range limits. He is also a herpetologist with strong interests in the biogeography of the Sky Island Region in the Madrean Archipelago.



A charter member of the Arizona Native Plant Society, Tom has generously donated his time and efforts to many Society activities and projects over the years. He has published well over a hundred research publications including journal articles, book chapters, and six books on desert grassland, the cacti of Sonora, the Sonoran desert tortoise, packrat middens, and the paleoecology of the southwestern deserts.

Congratulations Tom on this well-deserved recognition!





Left Butterfly pea. Center Smaller parasita moth (*Parasa chloris*). Right Thurber's hoarypea. Photos courtesy Sue Carnahan.

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was the first European to see the fog-bound San Francisco Bay. In 2010, Fronteras again gained prominence with the discovery of a rich fossil deposits, including many new species of ceratopsid, duck-billed ostrich, and theropod dinosaurs.

With the exception of a wildlife camera study by Ajos-Bavispe biologists, the flora and fauna were unknown prior to MDE Sierra Buenos Aires. This is ironic because Fronteras, Rancho Mababi, and Bacoáchi were important localities on the 1850-1854 survey which established the boundary between the United States and Mexico after the Mexican-American War and the Gadsden Purchase. American botanists and zoologists on the survey expedition made the first important collection in *la Frontera* along the Arizona-Sonora border. In 1851, George Thurber, a Rhode Island botanist, visited Rancho el Mababi, where he collected three new species — Thurber's diphysa (*Daubentonia thurberi*, now *Diphysa thurberi*), Thurber's hoarypea (*Cracca thurberi*, now *Tephrosia thurberi*), and Thurber's sedge (*Carex thurberi*). He also collected the first Sonoran staghorn cholla (*Cylindropuntia thurberi*) in Bacoáchi on the same trip.



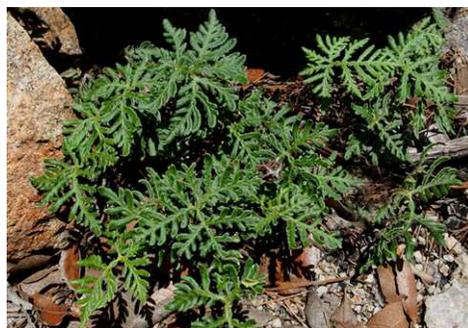
Asa Gray, considered the most important American botanist of the 19th century, was a botany professor at Harvard University for several decades. In 1854, he published *Plantae Novae Thurberianae*, a monograph describing the new genera and

species of plants collected by Thurber in New Mexico and Sonora. New species of plants named for Thurber by Gray and others in *Abutilon* and 23 other genera occur in Sonora.

The MDE Sierra Buenos Aires was a huge success. The participants from the United States (Arizona, Colorado, and North Carolina), Mexico (Sonora, Mexico City), and Canada (Alberta) went on hikes from base camp or rode in Ajos-Bavispe pickups to study areas. Cooks from Ajos-Bavispe provided delicious Sonoran breakfast and dinner to everyone. Activities included botanizing, birding, butterfly and reptile watching, photography, and always sharing discoveries. Ajos-Bavispe interns placed wildlife cameras to record nocturnal mammals. Botanists George Ferguson, Frank Reichenbacher, John Anderson, Steve Hale, Jim Malusa, Deb Sparrow, Van Devender, Carnahan, and Reina-G. combed the mountain, observing, collecting, and pressing about 400-500 species!! With every step, carpets of young limoncillo (*Dalea lumholtzii*) filled the air with a fresh lemon scent.

The Mt. Davis brickellbush (*Brickellia parvula*), seen in three different locations, was the first record for Sonora. Other noteworthy plants discovered included butterfly pea (*Clitoria mariana*), Heller's draba (*Draba helleriana*), and chain ferns. Arizona dewberry (*Rubus arizonensis*), mintleaf bergamot (*Monarda fistulosa* var. *menthifolia*), sharpglume brome

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Left Wright brachystigma. Photos courtesy Tom Van Devender. Center Copper fern (*Bommeria hispida*) and Right Slender sensitive pea. Photos courtesy Sue Carnahan. Inset George Thurber. Photo courtesy Michigan State University.

