A new epilithic *Tillandsia* from Central Bolivia: *T. lechneri*

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During a botanical field trip through Bolivia in September 2007, Peter Lechner from Vienna observed clumps of a *Tillandsia* growing nearly inaccessibly on a rock wall at Los Negros between Samaipata and Mataral in Cochabamba department. The plant was only photographed (Fig. 1). In spring 2009 he visited the locality again and after several attempts a small clump could be collected which showed the plant in fruit. In this state a reliable identification was not possible and therefore the infructescence was prepared for the herbarium while the corresponding clone was brought into cultivation in Vienna, Austria, where it flowered in the following year. The developing inflorescence (Fig. 2) strongly reminded us of *Tillandsia lotteae* H. Hrom. ex Rauh but the rather soft leaves made us hesitant to identify it as this species. At full bloom the white corolla (Fig. 3) and the pleasant flower scent placed the plant in question much nearer to *T. xiphioides* Ker-Gawl. However, it was different from all known populations of this species which is widespread from South-central Bolivia to Central Argentina and Uruguay. We also took into consideration that it could be a natural hybrid of both mentioned species albeit the supposed parent taxa have not been observed in the area of our new species. To exclude this option and to get an estimate of their phylogenetic relationships we sequenced

Figure 1. Fruiting *T. lechneri* at the type locality, 24 September 2007. Photo by P. Lechner

Figure 2. Clump of rosettes starting to bloom in cultivation in 2010. Photo by P. Lechner

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Figure 3. *T. lechneri* at bloom in February 2010, note the wide, green floral bracts and white, crenulate petals. Photo by P. Lechner.

two plastid markers (matK, ycf1) and one nuclear locus (PHYC) for the Los Negros plant (sample 808: leaves from the flowering clone, and sample 809: seeds from the infructescence) and compared the sequence with that of *T. lotteae* and *T. xiphioides*. Several partly closely, partly distantly related taxa served as an outgroup. Aligned DNA matrices were analysed using the maximum likelihood (ML) approach implemented in the GUI version (Silvestro & Michalak, 2012) of the program RAxML (Stamatakis et al., 2005).

A ML phylogram with ML bootstrap values is given in Figure 4. Although the target taxa are closely related, the sequence differences are of the same degree as in other alliances of accepted species. Most important, from the sequence structure we can conclude that the Los Negros plants do not represent a recent primary hybrid (although an ancient hybridization might have been involved in the evolution of the population). We therefore propose it as a new species.

Tillandsia lechneri W. Till & Barfuss, sp. nov.

This new species differs from *Tillandsia xiphioides* Ker-Gawl. (1816) by the broader green (18 mm vs. 14 mm and stramineous) floral bracts, the broadly acute (vs. acuminate), shorter sepals (ca. 30 mm vs. ca. 40 mm), the shorter petals (6

cm vs. 7-9 cm) and the pistil being included (vs. slightly exserted) in the corolla; from *T. lotteae* H. Hrom. ex Rauh (Rauh, 1978) it differs in being nearly stemless (vs. caulescent), the soft leaves (vs. rigid), the longer pure green (vs. yellow-green) floral bracts which are chartaceous when dry and with broad hyaline margins (vs. without broad hyaline margins), the sepals being much shorter than the floral bracts (10-15 mm shorter vs. subequaling), the fragrant (vs. odourless) flowers and the longer (6 cm vs. 5.5 cm) white (vs. yellow) petals which are much wider (16 mm vs. 6 mm) apically.

Plants saxicolous, with very short stems, forming clusters. **Leaves** densely rosulate, rather soft, yellowish grey-green, densely pale pruinose-lepidote on both surfaces, spreading and somewhat recurved; leaf-sheaths not distinct from the leaf-blades, densely lepidote except at the very base adaxially; leaf blades narrowly triangular, 9 – 13 cm long, 1.3 – 1.5 cm wide at the base, margins slightly involute at the base becoming canaliculate towards the apex. **Peduncle** 3 – 4 cm long, ca. 4 mm in diameter, densely covered by the peduncle bracts; peduncle bracts 3 – 4 cm long, elliptic, apiculate, glabrous, green and smooth when fresh becoming straw-colored, chartaceous and slightly nerved when dry. **Inflorescence** simple, densely distichously 8 – 12-flowered, 10 – 12 cm long and ca. 2.5 cm wide. **Flowers** 5 – 5.5 cm long, pleasantly fragrant, sessile; floral bracts like the

