

***Lewinskya*, a new genus to accommodate the phaneroporous and monoicous taxa of *Orthotrichum* (Bryophyta, Orthotrichaceae)**

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Abstract – Molecular analyses have consistently evidenced the phylogenetic heterogeneity of *Orthotrichum* Hedw., and suggested the need to segregate the species with superficial stomata in a separate genus. A recent proposal has been made to accommodate the monoicous species with such stomata in the genus *Dorcadion* Adans. ex Lindb., which is, however, an illegitimate name according to the current Code of nomenclature of algae, fungi and plants. Consequently a new name is required, and the generic name *Lewinskya* F.Lara, Garilleti & Goffinet is proposed. New combinations are made for all the species included in the new genus. Given the long history of the genus *Orthotrichum* and the similarities between this genus and *Lewinskya*, the morphological and geographic circumscriptions of both genera are provided to define them accurately. The taxa remaining in *Orthotrichum s.str.* are also listed.

Biogeography / Diversity / Musci / Nomenclature / Systematics

INTRODUCTION

Acrocarpic mosses growing on trees or rocks, with orthotropic stems, leaves with short isodiametric cells above, elongate basal cells, undifferentiated marginal cells, a mitrate calyptra and with sporangia, which upon dehiscence reveal a diplolepideous (though often variously reduced) peristome, are accommodated in the genus *Orthotrichum* Hedw. The genus is part of the tribe Orthotricheae Goffinet & Vitt, within the Orthotrichaceae Arnott, a highly speciose and cosmopolitan family. At the end of the last century, Goffinet & Vitt (1998) proposed a revised classification whereby the Orthotricheae included five genera (i.e., *Muelleriella* Dusén, *Orthomitrium* Lewinsky & Crosby, *Orthotrichum*, *Stoneobryum* Norris & H. Rob. and *Ulota* D. Mohr). Lewinsky-Haapasaari & Hedenäs (1998) subsequently

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segregated *O. paraguense* Besch. in the new genus *Sehneobryum* Lewinsky & Hedenäs. Most species of the Orthotricheae belong to either *Orthotrichum* or *Ulota*, with the remaining genera holding only one to five species (Crosby *et al.*, 1999). Generic concepts within the tribe reflect patterns in the ornamentation of laminal cells, the precocious germination of spores (endospory), differentiation of the laminal margin, costal anatomy and architecture and distribution of the stomata (Goffinet & Vitt, 1998; Lewinsky-Haapasaari & Hedenäs, 1998). However, both speciose genera harbor variation in these traits, most notably with *Orthotrichum* including species with either superficial (phaneroporous) or immersed (cryptoporous) stomata.

Lewinsky (1993a) critically revised the taxonomic diversity of *Orthotrichum*. The circumscription of the genus continues to grow, with 45 taxa added since 1993. The species have been historically organized into subgenera and sections (e.g., Vitt, 1971). Phylogenetic inferences from morphological traits providing the basis for these infrageneric taxa suggested, however, significant homoplasy in these traits (Lewinsky-Haapasaari & Hedenäs, 1998). Furthermore, the phylogenetic significance of transformations in the generic traits appeared ambiguous, with Goffinet *et al.* (1998) providing the first evidence from analyzing *rbcL* sequences that *Orthotrichum* as circumscribed and diagnosed by Lewinsky (1993a) was an artificial lineage. Goffinet *et al.* (2004) subsequently corroborated this hypothesis based on inferences from four *loci*, demonstrating that a) species with superficial stomata shared a unique ancestor with *Ulota*, b) *Muelleriella* and *Orthomitrium* were nested among species with immersed stomata, c) *Orthotrichum exiguum* belonged to the tribe Zygodontaeae (Schimp.) Goffinet, but that d) *Stoneobryum* and *Sehneobryum* were indeed distinct. However, Goffinet *et al.* (2004) preferred to retain *Orthotrichum sensu* Lewinsky until the inferences could be strengthened by additional data from a more extensive sampling of taxa. Thus by 2004, the Orthotricheae included four genera: *Orthotrichum*, *Sehneobryum*, *Stoneobryum* and *Ulota* (Goffinet & Buck, 2004).

The polyphyly of *Orthotrichum* was repeatedly suggested by inferences from molecular data (Goffinet *et al.*, 2007; Plášek *et al.*, 2009, 2011; Sawicki *et al.*, 2009, 2010, 2012; Vigalondo *et al.*, 2016a). Sawicki *et al.* (2010) proposed the first systematic consequences since 2004 to reflect the phylogenetic reconstruction, and reinstated *Nyholmiella* Holmen & E.Warncke for *O. gymnostomum* Bruch ex Brid. and *O. obtusifolium* Brid., traditionally composing subgenus *Orthophyllum* Delogne (Vitt, 1971). Plášek *et al.* (2015) further divided *Orthotrichum* and segregated *O. lyellii* Hook. & Taylor in the new genus *Pulvigera* Plášek, Sawicki & Ochrya, and resurrected *Dorcadion* Adans. ex Lindb. to accommodate the monoicous and phaneroporous taxa of *Orthotrichum*. The genus *Orthotrichum s.str.* would thus be restricted to the cryptoporous species. Although this revised classification of the Orthotricheae settles the incongruence between phylogenetic inferences and systematic concepts, assuming that a criterion of monophyly is considered necessary (see Zander, 2013), nevertheless it invokes an illegitimate name. Consequently we propose a new name, *Lewinskya gen. nov.* for *Dorcadion* Adans. ex Lindb. *sensu* Plášek *et al.* (2015). Furthermore we provide an expanded morphological description of the genus, an assessment of its geographic distribution and a complete taxonomic circumscription with all necessary new combinations. With the proposed segregation of a significant number of species from *Orthotrichum s.str.*, the morphological and geographic distribution of this genus needs to be revised, too. Hence we present along with the current circumscription of *Orthotrichum* a description of its morphological traits and distribution.

METHODS

The characterization of morphological traits and geographic distributions is based on descriptions in Lewinsky (1993a) complemented with those from all subsequently discovered and recognized taxa (Lewinsky, 1993b, 1994; Ignatov & Lewinsky-Haapasaari, 1994; Lara *et al.*, 1994, 1996, 1999a, 1999b, 1999c, 2000, 2006, 2007, 2009a, 2009b, 2009c, 2010; Lewinsky-Haapasaari, 1994, 1995, 1999a, 1999b; Vitt, 1994, 2014; Lewinsky-Haapasaari & Tan, 1995; Tan & Yu, 1997; Vitt & Darigo, 1997; Lewinsky-Haapasaari & Norris, 1998a, 1998b; Magill & van Rooy, 1998; Mazimpaka *et al.*, 1999, 2000a, 2000b; Matteri, 2000; Garilleti *et al.*, 2001, 2006a, 2006b, 2009, 2011; Ignatov *et al.*, 2001, 2006; Allen, 2002; Goffinet, 2002; Draper *et al.*, 2003, 2006; Akatova *et al.*, 2004; Norris *et al.*, 2004; Kürschner & Erdağ, 2005; Goffinet *et al.*, 2007; Albertos *et al.*, 2008; Medina *et al.*, 2008, 2009, 2011, 2012, 2013; Atwood & Allen, 2009; Frahm *et al.*, 2009; Plášek *et al.*, 2009, 2014; Fedosov & Ignatova, 2010, 2011; Jia *et al.*, 2011; Bosanquet & Lara 2012; Lara & Garilleti, 2014; Wang & Jia, 2014; Ellis *et al.*, 2015a; Vigalondo *et al.*, 2016b). Distribution areas used for listed taxa and maps follow Wijk *et al.* (1964).

RESULTS AND DISCUSSION

Nomenclature and taxonomy

Lindberg (1878) proposed to restore the pre-Hedwigian name *Dorcadion* (Adanson, 1763) for the genus *Orthotrichum* (Hedwig, 1801), thus creating a superfluous name. The author (Lindberg, 1878: 6) pointed this out neatly and indisputably, when he refers to the names of Adanson (1763): “All of the new ones are composed of rather heterogeneous links and therefore unnatural, with the exception of two, *Sekra* and *Dorcadion*, the former the same as *Cinclidotus* P.-B., the latter completely the same as *Orthotrichum* Hedw.” (“Af de nya äro alla sammansatta af ganska heterogena länkar och därför onaturliga, med undantag af två, *Sekra* och *Dorcadion*, det förra alldeles detsamma som *Cinclidotus* P.-B., -det sednare fullkomligt liktydigt med *Orthotrichum* Hedw.”). A few pages later, Lindberg (1878: 35) created some confusion when he listed the genera that would constitute the Grimmiaceae, since using a broad concept he cited “*Weissia* (*Ulota*), *Dorcadion* (*Orthotrichum* Hedw. p. p.), ...”, which could suggest that *Dorcadion* is a new taxon incorporating only part of the members of *Orthotrichum*. However, what he did here was to indicate that under *Dorcadion* he included all the species of *Orthotrichum* as defined by Hedwig, except for those included in *Weissia* Ehrh. ex G. Gaertn., B.Mey. & Scherb. (*Ulota* D.Mohr). At that time, however, *Orthotrichum* already excluded the species of *Ulota*, given the combination *U. crispa* (Hedw.) Brid. established by Bridel (1818). Furthermore, Lindberg (1879), in his *Musci Scandinavici*, proposed two subgenera within *Dorcadion*, *Calyptoporus* and *Gymnoporus* (*nomina nuda*) that included the species with immersed and superficial stomata, respectively, that had until then been included in *Orthotrichum* (excluding *Ulota*). Therefore, we argue that Lindberg had the same concept for *Dorcadion* and *Orthotrichum*, once *Ulota* species were excluded. Consequently, *Dorcadion* is superfluous and thus illegitimate according to the Code of nomenclature of algae, fungi and plants

(McNeill *et al.*, 2012), as previously indicated by Wijk *et al.* (1964) and Lewinsky (1993a).

