Two new species and a new hybrid species of Selaginella (Selaginellaceae) from W Cuba

Authors: Caluff, Manuel G., and Shelton, Gustavo
Source: Willdenowia, 44(3) : 311-319
Published By: Botanic Garden and Botanical Museum Berlin (BGBM)
URL: https://doi.org/10.3372/wi.44.44301
Manuel G. Caluff & Gustavo Shelton

Two new species and a new hybrid species of Selaginella (Selaginellaceae) from W Cuba

Abstract


DOI: http://dx.doi.org/10.3372/wi.44.44301

Two new species and a new hybrid species of Selaginella (Lycophyta: Selaginellaceae), from Pinar del Río and Artemisa Provinces in W Cuba, are described and illustrated. The new species are S. cavernaria, an erect plant growing on calcareous rocks and cliffs in mogote vegetation, and S. striata, a prostrate plant occurring in the same ecosystems and sometimes growing together with S. cavernaria. The new hybrid species is S. ×dualis (S. serpens × S. striata), with intermediate morphology, growing together and sometimes mixed with the postulated parent species. All three new taxa are representatives of S. subg. Stachygynandrum.

Additional key words: Caribbean, West Indies, Lycophyta, taxonomy, Selaginella subg. Stachygynandrum

Selaginella cavernaria Caluff & Shelton, sp. nov. – Fig. 1.

Holotype: Cuba, Prov. Pinar del Río, Sierra de Los Órganos, Cueva de las Avispas, Caverna de Santo Tomás, Sierra de Quemados, Pinar del Río, 400 m, mogote vegetation, on humid calcareous [cave] floor under opening in roof where sun enters, mixed with Selaginella eatonii Hieron. and S. wilsonii Hieron., 17 Mar 2003, Caluff, Shelton & Urquiola 4575 (BSC; isotypes: B, HAC, HAJB, JBSD).

Diagnosis — Selaginella cavernaria is similar and perhaps related to S. subcaulescens Baker but differs principally in the following characteristics: stem erect with alternate dormant buds on both sides and imbricate leaves (vs without dormant buds and distant leaves in S. subcaulescens); lateral leaves on branched stems and branches with aristate apex (vs merely acute apex in S. subcaulescens); and megaspores orange (vs cream-coloured in S. subcaulescens). The two species also differ in distribution and habitat: S. cavernaria is apparently confined to W Cuba, usually growing on vertical calcareous rocks and cliffs in mogote vegetation, whereas S. subcaulescens is found in E Cuba, growing on horizontal non-calcareous rocks in gallery forests.

Description — Plants erect, 12–25 cm tall, not flabelliform at apex, at first a creeping stem with spaced rudi-

Studies carried out in Selaginella P. Beauv. (Lycophyta: Selaginellaceae) of the West Indies revealed some new endemic species from Cuba (Caluff & Shelton 2003, 2009; Shelton & Caluff 2003). In this paper two further new species of Selaginella and a new hybrid species, from Pinar del Río and Artemisa Provinces in W Cuba, are described and illustrated. They all belong to S. subg. Stachygynandrum (P. Beauv. ex Mirb.) Warb. The terminology used to describe the spore ornamentation follows Lellinger & Taylor (1997).

Selaginella cavernaria Caluff & Shelton, sp. nov. – Fig. 1.

Holotype: Cuba, Prov. Pinar del Río, Sierra de Los Órganos, Cueva de las Avispas, Caverna de Santo Tomás, Sierra de Quemados, Pinar del Río, 400 m, mogote vegetation, on humid calcareous [cave] floor under opening in roof where sun enters, mixed with Selaginella eatonii Hieron. and S. wilsonii Hieron., 17 Mar 2003, Caluff, Shelton & Urquiola 4575 (BSC; isotypes: B, HAC, HAJB, JBSD).

Diagnosis — Selaginella cavernaria is similar and perhaps related to S. subcaulescens Baker but differs principally in the following characteristics: stem erect with alternate dormant buds on both sides and imbricate leaves (vs without dormant buds and distant leaves in S. subcaulescens); lateral leaves on branched stems and branches with aristate apex (vs merely acute apex in S. subcaulescens); and megaspores orange (vs cream-coloured in S. subcaulescens). The two species also differ in distribution and habitat: S. cavernaria is apparently confined to W Cuba, usually growing on vertical calcareous rocks and cliffs in mogote vegetation, whereas S. subcaulescens is found in E Cuba, growing on horizontal non-calcareous rocks in gallery forests.

