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Figure 1. 2014 Mt. Ayanganna Expedition team (from left to right): Boyeid Edmond, John L. Clark (back row), Christopher Andrew, Jon Grammer (back row), Clafford Joseph, Rodney Daniel, Peter Joseph, Christopher Milensky (back row), Franzin Edmon, and Luciano Edmon.

EXPLORATORY RESEARCH EXPEDITION TO MT. AYANGANNA IN THE INTERIOR OF GUYANA

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IN FEBRUARY 2014 I PARTICIPATED IN AN EXPEDITION TO WESTERN Guyana in South America to visit Mount Ayanganna. The objective of our expedition was to scout the relatively unexplored eastern side of Mt. Ayanganna for an upcoming research expedition. The small size of our team greatly facilitated our ability to mobilize and assess the route to the summit of Mt. Ayanganna in a relatively short time period. Participants in addition to myself included Chris Milensky (of the Smithsonian Institution's Division of Birds), Jon Grammer (an undergraduate student from The University of Alabama), and seven Patamona Amerindians (Figure 1).

Mount Ayanganna (2080 m high) is the highest mountain wholly within Guyana. (Mt. Roraima is higher, but it is on the border with Venezuela and Brazil.) Ayanganna is a *tepui*, a flat-topped mountain that is formed from exposed Roraima sandstone. The mountain consists of multiple tiered escarpments that are comprised of precipitous cliffs and gently sloping plateaus. Walking up a *tepui* is different from other mountains in rainforest regions because slogging through knee-deep mud and a constant barrage of steep hills is replaced here by level ground of hard-packed sand that is interrupted by cliffs. Shallow puddles accumulate on the level ground and hiking on the four billion year-old exposed sandstone is like walking on a beach without waves and then navigating steep climbs to access another plateau.

We ascended a route that had been pioneered in 2001 by Dr. David Clarke from the University of North Carolina at Asheville. Dr. Clarke's exploration in Guyana was funded through the Smithsonian Institution's Biological Diversity of the Guianas Program. He was a resident collector in Guyana (1995-1997) and his exploratory expeditions facilitated the discovery of many new species, botanical novelties, and publications on plant diversity of the Guiana Shield (Kelloff et al. 2011).

My interest in visiting the Pataro-Siparuni Region in Guyana and Mt. Ayanganna is because it is the only known locality for *Lampadaria rupestris*, a monotypic (i.e., only one species) genus in the Gesneriaceae. *Lampadaria* is endemic to Guyana and it is only known from two collections. Feuillet and Skog (2003) described *Lampadaria* from collections made by David Clarke, and it is the only genus in the New World Gesneriaceae that has never been evaluated in a phylogenetic context using molecular sequence data.

My dream to visit Ayanganna was made possible through an opportunity facilitated by Chris Milensky, museum specialist at the Smithsonian Institution's Division of Birds. Chris has extensive experience in Guyana from more than two decades of exploratory collecting expeditions. He was gracious in allowing me to accompany him on a preliminary scouting trip. Chris returned to the area one month after our trip to lead an extensive collections-based expedition with a primary emphasis to collect birds. Chris was assisted by Aleksandar "Aleks" Radosavljevic from the Chicago Botanic Garden who was to collect the gesneriads featured in this report. Aleks' collections will be made available for ongoing studies at the Smithsonian Institution's National Museum of Natural History.

All expeditions to the interior of Guyana mandate meticulous and comprehensive preparations because all necessary supplies must be transported on a small plane. We calculated three pounds of food/person/day (10 people × 7 days × 3 pounds/person/day = 210 pounds). Equipment is an additional 200 pounds and three men with clothing weigh approximately 500 pounds. Our Cessna 206 flight was limited to 1050 pounds, and the total weight that we calculated the night before our departure was only 910 pounds (200+210+500). Another important factor to calculate is total weight for the return flight because remote landing strips have short runways and mandate even lighter loads for a safe takeoff.

