

# Taxonomic placement of *Onuris hauthalii* (Brassicaceae: Eudemeae), based on morphology and multilocus species tree analyses, and the recognition of the new genus *Alshehbazia*

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**Summary.** *Onuris hauthalii* is a species distributed in Southern Argentina and Chile. Its generic assignment has been controversial, being included in *Eudema*, *Brayopsis* and *Onuris*. In order to clarify its generic affinities, we studied its morphology and phylogenetic relationships using multilocus/multispecies coalescent species-tree analyses based on four DNA regions (ITS, *trnL-F*, *trnH-psbA*, and *rps16* intron). Results show that while *O. hauthalii* is related to *Onuris* s.s., it represents a well-differentiated lineage characterised primarily by having branched rhizomes, rosette flowering with ebracteate flowers, and latiseptate silicles. Based on the morphological and molecular evidence, we place this species in the new monospecific genus *Alshehbazia*. A description, morphological key, updated geographical distributions, map, and illustration are provided.

**Key Words.** Argentina, Chile, Cruciferae, *Eudema*, Patagonia, phylogeny.

## Introduction

*Onuris hauthalii* (Gilg & Muschl.) Al-Shehbaz (Brassicaceae) is distributed in southern Argentina (Santa Cruz Province) and Chile (Magallanes and Antártica Chilena Region). Generic assignment of this species has been controversial. Gilg & Muschler (1909) originally placed it in *Eudema* Humb. & Bonpl., based on the presence of a scapose perennial habit with linear entire basal leaves, much reduced inflorescence rachis with the flowers borne on long pedicels originating from the centre of rosettes, and pyriform silicles. Skottsberg (1916) treated it under *Brayopsis* Gilg & Muschl. but Schulz (1924) reassigned it to *Eudema* based on fruit shape. Al-Shehbaz (2012a, b) transferred the species to the Patagonian *Onuris* Phil. (hereafter *Onuris* s.s.), differing from *Eudema* basically by having latiseptate (vs angustiseptate) silicles, and smooth (vs conspicuously reticulate) seeds. In addition, the distribution of *Onuris* s.s. overlaps with that of *O. hauthalii*, while species of *Eudema* grow in Ecuador and northern Peru. Therefore, Al-Shehbaz's (2012a) transfer of the species to *Onuris* (hereafter *Onuris* s.l.) may be justified, but it clearly differs from species of *Onuris* s.s. by its habit and inflorescence.

Salaria *et al.* (2015) published a molecular phylogeny of tribe Eudemeae, which included *Onuris* s.s., *O. hauthalii*, *Aschersoniodoxa* Gilg & Muschl., *Brayopsis*, *Eudema*, *Dactylocardamum* Al-Shehbaz, and *Xerodraba* Skotts. Their results showed *O. hauthalii* in a clade

(“Southern Andean clade”) with *Onuris* s.s. and *Xerodraba*, although their relationships were poorly supported.

The aim of this work is to analyse the generic placement of *Onuris hauthalii* using morphological data and estimating the species tree for *Onuris* s.l. and related taxa with multilocus DNA sequence data.

## Materials & Methods

### Morphological studies

Morphological studies of *Onuris hauthalii* and species of *Onuris* s.s. were based on herbarium specimens from B, BA, BAA, BAB, CONC, HIP, SCO, SI, and UPS (herbarium acronyms follow Thiers 2014). All cited specimens have been seen by the authors. Leaves, flowers and fruits from herbarium specimens were re-hydrated prior to observations using stereoscopic microscope.

### Molecular studies

**Sampling and DNA sequence selection.** For the estimation of the species tree of *Onuris* s.l., we used the multilocus DNA sequence data of Salaria *et al.* (2015). Sequence data from the nuclear ribosomal ITS region and chloroplast regions *trnL* intron + *trnL-F* spacer, *trnH-psbA* spacer, and *rps16* intron, were included for *O. hauthalii* (four specimens) and all species of *Onuris* s.s.: *O. alismatifolia* Gilg in Skotts.

(1), *O. graminifolia* Phil. (2), *O. hatcheriana* (Gilg ex Macloskie) Gilg & Muschl. (3), *O. papillosa* O. E. Schulz (2), and *O. spegazziniana* Gilg & Muschl. (2). We also included species of the related genus *Xerodraba*: *X. patagonica* (Speg.) Skottsb. (2), *X. pectinata* (Speg.) Skottsb. (3), and *X. pycnophylloides* (Speg.) Skottsb. (1), as well as representatives of the “Northern-Central Andean clade”: *Aschersoniodoxa*, *Brayopsis*, *Eudema*, and *Dactylocardamum* (one specimen each). All analyses were rooted with *Menonvillea chilensis* (Turcz.) B. D. Jacks. Vouchers and GenBank accession numbers are provided in [Appendix 1](#).