Description — Plants erect, 12–25 cm tall, not flabelliform at apex, at first a creeping stem with spaced rudi-
Fig. 1. Selaginella cavernaria – A: erect main unbranched stem with lateral leaves and buds, underside (“abaxial”) view; B: lateral leaf of main unbranched stem; C: medial leaf of main unbranched stem; D: axillary leaf; E: lateral leaf of main branched stem; F: medial leaf of main branched stem; G: lateral leaf of branches; H: medial leaf of branches; I: sporophyll; J: habit. – From Caluff, Shelton & Novo 6286 (BSC). – Drawn by Manuel G. Caluff.
mentary leaves and rhizophores, with roots at short intervals, then curving upward and producing numerous roots and leafy stolons; next portion an erect dorsiventral stem without branches and finally a branched stem like a frond. **Main unbranched stem** 5 – 15 cm long, 0.5 – 0.7(–1) mm in diam. without leaves, to 1.2 mm wide with leaves, straight, monostelic, not articulate, simple to rarely bifurcate, usually ridged, clear brown toward base and stramineous above, producing near base short rhizophores 0.1 – 0.2 mm in diam. and latent alternate small leafy buds in young plants, deltoid in adult plants, inequilateral; **branches** alternate, ascending, branched 1 – 3 times, 3 – 12 × 1 – 4 cm, without rhizophores. **Leaves** dimorphic, ascending, herbaceous, pappreaceous on unbranched stem, dark green, dull on adaxial side, paler and shinier abaxially, without idioleasts, margin differentiated beneath into 3 – 7 rows of papillose enlarged cells and some longitudinal rows of dark papillose cells on surface. **Lateral leaves on main unbranched stem** more openly ascending, nearly appressed, ovate-attenuate, 1.2 – 2.1 × 0.6 – 1.2 mm, base truncate, rounded to cordate, margin wide, clear brown, denticulate on outer side, entire on inner side or with few teeth, ciliate toward base, apex acute. **Medial leaves on main unbranched stem** strongly ascending, appressed, cordate-attenuate, 0.6 – 2.1 × 0.8 – 1.1 mm, base auriculate on outer side, auricle rounded, with a tuft of cilia, margin wide, pale green, denticulate on outer side, nearly entire to denticulate on inner side, apex aristate, arista 0.1 – 0.2 mm long. **Lateral leaves on main branched stem** deltoid-oblong-attenuate to deltoid-ovate-attenuate, 1.5 – 2.8 × 0.9 – 1.7 mm, slightly inequilateral, acrosopic side widest, midvein evident, ending abruptly 0.2 – 0.4 mm from apex, base narrowed, truncate, rounded to nearly cordiform, acrosopic auricle partially overlapping stem, margin thin, pale green, both sides denticulate, teeth on basiscopic side smaller and more spaced, shortly ciliate on base, cilia 0.1 – 0.15 mm long, apex acute to shortly aristate, arista 0.1 – 0.2 mm long. **Medial leaves of main branched stem** ovate-lanceolate, 0.6 – 2.1 × 0.3 – 0.8 mm, base oblique, auriculate on outer side, auricle short, rounded, with a tuft of cilia, margin thin, pale green, shortly ciliate toward base, denticulate on inner side, with few spaced teeth on outer side, apex shortly aristate, arista 0.1 – 0.2 mm long. **Lateral leaves of branches** similar to those of main stem but narrower, oblong-attenuate, 1.7 – 2.3 × 0.6 – 1.1 mm, arista to 0.3 mm long. **Medial leaves of branches** ovate-lanceolate to oblong-attenuate, 0.8 – 0.9 × 0.3 – 0.7 mm, midvein inconspicuous, arista to 0.3 mm long. **Axillary leaves** oblong-attenuate, 1.5 – 2 × 0.6 – 1 mm, placed in middle of bifurcation, slightly inequilateral, base truncate to shortly biauriculate, ciliate, margin pale green, denticulate on both sides, apex acute. **Strobili** relatively short, 1.8 – 4.3 × 1 – 2.5 mm, at first quadrangular. **Sporophylls** nearly appressed when living, more open when dried, oblique to stem, uniform, ovate-attenuate, 0.8 – 1.2 × 0.6 – 1 mm, some translucent, margin ciliolate on both sides, keel en-tire to slightly denticulate toward apex, apex aristate, arista 0.1 – 0.15 mm long, slightly recurved. **Megasporangia** purse-shaped; **megaspores** orange, 300 – 350 μm in diam., surface reticulate. **Microsporangia** ovoid; **microspores** deep orange, 15 – 20 μm in diam., surface gemmulate, gemmulae hemispheric, large.