Our seven Patamona Amerindian workers walked three days from various villages along the upper Ireng River on the Brazilian border to meet us at an overgrown airstrip that was originally built for a currently inactive diamond mine. The arrangements for our trip were made in early December of 2013 via a logistically complicated string of communication. We had faith that our guides would arrive early, clear the landing strip from overgrown vegetation, prepare a base camp, and meet us on the pre-arranged date of arrival (assuming good weather). The non-conventional communication is hard to imagine, but the beauty of working in countries like Guyana is experiencing a system of communication that does not depend on telephones or computers.

Our first day in Guyana began in the capital, Georgetown, at the Ogle Airport. It ended by arriving on the landing strip near Mt. Ayanganna and setting up base camp. We just had time for a brief walk before dark. One of the first plants that I observed was *Lesia savannarum* (Figure 2), a recently described genus (Smith & Clark, 2013) that I published collaboratively with James Smith from Boise State University. This taxon was previously classified first as a member of the genus *Alloplectus* and then reclassified in the genus *Nematanthus*. Its confusing classification is a result of its isolated phylogenetic position that is supported by molecular sequence data (Clark et al. 2006, 2012), morphological characters, and biogeography. The name *Lesia* honors Laurence E. Skog

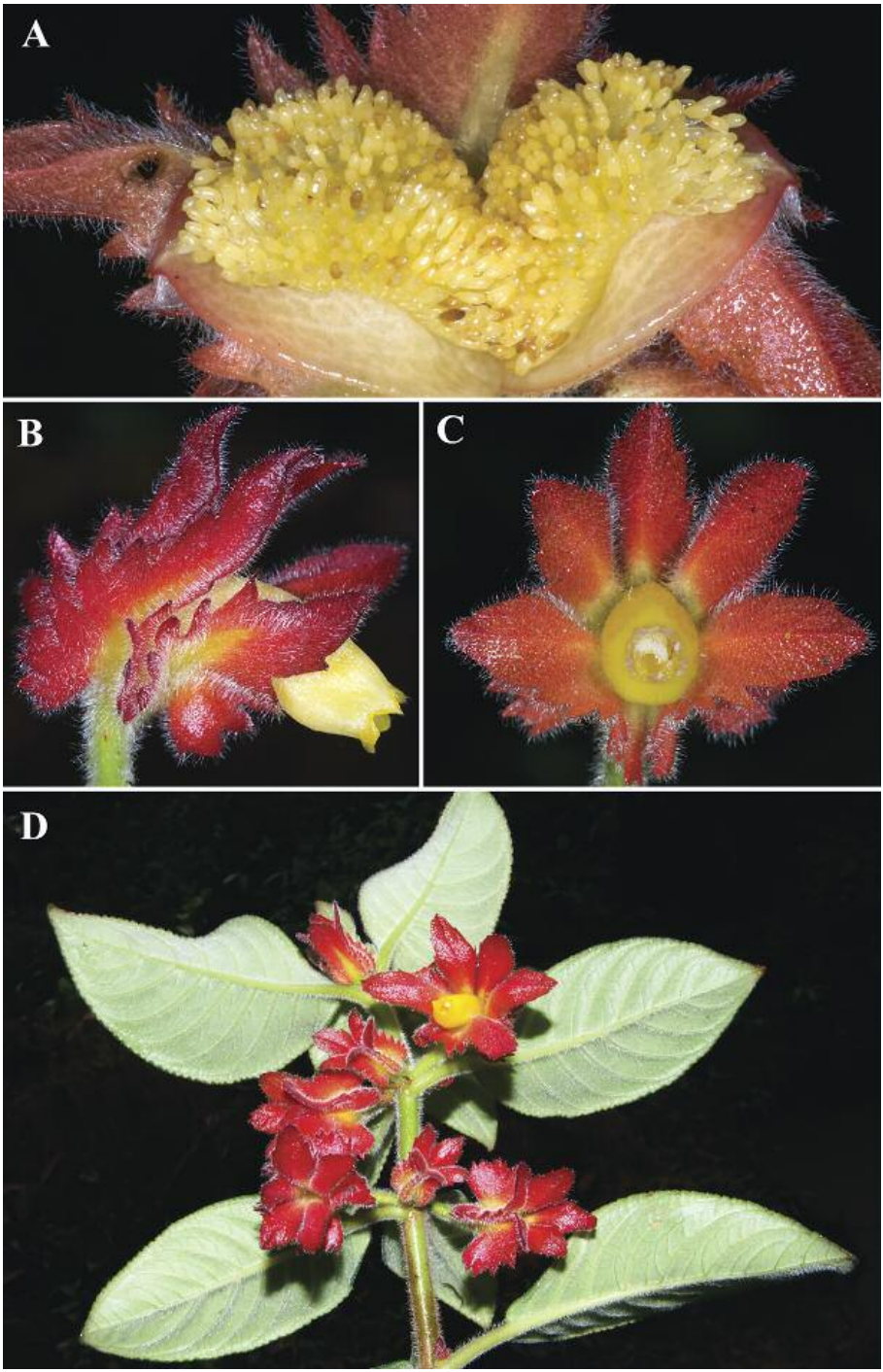

Figure 2. *Lesia savannarum* (C.V. Morton) J.L. Clark & J.F. Smith. **A.** Fleshy display capsule. **B.** side view of mature flower. **C.** Front view of mature flower. **D.** Elongate shoot.

