Check List 9(4): 832–837, 2013

ISSN 1809-127X (available at *www.checklist.org.br*)

Check List
Journal of species lists and distribution

NOTES ON GEOGRAPHIC DISTRIBUTION

Notes on the Chilean geographic distribution of several vascular plant species

Simon Pfanzelt [1*], Carolina García [2] and Alicia Marticorena [2]

1 Carl-von-Ossietzky-Universität Oldenburg, Institut für Biologie und Umweltwissenschaften, AG Biodiversität und Evolution der Pflanzen. Carl-von-Ossietzky-Str. 9-11. 26111 Oldenburg, Niedersachsen, Germany.
2 Universidad de Concepción, Facultad de Ciencias Naturales y Oceanografía, Departamento de Botánica. Barrio Universitario s/n. Concepción, Bío-Bío, Chile.
* Corresponding author. Email: *simon.pfanzelt@uni-oldenburg.de*

ABSTRACT: New collections extend the Chilean geographic distributions of five native and one endemic vascular plant species: *Coriaria ruscifolia* L. (Coriariaceae), *Fascicularia bicolor* (Ruiz and Pav.) Mez subsp. *canaliculata* E.C. Nelson and Zizka (Bromeliaceae), *Drapetes muscosus* Lam. (Thymelaeaceae), *Phyllachne uliginosa* J.R. Forst. and G. Forst (Stylidiaceae), *Saxifragella bicuspidata* (Hook.f.) Engl., and *Saxifragodes albowiana* (Kurtz ex Albov) D.M. Moore (both Saxifragaceae). Species descriptions, distribution maps, and figures are presented. Distribution patterns are discussed in light of biogeographic implications.

Our contribution concerns the geographic distribution extensions of several vascular plant species within their Chilean range. During fieldwork in Chilean Patagonia new collections of *Coriaria ruscifolia* (Coriariaceae), *Fascicularia bicolor* subsp. *canaliculata* (Bromeliaceae), *Drapetes muscosus* (Thymelaeaceae), *Phyllachne uliginosa* (Stylidiaceae), *Saxifragella bicuspidata*, and *Saxifragodes albowiana* (both Saxifragaceae) were made, leading to extensions of northern or southern distribution limits in each case. We present updated distribution maps that are based on species occurrence data drawn from herbarium records (CM, CONC, SGO) and the GBIF database (Global Biodiversity Information Facility 2012), as well as on the authors' personal observations and collections. Plant nomenclature follows Zuloaga et al. (2008). Private landowners (A. Arriegada, L. Vega Aravena, Fundación San Ignacio del Huinay) authorized collecting on their respective properties. The Chilean National Park authority Corporación Nacional Forestal (CONAF) issued a collection permit to S.P. (N°18-2009). Voucher specimens were deposited at CONC.

A new southern distribution limit for *Coriaria ruscifolia*

Shrub or subshrub with twining branches, pendent. Leaves opposite or 3-verticillate, ovate, acuminate, subsessile, glabrous, up to 7.5 cm long, those of main axis different from those of lateral branches that have 3-5 veins. Inflorescence a pendulous raceme up to 25 cm long, with numerous flowers (up to 200) subtended by a linear to lanceolate, acuminate bract; racemes either borne terminally on the lateral leafy branches or from leaf axils on the main axes. Flowers strictly perfect, protogynous. Sepals ovate, up to 2 mm long, green to red, rather fleshy. Petals ovate. Ovary superior, 5-carpellate, 5-locular. Fruit enclosed by the persistent, fleshy petals and composed of small, black achenes. Description based on Kubitzki (2011). The somewhat toxic fruits are used as rodenticide (Baeza 1930).

Coriaria ruscifolia grows along river banks or lake shores, in coastal shrub, and on moist slopes and cliffs, from near sea level to 1400 m a.s.l. It has been recently collected at Laguna Los Palos (45°19' S) in the region of Aysén, which is the new southern distribution limit (Figure 1). Thus, its Chilean range comprises central and south-central Chile, from Curicó (34°46' S) to near Puerto Aysén (45°19' S). In Argentina, it grows in the western parts of the provinces of Neuquén and Chubut.

Material examined: CHILE. Región de Aysén: Laguna Los Palos, 45°19'05.4" S, 72°42'35.7" W, 20 m a.s.l., 21.II.2011, *S. Pfanzelt 569* (CONC); Camino de La Junta a Raúl Marín Balmaceda, 43°53'06.7" S, 72°55'21.2" W, 15 m a.s.l., 31.I.2011, *S. Pfanzelt 517* (CONC).

The southern distribution limit of *Fascicularia bicolor* subsp. *canaliculata* resolved

Herbaceous perennial, terrestrial or epiphytic. Stem absent or very short. Leaves up to 1 m long, arranged in a dense rosette, with ovate sheaths and linear, coriaceous blades, leaf apex pungent, margin spinose-serrate, inner leaves red in flowering individuals. Inflorescence sunk in the center of the rosette, capitate. Flowers many, sessile, subtended by two bracts, perfect, trimerous, gamosepalous, gamopetalous, with an epigynous tube. Petals bluish. Stamens 6, included, anthers dorsifixed, anthers and pollen orange. Ovary inferior, 3-locular, style with 3 stigmatic branches. Fruit an edible berry. Seeds brownish, globose. Description based on Smith and Downs (1979), Nelson and Zizka (1997), and Zizka *et al. (*1999).

