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**NEW COMBINATIONS AND NEW NAMES IN AMERICAN
CINNAGROSTIS, PEYRITSCHIA, AND DESCHAMPSIA,
AND THREE NEW GENERA:
GRENEOCHLOA, LAEGAARDIA AND PARAMOCHLOA (POEAE, POACEAE)**

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ABSTRACT

Based on morphological and molecular evidence we present new combinations or new names for 77 taxa of *Cinnagrostis*, seven taxa of *Deschampsia*, and 24 taxa of *Peyritschia*; and describe three new genera, **Greeneochloa** P.M. Peterson, Soreng, Romasch. & Barberá, **gen. nov.** (subtribe Echinopogoninae), **Paramochloa** P.M. Peterson, Soreng, Romasch. & Barberá, **gen. nov.** (subtribe Calothecinae), and **Laegaardia** P.M. Peterson, Soreng, Romasch. & Barberá, **gen. nov.** (subtribe Calothecinae) with two, two and one species, respectively. In addition to the 116 new taxonomic entities, we provide a key to the genera of American grasses presently or formerly treated in *Calamagrostis* or *Deyeuxia* and generic emendations for *Cinnagrostis* and *Peyritschia*.

RESUMEN

De acuerdo con evidencias de carácter morfológico y molecular se presentan nuevas combinaciones o nuevos nombres para 77 táxones de *Cinnagrostis*, siete táxones de *Deschampsia* y 24 táxones de *Peyritschia*, así como la descripción de tres nuevos géneros, **Greeneochloa** P.M. Peterson, Soreng, Romasch. & Barberá, **gen. nov.** (subtribu Echinopogoninae), **Paramochloa** P.M. Peterson, Soreng, Romasch. & Barberá, **gen. nov.** (subtribu Calothecinae) y **Laegaardia** P.M. Peterson, Soreng, Romasch. & Barberá, **gen. nov.** (subtribu Calothecinae) con dos, dos y una especie respectivamente. Además de las 116 nuevas entidades taxonómicas, proporcionamos una clave para los géneros de gramíneas americanas tratadas actual o anteriormente en *Calamagrostis* o *Deyeuxia* y enmendamos los géneros *Cinnagrostis* y *Peyritschia*.

In a large unpublished molecular DNA sequence study using four gene regions (ITS, *rpl32-trnL* spacer, *rps16-trnK* spacer, and *rps16* intron) we found most South American species of *Deyeuxia* Clarion ex P. Beauv. and *Calamagrostis* Adans., to align in a large clade excluding the type species of each of these genera (Peterson et al., in prep.). These results were largely corroborated by Saarela et al, (2010, 2017) in the study of Poeae R. Br. chloroplast group I where genera were split into Koeleriinae Asch. & Graebn. clade A (e.g. *Koeleria* Pers. and others) and Koeleriinae clade B (*Cinnagrostis* Griseb., *Peyritschia* E. Fourn., and others). We, therefore are resurrecting *Cinnagrostis* (Grisebach, 1874), a little known genus described from a single dichogamous species, *C. polygama*

Griseb., for the taxa in this South American clade. Sister to *Cinnagrostis* are Mexican and Central American species of *Trisetum* Pers., *Calamagrostis*, and *Peyritschia* that form the *Peyritschia* clade (Romaschenko et al. in prep.). Recent molecular phylogenetic studies confirmed that *Trisetum* s.l. is polyphyletic and now contains only two or three species (Soreng & Davis 2000; Quintanar et al. 2007; Saarela et al. 2017; Barberá et al. 2019). Finot et al. (2006) treated *Peyritschia* s.s. as having seven species but we are expanding it here to include 32 species. In our same unpublished molecular DNA study we found two species (*Greeneochloa* P.M. Peterson, Soreng, Romasch. & Barberá, **gen. nov.**) of *Calamagrostis* from North America in a clade within the Echinopogoninae Soreng, and three species of *Calamagrostis/Deyeuxia* from South America in a clade within the Calothecinae Soreng that we treat here in *Laegaardia* P.M. Peterson, Soreng, Romasch. & Barberá, **gen. nov.** and *Paramochloa* P.M. Peterson, Soreng, Romasch. & Barberá, **gen. nov.** We also have molecular support to place four species and two varieties in *Deschampsia* P. Beauv. following the criteria used by Saarela et al. (2017).

The United States National Herbarium (US) in the Department of Botany, National Museum of Natural History, Smithsonian Institution, is in the process of rearranging the grass collection in a phylogenetic sequence following Soreng et al. (2017). To accommodate each grass genus in the family we have generated 781 G-numbers in our location poster called Systema Graminum (DOI:10.13140/RG.2.2.26027.34084). For using the US collection (or anyone else using our linear phylogenetic sequence) one must first look up the genus number and then proceed to the appropriate cabinet housing the specimens. G-numbers for the genera treated in this paper are: *Cinnagrostis* (210), *Deschampsia* (261), *Greeneochloa* (231B), *Laegaardia* (234E), *Paramochloa* (234C), and *Peyritschia* (216).

Based on our unpublished molecular DNA sequence phylogeny, and review of morphological characters on specimens and documented in primary protologues and secondary, we present new combinations or new names for 77 taxa of *Cinnagrostis*, seven taxa of *Deschampsia*, and 24 taxa of *Peyritschia*; and describe three new genera, *Greeneochloa*, *Paramochloa*, and *Laegaardia* with two, two and one species, respectively. In addition to the 116 new taxonomic entities, we provide a key to the genera of American grasses presently or formerly treated in *Calamagrostis* or *Deyeuxia*, and generic emendations for *Cinnagrostis* and *Peyritschia*. An asterisk (*) following the combination or name indicates we lack molecular evidence but based on morphology we feel confident in its placement.

TAXONOMY

CINNAGROSTIS Griseb., Abh. Königl. Ges. Wiss. Göttingen 19: 256–257, t. 2, f. 7. 1874, **gen. emend.**

TYPE: *Cinnagrostis polygama* Griseb. [≡ *Calamagrostis polygama* (Griseb.) Parodi ≡ *Deyeuxia polygama* (Griseb.) Parodi].

Description—Cespitose or rhizomatous perennials, a few stoloniferous. Culms 1–180 cm tall, generally erect, simple or branched; nodes glabrous or hairy. Leaf sheaths longer or shorter than the internodes, open, smooth or scabrous, glabrous or hairy; ligules usually ≤ 4.5 mm long [infrequently the longest 5 to 10(–15 mm)], membranous, apex truncate, rarely acuminate, usually scabrous or variously pubescent; leaf blades linear, straight or recurved, flat, convolute or conduplicate. Panicles terminal, lax or contracted, spiciform or subspiciform to globose, greenish, straw-colored, silver or gold. Spikelets 1–12 mm long, 1-flowered, laterally compressed, lanceolate to occasionally ovate; rachilla prologation usually hairy; disarticulation above the glumes; glumes 2, lanceolate, glabrous or scabrous, apex acute or acuminate, both exceeding the floret body; lower glumes 1-veined; upper glumes 1–3-veined, glabrous or scabrous along the median vein; lemmas membranous, glabrous or scabrous, usually smooth, 5-veined, apex acute, bifid, dentate or aristidate, usually awned dorsally from upper, middle or lower third, rarely mucronate; paleas usually slightly shorter than the lemma to as long, membranous, sometimes hyaline, 2-veined, 2-keeled; callus rounded, recurved or acute, hairy, rarely glabrous, the hairs shorter, as long or longer than the floret; stamens 3; ovary usually glabrous,

styles 2, stigmas feathery; lodicules 2, membranous, generally with 2 unequal lobes, glabrous or sometimes ciliate. Caryopses usually fusiform to oblong, sometimes laterally compressed, pericarp adherent, endosperm dry, pasty, or liquid. Basic chromosome number $x = 7$.

Distribution—Species of *Cinnagrostis* range throughout South America and extend to Central America, *C. rigescens* (J. Presl) P.M. Peterson, Soreng, Romasch. & Barberá reaching North America in Veracruz, Mexico (Tovar 1993; Rúgolo de Agrasar & Villavicencio 1998; Rúgolo de Agrasar 2006, 2012).

Comments—In a molecular phylogeny based on four gene regions (ITS, *rpl32-trnL* spacer, *rps16-trnK* spacer, and *rps16* intron) [henceforth referred to as Romaschenko et al. (in prep.)] the South American species of *Calamagrostis* and *Deyeuxia* form a clade sister to the Mexican and Central American species of *Trisetum*, *Calamagrostis*, and *Peyritschia* (most transferred below to *Peyritschia*), within the Koeleriinae clade B of the Aveninae J. Presl. Within the *Cinnagrostis* clade are two subclades, one containing species formerly placed in *Calamagrostis* sect. *Chamaecalamus* Pilg. [more recently placed in *Deyeuxia* sect. *Chamaecalamus* (Pilg.) Rúgolo & Villav.], which is sister to the remaining species in the genus (Pilger 1938; Rúgolo de Agrasar & Villavicencio 1995).

Cinnagrostis alba (J. Presl) P.M. Peterson, Soreng, Romasch. & Barberá, **comb. nov.*** Basionym: *Deyeuxia alba* J. Presl, Reliq. Haenk. 1 (4–5): 248. 1830.

Cinnagrostis alba var. **breviaristata** (Rúgolo) P.M. Peterson, Soreng, Romasch. & Barberá, **comb. nov.*** Basionym: *Deyeuxia alba* subsp. *breviaristata* Rúgolo, Darwiniana 44 (1): 146–147, f. 4C–D. 2006.