**Phylogenetic analyses.** Alignments were generated with Muscle v.3.6 (Edgar 2004) using a first round of multiple alignments and posterior rounds of refinement under the default settings. The alignments obtained were then checked and improved manually where necessary by visual refinement using the program Bioedit v.7.0.9.0 (Hall 1999). All aligned matrices of each locus are available from TreeBase ([www.treebase.org](http://www.treebase.org)) (<http://purl.org/phylo/treebase/phyloids/study/TB2:S16488>).

The coalescent-based method implemented in \*BEAST extension (Heled & Drummond 2010) of software BEAST v2.1.3 (Bouckaert *et al.* 2014) was used to obtain the Bayesian species trees based on all four sampled sequences (ITS, *trnL-F*, *trnH-psbA*, *rps16* intron). Best nucleotide substitution models from each region were determined using jModeltest v2.1.6 (Darriba *et al.* 2012) under the AIC as follows: ITS: TVMef+G, *trnL-F*: TVM+I, *trnH-psbA* spacer: TPM1uf+G, *rps16* intron: TIM1+G. All molecular evolutionary models were unlinked across loci and with an uncorrelated log-normal model (UCLN) of molecular evolutionary heterogeneity assigned to each sampled locus. We linked the tree model for the three chloroplast regions (*trnL-F*, *trnH-psbA*, *rps16* intron), since they are genetically linked, and set separate tree models for the chloroplast dataset and the nuclear ribosomal ITS region. A Yule process was used for the species tree prior, and the piecewise linear and constant root was used for the population size model. The program BEAUti was used to generate input files for the analyses, in which substitution models were edited manually on the xml file to fit the models selected using jModeltest. All remaining priors were set to the defaults. Two independent runs of  $5 \times 10^8$ , sampling every  $2.5 \times 10^4$  were executed, discarding as burn-in the first 25% of the samples. Convergence of the chains was checked using Tracer v1.6.0 (Rambaut *et al.* 2013) ensuring that ESS values for parameters were  $> 200$ . Trees from the two independent runs were combined using LogCombiner v1.2.3, and the maximum-clade credibility tree from 3000 trees was generated with TreeAnnotator v1.8 using the poste-

rior probability limit set to 0.5 and the median node heights, visualising it in Figtree v1.4. Finally, results from the species-tree analyses were compared with the concatenated analyses conducted in Salariato *et al.* (2015).

