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A REVISION OF *TRisetum*  
(POACEAE: POOIDEAE:  
AVENINAE) IN SOUTH  
AMERICA<sup>1</sup>

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ABSTRACT

A taxonomic treatment of *Trisetum* Pers. for South America, is given. Eighteen species and six varieties of *Trisetum* are recognized in South America. Chile (14 species, 3 varieties) and Argentina (12 species, 5 varieties) have the greatest number of taxa in the genus. Two varieties, *T. barbinode* var. *sclerophyllum* and *T. longiglume* var. *glabratum*, are endemic to Argentina, whereas *T. mattheii* and *T. nancaguense* are known only from Chile. *Trisetum andinum* is endemic to Ecuador, *T. macbridei* is endemic to Peru, and *T. foliosum* is endemic to Venezuela. A total of four species are found in Ecuador and Peru, and there are two species in Venezuela and Colombia. The following new species are described and illustrated: *Trisetum mattheii* Finot and *T. nancaguense* Finot, from Chile, and *T. pyramidatum* Louis-Marie ex Finot, from Chile and Argentina. The following two new combinations are made: *T. barbinode* var. *sclerophyllum* (Hack. ex Stuck.) Finot and *T. spicatum* var. *cumingii* (Nees ex Steud.) Finot. A key for distinguishing the species and varieties of *Trisetum* in South America is given. The names *Koeleria cumingii* Nees ex Steud., *Trisetum* sect. *Anaulacoa* Louis-Marie, *Trisetum* sect. *Aulacoa* Louis-Marie, *Trisetum* subg. *Heterolytrum* Louis-Marie, *Trisetum* subg. *Isolytrum* Louis-Marie, *Trisetum* subsect. *Koeleriformia* Louis-Marie, *Trisetum* subsect. *Sphenopholidea* Louis-Marie, *Trisetum malacophyllum* Steud., *Trisetum variabile* E. Desv., and *Trisetum variabile* var. *virescens* E. Desv. are lectotypified.

*Key words:* Aveninae, Gramineae, Poaceae, Pooideae, *Trisetum*.

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RESUMEN

Se realizó un estudio taxonómico del género *Trisetum* en América del Sur. Se reconoció 18 especies y 6 variedades sudamericanas de *Trisetum*. Chile (14 especies, 3 variedades) y Argentina (12 especies, 5 variedades) poseen el mayor número de taxones del género *Trisetum*. Dos variedades, *T. barbinode* var. *sclerophyllum* y *T. longiglume* var. *glabratum*, son endémicos de Argentina, mientras *T. mattheii* y *T. nancaguense* se conocen sólo para Chile. Cuatro especies se encuentran en Ecuador y Perú y dos especies en Venezuela y Colombia. *Trisetum andinum* es endémica del Ecuador, *T. macbridei* es endémica del Perú, y *T. foliosum* es endémica de Venezuela. Se describen e ilustran las siguientes nuevas especies: *Trisetum mattheii* Finot y *T. nancaguense* Finot, de Chile, y *T. pyramidatum* Louis-Marie ex Finot, de Chile y Argentina. Se establecen las siguientes dos nuevas combinaciones: *T. barbinode* var. *sclerophyllum* (Hack. ex Stuck.) Finot y *T. spicatum* var. *cumingii* (Nees ex Steud.) Finot. Se entrega una clave para separar las especies y variedades de *Trisetum* en Sudamérica. Los nombres *Koeleria cumingii* Nees ex Steud., *Trisetum* sect. *Anaulacoa* Louis-Marie, *Trisetum* sect. *Aulacoa* Louis-Marie, *Trisetum* subg. *Heterolytrum* Louis-Marie, *Trisetum* subg. *Isolytrum* Louis-Marie, *Trisetum* subsect. *Koeleriformia* Louis-Marie, *Trisetum* subsect. *Sphenopholidea* Louis-Marie, *Trisetum malacophyllum* Steud., *Trisetum variabile* E. Desv., y *Trisetum variabile* var. *virescens* E. Desv. fueron lectotipificados.