Fascicularia Mez is a monotypic genus endemic to central and southern Chile. On the basis of differences in geographical distribution, habitat and leaf morphology, Nelson and Zizka (1997) recognize two subspecies, *F. bicolor* subsp. *bicolor* and *F. bicolor* subsp. *canaliculata*. Molecular data support the infraspecific classification (Zizka *et al.* 1999). *Fascicularia bicolor* subsp. *bicolor* is

mainly saxicolous and prefers open rocky habitats along the coast of central and south-central Chile. Subspecies *canaliculata* reaches farther south and grows mainly as an epiphyte in the Valdivian evergreen temperate rain forest.

Assignment of non-flowering herbarium specimens to subspecies is not always possible. Furthermore, the closely related genera *Fascicularia* and *Ochagavia* cannot be easily distinguished on vegetative characters alone. As a consequence, the geographic delimitation of the subspecies' distribution areas is problematic. The distribution of *F. bicolor* in Chile comprises the Mediterranean as well as the temperate macroclimates and ranges from 34° S to 42° S (Zizka *et al.* 2009). Although Smith and Downs (1979) cite a *Fascicularia* specimen from Puerto Lagunas at 45°17' S (*R.L. Fricke s.n.*, CM), subsequently published distribution maps did not include this locality, as the respective authors did not see this specimen (Zizka *et al.* 1999; 2009; pers. comm.). Examination of a photograph of the Fricke specimen confirmed its identity as *Fascicularia bicolor* subsp. *canaliculata* (det. W. Till, WU), making it the southernmost distributed bromeliad species. A further specimen of *F. bicolor* subsp. *canaliculata* growing at 44°54' S (S. Pfanzelt *et al.* 556) indicates that the occurrence of the Fricke specimen that far south is not accidental (Figure 2).

Material examined: CHILE. Región de Aysén: Puerto Lagunas, 18.III.1936, *R.L. Fricke s.n.* (CM, photograph); Isla Magdalena, Puerto Gaviota, 44°53'46.0" S, 73°18'22.6" W, 7 m.a.s.l., 17.II.2011, *S. Pfanzelt et al. 556* (CONC).

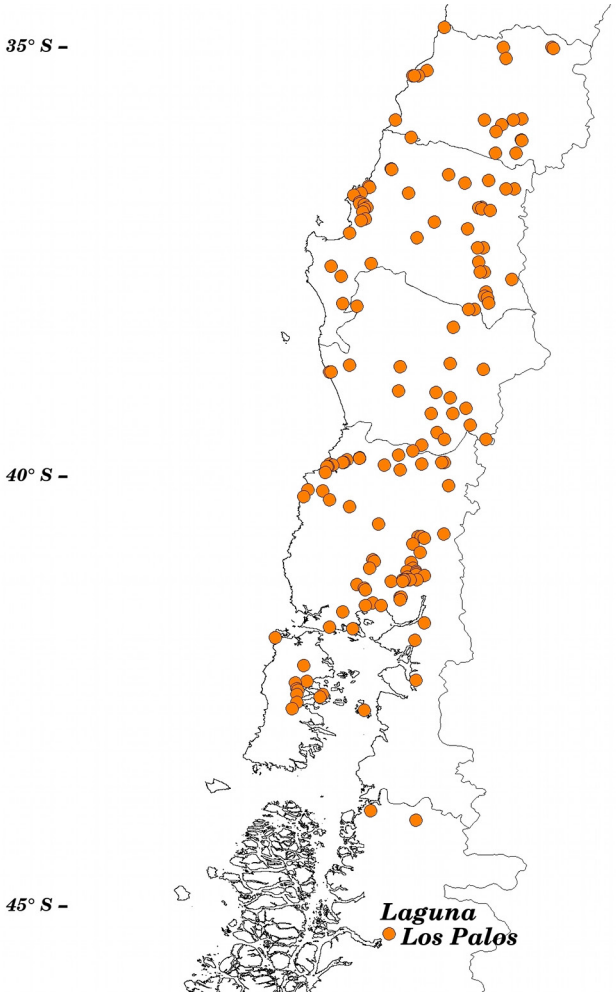

Figure 1. Distribution of *Coriaria ruscifolia* in Chile. The new southern distribution limit is Laguna Los Palos at 45°19' S (*S. Pfanzelt 569*, CONC).