Cinnagrostis alba var. **tricholemma** (Roseng., B.R. Arrill. & Izag.) P.M. Peterson, Soreng, Romasch. & Barberá, **comb. nov.*** Basionym: *Calamagrostis alba* subsp. *tricholemma* Roseng., B.R. Arrill. & Izag., Gram. Urug. 27, f. 4. 1970.

Cinnagrostis boliviensis (Hack.) P.M. Peterson, Soreng, Romasch. & Barberá, **comb. nov.** Basionym: *Calamagrostis boliviensis* Hack., Repert. Spec. Nov. Regni Veg. 6: 156. 1908.

Cinnagrostis breviaristata (Wedd.) P.M. Peterson, Soreng, Romasch. & Barberá, **comb. nov.** Basionym: *Deyeuxia breviaristata* Wedd., Bull. Soc. Bot. France 22: 177, 179. 1875.

Cinnagrostis brevifolia (J. Presl) P.M. Peterson, Soreng, Romasch. & Barberá, **comb. nov.** Basionym: *Deyeuxia brevifolia* J. Presl, Reliq. Haenk. 1 (4–5): 248. 1830.

Cinnagrostis brevifolia var. **expansa** (Rúgolo & Villav.) P.M. Peterson, Soreng, Romasch. & Barberá, **comb. nov.** Basionym: *Deyeuxia brevifolia* var. *expansa* Rúgolo & Villav., Bol. Soc. Argent. Bot. 31 (1–2): 125. 1995.

Cinnagrostis cabreræ (Parodi) P.M. Peterson, Soreng, Romasch. & Barberá, **comb. nov.** Basionym: *Calamagrostis cabreræ* Parodi, Revista Argent. Agron. 15 (1): 59, f. 3. 1948.

Cinnagrostis cabreræ var. **aristulata** (Rúgolo & Villav.) P.M. Peterson, Soreng, Romasch. & Barberá, **comb. nov.** Basionym: *Deyeuxia cabreræ* var. *aristulata* Rúgolo & Villav., Bol. Soc. Argent. Bot. 31 (1–2): 126, f. 1. 1995.

Cinnagrostis cabreræ var. **maxima** (Rúgolo) P.M. Peterson, Soreng, Romasch. & Barberá, **comb. nov.** Basionym: *Deyeuxia cabreræ* var. *maxima* Rúgolo, Parodiana 4 (1): 106, f. 3a–e. 1986.

- Cinnagrostis cabreræ** var. **trichopoda** (Parodi ex Rúgolo) P.M. Peterson, Soreng, Romasch. & Barberá, **comb. nov.** Basionym: *Deyeuxia cabreræ* var. *trichopoda* Parodi ex Rúgolo, *Parodiana* 4 (1): 107, f. 3f–k. 1986.
- Cinnagrostis calderillensis** (Pilg.) P.M. Peterson, Soreng, Romasch. & Barberá, **comb. nov.** Basionym: *Calamagrostis calderillensis* Pilg., *Bot. Jahrb. Syst.* 42 (1): 72. 1908.
- Cinnagrostis chrysophylla** (Phil.) P.M. Peterson, Soreng, Romasch. & Barberá, **comb. nov.** Basionym: *Deyeuxia chrysophylla* Phil., *Verz. Antofagasta Pfl.* 83. 1891.
- Cinnagrostis ciliata** (Rúgolo & Villav.) P.M. Peterson, Soreng, Romasch. & Barberá, **comb. nov.** Basionym: *Deyeuxia ciliata* Rúgolo & Villav., *Bol. Soc. Argent. Bot.* 31 (1–2): 126, f. 2. 1995 (≡ *Calamagrostis cordechii* Govaerts).
- Cinnagrostis ciliata** var. **glabrescens** (Rúgolo & Villav.) P.M. Peterson, Soreng, Romasch. & Barberá, **comb. nov.** Basionym: *Deyeuxia ciliata* var. *glabrescens* Rúgolo & Villav., *Bol. Soc. Argent. Bot.* 31 (1–2): 128, f. 3. 1995.
- Cinnagrostis coarctata** (Kunth) P.M. Peterson, Soreng, Romasch. & Barberá, **comb. nov.** Basionym: *Deyeuxia coarctata* Kunth, *Nov. Gen. Sp.* (quarto ed.) 1: 143. 1815 (1816) (≡ *Calamagrostis fibrovaginata* Lægaard, non *Calamagrostis coarctata* Eaton).
- Cinnagrostis crispa** (Rúgolo & Villav.) P.M. Peterson, Soreng, Romasch. & Barberá, **comb. nov.** Basionym: *Deyeuxia crispa* Rúgolo & Villav., *Bol. Soc. Argent. Bot.* 31 (1–2): 128, f. 4. 1995.
- Cinnagrostis cryptolopha** (Wedd.) P.M. Peterson, Soreng, Romasch. & Barberá, **comb. nov.** Basionym: *Calamagrostis cryptolopha* Wedd., *Bull. Soc. Bot. France* 22: 176, err. typ. 156, 179. 1875.
- Cinnagrostis curta** (Wedd.) P.M. Peterson, Soreng, Romasch. & Barberá, **comb. nov.*** Basionym: *Deyeuxia curta* Wedd., *Bull. Soc. Bot. France* 22: 156 (176), 179. 1875.
- Cinnagrostis curvula** (Wedd.) P.M. Peterson, Soreng, Romasch. & Barberá, **comb. nov.** Basionym: *Deyeuxia curvula* Wedd., *Bull. Soc. Bot. France* 22: 178, 179. 1875.
- Cinnagrostis cuzcoensis** (Tovar) P.M. Peterson, Soreng, Romasch. & Barberá, **comb. nov.*** Basionym: *Calamagrostis cuzcoensis* Tovar, *Publ. Mus. Hist. Nat. Javier Prado, Ser. B, Bot.* 33: 11. 1985.
- Cinnagrostis densiflora** (J. Presl) P.M. Peterson, Soreng, Romasch. & Barberá, **comb. nov.** Basionym: *Deyeuxia densiflora* J. Presl, *Reliq. Haenk.* 1 (4–5): 247. 1830.
- Cinnagrostis deserticola** (Phil.) P.M. Peterson, Soreng, Romasch. & Barberá, **comb. nov.** Basionym: *Deyeuxia deserticola* Phil., *Fl. Atacam.* 55. 1860.
- Cinnagrostis deserticola** var. **breviaristata** (Rúgolo & Villav.) P.M. Peterson, Soreng, Romasch. & Barberá, **comb. nov.** Basionym: *Deyeuxia deserticola* var. *breviaristata* Rúgolo & Villav., *Bol. Soc. Argent. Bot.* 31 (1–2): 134, f. 6. 1995.

- Cinnagrostis divergens** (Swallen) P.M. Peterson, Soreng, Romasch. & Barberá, **comb. nov.***
Basionym: *Calamagrostis divergens* Swallen, Contr. U.S. Natl. Herb. 29 (6): 262–263. 1948 (1949).
- Cinnagrostis fiebrigii** (Pilg.) P.M. Peterson, Soreng, Romasch. & Barberá, **comb. nov.** Basionym:
Calamagrostis fiebrigii Pilg., Bot. Jahrb. Syst. 42 (1): 68. 1908.
- Cinnagrostis filifolia** (Wedd.) P.M. Peterson, Soreng, Romasch. & Barberá, **comb. nov.** Basionym:
Deyeuxia filifolia Wedd., Bull. Soc. Bot. France 22: 178, 179. 1875 [= *Calamagrostis amoena* (Pilg.) Pilg.].
- Cinnagrostis filifolia** var. **festucoides** (Wedd.) P.M. Peterson, Soreng, Romasch. & Barberá, **comb. nov.** Basionym: *Deyeuxia festucoides* Wedd., Bull. Soc. Bot. France 22: 178, 179. 1875 [= *Calamagrostis amoena* var. *festucoides* (Wedd.) Soreng].
- Cinnagrostis fuscata** (J. Presl) P.M. Peterson, Soreng, Romasch. & Barberá, **comb. nov.** Basionym:
Deyeuxia fuscata J. Presl, Reliq. Haenk. 1 (4–5): 249. 1830.
- Cinnagrostis glacialis** (Wedd.) P.M. Peterson, Soreng, Romasch. & Barberá, **comb. nov.** Basionym:
Deyeuxia glacialis Wedd., Bull. Soc. Bot. France 22: 178–179. 1875.
- Cinnagrostis heterophylla** (Wedd.) P.M. Peterson, Soreng, Romasch. & Barberá, **comb. nov.**
Basionym: *Deyeuxia heterophylla* Wedd., Bull. Soc. Bot. France 22: 177, 180. 1875 (= *Calamagrostis swallenii* Tovar).
- Cinnagrostis hieronymi** (Hack.) P.M. Peterson, Soreng, Romasch. & Barberá, **comb. nov.** Basionym:
Calamagrostis hieronymi Hack., Oesterr. Bot. Z. 52 (3): 109. 1902.
- Cinnagrostis hirsuta** (Rúgolo & Villav.) P.M. Peterson, Soreng, Romasch. & Barberá, **comb. nov.**
Basionym: *Deyeuxia hirsuta* Rúgolo & Villav., Bol. Soc. Argent. Bot. 31 (1–2): 136, f. 7. 1995
(≡ *Calamagrostis menhoferi* Govaerts).
- Cinnagrostis hirta** (Sodirol) P.M. Peterson, Soreng, Romasch. & Barberá, **comb. nov.*** Basionym:
Deyeuxia hirta Sodirol, Revista Colegio Nac. Vicente Rocafuerte 12: 64, 75. 1930.
- Cinnagrostis intermedia** (J. Presl) P.M. Peterson, Soreng, Romasch. & Barberá, **comb. nov.**
Basionym: *Deyeuxia intermedia* J. Presl, Reliq. Haenk. 1 (4–5): 249. 1830.
- Cinnagrostis involuta** (Swallen) P.M. Peterson, Soreng, Romasch. & Barberá, **comb. nov.***
Basionym: *Calamagrostis involuta* Swallen, Contr. U.S. Natl. Herb. 29 (6): 259. 1948 (1949).
- Cinnagrostis jamesonii** (Steud.) P.M. Peterson, Soreng, Romasch. & Barberá, **comb. nov.** Basionym:
Calamagrostis jamesonii Steud., Syn. Pl. Glumac. 1: 191. 1855 (1854).
- Cinnagrostis lagurus** (Wedd.) P.M. Peterson, Soreng, Romasch. & Barberá, **comb. nov.*** Basionym:
Deyeuxia lagurus Wedd., Bull. Soc. Bot. France 22: 156 (176). 1875 (≡ *Calamagrostis cephalantha* Pilg.).
- Cinnagrostis leiophylla** (Wedd.) P.M. Peterson, Soreng, Romasch. & Barberá, **comb. nov.***
Basionym: *Deyeuxia leiophylla* Wedd., Bull. Soc. Bot. France 22: 177, 180. 1875.