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The genus *Trisetum* was described by Persoon (1805), including 11 species previously treated under *Avena* L. As currently defined, *Trisetum* comprises about 70 species of perennial grasses, in-

habiting temperate and cold zones in both hemispheres (Louis Marie, 1928, 1929; Swallen, 1948; Tsvelev, 1970, 1983; Jonsell, 1980; Veldkamp & Van der Have, 1983; Clayton & Renvoize,

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1986; Pohl & Davidse, 1994; Tucker 1996; Edgar, 1998; Finot et al., 2004). In America, the genus is distributed from Greenland to southern South America, ranging from approximately 69°N to 55°S (Hultén, 1959; Nicora, 1978).

*Trisetum* has been traditionally divided in two sections: section *Trisetum*, typified by *T. flavescens* (L.) P. Beauv., with lax, open panicles and culms glabrous below the inflorescence, and section *Trisetraera* Asch. & Graebn., typified by *T. spicatum* (L.) K. Richt., with dense, spiciform panicles and culms pilose below the inflorescence. This supra-specific classification has been accepted by most authors (Chrtek, 1965; Chrtek & Jirásek, 1963; Tselev, 1983). Chrtek (1965) divided *Trisetum* in four subgenera: subgenus *Trisetum*, subgenus *Distichotrisetum* Chrtek, subgenus *Glaciotrisetum* Chrtek, and subgenus *Graciotrisetum* Chrtek and divided subgenus *Trisetum* into five sections: section *Trisetum*, section *Trisetraera* Asch. & Graebn., section *Rigida* Chrtek, section *Hispanica* Chrtek, and section *Carpotica* Chrtek. Only the *Trisetum* sections *Trisetum* and *Trisetraera* include American representatives.

A general account of the American taxa was first made by Steudel (1853–1855), who described ten species for South America: *Trisetum andinum* Benth., *T. barbatum* Steud., *T. hirtum* Trin., *T. caudulatum* Trin., *T. barbinode* Trin., *T. splendidulum* Steud., *T. oiriforme* Steud., *T. heteronymum* Steud., *T. malacophyllum* Steud., and *T. phleoides* (d'Urv.) Kunth. Hitchcock (1927) later recognized the following six species from Ecuador, Peru, and Bolivia: *Trisetum deyeuxioides* (Kunth) Kunth, *T. scabrifolium* Hitchc., *T. floribundum* Pilg., *T. mocbridei* Hitchc., *T. spicatum* (L.) K. Richt., and *T. andinum* Benth.

Louis-Marie (1928, 1929), in his taxonomic revision of *Trisetum*, recognized 60 species for America. However, Louis-Marie had a very broad concept of *Trisetum* that included several species later transferred to other genera, including *Bromus*, *Deschampsia*, *Dielsiochloa*, *Graphephorum*, *Leptophyllochloa*, *Peyritschia*, and *Sphenopholis* (Valencia, 1941; Pilger, 1943; Parodi, 1949a; Erdman, 1965; Nicora, 1978; Finot, 2003; Finot et al., 2004). Louis-Marie (1928, 1929) divided the genus *Trisetum* into two subgenera (Table 1; see Appendix 3 for subgeneric lectotypifications): subgenus *Heterolytrum* Louis-Marie and subgenus *Isolytrum* Louis-Marie. He divided *Trisetum* subg. *Heterolytrum* into two sections: section *Anaulacoo* Louis-Marie (including subsect. *Trisetum*, subsect. *Sphenopholidea* Louis-Marie, subsect. *Graphephorum* (Desv.) Louis-Marie, subsect. *Koeleriformia* Louis-Marie, and

