

Lewinskya transcaucasica (Orthotrichaceae, Bryopsida) *sp. nov.* A contribution to the bryophyte flora of Georgia

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A new orthotrichaceous species, *Lewinskya transcaucasica* Eckstein, Garilleti & F.Lara, is described, based on several samples collected in the Georgian territories of Greater Caucasus and Lesser Caucasus. The species is best differentiated by its sporophytic characteristics. Its capsules are long ovoid to cup-shaped and smooth and show no differentiation of the longitudinal bands of the exothecial cells. The capsules vary from emerging fully from the perichaetial leaves to having a shortly exerted position. The peristome is double, with an exostome of eight pairs of orange to crimson teeth whose tips are variably cancellated and fenestrated and recurved when dry, and an endostome of eight segments that occasionally alternate with reduced intermediate segments. All of these segments are yellowish to pale orange, mainly linear, uniseriate or partially biseriate, and strongly ornamented on the inner side. The new moss is illustrated and compared with similar taxa around the world.

Keywords: Caucasus, *Orthotrichum*, Peristomial arrangement, Sexual condition, Taxonomy

Introduction

For many years, scientists from the Friedrich-Schiller-University in Jena, Germany, have undertaken expeditions to Georgia to study the rich flora of the region, focusing mainly on phanerogams and bryophytes. These numerous expeditions have resulted in a large botanical specimen collection kept at the Herbarium Haussknecht in Jena (JE). In 2015 and 2016, the first author studied all the specimens of Orthotrichaceae in this collection, revealing high levels of diversity for this family in Georgia (Eckstein & Zündorf, 2017). During these studies, it was found that the collection contained several specimens of a morphologically well-differentiated species that could not, however, be assigned to any previously described species. Here, based on these herbarium specimens, we describe this new species as *Lewinskya transcaucasica*.

The genus *Lewinskya* F.Lara, Garilleti & Goffinet has been recently proposed (Lara *et al.*, 2016) to accommodate a group of monoicous species with superficial stomata (phaneroporous) that were previously considered to be members of the genus *Orthotrichum* Hedw. In addition to the position of

the stomata (the most recognisable trait), some other outstanding morphological characteristics distinguish *Lewinskya* from *Orthotrichum* s.s. (Lara & Garilleti, 2014, as *Orthotrichum* subgenus *Phaneroporum* Delogne; Lara *et al.*, 2016). Notably, *Lewinskya* is characterised by (1) basal leaf cells that are mostly elongate, with incrassate and sinuous or nodulous walls; (2) an endostome without a connecting membrane; (3) gametophores that are usually taller than 10 mm; (4) the gonautoicous position of their gametangia; (5) capsules that are mostly exerted, and often smooth or faintly ribbed when dry; (6) an absence of propagules, with very rare exceptions; and (7) spores that are frequently over 20 µm in diameter. *Orthotrichum*, on the other hand, is characterised by (1) basal leaf cells that are rectangular, and usually with thin, non-nodulous walls; (2) an endostome with a connecting membrane, although this can sometimes be incomplete; (3) gametophores that are usually smaller than 10 mm; (4) the cladautoicous position of the gametangia; (5) capsules that are rarely exerted and mostly strongly ribbed when dry; (6) the frequent presence of propagules; and (7) spores that are usually less than 20 µm in diameter.

The polyphyly of *Orthotrichum* s.l. is supported not only by these morphological differences, but also by several phylogenetic analyses with partial sampling as

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detailed in Lara et al. (2016), thus lending further support to the secession of *Lewinskya*. Although these phylogenetic analyses represent neither a complete nor a large phylogeny of the group, results are consistently coherent between the nuclear and plastid genomes. The nuclear markers ITS1, ITS2, ISJ, and ISSR were used by Plášek et al. (2009, 2011), Sawicki et al. (2009) and Plášek & Sawicki (2010). Combined nuclear ITS1, ITS2, and chloroplast *trnH-psbA* data were tested in Sawicki et al. (2010, 2012), while the chloroplast markers *trnL-trnF* and *rps4* were used by Goffinet et al. (2007). Finally, Vigalondo et al. (2016) showed differences in complete mitochondrial genomes to be greater between cryptoporous (*Orthotrichum* s.s.) and phaneroporous species (*Lewinskya*) than between *Lewinskya* and *Ulotia*.