**Distribution and ecology** — Selaginella cavernaria is endemic to Sierra del Rosario and Sierra de Los Órganos in Pinar del Río and Artemisa Provinces of westernmost Cuba. It is uncommon in mogote vegetation on vertical or inclined locations, cliffs, large rocks and cave entrances, rarely growing on rocky ground, at altitudes of 150 – 720 m. It never forms very large populations, and grows in shaded places mixed with bryophytes and other calciphilous Selaginella species such as S. armata Baker, S. eatonii Hieron., S. heterodonta (Desv.) Hieron., S. ser­pens (Desv.) Spring, S. striata Caluff & Shelton and S. wilsonii Hieron.

**Additional specimens seen** — **CUBA**: **PINAR DEL RÍO Province**: foot of La Sierra, Valle de Ancón, Pinar del Río, 4 Feb 1956, H. Alain, C. V. Morton & J. Acuña 5260 (HAC); Minas de Matahambre, Mogote de La Punta, NW side and summit, 590 m, 19 Dec 1978, J. Bisse, M. Díaz, Y. Randel, H. Dietrich & A. Claro 38818 (B, HAJB [2 sheets], JE n.v.); Las Virgenes, Pinar del Río, 11 Nov 1972, Bobrov & A. Cárdenas 29380 (HAC [2 sheets]); overhang of Salón de los Gigantes, Sierra San Carlos, Pinar del Río, 150 m, mogote vegetation, on calcareous stones and cliffs, 22 Jan 2007, Caluff, Shelton & Novo 6286 (BSC); overhang of Salón de los Gigantes, Sierra San Carlos, Pinar del Río, 150 m, on a stalactite at 3 m from floor, mixed with Selaginella wilsonii, mogote vegetation, 22 Jan 2007, Caluff, Shelton & Novo 6293 (BSC); Hoyo de los Helechos, Salón de los Gigantes, San Carlos, Pinar del Río, 150 m, mogote vegetation, on a stalagmite at 3 m from floor, abundant there, 22 Jan 2007, Caluff, Shelton & Novo 6303 (BSC); Villanes, Sierra Sito del Infierno, from Abra de Boquerón to Hoyo of los Cimarrones, mogote vegetation, Feb 1992, C. Sánchez 3475 (BSC); Sierra del Infierno, Hoyo of los Cimarrones, Villanes, Pinar del Río, mogote vegetation, mogote cliffs, growing perpendicular to rock face, 21 Jul 1991, C. Sánchez 69951 (HAJB [5 sheets]). — **ARTEMISA Province**: La Palma, Pan de Guajaibón summit, 720 m, 28 Dec 1969 [“1970”], J. Bisse 15606 (HAJB, JE n.v.).

**Selaginella striata** Caluff & Shelton, sp. nov. — Fig. 2. Holotype: Cuba, Pinar del Río Province, overhang Salón de los Gigantes, Sierra de San Carlos, Pinar del Río, 150 m, mogote vegetation, calciphilous, on cliffs, stlagmites and on the humid floor forming carpets, 22 Jan 2007, Caluff, Shelton & Novo 6307 (BSC; isotypes: B, HAC, HAJB, JBSD).
314 Caluff & Shelton: Two new species and a new hybrid species of Selaginella from W Cuba

Fig. 2. Selaginella striata – A: lateral leaf of main stem; B: medial leaf of main stem; C: lateral leaf of branches; D: medial leaf of branches; E: axillary leaf; F: apex of lateral leaf; G: apex of medial leaf; H: habit, showing a strobilus. – From Bobrov & A. Cárdenas 29383 (HAC). – Drawn by Manuel G. Caluff.
Diagnosis — Selaginella striata resembles S. heterodonta (Desv.) Hieron. and S. serpens (Desv.) Spring. It differs from S. heterodonta mainly in being larger, with stems to 43 cm long, (vs 8–15(-33) cm long in S. heterodonta); in its non-flagelliform and non-proliferous apex (vs flagelliform and proliferous in S. heterodonta); in its conspicuously striate leaves (vs nearly smooth in S. heterodonta); in its calliculate megaspores (vs clavate in S. heterodonta); and in its rugate microspores (vs cristate in S. heterodonta). Selaginella striata differs from S. serpens in having lateral leaves always with apex acute, mucronate to shortly aristate (vs rounded to obtuse in S. serpens). Selaginella striata is apparently restricted to Pinar del Río and Artemisa Provinces of westernmost Cuba, whereas both S. heterodonta and S. serpens grow in nearly all of Cuba.