## Results

### Morphological Studies

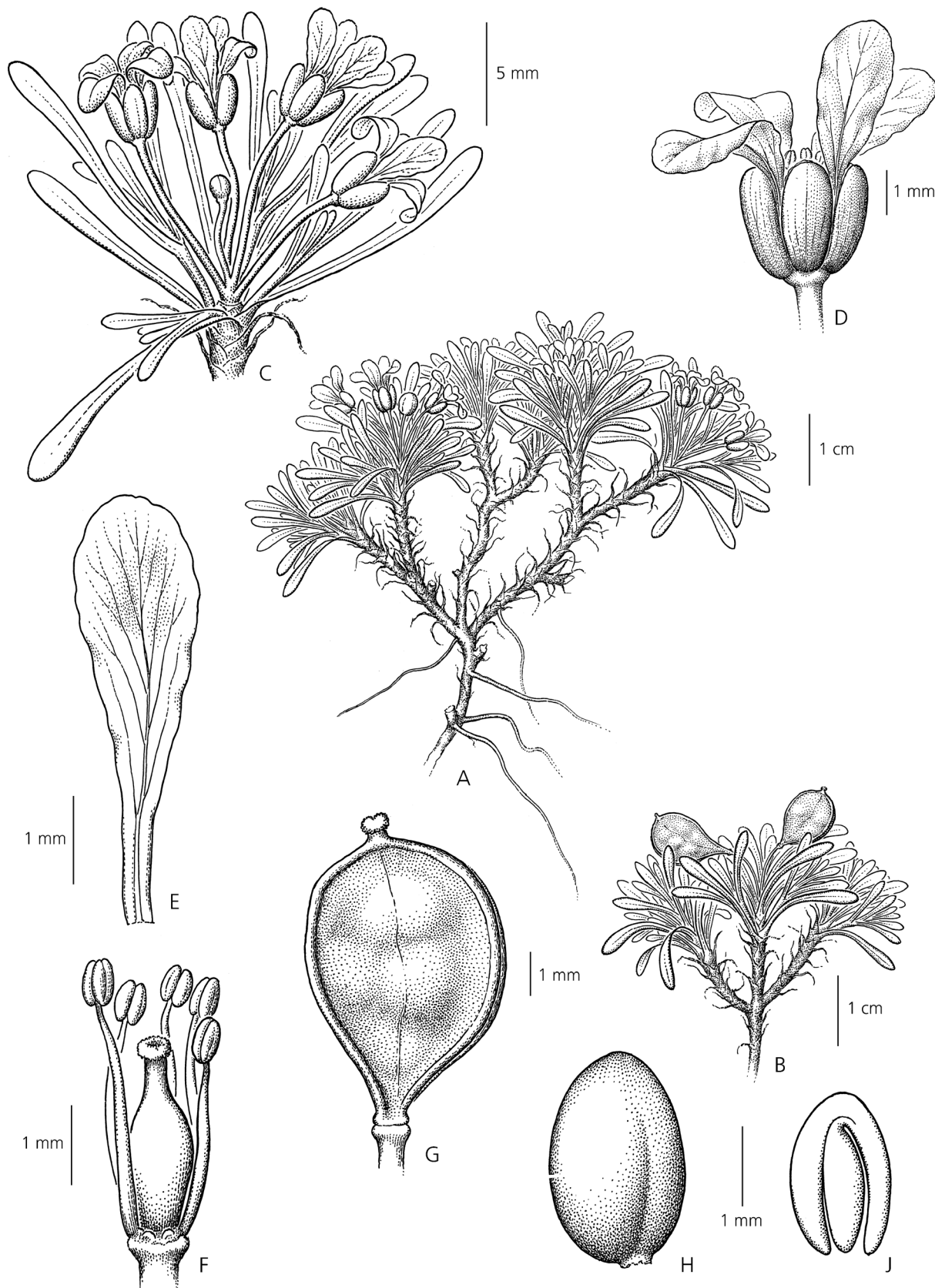
Morphological analysis of *Onuris hauthalii* agrees with previous observations of Boelcke (1984), Boelcke & Romanczuk (1984), and Al-Shehbaz (2012a, b), and confirm that this species has a unique combination of characters lacking in both *Eudema* and *Onuris* s.s. *O. hauthalii* is characterised by forming scapose perennial herbs with slender rhizomes, the branches of which end in rosettes (Fig. 1A, B). In contrast, both *Eudema* and *Onuris* s.s. have a woody caudex. Also, the inflorescences in *O. hauthalii* have a shortened rachis, generally less than 1.5 mm, with ebracteate flowers on long pedicels originating from the centre of the rosette (Fig. 1C). This flowering type is also present in *Eudema*, but absent in species of *Onuris* s.s., which have corymbose racemes bracteate throughout and elongated in fruit. Fruits in *O. hauthalii* are latiseptate, pyriform silicles (Fig. 1G), while *Eudema* has angustiseptate silicles. Species in *Onuris* s.s. also have latiseptate silicles, but they are oblong to ovoid or ellipsoid. Finally, the seed coat in *O. hauthalii* and *Onuris* s.s. is smooth, but it is reticulate in *Eudema*.

