

# A new species of *Chusquea* (Poaceae: Bambusoideae: Bambuseae) from Southeastern Peru

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**Abstract.** A new species from the southeastern Andes of Peru, *Chusquea echaratensis*, is described and illustrated. A comparative table based on vegetative and reproductive characters is included to distinguish it from *C. barbata*, the morphologically most similar species. Some comments about geographical distribution and habitat of the new taxon are also provided.

## INTRODUCTION

In Peru, Neotropical woody bamboos (subtribes Arthrostylidiinae, Chusqueinae and Guaduinae) are mainly distributed along the central and eastern slopes of the Andes from 0–4000m (Judziewicz & Clark 1993, Tovar 1993, La Torre et al. 2006, Judziewicz et al. 2013, Guerreiro et al. 2019a; 2019b), with some occurring along the western slopes, as in the case for *Chusquea limensis* and *C. scandens* (Tovar 1993, Guerreiro et al. 2019a). The species of the Neotropical woody bamboo clade are mainly found in moist forests and evergreen lowland forests, from the understory to tree-like heights, along river and stream banks of still-vegetated ravines with running water, while the more aggressive species can also take over deforested areas (Judziewicz & Clark 1993, Judziewicz et al. 1999, Guerreiro et al. 2019a). They can even be found in the high altitude grasslands known as “páramos” and “punas”, (Tovar 1993, Judziewicz et al. 1999, Clark 2001).

These bamboos comprise 62 species and 6 genera in Peru (Guerreiro et al. 2019a, Ruiz-Sanchez et al. 2021), with the departments of Pasco and Cusco having the highest number of species (Londoño 2013), placing the country in fourth position in the Americas for woody bamboo diversity, after Brazil, Colombia and Venezuela (Ruiz-Sanchez et al. 2021). However, it is expected that this number will continue to increase with further field work targeting bamboo diversity in the country (Clark 2001, Fadrique et al. 2019, Ruiz-Sanchez et al. 2021). In fact, in the subtribe Chusqueinae, after the checklist by Vorontsova et al. (2016) listed 24 species of *Chusquea* for

Peru, some new species have already been described (Alegría Olivera et al. 2017, Fadrique et al. 2019, Guerreiro et al. 2019a) and several taxonomic novelties have also been reported (Fadrique et al. 2019, Guerreiro et al. 2019b), resulting in the current record of 36 species for Peru, 18 of which are considered endemic.

In the present article, we describe and illustrate a further new species of *Chusquea*, occurring in the Yunga forests of the Andes of southeastern Peru, on the basis of morphological characters. A comparative table for the identification of the species is included as well as some comments about the phytogeographical region and habitat of the new species.

## TAXONOMIC TREATMENT

***Chusquea echaratensis*** N. Reátegui & Alegría, **sp. nov.**  
 TYPE: PERU. Cusco: La Convención, Echarate district, sector Tintiniquiato, 12° 32' 53.6202'' S; 72° 58' 24.8641'' W, 1809m, Sep 2020 (fl), *B. Canal LCI*, (Holotype MOL 2 sheets). Figs. 1 & 2.

**Diagnosis.** *Chusquea echaratensis* is morphologically similar to *C. barbata* L.G. Clark in its triangular central bud, extravaginal branching, capitate, congested synflorescences, and spikelets with minute glumes I and II and setose lemmas, but it is substantially different in having thicker internodes, far fewer subsidiary branches per node, foliage leaf blades nearly twice as long and four to five times as wide, with tessellate vs. non-tessellate venation;

inflorescence bracts hispid-pilose (vs. glabrous), with longer spikelets, and glumes I, II, III and IV having some type of pubescence (vs. glabrous).