- Cinnagrostis macrophylla** (Pilg.) P.M. Peterson, Soreng, Romasch. & Barberá, **comb. nov.**
Basionym: *Deyeuxia macrophylla* Pilg., Bot. Jahrb. Syst. 25 (5): 711–712. 1898.
- Cinnagrostis macrostachya** (Sodiolo) P.M. Peterson, Soreng, Romasch. & Barberá, **comb. nov.***
Basionym: *Deyeuxia macrostachyum* Sodiolo, Revista Colegio Nac. Vicente Rocafuerte 12: 64, 74. 1930.
- Cinnagrostis malamalensis** (Hack.) P.M. Peterson, Soreng, Romasch. & Barberá, **comb. nov.**
Basionym: *Calamagrostis malamalensis* Hack., Anales Mus. Nac. Buenos Aires 13: 478. 1906.
- Cinnagrostis mandoniana** (Wedd.) P.M. Peterson, Soreng, Romasch. & Barberá, **comb. nov.**
Basionym: *Deyeuxia mandoniana* Wedd., Bull. Soc. Bot. France 22: 179, 180. 1875.
- Cinnagrostis micrathera** (E. Desv.) P.M. Peterson, Soreng, Romasch. & Barberá, **comb. nov.**
Basionym: *Trisetum micratherum* E. Desv., Fl. Chil. 6: 352. 1854 (≡ *Leptophyllochloa micrathera* (E. Desv.) C.E. Calderón).
- Cinnagrostis minima** (Pilg.) P.M. Peterson, Soreng, Romasch. & Barberá, **comb. nov.** Basionym:
Calamagrostis vicinarum var. *minima* Pilg., Pilg. Bot. Jahrb. Syst. 42: 63. 1908.
- Cinnagrostis mollis** (Pilg.) P.M. Peterson, Soreng, Romasch. & Barberá, **comb. nov.*** Basionym:
Calamagrostis mollis Pilg., Bot. Jahrb. Syst. 42 (1): 61. 1908.
- Cinnagrostis mulleri** (Lucas) P.M. Peterson, Soreng, Romasch. & Barberá, **comb. nov.*** Basionym:
Calamagrostis mulleri Lucas, Bol. Soc. Venez. Ci. Nat. 15 (80): 9–11, f. 5. 1953.
- Cinnagrostis nitidula** (Pilg.) P.M. Peterson, Soreng, Romasch. & Barberá, **comb. nov.** Basionym:
Calamagrostis nitidula Pilg., Bot. Jahrb. Syst. 42 (1): 69. 1908.
- Cinnagrostis orbignyana** (Wedd.) P.M. Peterson, Soreng, Romasch. & Barberá, **comb. nov.**
Basionym: *Deyeuxia orbignyana* Wedd., Bull. Soc. Bot. France 22: 178, 180. 1875.
- Cinnagrostis patagonica** (Speg.) P.M. Peterson, Soreng, Romasch. & Barberá, **comb. nov.***
Basionym: *Deyeuxia patagonica* Speg., Anales Mus. Nac. Hist. Nat. Buenos Aires 7: 191. 1902.
- Cinnagrostis polygama* Griseb., Abh. Königl. Ges. Wiss. Göttingen 19: 257, t.2, f. 7. 1874. **Figure 1A–G.**
- Cinnagrostis polygama** var. **filifolia** (Rúgolo & Villav.) P.M. Peterson, Soreng, Romasch. & Barberá, **comb. nov.** Basionym: *Deyeuxia polygama* var. *filifolia* Rúgolo & Villav., Bol. Soc. Argent. Bot. 31(1–2): 139, f. 8. 1995.
- Cinnagrostis preslii** (Kunth) P.M. Peterson, Soreng, Romasch. & Barberá, **comb. nov.** Basionym:
Agrostis preslii Kunth, Enum. Pl. 1: 225. 1833 (≡ *Agrostis caespitosa* J. Presl, nom. illeg. hom. non. (L.) Salisb. ≡ *Deyeuxia nana* Rúgolo).
- Cinnagrostis rauhii** (Tovar) P.M. Peterson, Soreng, Romasch. & Barberá, **comb. nov.** Basionym:
Calamagrostis rauhii Tovar, Mem. Mus. Hist. Nat. "Javier Prado" 11: 78. 1960.

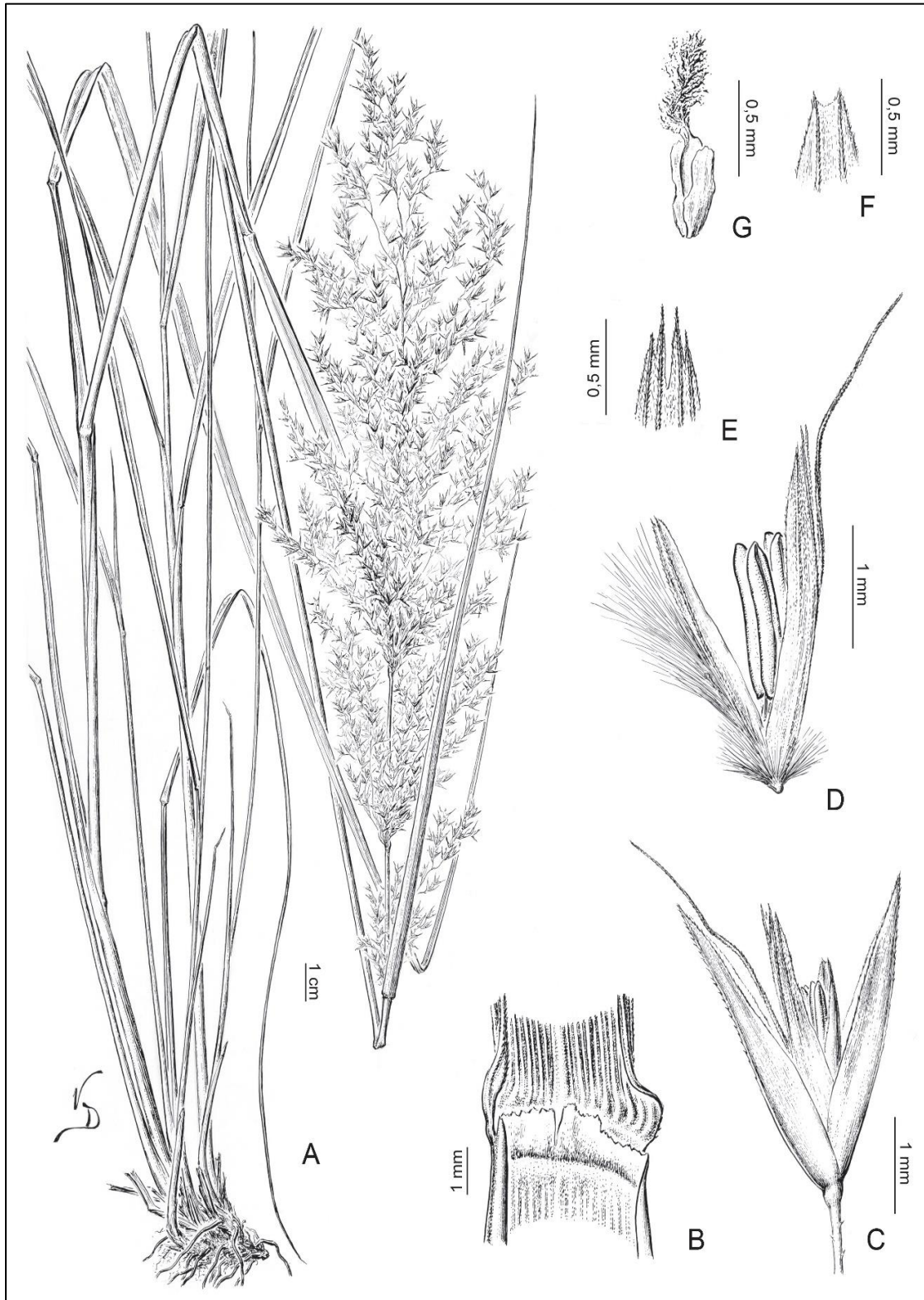


Figure 1. Illustration of *Cinnagrostis polygama* from Argentina; drawn by Victor Dudas. A. Habit. B. Ligule. C. Spikelet. D. Floret. E. Lemma apex. F. Palea apex. G. Pistil and lodicules.