### Molecular studies

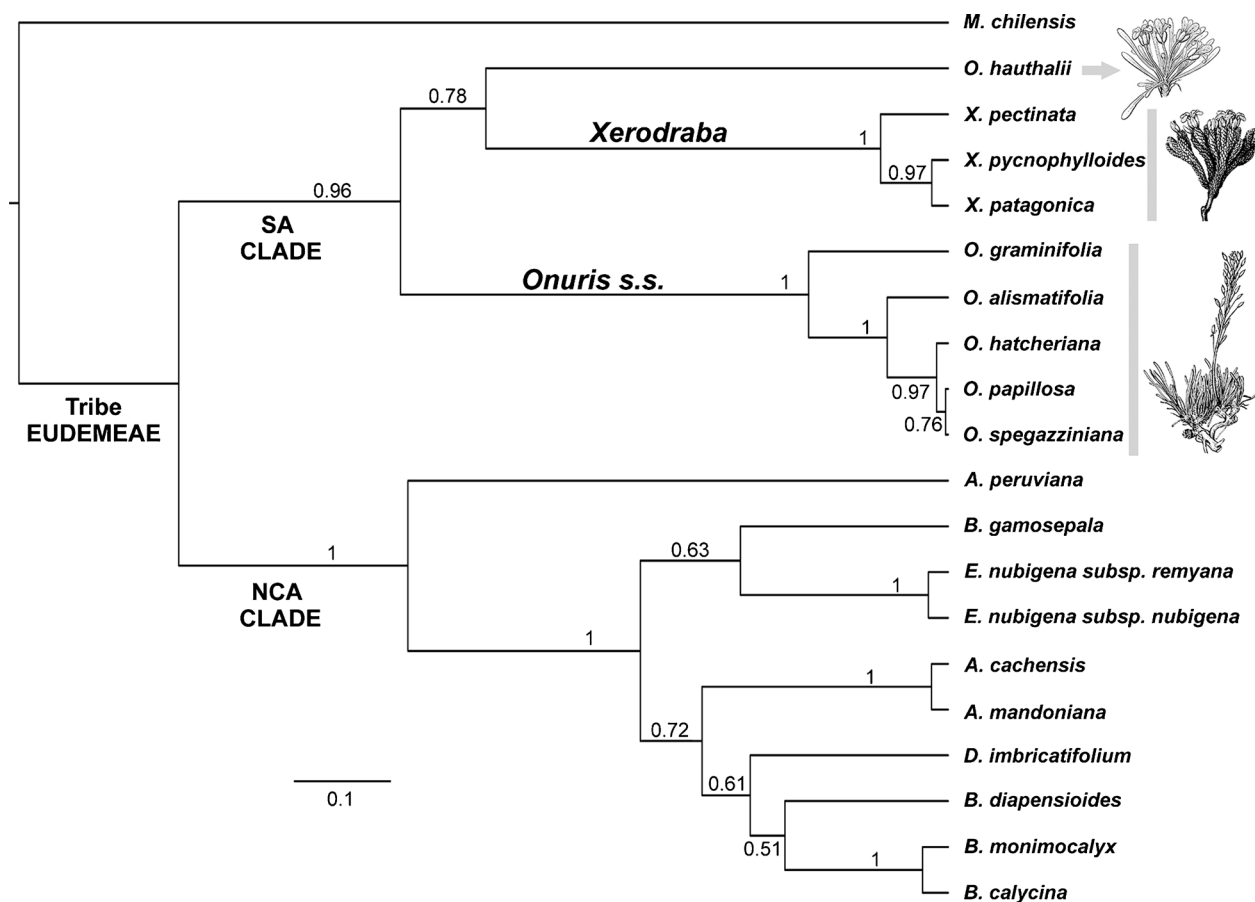
The inferred species tree obtained (Fig 2.) is similar to the phylogenetic tree of Eudemeae presented by Salariato *et al.* (2015) using concatenated phylogenetic analyses. The tribe Eudemeae is grouped in two main clades, the northern-central Andes clade (NCA clade) that includes *Aschersoniodoxa*, *Brayopsis*, *Dactylocardamum* and *Eudema* (posterior probability “PP”=1); and the southern Andes clade, including *Xerodraba*, *Onuris* s.s., and *O. hauthalii* (PP=0.96). Monophyly was strongly recovered for *Onuris* s.s. (PP=1), but not for *Onuris* s.l. *O. hauthalii* was sister to *Xerodraba* in a weakly supported relationship (PP: 0.78).

## Discussion

Morphological and molecular studies show that *Onuris hauthalii* is a taxon differentiated from both *Onuris* s.s. and *Eudema*. Its morphology exhibits a unique combination of habit, inflorescence, and fruits characters that distinguish it from species of *Eudema* and the closely related *Onuris* s.s. Species trees obtained in this work, as well as the phyloge-



**Fig. 1.** *Alshehbazia hauthalii*. A plant with flowers; B plant with fruits; C inflorescence showing the rosette flowering; D flower; E petal; F stamens and ovary; G fruit, dorsal view; H seed; J embryo. From *TBPA* 2674 (SI). DRAWN BY FRANCISCO ROJAS.



**Fig. 2.** Maximum clade credibility species tree estimated from one nuclear ribosomal (ITS) and three chloroplast (*trnL-F*, *trnH-psbA*, *rps16* intron) DNA regions using the multispecies coalescent method implemented in \*BEAST. Bayesian posterior support values are given at each node. The arrow shows the position of *Alshehbazia hauthalii*. Abbreviations: NCA north-central Andes; SA, southern Andes.

netic trees obtained with the concatenated phylogenetic analyses of Salariato *et al.* (2015), show that *O. hauthalii* represents a morphologically unique lineage, which is sufficiently phylogenetically isolated from related genera to warrant its generic status. Regarding the weakly supported sister-group relationship between *O. hauthalii* and *Xerodraba*, it should be mentioned that the former is easily distinguished from the latter by not forming cushions with imbricate leaves and solitary flowers

or occasionally 2- or 3-flowered racemes. The molecular results do not fully support the phylogenetic position of *O. hauthalii* as sister to *Xerodraba*; it is also possible that additional data would establish that this species is sister to *Onuris* s.s. Nevertheless, our analysis indicates that *O. hauthalii* is a well-differentiated lineage both from *Xerodraba* and from *Onuris* s.s. Therefore, based on the morphological and molecular results obtained, we place *O. hauthalii* into the new monospecific genus *Alshehbazia*.