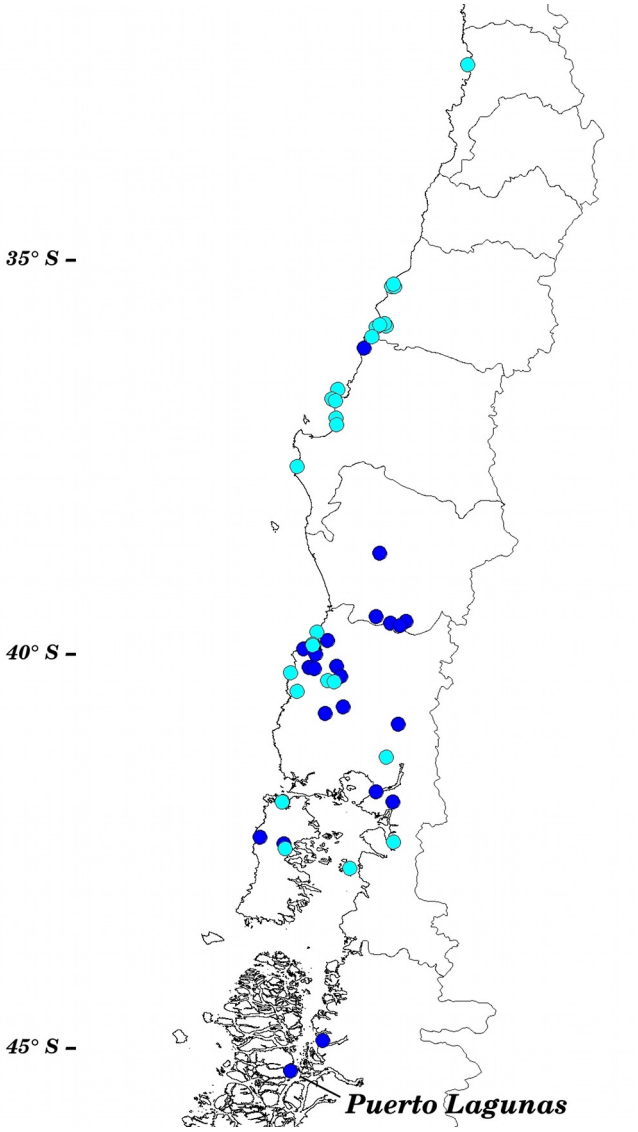

Figure 2. Distribution of *Fascicularia bicolor*. Records of subsp. *canaliculata* in dark blue, records of subsp. *bicolor* or of unassigned specimens in light blue.

A new northern distribution limit for *Drapetes muscosus*

Subshrub, forming lax cushions. Stems of up to 2 mm diameter, dark brown, bearing adventitious roots, orthotropic, with lateral shoots. Leaves 2.6-5.5 x 0.7-2.5 mm, aggregated at the distal part of shoots, decussate, sessile, oval-elliptic, margin entire, densely sericeous beneath, glabrous above. Inflorescence an umbel of 3-8 flowers, terminal, immersed among leaves, but peduncle elongating in fruit; enclosed by two clearly differentiated, obtuse bracts, these 3-5.5 x 2-3 mm and caducous in fruit. Flowers hermaphrodite, protantherous, perigynous, with 4 perianth lobes, these 1.5-2 x 2-3 mm, white to purple, glabrous within, pubescent on the outside; hypanthium tubular, lower half persistent and enclosing the fruit, white, upper half caducous. Stamens 4, alternating with the perianth lobes, exserted; anthers rounded, introrse, basifixed, with apiculate connective. Ovary sessile, the single locule with a singular ovule; style linear; the dorsiventral stigma forming a brush with cylindrical papillae of 0.3 mm, hyaline or purple. Fruit an ellipsoid, brownish achene, 1.5 x 0.75 mm. Seeds ovoid, 0.4 x 0.7-1.3 mm. Flowering time from October through February.

Description based on Skottsberg (1913), Cámara Hernández (1964), Heads (1990), and Herber (2003).

Drapetes muscosus occurs in southern Chile and Argentina, and on the Falkland Islands (Islas Malvinas). In Chile, its distribution ranges from Cerro Tambor (42°23' S) in the southern part of Los Lagos Region, which is the new northern distribution limit, to Wollaston Island (55°50' S) of the Cape Horn archipelago (Figure 3). On the northern part of Chiloé Island (42°15' S), fossil pollen of the species from the last glacial maximum (LGM) was found (Heusser and Flint 1977). There are no extant records of *Drapetes muscosus* from this island, where it has presumably gone extinct since the LGM. Based on nuclear and plastid DNA sequence data, monotypic *Drapetes* is closely related to several *Gnidia* species from southeast Africa, which together form a clade that is sister to the South African genus *Passerina* (Van der Bank *et al.* 2002; Beaumont *et al.* 2009).

Material examined: CHILE. Región de Los Lagos: Cerro Tambor, 42°23'14.6" S, 72°23'33.6" W, 994 m a.s.l., 20.II.2012, *S. Pfanzelt and R. Fitzek 736* (CONC). Región de Aysén: Cordón montañoso al este del Río Los Ñadis, Cerro Sin Nombre, 47°32'22.3" S, 72°49'26.0" W, 1080 m a.s.l., 2.III.2011, *S. Pfanzelt and A. Arriegada 589* (CONC). El Gato, Fundo Cerro El Águila, 45°07'06.4" S, 71°54'29.7" W, 1377 m a.s.l., 15.II.2013, *S. Pfanzelt 830* (CONC).