The genus *Lewinskya* is a sub-cosmopolitan group so far comprising 70 species, thus comparable in size to the genus *Ulotia* D.Mohr (Garilleti et al., 2015) and one of the most speciose genera of the tribe Orthotricheae, only exceeded in richness by the genus *Orthotrichum* (Lara et al., 2016). The new species described here might be considered a typical representative of this newly delimited genus since most of its relevant morphological traits are very common in the group. Nonetheless, *L. transcaucasica* is distinguished by a unique combination of characteristics, allowing its safe delineation and making it a very distinctive moss within the Eurasian context.

***Lewinskya transcaucasica* Eckstein, Garilleti & F.Lara sp. nov.**

Type: Georgia: Greater Caucasus central part, Tush-Pshav-Khevsureti, Omalo, in the Pirikita Alazani valley ca 6 km east of Dartlo village [Großer Kaukasus: Zentralteil, Tush-Psav-Khevsureti, Omalo, im Tal des Pirikita Alazani ca 6 km östlich des Ortes Dartlo], on bark of *Betula*, 2300 m a.s.l., 42°24'16"N, 45°37'25"E, leg. H.-J. Zündorf (25277), 5 September 2009 (Holotype: JE, Isotypes: MAUAM, TBI). (Figures 1–3)

Diagnosis: *Plantae ad 2.6 cm altae medios ad grandes pulvinos formantes. Folia lanceolata ad anguste ovata-lanceolata, marginibus recurvatis ad revolutos, aliquantum distaliter flexuosa, apice curte acuminata ad aristata. Capsula curte exserta, longe ovoidea ad cupulatam, laevis cellulis exothecii quae nullo modo differentiatis vittatas formantibus. Peristoma duplex. Exostoma 8 paribus aurantiacorum ad coccineos dentium, versus apicem varie cancellatorum fenestrorumque, sicco recurvatorum. Endostoma 8 segmentis, interdum cum intermediis, luteis ad dilute aurantiaca, praecipue linearibus, uniseriatis vel pro parte bisseriatis, intra valde ornamentatis. Calyptra valde pilosa. Sporae grosse papilloae, diametro plerumque 27–32 µm.*

Description: *Plants* (0.8–)1.5–2.6 cm tall, olive green, in cushions of up to ca 5 cm in diameter. *Stems* orange, rounded or broadly ellipsoid in section, 200–300 µm in diameter. *Axillary hairs* usually formed by (2–)3–5 elongated hyaline cells with slightly bulging cell walls and 1(–2) basal shorter and coloured cell(s). *Rhizoids* orange to reddish brown, smooth, abundant at main stem base and upwards on branch bases. *Leaves* densely disposed, erect, stiff, and somewhat distally flexuous when dry, patent to spreading when moist, lanceolate to narrowly ovate-lanceolate, keeled, (1.8–)3.0–3.6 (–4.0) × (0.4–)0.6–0.9(–1.0) mm, unistratose throughout; *leaf apex* acuminate to aristate; *leaf margin* recurved to revolute for most of its length, frequently more or less undulate, especially near apex. *Costa* percurrent to excurrent in a mucro or a short arista, 45–90 (–100) µm wide at leaf base, 30–60(–90) µm at mid leaf. *Basal leaf cells* elongate, (30–)40–80(–90) × (9–)11–16 (–19) µm, smooth, with cell walls moderately incrassate, sinuous to strongly nodulose in mature leaves, hyaline or orange, at margin with 2–7 rows of shortly rectangular to quadrate cells, (11–)13–31 (–45) × (10–)13–16(–20) µm, hyaline or greenish, usually with less incrassate and almost straight walls. *Median and upper leaf cells* irregular, mostly ellipsoid, moderately thick walled, (9–)13–23(–32) × (9–)12–16 (–20) µm, with (1–)2–3(–4) stout, simple, or basally forked papillae. *Brood bodies* not seen. Cladautoicous. *Perigonia* bud shaped, terminal on short branches grouped on lateral branch systems; perigonial leaves ovate to shortly ovate-oblong, with acute to apiculate apices. *Perichaetia* terminal; perichaetial leaves similar to vegetative ones. *Vaginula* cylindrical, naked or with several uniseriate or partially 2–3 seriate, scarcely papillose, long hairs. *Sporophyte* 1 per perichaetium. *Seta* 1.2–2.2 mm long. *Capsule* fully emergent to shortly exserted, (1.3–)1.5–2.2 mm long, pale brown to orange when mature, ovoid when moist, long ovoid to cup-shaped, not furrowed, not or very slightly constricted below mouth when dry, progressively narrowing to seta through a long neck. *Exothecial cells* irregular, mostly sub-rectangular with one or both longitudinal walls incrassate, below mouth forming a narrow ring of 2–3 rows of rounded to oblate cells, not differentiated into longitudinal band. *Stomata* superficial, in central and lower two-thirds of urn. *Peristome* double. Basal remains of a prostome sometimes present. *Exostome* of eight teeth pairs, (240–)280–370 µm long, variably cancellated and fenestrated at tips, orange to crimson, usually paler at distal portions, recurved when dry, with age distally or completely splitting but in many cases remaining paired due to the presence of oblique cross cells connecting the individual teeth of each pair; external surface (Outer