subsect. *Deschampsioidea* Louis-Marie) and section *Aulocoo* Louis-Marie. South American species in *Trisetum* sect. *Anaulacoo* subsect. *Trisetum* included: *T. splendidulum*, *T. irazuense* (Kuntze) Hitchc., *T. froudulentum* Steud., *T. malacophyllum* Steud., *T. cernuum* Trin., *T. heteronymum* Steud., *T. hirtum* Trin., *T. mollifolium* Louis-Marie, *T. oreophilum* Louis-Marie var. *oreophilum*, *T. oreophilum* var. *johnstonii* Louis-Marie, *T. lasiolepis* E. Desv., *T. preslei* (Kunth) E. Desv., *T. spicatum* var. *spicatum*, *T. spicatum* var. *hirsutum* Louis-Marie, *T. spicatum* var. *phleoides* (Kunth) Macloskie, *T. spicatum* var. *fuegianum* (Hack.) Louis-Marie, *T. spicatum* var. *dianthemum* Louis-Marie, *T. spicatum* var. *andinum* (Benth.) Louis-Marie, *T. barbinode* Trin. var. *barbinode*, *T. barbinode* var. *hirtiflorum* (Hack.) Louis-Marie, *T. caudulatum* Trin., *T. variabile* E. Desv. var. *variabile*, *T. variabile* var. *flavescens* E. Desv., *T. variabile* var. *virescens* E. Desv., *T. variabile* var. *chiloense* (Phil.) Louis-Marie, *T. variabile* var. *vidalii* (Phil.) Louis-Marie, *T. erectum* Phil., *T. monticola* Phil., and *T. povodoxum* Phil. In *Trisetum* subsect. *Koeleriformia* Louis-Marie included the following seven species: *T. laxiflorum* Phil., *T. araeanthum* Phil., *T. brachytherum* Phil., *T. depauperatum* Phil., *T. micratherum* E. Desv., *T. nemorosum* Phil., and *T. laxum* Phil. *Trisetum micratherum* was later transferred to *Leptophyllochloa* by Calderón (1978) (*L. microthera* (E. Desv.) C. E. Calderón). *Trisetum* subsect. *Sphenopholidea* and subsection *Graphephorum* do not have South American representatives. Louis-Marie included two South American species: *T. brasiliense* Louis-Marie and *T. juergensii* Hack., in *Trisetum* subsect. *Deschampsioidea*. In *Trisetum* sect. *Aulocoo* Louis-Marie included two species, *Bromus trinii* E. Desv. (replaced name *Trisetum hirtum* Trin. = *Bromus berterioanus* Colla) and *T. floribundum* Pilg. (= *Dielsiochloa floribunda* (Pilg.) Pilg.). South American representatives of *Trisetum* subg. *Isolytrum* included *T. deyeuxioides*, *T. longiglume* Hack., *T. andicola* Louis-Marie, *T. evolutum* (E. Fourn.) Hitchc., and *T. mocbridei* Hitchc.

Valencia (1941) placed *Trisetum juergensii*, *T. confertum* Pilg., *T. brasiliense*, and *T. andicola* in *Deschampsia*. However, Parodi (1949b) disagreed with Valencia concerning the position of *T. andicola*. According to Parodi (1949b), a lemma with two apical setae produced by the apical extension of the intermediate nerves supports the recognition of this species in genus *Trisetum*.

Hultén (1959) reviewed the taxonomy of the *Trisetum spicatum* complex on a world-wide basis and he cited several South American taxa, including a new subspecies, *T. spicatum* subsp. *bolivianum*

Hultén from La Paz, Bolivia. Hultén did not treat most of the varieties of *T. spicatum* s.l. mentioned by Louis-Marie for South America.

In addition to the European *T. flavescens* introduced in North and South America, Nicora (1978) recognized 13 species in Patagonia: *T. cernuum*, *T. longiglume* Hack., *T. tomentosum* (E. Desv.) Nicora, *T. spicatum*, *T. phleoides* (d'Urv.) Kunth, *T. cumingii* (Nees ex Steud.) Nicora, *T. lechleri* (Steud.) Nicora, *T. caudulotum*, *T. barbinode*, *T. hirtiflorum* Hack., *T. sclerophyllum* Hack., *T. lasiolepis* E. Desv., and *T. preslei* (Kunth) E. Desv. Later, Rúgolo de Agrasar and Nicora (1988) described a new species, *T. ambiguum* Rúgolo & Nicora, from Argentina.

Several species are controversial in the generic alignment. Although *Trisetum* subsect. *Deschampsioideum* is retained for several species of Mexico and Central America (Finot et al., 2004), *T. brasiliense* and *T. juergensii* of South America do not fit well in the genus and will be dealt with in future papers. In addition, we recognize *Trisetum confertum* as *Peyritschia conferta* (Pilg.) Finot (Finot, 2003).

Our current treatment of *Trisetum* for the Americas recognizes 45 species and 20 varieties (Finot, 2003; Finot et al., 2004; this paper). In this paper we recognize 18 species and six varieties for South America (see Appendix 1 for alphabetical list). We describe and illustrate three new species of *Trisetum* (*T. mattheii* Finot, *T. nancaguense* Finot, and

*T. pyramidatum* Louis-Marie ex Finot), make two new combinations (*T. barbinode* var. *sclerophyllum* (Hack. ex Stuck.) Finot and *T. spicatum* var. *cumingii* (Nees ex Steud.) Finot), and provide descriptions and keys to the species and varieties in South America.