**Description.** Culms 1.5–2m tall, erect at the base, arching towards the apex, scandent. Internodes ca. 3.5mm diam., ca. 24–29cm long, terete. Culm leaves unknown. Nodes with a single triangular central bud flanked by 2–3 subsidiary buds; nodal line horizontal; supranodal ridge prominent; nodal region 3–4mm wide, relatively large. Branching extravaginal; branch complement with a central branch subequal to 2–5 subsidiary branches per node, 41–78cm long, usually ascending or geniculate upwards near the base and appressed, sometimes curving downwards, bearing foliage leaves and spikelet clusters. Foliage leaves 5–8 per complement; sheaths 4.5–6.5cm long, striate, scabrid, appearing papillate (from swollen bases of deciduous hairs), densely setose on the upper 1/2–1/3 near the margins and on both margins (ciliate) or only on the overlapping margin, the hairs glassy, stiff, reddish gold, basally swollen, deciduous, becoming longer towards the margin apex, up to 2mm long, summit extensions absent or summit prolonged on the underlapping side up to 1.5mm long, adnate to the inner ligule; outer ligule 1–1.7mm long, ciliolate with deciduous hairs, unlobed to bilobed or irregular with one lobe minute or sometimes reflexed; inner ligule 1.5–2.5mm long, rounded to irregular, abaxially pubescent, apex ciliolate with deciduous hairs; pseudopetiole 2–4mm long, hispidulous; blades 15.2–27.2cm long, 3.1–3.7cm wide, L:W = 4.8–7.5, broadly lanceolate to lanceolate, adaxially and abaxially glabrous, but adaxially scabrous towards the apex and one or two nerves next to the midrib prominent and scabrous for nearly the full length, tessellate on both surfaces, base rounded-attenuate, often asymmetrical, both margins scabrous or one margin smooth, 11–15-nerved, midrib centric or slightly excentric, apex acuminate. Synflorescence bractiferous, capitate, congested, clustered at the nodes, composed of partial inflorescences (coflorescences) consisting of a solitary spikelet terminating a short subsidiary branch subtended by 4–6 small bracts; bracts 2–5.5mm long, ovate to orbicular, hispid-pilose to setose on the upper 1/3–1/4 and sometimes also along the midnerve area and near the margins, acute, mucronate or short-awned with an awn up to 2mm long, 7–13-nerved, lateral nerves mainly straight or the outermost curving gradually toward the apex; pedicels ca. 1mm long, glabrous, ridged. Spikelets 12–16mm long, more or less laterally compressed; glumes I and II minute, pubescent; glume I 0.1–0.2mm long, much less than 1/10 the spikelet length; glume II 0.2–0.3mm long, much less than 1/10 the spikelet length; glumes III and IV ovate to lanceolate, acute or mucronate, puberulent to strigulose or sparsely setose, lateral nerves mainly straight; glume III 5.5–8mm long, ca. 1/2 the spikelet length, 9–12-nerved; glume IV 8.5–

10.7mm long, ca. 2/3 the spikelet length, 9–11-nerved; lemma 11–15mm long, lanceolate, subulate, setose to hispid-pilose on the lower 1/2–3/4 or on the middle 1/3, the setose hairs up to ca. 1mm long, glassy, stiff, reddish gold, 9–13-nerved; palea 9.5–14mm long, bimucronulate, convex on the back, 4–6-nerved, appressed-pubescent to strigulose or sparsely setose along the area between the inner 2–4 nerves; lodicules 3, ciliate, anterior pair 3.2–3.8mm long, posterior one 2.4–2.9mm long; stamens 3, anthers 7–9mm long; gynoecium 8–10mm long.