Since *Dorcadion* is an illegitimate name, it must be replaced. We propose the name *Lewinskya* F.Lara, Garilleti & Goffinet, in honour of the late Jette Lewinsky-Haapasaari, whose taxonomic work underlies much of our current knowledge and understanding of the diversity of the Orthotrichaceae. The establishment of a new genus requires the designation of a type, which ideally reflects the typical morphological features of the genus. With the proposed selection of *Orthotrichum striatum* Hedw., each of the three species originally included in *Orthotrichum* by

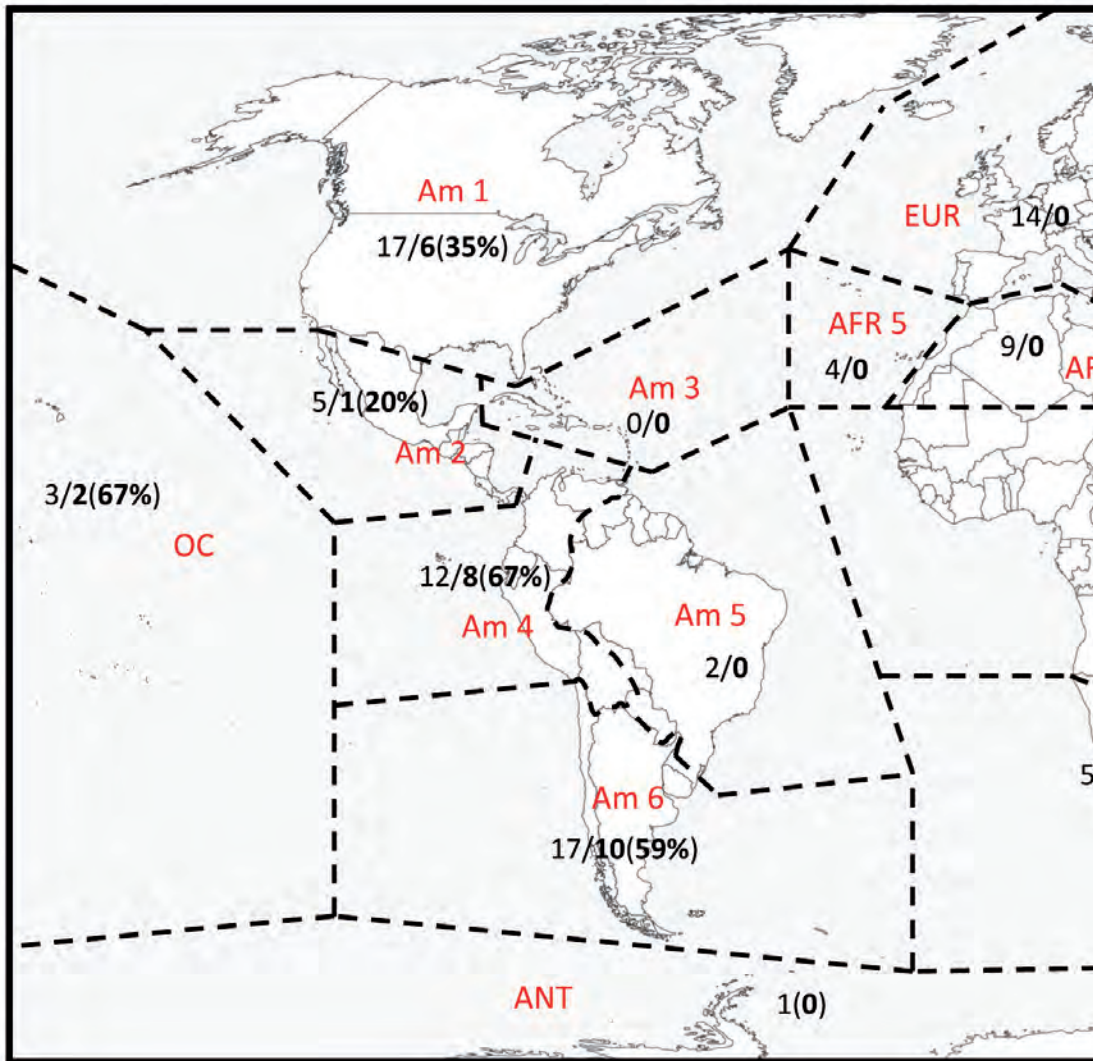


Fig. 1. Regional diversity and endemicity of *Lewinskya* F.Lara, Garilleti & Goffinet considering the world geographical areas used in *Index Muscorum* (Wijk *et al.*, 1964). The first numeral indicates the

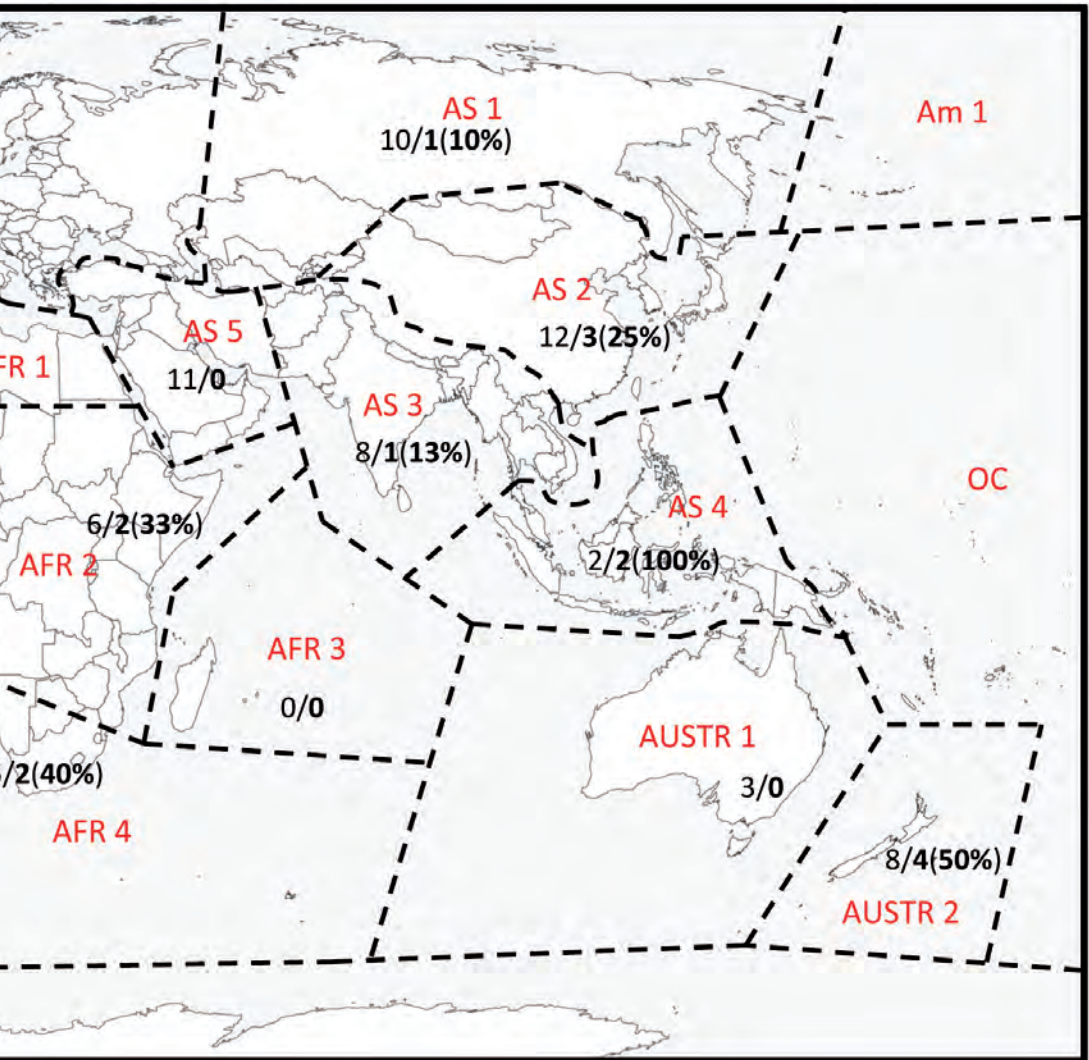
Hedwig (1801) are now the type species for the three speciose genera of the Orthotricheae: *Orthotrichum s.str.*, *Ulota*, and *Lewinskya*.