#### MATERIAL AND METHODS

Type specimens and general collections from the following herbaria were studied: BA, BAA, BAF, CONC, CTES, CR, F, LP, MERL, P, QCA, S, SI, US, and ZOELLNER. In some cases, the curators of these herbaria sent us digital photographs or Xerox copies of types, or we had access to internet digital images (C. PR, NY). Abbreviations for herbaria correspond to those cited by Holmgren et al. (1990), except ZOELLNER, which is the personal herbarium of Otto Zoellner, Quilpué, Chile. An index to specimens examined and a list of all names and synonyms mentioned in this manuscript, including those in the introduction, are treated in Appendix 2 and 4, respectively.

In the morphological descriptions the length given for florets was usually taken from the first or lowest floret. If there were three or more florets per spikelet, then the second floret was sometimes used to calculate the range. Therefore, when using our keys to determine South American specimens of *Trisetum* it is best to measure only the first or lowest floret.

#### KEY TO *TRISETUM* AND MORPHOLOGICALLY SIMILAR GENERA IN SOUTH AMERICA

- 1a. Plants annual.
  - 2a. Plants 20–250 cm tall; panicles lax, open; spikelets 15–50 mm long, pendulous; glumes equal in length; lemmas dorsally awned, the awn geniculate and bent at the base; ovary pilose; caryopsis with solid endosperm ..... *Avena*
  - 2b. Plants 3–50 cm tall; panicles dense, spiciform; spikelets 2.8–4.5(–7) mm long; glumes unequal in length; lemmas muticous or with a short subapical awn up to 3 mm long; ovary glabrous; caryopsis with liquid endosperm ..... *Rostraria*
- 1b. Plants perennial, caespitose, rhizomatous or with bulbous bases.
  - 3a. Spikelets 7- to 9-flowered, with 2 or 3 fertile basal florets and 4 to 6 sterile upper florets; rachilla disarticulating only immediately above the glumes, florets falling as a collective unit ..... *Dielsiachloa*
  - 3b. Spikelets (1)2- to many-flowered, without sterile florets or the terminal floret reduced; rachilla disarticulating above the glumes and between the florets (except *Arrhenatherum* where 2 florets fall together).
    - 4a. Lemmas muticous or with a small awn inserted near the apex, the awn straight.
      - 5a. Panicles lax, open; lemmas 3-nerved ..... *Leptaphyllochloa*
      - 5b. Panicles contracted, subspiciform; lemmas 5-nerved.
        - 6a. Lemmas strongly scabrous, the keel with shining ciliate hairs; florets with a single stamen ..... *Raimundachloa*
        - 6b. Lemmas glabrous, the keel scabrous, rarely ciliate (ciliate in *Koeleria fueguina* C. E. Calderón ex Nicora); florets with 3 stamens.
          - 7a. Spikelets 2- or 3(4)-flowered; ovary glabrous or with a few short hairs near the apex; caryopsis fusiform, without a ventral groove, hilum punctiform, endosperm liquid ..... *Koeleria*
          - 7b. Spikelets (1)2(3)-flowered; ovary pilose; caryopsis sub-triangular, with a ventral groove, hilum linear, 1/5–1/3 as long as the caryopsis; endosperm solid ... *Relchela*
    - 4b. Lemma with a dorsal awn inserted well below the apex, the awn geniculate and bent.
      - 8a. Spikelets 2-flowered; the lower floret staminate with a large geniculate awn inserted on the

Table 1. Infrageneric classification of the South American species of *Trisetum* in Louis-Marie's (1928, 1929) and our taxonomic treatment. Accepted taxa are presented in **bold**.