SPOTLIGHT ON A NATIVE PLANT *by Bob Herrmann, Arizona Native Plant Society, Cochise Chapter*
Rothrock's Knapweed (*Plectocephalus rothrockii*)

When some folks hear about knapweed, they think of it as an invasive species. But not so *Plectocephalus rothrockii*. Rothrock's knapweed is an Arizona native which can be seen blooming in the lower canyons of southeastern Arizona. The plant starts blooming as early as June and a few are still around in October. Rothrock's knapweed is one of our most colorful wild flowers and it is very popular with pollinators, thus making it a fun Arizona native plant to photograph. Two-tailed, Pipevine, and Giant Swallowtails compete for the nectar. The local Dull Firetip, the American and Painted Ladies, and even the Monarch butterfly also pollinate this plant. Sometimes you can be fooled as to whether you're seeing a hummingbird or the Hummingbird Hawk-moth on the flowers; both can be seen pollinating the same flower at the same time.

Plectocephalus rothrockii is a member of the Aster Family (Asteraceae) and was formerly classified in the genus *Centaurea*. It is a multi-stemmed hardy annual with lance-shaped leaves and grows up to 5 feet in height. It



bears pale purple to pink flower heads 4 to 5 inches across, with off-white to yellow centers. In Arizona, *P. rothrockii* is restricted to moist canyons of southeastern Arizona and is known to occur only in the Huachuca and Chiricahua Mountains. There is also one record of it occurring in the Pinos Altos Mountains of New Mexico. It is much more common in the Mexican Sierra Madre Mountains to the south.

Rothrock's knapweed was named for Joseph Trimble Rothrock (1839-1922) by Jesse M. Greenman of the Missouri Botanical Garden. Dr. Rothrock was a physician, botanist, and forester. He enlisted in the Civil War and was Captain of Company E, 20th Regiment, Pennsylvania Volunteer Cavalry. He later served as a surgeon and botanist under Lieutenant George M. Wheeler of the Wheeler Survey (1873-1875) for the geographical and geological exploration and survey west of the 100th Meridian. He also served as the first president of the Pennsylvania Forestry Association (PFA) in 1886.



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(*Bromus mucroglumis*), and smooth sumac (*Rhus glabra*) are rare in Sonora. Sonoran birdfoot trefoil (*Hosackia alamosana*) is a perennial herb with yellow and white petals that grows at the edge of streams. It is found from Sinaloa north through Sonora, reaching Arizona in Sycamore Canyon west of Nogales. The flowers of common species such as Arizona bluecurls (*Trichostema arizonicum*, blue and white), cardinal catchfly (*Silene laciniata*, red), coralbells (*Heuchera sanguinea*, red), firecracker bush (*Bouvardia ternifolia*, red), Huachuca Mountain adder's-mouth orchid (*Malaxis corymbosa*, pale yellow), Parry's sage (*Salvia parryi*, blue), pineapple sage (*S. elegans*, red), slender sensitive pea (*Chamaecrista serpens*, yellow), and Wright brachystigma (*Brachystigma wrightii*, yellow) are always lovely.

Clitoria mariana was described in 1783 by the Swedish botanist Carl Linnaeus. It is a perennial herb with a lovely lavender flower native to the eastern and southwestern United States and Asia. Although Linnaeus is considered the father of modern



taxonomy, he was an iconoclast with a rakish wit, and was despised by the church at the time. His scientific names often had earthy connotations. He named our stalked puffball *Lycoperdon* — “wolf fart” in Latin! *Cracca* was another Linnean name.

GreaterGood.org is continuing the tradition of expeditions — sending large groups of biologists to document the animals and plants in the Sonoran Sky Islands of Sonora, Mexico, for conservation, research, and education. It will take months to transcribe notes and identify unknowns. But it is clear that there will be a thousand or more records, hundreds of them with images, documenting the biodiversity of another Sky Island in the Madrean Archipelago. All of these observations and images will be publicly available in the Madrean Discovery Expeditions database (MadreanDiscovery.org).



Inset Carl Linnaeus. Photo courtesy Wikipedia.