***Lewinskya* F.Lara, Garilleti & Goffinet gen. nov.**

Type: *Lewinskya striata* (Hedw.) F.Lara, Garilleti & Goffinet, *comb. nov.*
 ≡ *Orthotrichum striatum* Hedw.

Dorcadion Adans. ex Lindb. *nom. illeg. sensu* Plášek et al. (2015).

Diagnosis: *Orthotricho similis*, a quo plerumque differt foliorum basalibus cellulis elongatis, parietibus incrassatis nodulosisque, sexuali conditione gonioautoica,



total number of taxa recognized for the respective areas. The second numeral (in **bold**) refers to the number of taxa exclusive of each area, indicating between brackets the endemicity rate for each area.

capsulis saepe laevibus, stomatibus phaneroporis, endostoma sine membrana connectivali, sporisque diametro generatim 20 μm maiore.

Circumscription of *Lewinskya* and *Orthotrichum s.str.*

Lewinskya

Plants small or large, to 5 cm high, rarely smaller than 1 cm, in more or less loose cushions. Leaves erect or erect-patent when dry, sometimes flexuose,

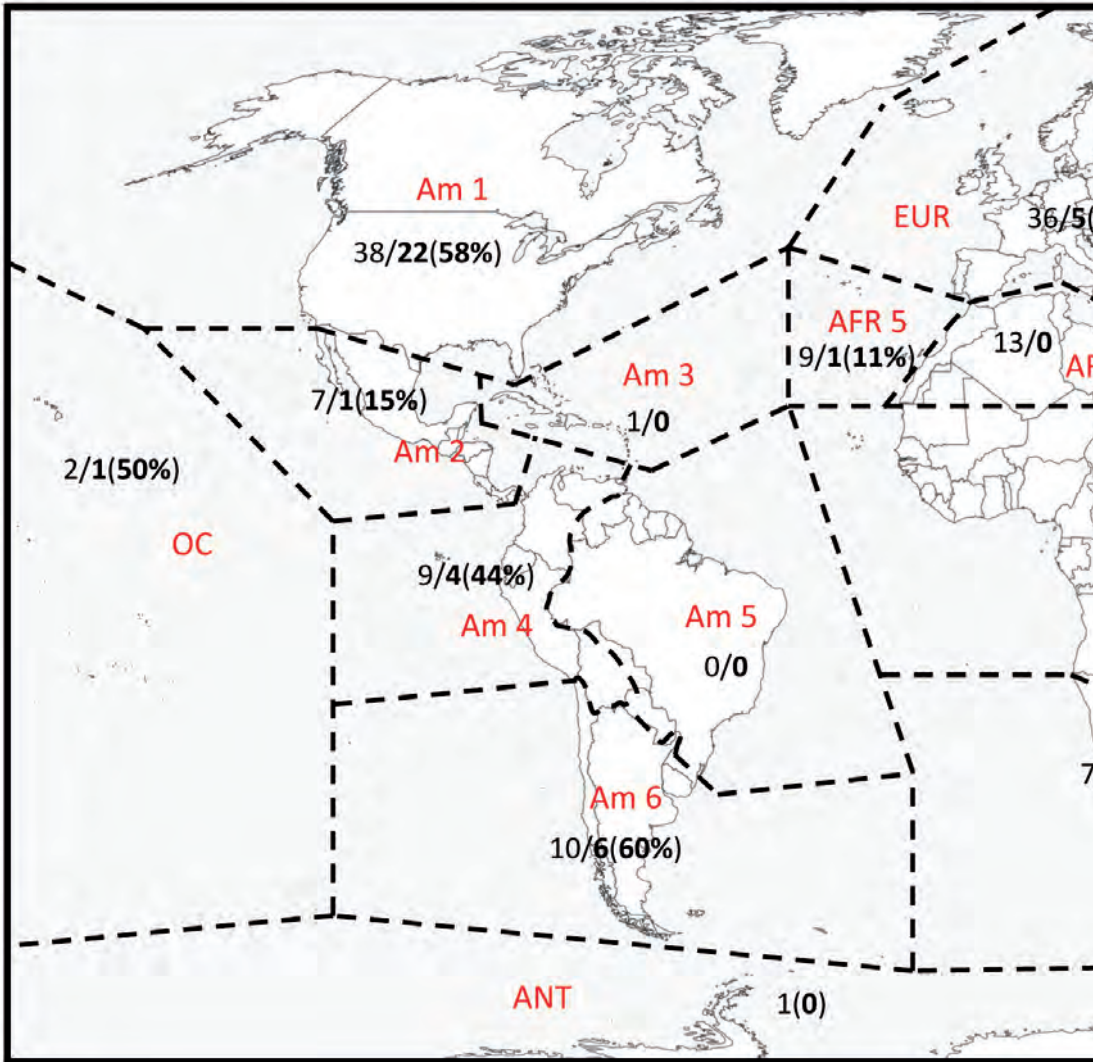
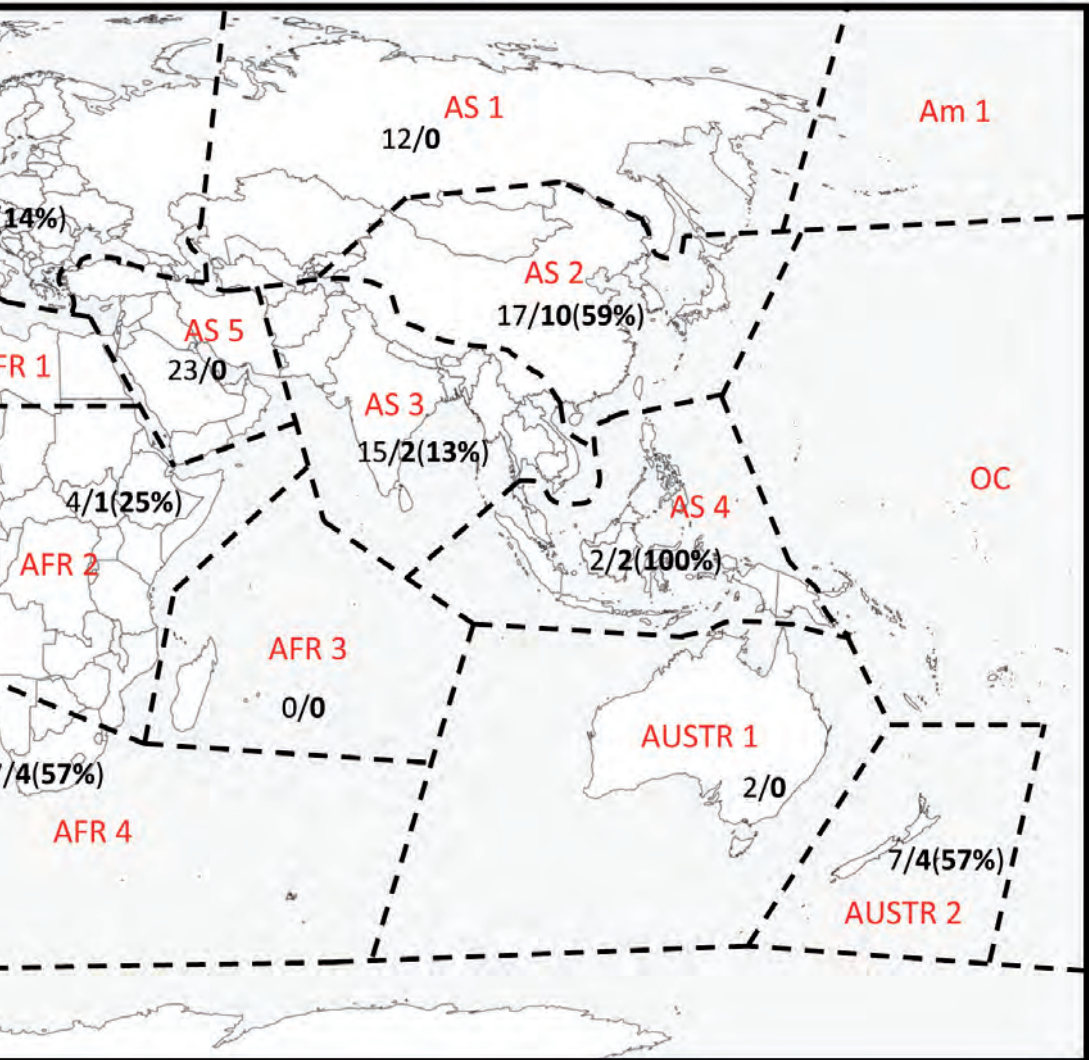


Fig. 2. Regional diversity and endemism of *Orthotrichum* Hedw. *s.str.* considering the world geographical areas used in *Index Muscorum* (Wijk *et al.*, 1964). The first numeral indicates the total number of taxa

rarely crisped, with plane or recurved margins, sometimes undulate, exceptionally incurved. Leaf apex acute to long acuminate, sometimes aristate, rarely obtuse, rounded or retuse. Leaf lamina unistratose, exceptionally predominantly bistratose in the upper half. Upper leaf cells isodiametric or oblong, sometimes elongate, variably papillose or smooth. Basal leaf cells mostly elongate, with incrassate walls, often dimorphic, with rows of cells with nodulose and coloured walls between cells with hyaline and more or less sinuose walls; alar cells occasionally differentiated. Propagules absent, except for one report of claviform propagules, with longitudinal and transverse walls, similar to those of *Zygodon*. Goniatocous. Calyptra more or less hairy, frequently densely so, exceptionally naked. Vaginula naked or hairy,



recognized for the respective areas. The second numeral (in **bold**) refers to the number of taxa exclusive of each area, indicating between brackets the endemicity rate for each area.