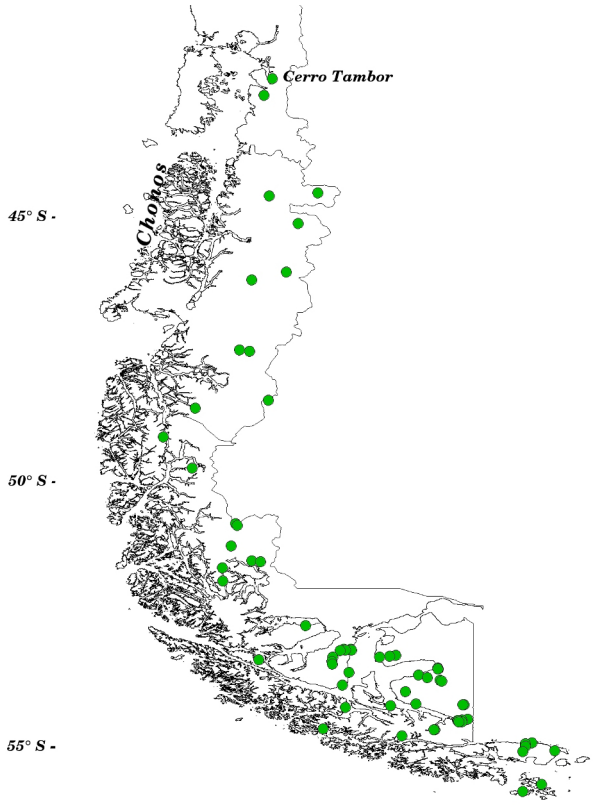

Figure 3. Distribution of *Drapetes muscosus* in Chile. The new northern distribution limit is Cerro Tambor at 42°23' S (*S. Pfanzelt and R. Fitzek 736*, CONC). *Fonck 122* (SGO 77602), coming from "Taitao, un cerro de Chonos", was not included in the map as the exact locality could not be retrieved.

A new northern distribution limit for *Phyllachne uliginosa*

Dense cushion-forming subshrub, with aerial roots. Stems short, up to 5 cm, densely branched dichotomously. Leaves imbricate, 3-4 x 1-3 mm, lanceolate, mucronate, coriaceous, with translucent margins. Flowers sessile, actinomorphic, solitary, emerging from the surface of the foliage, sympetalous, petal number variable (5-7). Sepals connate. Corolla white, 2.5-3 mm long. Stamens 2, adnate to the style, thus forming a floral column (gynostemium); anthers extrorse, disporangiate and opening horizontally, sessile on each side of the column apex. Stigma 2-lobed, papillose. Ovary united with calyx tube, inferior, obovoid to oblong, unilocular. Epigynous nectaries 2, short. Fruit an indehiscent capsule with obovoid seeds. Description based on Good (1925), Correa (1999), Laurent *et al.* (1999), and Carolin (2006).

Phyllachne uliginosa is the only South American representative of the trigger plant family (Stylidiaceae). The species can be found in bogs from sea level to the alpine zone. On Tierra del Fuego, it prefers sheltered areas with high rainfall (Moore 1983). *Phyllachne uliginosa* is endemic to the southern parts of Chile and Argentina, from southern Los Lagos Region (42°23' S) to Cape Horn (55°48' S). It was first found growing on Cerro Tambor (42°23' S) by L. Flores and R. Soto (pers. comm.), but this has not been confirmed or published until now (Figure 4).

Based on analysis of ITS and *rbc*L sequence variation, Wagstaff and Wege (2002) found *Phyllachne* to be paraphyletic and hence proposed the inclusion of *Phyllachne* in *Forstera*.

Material examined: CHILE. Región de Los Lagos: Huinay, 42°23' S, 72°23' W, 1145 m a.s.l., 8.III.2008, *L. Flores and R. Soto s.n.* (CONC 169753). Cerro Tambor, 42°23'26.3" S, 72°23'11.0" W, 1320 m a.s.l., 20.II.2012, *S. Pfanzelt and R. Fitzek 744* (CONC).

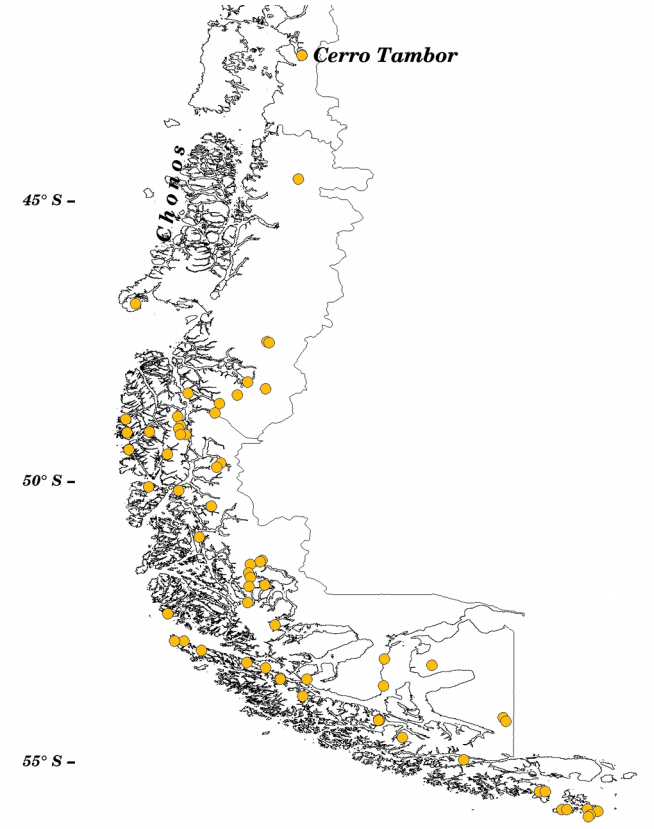

Figure 4. Distribution of *Phyllachne uliginosa* in Chile. The new northern distribution limit is Cerro Tambor at 42°23' S (*L. Flores* and *R. Soto s.n.*, CONC 169753; *S. Pfanzelt and R. Fitzek 744*, CONC). *Philippi s.n.* (SGO 43581) and *Fonck 124* (SGO 57125) were collected in the Chonos archipelago, but exact locality data is missing.