Description — Plants prostrate, caespitose, with stems to 43 cm long, never flagelliform or proliferous at apex. Main stem usually cylindrical, or if ridged then central ridge straight, 0.6–0.8 mm in diam. without leaves, to 5–6 mm wide with leaves, monostelic, stramineous, not articulate, alternately branched 1 or 2 times, 9–11 × 2.8–3.5 cm. Rhizophores axillary, filiform, 0.1–0.2 mm in diam., descending between branches of bifurcation. Leaves herbaceous, dark green, dull on adaxial surface, clear green and sometimes shiny on abaxial surface, cells with a central protuberant papilla, striate with rows of enlarged cells, ciliate throughout, sometimes ciliate over stem, base strongly ciliate on both sides, cilia to 0.35 mm long, apex acute. Strobili at first quadrangular, 10–15 × 1–1.3 mm. Sporophylls ovate-lanceolate, to 2.4 × 0.8 mm, uniform, margin and keel ciliolate, margin differentiated, cartilaginous, apex acute, shortly aristate. Megasporangia purse-shaped; microspores cream-coloured, 400–600 µm in diam., surface calliculate. Microsporangia ovoid; microspores orange-coloured, 30–50 µm in diam., surface rugate.

Distribution and ecology — Selaginella striata is endemic to Sierra del Rosario and Sierra de los Órganos in Pinar del Río and Artemisa Provinces of westernmost Cuba. The species is locally common in mogote vegetation, evergreen forests, gallery forests and secondary forests at altitudes of 100–500 m. It grows on cliffs, river banks, between mogotes, at cave entrances and on waysides, often over old stone walls of the French coffee plantations, especially on the mortar between the stones, sometimes growing on earth, humus or decayed leaves forming great mats, usually in shaded places or with filtered sun, mixed with bryophytes and other calciphilous Selaginella species such as S. armata, S. cavernaria, S. eatonii, S. heterodonta, S. prasina Baker, S. serpens, and S. wilsonii.

Additional specimens seen — CUBA: [sine loco], 1865, Fraser 8, 17, 12 & 38 (B); in Cuba orientali [?], 1860, Wright 940 (B). — Pinar del Río Province: Pan de Azúcar cliffs, Viñales, 5 Feb 1956, J. Acuña & C. V. Morton 20097 (HAC); Valle de Ancón cliffs, Viñales, 4 Feb 1956, J. Acuña, H. Alain & C. V. Morton 0096 (HAC); Valle del Ruiséñor cliffs, Viñales, 4 Feb 1956, J. Acuña, H. Alain & C. V. Morton 20098 (HAC); Viñales, Valle del Ruiséñor, 27 Feb 1972, J. Bisé 21584 (HAJB); Viñales, Valle de San Vicente, near El Indio Cave, 150 m, 13 Feb 1983, J. Bisé, G. Proctor & C. Sánchez (HAC); Las Virgenes, 1 Nov 1972, Bobrov & A. Cárdenas 29383 (HAC); Paso de La Estechura, Sierra de San Carlos, Pinar del Río, 150 m, mogote vegetation, on calcareous cliffs, 2 Jan 2007, Caluff, Shelton & Novo 6285 (BSC); overhang Salón de los Gigantes, Sierra San Carlos, Pinar del Río, 150 m, mogote vegetation, forming a carpet on floor, mixed with Selaginella cavernaria, 21 Jan 2007, Caluff, Shelton & Novo 6305 (BSC); Hoyo de Los Helechos, Salón de Los Gigantes, Sierra de San Carlos, Pinar del Río, 150 m, mogote vegetation, on calcareous cliffs and stalagmites, 22 Jan 2007, Caluff, Shelton & Novo 6281 (BSC); cliffs on base of Sierra de La Guacamaya, 100 m, mogote vegetation, 21 Jan 2007, Caluff, Shelton, Urquiola & Novo 6281 (BSC); prope Viñales, ad Mogote de La Mina, in rupibus arduis umbrosis, 7 Nov 1923, E. Ekman 17960 (B); Pan de Azúcar, 200–400 m, 8 Feb 1954, C. V. Morton 9848 & 79452 (JBSD); vicinity of Sumidero, 18 Jan 1984, Nikolai 40220 (HAC); Viñales, Ponce de León s.n. (HAC); Viñales, 1941, Ponce de León s.n. (HAC); Viñales, 1943, Ponce de León s.n. (HAC); Mogote de
Selaginella x dualis Caluff & Shelton, nothosp. nov. (postulated parents: S. serpens (Desv.) Spring and S. striata Caluff & Shelton) – Fig. 3.