- Cinnagrostis recta** (Kunth) P.M. Peterson, Soreng, Romasch. & Barberá, **comb. nov.** Basionym: *Deyeuxia recta* Kunth, Nov. Gen. Sp. (quarto ed.) 1: 144–145. 1815 (1816).
- Cinnagrostis reitzii** (Swallen) P.M. Peterson, Soreng, Romasch. & Barberá, **comb. nov.*** Basionym: *Calamagrostis reitzii* Swallen, Sellowia 7: 11. 1956.
- Cinnagrostis rigescens** (J. Presl) P.M. Peterson, Soreng, Romasch. & Barberá, **comb. nov.** Basionym: *Agrostis rigescens* J. Presl, Reliq. Haenk. 1 (4–5): 237. 1830.
- Cinnagrostis rigida** (Kunth) P.M. Peterson, Soreng, Romasch. & Barberá, **comb. nov.** Basionym: *Deyeuxia rigida* Kunth, Nov. Gen. Sp. (quarto ed.) 1: 144. 1815 (1816).
- Cinnagrostis rosea** (Griseb.) P.M. Peterson, Soreng, Romasch. & Barberá, **comb. nov.** Basionym: *Agrostis rosea* Griseb., Abh. Königl. Ges. Wiss. Göttingen 19: 253–254. 1874.
- Cinnagrostis rupestris** (Trin.) P.M. Peterson, Soreng, Romasch. & Barberá, **comb. nov.** Basionym: *Calamagrostis rupestris* Trin., Gram. Panic. 28. 1826.
- Cinnagrostis scaberula** (Swallen) P.M. Peterson, Soreng, Romasch. & Barberá, **comb. nov.** Basionym: *Calamagrostis scaberula* Swallen, Contr. U.S. Natl. Herb. 29 (6): 261. 1948 (1949).
- Cinnagrostis sclerantha** (Hack.) P.M. Peterson, Soreng, Romasch. & Barberá, **comb. nov.*** Basionym: *Calamagrostis sclerantha* Hack., Oesterr. Bot. Z. 52 (3): 108. 1902.
- Cinnagrostis setiflora** (Wedd.) P.M. Peterson, Soreng, Romasch. & Barberá, **comb. nov.** Basionym: *Deyeuxia setiflora* Wedd., Bull. Soc. Bot. France 22: 176, 180. 1875.
- Cinnagrostis spicigera** (J. Presl) P.M. Peterson, Soreng, Romasch. & Barberá, **comb. nov.** Basionym: *Deyeuxia spicigera* J. Presl, Reliq. Haenk. 1 (4–5): 247. 1830.
- Cinnagrostis spicigera** var. **cephalotes** (Wedd.) P.M. Peterson, Soreng, Romasch. & Barberá, **comb. nov.** Basionym: *Deyeuxia cephalotes* Wedd., Bull. Soc. Bot. France 22: 178, 179. 1875.
- Cinnagrostis steyermarkii** (Swallen) P.M. Peterson, Soreng, Romasch. & Barberá, **comb. nov.*** Basionym: *Calamagrostis steyermarkii* Swallen, Contr. U.S. Natl. Herb. 29 (6): 258–259. 1948 (1949).
- Cinnagrostis tarmensis** (Pilg.) P.M. Peterson, Soreng, Romasch. & Barberá, **comb. nov.** Basionym: *Calamagrostis tarmensis* Pilg., Bot. Jahrb. Syst. 42 (1): 70. 1908.
- Cinnagrostis tarmensis** var. **macrochaeta** (Hack. ex R.E. Fr.) P.M. Peterson, Soreng, Romasch. & Barberá, **comb. nov.** Basionym: *Calamagrostis rosea* var. *macrochaeta* Hack. ex R.E. Fr., Ark. Bot. 8 (8): 40. 1908 (1909).
- Cinnagrostis trichodonta** (Wedd.) P.M. Peterson, Soreng, Romasch. & Barberá, **comb. nov.** Basionym: *Deyeuxia trichodonta* Wedd., Bull. Soc. Bot. France 22: 156 (176), 180. 1875.
- Cinnagrostis trichodonta** var. **hirsuta** (Rúgolo) P.M. Peterson, Soreng, Romasch. & Barberá, **comb. nov.** Basionym: *Deyeuxia trichodonta* var. *hirsuta* Rúgolo, Darwiniana 44(1): 254, f. 47. 2006.

Cinnagrostis velutina (Nees & Meyen) P.M. Peterson, Soreng, Romasch. & Barberá, **comb. nov.**
Basionym: *Deyeuxia velutina* Nees & Meyen, Gramineae 15–16. 1841.

Cinnagrostis velutina var. **nardifolia** (Griseb.) P.M. Peterson, Soreng, Romasch. & Barberá, **comb. nov.**
Basionym: *Agrostis nardifolia* Griseb., Abh. Königl. Ges. Wiss. Göttingen 19: 252–253. 1874.

Cinnagrostis vicunarum (Wedd.) P.M. Peterson, Soreng, Romasch. & Barberá, **comb. nov.**
Basionym: *Deyeuxia vicunarum* Wedd., Bull. Soc. Bot. France 22: 177, 180. 1875.

Cinnagrostis violacea (Wedd.) P.M. Peterson, Soreng, Romasch. & Barberá, **comb. nov.** Basionym:
Deyeuxia violacea Wedd., Bull. Soc. Bot. France 22: 179, 180. 1875.

Cinnagrostis violacea var. **puberula** (Rúgolo & Villav.) P.M. Peterson, Soreng, Romasch. & Barberá, **comb. nov.**
Basionym: *Deyeuxia violacea* var. *puberula* Rúgolo & Villav., Bol. Soc. Argent. Bot. 31 (1–2): 139. 1995.

Cinnagrostis viridiflavescens (Poir.) P.M. Peterson, Soreng, Romasch. & Barberá, **comb. nov.**
Basionym: *Arundo viridiflavescens* Poir., Encycl. 6: 271. 1804.

Cinnagrostis viridiflavescens var. **montevidensis** (Nees) P.M. Peterson, Soreng, Romasch. & Barberá, **comb. nov.**
Basionym: *Calamagrostis montevidensis* Nees, Fl. Bras. Enum. Pl. 2 (1): 401. 1829.

Cinnagrostis viridis (Phil.) P.M. Peterson, Soreng, Romasch. & Barberá, **comb. nov.** Basionym:
Deyeuxia viridis Phil., Linnaea 33 (3–4): 288. 1865.

DESCHAMPSIA P.Beauv., Ess. Agrostogr. 91, pl. 18, f. 3. 1812. TYPE: *Deschampsia cespitosa* (L.) P. Beauv. [≡ *Aira cespitosa* L. ≡ *Agrostis caespitosa* (L.) Salisb. ≡ *Avena caespitosa* (L.) Kuntze ≡ *Campella caespitosa* (L.) Link ≡ *Podionapus caespitosus* (L.) Dulac].

Comments—We report 12 western hemisphere taxa usually treated in *Calamagrostis*, *Deyeuxia*, or *Scribneria* Hack., transferred into *Deschampsia* by Saarela et al. (2017), along with new combinations, all except three supported by our molecular phylogeny (Romaschenko et al. in prep). Two morphologically similar taxa published by Sylvester (2019) have not yet been tested. We choose not to emend the generic description at this time but note all these species of *Deschampsia* (subtribe Aristaveninae F. Albers & Butzin) generally have 1(–2)-flowered spikelets, stipitate basal florets [the rachilla below the floret is slightly elongated raising it above the glumes as in *Stylagrostis* Mez], long membranous ligules (usually 6–20 mm long), smooth or nearly so, glabrous, often with flanking auriculate lobes and decurrent along the sheath margins, shiny and lustrous glumes (Escalona 1988; Saarela et al. 2017), and caryopses with solid endosperm.

Deschampsia ampliflora (Tovar) Romasch., P.M. Peterson, Soreng & Barberá, **comb. nov.***
Basionym: *Calamagrostis ampliflora* Tovar, Mem. Mus. Hist. Nat. Javier Prado 11: 16. 1960.

Deschampsia aurea (Munro ex Wedd.) Saarela, PhytoKeys 87: 87. 2017. Basionym: *Deyeuxia aurea* Munro ex Wedd., Bull. Soc. Bot. France 22: 176 (156), 179. 1875 (1876).

Deschampsia bolanderi (Thurb.) Saarela, PhytoKeys 87: 90. 2017. Basionym: *Lepturus bolanderi* Thurb., Proc. Amer. Acad. Arts 7: 401. 1868. [≡ *Scribneria bolanderi* (Thurb.) Hack.].

Deschampsia boyacensis (Swallen & García-Barr) Romasch., P.M. Peterson, Soreng & Barberá, **comb. nov.*** Basionym: *Calamagrostis boyacensis* Swallen & García-Barr, *Caldasia* 2(8): 302, f. D. 1943.

Deschampsia chrysantha (J. Presl) Saarela, *PhytoKeys* 87: 88. 2017. Basionym: *Deyeuxia chrysantha* J. Presl, *Reliq. Haenk.* 1 (4–5): 247. 1840.

Deschampsia chrysantha var. *phalaroides* (Wedd.) Saarela, *PhytoKeys* 87: 88. 2017. Basionym: Wedd. *Bull. Soc. Bot. France* 22: 177, 180. 1875.

Deschampsia chrysostachya (E. Desv.) Romasch., P.M. Peterson, Soreng & Barberá, **comb. nov.** Basionym: *Deyeuxia chrysostachya* E. Desv. *Fl. Chil.* 6: 323, t. 78, f. 2. 1854.

Deschampsia eminens (J. Presl) Saarela, *PhytoKeys* 87: 89. 2017. Basionym: *Deyeuxia eminens* J. Presl, *Reliq. Haenk.* 1 (4–5): 250. 1830.