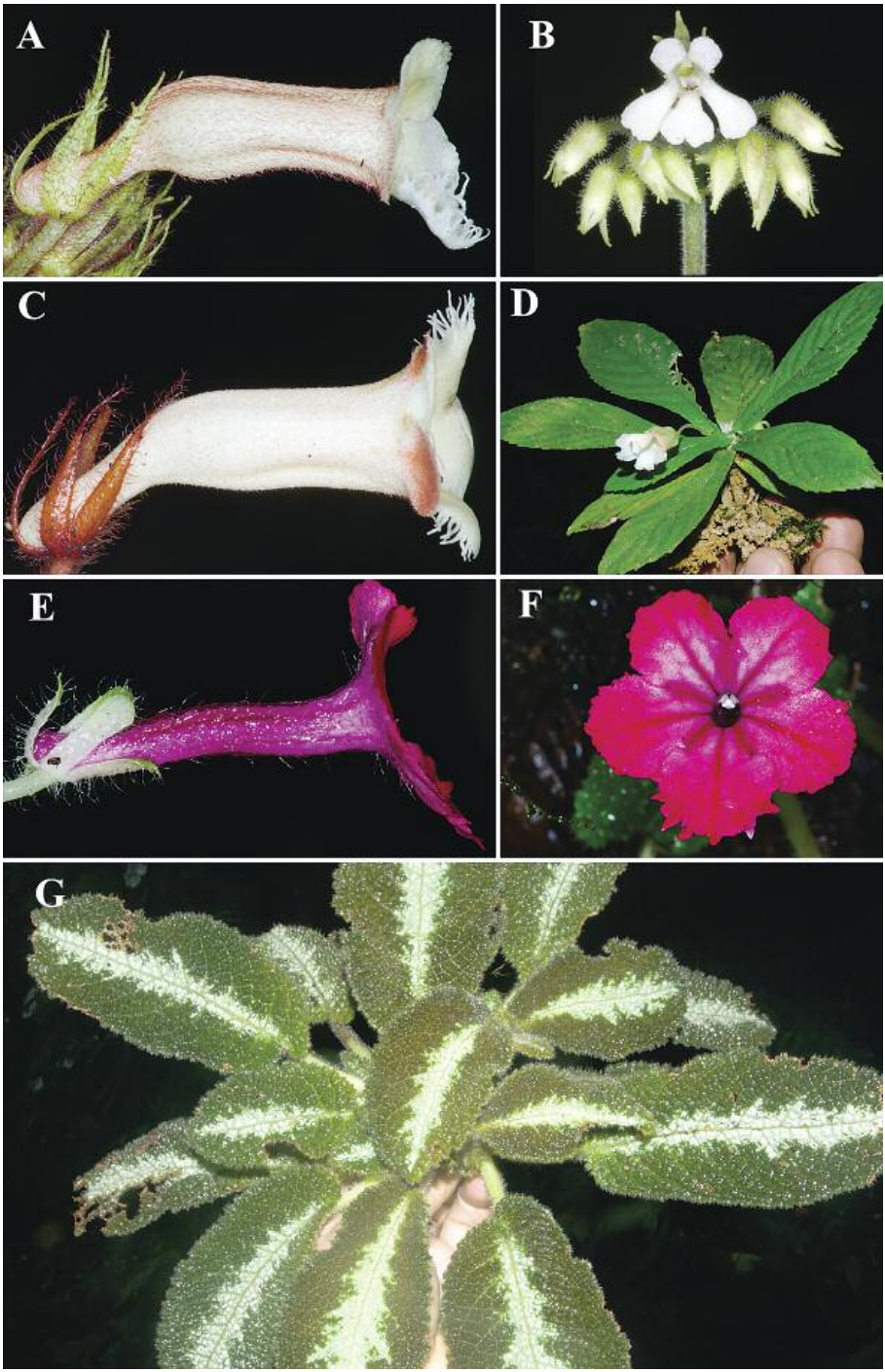

Figure 3. Gesneriaceae diversity encountered on Mt. Ayanganna. **A.** *Paradrymonia* sp. **B.** *Anetanthus* sp. **C.** *Paradrymonia ciliosa*. **D**. *Napeanthus rupicola*. **E-G.** *Nautilocalyx coccineus*.

Figure 4. **A.** J.L. Clark, Christopher Milensky and Jon Grammer in front of the Cessna 206. **B.** Clafford Joseph (Patamona Amerindian guide) carrying 100+ lbs. using a Wurushi. **C.** Locally caught eels and small fish grilled over low-burning fire. **D.** Campsite.