commonly with some long and papillose hairs. Sporophytes usually 1 per perichaetium, occasionally in pairs in several species, consistently many in some species. Seta short, generally as long as capsule, or more or less longer, exceeding the perichaetial leaves. Capsule immersed, emergent or exserted, then often longly so. Urn frequently cylindrical, sometimes ovoid, rarely globose or cup-shaped, often smooth or with 8 ribs scarcely and variably developed, less frequently with prominent ribs. Exothecial bands not or scarcely differentiated in most species, well differentiated in others. Stomata superficial, generally in the middle of the urn, less frequently in its upper or lower portions. Peristome generally double, rarely simple, exceptionally vestigial. Prostome frequent, variably developed. Exostome of 8 pairs of fused teeth, less frequently of 16 free teeth, occasionally very reduced or almost absent. Endostome of 8 or 16 segments, rarely vestigial or absent, frequently very wide but sometimes more or less narrow, almost always internally biseriate, exceptionally uniseriate, almost always roughly ornamented, with irregular or regular margins, without connecting membrane. Spores frequently over 20 μm in diameter, usually unicellular, sometimes with a proportion two-celled, exceptionally multicellular.

The genus comprises 70 taxa (66 species and 4 varieties), which are mostly epiphytes, with some being saxicolous. The diversity of species is unevenly distributed (Fig. 1). The Northern Hemisphere harbors 46 taxa (66% of the total) and 38 of these (83%) are not known from the austral territories. Thirty-two taxa (46% of the total) occur in the Southern Hemisphere, and 24 of these (75%) are absent from septentrional territories. The percentage of endemics in each region (based on the divisions in Wijk *et al.*, 1964) is notably higher in the Southern Hemisphere.

Orthotrichum s.str.

Type: *Orthotrichum anomalum* Hedw.

Plants small or medium sized, frequently less than 1 cm high, forming more or less compact cushions or, more rarely, patches. Leaves erect when dry, rarely contorted, with recurved margins, rarely plane. Leaf apex commonly acute or acuminate but frequently specialized: obtuse, rounded, denticulate, channeled, mucronate or piliferous. Leaf lamina generally unistratose, frequently with bistratose bands, in several species predominantly bistratose. Upper leaf cells isodiametric, rarely oblong, generally papillose, with simple or branched papillae, sometimes smooth or almost so. Basal leaf cells rectangular, with straight or somewhat sinuose walls, thin or slightly incrassate, only occasionally more or less nodulose, monomorphic; alar cells not differentiated. Propagules frequently present on leaves, more rarely also on rhizoids, cylindrical to vermiform, only with transverse walls, sometimes branched; exceptionally with rhizoidal tubers. Cladautoicous, always with a terminal perigonium in the male branches, frequently also with lateral perigonia. Calyptra variably hairy to naked. Vaginula naked or, less frequently, hairy. One sporophyte per perichaetium, polysety exceptional. Seta short, often extremely so, rarely longer than the perichaetial leaves. Capsule immersed to long-emergent, only occasionally exserted, rarely long-exserted. Urn cylindrical to urceolate, often shortly so, with 8 ribs, rarely 16, more or less prominent and wide, occasionally limited to the distal area, never totally smooth. Exothecial bands generally well differentiated. Stomata immersed, more or less covered by the subsidiary cells, exceptionally almost uncovered and apparently superficial, often limited to the urn base, occasionally spreading across the neck. Peristome generally double, rarely

simple or absent. Prostome occasional, variably developed. Exostome of 8 pairs of teeth, rarely 16 completely independent, occasionally vestigial or absent. Endostome of 8 or 16 segments, rarely completely absent, generally filiform, rarely wide, exceptionally fused, smooth or ornamented, with differentiated connecting membrane, sometimes incomplete. Spores usually unicellular, in most cases with diameters of less than 20 μm , pluricellular in some species.

The genus comprises 103 taxa (94 species, 1 subspecies and 8 varieties) that are mostly epiphytes, although some species are exclusively or preferentially saxicolous. The distribution of species diversity and endemics is also very uneven (Fig. 2). The Northern Hemisphere hosts 83 taxa (81% of the total), with 76 of these (92%) being exclusive. In the Southern Hemisphere 27 taxa are known (26% of the total), and 20 of these (74%) do not reach any of the septentrional territories. Endemism is high across the Southern Hemisphere, but also in the Northern Hemisphere, and particularly in North America (Am 1) and Eastern Asia (the China-Japan area, AS 2; Fig. 2). The Mediterranean basin is a center of diversity (Lara *et al.*, 2009b) not evidenced in the chosen geographic divisions.

KEY TO GENERA

- Stomata superficial. Basal leaf cells mostly elongate, with incrassate and sinuose or nodulose walls. Goniautoicous. Endostome without connecting membrane. Gametophores usually taller than 1 cm. Capsules often smooth or faintly ribbed when dry, frequently exserted. Propagules absent. Spores frequently over 20 μm in diameter *Lewinskya*
- Stomata immersed, more or less covered by the subsidiary cells. Basal leaf cells rectangular, usually with thin, not nodulose walls. Cladautoicous. Endostome with connecting membrane, sometimes incomplete. Gametophores usually smaller than 1 cm. Capsules mostly strongly ribbed when dry, rarely exserted. Propagules frequently present. Spores usually less than 20 μm in diameter *Orthotrichum*

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APPENDIX 1

Taxa included in the genus *Lewinskya* F.Lara, garilleti & goffinet, with indication of their known distribution as shown in Fig. 1.

- Lewinskya acuminata*** (H.Philib.)
F.Lara, Garilleti & Goffinet,
comb. nov.
≡ *Orthotrichum acuminatum*
H.Philib., Rev. Bryol. 8: 28. 1881
Distribution: Am 1, Eur, AFR 1,
AFR 2, AFR 5, AS 5.
- Lewinskya affinis*** (Schrad. ex Brid.)
F.Lara, Garilleti & Goffinet,
comb. nov.
≡ *Orthotrichum affine* Schrad. ex
Brid., Muscol. Recent. 2: 22-23.
1801
Distribution: Am 1, Eur, AFR 1,
AFR 5, AS 1, AS 5.
- Lewinskya anaglyptodon*** (Cardot &
Broth.) F.Lara, Garilleti & Goffinet,
comb. nov.
≡ *Orthotrichum anaglyptodon* Cardot
& Broth., Kongl. Svenska Vetensk.
Acad. Handl. n.s. 63: 31, 2 f. 10.
1923
Distribution: Am 6.
- Lewinskya araucarieti*** (Müll.Hal. in
Brotherus) F.Lara, Garilleti &
Goffinet, **comb. nov.**
≡ *Orthotrichum araucarieti* Müll.
Hal. in Brotherus, Ergebn. Bot.
Exped. Südbras. Musci 287. 1924
Distribution: Am 5, Am 6.
- Lewinskya arborescens*** (Thér. &
Naveau) F.Lara, Garilleti &
Goffinet, **comb. nov.**
≡ *Orthotrichum arborescens* Thér. &
Naveau, Bull. Soc. Roy. Bot.
Belgique 60: 48. 1927
Distribution: AFR 2.
- Lewinskya armata*** (Lewinsky & van
Rooy) F.Lara, Garilleti & Goffinet,
comb. nov.
≡ *Orthotrichum armatum* Lewinsky
& van Rooy, J. Bryol. 16: 69,
f. 2-5. 1990
Distribution: AFR 4.
- Lewinskya bolanderi*** (Sull.) F.Lara,
Garilleti & Goffinet, **comb. nov.**
≡ *Orthotrichum bolanderi* Sull.,
Icon. Musc. Suppl. 64, pl. 46. 1874
Distribution: Am 1, Am 2.
- Lewinskya brassii*** (E.B.Bartram)
F.Lara, Garilleti & Goffinet,
comb. nov.
≡ *Orthotrichum brassii* E.B.Bartram,
Lloydia 5: 268, 25. 1942
Distribution: AS 4.
- Lewinskya breviseta*** (F.Lara, Garilleti
& Mazimpaka) F.Lara, Garilleti &
Goffinet, **comb. et stat. nov.**
≡ *Orthotrichum speciosum* var.
brevisetum F.Lara, Garilleti &
Mazimpaka, J. Bryol. 25: 276, f. 2.
2003
Distribution: Eur, AFR 1, AS 5.
Within the context of the new
genus, *L. breviseta* differs from
Lewinskya speciosa in significative
morphological characters, such as
the short seta and the ribbed
capsules. Additionally, both mosses
show very different ecological
preferences and distribution ranges,
being *L. breviseta* restricted to
Mediterranean environments
whereas *L. speciosa* is a Boreal
widespread species that seems to
avoid climates with strong summer
drought (Ellis *et al.*, 2015b). All
these divergences lead us to propose
the recognition of *L. breviseta* at the
species level.
- Lewinskya brotheri*** (Dusén ex
Lewinsky) F.Lara, Garilleti &
Goffinet, **comb. nov.**
≡ *Orthotrichum brotheri* Dusén ex
Lewinsky, Mem. New York Bot.
Gard. 45: 348, f. 133-143. 1987
Distribution: Am 6.
- Lewinskya cyathiformis*** (R.Br.bis)
F.Lara, Garilleti & Goffinet,