Figure 1 *Lewinskya transcaucasica* Eckstein, Garilleti & F.Lara. (A) Habit. (B) Detail of a sporophyte when dry. (C) Wet sporophyte under compound light microscope. (D) Relative position of perigonia (arrows) and perichaetia. (E) Vegetative leaves. (F) Upper part of a vegetative leaf, showing an apiculate apex. Specimen in figure F after a treatment with 20% KOH. (A) From Zündorf 25283 (JE s.n.); (B–D, F) from the holotype; (E) from Zündorf 23352a (JE s.n.).

Peristomial Layer, OPL) finely and densely papillose; internal surface (Primary Peristomial Layer, PPL) finely ornamented in the basal half by oblique or longitudinal lines or papillose crests mixed with single papillae, in the upper half becoming denser and more irregular, with a predominance of single papillae. *Endostome* of eight linear segments alternating with the teeth pairs, sometimes with up to eight additional, usually shorter or rudimentary, intermediate segments, the principal ones as long as the teeth or somewhat shorter, yellowish to pale orange, uniseriate, often with sinuous margins, sometimes with irregular portions of a second cell row, occasionally appendiculate or with projections connecting two adjacent segments, smooth on the outer side (PPL), strongly ornamented on the inner side (Inner Peristomial Layer, IPL) with papillae and short lines variably and densely arranged throughout; without a connective membrane between segments. *Operculum* almost plane and rostrate, yellowish with reddish basal rim. *Calyptra* conic, pale orange with dark brown beak,

2.0–2.5 mm long, strongly hairy, with pale golden, uniseriate to biseriate, slightly papillose hairs, often shortly exceeding the tip. *Spores* brownish, coarsely papillose, (24–)27–32(–36) µm in diameter.

Ecology and Distribution

Lewinskya transcaucasica has been found in six Georgian localities, four of them in the central part of the Greater Caucasus and two in the Lesser Caucasus (Figure 4). It appears to mainly occur in the subalpine and altimontane belts, with most known localities lying between 1700 and 2300 m a.s.l., although in one case the recorded altitude is only 800 m. At the four localities in the Greater Caucasus (localities 3–6 in Figure 4) it was found growing on trunks of *Betula* L. and *Sorbus* L. in low, open, heavily managed forests composed of *Betula raddeana* Trautv. and *B. pubescens* Ehrh., with some interspersed *Sorbus aucuparia* L. as well as *Populus* L. and *Salix* L. species. Arcuate tree trunks give these forests a characteristic appearance (picture in