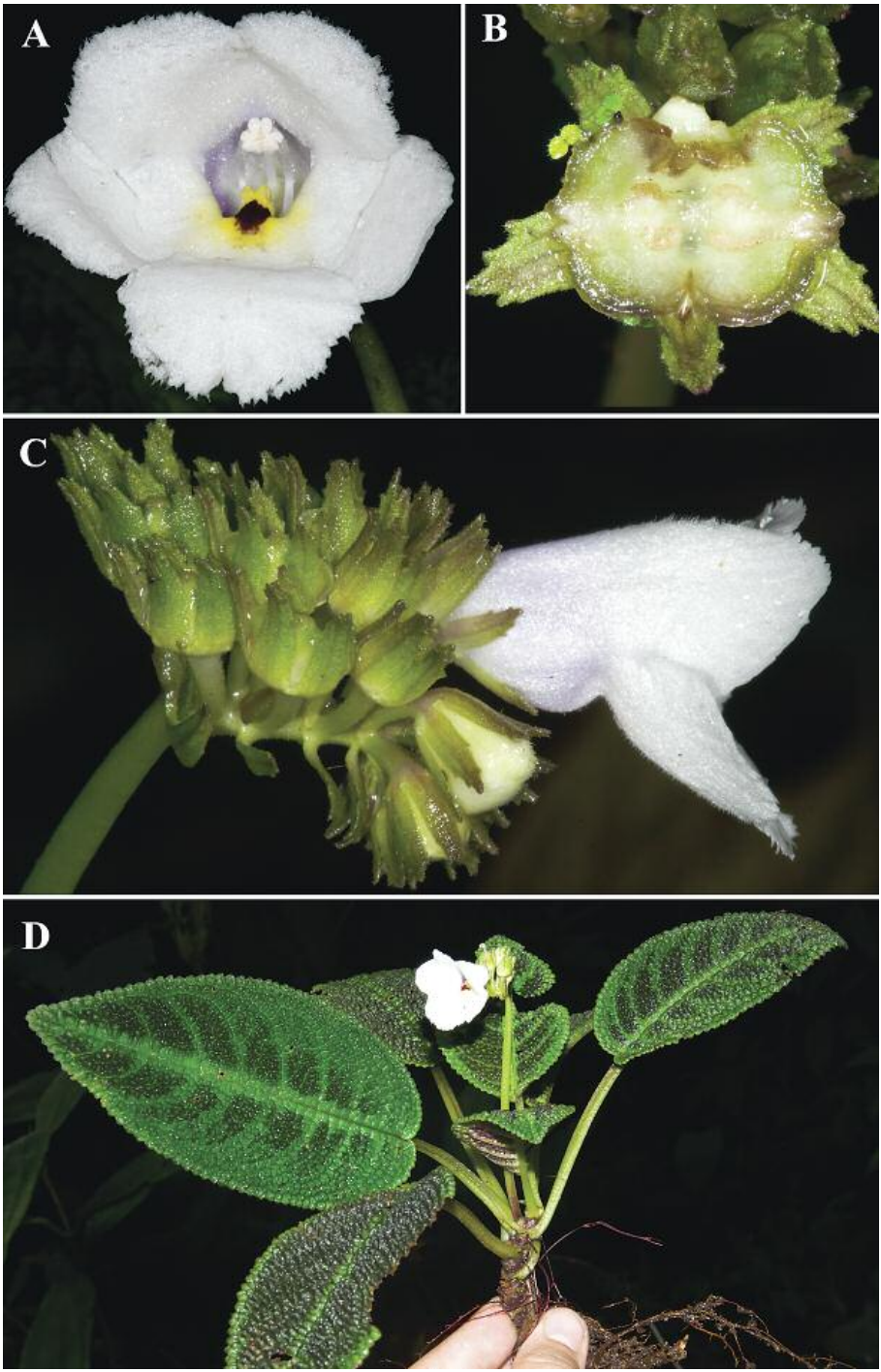

Figure 5. *Lampadaria rupestris* Feuillet & L.E. Skog. **A.** Front view of corolla. **B.** Mature bivalved capsule. **C.** Lateral view of inflorescence. **D.** Habit.

and is derived from his initials (L+E+S = *Lesia*). Dr. Skog co-chaired my Ph.D. committee and has dedicated more than four decades of research to taxonomic studies of the Gesneriaceae as a curator and research scientist at the Smithsonian Institution's National Museum of Natural History.

Our second day in the field involved hiking along a plateau with relatively little elevation gain. Gesneriads observed throughout our six-hour walk included *Nautilocalyx pictus* and *Paradrymonia ciliosa* (Figure 3). My 50+ pound pack was hefty, but not nearly as challenging as the 100+ pounds carried in back packs called Wuruchis (Figure 4B) by our Amerindian guides. Watching their bodies stand from a sitting position gave me an entirely new appreciation for their natural strength. Other impressionable abilities of our Amerindian guides included an astonishing skill to wield cutlasses (=machetes) for constructing campsites using only natural products such as vines for lashing the beams of the shelter (Figure 4D), to build wet-dry fires for cooking (Figure 4C), and to hunt using sling shots that were readily available because the sling shots adorned their heads like hats. The structures that they created for campsites were strong enough to hold the weight of 5+ adults in hammocks that hung between beams.