- comb. nov.**
 ≡ *Orthotrichum cyathiforme*
 R.Br.bis, Trans. & Proc.
 New Zealand Inst. 27: 436,
 39 f. 24. 1895
 Distribution: AUSTR 2.
- Lewinskya dasymitria* (Lewinsky in
 T.Koponen & J.X.Luo) F.Lara,
 Garilleti & Goffinet, **comb. nov.**
 ≡ *Orthotrichum dasymitrium*
 Lewinsky in T.Koponen & J.X.Luo,
 Bryobrothera 1: 169, f. 1–2. 1992
 Distribution: AS 2, AS 3.
- Lewinskya densa* (Lewinsky) F.Lara,
 Garilleti & Goffinet, **comb. nov.**
 ≡ *Orthotrichum densum* Lewinsky,
 Mem. New York Bot. Gard. 45:
 336, f. 51–62. 1987
 Distribution: Am 6.
- Lewinskya elegans* (Schwägr. ex Hook.
 & Grev.) F.Lara, Garilleti &
 Goffinet, **comb. nov.**
 ≡ *Orthotrichum elegans* Schwägr.
 ex Hook. & Grev., Edinburgh J. Sci.
 1: 122, pl. 6 [upper right]. 1824
 Distribution: Am 1.
- Lewinskya elegantula* (Schimp.
 ex Mitt.) F.Lara, Garilleti &
 Goffinet, **comb. nov.**
 ≡ *Orthotrichum elegantulum* Schimp.
 ex Mitt., J. Linn. Soc. Bot. 12:
 187. 1869
 Distribution: Am 6.
- Lewinskya elongata* (Taylor) F.Lara,
 Garilleti & Goffinet, **comb. nov.**
 ≡ *Orthotrichum elongatum* Taylor,
 London J. Bot. 5: 45. 1846
 Distribution: Am 4.
- Lewinskya erosa* (Lewinsky) F.Lara,
 Garilleti & Goffinet, **comb. nov.**
 ≡ *Orthotrichum erosum* Lewinsky,
 J. Hattori Bot. Lab. 72: 32, f. 17.
 1992
 Distribution: AS 2.
- Lewinskya fenestrata* (Cardot & Thér.)
 F.Lara, Garilleti & Goffinet,
comb. nov.
 ≡ *Orthotrichum fenestratum* Cardot
 & Thér., Proc. Wash. Acad. Sci. 4:
 310–311, pl. 16, f. 2. 1902
 Distribution: Am 1.
- Lewinskya firma* (Venturi) F.Lara,
 Garilleti & Goffinet, **comb. nov.**
 ≡ *Orthotrichum firmum* Venturi,
 Nuovo Giorn. Bot. Ital. 4: 15. 1872
 Distribution: AFR 2, AFR 4, AS 3.
- Lewinskya galiciae* (F.Lara, Garilleti &
 Mazimpaka) F.Lara, Garilleti &
 Goffinet, **comb. nov.**
 ≡ *Orthotrichum galiciae* F.Lara,
 Garilleti & Mazimpaka, Nova
 Hedwigia 83: 200. 2006
 Distribution: AFR 2.
- Lewinskya graphiomitria* (Müll.Hal.
 ex Beckett) F.Lara, Garilleti &
 Goffinet, **comb. nov.**
 ≡ *Orthotrichum graphiomitrium*
 Müll.Hal. ex Beckett, Trans. &
 Proc. New Zealand Inst. 25: 291.
 1893
 Distribution: AUSTR 2.
- Lewinskya hawaiiica* (Müll.Hal.)
 F.Lara, Garilleti & Goffinet,
comb. nov.
 ≡ *Orthotrichum hawaiiicum* Müll.
 Hal., Flora 82: 451. 1896
 Distribution: OC.
- Lewinskya holzingeri* (Renauld &
 Cardot in Holzinger) F.Lara,
 Garilleti & Goffinet, **comb. nov.**
 ≡ *Orthotrichum holzingeri* Renauld
 & Cardot in Holzinger, Contr. U.S.
 Natl. Herb. 3: 270. 1895
 Distribution: Am 1.
- Lewinskya hookeri* (Wilson ex Mitt.)
 F.Lara, Garilleti & Goffinet,
comb. nov.
 ≡ *Orthotrichum hookeri* Wilson ex
 Mitt., J. Proc. Linn. Soc. Bot.
 Suppl. 1: 48. 1859
 Distribution: AS 2, AS 3.
- Lewinskya hookeri* var. *granulata*
 (Lewinsky) F.Lara, Garilleti &
 Goffinet, **comb. nov.**
 ≡ *Orthotrichum hookeri* var.
granulatum Lewinsky, J. Hattori
 Bot. Lab. 72: 20. 1992
 Distribution: AS 2, AS 3.

- Lewinskya hortensis* (Bosw.) F.Lara, Garilleti & Goffinet, **comb. nov.**
 ≡ *Orthotrichum hortense* Bosw., J. Bot. 30: 97. 1892
 Distribution: Am 6, AUSTR 1, AUSTR 2.
- Lewinskya hortoniae* (Vitt) F.Lara, Garilleti & Goffinet, **comb. nov.**
 ≡ *Orthotrichum hortoniae* Vitt, Bryologist 82: 2, f. 1-9, 62, 64. 1979
 Distribution: Am 2.
- Lewinskya iberica* (F.Lara & Mazimpaka) F.Lara, Garilleti & Goffinet, **comb. nov.**
 ≡ *Orthotrichum ibericum* F.Lara & Mazimpaka, Nova Hedwigia 56: 263, f. 1-3. 1993
 Distribution: Eur, AFR 1, AS 5.
- Lewinskya incana* (Müll.Hal.) F.Lara, Garilleti & Goffinet, **comb. nov.**
 ≡ *Orthotrichum incanum* Müll.Hal., Flora 68: 419. 1885
 Distribution: Am 6.
- Lewinskya incrassata* (Lewinsky) F.Lara, Garilleti & Goffinet, **comb. nov.**
 ≡ *Orthotrichum incrassatum* Lewinsky, Bryobrothera 2: 67, f. 4-5. 1993
 Distribution: OC.
- Lewinskya incurvomarginata* (Lewinsky & van Rooy) F.Lara, Garilleti & Goffinet, **comb. nov.**
 ≡ *Orthotrichum incurvomarginatum* Lewinsky & van Rooy, J. Bryol. 16: 67, f. 1, 4. 1990
 Distribution: AFR 4.
- Lewinskya iwatsukii* (Ignatov) F.Lara, Garilleti & Goffinet, **comb. nov.**
 ≡ *Orthotrichum iwatsukii* Ignatov, Arctoa 10: 172. 2001
 Distribution: Eur, AS 1, AS 2, AS 3.
- Lewinskya johnstonii* (E.B.Bartram) F.Lara, Garilleti & Goffinet, **comb. nov.**
 ≡ *Orthotrichum johnstonii* E.B.Bartram, Trav. Bryol. 1: 132. 1942
 Distribution: Am 6.
- Lewinskya keeverae* (H.A.Crum & L.E.Anderson) F.Lara, Garilleti & Goffinet, **comb. nov.**
 ≡ *Orthotrichum keeverae* H.A.Crum & L.E.Anderson, J. Elisha Mitchell Sci. Soc. 72: 281, f. 3-12. 1956
 Distribution: Am 1.
- Lewinskya laevigata* (J.E.Zetterst.) F.Lara, Garilleti & Goffinet, **comb. nov.**
 ≡ *Orthotrichum laevigatum* J.E.Zetterst., Öfvers. Förh. Kongl. Svenska Vetensk.-Akad. 19: 363. 1862
 Distribution: Am 1, Eur, AS 1.
- Lewinskya latimarginata* (Lewinsky) F.Lara, Garilleti & Goffinet, **comb. nov.**
 ≡ *Orthotrichum latimarginatum* Lewinsky, Mem. New York Bot. Gard. 45: 331, f. 14-24. 1987
 Distribution: Am 4.
- Lewinskya laxifolia* (Wilson ex Mitt.) F.Lara, Garilleti & Goffinet, **comb. nov.**
 ≡ *Orthotrichum laxifolium* Wilson ex Mitt., Hooker's J. Bot. Kew Gard. Misc. 3: 57. 1851
 Distribution: Am 4.
- Lewinskya leiolecythis* (Müll.Hal.) F.Lara, Garilleti & Goffinet, **comb. nov.**
 ≡ *Orthotrichum leiolecythis* Müll. Hal., Nuovo Giorn. Bot. Ital. n.s. 3: 107. 1896
 Distribution: AS 2.
- Lewinskya ludificans* (Lewinsky) F.Lara, Garilleti & Goffinet, **comb. nov.**
 ≡ *Orthotrichum ludificans* Lewinsky, Mem. New York Bot. Gard. 45: 347, f. 122-132. 1987
 Distribution: Am 6.
- Lewinskya mandonii* (Schimp. ex Hampe) F.Lara, Garilleti & Goffinet, **comb. nov.**
 ≡ *Orthotrichum mandonii* Schimp. ex Hampe, Ann. Sci. Nat. Bot. sér. 5, 4: 332. 1865
 Distribution: Am 4.
- Lewinskya pariata* (Mitt.) F.Lara, Garilleti & Goffinet, **comb. nov.**
 ≡ *Orthotrichum pariatum* Mitt.,