**Key to *Alshehbazia* and related genera**

- 1. Plants producing loose to compact woody cushions with tiny imbricate leaves (shorter than 1 cm) and solitary flowers, rarely 2 or 3- flowered racemes .....**Xerodraba**
- 1. Plant producing rosettes of non-imbricate leaves, inflorescences several- to many- flowered racemes.....2
- 2 (1). Inflorescences elongated, rachis elongated at least in fruiting, flowers bracteate .....**Onuris**
- 2. Inflorescences not elongated, rachis of inflorescences reduced, flowers ebracteate, with long pedicels arising from the centre of the rosette.....3
- 3 (2). Silicles angustiseptate; seed coat coarsely reticulate.....**Eudema**
- 3. Silicles latiseptate, pyriform; seed coat smooth .....**Alshehbazia**

### Taxonomic treatment

**Alshehbazia Salariato & Zuloaga gen. nov.** Type: *Alshehbazia hauthalii* (Gilg & Muschl.) Salariato & Zuloaga (*Eudema hauthalii* Gilg & Muschl.).

<http://www.ipni.org/urn:lsid:ipni.org:names:77150415-1>

*Herbs* perennial, scapose, with slender rhizomes the branches of which terminated by rosettes with petiolar remains of previous years. *Basal leaves* rosulate, petiolate; petioles persistent, as long as or longer than blade, strongly flattened at base; leaf blade oblanceolate-spatulate to narrowly oblanceolate or linear, glabrous. *Inflorescences* not elongated, with the rachis obsolete, generally shorter than 1.5 mm; flowers borne on long pedicels originating from the centre of rosette, maturing centripetally; fruiting pedicels ascending to divaricate or recurved, persistent. *Sepals* ovate, free, deciduous, erect, equal, base of inner pair not saccate. *Petals* creamy white, erect at base, longer than sepals; blade oblanceolate, apex rounded; claw not differentiated from blade. *Stamens* 6, exerted or slightly so, erect, slightly tetradynamous; filaments filiform, wingless, unappendaged, not dilated at base, glabrous; anthers ovate, rounded at base, not apiculate at apex. *Nectar glands* 4, distinct; median nectaries absent; lateral nectaries 1 on each side of lateral stamen. *Ovules* 4–10 per ovary; placentation parietal. *Fruits* dehiscent, capsular silicles, obovoid to pyriform, rarely ovoid, latiseptate, unsegmented, dehiscing from apex downward; valves thin, obscurely veined, smooth, wingless, unappendaged; gynophore absent; replum rounded; septum reduced to a narrow rim, hyaline, not veined; style slender; stigma capitate, entire, slightly 2-lobed, unappendaged. *Seeds* biseriate, wingless, oblong, plump, light brown; seed coat smooth, not mucilaginous when wetted; cotyledons incumbent, entire.

**RECOGNITION.** *Alshehbazia* is easily distinguished from other genera of tribe Eudemeae by having slender and branched rhizomes, not elongated inflorescences with an obsolete rachis, ebracteate flowers on long pedicels originating from the centre of rosette, and obovoid to pyriform latiseptate silicles with smooth seeds.

**DISTRIBUTION.** The genus is restricted to Southern Argentina (Santa Cruz Province) and Chile (Magallanes and Antartica Chilena region).

**ETYMOLOGY.** *Alshehbazia* is named after Dr Ihsan A. Al-Shehbaz, Senior Curator at Missouri Botanical Garden (MO) and an expert on the Brassicaceae (Cruciferae). His contributions to the worldwide knowledge of the family have been invaluable.

**Alshehbazia hauthalii** (Gilg & Muschl.) Salariato & Zuloaga comb. nov.

<http://www.ipni.org/urn:lsid:ipni.org:names:77150416-1>

*Eudema hauthalii* Gilg & Muschl. (Gilg & Muschler, *Bot. Jahrb. Syst.* 42 (5): 471 (1909)). *Brayopsis hauthalii* (Gilg & Muschl.) Skottsberg. (Skottsberg 1916: 236). *Omuris hauthalii* (Gilg & Muschl.) Al-Shehbaz (2012b: 949). Type: Argentina, Prov. Santa Cruz, Río Gallegos, al frente del Cerro Buitres (Basalto), 15 leguas de la costa, 1899, R. *Hauthal* 10618 (holotype B!; isotypes BAA! fragm. ex B, CORD!).