Deschampsia eminens var. **discreta** (Rúgolo & Villav.) Romasch., P.M. Peterson, Soreng & Barberá, **comb. nov.** Basionym: *Deyeuxia eminens* var. *discreta* Rúgolo & Villav., *Bol. Soc. Argent. Bot.* 31(1–2): 135. 1995.

Deschampsia eminens var. *fulva* (Griseb.) Saarela, *PhytoKeys* 87: 89. 2017. Basionym: *Agrostis fulva* Griseb., *Abh. Königl. Ges. Wiss. Göttingen* 24: 294. 1879.

Deschampsia eminens var. *inclusa* (Rúgolo) Saarela, *PhytoKeys* 87: 90. 2017. Basionym: *Deyeuxia eminens* var. *inclusa* Rúgolo, *Darwiniana* 44 (1): 195, f. 24. 2006.

Deschampsia gayana (Steud.) Romasch., P.M. Peterson, Soreng & Barberá, **comb. nov.** Basionym: *Aira gayana* Steud., *Syn. Pl. Glumac.* 1: 220. 1855 (1854). (other name: *Deyeuxia erythrostachya* E. Desv.).

Deschampsia gayana var. **neuquenensis** (Rúgolo) Romasch., P.M. Peterson, Soreng & Barberá, **comb. nov.*** Basionym: *Deyeuxia erythrostachya* var. *neuquenensis* Rúgolo, *Darwiniana* 19(2–4): 410, f. 3. 1975.

Deschampsia hackelii (Lillo) Saarela, *Phytokeys* 87: 87. 2017. Basionym: *Calamagrostis hackelii* Lillo, *Anales Mus. Nac. Buenos Aires* 21: 100, t. 4, f. A. 1–5. 1911.

Deschampsia ovata (J. Presl) Saarela, *PhytoKeys* 87: 88. 2017. Basionym: *Deyeuxia ovata* J. Presl, *Reliq. Haenk.* 1(4–5): 246. 1830.

Deschampsia ovata var. *nivalis* (Wedd.) Saarela, *PhytoKeys* 87: 88. 2017. Basionym: *Deyeuxia nivalis* Wedd., *Bull. Soc. Bot. France* 22: 176, 180. 1875.

Deschampsia parodiana (Kunth) Saarela, *PhytoKeys* 87: 90. 2017. Basionym: *Deyeuxia ligulata* Kunth, *Nov. Gen. Sp.* (quarto ed.) 1: 145. 1815 (1816).

Deschampsia podophora (Pilg.) Saarela, *PhytoKeys* 87: 90. 2017. Basionym: *Calamagrostis podophora* Pilg., *Bot. Jahrb. Syst.* 42 (1): 66. 1908.

Deschampsia podophora var. *mutica* Sylvester*, *PhytoKeys* 122: 63–66, f. 3. 2019.

Deschampsia santamartensis Sylvester & Soreng*, PhytoKeys 122: 56–59, f. 2. 2019.

Deschampsia teretifolia (Lægaard) Romasch., P.M. Peterson, Soreng & Barberá, **comb. nov.**
Basionym: *Calamagrostis teretifolia* Lægaard, Novon 8 (1): 27, f. 1E. 1998.

GRENEOCHLOA P.M. Peterson, Soreng, Romasch. & Barberá, **gen. nov.** **TYPE:** *Greeneochloa coarctata* (Eaton) P.M. Peterson, Soreng, Romasch. & Barberá (\equiv *Calamagrostis coarctata* Eaton).

Diagnosis—Differing from *Calamagrostis* Adans. in having hairy ovaries, extravaginal shoot innovations, flat leaf blades, and panicles contracted usually with ascending tightly appressed or slightly spreading branches.

Description—Loosely cespitose perennials with rhizomes 1–10 cm long, 2–4 mm thick. Culms (47–)60–200 cm tall, 3–8 mm in diameter, unbranched, smooth to scabrous with extravaginal shoot innovations below; nodes 2–5(–6), glabrous. Leaf sheaths shorter than the internodes, smooth or scabrous, sometimes inflated near summit, glabrous or sparingly hairy, culm sheath margins fused at the base for a few mm; collars smooth to scabrous, sometimes hairy; ligules (1–)3–6(–12) mm long, hyaline to chartaceous, obtuse to truncate, rarely acute, often erose or lacerate, abaxially scabrous to scaberulous; blades (3–)4–35(–45) cm long, (2–)3–15 mm wide, flat, glabrous below, glabrous and scabrous to hairy above, margins sometimes hairy. Panicles 7–25 cm long, (0.8–)1–3 cm wide, terminal, contracted sometimes interrupted near base, greenish to purplish or yellowish; branches ascending and loosely to tightly appressed, nearly smooth to densely scabrous, sometimes naked below. Spikelets (4.5–)5–8(–9) mm long, 1(–2)-flowered, laterally compressed; rachilla prolongation (0.5–)1–2(–4) mm long, hairy or glabrous and hairy at the apex, the hairs 1–4 mm long, whitish; disarticulation above the glumes; glumes usually longer to as long as the florets, acuminate, scabrous along the midvein, margins often hyaline; lower glumes 1 or 3-veined; upper glumes usually 3-veined; lemmas 4–6.5(–7.5) mm long, lanceolate, chartaceous to membranous, scaberulous, 5-veined, dorsally awned from the lower 1/5 to upper 3/4 or at the apex, the awns 1–10 mm long, straight or bent, apex entire or 4-toothed; callus hairy, the hairs (0.8–)1–5 mm long; paleas shorter than the lemmas, 2-keeled, apex acuminate, body sub-chartaceous or scabrous, gap between keels about as broad as outer flanges; stamens 3, anthers 1.5–4 mm long; ovaries with scattered or dense hairs, at least at the apex, styles 2, stigmas feathery; lodicules 2, membranous, lobed, glabrous or pubescent. Caryopses 2–3 mm long, ovoid to fusiform, slightly compressed, sulcus prominent, hilum 1/3 the grain in length, endosperm dry, hard, pericarp adherent.

Etymology—The new genus honors Craig William Greene (1949–2003), an American taxonomist who focused on agamic complexes in polyploid species of *Calamagrostis* and *Amelanchier* Medik.

Distribution—*Greeneochloa* occurs in Oregon, Washington, and Montana (*G. tweedyi*), and extending in eastern North America from Nova Scotia and Maine to Georgia and Louisiana (*G. coarctata*) [Marr. et al. 2007].

Comments—In Romaschenko et al. (in prep.) the two species of *Greeneochloa* form a clade within subtribe Echinopogoninae which is sister to subtribe Calothecinae plus *Calamagrostis* s.s. (subtribe. Agrostidinae Fr.) all in supersubtrib. Agrostidodinae Soreng [Soreng et al. 2017; Peterson al. in prep.].

Greeneochloa coarctata (Eaton) P.M. Peterson, Soreng, Romasch. & Barberá, **comb. nov.** Basionym: *Calamagrostis coarctata* Eaton, Man. Bot. 144. 1829 (*Calamagrostis cinnoides* W.P.C. Barton is misapplied to this species \equiv *Calamagrostis canadensis* Michx.). Figure 2.



Figure 2. *Greeneochloa coarctata* collected by L.J. Lehtonen & S.M. Young 62 (US) in Maryland, USA.

Greeneochloa tweedyi (Scribn.) P.M. Peterson, Soreng, Romasch. & Barberá, **comb. nov.** Basionym: *Deyeuxia tweedyi* Scribn., Bull. Torrey Bot. Club 10: 64. 1883 [≡ *Calamagrostis tweedyi* (Scribn.) Scribn.].

LAEGAARDIA P.M. Peterson, Soreng, Romasch. & Barberá, **gen. nov.** **TYPE:** *Laegaardia ecuadoriense* (Lægaard) P.M. Peterson, Soreng, Romasch. & Barberá (≡ *Calamagrostis ecuadoriensis* Lægaard).

Diagnosis—Differing from *Paramochloa* P.M. Peterson, Soreng, Romasch. & Barberá in having unawned lemmas, two 3-veined glumes, and culms 11–42 cm tall.

Description—Cespitose perennials. Culms 11–42 cm tall, about 1 mm diameter, erect, furrowed, smooth to hispid with intravaginal shoot innovations below. Basal leaves with short sheaths, the sheaths 2–3(–5) cm long, shallowly furrowed, glabrous, fibrous in age; ligules 0.5–1 mm long, truncate; collar distinct ±swollen; leaf blades 3–7 cm long, 0.3–1 mm wide, tightly involute, abaxially furrowed, glabrous, adaxially deeply furrowed, finely hispid. Culm leaves with long sheaths, upward slightly inflated, membranous; auricles higher than ligule; leaf blades 1–5 cm long, involute; flag leaf 1–1.5 cm long. Panicles 8–14 cm long, 0.7–1.6 cm wide, narrow, the axis, branches and pedicels glabrous to hispid, usually dark purplish; branching verticillate on lower nodes. Spikelets 1(2)-flowered, laterally compressed; rachilla prolongation 1.4–1.6 mm long with hairs almost reaching the apex of the lemma; disarticulation above the glumes; glumes 3.5–4 mm long, subequal, both 3-veined with lateral veins rather faint, broadly lanceolate, apex obtuse to acute, finely erose, keeled toward apex, scabrid and mat on and between veins, glabrous and shining along margin; floret on short stipe about 0.15 mm long; lemmas 2.7–3.1 mm long, ovate, membranous, 5-veined, apex obtuse, to irregularly minutely-toothed, scabrid on back, awn lacking; callus hairy, the hairs 1–1.5 mm long; paleas 1.9–2.7 mm long, shorter than the lemma, 2-veined, scareous, keels scabrid with a narrow gap between them and broad lateral flanges; stamens 3, anthers 0.8–1 mm long, purple; ovaries glabrous, styles 2, distinctly gapped, stigmas feathery; lodicules 2, membranous. Caryopses 1.2–1.4 mm long, elliptical-ovoid, slightly compressed, sulcate, hilum linear 1/3 the grain in length, embryo small, endoperm solid, pericarp adherent.