Louis-Marie (1928, 1929)	This treatment
Genus <b>Trisetum</b>	Genus <b>Trisetum</b>
Subg. <i>Heterolytrum</i>	Subg. <i>Trisetum</i>
Sect. <i>Anaulacaa</i>	(Subg. <b>Trisetum</b> )
Subsect. <i>Trisetum</i> (as <i>Eutriseta</i> )	(Subg. <b>Trisetum</b> sect. <b>Trisetum</b> )
<b>T. cernuum</b> Trin., <i>T. fraudulentum</i> Steud.	Sect. <b>Trisetum</b>
<b>T. irazuense</b> (Kuntze) Hitchc.	<b>T. cernuum</b>
<b>T. flavescens</b> (L.) P. Beauv.	<b>T. irazuense</b>
	<b>T. flavescens</b>
	<b>T. foliosum</b> Swallen
	Sect. <b>Trisaetera</b> Asch. & Graebn.
	<b>T. ambiguum</b> Rúgolo & Nicora
<i>T. spicatum</i> var. <i>andinum</i> (Benth.) Louis-Marie	<b>T. andinum</b> Benth.
<b>T. barbinode</b> Trin. var. <b>barbinode</b>	<b>T. barbinode</b> var. <b>barbinode</b>
<b>T. barbinode</b> var. <b>hirtiflorum</b> (Hack.) Louis-Marie	<b>T. barbinode</b> var. <b>hirtiflorum</b>
<b>T. caudulatum</b> Trin., <i>T. splendidulum</i> Steud., <i>T. heteranymum</i> Steud., <i>T. variabile</i> var. <i>flavescens</i> E. Desv., <i>T. variabile</i> var. <i>virescens</i> E. Desv., <i>T. variabile</i> var. <i>chiloense</i> (Phil.) Louis-Marie, <i>T. variabile</i> var. <i>vidalii</i> (Phil.) Louis-Marie, <i>T. mouticola</i> Phil.	<b>T. barbinode</b> var. <b>sclerophyllum</b> (Hack.) Finot
	<b>T. caudulatum</b> Trin. var. <b>caudulatum</b>
<i>T. spicatum</i> var. <i>diauthemum</i> Louis-Marie	<b>T. caudulatum</b> Trin. var. <b>correae</b> Nicora
	<b>T. dianthemum</b> (Louis-Marie) Finot
	<b>T. longiglume</b> Hack.
	<b>T. longiglume</b> var. <b>glabratum</b> Nicora
	<b>T. macbridei</b> Hitchc.
	<b>T. mattheii</b> Finot
	<b>T. nancaguense</b> Finot
<b>T. oreophilum</b> var. <b>johnstonii</b> Louis-Marie	<b>T. oreophilum</b> var. <b>johnstonii</b>
<b>T. oreophilum</b> Louis-Marie var. <b>oreophilum</b>	<b>T. oreophilum</b> var. <b>oreophilum</b>
<i>T. spicatum</i> var. <i>hirsutum</i> Louis-Marie, <i>T. spicatum</i> var. <i>phleoides</i> (d'Urv.) Macloskie	<b>T. phleoides</b> (d'Urv.) Kunth
<b>T. preslei</b> (Kunth) E. Desv., <i>T. lasiolepis</i> E. Desv.	<b>T. preslei</b>
<b>T. spicatum</b> (L.) K. Richt., <i>T. spicatum</i> var. <i>fuagianum</i> (Hack.) Louis-Marie	<b>T. pyramidatum</b> Louis-Marie ex Finot
<i>T. malacophyllum</i> Steud., <i>T. mollifalium</i> Louis-Marie	<b>T. spicatum</b>
<i>T. hirtum</i> Trin.	
	<b>T. spicatum</b> var. <b>cumingii</b> (Nees ex Steud.) Finot
<i>Trisetum erectum</i> Phil.	<b>Bromus</b> sect. <b>Neobromus</b> (Shear) Hitchc.
<i>T. paradaxum</i> Phil.	<b>B. berteroaenus</b> Colla
Subsect. <i>Kaelerifarmia</i>	Unknown status
<i>T. laxiflorum</i> Phil., <i>T. araeauthum</i> Phil., <i>T. brachyatherum</i> Phil., <i>T. depauperatum</i> Phil., <i>T. nemarasum</i> Phil., <i>T. laxum</i> Phil.	Unknown status
	<b>Leptophyllochloa</b> C. E. Calderón
	<b>L. micranthera</b> (E. Desv.) C. E. Calderón

Table 1. Continued.

