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J. Travis Columbus

Rancho Santa Ana Botanic Garden

Hester L. Bell

Rancho Santa Ana Botanic Garden

Rosa Cerros-Tlatilpa

Rancho Santa Ana Botanic Garden

M. Patrick Griffith

Rancho Santa Ana Botanic Garden

J. Mark Porter

Rancho Santa Ana Botanic Garden

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SCHAFFNERELLA REDISCOVERED! (GRAMINEAE, CHLORIDOIDEAE)

J. TRAVIS COLUMBUS, HESTER L. BELL, ROSA CERROS-TLATILPA, M. PATRICK GRIFFITH, AND J. MARK PORTER

Rancho Santa Ana Botanic Garden
1500 North College Avenue
Claremont, Calif. 91711-3157
e-mail: j.travis.columbus@cgu.edu

ABSTRACT

From 1876 to 1880 in San Luis Potosí, Mexico, J. G. Schaffner made the first collections of a small grass that later was named *Schaffnerella gracilis* (Chloridoideae). The monotypic genus apparently was not encountered again by botanists until 2001, when, during a targeted search, we discovered it in the Sierra de San Miguelito growing along the Río Potosino, ca. 6 air km southwest of the city of San Luis Potosí. Most of the 100–150 plants encountered along a 3-km stretch of the Río Potosino above the village of Escalerillas and reservoir El Potosino were growing in a moist alluvium of rock and sand. Historically known to occur some 10 km or more downstream near Morales, a village at the western edge of the city of San Luis Potosí, *S. gracilis* has been impacted adversely by the creation of dams. Much additional field work is required to determine the geographic range and frequency of the species. Also needed are life history and population-level studies.

RESUMEN

De 1876 a 1880, en San Luis Potosí, México, J. G. Schaffner hizo sus primeras colectas de un pasto pequeño posteriormente llamado *Schaffnerella gracilis* (Chloridoideae). Este género monotípico fué encontrado hasta el 2001 por los autores en la Sierra de San Miguelito en el Río Potosino, ca. 6 km (aire) al suroeste de la ciudad de San Luis Potosí. De 100 a 150 plantas fueron encontradas a lo largo de 3 km en el Río Potosino, poblado de Escalerillas y Presa El Potosino creciendo en aluvión arenoso-rocoso. *Schaffnerella gracilis* ha sido impactada adversamente por la creación de presas ya que su ocurrencia histórica era el río cercano a Morales, un poblado al oeste de la ciudad de San Luis Potosí. Se requiere trabajo adicional para determinar el rango geográfico y la frecuencia de las especies, así también es necesario realizar estudios a nivel poblacional y de historia de vida.

Key words: Chloridoideae, Gramineae, Mexico, rediscovery, San Luis Potosí, Schaffner, *Schaffnerella*, *Schaffnerella gracilis*, Sierra de San Miguelito.

In 1882 George Bentham described the genus *Schaffnera* and species *S. gracilis* from plants collected by J. G. Schaffner in the state of San Luis Potosí, Mexico. *Schaffnera* turned out to be a later homonym and was renamed *Schaffnerella* by Nash (1912). The affinities of this puzzling grass, beyond being a member of subfamily Chloridoideae (e.g., Clayton and Renvoize 1986), remained unknown until recently (Columbus et al. 2000, unpubl. data). Adding to its mystery, no specimens known to us had been collected since Schaffner's, over 120 years ago! Was the species now extinct, grazed out by livestock or its former habitat built over? Or was this annual (as suggested by Schaffner's specimens) species still extant, but had been overlooked due to its relatively small stature (stems mostly < 15 cm long, often ascending or decumbent), restricted distribution, and/or limited numbers or absence during drought years? Its distinctive morphology even suggested to us that it may be a transient intergeneric hybrid that Schaffner had happened upon.

Our attempt to relocate *S. gracilis* in the field began with a study of Schaffner's specimens. Assembling 14 sheets from 11 herbaria in the United States of America, including POM and RSA, we found that his specimens of the species are not particularly rare. (For a brief biography of Schaffner and a discussion of his San Luis Potosí collections, see Rzedowski [1959].) Although most specimens are numbered with both 134 and 1070, it became apparent to us that plants were collected at different times, with dates ranging from 1876 to 1880 (two specimens further indicate August), and possibly from different sites. However, only one specimen possesses a specific collection locality and none indicates habitat (besides "mountains") or elevation. One of the specimens has no locality data beyond "Mexico" and half indicate only "San Luis Potosí, Mexico". Another adds "Mountains" and three more, "San Miguelito Gebirge [German, Schaffner's native tongue, for mountain range]". Wrapping around the west and south sides of the city of San Luis Potosí, the NNW-SSE trending Sierra de San Miguelito is ca.