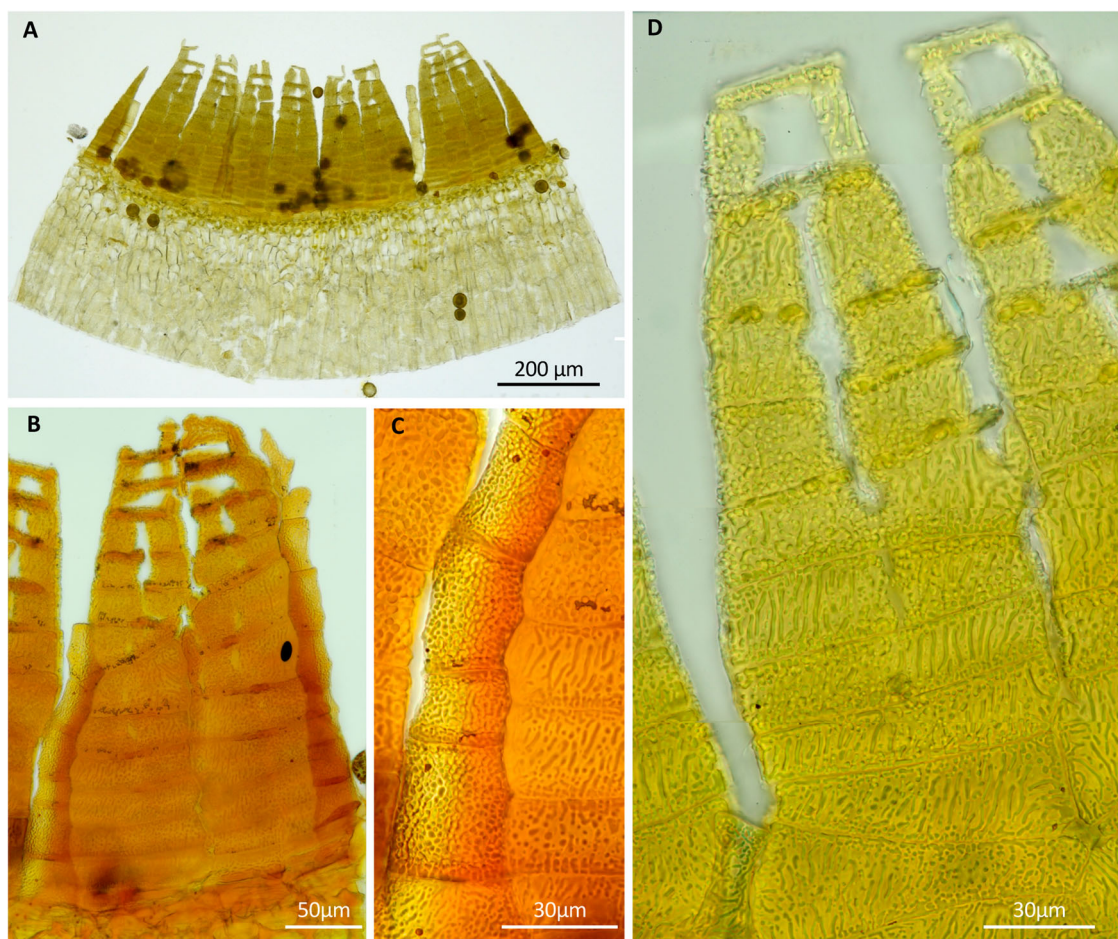


Figure 2 *Lewinskya transcaucasica* Eckstein, Garilleti & F.Lara, details of peristome. (A) General view of half a peristome, showing four pairs of exostome teeth and three remaining endostome segments. (B) A pair of teeth and the corresponding endostome segments; note the cancellated upper half of the teeth and the incrassate trabeculae. (C) Detail of the ornamentation of the endostome with a basal portion of a tooth behind. (D) General view of the ornamentation of the inner (exostomial PPL) side of a tooth. Specimen in figures (B–C) after a treatment with 20% KOH. All from the holotype.

Figure 4). The ground is mostly covered with dense mats of pleurocarpous mosses, and air humidity is generally high. Locality 1 is situated in the altimontane belt of the Lesser Caucasus in a sparse forest dominated by *Pinus kochiana* Klotzsch ex K.Koch and diverse pioneer trees and shrubs. Here, *L. transcaucasica* was found on a vertical trunk of *Salix*. Locality 2 is situated in the colline-submontane belt of the Lesser Caucasus, and is clearly distinguished from the other known localities for the species by its mostly xerothermic climate, with forests dominated by *Quercus macranthera* Fisch. & C.A.Mey. ex Hohen, along with some *Carpinus orientalis* Mill. and *Fagus orientalis* Lipsky. In all instances, *L. transcaucasica* was epiphytic on the bark of broadleaf trees of the genera *Betula*, *Quercus* L., *Salix* and *Sorbus*. The bryo-epiphytic communities where this new species was found always included other orthotrichaceous mosses, most frequently *Lewinskya striata* (Hedw.) F.Lara, Garilleti & Goffinet, *L. vladikavkana* (Venturi in Husnot) F.Lara, Garilleti & Goffinet, *Orthotrichum pallens* Bruch ex Brid., and *Ulota* s.l. Several other orthotrichaceous species were

occasionally present, including *Lewinskya affinis* (Schrader ex Brid.) F.Lara, Garilleti & Goffinet, *L. speciosa* (Nees) F.Lara, Garilleti & Goffinet, *L. rupestris* (Schleich. ex Schwägr.) F.Lara, Garilleti & Goffinet, *L. sordida* (Sull. & Lesq.) F.Lara, Garilleti & Goffinet, *Orthotrichum alpestre* Hornsch. ex Bruch & Schimp., *O. scanicum* Grönvall, *Nyholmiella obtusifolia* (Brid.) Holmen & E.Warncke, and *N. gymnostoma* (Bruch ex Brid.) Holmen & E.Warncke. Other relevant bryophytes in these assemblages were *Leucodon immersus* Lindb., *Pterigynandrum filiforme* Hedw., and *Frullania eboracensis* subsp. *parvistipula* (Steph.) R.M.Schust.