- J. Linn. Soc. Bot. 12: 186. 1869
Distribution: Am 4, Am 6.
- Lewinskya praemorsa*** (Venturi) F.Lara, Garilleti & Goffinet, **comb. nov.**
≡ *Orthotrichum praemorsum* Venturi, Bot. Centralbl. 44: 418. 1890
Distribution: Am 1.
- Lewinskya psychrophila*** (Mont.) F.Lara, Garilleti & Goffinet, **comb. nov.**
≡ *Orthotrichum psychrophilum* Mont., Ann. Sci. Nat. Bot. sér. 2, 9: 52. 1838
Distribution: Am 6.
- Lewinskya pulchra*** (Lewinsky) F.Lara, Garilleti & Goffinet, **comb. nov.**
≡ *Orthotrichum pulchrum* Lewinsky, J. Hattori Bot. Lab. 72: 20, f. 1-10. 1992
Distribution: AS 2.
- Lewinskya pycnophylla*** (Schimp. in C.MüllerHal.) F.Lara, Garilleti & Goffinet, **comb. nov.**
≡ *Orthotrichum pycnophyllum* Schimp. in C.MüllerHal., Syn. Musc. Frond. 1: 709. 1849
Distribution: Am 1, Am 2, Am 4, Am 6.
- Lewinskya pycnophylla* var. *verrucosa*** (Müll.Hal.) F.Lara, Garilleti & Goffinet, **comb. nov.**
≡ *Orthotrichum verrucosum* Müll. Hal., Linnaea 42: 359. 1879
Distribution: Am 4, Am 6.
- Lewinskya pylaisii*** (Brid.) F.Lara, Garilleti & Goffinet, **comb. nov.**
≡ *Orthotrichum pylaisii* Brid., Bryol. Univ. 1(1): 722. 1826
Distribution: Am 1, Eur, AS 1.
- Lewinskya rupestris*** (Schleich. ex Schwäger.) F.Lara, Garilleti & Goffinet, **comb. nov.**
≡ *Orthotrichum rupestre* Schleich. ex Schwäger., Sp. Musc. Frond. Suppl. 1: 27, pl. 53 [top]. 1816
Distribution: Am 1, Am 2, Am 4, Am 5, Am 6, Eur, AFR 1, AFR 2, AFR 4, AFR 5, AS 1, AS 2, AS 3, AS 5, AUSTR 1, AUSTR 2, OC, ANT.
- Lewinskya rupestris* var. *papillosa*** (Lewinsky) F.Lara, Garilleti & Goffinet, **comb. nov.**
≡ *Orthotrichum rupestre* var. *papillosum* Lewinsky, J. Hattori Bot. Lab. 56: 402. 1984
Distribution: Am 6, AUSTR 2.
- Lewinskya sainsburyi*** (Allison) F.Lara, Garilleti & Goffinet, **comb. nov.**
≡ *Orthotrichum sainsburyi* Allison, Trans. & Proc. Roy. Soc. New Zealand 77: 280. 1947
Distribution: AUSTR 2.
- Lewinskya schoddei*** (Lewinsky) F.Lara, Garilleti & Goffinet, **comb. nov.**
≡ *Orthotrichum schoddei* Lewinsky, J. Hattori Bot. Lab. 72: 34, f. 20. 1992
Distribution: AS 4.
- Lewinskya shawii*** (Wilson) F.Lara, Garilleti & Goffinet, **comb. nov.**
≡ *Orthotrichum shawii* Wilson, Musci Eur. Nov. fasc. 1-2, Monogr. 1. 1. 1864
Distribution: Am 1, Eur, AFR 1, AS 5.
- Lewinskya sordida*** (Sull. & Lesq. in Austin) F.Lara, Garilleti & Goffinet, **comb. nov.**
≡ *Orthotrichum sordidum* Sull. & Lesq. in Austin, Musci Appalach. 30. 1870
Distribution: Am 1, Eur, AS 1, AS 2, AS 5.
- Lewinskya spanotricha*** (Lewinsky) F.Lara, Garilleti & Goffinet, **comb. nov.**
≡ *Orthotrichum spanotrichum* Lewinsky, Lindbergia 18: 116, f. 1-2. 1993 [1994]
Distribution: Am 4.
- Lewinskya speciosa*** (Nees) F.Lara, Garilleti & Goffinet, **comb. nov.**
≡ *Orthotrichum speciosum* Nees, Deutschl. Fl. Abt. II Cryptog. 5: 5. 1819
Distribution: Am 1, Eur, AFR 1, AS 1, AS 2, AS 5.

- Lewinskya spjutii* (D.H.Norris & Vitt)
F.Lara, Garilleti & Goffinet,
comb. nov.
≡ *Orthotrichum spjutii* D.H.Norris &
Vitt, Nova Hedwigia 56: 260, f. 1.
1993
Distribution: Am 1.
- Lewinskya steerei* (Lewinsky) F.Lara,
Garilleti & Goffinet, **comb. nov.**
≡ *Orthotrichum steerei* Lewinsky,
Mem. New York Bot. Gard. 45:
357, f. 188-197. 1987
Distribution: Am 4.
- Lewinskya striata* (Hedw.) F.Lara,
Garilleti & Goffinet, **comb. nov.**
≡ *Orthotrichum striatum* Hedw.,
Sp. Musc. Frond. 163. 1801
Distribution: Am 1, Eur, AFR 1,
AFR 5, AS 1, AS 2, AS 3, AS 5.
- Lewinskya subulata* (Mitt.) F.Lara,
Garilleti & Goffinet, **comb. nov.**
≡ *Orthotrichum subulatum* Mitt.,
J. Linn. Soc. Bot. 12: 184. 1869
Distribution: Am 4.
- Lewinskya taiwanensis* (Lewinsky)
F.Lara, Garilleti & Goffinet,
comb. nov.
≡ *Orthotrichum taiwanense*
Lewinsky, J. Hattori Bot. Lab. 72:
25, f. 12. 1992
Distribution: AS 2.
- Lewinskya tanganyikae* (P. de la
Varde) F.Lara, Garilleti & Goffinet,
comb. nov.
≡ *Ulota tanganyikae* P. de la Varde,
Ark. Bot., n.s. 3: 174, f. 25. 1955
Distribution: AFR 2, AFR 4.
- Lewinskya tasmanica* (Hook.f. &
Wilson) F.Lara, Garilleti & Goffinet,
comb. nov.
≡ *Orthotrichum tasmanicum* Hook.f.
& Wilson, London J. Bot. 7: 27,
pl. 1 c. 1848
Distribution: AUSTR 1, AUSTR 2.
- Lewinskya tasmanica* var. *parvitheca*
(R.Br.bis) F.Lara, Garilleti &
Goffinet, **comb. nov.**
≡ *Orthotrichum parvithecum* R.Br.
bis, Trans. & Proc. New Zealand
Inst. 27: 440, pl. 41 f. 1894[1895]
Distribution: AUSTR 2.
- Lewinskya tenuicaulis* (Lewinsky)
F.Lara, Garilleti & Goffinet,
comb. nov.
≡ *Orthotrichum tenuicaule* Lewinsky,
J. Hattori Bot. Lab. 75: 45, f. 1.
1994
Distribution: Am 4.
- Lewinskya tortidontia* (F.Lara, Garilleti
& Mazimpaka) F.Lara, Garilleti &
Goffinet, **comb. nov.**
≡ *Orthotrichum tortidontium* F.Lara,
Garilleti & Mazimpaka, Nova
Hedwigia 63: 517, f. 1-17. 1996
Distribution: Eur, AFR 1, AS 5.
- Lewinskya tortifolia* (Lewinsky)
F.Lara, Garilleti & Goffinet,
comb. nov.
≡ *Orthotrichum tortifolium*
Lewinsky, J. Hattori Bot. Lab. 72:
23, f. 11. 1992
Distribution: AS 3.
- Lewinskya truncatodentata* (Müll.Hal.)
F.Lara, Garilleti & Goffinet,
comb. nov.
≡ *Orthotrichum truncatodentatum*
Müll.Hal., Linnaea 43: 442. 1882
Distribution: Am 6.
- Lewinskya truncata* (Lewinsky &
Deguchi) F.Lara, Garilleti &
Goffinet, **comb. nov.**
≡ *Orthotrichum truncatum* Lewinsky
& Deguchi, Bryologist 89: 216, f.
1-17. 1986 [1987]
Distribution: Am 6.
- Lewinskya vicaria* (Laz.) F.Lara,
Garilleti & Goffinet, **comb. nov.**
≡ *Orthotrichum vicarium* Laz., Žurn.
Inst. Bot. Vseukrajinsk. Akad.
Nauk 26-27: 210. 1938.
Distribution: AS 1.
- Lewinskya vladikavkana* (Venturi *in*
Husnot) F.Lara, Garilleti &
Goffinet, **comb. nov.**
≡ *Orthotrichum vladikavkanum*
Venturi *in* Husnot, Muscol. Gall.
167. 1887
Distribution: Eur, AS 1, AS 5.