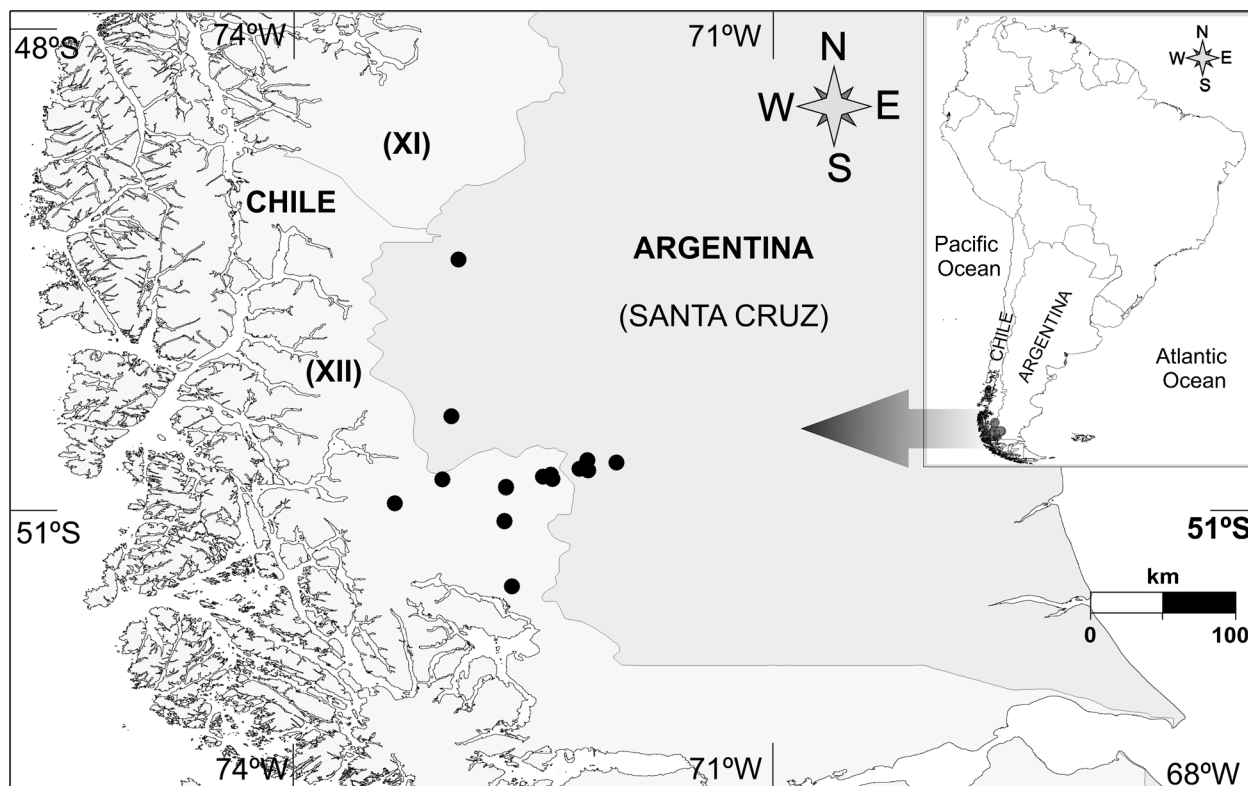
*Brayopsis skottsbergii* Gilg in Skottsberg. (Skottsberg 1916: 236). Type: Argentina, Prov. Santa Cruz, Sierra de los Baguales, Paso Centinela, 5 Feb. 1909, C. *Skottsberg* s.n. (holotype, UPS!).

Plants glabrous throughout, prostrate. *Leaves* (6–) 9–15 (–22) mm long, (0.7–) 1–1.5 (–2) mm wide, base attenuate, margin entire, apex rounded. Fruiting pedicels (3–) 5–10 mm long. Sepals 2.5–3.5 mm long, (1.2–) 1.5–2 mm wide; petals (4.5–) 5.5–6.5 mm long, (1.2–) 1.5–1.8 mm wide; filaments erect, slender, 2.5–3.5 mm long; anthers 0.5–0.6 mm long; ovules 4–10 per ovary. *Fruits* (4–) 5–11 (–12) mm long, 4–7 mm wide, style 0.5–1 mm long. *Seeds* light brown 2–2.5 (–3) mm long, 1–1.3 (–1.8) mm wide; funicles thick. Fig. 1.

**DISTRIBUTION.** *Alshehbazia hauthalii* is restricted to Southern Argentina in Santa Cruz province (Depts Güer Aike and Lago Argentino) and Chile in XII Region (Prov. Última Esperanza). Map 1.