Holotype: Cuba, Artemisa Province, Pedernales river, behind CITMA Station, Las Terrazas, Sierra del Rosario, 200 m, gallery forest, 2 Feb 2013, Caluff 6536 (BSC; isotypes: B, HAC, HAJB, JBDS).

Diagnosis — Selaginella x dualis is intermediate between the postulated parents, S. serpens and S. striata. Some individuals are more similar to one or the other species, and frequently morphological characters of both species occur mixed in one individual. Table 1 provides a detailed comparison of the characteristics of the hybrid and its postulated parents.

Distribution and ecology — Selaginella x dualis is endemic to the Sierra del Rosario, Sierra de los Organos and Alturas de Cajalbana in Pinar del Rio and Artemisa Provinces of westernmost Cuba. It is uncommon in gallery forests and secondary vegetation near rivers, less commonly on serpentine, at altitudes of 100–300(–400) m. It is found on river banks and river cliffs, growing on humid rocks, earth, humus and decaying leaves, in shaded places or with filtered sun, mixed with bryophytes and other calciphilous Selaginella species such as S. armata, S. heterodonta, S. prasina, S. serpens and S. striata.

Additional specimens seen — CUBA: [sine loco], Wright 941 p.p. (HAC); “Oriente”, Wright 1821 p.p. (HAC [2 sheets]). — PINAR DEL RIO PROVINCE: Caja de Agua rivulet, Cajalbana, N side, La Palma, 300 m, gallery forest, 25 Oct 1997, Shelton & Caluff 4365 (BSC); El Caliente, Sierra de Sumidero, Pinar del Rio, 300 m, gallery forest, 25 Oct 1997, Shelton & Caluff 4366 (BSC); Bayate River, Soroa, near place where river meets autopista, 100–200 m, gallery forest, 22 Oct 1997, Shelton & Caluff 4365 (BSC); Naranjal Viejo, Soroa, Pinar del Rio, 200 m, gallery forest, 25 Oct 1997, Shelton & Caluff 4365 (BSC); BAYATE, Soroa, Pinar del Rio, 200 m, gallery forest, 2 Feb 2013, Caluff 6536, 6535, 6539, 6544 & 6545 (BSC); Bayate River, Soroa, near place where river meets autopista, 100–200 m, gallery forest, 22 Oct 1997, Shelton & Caluff 4364 (BSC); Bayate River, Soroa, Pinar del Rio, 100–200 m, gallery forest, on limestone, 22 Oct 1997, Shelton & Caluff 4365 (BSC); Naranjal Viejo, Soroa, Pinar del Rio, 300 m, gallery forest, mixed with S. heterodonta, 25 Oct 1997, Shelton & Caluff 4371 (BSC); Naranjal Viejo, Soroa, Pinar del Rio, 300 m, gallery forest, mixed with S. heterodonta and S. striata, 25 Oct 1997, Shelton & Caluff 4372 (BSC); El Salto, Soroa, Pinar del Rio, 200 m, gallery forest, on cliffs near cascade, mixed with S. armata, 100–200 m, gallery forest, on limestone, 22 Oct 1997, Shelton & Caluff 4365 (BSC); Naranjal Viejo, Soroa, Pinar del Rio, 300 m, gallery forest, mixed with S. heterodonta, 25 Oct 1997, Shelton & Caluff 4371 (BSC); Naranjal Viejo, Soroa, Pinar del Rio, 300 m, gallery forest, mixed with S. heterodonta and S. striata, 25 Oct 1997, Shelton & Caluff 4372 (BSC); El Salto, Soroa, Pinar del Rio, 200 m, gallery forest, on cliffs near cascade, mixed with S. armata, 27 Oct 1997, Shelton & Caluff 4376 (BSC); Naranjal Viejo, Soroa, Pinar del Rio, Las Terrazas, Sierra del Rosario, 250 m, gallery forest, 25 Oct 1997, Shelton & Caluff 4365 (BSC); Rangel, rocks in mountain woods, Wright 1821 p.p. (HAC).