Discussion

Lewinskya is a genus of acrocarpous mosses growing in temperate or tropical montane environments of both hemispheres that form medium-to-large size cushions mainly on the bark of trees and shrubs, and more rarely also on rocks. In Eurasia, this is an important genus with 24 recognised species (data after Lara et al., 2016, excluding New Guinea endemics), to

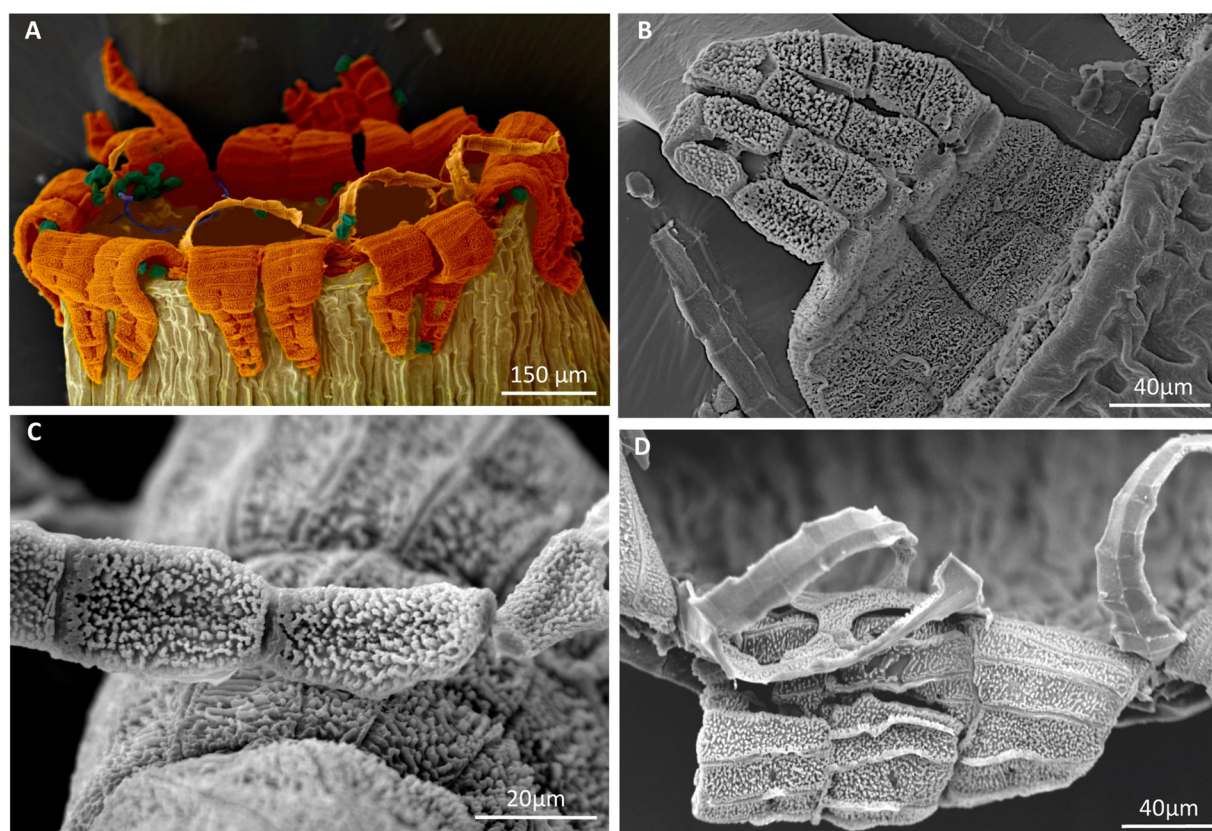


Figure 3 *Lewinskya transcaucasica* Eckstein, Garilleti & F.Lara, Scanning Electronic Microscope images. (A) General view of capsule mouth with false colour. (B) External side of a pair of teeth, showing the dense papillae pattern; two endostome segments can be seen at both sides of teeth. (C) Endostome segment, seen on its papillose inner surface (IPL). (D) An image of an exceptional endostome organisation with appendiculate segments, in which an intermediate segment has lateral and basal connections with one principal one. All from the holotype.

which the newly described *L. transcaucasica* must be added.