**SPECIMENS EXAMINED. ARGENTINA.** Prov. Santa Cruz: Dept. Güer Aike, Estancia Las Vizcachas, Cerro Pto. la Piedra, faldeos SE, W de Arroyo Bueno, 26 Jan. 1977, *TBPA* 2542 (SI); Cerro sin Nombre, ladera E, 29 Jan. 1977, *TBPA* 2674 (SI); ensenada de Rique, al pié del cerro sin nombre, 3 Jan. 1977, *TBPA* 2679 (BAA); Laguna las Vizcachas, ladera SSE de la laguna, 28 Jan. 1977, *TBPA* 2600 (BAB, SI); Dept. Lago Argentino: Cerro Argentino, 8 Jan. 1964, *Zöllner* s.n. (CONC-94665, SI-167056); Lago Argentino, Cerro Buenos Aires, 14 Jan. 1941, *Spegazzini* 482 (BAA, BAB); margen de la Meseta Quemada, arriba de la estancia Pérez (Río de las Vueltas), 28 Dec. 1950, *Sleumer* 1386 (BAA, LIL).

**CHILE.** Magallanes y de la Antártica Chilena Region (XII): Prov. Última Esperanza, Torres del Paine, Cerro Donoso, Sector Río de las Chinas, 9–11 Feb. 1987, *Arroyo et al.* 870226 (CONC); Cordillera Señoret, 1 Jan. 1931, *Donat* 436½ (BA); Parque Nacional



**Map 1.** Map of Southern Argentina and Chile showing the distribution of *Alshehbazia hauthalii*.

Torres del Paine, Cerro Agudo, 15 – 17 Jan. 1987, *Arroyo & Squeo* 870015 (CONC); Cerro Diente, 16 Dec. 1985, *Arroyo & Squeo* 850848 (CONC); 25 Dec. 1985, *Arroyo & Squeo* 850953 (CONC); Cerro Daudet, 18 Jan. 1987, *Arroyo* 870141 (CONC); Sierra Baguales, Estancia La Cumbre, Cerro Cono, 19 Dec. 1975, *TBPA* 757 (CONC, SI); Estancia La Cumbre, campo Laguna Grande, 9 Dec. 1986, *Landero* 651 (CONC); Sierra del Toro, 10 Feb. 1992, *Arroyo et al.* 92115 (CONC); *Arroyo et al.* 92191A (CONC); *Arroyo et al.* 92293 (CONC).

**HABITAT.** It grows on fine gravel, along mountain wetlands, peat bogs, and moist seepage areas; between 700 – 1400 m.

**CONSERVATION STATUS.** *Alshehbazia hauthalii* has an apparently restricted distribution in southern Argentina and Chile, but most certainly its populations are under-collected: DD (Data Deficient) following IUCN Categories and Criteria.

**PHENOLOGY.** The species flowers from December to January, and produces fruits until February.

**NOTES.** Al-Shehbaz (2012b) cited this species for San Juan and La Rioja Provinces in Argentina, based on three specimens, *Krapovickas & Hunziker* 5996 (BAA, LP), *Nicora et al.* 8508 (LP, P) and *Múlgura & Deginani* 169 (SI), but a closer examination of the leaves show

branched trichomes characteristic of *Petroravenia werdermannii* (O. E. Schulz) Al-Shehbaz. Therefore, the distribution of *Alshehbazia hauthalii* is restricted to southern Argentina and Chile.

### Acknowledgements

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## Appendix 1

Genbank accession numbers for sequences used in this study.