Louis-Marie (1928, 1929)	This treatment
Subsect. <i>Deschampsioidea</i> Louis-Marie	Subg. <b>Deschampsioideum</b> (Louis-Marie) Finot (without representatives in South America)
<i>Trisetum brasiliense</i> Louis-Marie	<b>Deschampsia brasiliensis</b> (Louis-Marie) Valencia
Subsect. <i>Sphenopholidea</i> Louis-Marie (with- out representatives in South America)	<b>Sphenopholis</b> Scribn. (without representatives in South America)
Subsect. <i>Grappheporum</i> (Desv.) Louis-Marie (without representatives in South America)	<b>Grappheporum</b> Desv. (without representatives in South America)
Sect. <i>Aulacoa</i>	<b>Dielsiochloa</b> Pilg.
<i>T. trinii</i> (E. Desv.) Louis-Marie	<b>Bromus berterioanus</b> Colla
<i>T. floribundum</i> Pilg.	<b>Dielsiochloa floribunda</b> (Pilg.) Pilg.
Subg. <i>Isolytrum</i>	
<i>T. deyeuxioides</i> (Kunth) Kunth, <i>T. evolutum</i> (E. Fourn.) Hitchc.	<b>Peyritschia deyeuxioides</b> (Kunth) Finot
<b>T. longiglume</b> Hack., <i>T. andicola</i> Louis- Marie	see <b>T. sect. Trisaetera</b>
<b>T. macbridei</b> Hitchc.	see <b>T. sect. Trisaetera</b>

- lower 1/3 of the lemma; upper floret perfect, the apex mucicous or with a small subapical awn ..... *Arrhenatherum*
- 8b. Spikelets (1)2- to many-flowered; florets all perfect.
- 9a. Spikelets 3- to 8-flowered; lemmas 7- to 9-nerved; panicles terminal and with cleistogamous axillary panicles ..... *Amphibromus*
- 9b. Spikelets (1)2- or 3(to 6)-flowered; lemmas 5-nerved; panicles terminal and, if present, axillary panicles not cleistogamous.
- 10a. Culms with a bulbous base; panicles spiciform; glumes shorter than all florets (together); lemmas rounded on the back, the awn inserted near the middle; lemma apex bilobed, hyaline; callus acute ..... *Helictotrichon*
- 10b. Culms without a bulbous base; panicles open or spiciform; glumes shorter to longer than all florets; lemma keeled, somewhat laterally flattened, the awn inserted on the upper 1/3; lemma apex bidentate with intermediate nerves prolonged into setae; callus obtuse ..... *Trisetum*

TAXONOMIC TREATMENT

**Trisetum** Pers., Syn. Pl. 1: 97. 1805. TYPE: *Trisetum flavescens* (L.) P. Beauv., Ess. Agrostogr. 88, 153, t. 13, f. 1. 1812, lectotype, designated by Hitchcock, U.S.D.A. Bull. 772: 107–109. 1920.

*Rupestrina* Prov., Fl. Canad.: 689. 1862. TYPE: *Rupestrina pubescens* Prov. (= *Trisetum spicatum* (L.) Richt.)

Perennials, caespitose, sometimes shortly rhizomatous; culms 5–300 cm tall, erect to geniculate at base, glabrous or pubescent. Leaf sheaths glabrous or pubescent, longer or shorter than the internodes; blades flat, conduplicate, convolute or involute, soft, rarely rigid; ligule membranous. Inflorescence in panicles contracted or open, spiciform, ovate or pyramidal; the rachis glabrous, scabrous, or pubescent. Spikelets (1)2- to 6-flowered, short pedicellate; rachilla pubescent or glabrous, usually prolonged beyond the upper floret; disarticulation above the glumes and between the florets;

glumes heteromorphic, lanceolate to ovate-lanceolate, equal or unequal, first glume 1- to 3-veined, usually shorter and narrower than the second, second glume 3- to 5-nerved; lemmas lanceolate, (3 to)5(to 7)-veined, usually awned or mucicous, with apex and margins hyaline, glabrous or pubescent, slightly keeled and compressed, rarely terete; apex with 2 to 4 short awns, entire, or 2-toothed; central awn from the upper 1/3, rarely the middle, of the subapical portion of the lemma; awn exerted, geniculate or merely divaricate; callus short pilose; palea not tightly enclosed by the margins of the lemma (gaping), 2-keeled, hyaline, usually shorter than the lemma; stamens 3, anthers 0.3–4.5 mm long; lodicules 2, membranous; ovary glabrous or with short and shining trichomes near the apex. Caryopses compressed, soft; hilum short, punctiform; endosperm solid or liquid, soft or hard. Basic chromosome number  $x = 7$ .