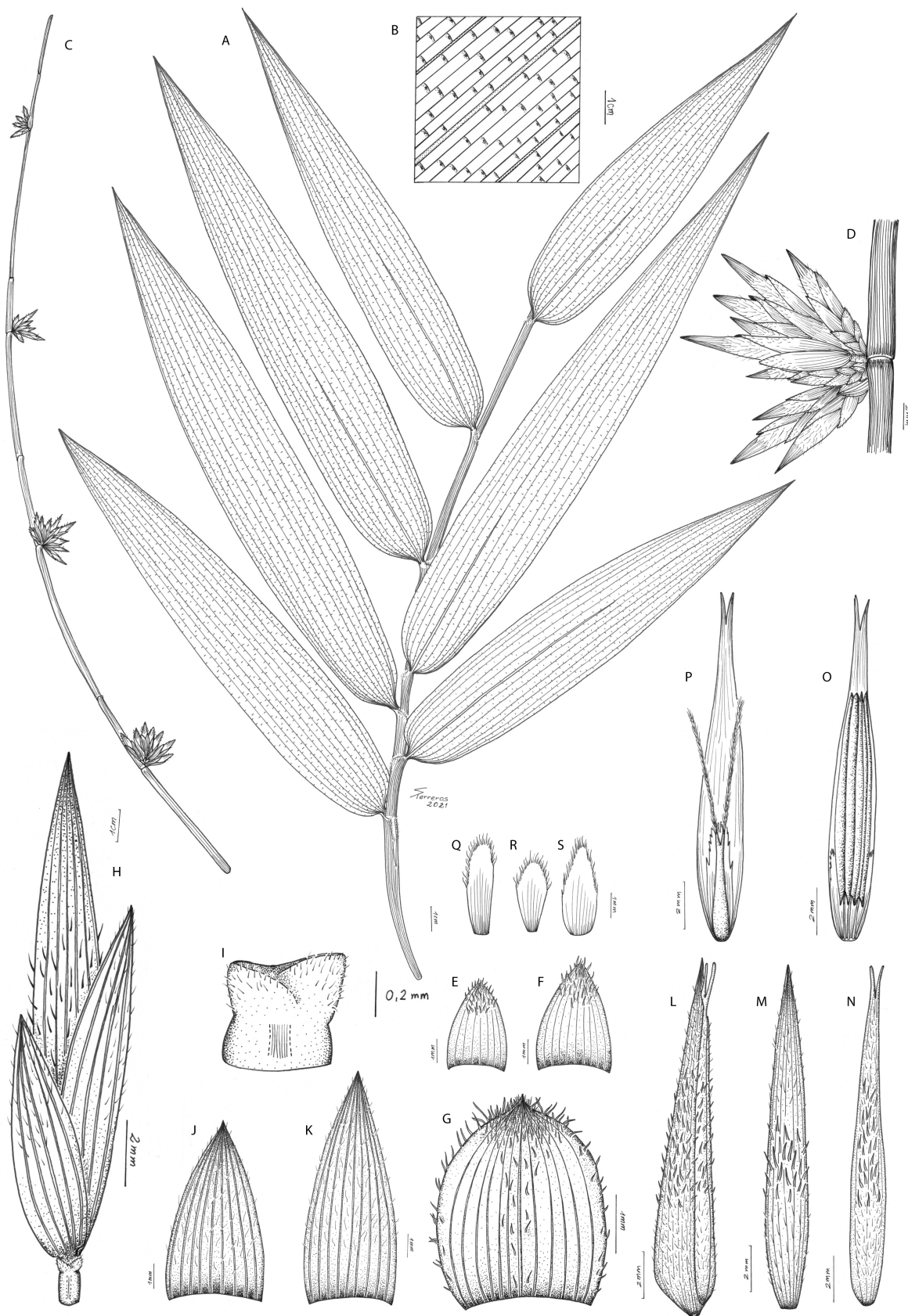
**Etymology.** This species is named after its collection site, Echarate district, in the province of La Convención in Cusco.

**Distribution and habitat.** *Chusquea echaratensis* is an endemic species, only known from one population in the Echarate district, La Convención Province, Cusco, at 1809 m. According to the Ecological Map of Peru (ONERN 1976), the geographical coordinates of the locality correspond to an area covered by Yunga piedmont forests and/or Yunga montane forests. These ecosystems are located in an altitudinal range between 600 and 2500m, with very steep slopes and very high levels of floristic richness. The forests have closed canopies, with three distinguishable strata, and the trees can reach heights of 25–30m. The piedmont forests include species of both the Amazon lowlands as well as the Yungas, being a transitional area of vegetation types, including some “pacales” (bamboo forests). Furthermore, Yunga montane forests are rich in epiphytes, lichens, Bromeliaceae and Orchidaceae.

**Phenology.** The flowering cycle of *Chusquea echaratensis* is unknown given the lack of information about the species. The single known flowering collection was made in September 2020.

**Comments.** *Chusquea echaratensis* is morphologically similar to *C. barbata*, a species only known from Oxapampa, Pasco, Peru (Clark 1993). They share nodes with a triangular central bud; extravaginal branching; capitate, congested synflorescences composed of partial inflorescences (coflorescences) consisting of a solitary spikelet terminating a short subsidiary branch, each spikelet subtended by 4–6 small bracts; spikelets with minute glumes I and II; and setose lemmas with glassy, stiff, reddish gold hairs up to ca. 1mm long.

It is distinguished from *C. barbata* by its thicker internodes (ca. 3.5 vs. ca. 2mm diam.); nodes with fewer subsidiary branches (2–5 vs. 20–25); foliage leaf blades broadly lanceolate to lanceolate, tessellate on both surfaces (vs. linear to linear-lanceolate, not tessellate); longer inflorescence bracts (2–5.5mm long), hispid-pilose to setose (vs. 0.8–3.6mm long, glabrous); longer spikelets (12–16 vs. 9.1–12.1mm long); glumes I and II discrete from each other, pubescent (vs. appearing as one structure,



**Figure 1.** *Chusquea echaratensis*. **A.** Foliage leaf complement. **B.** Detail of tessellation on foliage leaves. **C.** Segment of subsidiary branch showing spikelet clusters. **D.** Detail of one spikelet cluster. **E–G.** Bracts, dorsal views. **H.** Spikelet. **I.** Glumes I and II. **J.** Glume III, dorsal view. **K.** Glume IV, dorsal view. **L.** Floret, lateral view. **M.** Lemma, dorsal view. **N.** Palea, dorsal view. **O.** Palea and androecium. **P.** Palea and gynoecium. **Q–S.** Lodicules.