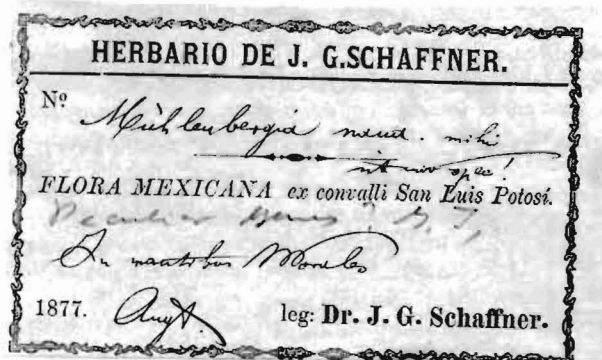


Fig. 1. The most specific of J. G. Schaffner's collections of *Schaffnerella gracilis* as to locality (GH). The plant is 12 cm tall.

50 km long and averages ca. 20 km wide, and rises from 1900 m on its east side to a maximum elevation of 2870 m. Labels on the two remaining specimens are printed with "ex convalli San Luis Potosí". As discussed by Rzedowski (1959), it is uncertain how Schaffner delimited the Valley of San Luis Potosí. One of these specimens also bears, in script, "In montibus San Miguelito", and the second, "In montibus Morales" (Fig. 1). This latter specimen is by far the most specific as to collection locality. Morales, absent from many maps, is a small village lying at the western edge

of the city of San Luis Potosí. It is situated at the mouth of a large canyon, carved out by the Río Santiago, leading west into the Sierra de San Miguelito. Although we had determined that Schaffner collected the species on multiple occasions over five years, and that one of his localities was fairly specific, the absence of any reports of *Schaffnerella* for over a century did not leave us optimistic about finding plants in the wild.

Armed with the foregoing information, in August 2001 we contacted Dr. Jerzy Rzedowski (Instituto de Ecología, Pátzcuaro, Michoacán, Mexico), who founded the herbarium at the Universidad Autónoma de San Luis Potosí (SLPM) in 1954 and remained there until 1959, and is the authority on Schaffner. He responded with no specific information regarding *Schaffnerella*, except that he had looked for it on his collecting trips, but indicated that he thought Schaffner had collected a lot in the Sierra de San Miguelito along a road from Escalerillas (along Hwy. 80, which crosses the Sierra, ca. 5 air km southwest of the city of San Luis Potosí) to Jesús María (ca. 25 air km south of the city), especially around a place named Cueva del Mezquite. Dr. Rzedowski kindly drew and provided a map for us. On none of our purchased maps did we find Cueva del Mezquite or indication of a road leading all the way from Escalerillas to Jesús María.

On 24 September 2001 we set out from Claremont, California, on a 23-day plant collecting trip that took us to Oaxaca, Mexico. Two days were set aside to search for *Schaffnerella*. On the evening of 30 Sep we arrived in the city of San Luis Potosí and awoke early the next morning to find the local flora prospering from an abundance of rainfall—important when one is in pursuit of a presumed annual. Rather than begin our search in the area around Morales, a name on a Schaffner specimen but a place now greatly impacted by humans and livestock, we opted to spend the first day searching along the route suggested by Dr. Rzedowski. A several-minute drive on Hwy. 80, including a stretch along the picturesque Cañon Santiago, took us into the Sierra de San Miguelito and to the village of Escalerillas. Here we asked a local about Cueva del Mezquite and the road to it. To our dismay, although he knew of the place, he said that no road led to it. Rather than hike in, we decided to drive around the west and south flanks of the Sierra to Jesús María, periodically stopping for brief searches in diverse habitats, and try our luck from the other side. That afternoon found us in the small town of Jesús María with some good collections in hand but no *Schaffnerella*. We inquired about Cueva del Mezquite of a middle-aged man, a mason by profession, whom we encountered. He too knew of this place and indicated that no road went there. However, he did know of a road that went part way, an option we chose. Accompanied by this man (for twice his daily