APPENDIX 2

Taxa included in the genus *Orthotrichum* Hedw., with indication of their known distribution as shown in Fig. 2.

- Orthotrichum aequatoreum*** Mitt.,
J. Linn. Soc. Bot. 12: 184. 1869.
Distribution: Am 2, Am 4, AFR 2.
- Orthotrichum alpestre*** Hornsch. ex
Bruch & Schimp., Bryol. Eur. 3: 75,
pl. 213 (fasc. 42. Monogr. Suppl. 1:
1. pl. 1). 1849. Distribution: Am 1,
Eur, AS 1, AS 3.
- Orthotrichum alpestre* var. *berggrenii***
(E.B.Bartram) Lewinsky,
Bryobrothera 2: 63. 1993.
Distribution: OC.
- Orthotrichum angustifolium*** Hook.f. &
Wilson, London J. Bot. 3: 547.
1844. Distribution: AUSTR 2.
- Orthotrichum anodon*** F.Lara, Garilleti
& Mazimpaka, Bryologist 109: 188,
f. 1–17, 28. 2006. Distribution: Am 1.
- Orthotrichum anomalum*** Hedw.,
Sp. Musc. Frond. 162. 1801.
Distribution: Am 1, Am 2, Am3,
Eur, AFR 1, AS 1, AS 2, AS 3, AS 5.
- Orthotrichum assimile*** Müll.Hal., Syn.
Musc. Frond. 1: 704. 1849.
Distribution: Am 6, AUSTR 1,
AUSTR 2.
- Orthotrichum atratum*** Mitt., J. Linn.
Soc. Bot. 15: 66. 1876 [1877].
Distribution: AFR 4.
- Orthotrichum aucklandicum*** (Vitt)
B.Goffinet, Monogr. Syst. Bot.
Missouri Bot. Gard. 98: 287. 2004.
Distribution: AUSTR 2.
- Orthotrichum bartramii*** R.S.Williams,
Bryologist 28: 76, pl. 9. 1925.
Distribution: Am 1, Am 2.
- Orthotrichum bistratosum*** (Schiffn.)
J.Guerra, Anales Jard. Bot. Madrid 42:
248. 1985. Distribution: Eur, AS 5.
- Orthotrichum callistomum*** Fisch.-Oost.
ex Bruch & Schimp., Bryol. Eur. 3:
77, pl. 224 (fasc. 43. Mon.
suppl. 2: 1. pl. 3). 1850.
Distribution: Eur, AS 2, AS 3, AS 5.
- Orthotrichum calvum*** Hook.f. &
Wilson, Fl. Nov.-Zel. 2: 80, f. 7.
1854. Distribution: AUSTR 2.
- Orthotrichum cambrense*** Bosanquet &
F.Lara, Cryptog. Bryol. 33: 330.
2012. Distribution: Eur.
- Orthotrichum casasianum*** F.Lara,
Garilleti & Mazimpaka, J. Bryol.
21: 47, f. 1–9, 11–12, 15–16. 1999.
Distribution: Eur.
- Orthotrichum columbicum*** Mitt.,
J. Proc. Linn. Soc. Bot. 8: 24. 1864.
Distribution: Am 1, Eur.
- Orthotrichum comosum*** F.Lara,
R.Medina & Garilleti, Taxon 62:
1142. 2013. Distribution: Eur,
AFR 1, AFR 5.
- Orthotrichum confusum*** R.Medina,
F.Lara & Garilleti, Taxon 61: 1191.
2012. Distribution: Am 1.
- Orthotrichum consimile*** Mitt., J. Linn.
Soc. Bot. 8: 24. 1864. Distribution:
Am 1.
- Orthotrichum consobrinum*** Cardot,
Bull. Herb. Boissier sér. 2 8: 336.
1908. Distribution: Eur, AS 1, AS 2,
AS 5.
- Orthotrichum coulteri*** Mitt., J. Proc.
Linn. Soc. Bot. 8: 25. 1864.
Distribution: Am 1.
- Orthotrichum crassifolium*** Hook.f. &
Wilson, London J. Bot. 3: 546.
1844. Distribution: Am 6, AFR 4,
AUSTR 2, ANT.
- Orthotrichum crassifolium* subsp.
*acutum*** (Müll.Hal.) B.Goffinet,
Monogr. Syst. Bot. Missouri Bot.
Gard. 98: 288. 2004. Distribution:
AFR 4.
- Orthotrichum crenulatum*** Mitt.,
J. Proc. Linn. Soc. Bot. Suppl. 1:
48. 1859. Distribution: Eur, AS 1,
AS 3, AS 5.

- Orthotrichum crispifolium*** Broth.,
Symb. Sin. 4: 69. 1929.
Distribution: AS 3.
- Orthotrichum cucullatum*** F.Lara,
R.Medina & Garilleti, Taxon 62:
1143. 2013. Distribution: Am 1.
- Orthotrichum cupulatum*** Brid.,
Muscol. Recent. 2: 25. 1801.
Distribution: Am 1, Am 2, Eur
AFR 1, AFR 5, AS 1, AS 3, AS 5,
AUSTR 1, AUSTR 2.
- Orthotrichum cupulatum* var.
*austroamericanum*** Lewinsky,
Lindbergia 10: 69, f. 1-11. 1984
[1985]. Distribution: Am 4, Am 6.
- Orthotrichum cupulatum* var.
*austrocupulatum*** (Dixon &
Sainsbury) Lewinsky, J. Hattori Bot.
Lab. 56: 433. 1984. Distribution:
AUSTR 2.
- Orthotrichum cupulatum* var. *fuscum***
(Venturi) Boulay, Musc. France
Mousses 329. 1884. Distribution:
Eur.
- Orthotrichum cupulatum* var.
*riparium*** Huebener, Muscol.
Germ. 381. 1833. Distribution:
Am 1, Eur, AS 1, AS 5.
- Orthotrichum dagestanicum*** Fedosov
& Ignatova, Arctoa 19: 69. 2010.
Distribution: Eur, AS 2.
- Orthotrichum denticulatum*** Lewinsky,
Bot. Tidsskr. 72: 75. 1978.
Distribution: AFR 2, AFR 5.
- Orthotrichum diaphanum*** Brid.,
Muscol. Recent. 2: 29. 1801.
Distribution: Am 1, Am 2, Am 4,
Eur, AFR 1, AFR 2, AFR 4, AFR 5,
AS 3, AS 5, OC.
- Orthotrichum diaphanum* var.
*podocarpi*** (Müll.Hal.) Lewinsky,
Lindbergia 10: 72. 1984 [1985].
Distribution: Am 4, Am 6.
- Orthotrichum erubescens*** Müll.Hal.,
Nuovo Giorn. Bot. Ital. n.s. 4: 260.
1897. Distribution: AS 2.
- Orthotrichum euryphyllum*** Venturi,
Bot. Centralbl. 44: 417. 1890.
Distribution: Am 1.
- Orthotrichum flowersii*** Vitt, Bryologist
74: 159, f. 1-8. 1971. Distribution:
Am 1.
- Orthotrichum franciscanum*** F.Lara,
R.Medina & Garilleti, Taxon 62:
1144. 2013. Distribution: Am 1.
- Orthotrichum freyanum*** B.Goffinet,
W.R. Buck & M.A.Wall, Nova
Hedwigia Beih. 131: 6. 2007.
Distribution: Am 6.
- Orthotrichum gigantosporum***
Lewinsky, Lindbergia 14: 183. 1988
[1989]. Distribution: Am 6.
- Orthotrichum griffithii*** Mitt. *ex* Dixon,
J. Bot. 49: 140, 513 f. 2. 1911.
Distribution: AS 2, AS 3.
- Orthotrichum hallii*** Sull. & Lesq.,
Icon. Musc. Suppl. 63, pl. 45. 1874.
Distribution: Am 1, AS 1.
- Orthotrichum handiense*** F.Lara,
Garilleti & Mazimpaka, Bryologist
102: 619, f. 1-15. 1999 [2000].
Distribution: AFR 5.
- Orthotrichum hispanicum*** F.Lara,
Garilleti & Mazimpaka, J. Bryol.
22: 263, f. 1-19. 2000. Distribution:
Eur, AS 3, AS 5.
- Orthotrichum hooglandii*** E.B.Bartram,
Rev. Bryol. Lichénol. 30: 194.
1962. Distribution: AS 4.
- Orthotrichum ibukiense*** Toyama,
J. Jap. Bot. 14: 620. 1938.
Distribution: AS 2.
- Orthotrichum inclinatum*** Müll.Hal.,
Flora 68: 419. 1885. Distribution:
Am 6.
- Orthotrichum jetteae*** B.H.Allen,
Monogr. Syst. Bot. Missouri Bot.
Gard. 90: 639. 2002. Distribution:
AS 2.
- Orthotrichum karoo*** F.Lara, Garilleti &
Mazimpaka, Bryologist 112: 195.
2009. Distribution: AFR 4.
- Orthotrichum kellmanii*** D.H.Norris,
Shevock & B.Goffinet, Bryologist
107: 210, f. 2. 2004. Distribution:
Am 1.