A new northern distribution limit for *Saxifragella bicuspidata*

Cushion-forming perennial herb, glabrous. Stems up to 10 cm, basally covered by brown leaf remains and with green, opposite, imbricate leaves above. Leaves 3-6 x 0.7-1.5 mm, linear-spathulate, bicuspidate, the cusps somewhat cartilaginous. Flowers perfect, apetalous, solitary from the leaf axils, the short peduncle lifting them hardly above foliage. Sepals 5, bicuspidate. The basal portions of calyx and filaments are adnate into a hypanthium. Stamens slightly exceeding the sepals. Ovary semi-inferior, adnate to the hypanthium, the two carpels fused to ca. half their length, the distal parts free, semiconvex with excentric, sessile stigmas, carpel ventral traces brownish. Fruit a deshicent capsule, opening by the ventral suture. Seeds ca. 1 mm, carinate. Description based on Hooker (1844), Moore (1983), and Correa (1984).

Saxifragella bicuspidata grows on screes and in rock-crevices above the tree-line. It is a frequent constituent of the alpine flora of the Fuegian Andes, but less common in the remaining distribution area. In Chile, the species occurs from the new northern distribution limit at Cerro Tambor (42°23' S) to Hermite Island (55°48' S) of the Cape Horn archipelago. It has also been collected in the Patagonian fjord region (Figure 5). In Argentina, the distribution range comprises the Andes of the provinces of Santa Cruz and Tierra del Fuego.

The species was observed growing on a scree slope of Cerro Tambor at 1500 m a.s.l., extending the known distributional range in Chile by several hundred kilometers. As just one individual was found (S.P. and R. Fitzek, Fundación San Ignacio del Huinay, pers. obs.), we refrained from collecting a voucher specimen. Nonetheless, the combination of cushion growth, emarginate leaves, apetalous flowers, and ovary position and morphology allowed for an unambiguous identification of that specimen as *Saxifragella bicuspidata* (Figure 6).

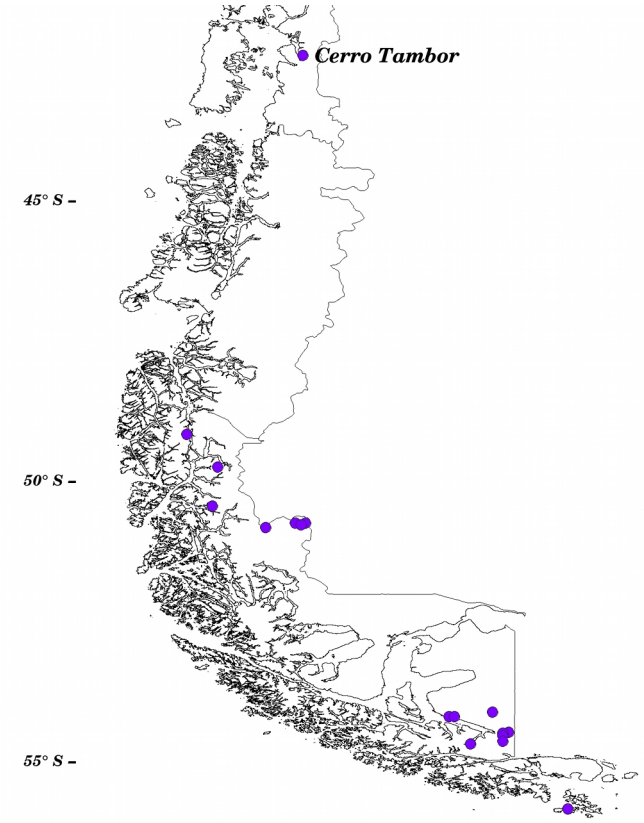

Figure 5. Distribution of *Saxifragella bicuspidata* in Chile. The new northern distribution limit is Cerro Tambor at 42°23' S (S. Pfanzelt and R. Fitzek, pers. obs.).

Soltis *et al.* (2001) consider *S. bicuspidata* to be a relictual species of the ancient radiation of Saxifragaceae *sensu stricto*. The species may have arrived southern South America by long distance dispersal from either the Pacific Northwest of North America or eastern Asia.

Figure 6. *Saxifragella bicuspidata* growing on Cerro Tambor. Photo by R. Fitzek (Fundación San Ignacio del Huinay).