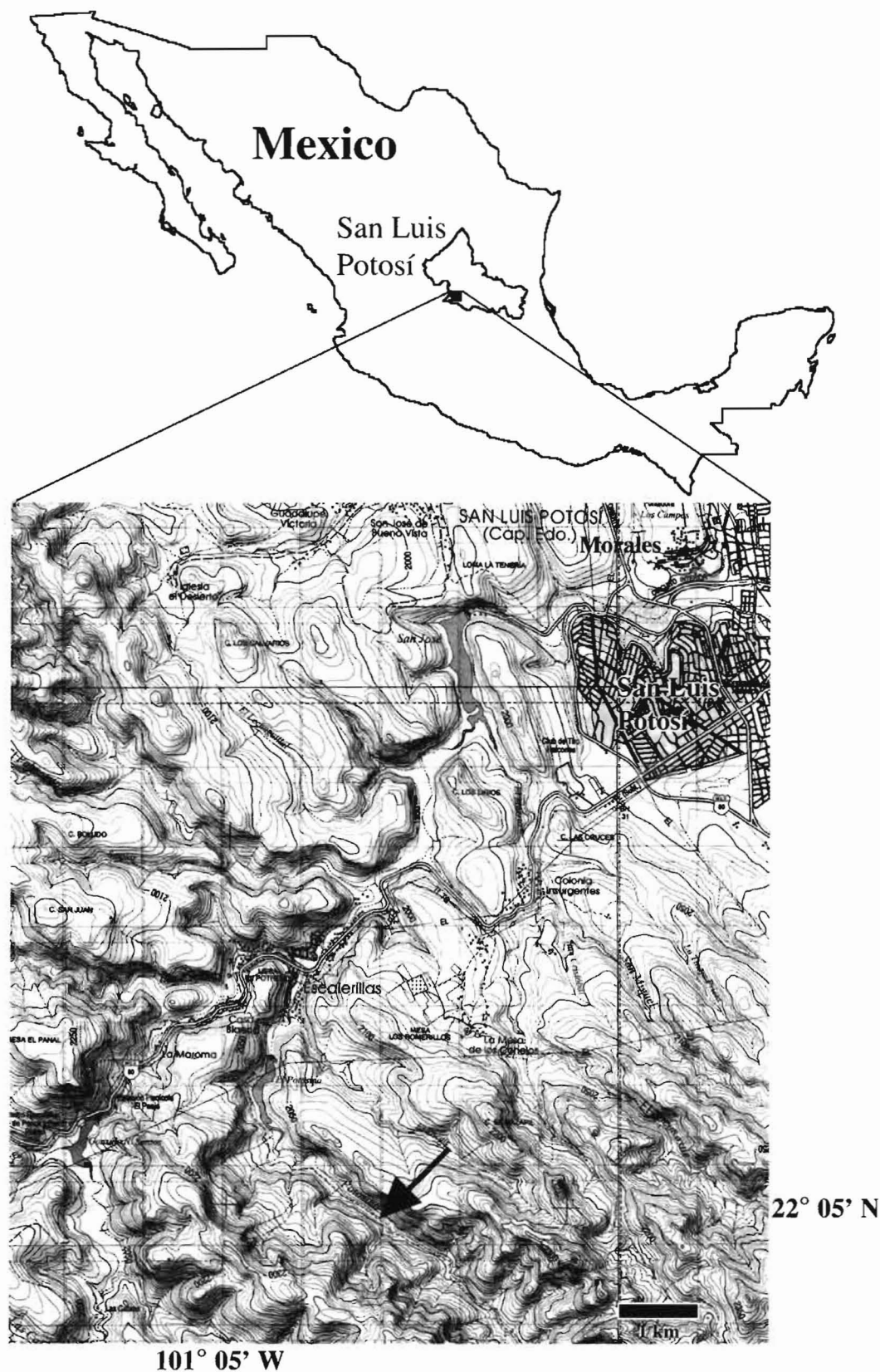


Fig. 2. Map of the rediscovery site. Denoted by an arrow is the location where *Schaffnerella gracilis* was first encountered. The topographic map is a portion of map F14A83 (Tepetate; 1:50,000) from the Instituto Nacional de Estadística, Geografía e Informática (Mexico).