As in other groups of Orthotrichaceae (Medina *et al.*, 2012, 2013; Caparrós *et al.*, 2016), in *Lewinskya* a large number of gametophytic and sporophytic morphological traits can be used as distinguishing taxonomic features. However, the segregation of *Lewinskya* from *Orthotrichum* has led to a much more homogeneous genus in which the level of taxonomical significance of some characters has changed in relative terms. This applies for example to the level of striation of the capsule wall when dry. Whereas in a wide concept of *Orthotrichum*, including both cryptoporous and phaneroporous species, the existence of smooth capsules was considered an exception (Lewinsky, 1993), in *Lewinskya* the development among its members of smooth or faintly striate capsules is as common as the presence of furrowed capsules. Although a trait like this could maintain taxonomic relevance, its mere occurrence does not equate to peculiarity or uniqueness, and thus species differentiation must rely on other characteristics or, frequently, on unique combinations of several characteristics. In *Lewinskya*, although many organs could offer distinctive traits (Lara *et al.*, 2016), some sporophytic structures,

namely the peristome (peristomial arrangement and teeth characteristics) and the capsule urn (general shape, wall areolation, relative position, etc.) are particularly important in providing differentiating attributes.

As mentioned above, in many aspects—including habitat and growth form, size of the plants, general shape of leaves, basal and upper leaf areolation, absence of vegetative propagules, calyptra hairiness, presence of double peristome, and spore size—*Lewinskya transcaucasica* is a typical member of its genus (Lara *et al.*, 2016). Nonetheless, it can be easily distinguished from other members by its capsule and peristome (Figures 1–3). The capsule is long ovoid to cup-shaped, not constricted below the mouth, not furrowed when dry, without differentiated longitudinal exothecial cell bands, and well-visible when mature, protruding from the perichaetial leaves in a fully emergent to shortly exerted position. The peristome consists of an exostome with eight pairs of teeth and an endostome of $8 + n$ segments. The exostome tooth pairs can split with age but frequently this splitting is only partial, due to the presence of oblique cross cells connecting the individual teeth of each pair. The teeth have a distinctive appearance, being orange to crimson with usually paler distal

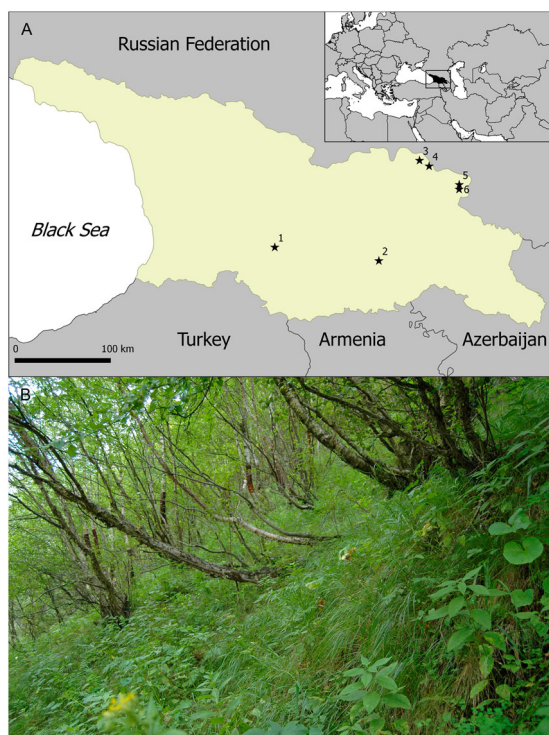


Figure 4 *Lewinskya transcaucasica* Eckstein, Garilleti & F.Lara. (A) Distribution in Georgia. Numbers are those referred to in parenthesis in 'Other specimens examined (paratypes)' section. Type locality corresponds to number 5. (B) Aspect of the low and heavily managed forest dominated by *Betula* sp. pl. which constitutes the typical habitat of *L. transcaucasica* in Greater Caucasus. Figure (B) by Hans-Joachim Zündorf.

portions, which are also variably cancellated and fenestrated. Exostome teeth recurve completely when dry, lying appressed to the exothecium. Endostome segments appear to be highly variable: mostly they are close to linear, formed by a single row of cells with straight or faintly sinuose margins, but sometimes they are partially biseriate, with margins that can be moderately to strongly irregular, or even appendiculate. The segments are yellowish to pale orange and strongly ornamented on the inner surface. Other remarkable characteristics that complement the combination of distinguishing morphological traits are: (a) lanceolate to narrowly ovate-lanceolate leaves, somewhat flexuous and shortly acuminate to aristate at apex; (b) leaf margins recurved to revolute for most of their length; (c) cladautoicous condition; (d) conic, strongly hairy calyptra, with pale golden, uniseriate to biseriate, slightly papillose hairs; (e) operculum almost plane and rostrate with reddish basal rim; and (f) spores mostly 27–32 µm in diameter.