From *Canal LC1* (MOL). Illustration by S. Terreros.



**Figure 2.** A–B Spikelet cluster showing stamens C. Foliage leaf complement D. Habit and habitat A–D photos by Beto Canal.

Character	<i>C. echaratensis</i>	<i>C. barbata</i>
Internode diameter (mm)	ca. 3.5	ca. 2
Subsidiary branches per node	2–5	20–25
Foliage leaf outer ligule length (mm)	1–1.7	0.7–1
Foliage leaf inner ligule length (mm)	1.5–2.5	1–1.5
Foliage leaf blade length (cm)	15.2–27.2	7.7–11.7
Foliage leaf blade width (cm)	3.1–3.7	0.6–0.9
Foliage leaf blade L:W	4.8–7.5	11.8–13.8
Foliage leaf shape	Broadly lanceolate to lanceolate	Linear to linear-lanceolate
Foliage leaf blade number of primary nerves	11–15	5–7
Foliage leaf blade tessellation	Tessellate on both surfaces	Not tessellate
Synflorescence bract length (mm)	2–5.5	0.8–3.6
Synflorescence bract indumentum	Hispid-pilose or setose on the upper 1/3–1/4	Glabrous
Synflorescence bract number of nerves	7–13	ca. 7
Synflorescence bract lateral nerves curvature	Straight or the outermost nerves curving gradually toward the apex	Curving strongly toward the apex
Spikelet length (mm)	12–16	9.1–12.1
Glumes I and II appearance	Discrete from each other	Appearing as one structure
Glumes I and II indumenta	Pubescent	Glabrous
Glumes III and IV indumenta	Puberulent to strigulous or sparsely setose	Glabrous
Glumes III and IV lateral nerves curvature	Mainly straight	Curving strongly toward the apex
Glume III length (mm)	5.5–8	4.1–5.7
Glume III number of nerves	9–12	7 or 9
Glumes IV length (mm)	8.5–10.7	5.7–8
Glumes IV number of nerves	9–11	7 or 9
Lemma length (mm)	11–15	9.7–11.1
Lemma number of nerves	9–13	7 or 9
Palea length (mm)	9.5–14	8.5–9
Palea back (convexity)	Convex	Weakly 2-keeled
Palea indumentum	Appressed-pubescent to strigulose or sparsely setose along the area between the inner 2–4 nerves	With a few scattered hairs on the sulcus
Lodicules length (mm)	3.2–3.8 (anterior), 2.4–2.9 (posterior)	2.4 (anterior), 1.8 (posterior)
Anthers length (mm)	7–9	3.7–4.4
Geographical distribution (Province, Department)	La Convención, Cusco	Oxapampa, Pasco
Elevation (m)	ca. 1800	400–700

**Table 1.** Comparison of *Chusquea echaratensis* and *C. barbata*.

glabrous); glumes III and IV puberulent to strigulose or sparsely setose (vs. glabrous); longer glumes III (5.5–8 vs. 4.1–5.7mm long) and IV (8.5–10.7 vs. 5.7–8mm long) as well as longer lemmas (11–15 vs. 9.7–11.1mm long) and paleas (9.5–14 vs. 8.5–9mm long), the latter convex on the back (vs. weakly 2-keeled); and longer anthers (7–9 vs. 3.7–4.4mm long). In addition, *C. echaratensis* is found at a higher elevation (ca. 1800 vs. 400–700m). A complete comparison is given in Table 1.

*Chusquea echaratensis* is classified within *Chusquea* subg. *Chusquea* based on its scandent habit, internodes 24–29cm long, nodes with a triangular central bud and 2–3 subsidiary buds, extravaginal branching, foliage leaf blades 15.2–27.2 × 3.1–3.7cm, pseudopetiole present as a distinct constriction, and lemmas with free margins at the apex (Fisher et al. 2009; 2014). The extravaginal branching pattern and reduced, subequal glumes I and II are typical characteristics found in the species placed in sect. *Chusquea*, but its few (2–3) subsidiary buds per node exclude it from that section. Similarly, the few subsidiary

buds per node is a diagnostic feature of sect. *Serpentes*, but the members of that section have infravaginal branching and developed (> 1/10 the spikelet length), unequal glumes I and II (Fisher et al. 2014, Attigala et al. 2017). Due to its morphological similarity to *C. barbata*, we tentatively place *C. echaratensis* in the same placement given to the similar species by Fisher et al. (2009) as Incertae Sedis within *Chusquea* subg. *Chusquea*.

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