Fig. 3. The rediscovery site of *Schaffnerella gracilis* along the Río Potosino in the Sierra de San Miguelito, San Luis Potosí, Mexico. View looking southeast and upstream towards the high reaches of the Sierra.

wage) we cautiously crept northwest in our four-wheel-drive truck up towards a large canyon (La Laja) in the Sierra. The old track was scarcely discernable and had been washed out in a number of places—places our guide fortunately knew how to get around. At the mouth of the canyon, unable to proceed farther by vehicle, we parked and our guide led us by foot up the canyon for ca. 2 km until we reached what he knew as Cueva, nothing more than a rock overhang in the canyon bottom. Searching both sides of the canyon for a couple of hours, we saw no sign of *Schaffnerella*, although some pre-anthesis plants of an annual *Muhlenbergia* Schreb. species drew our attention. With dusk fast approaching, we retreated to the vehicle and back to the city—day one had ended.

Our plan for the second and final day (2 Oct) of searching was to spend the first part of the day looking around Morales and then hike as far as time allowed from Escalerillas towards Cueva (Fig. 2). A few hours of walking the open, rocky ridge between Morales and Presa San José, made interesting by the adjacent, active rifle target range, yielded no sign of our mysterious grass. At midmorning we turned into the narrow main street of Escalerillas and managed to locate a

place wide enough to park the vehicle, then readied our packs and set out by foot, under overcast skies, up the Río Potosino, a major tributary of the Río Santiago. We found a dirt road that followed the canyon and soon we encountered Presa El Potosino, a reservoir overlooking Escalerillas. Along the way we searched the open, rocky slopes, being teased once again by a pre-anthesis annual *Muhlenbergia* species. After ca. 2 km of walking we reached the upper end of Presa El Potosino and after another km the road forked, one road remaining in the bottom, where a stream flowed, and the other angling up the northeast side of the canyon. Above us we observed sizable excavations, accessible from the upper road. (Later we learned that the rhyolitic parent material is mined by hand and transported as blocks via dump trucks the short distance to Escalerillas, where they are sculpted and lathed into statues, fountains, and other decorative objects, and sold along Hwy. 80 which connects the cities of San Luis Potosí and Guadalajara, Jalisco.) In order to cover as much ground as possible and explore different habitats, we elected to split up into two groups, each following one of the roads. The group in the canyon bottom searched the lower slopes, bounc-



Fig. 4. *Schaffnerella gracilis*. Plant ca. 10 cm tall.

ing from one side of the canyon to the other. Old rock corrals were encountered along the way. Soon the canyon narrowed appreciably, its sides too steep to easily climb, and the group was relegated to proceeding in the rocky, sandy bottom along the stream and road.

After walking a short distance in the canyon bottom, panning intently from side to side at the ground, occasionally glancing ahead at the beckoning high peaks of the Sierra, the lead author's focus was drawn to a small grass growing at the moist edge of the road track. It was instantly recognized as the elusive *Schaffnerella gracilis*, in full flower (Fig. 3–5)! Following a brief yet euphoric celebration, another plant was spotted nearby. Working both up- and downstream, our two groups united for an intensive search of the stream bed. Gradually more plants were discovered, indeed for at least a kilometer farther upstream and all the way back down the stream course to the reservoir. Although we now had a fix on the habitat of Schaffner's grass, finding plants proved to be a challenge because they were sporadic, though sometimes in clusters of several plants, and difficult to see against the rocky background. A few plants were found on a relatively dry, sandy bank, but the remainder of the 100–150 plants ultimately discovered were growing on moist alluvium of rock and sand. Based on these field observations and the growth of

transplants in a controlled environment chamber at Rancho Santa Ana Botanic Garden, the plants indeed appear to be of annual longevity.