Capsules of *Lewinskya transcaucasica* are unusual within the genus particularly with respect to their form when dry and empty. While most species have smooth, non-furrowed capsules, in most cases, these are more or less long cylindrical. Only a few species (Vitt, 1973; Lewinsky, 1984, 1987, 1992a, 1992b;

Lara & Garilleti, 2014) have smooth and short (ovoid to shortly cylindrical) capsules, and among these, in only two is the capsule position fully emergent to shortly exserted: *L. tasmanica* var. *parvitheca* (R.Br.bis) F.Lara, Garilleti & Goffinet and *L. tortifolia* (Lewinsky) F.Lara, Garilleti & Goffinet. The former is a New Zealand endemic best characterised by its polysety, as typically it forms two to several sporophytes per perichaetium (Lewinsky, 1984); the latter is a rare Himalayan species only known from a few localities in Bhutan that has very distinctive long linear-lanceolate leaves with almost completely plane margins that remain strongly contorted when dry (Lewinsky, 1992a). In addition, these two species have eight broadly triangular and biseriate endostome segments, an essential peristomial difference with respect to *L. transcaucasica*.

Most closely resembling *Lewinskya transcaucasica* are five other Eurasian species. These differ mainly by their peristomial characteristics and by the shape and position of the capsule (Lewinsky, 1992a; Lara & Garilleti, 2014). Three of these are from central China (Jia et al., 2011), including (a) *L. dasymitria* (Lewinsky) F.Lara, Garilleti & Goffinet, which has an exostome of eight pairs of yellowish teeth and an endostome of 16 thin, biseriate segments, as well as capsules ovoid and furrowed below the mouth when dry; (b) *L. erosa* (Lewinsky) F.Lara, Garilleti & Goffinet, which has eight pairs of yellow exostomial teeth, eight very broad endostomial segments, and immersed capsules; and (c) *L. leioclythis* (Müll.Hal.) F.Lara, Garilleti & Goffinet, which has an exostome of eight pairs of revolute teeth when dry and an endostome of eight thin and hyaline, frequently biseriate segments, as well as slightly furrowed immersed capsules and calyptrae with few scattered hairs. The remaining two are predominantly European species whose distribution range extends into Asia, also including some disjunct North American populations (Lara & Garilleti, 2014). One of these is (d) *L. shawii* (Wilson) F.Lara, Garilleti & Goffinet, which has an exostome of 16 white-yellowish teeth that are irregularly divided and mainly single (although some are partially connected in pairs by oblique cross cells), a vestigial or absent endostome, and an immersed capsule that is smooth or faintly furrowed below its mouth; the other is (e) *L. striata* (Hedw.) F.Lara, Garilleti & Goffinet, which has 16 orange or yellowish, completely independent exostomial teeth and 16 whitish, broad and biseriate endostomial segments with very irregular margins, and immersed capsules.

Of these five species, *Lewinskya striata*, is the only one known from the Caucasus, where it is a common moss on trees and frequently co-occurs with *L. transcaucasica*. Both mosses can be easily distinguished

even in the field, due to their differences in peristomial arrangement and position of the capsules with respect to the surrounding leaves. They also differ to some extent in the hairiness of their calyptrae, seta length, leaf apex shape, and leaf areolation (Vitt, 1973; Lewinsky, 1992a; Lewinsky-Haapasaari, 1998; Lara & Garilleti, 2014). Another Caucasian species that shares some similarities with *L. transcaucasica* is *L. sordida* (Sull. & Lesq.) F.Lara, Garilleti & Goffinet (Akatova et al., 2004; Lara et al., 2010). While both species have shortly exserted capsules and a reddish exostome with cancellated to perforated tips, they can nonetheless be easily distinguished due to the fact that *L. sordida* is macroscopically distinctive, with deeply furrowed capsules that are constricted below the mouth when dry.