Etymology—The new genus honors Simon Lægaard (1933–), a renowned Danish Botanist, who has made extensive collections in Ecuador, Greenland, and South America.

Distribution—The single species in *Laegaardia* is endemic to Ecuador where it has been found in the Provinces of Azuay, Chimborazo, Loja [*Laegaard 18999, 19111, 19339* (AAU, QCA, US)], Napo, and Pichincha (Lægaard 1998).

Comments—*Laegaardia ecuadoriense* is a strongly supported sister to *Paramochloa crispifolia* (Sylvester) P.M. Peterson, Soreng, Romasch. & Barberá plus *P. effusa* (Kunth) P.M. Peterson, Soreng, Romasch. & Barberá within subtribe Calothecinae (Soreng 2015; Romaschenko et al. in prep.).

Laegaardia ecuadoriense (Lægaard) P.M. Peterson, Soreng, Romasch. & Barberá, **comb. nov.** Basionym: *Calamagrostis ecuadoriensis* Lægaard, Novon 8 (1): 25–26, f. 1B. 1998. **Figure 3.**

PARAMOCHLOA P.M. Peterson, Soreng, Romasch. & Barberá, **gen. nov.** **TYPE:** *Paramochloa effusa* (Kunth) P.M. Peterson, Soreng, Romasch. & Barberá [≡ *Deyeuxia effusa* Kunth ≡ *Calamagrostis effusa* (Kunth) Steud.].

Diagnosis—Differing from *Laegaardia* P.M. Peterson, Soreng, Romasch. & Barberá in having awned lemmas, 1-veined lower glumes, and culms 40–100 cm tall.



Figure 3. Isotype of *Laegaardia ecuadoriensis* collected by S. Lægard 53295 (US) in Ecuador.

Description—Cespitose perennials, forming dense mats sometimes appearing below as short vertical or oblique rhizomes. Culms 40–100 cm tall, 1–2.5 mm diameter, erect, smooth, with intravaginal shoot innovations below. Basal leaf sheaths becoming fibrous below, the sheaths shorter than the internodes; ligules 2.2–10 mm long, truncate, obtuse to acute; leaf blades 5–30 cm long, 0.5–3 mm wide, involute, stiffly erect or strongly curled, readily or tardily deciduous with age breaking off at ligule insertion tending to form a J at base after falling leaving the ligule exposed. Panicles (5.5–)9–20 cm long, 3–10 cm wide, open to somewhat contracted, the axis, branches and pedicels terete, smooth to scabrous, purplish; branching verticillate on lower nodes. Spikelets 1-flowered, not strongly laterally compressed; rachilla prolongation 1.6–5.5 mm long, hairy, the hairs 0.5–1.2 mm long, sometimes exceeding the apex of the lemma; disarticulation above the glumes; glumes 3–5.5 mm long, as long or longer than the florets, subequal, lanceolate, membranous, scaberulous distally, purplish, lustrous; lower glumes 1-veined; upper glumes 3-veined, the lateral veins present on lower 1/3–1/2, with 1 or 2 cross veins between the keel and lateral vein infrequently present in ca. 10% of spikelets seen (requires 25x magnification); floret sessile; lemmas 2.9–4.6 mm long, 5-veined, lanceolate, membranous, glabrous to scabrous, lustrous, awned dorsally, apex emarginate with finely denticulate lobes; awns 2–7.2 mm long, inserted from near the middle, geniculate and twisted near base; callus rounded with a tuft of hairs, the hairs 0.2–0.8 mm long; paleas shorter than the lemma, 2-veined, membranous, apex bidentate; stamens 3, anthers 1.5–2.7 mm long; ovaries glabrous, styles 2, separated, stigmas feathery; lodicules 2, 2-lobed, membranous. Caryopses 1.8–2 mm long, ovate, sulcus shallow, hilum linear, 1/3–1/2 the grain in length, embryo small, endosperm dry, hard, pericarp adherent.

Distribution—The two South American species of *Paramochloa* occur in the paramos of Colombia, Ecuador, and Venezuela.

Comments—In a molecular phylogeny based on four gene regions (ITS, *rpl32-trnL* spacer, *rps16-trnK* spacer, and *rps16* intron), *Paramochloa crispifolia* and *P. effusa* form a clade sister to *Laegaardia ecuadoriense* within subtribe Calothecinae (Romaschenko et al. in prep.).

Paramochloa crispifolia (Sylvester) P.M. Peterson, Soreng, Romasch. & Barberá, **comb. nov.**
Basionym: *Calamagrostis crispifolius* Sylvester, PhytoKeys 122: 51–54, f. 1. 2019.

Paramochloa effusa (Kunth) P.M. Peterson, Soreng, Romasch. & Barberá, **comb. nov.** Basionym: *Deyeuxia effusa* Kunth, Nov. Gen. Sp. (quarto ed.) 1: 146, t. 46. 1815 (1816). **Figure 4.**

PEYRITSCHIA E. Fourn., Mexic. Pl. 2: 109. 1886, **gen. emend.** **TYPE:** *Peyritschia koelerioides* (Peyr.) E. Fourn. (\equiv *Aira koelerioides* Peyr.).

Description—Perennials, cespitose or with short rhizomes. Culms 5–300 cm tall, glabrous or pubescent. Leaf blades flat, conduplicate, convolute or involute, soft, rarely rigid; ligule membranous. Panicles narrow, contracted to open and ovate to pyramidal. Spikelets 3–10 mm long, 1–6-flowered, laterally compressed; rachilla hairy, rarely glabrous to scabrous, usually prolonged above the upper floret (usually to $\frac{3}{4}$ the length of the lemma in single-flowered species); disarticulation above the glumes and between the florets; glumes usually longer than the lower floret, isomorphic or dimorphic, the lower 1 or 3-veined, the upper 1, 3 or 5-veined; basal floret often short stipitate; lemmas (3)5(7)-veined, usually awned from the back, the central awn often geniculate or divaricate, apex entire or sometimes with 2–4 short awns (extension of the lateral veins); callus usually short pilose or pubescent, sometimes glabrous; paleas usually shorter than the lemma, tightly enclosed by margins of the lemma or loosely enclosed, 2-keeled, hyaline; stamens 2 or 3, anthers 0.5–3.5 mm long; lodicules 2, membranous; ovary glabrous or hairy. Caryopses compressed, hilum < 1/5 the grain in length, endosperm liquid, soft or pasty, or hard, pericarp adherent. Basic chromosome number $x = 7$.



Figure 4. *Paramochloa effusa* collected by J. Cuatrecasas 18982 (USF) in Dpto. Cauca, Colombia.

Distribution—Species of *Peyritschia* primarily range throughout Mexico and Central America with a few species extending into South America as far south as Bolivia.

Comments—In Romaschenko et al. (in prep.) the former Mexican and Central American species of *Trisetum*, *Calamagrostis*, and those previously placed in *Peyritschia* form a clade (*Peyritschia* clade) sister to *Cinnagrostis* within the Koeleriinae clade B of the Aveninae (Finot et al. 2004, 2006; Peterson et al. 2004; Romaschenko et al. in prep.). The traditional seven species treated in *Peyritschia* s.s. (Finot et al. 2004, 2006) also form a clade nested within the expanded *Peyritschia* s.l. treated here.

Peyritschia angusta (Swallen) P.M. Peterson, Soreng, Romasch. & Barberá, **comb. nov.*** Basionym: *Trisetum angustum* Swallen, Phytologia 4 (7): 423. 1953.

Peyritschia bealii P.M. Peterson, Soreng, Romasch. & Barberá, **nom. nov.** Basionym: *Calamagrostis pringlei* Scribn. ex Beal, Grass. N. Amer. 2: 345. 1896.

Peyritschia coahuilensis (P.M. Peterson, Soreng, & Valdés-Reyna) P.M. Peterson, Soreng, Romasch. & Barberá, **comb. nov.** Basionym: *Calamagrostis coahuilensis* P.M. Peterson, Soreng, & Valdés-Reyna, Sida 21 (1): 312, 314, f.1. 2004.

Peyritschia conferta (Pilg.) Finot, Contr. U.S. Natl. Herb. 48: 478. 2003. Basionym: *Trisetum confertum* Pilg., Bot. Jahrb. Syst. 25 (5): 714. 1898.

Peyritschia curviseta (Morden & Valdés-Reyna) P.M. Peterson, Soreng, Romasch. & Barberá, **comb. nov.** Basionym: *Trisetum curvisetum* Morden & Valdés-Reyna, Brittonia 35 (4): 375, f.1. 1983.

Peyritschia deyeuxioides (Kunth) Finot, Contr. U.S. Natl. Herb. 48: 478. 2003. Basionym: *Avena deyeuxioides* Kunth, Nov. Gen. Sp. (quarto ed.) 1: 147 1815 (1816) [≡ *Trisetaria deyeuxioides* (Kunth) Poir. ≡ *Trisetum deyeuxioides* (Kunth) Kunth].

Peyritschia divaricata (P.M. Peterson & Soreng) P.M. Peterson, Soreng, Romasch. & Barberá, **comb. nov.** Basionym: *Calamagrostis divaricata* P.M. Peterson & Soreng, Sida 21 (1): 315, f. 3. 2004.