A new northern distribution limit for *Saxifragodes albowiana*

Creeping to erect perennial herb, glabrous. Stems slender, branching from the base, up to 10 cm. Leaves 2-7 x 2-5 mm, alternate, broadly spathulate to orbicular, sometimes 1-2 teeth at the margin, petiole as long as lamina. Flowers perfect, solitary, emerging from the upper leaf axils, somewhat pendulous. Perianth and filaments basally adnate into a hypanthium. Calyx lobes 5, 1-2 x 1-2 mm, light green with a reddish tinge, triangular to ovate, subacute. Petals 5, cream-coloured, or pinkish, slightly shorter than to slightly longer than sepals. Stamens 6, 5 of them antisepalous, the remaining stamen and the 2 staminodes antipetalous. Ovary adnate to hypanthium, bicarpellate, carpels fused at base, free distally; placentation axillary, styles 2, stigmas small, capitate. Fruit a dehiscent capsule, deeply bifid. Seeds dark brown, ovoid to reniform, tuberculate. Description based on Alboff and Kurtz (1896), Moore (1983), and Correa (1984).

The species grows in damp sites above the tree-line. The Chilean distribution range of *Saxifragodes albowiana* extends from Cerro Tambor (42°23' S), which is the new northern distribution limit, to southern Tierra del Fuego (54°48' S; Figure 7). In Argentina, it occurs in the provinces of Santa Cruz and Tierra del Fuego.

The biogeography of *S. albowiana* resembles that of *Saxifragella bicuspidata*, as both are considered to have arrived southern South America via long-distance dispersal (Soltis *et al.* 2001). *Saxifragodes albowiana* is not closely related to *Saxifragella bicuspidata*, but is instead sister to *Cascadia nuttallii*, an endemic of the Pacific Northwest of North America.

Material examined: CHILE. Región de Los Lagos: Cerro Tambor, 42°23'33.8" S, 72°23'00.3" W, 1480 m a.s.l.,

20.II.2012, *S. Pfanzelt and R. Fitzek 725* (CONC). Región de Magallanes: Isla Grande de Tierra del Fuego, Valle del Río Bethbeder, 54°37'00.3" S, 68°49'40.6" W, 639 m a.s.l, 25.I.2012, *S. Pfanzelt 668* (CONC).

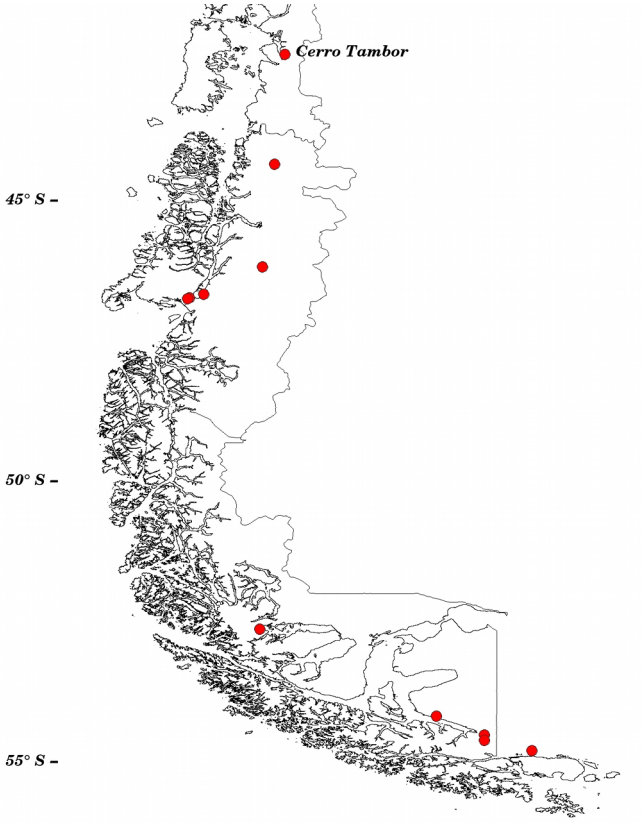

Figure 7. Distribution of *Saxifragodes albowiana* in Chile. The new northern distribution limit is Cerro Tambor at 42°23' S (*S. Pfanzelt and R. Fitzek 725*, CONC).

The Cerro Tambor (42°23' S) populations of *Drapetes muscosus* and *Phyllachne uliginosa*, as well as those of other cushion peat bog species like *Donatia fascicularis* J.R. Forst. and G. Forst. (Donatiaceae), *Astelia pumila* (G. Forst.) Gaudich. (Asteliaceae), and *Gaimardia australis* Gaudich. (Centrolepidaceae), are among the northermost occurrences of these species known from the western Patagonian Andes. Cushion peat bogs build the zonal vegetation of the Patagonian fjords and channels south of 48°S (Schmithüsen 1956), for which Godley (1960) coined the term Magellanic moorland. Further north, cushion peat bogs are found azonally in the Chonos and Guaytecas archipelagos, and in isolated pockets at and above timberline of the Chilean Coastal Range (e.g., Espinosa 1917; Looser 1952; Godley 1968; Rámirez 1968; Villagrán 2001). In the northwestern Patagonian Andes cushion peat bog species have been recorded in Queulat National Park (Pfanzelt *et al.*, pers. obs.), Cuesta Moraga (Heusser *et al.* 1992), the Andes of Hornopirén (Villagrán 2001), and Cerro Tambor (present study). Palynological data suggest that Magellanic moorland expanded northwards during the last glaciation and occupied the lowlands of south-central Chile (e.g., Villagrán 1988; Moreno 1997; Villagrán 2001). The extant distribution of cushion bog species results from post-glacial range shifts into refugia at high elevations both in the Chilean Coastal Range and in the Andes (Heusser *et al.* 1992; Villagrán 2001). Nonetheless, plant distribution patterns in the western Patagonian Andes are far from being recorded with a satisfying resolution. Incomplete knowledge about actual distributions may blur conclusions made on vegetation history, climatic tolerances of species, and conservation needs. For example, Heusser and Flint (1977) suggested a post-glacial southward movement of peat bog species like *Drapetes muscosus* and *Huperzia fuegiana* (Roiv.) Holub triggered by a warming climate. Now we found that *D. muscosus* occurs farther north than previously known. Its populations in the western Patagonian Andes might stem from a post-glacial altitudinal range shift, as suggested for several cold-adapted species (Villagrán et al. 1998; Villagrán 2001). Thus, improved species records, together with additional data (*e.g.*, DNA sequences), will allow for a re-evaluation of the role of the western Patagonian Andes as a potential refugium during glacial and interglacial periods (Pfanzelt, unpubl. data).