Voucher plants (*Columbus 4040*) were collected from the site of original discovery, at 22°04'55"N, 101°03'51"W, and an elevation of 1980 m (Fig. 2). Specimens will be deposited at RSA, MEXU, and elsewhere. Grass associates included *Aegopogon cenchroides* Humb. & Bonpl. ex Willd., *Aristida adscensionis* L., *A. divaricata* Humb. & Bonpl. ex Willd., *A. gypsophila* Beetle, *A. pansa* Wooton & Standl. f. *dissita* (I. M. Johnst.) Allred & Valdés-Reyna, *A. scribneriana* Hitchc., *Bouteloua curtipendula* (Michx.) Torr., *B. gracilis* (Kunth) Lag. ex Griffiths, *B. hirsuta* Lag., *B. simplex* Lag., *Chloris virgata* Sw., *Cynodon* Rich. sp., *Digitaria* Haller sp., *Eragrostis intermedia* Hitchc. var. *intermedia*, *E. pectinacea* (Michx.) Nees, *Heteropogon* Pers. sp., *Leptochloa* P. Beauv. sp., *Lycurus phalaroides* Kunth, *Melinis* P. Beauv. sp., *Microchloa kunthii* Desv., *Muhlenbergia glauca* (Nees) B. D. Jacks., *Paspalum* L. sp., and *Schizachyrium sanguineum* (Retz.) Alston. Nongrass associates included *Agave* L. sp., *Aphanostephus ramossissimus* DC., *Aster subulatus* Michx. var. *parviflorus* (Nees) Sund., *Baccharis salicifolia* (Ruiz & Pav.) Pers., *Castilleja nervata* Eastw., *Cordia glauca* Hemsl., *Conyza filaginoides* (DC.) Hieron., *Crusea* Cham. & Schldl. sp.,



Fig. 5. Two inflorescences of *Schaffnerella gracilis*, each 1.5–2 cm tall.

Diodia teres Walter, *Drymaria arenarioides* Willd. ex Roem. & Schult., *Euphorbia ophthalmica* Pers., *E. potosina* Fernald, *Evolvulus alsinoides* (L.) L., *Gomphrena decumbens* Jacq., *Guilleminea densa* (Willd. ex Roem. & Schult.) Moq., *Heterosperma pinnatum* Cav., *Isocoma veneta* (Kunth) Greene, *Lobelia berlandieri* A. DC., *Mecardonia vandelliioides* (Kunth) Pennell, *Mimosa aculeaticarpa* Ortega var. *biuncifera* (Benth.) Barneby, *Opuntia robusta* J. C. Wendl., *Piqueria laxiflora* B. L. Rob. & Seaton, *Plantago ovata* Forssk., *Sisyrinchium schaffneri* S. Watson, *Stevia serrata* Cav., *Tagetes micrantha* Cav., *Zornia reticulata* Sm., and an undetermined Compositae sp.

Due to time constraints, we were unable to expand our search beyond this section of the Río Potosino. *Schaffnerella gracilis* almost certainly occurs farther up the long canyon, and, from Schaffner's Morales specimen, we know that historically it was found some 10 or more km downstream (Fig. 2). A careful search of Río Santiago between Escalerillas and Morales

might yield some plants, but this area, which includes the 2–4 km-long reservoir San José, has been significantly impacted by humans. Exploration of other canyons nearby, especially the large drainage just southwest of Cañon Potosino, above another reservoir, Gonzalo N. Santos, likely would bear fruit.

It is clear that creation of dams has adversely impacted *Schaffnerella*, certainly by submerging habitat, but perhaps also through a reduction in flood frequency and magnitude downstream. Livestock grazing and roads are additional threats to the species, as we observed. Some of the plants we encountered had been grazed by livestock, and the road in Cañon Potosino is located in the bottom in places, including where the first plant was discovered at the edge of the road track. In order to ascertain fully the rarity of *S. gracilis* and the threats posed to the species, much additional field work is required to establish its geographic limits and frequency, and also needed are life history and population-level studies. We hope that our rediscovery will stimulate interest in the biology and conservation of this elusive, long-lost monotypic genus.

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LITERATURE CITED

- BENTHAM, G. 1882. Plate 1378. *Schaffnera gracilis*, Benth. *Hooker's Icon. Pl.* 14: 59.
 CLAYTON, W. D., AND S. A. RENVOIZE. 1986. Genera graminum: grasses of the world. *Kew Bull., Addit. Ser.* 13: 1–389.
 COLUMBUS, J. T., M. S. KINNEY, M. E. SIQUEIROS D., AND R. CERROS T. 2000. Homoplasy, polyphyly, and generic circumscription: the demise of the Boutelouinae (Gramineae: Chloridoideae). *Amer. J. Bot.* 87(Suppl.): 120.
 NASH, G. V. 1912. *Schaffnerella*, p. 141. In *North American flora*, Vol. 17. New York Botanical Garden, New York.
 RZEDOWSKI, J. 1959. Las colecciones botánicas de Wilhelm (José Guillermo) Schaffner en San Luis Potosí. I. *Acta Ci. Potos.* 3: 99–121.