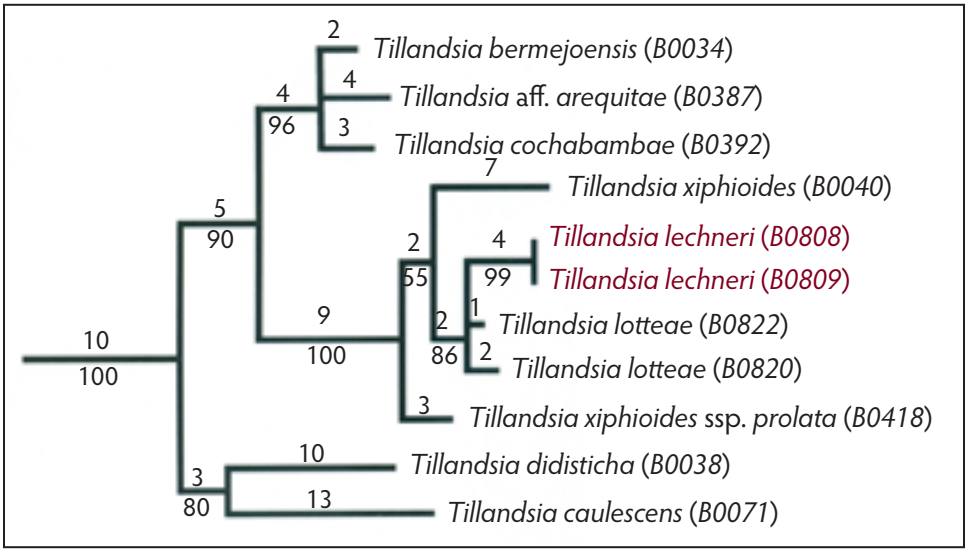

Figure 4. Maximum likelihood phylogram containing *T. lechneri* and its relatives *T. lotteae* and *T. xiphioides*. The remaining *Tillandsia* taxa served as outgroups. Branch length (supporting DNA characters) is given above and ML bootstrap values are given below the branches. DNA voucher numbers are given in parenthesis after the species names.

peduncle bracts but somewhat larger, 4 – 4.5 cm long, ca. 1.8 cm wide at the middle, elliptic, broadly acute, ecarinate, glabrous, chartaceous when dry and with broad hyaline margins, distinctly longer than the sepals. **Sepals** chartaceous, glabrous, nerved in the central part when dry and with broad hyaline margins, broadly acute, (2.6-) 2.8 – 3.1 (-3.3) cm long, (6.5-) 7 – 8 (-10) mm wide, free, the abaxial ones ecarinate, the adaxial ones obtusely subcarinate. **Petals** white, ca. 6 cm long, 1.6 cm wide distally, apical margins crenulate. **Stamens** ca. 4.5 cm long, filaments white, linear, not plicate, 37 mm long, anthers pale yellow, 9 mm long, linear, subbasifixed. **Gynoeceum** whitish, 42 mm long; stigma 2 mm long, reaching the middle of the anthers, of the simple-erect type, lobes somewhat spreading, with undulate margins and minute papillae-like projections; style 35 mm long, ovary slenderly conical, 5 mm long; ovules slenderly obconical, with a very short obtuse chalazal appendage about one fourth the length of the ovule proper. **Capsule** ca. 3.2 cm long, dull straw-colored outside when dry, dark castaneous and lustrous inside, with a short beak; seeds fusiform, with a 1 cm long straw-colored pseudopappus bearing divergent rays on both ends, chalazal appendage very short and undivided.

Type: Bolivia, Depto. Santa Cruz, Prov. Florida, carretera de Santa Cruz a Cochabamba, entre Samaipata y Mataral, 6 kms al este de Los Negros, ca. 1220 m s. n. m., 18°00‘56“N, 64°05‘58“W, 18 de mayo de 2009, leg. P. Lechner 20-451, sobre rocas en el lado del río; flores fragrantes; floreció en cultivo el 15 de mayo de 2010 sub B09/2-1, holotype: LPB; isotype: WU 0072992 (= DNA voucher *B0808*); Depto. Santa Cruz, Prov. Florida, along the road from Santa Cruz to Cochabamba, between Samaipata and Mataral, 6 km east of Los Negros, ca. 1220 m a. s. l., 18°00‘56“N, 64°05‘58“W, 18. 5. 2009, leg. P. Lechner 20.451, epilithic on rock wall at the river, paratype: WU 0072993 (= DNA voucher *B0809*).

The plant is named after O. Univ.-Prof. Dipl. Ing. Dr. Peter Lechner, emeritus of the Agricultural University in Vienna, Austria, who brought this interesting plant to our attention and enabled our investigation of living material.

Tillandsia xiphioides is widespread in southwestern South America extending towards the north to the vicinity of Cochabamba at elevations usually above 1500 m a. s. l. At the eastern margin of the south Bolivian Andes the white flowering populations are replaced by the yellow flowering *T. xiphioides* var. *lutea* L. Hrom. (Hromadnik, 1990) at elevations between 900 and 1400 m a. s. l. In contrast to Argentina where it prevailingly grows as an epiphyte, in Bolivia numerous epilithic populations occur with a considerable interpopulational variation. However, despite of this variation, there is no population matching the inflorescence and flower characteristics of *T. lechneri*.

The Bolivian endemic *T. lotteae* is known from La Viña in Cochabamba department to El Puente in Tarija department at elevations from 1300 to 2900 m a. s. l., only rarely it is found at lower elevations. It grows epilithically in the dry valleys running north to south from Cochabamba via Sucre to Tarija.

T. lechneri is quite remote to the northeast from the nearest populations of *T. lotteae* and even more from *T. xiphioides*. Considering this geographic isolation, the morphological differences, and the genetic data these plants as a separate species is appropriate.

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ANNOUNCEMENT

Michael Rothenberg informs us that he has discovered 50 copies of Leon Duval's 'The Bromeliads' in storage while preparing to move to a new house. If anyone is interested in obtaining a copy, they can contact him at the following: Michael Rothenberg, Box 870, Guerneville, Ca 95446 or by phone at 305/753-4569. Sorry, no email is available.

Figure 5. *T. xiphioides* var. *minor* (W. Till 5219) collected in Argentina, Prov. Córdoba, Cumbre de Achalá, 1600 m, growing on rocks). This plant has a short peduncle and flower petals very similar to that of *T. lechneri*, but differs greatly in the color and shape of the floral bracts and the low number of flowers in the inflorescence. Photo by Walter Till.