Peyritschia durangensis (Finot & P.M. Peterson) P.M. Peterson, Soreng, Romasch. & Barberá, **comb. nov.** Basionym: *Trisetum durangense* Finot & P.M. Peterson, Ann. Missouri Bot. Gard. 91 (1): 19–21, f.2. 2004. **Figure 5A–N.**

Peyritschia erectifolia (Hitchc.) P.M. Peterson, Soreng, Romasch. & Barberá, Romasch., **comb. nov.** Basionym: *Calamagrostis erectifolia* Hitchc., N. Amer. Fl. 17 (7): 507. 1937.

Peyritschia eriantha (Kunth) P.M. Peterson, Soreng, Romasch. & Barberá, **comb. nov.** Basionym: *Deyeuxia eriantha* Kunth, Nov. Gen. Sp. (quarto ed.) 1: 145. 1815 (1816) [≡ *Arundo eriantha* (Kunth) Poir. ≡ *Calamagrostis eriantha* (Kunth) Steud.].

Peyritschia filifolia (Scribn. ex Beal) P.M. Peterson, Soreng, Romasch. & Barberá, **comb. nov.** Basionym: *Trisetum filifolium* Scribn. ex Beal, Grass. N. Amer. 2: 375. 1896.

Peyritschia foliosa (Swallen) P.M. Peterson, Soreng, Romasch. & Barberá, **comb. nov.** Basionym: *Trisetum foliosum* Swallen, Contr. U.S. Natl. Herb. 29 (6): 256–257. 1948 (1949).

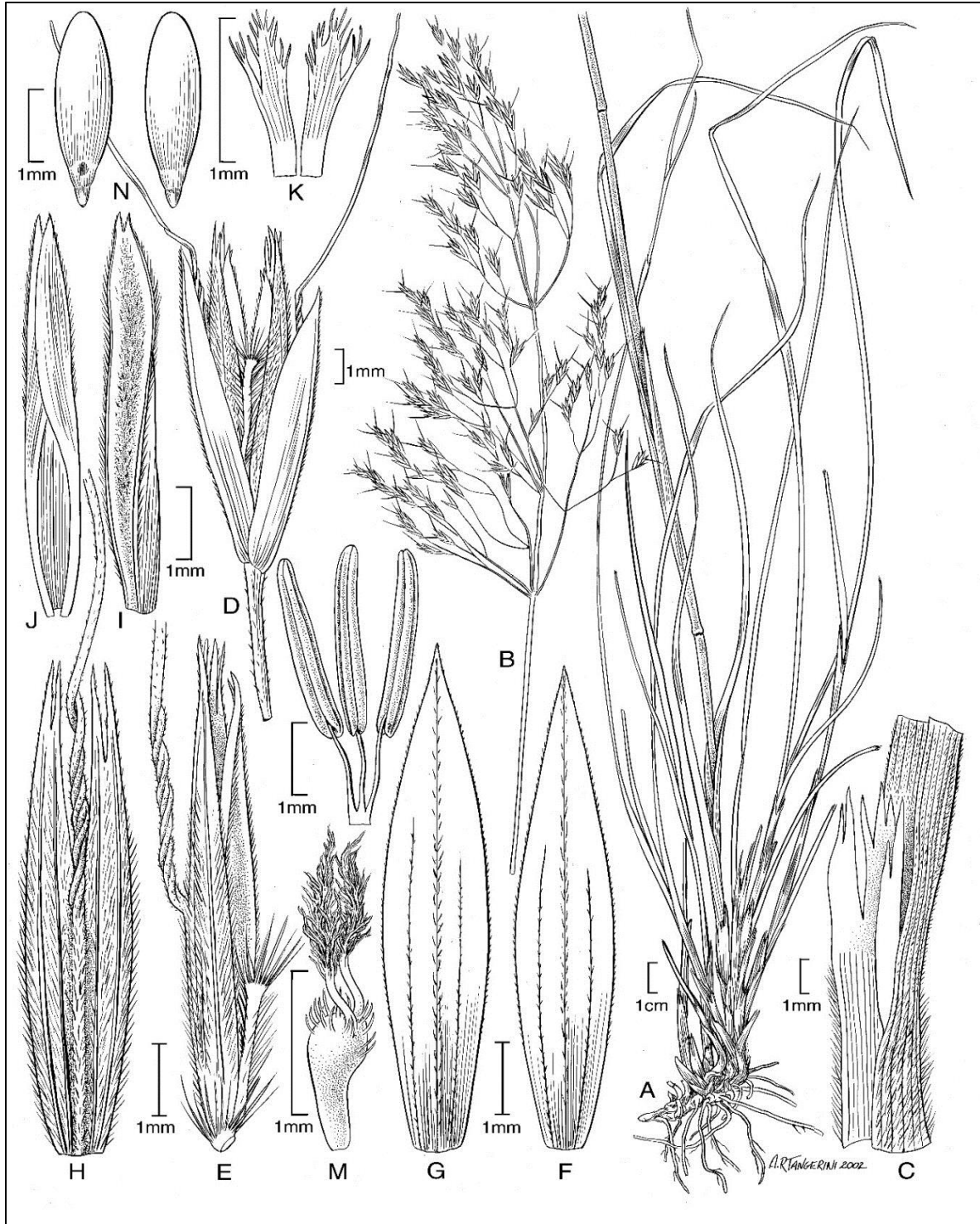


Figure 5. Holotype illustration of *Peyritschia durangensis* collected by P.M. Peterson and C.R. Annable 6034 (US) in Durango, Mexico; drawn by Alice Tangerini. A. Habit. B. Inflorescence. C. Ligule. D. Spikelet. E. Floret. F. Lower glume. G. Upper glume. H. Lemma. I. Palea, dorsal view. J. Palea, ventral view. K. Lodicules. L. Stamens. M. Pistil. N. Caryopses.

- Peyritschia graphephoroides** P.M. Peterson, Soreng, Romasch. & Barberá, **nom. nov.** Basionym: *Graphephorum pringlei* Scribn. ex Beal, Grass. N. Amer. 2: 561. 1896 [≡ *Trisetum pringlei* (Scribn. ex Beal) Hitchc.], non *Peyritschia pringlei* (Scribn.) S.D. Koch.
- Peyritschia howellii* (Hitchc.) Finot & P.M. Peterson, Sida 22 (2) 897. 2006. Basionym: *Trisetum howellii* Hitchc., Proc. Calif. Acad. Sci., ser. 4, 21 (24): 296. 1935.
- Peyritschia humilis* (Louis-Marie) Finot, Contr. U.S. Natl. Herb. 48: 478. 2003. Basionym: *Trisetum humile* Louis-Marie, Rhodora 30: 244. 1928 (1929).
- Peyritschia irazuense** (Kuntze) P.M. Peterson, Soreng, Romasch. & Barberá, **comb. nov.** Basionym: *Calamagrostis irazuense* Kuntze, Revis. Gen. Pl. 2: 763. 1891.
- Peyritschia killipii** (Swallen) P.M. Peterson, Soreng, Romasch. & Barberá, **comb. nov.** Basionym: *Calamagrostis killipii* Swallen, Contr. U.S. Natl. Herb. 29 (6): 257. 1948 (1949).
- Peyritschia koelerioides* (Peyr.) E. Fourn., Mexic. Pl. 2: 110. 1886. Basionym: *Aira koelerioides* Peyr., Linnaea 30 (1): 5–6. 1859 [≡ *Deschampsia koelerioides* (Peyr.) Benth. nom illeg. hom.] [= *Graphephorum altijugum* E. Fourn. ≡ *Trisetum altijugum* (E. Fourn.) Scribn.].
- Peyritschia martha-gonzaleziae** (P.M. Peterson & Finot) P.M. Peterson, Soreng, Romasch. & Barberá, **comb. nov.*** Basionym: *Trisetum martha-gonzaleziae* P.M. Peterson & Finot, Ann. Missouri Bot. Gard. 91 (1): 21, f.3. 2004.
- Peyritschia orizabae** (Rupr. ex E. Fourn.) P.M. Peterson, Soreng, Romasch. & Barberá, **comb. nov.** Basionym: *Deyeuxia orizabae* Rupr. ex E. Fourn., Bull. Soc. Bot. France 24: 181. 1877.
- Peyritschia palmeri** (Hitchc.) P.M. Peterson, Soreng, Romasch. & Barberá, **comb. nov.** Basionym: *Trisetum palmeri* Hitchc., Contr. U.S. Natl. Herb. 17(3): 325. 1913.
- Peyritschia pinetorum* (Swallen) Finot & P.M. Peterson, Sida 22 (2): 899. 2006. Basionym: *Trisetum pinetorum* Scribn., Phytologia 4: 424. 1953.
- Peyritschia planifolia** (Kunth) P.M. Peterson, Soreng, Romasch. & Barberá, **comb. nov.** Basionym: *Calamagrostis planifolia* Kunth, Nov. Gen. Sp. (quarto ed.) 1: 145 1815. (1816).
- Peyritschia pringlei* (Scribn.) S.D. Koch, Taxon 28 (1–3): 233. 1979. Basionym: *Deschampsia pringlei* Scribn., Proc. Acad. Nat. Sci. Philadelphia 43 (2): 300–301, t. 13, f.1, 1a. 1891 (≡ *Trisetum kochianum* Hern. Torres).
- Peyritschia spellenbergii** (Soreng, Finot, & P.M. Peterson) P.M. Peterson, Soreng, Romasch. & Barberá, **comb. nov.** Basionym: *Trisetum spellenbergii* Soreng, Finot & P.M. Peterson, Ann. Missouri Bot. Gard. 91 (1): 23–25, f.4. 2004.
- Peyritschia tolucensis** (Kunth) P.M. Peterson, Soreng, Romasch. & Barberá, **comb. nov.** Basionym: *Deyeuxia tolucensis* Kunth, Nov. Gen. Sp. (quarto ed.) 1: 143. 1815 (1816) [≡ *Arundo tolucensis* (Kunth) Poir. ≡ *Calamagrostis tolucensis* (Kunth) Trin. ex Steud.].
- Peyritschia tonduzii** (Hitchc.) P.M. Peterson, Soreng, Romasch. & Barberá, **comb. nov.** Basionym: *Trisetum tonduzii* Hitchc., N. Amer. Fl. 17 (8): 558. 1939.