Species	Voucher	Country	ITS	trnL-F	trnH-psbA	rps16
<i>Aschersoniodoxa cachenensis</i> (Speg.) Al-Shehbaz	Menhofer 1460 (LPB)	Bolivia: La Paz	KM376251	KM376289	KM376361	KM376326
<i>Aschersoniodoxa mandoniana</i> (Wedd.) Gilg & Muschl.	Beck 14033 (LPB)	Bolivia: La Paz	KM376252	KM376290	KM376362	KM376327
<i>Aschersoniodoxa peruviana</i> Al-Shehbaz, Navarro & A. Cano	Navarro 771 (USM)	Peru: Lima	KM376253	KM376291	KM376363	KM376328
<i>Brayopsis calycina</i> (Desv.) Gilg & Muschl.	Zuloaga 14327 (SI)	Argentina: Jujuy	KM376249	KM376287	KM376359	KM376324
<i>Brayopsis dipensoides</i> (Wedd.) Gilg & Muschl.	Fuentes 14089 (MO)	Bolivia: La Paz	KM376243	KM376282	KM376356	KM376320
<i>Brayopsis gamosepala</i> Al-Shehbaz	Krach 7640 (MO)	Bolivia: La Paz	KM376245	KM376283	-	KM376321
<i>Brayopsis monimocadex</i> O. E. Schulz	Salomon 172 (SI)	Argentina: La Rioja	KM376240	KM376280	KM376354	KM376318
<i>Dactylocardium imbricatifolium</i> Al-Shehbaz	Cano 21546 (USM)	Peru: Ancash	KM376257	KM376295	KM376367	KM376331
<i>Eudema nubigena</i> Bonpl. subsp. <i>nubigena</i>	Holme-Nielsen 25009 (MO)	Ecuador: Pichincha	KM376255	KM376292	KM376364	KM376329
<i>Eudema nubigena</i> Bonpl. subsp. <i>renyana</i> (Wedd.) Al-Shehbaz	Shleuter 2284 (MO)	Ecuador: Chimborazo	KM376256	KM376293	KM376365	KM376330
<i>Memnonvillea chilensis</i> (Turcz.) B. D. Jacks.	<sup>a</sup> Hoffmann 180 (CONC) <sup>b</sup> Toro (MO)	Chile: Atacama	<sup>a</sup> KF662739	<sup>a</sup> KF662780	<sup>b</sup> KC174449	<sup>b</sup> KC174486
<i>Onuris alsmatifolia</i> Gilg ex Skottsb.	Pisano 8242 (CONC)	Argentina: Tierra del Fuego	KM376232	KM376272	KM376346	KM376310
<i>Onuris graminifolia</i> Phil.	Zuloaga 12540 (SI)	Argentina: Neuquén	KM376226	KM376266	KM376340	KM376304
<i>Onuris graminifolia</i> Phil.	Zuloaga 13866 (SI)	Argentina: Río Negro	KM376227	KM376267	KM376341	KM376305
<i>Onuris hatcheriana</i> (Gilg ex Macloskie) Gilg & Muschl.	Lanero 611B (CONC)	Chile: Región XII	KM376237	KM376277	KM376351	KM376315
<i>Onuris hatcheriana</i> (Gilg ex Macloskie) Gilg & Muschl.	Arroyo 85060 (CONC)	Chile: Región XII	KM376238	KM376278	KM376352	KM376316
<i>Onuris hatcheriana</i> (Gilg ex Macloskie) Gilg & Muschl.	Lanero 735 (CONC)	Chile: Región XII	KM376239	KM376279	KM376353	KM376317
<i>Onuris haulthalii</i> (Gilg & Muschl.) Al-Shehbaz	Arroyo 850953 (CONC)	Chile: Región XII	KM376233	KM376273	KM376347	KM376311
<i>Onuris haulthalii</i> (Gilg & Muschl.) Al-Shehbaz	Arroyo 850848 (CONC)	Chile: Región XII	KM376234	KM376274	KM376348	KM376312
<i>Onuris haulthalii</i> (Gilg & Muschl.) Al-Shehbaz	Arroyo 92191A (CONC)	Chile: Región XII	KM376235	KM376275	KM376349	KM376313
<i>Onuris haulthalii</i> (Gilg & Muschl.) Al-Shehbaz	Arroyo 92293 (CONC)	Chile: Región XII	KM376236	KM376276	KM376350	KM376314
<i>Onuris papillosa</i> O. E. Schulz	Zuloaga 14040 (SI)	Argentina: Santa Cruz	KM376228	KM376268	KM376342	KM376306
<i>Onuris papillosa</i> O. E. Schulz	Zuloaga 14063 (SI)	Argentina: Santa Cruz	KM376229	KM376269	KM376343	KM376307
<i>Onuris spagazziniana</i> Gilg & Muschl.	Zuloaga 14069 (SI)	Argentina: Santa Cruz	KM376230	KM376270	KM376344	KM376308
<i>Onuris spagazziniana</i> Gilg & Muschl.	Arroyo 870215 (CONC)	Chile: Región XII	KM376231	KM376271	KM376345	KM376309
<i>Xerodraba patagonica</i> (Speg.) Skottsb.	Zuloaga 14035 (SI)	Argentina: Santa Cruz	KM376220	KM376260	KM376334	KM376298
<i>Xerodraba patagonica</i> (Speg.) Skottsb.	Zuloaga 14104 (SI)	Argentina: Santa Cruz	KM376224	KM376264	KM376338	KM376302
<i>Xerodraba pectinata</i> Skottsb.	Zuloaga 14030 (SI)	Argentina: Santa Cruz	KM376219	KM376259	KM376333	KM376297
<i>Xerodraba pectinata</i> Skottsb.	Zuloaga 14066 (SI)	Argentina: Santa Cruz	KM376221	KM376261	KM376335	KM376299
<i>Xerodraba pectinata</i> Skottsb.	Zuloaga 13986 (SI)	Argentina: Santa Cruz	KM376223	KM376263	KM376337	KM376301
<i>Xerodraba pycnophylloides</i> (Speg.) Skottsb.	Zuloaga 14111 (SI)	Argentina: Santa Cruz	KM376222	KM376262	KM376336	KM376300

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