- Orthotrichum laxum*** Lewinsky,
Lindbergia 24: 29, f. 1-2. 1999.
Distribution: AS 2.
- Orthotrichum lescurii*** Austin, Musci
Appalach. 163. 1870. Distribution:
Am 1.
- Orthotrichum liliputanum*** Broth. in
Herzog, Biblioth. Bot. 87: 63. 1916.
Distribution: Am 4.
- Orthotrichum macrocephalum*** F.Lara,
Garilleti & Mazimpaka, Bryologist
97: 402, f. 1-20. 1994. Distribution:
Eur, AFR 1, AS 5.
- Orthotrichum mazimpakanum*** Garilleti
& F.Lara, Bryologist 114: 351.
2011. Distribution: Am 1.
- Orthotrichum meyenianum*** Hampe,
Syn. Musc. Frond. 2: 639. 1851.
Distribution: AS 4.
- Orthotrichum microcarpum*** De Not.,
Erb. Crittog. Ital. 19: 915. 1863.
Distribution: Eur, AS 5.
- Orthotrichum moravicum*** Plášek &
Sawicki, Bryologist 112: 329. 2009.
Distribution: Eur.
- Orthotrichum norrisii*** F.Lara,
R.Medina & Garilleti, Bryologist
111: 670, f. 1-2. 2008. Distribution:
Am 1.
- Orthotrichum notabile*** Lewinsky,
Lindbergia 20: 102. 1995 [1996].
Distribution: AS 2.
- Orthotrichum ohioense*** Sull. & Lesq.,
Musci Appalach. 169. 1870.
Distribution: Am 1.
- Orthotrichum pallens*** Bruch ex Brid.,
Bryol. Univ. 1: 788. 1827.
Distribution: Am 1, Am 2, Am 4,
Eur, AFR 1, AFR 5, AS 1, AS 3,
AS 5.
- Orthotrichum pallens* var. *crenulatum***
Vitt, Bryologist 74: 161, f. 9-12.
1971. Distribution: Am 1.
- Orthotrichum pallens* var. *johnseniae***
Vitt, Bryologist 74: 162, f. 13-16.
1971. Distribution: Am 1.
- Orthotrichum pamiricum*** Plášek &
Sawicki, Turk. J. Bot. 38: 755.
2014. Distribution: AS 3.
- Orthotrichum parvulum*** Mitt., J. Linn.
Soc. Bot. 8: 25. 1864. Distribution:
Am 1.
- Orthotrichum patens*** Bruch & Brid.,
Bryol. Univ. 1: 787. 1827.
Distribution: Eur, AS 5.
- Orthotrichum pellucidum*** Lindb.,
Öfvers. Förh. Kongl. Svenska
Vetensk.-Akad. 23: 549. 1866
[1867]. Distribution: Am 1, Eur,
AS 1.
- Orthotrichum penicillatum*** Mitt.,
J. Linn. Soc. Bot. 12: 185. 1869.
Distribution: Am 4.
- Orthotrichum perexiguum*** Dusén ex
Lewinsky, Lindbergia 10: 89, f. 142.
1984 [1985]. Distribution: Am 6.
- Orthotrichum persimile*** F.Lara,
R.Medina & Garilleti, Taxon 61:
1193. 2012. Distribution: Am 1.
- Orthotrichum philibertii*** Venturi,
Rev. Bryol. 5: 45. 1878.
Distribution: Eur, AFR 1, AS 5.
- Orthotrichum pilosissimum*** R.Medina,
F.Lara & Garilleti, Bryologist 114:
317. 2011. Distribution: Am 1.
- Orthotrichum pulchellum*** Brunt.,
Bot. Guide Northumberland &
Durham 2: 23. 1807.
Distribution: Am 1, Eur.
- Orthotrichum pumilum*** Sw. ex anon.,
Monthly Rev. 34: 538. 1801.
Distribution: Am 1, Eur, AFR 1,
AFR 5, AS 1, AS 2, AS 3, AS 5.
- Orthotrichum pungens*** Mitt., J. Linn.
Soc. Bot. 12: 184. 1869.
Distribution: Am 4.
- Orthotrichum pusillum*** Mitt., J. Linn.
Soc. Bot. 8: 25. 1864. Distribution:
Am 1.
- Orthotrichum revolutum*** Müll.Hal.,
Nuovo Giorn. Bot. Ital. n.s. 4: 261.
1897. Distribution: AS 2.
- Orthotrichum rivulare*** Turner, Muscol.
Hibern. Spic. 96, pl. 8. 1804.
Distribution: Am 1, Eur, AS 1.
- Orthotrichum rogeri*** Brid., Muscol.
Recent. Suppl. 2: 9. 1812.
Distribution: Eur, AS 5.

- Orthotrichum scanicum*** Grönvall,
Bidr. Känned. Nord. Orthotrichum
& Ulota 13. 1885. Distribution: Eur,
AFR 1, AS 3, AS 5.
- Orthotrichum schimperi*** Hammar,
Monogr. Orthotrich. Ulot. Suec. 9.
1852. Distribution: Am 1, Eur,
AFR 1, AFR 5, AS 5.
- Orthotrichum schofieldii*** (B.C.Tan &
Y.Jia) B.H.Allen, Monogr. Syst.
Bot. Missouri Bot. Gard. 90: 639.
2002. Distribution: AS 2.
- Orthotrichum sharpii*** H.Rob.,
Bryologist 67: 449, f. 16-22. 1964.
Distribution: Am 2.
- Orthotrichum shevockii*** Lewinsky &
D.H.Norris, Bryologist 101: 435.
1998. Distribution: Am 1.
- Orthotrichum sinuosum*** Lewinsky,
J. Hattori Bot. Lab. 72: 73, f. 42.
1992. Distribution: AS 2.
- Orthotrichum spiculatum*** F.Lara,
Garilleti & Mazimpaka,
Bot. J. Linn. Soc. 155: 477. 2007.
Distribution: Am 6.
- Orthotrichum sprucei*** Mont., London
J. Bot. 4: 186. 1845. Distribution:
Eur, AS 1, AS 5.
- Orthotrichum stellatum*** Brid., Bryol.
Univ. 1: 274. 1826. Distribution:
Am 1, Eur, AS 5.
- Orthotrichum stramineum*** Hornsch. *ex*
Brid., Bryol. Univ. 1: 789. 1827.
Distribution: Am 1, Eur, AFR 1,
AS 3, AS 5.
- Orthotrichum strangulatum*** P.Beauv.,
Prodr. Aethéogam. 81. 1805.
Distribution: Am 1.
- Orthotrichum subexsertum*** Schimp. *ex*
Müll.Hal., Bot. Zeitung (Berlin) 16:
164. 1858. Distribution: AFR 2,
AFR 4.
- Orthotrichum subpumilum***
E.B.Bartram *ex* Lewinsky J. Hattori
Bot. Lab. 72: 59, f. 34 1992.
Distribution: AS 2.
- Orthotrichum tenellum*** Bruch *ex* Brid.,
Bryol. Univ. 1: 786. 1827.
Distribution: Eur, AFR 1, AFR 5,
AS 5.
- Orthotrichum trachymitrium*** Mitt.,
J. Linn. Soc. Bot. 12: 183. 1869.
Distribution: Am 4.
- Orthotrichum transvaaliense*** Rehmann
ex Sim, Trans. Roy. Soc. South
Africa 15: 276. 1926. Distribution:
AFR 4.
- Orthotrichum tristriatum*** Lewinsky,
Lindbergia 15: 70. 1989 [1990].
Distribution: Am 6.
- Orthotrichum underwoodii*** F.Lara,
Garilleti & Mazimpaka, Bryologist
104: 268. 2001. Distribution: Am 1.
- Orthotrichum urnaceum*** Müll.Hal.,
Trudy Imp. S.-Peterburgsk. Bot.
Sada 10: 259. 1887. Distribution: Eur.
- Orthotrichum urnigerum*** Myrin,
Coroll. Fl. Upsal. 71. 1833.
Distribution: Eur, AS 3.
- Orthotrichum vermiferum*** Lewinsky,
Lindbergia 24: 33, f. 1. 1999.
Distribution: AS 2.
- Orthotrichum vittii*** F.Lara, Garilleti &
Mazimpaka, Bryologist 102: 53,
f. 1-22. 1999. Distribution: Eur,
AFR 1, AS.