Peyritschia valida (Sohns) P.M. Peterson, Soreng, Romasch. & Barberá, **comb. nov.** Basionym:
Calamagrostis valida Sohn, J. Wash. Acad. Sci. 46 (12): 385, f. 47–55. 1956.

Peyritschia viridis (Kunth) P.M. Peterson, Soreng, Romasch. & Barberá, **comb. nov.** Basionym:
Avena viridis Kunth, Nov. Gen. Sp. (quarto ed.) 1: 147. 1815 (1816) [= *Trisetum viride* (Kunth)
Kunth].

Peyritschia virletii (E. Fourn.) P.M. Peterson, Soreng, Romasch. & Barberá, **comb. nov.** Basionym:
Trisetum virletii E. Fourn., Mexic. Pl. 2: 108. 1886.

Peyritschia vulcanica (Swallen) P.M. Peterson, Soreng, Romasch. & Barberá, **comb. nov.** Basionym:
Calamagrostis vulcanica Swallen, Phytologia 4 (7): 424. 1953.

Unplaced taxa

Calamagrostis brevipaleata Swallen (probable syn. of *Cinnagrostis hirta*)

Calamagrostis carchiensis Lægaard (probably *Peyritschia*)

Calamagrostis chaseae Luces (probably *Calamagrostis*)

Calamagrostis cleefii Escalona (probably *Peyritschia*)

Calamagrostis diemii (Rúgolo) Soreng (probably *Calamagrostis*)

Calamagrostis fulgida Lægaard

Calamagrostis guamanensis Escalona (probably *Deschampsia*)

Calamagrostis leonardii Chase (Molecular data indicate this is a hybrid between *Cinnagrostis* and
possibly *Sphenopholis* Scribn. Further study is needed to confirm this result)

Calamagrostis macbridei Tovar

Calamagrostis pisinna Swallen (probably *Peyritschia*)

Calamagrostis pungens Tovar

Calamagrostis ramonae Escalona (probably *Deschampsia*)

Calamagrostis scabriflora Swallen (probably *Calamagrostis*)

Calamagrostis suka Speg. (probably *Calamagrostis*)

Deyeuxia curtooides Rúgolo & Villav. (probably *Cinnagrostis*)

Deyeuxia pubescens Pilg. (probably *Peyritschia*, possibly a syn. of *P. planifolia*)

Deyeuxia spruceana Wedd.

Confirmed *Calamagrostis* occurring in Latin America

Calamagrostis bogotensis (Pilg.) Pilg.

Calamagrostis epigeios (L.) Roth

Calamagrostis guatemalensis Hitchc.

Calamagrostis llanganatensis Lægaard

Calamagrostis neglecta (Ehrh.) G. Gaertn., B. Mey. & Scherb. s.l. [including *Deyeuxia pooides*
(Steud.) Rúgolo, *Calamagrostis stricta* (Timm) Koeler]

Calamagrostis pinetorum Swallen

Key to genera of American grasses presently or formerly treated in *Calamagrostis* or *Deyeuxia*

1. Plants from Canada or USA; caryopses hard (2).

1. Plants from Mexico, Central America or South America; caryopses soft (liquid or semi-soft) to
hard (3).

2. Ovary hairy; plants rhizomatous with extravaginal branching, not tufted; lemmas awned from upper 2/5; rachilla extension glabrous except for apical tuft of hairs (*G. coarctata*), or lemmas awned from middle, callus hairs short and all blades broad and flat (*G. tweedyi*); panicles contracted **Greeneochloa**
2. Ovary glabrous; plants rhizomatous or not, with or without extravaginal branching, tufted or not; lemmas awned from near base to upper 1/3; rachilla extension hairy along the length or glabrous and rudimentary but then callus with long hairs; plants not with a combination of well-developed rhizomes, exclusively extravaginal branching, short callus hairs, broad flat blades, and contracted panicles; panicles open or contracted **Calamagrostis**
3. Rachilla extension rudimentary (± 1 mm long with hairs ± 3 mm long); callus hairs mostly 1.5–2 times longer than lemma, the callus indistinct, not angled downward or recurved **Calamagrostis epigeios** (introduced)
3. Rachilla extension well developed (absent in *Calamagrostis llanganatensis*, short in a few other species, but then with hairs up to 1.5 mm long); callus hairs short or long (rarely absent), as much as 1.5–2 times longer than the lemma in a few species but the callus distinct and recurved (4).
4. Anthers 2, or 3 in plants from Mexico to Guatemala; lemma body strongly 5-veined, often puberulent in part **Peyritschia**
4. Anthers 1 or 3, if 3 then plants not from Mexico (*Calamagrostis guatemalensis* from Guatemala); lemma body variously veined, glabrous, sometimes scabrous (5).
5. Lemmas unawned (6).
5. Lemmas awned (8).
6. Callus and rachilla glabrous (rarely with a few short callus hairs); floret stipitate; glumes and lemmas lustrous; panicles dense, short, globose; ligules usually elongated, decurrent and acute to acuminate, entire or laterally cleft, smooth or nearly so; lodicules entire **Deschampsia**
6. Callus and rachilla hairy; floret stipitate or not; glumes and lemmas mat to sub-lustrous; panicles various but not globose; ligules often less than 4 mm long, decurrent or not, often truncate to obtuse, sometimes with margins taller than the midsection, usually scabrous or pubescent; lodicules often bilobate (7).
7. Florets with a short stipe (± 0.15 mm long) between the upper glume and the callus of the floret; both glumes 3-veined; caryopsis hard, hilum linear $\pm 1/3$ the grain in length; plants from the páramo in Ecuador **Laegaardia**
7. Florets sessile; lower glumes 1-veined, upper glumes 1 or 3-veined; caryopses hard to pasty, hilum oval to punctiform $< 1/4$ the grain in length; plants from various locations **Cinnagrostis**
8. Leaf blades readily to tardily disarticulating from collars in age (tending to form a J at base after falling), involute, sometimes sinuous; caryopsis hard, hilum linear $\pm 1/3$ the grain in length; lower glumes 1-veined, upper glumes 3-veined and sometimes with 1 or 2 cross-veins between them; lemmas awned from middle, the awns 2–7.2 mm long, basally twisted, geniculate; callus hairs 0.2–0.8 mm long; rachillas nearly as long as lemma, densely and evenly hairy with hairs 0.5–1.2 mm long; panicles open, diffuse; plants from the páramo of Colombia, Ecuador, and Venezuela **Paramochloa**
8. Leaf blades not disarticulating from collars in age, flat, folded or involute, not sinuous; caryopsis soft or hard; hilum elliptical, oval, round to punctiform $1/5$ – $1/3$ the grain in length; lower glumes 1–3-veined without cross-veins between them; lemmas awned from near base to upper 1/3, the awns 1–10 mm or more long, straight, sinuous or geniculate; callus hairs absent to 4 mm long; rachillas mostly less than $3/4$ the lemma in length, variously hairy, the hairs 0.5–4 mm long, sometimes reduced or absent proximally; panicles open (infrequently diffuse) or contracted; plants of various habitats, from Mexico to Tierra del Fuego, Argentina (9).

9. Florets (occasionally a second floret developed in some spikelets) with a stipe between the upper glume and the callus of the floret; glumes and lemmas lustrous, smooth or keels sparsely scaberulous; lemma awns slender, not geniculate, sometimes rudimentary or absent; blades flat or somewhat rolled inward, prominently ridged adaxially, more or less smooth (often with papillae on the long-cells between ridges); ligules slightly to strongly decurrent, usually elongated, 4–20 mm long, acuminate, smooth or nearly so, glabrous, entire or laterally cleft; lodicules, glabrous **Deschampsia**

9. Florets sessile (very rarely with a second floret developed in some spikelets), rarely with a stipe to 0.2 mm long; glumes sometimes lustrous, usually scabrous at least on the keels, lemmas usually mat; blades flat to involute, smooth or scabrous, often densely so (papillae absent so far as known); ligules decurrent or not, 0.2–10 (–15) mm long, commonly less than 4 mm long (lateral lobes often exceeding the central part), often scabrous or pubescent, commonly truncate to obtuse; lodicules entire or lobed (10).

10. Caryopses hard, distinctly sulcate, hilum 1/6–1/3 the grain in length; lemmatal awns strait or slightly bent, readily distinguished from callus hairs, inserted from near base to middle, not or slightly exceeding the lemma apex; callus hairs 0.1–3 mm long 1/10–3/4 as long as the lemma in length; rachilla glabrous, or sparsely to densely hairy, hairs not reaching lemma apex; panicles contracted; anthers 1 or 3; lodicules entire and lanceolate, sometimes with an isolated lateral lobe, glabrous

..... **Calamagrostis**

10. Caryopses soft (liquid or semi-soft) or hard, sulcate (often shallowly) or not, hilum 1/6–1/4 the grain in length (often obscure in species with lipid); lemmatal awns sometimes indistinguishable from callus hairs, straight, sinuous or geniculate, capillary or stout, inserted from base to upper 1/3, usually exceeding the lemma and often exerted from the glumes; callus hairs shorter to exceeding the lemma in length; rachilla hairy, hairs often reaching 3/4 to exceeding the lemma length; panicles contracted or open; anthers 3; lodicules apically bilobate or bidentate, infrequently entire and lanceolate, apical margin sometimes ciliolate or ciliate **Cinnagrostis**

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