Acknowledgments: Part of the fieldwork was funded by a DAAD grant to S.P. (D/10/49464). We thank G. Rojas Villegas (SGO) for giving access to herbarium data, I. Bonnie (CM) for sending a photograph of the Fricke *s.n.* specimen, and H. Meudt for comments on the manuscript.

Literature Cited

Alboff, N. and F. Kurtz. 1896. Contributions à la flore de Terre de Feu. II. Enumération des plantes du canal de Beagle et de quelques autres endroites de la Terre de Feu. *Revista del Museo de La Plata* 7: 355-392.

Baeza, V. 1930. *Los nombres vulgares de las plantas silvestres de Chile y su concordancia con los nombres científicos y observaciones sobre la aplicación técnica y medicinal de algunas especies.* Santiago: Imprenta El Globo. 270 p.

Beaumont, A.J., T.J. Edwards, J. Manning, O. Maurin, M. Rautenbach, M.C. Moitsi, M.F. Fay, M.W. Chase and M. Van der Bank. 2009. *Gnidia* (Thymelaeaceae) is not monophyletic: taxonomic implications for Thymelaeoideae and a partial new generic taxonomy for *Gnidia*. *Botanical Journal of the Linnean Society* 160: 402-417.

Cámara Hernández, J.A. (1964). Las especies de Timeleáceas de la flora Argentina. *Revista de la Facultad de Agronomía y Veterinaria Buenos Aires* 16: 143-60.

Carlquist, S. 1969. Studies in Stylidiaceae: New taxa, field observations, evolutionary tendencies. *Aliso* 7(1): 13-64.

Carolin, R.C. 2006. Stylidiaceae; p. 614-620 *In* J.W. Kadereit and C. Jeffrey (ed.). *The Families and Genera of Vascular Plants*. Volume VIII. Berlin: Springer.

Correa, M.N. 1984. Saxifragaceae; p. 11-18 *In* M.N. Correa (ed.). *Flora Patagónica*. Parte VIII. Buenos Aires: Instituto Nacional de Tecnología Agropecuaria.

Correa, M.N. 1999. Stylidiaceae; p. 480-491 *In* M.N. Correa (ed.). *Flora Patagónica*. Parte VI. Buenos Aires: Instituto Nacional de Tecnología Agropecuaria.

Espinosa, M. 1917. Los alerzales de Piuché. *Boletin del Museo Nacional de Historia Natural, Santiago de Chile* 10: 36-93.

Global Biodiversity Information Facility (GBIF) 2012. *Biodiversity occurrence data published by: Vascular Plant Herbarium (MA), SANT, Missouri Botanical Garden (MO), Royal Botanic Garden Edinburgh (E), Herbario de la Universidad de Salamanca (SALA), Antarctic Plant Database, Herbarium Senckenbergianum (FR), Royal Botanic Gardens (K), Instituto Nacional de Tecnología Agropecuaria (BAB), Museo Botánico (SI), Administración de Parques Nacionales APN-AR, Fundación Miguel Lillo (LIL), Uppsala University (UPS), Linnean Society of London (LINN), Landcare Research New Zealand Limited (CHR), Royal Botanic Gardens (MEL), Conservatoire et Jardin botaniques de la Ville de Genève (G), Natural History Museum of Denmark (C), Universität Göttingen (GOET), Botanischer Garten und Botanisches Museum Berlin-Dahlem (B), New York Botanical Garden (NY), and Instituto de Botánica Darwinion.* Electronic Database accessible at data.gbif.org. Captured on 14 May 2012.

Godley, E.J. 1960. The botany of southern Chile in relation to New Zealand and the Subantarctic. *Proceedings of the Royal Society of London. Series B, Biological Sciences* 152: 457-475.

Good, R. 1925. On the geographical distribution of the Stylidiaceae. *New Phytologist* 24(4): 225-240.

Heads, M.J. 1990. A revision of the genera *Kelleria* and *Drapetes* (Thymelaeaceae). *Australian Systematic Botany* 3: 595-652.