Finally, it ought to be highlighted that *L. transcaucasica* may be unique within *Lewinskya* in terms of the arrangement of the perigonia on the gametophores. In *Lewinskya*, erect gametophytic axes grow by means of sympodial branching (frequently a false monopodium, as in other Orthotrichoideae) in which the growth of each stem segment or branch is arrested by the development of terminal perichaetia, with the perigonia lateral on the same branches. This is not the case in the genus *Orthotrichum*, in which perigonia normally arise in a terminal position on branches. In this case, the appearance of a perigonium can be pseudolateral if it terminates the growth of a stem segment of a false monopodium, or clearly terminal on the top of short isolated branches; in other species, perigonia are mainly present on lateral systems of male branches. With respect to the distribution of the gametangia, *Lewinskya* has been specifically defined (Lara et al., 2016) as including only goniatocous species, that is, autoicous mosses in which the perigonia are always lateral on stems and branches that form apical perichaetia. In contrast, *Orthotrichum* s.s. comprises cladautoicous mosses in which perigonia are terminal on (male) branches. In the case of *Lewinskya transcaucasica*, while some apparently lateral perigonia can be found, the distribution of the gametangia best matches that of a cladautoicous species, since perigonia tend to be mostly arranged in short-branched lateral sympodial systems (Figure 1D). In consequence, *Lewinskya* must be re-described as usually goniatocous, rarely cladautoicous.

Other specimens examined (paratypes): **GEORGIA. Lesser Caucasus:** Borjomi, above timber line in the eastern part of the Borjomi-Kharagauli National Park [Kleiner Kaukasus: Bordshomi, oberhalb der Waldgrenze im Ostteil des Bordshomi-Kharagauli-Nationalpark], on bark of *Salix*, 1900 m a.s.l., 41° 49'N, 43°18'E, leg. H.-J. Zündorf 21891, 6 August 2004 (JE, TBI) [Loc. 1]. West of Tbilisi, north-exposed slopes above the Betania Monastery in the

Vere valley, ca 20 km west of Tbilisi [Kleiner Kaukasus westlich Tbilisi: nordexponierte Hänge im Vere-Tal oberhalb des Klosters Betania, ca 20 km westlich Tbilisi], on bark of *Quercus*, 800 m a.s.l., 41° 41'21"N, 44°36'40"E, leg. H.-J. Zündorf 21838b, 29 July 2004 (JE) [Loc. 2]. **Greater Caucasus:** Khevsureti, in the Arghunt valley south-west of Shantili in the immediate vicinity of Georgsminda [Großer Kaukasus: Zentralteil, Chewsuretien, Arghunt-Tal südwestlich Shantili, in der unmittelbaren Umgebung von Georgitsminda], on bark of *Betula*, 1700 m a.s.l., 42°37'50.2"N, 45°7'24.3"E, leg. H.-J. Zündorf 23913, 1 August 2007 (JE, TBI) [Loc. 3]. Khevsureti, remnants of forests on north-exposed slopes of a glacial U-shaped valley ca 500 m north of Khone [Großer Kaukasus: Chewsuretien, Restwälder an den Hängen im Trogtal ca 500 m nordöstlich Khone], on bark of *Betula*, 2200 m a.s.l., 42°34'38.2"N, 45°14'39"E, leg. H.-J. Zündorf 23352a, 2 September 2006 (JE) [Loc. 4]. Tush-Pshav-Khevsureti, Omalo in the Pirikita Alazani valley ca 6 km east of Dartlo village [Großer Kaukasus: Zentralteil, Tush-Psav-Khevsureti, Omalo, im Tal des Pirikita Alazani ca 6 km östlich des Ortes Dartlo], on bark of *Betula*, 2300 m a.s.l., 42° 24'16"N, 45°37'25"E, leg. H.-J. Zündorf 25283, 5 September 2009 (JE, TBI) [Loc. 5]. Tush-Pshav-Khevsureti, deciduous forest in the Tushetis Alazani valley (Gometsari) south-west of Omalo [Großer Kaukasus: Zentralteil, Tush-Psav-Khevsureti, Laubwald im Tal des Tushetis (Gometsaris) Alazani südwestlich Omalo], on bark of *Sorbus*, 1700 m a.s.l., 42°21'40"N, 45°37'19"E, leg. H.-J. Zündorf 26026b, 2 July 2010 (JE, TBI) [Loc. 6].

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from Georgia, from which all the examined specimens originated.

Taxonomic Additions and Changes: *Lewinskya transcaucasica* Eckstein, Garilleti & F.Lara, sp. nov.

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