Remarks — The gathering Wright 1821 p.p. is represented at HAC by three sheets, which include several Selaginella species, including S. x dualis, and cite different localities. One of the sheets states the locality as “Oriente”, but this is presumably a mistake because the hybrid is otherwise known exclusively from Pinar del Río and Artemisa Provinces in westernmost Cuba.

The megaspores of Selaginella x dualis are cream-coloured, with different sizes in one sporangium, ranging from 200–500 µm in diam., with the surface irregularly rugate. The microspores are variable in colour, from colourless to pale orange; they are very small, dissimilar in shape and size, and sometimes joined in pairs, with the ornamentation also variable and irregular.
Fig. 3. *Selaginella ×dualis* – A: lateral leaf of main stem; B & C: lateral leaves of branches; D & E: medial leaves; F: axillary leaf; G: sporophyll similar to that of *S. serpens*; H: sporophyll similar to that of *S. striata*; I: habit, showing a strobilus. – From Caluff 6545 (BSC). – Drawn by Manuel G. Caluff.
nearly smooth, rugate or in some spores partially clavate. Sexual abnormalities in lycophytes and ferns are usually evidence of hybridization, and the hybrids have abortive spores with some dissimilarity in colour, shape, size and ornamentation, e.g. Somers & Buck (1975) referred to strong differences between megaspores and microspores in one sporangium of a presumed *Selaginella* hybrid. This is the case with *S. ×dualis*. Moreover, *S. ×dualis* grows together with its postulated parents and, like *S. striata*, is confined to westernmost Cuba.

### Comparison with similar species

*Selaginella ×dualis*, *S. heterodonta*, *S. serpens* and *S. striata* are similar in some characteristics, such as size,
prostrate growth and outline of the median leaves. These four taxa can be distinguished with the following key:

1. Main stem and sometimes apical branches flagelliform and proliferous at apex; nearly all of Cuba ...  
   - Main stem and apical branches neither flagelliform nor proliferous at apex  
2. Lateral leaves dissimilar in orientation, colour, outline, size and apex, with characters of S. striata and S. serpens frequently mixed in one individual; W Cuba  
   - Lateral leaves uniform in orientation, colour, outline, size and apex  
3. Lateral leaves on main stem patent or nearly so, dark green, deltoid-attenuate to ovate-attenuate, to 2.6 mm long, apex acute, mucronate to shortly aristate; W Cuba  
   - Lateral leaves in main stem ascending, usually pale green, broadly ovate, to 2.1 mm long, apex rounded to subobtuse, entire; nearly all of Cuba  

S. heterodonta
S. ×dualis
S. striata
S. serpens

Acknowledgements

The first author thanks the Association of Friends of the Botanic Garden and Botanical Museum Berlin-Dahlem (BGBM) for funding his research stay in Berlin in July–September 2002. Both authors are grateful to BGBM for the facilities provided to revise the specimens in the herbarium B as well as those sent there on loan; to the Botanic Garden “Dr Rafael Ma. Moscoso”, Dominican Republic, for funding the first author’s research stay in Santo Domingo in August–September 2014; to the herbaria BM, BREM, E, GH, GOET, HAC, HAJB, JBSD, K, NY and P for the generous loan of specimens to B; to the Scientific Council of the Centro Oriental de Ecosistemas y Biodiversidad for the revision of the manuscript; and to Maité Serguera for her help in the spore microscopy and the revision of English in the manuscript. Both authors also thank all the people and institutions facilitating them in their many collecting trips in W Cuba, especially Dr Armando Urquiola (†), who was a great Cuban botanist and Director of the Pinar del Río Botanic Garden, and Manuel García Caneiro, functionary of the Ecological Community “Las Terrazas”, Artemisa Province.

References

Caluff M. G. & Shelton G. 2003: The musciform Selaginella species (Selaginellaceae) with broad lateral leaves in the West Indies. – Willdenowia 33: 425–437.