Herber, B.E. 2003. Thymelaeaceae; p. 373-396 *In* J.W. Kadereit and C. Bayer (ed.). *The families and genera of vascular plants*. Volume V. Berlin: Springer.

Heusser, C.J. and R.F. Flint. 1977. Quaternary glaciations and environments of northern Isla Chiloé, Chile. *Geology* 5: 305-308.

Heusser, C.J, L.E. Heusser and A. Hauser. 1992. Paleoecology of Late Quaternary Deposits in Chiloé Continental, Chile. *Revista Chilena de Historia Natural* 65: 235-245.

Hooker, J.D. 1846. *The Botany of the Antarctic voyage of H.M. Discovery Ships Erebus and Terror in the Years 1839-1843*. Volume 1. Flora Antarctica. London: Reeve Brothers. 574 p.

Kubitzki, K. 2011. Coriariaceae; p. 105-108 *In* K. Kubitzki (ed.). *The families and genera of vascular plants*. Volume X. Berlin: Springer.

Laurent, N., B. Bremer and K. Bremer. 1999. Phylogeny and generic interrelationships of the Stylidiaceae (Asterales), with a possible extreme case of floral paedomorphosis. *Systematic Botany* 23(3): 289-304.

Looser, G. 1952. *Donatia fascicularis* en la Cordillera de Nahuelbuta. *Revista Universitaria* 37: 7-9.

Moore, D.M. 1983. *Flora of Tierra del Fuego*. Oswestry/St Louis: Anthony Nelson/Missouri Botanical Garden. 396 p.

Moreno, P.I. 1997. Vegetation and climate near Lago Llanquihue in the Chilean Lake District between 20200 and 9500 ^{14}C yr BP. *Journal of Quaternary Science* 12(6): 485-500.

Nelson, E.C. and G. Zizka. 1997. *Fascicularia* (Bromeliaceae): which species are cultivated and naturalized in northwestern Europe? *New Plantsman* 4(4): 232–239.

Ramírez, C. 1968. Die Vegetation der Moore der Cordillera Pelada, Chile. *Bericht der Oberhessischen Gesellschaft für Natur- und Heilkunde zu Giessen* 36: 95-101.

Schmithüsen, J. 1956. Die räumliche Ordnung der chilenischen Vegetation. *Bonner Geographische Abhandlungen* 17: 1-86.

Skottsberg, C. 1913. Botanische Ergebnisse der Schwedischen Expedition nach Patagonien und dem Feuerlande 1907-1909. 3. A botanical survey of the Falkland Islands. *Kungliga Svenska Vetenskapsakademiens Handlingar* 50: 1-129.

Smith, L.B. and R.J. Downs. 1979. Bromelioideae. *Flora Neotropica Monographs* 14(3): 1493-2142.

Soltis, D.E., R.K. Kuzoff, M.E. Mort, M. Zanis, M. Fishbein, L. Hufford, J. Koontz and M.K. Arroyo. 2001. Elucidating deep-level phylogenetic relationships in Saxifragaceae using sequences for six chloroplastic and nuclear DNA regions. *Annals of the Missouri Botanical Garden* 88(4): 669-693.

Van der Bank, M., M.F. Fay and M.W. Chase. 2002. Molecular phylogenetics of Thymelaeaceae with particular reference to African and Australian genera. *Taxon* 51: 329-339.

Villagrán, C. 1988. Expansion of Magellanic Moorland during the Late Pleistocene:

Palynological Evidence from Northern Isla de Chiloé, Chile. *Quaternary Research* 30: 304-314.

Villagrán, C. 2001. Un modelo de la historia de la vegetación de la Cordillera de la Costa de Chile centro-sur: la hipótesis glacial de Darwin. *Revista Chilena de Historia Natural* 74: 793-803.

Villagrán, C., C. Le-Quesne, J.C. Aravena, H. Jiménez and F. Hinojosa. 1998. El rol de los cambios de clima del cuaternario en la distribución actual de la vegetación de Chile central-sur. *Bamberger Geographische Schriften* 15: 227-242.

Wagstaff, S.J. and J. Wege. 2002. Patterns of diversification in New Zealand Stylidiaceae. *American Journal of Botany* 89(5): 865-874.

Zizka, G., R. Horres, E.C. Nelson and K. Weising. 1999. Revision of the genus *Fascicularia* Mez. *Botanical Journal of the Linnean Society* 129: 315-332.

Zizka, G., M. Schmidt, K. Schulte, P. Novoa, R. Pinto and K. König. 2009. Chilean Bromeliaceae: diversity, distribution and evaluation of conservation status. *Biodiversity and Conservation* 18: 2449-2471.

Zuloaga, F.O., O. Morrone, M.J. Belgrano, C. Marticorena and E. Marchesi (ed.). 2008. Catálogo de las Plantas Vasculares del Cono Sur (Argentina, Sur de Brasil, Chile, Paraguay y Uruguay). *Monographs in Systematic Botany from the Missouri Botanical Garden* 107(1): i–xcvi, 1–983; 107(2): i–xx, 985–2286; 107(3): i–xxi, 2287–3348.

Received: November 2012
Accepted: July 2013
Published online: August 2013
Editorial responsibility: Angelo Gilberto Manzatto