Day three was dedicated to searching for populations of *Lampadaria*. We were fortunate to have an Amerindian guide who assisted David Clarke's 2001 expedition to the same area when the plant was last found. After walking for two days along streams and not seeing any *Lampadaria* I became anxious that its existence was a myth. The specific epithet "*rupestris*" means rock-lover. Thus we studied every exposed rock for the presence of *Lampadaria*. We searched for three hours with no success. Ultimately we located a stream with exposed lateritic boulders. It was there that we located *Lampadaria* in abundance (Figure 5). We celebrated with M&M's, high-fives, and some pleasant yelling. There were no previously known images of *Lampadaria* with mature flowers, so we were fortunate to photograph many individuals with mature flowers and fruits. Abundant populations of 2-3 individuals/rock were seen. Occasionally a cluster of five boulders would host 15+ individuals. A striking feature of *Lampadaria* is the marked dark foliage with bullate surfaces (Figure 5).

Days four and five were dedicated to climbing towards the summit of Mt. Ayanganna. Some of the gesneriads that we observed during these two days were the following: *Napeanthus rupicola*, *Anetanthus* sp. and *Paradrymonia* species (Figure 3). We walked long hours that included one 11-hour non-stop hike that brought us to a ridgeline below the peak. We had not planned to summit Ayanganna, so arriving near the summit ridge was a pleasant unexpected result of our expedition.

Day six was dedicated to walking back to the airstrip where we returned to our initial base camp. Preparations were made for meeting our airplane. Good weather made it possible for our pilot to arrive at 8 a.m. on the morning of day seven and we were back in Georgetown by 10 a.m.

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