*Comments.* Our subgeneric treatment of the

species that occur in South America includes a single subgenus: *Trisetum* subg. *Trisetum* with two sections: section *Trisetum* and section *Trisetaera*. In the following key we have indicated in which section each species resides (see leads 1a and 1b). Species

numbered 1–4 are placed in *Trisetum* sect. *Trisetum* and species numbered 5–18 are placed in *Trisetum* sect. *Trisetaera*. A description of *Trisetum* subg. *Trisetum* and *Trisetum* sects. *Trisetum* and *Trisetaera* appears in Finot et al. (2004).

KEY TO SPECIES AND VARIETIES OF *TRISETUM* IN SOUTH AMERICA

- 1a. Panicles lax, mostly open or narrow, pyramidal, never spiciform; culms glabrous below the inflorescence; glumes unequal, the first glume shorter and narrower than the second glume; glumes notably shorter than the florets (*Trisetum* sect. *Trisetum*).
  - 2a. Sheath apex notably extended upward on one side as an appendix as long as the ligule ..... 3. *T. foliosum*
  - 2b. Sheath apex not extended as an appendix.
    - 3a. Ovary and caryopsis hairy at the apex; panicles few-flowered, the lower branches usually naked below; first glume 0.5–5 mm long, sometimes reduced; ligule 1.5–7 mm long ..... 1. *T. ceruuum*
    - 3b. Ovary and caryopsis glabrous at the apex; panicles densely-flowered, branches not naked below; first glume 2–5 mm long, never reduced.
      - 4a. Panicles usually gold-yellowish; lemmas not strongly scabrous; ligule 0.5–2 mm long; leaf blades (3–)10–16 cm long, 2–4 mm wide ..... 2. *T. flavescens*
      - 4b. Panicles greenish to purplish; lemmas strongly scabrous; ligule 2–4 mm long; leaf blades 20–30 cm long, 2.5–6 mm wide ..... 4. *T. irazuense*
- 1b. Panicles spiciform to contracted, never open; culms pubescent or hairy below the inflorescence, rarely glabrous to subglabrous; glumes subequal, a little shorter, equal or longer than the florets (*Trisetum* sect. *Trisetaera*).
  - 5a. Lemma hairy, the hairs usually more than 0.5 mm long.
    - 6a. Plants small, usually less than 20 cm tall; panicle dense, spiciform.
      - 7a. Leaf glabrous; glumes equaling or slightly exceeding the florets; first glume 4.5–6 mm long; second glume (4.5–)5.5–6.6 mm long ..... 16. *T. preslei*
      - 7b. Leaf hairy; glumes shorter than the florets; first glume 2.7–4 mm long; second glume 3.3–4.7 mm long ..... 14b. *T. oreophilum* var. *johnstonii*
    - 6b. Plants taller, usually more than 30 cm tall; panicle spiciform or contracted.
      - 8a. Glumes longer or equaling the florets, the second glume usually longer than the florets; first glume 1- or 3-nerved; leaf glabrous.
        - 9a. Panicles contracted, pale green, up to 15 cm long; glumes unequal; second glume 6.5–10 mm long; leaf blades soft ..... 7a. *T. barbinode* var. *barbinode*
        - 9b. Panicles spiciform, gold-purple, (2–)3–5(–8) cm long; glumes subequal to unequal; second glume 5–8 mm long.
          - 10a. Ovary glabrous; blades stiff ..... 7c. *T. barbinode* var. *sclerophyllum*
          - 10b. Ovary with short trichomes on the apex; blades soft ..... 7b. *T. barbinode* var. *hirtiflorum*
      - 8b. Glumes shorter than the florets; first glume 1-nerved; leaf blades pubescent.
        - 11a. Panicles silvery-green to weakly purple, not purplish; spikelets 5.5–8 mm long; first glume 3.5–6 mm long; second glume 5.3–7.6 mm long ..... 13. *T. nancaguense*
        - 11b. Panicles green-purplish to strongly purplish; spikelets 3.5–5 mm long; first glume 2.2–4.5 mm long; second glume 2.8–4.7 mm long.
          - 12a. Panicles 0.8–1.5 cm wide, dense, many-flowered; spikelets 3.5–4.5 mm long; first glume 2.2–3.6 mm long; second glume 2.8–4.1 mm long ..... 14a. *T. oreophilum* var. *oreophilum*
          - 12b. Panicles 0.5–0.8 cm wide, narrow, few-flowered; spikelets 4.5–5 mm long; first glume 3.5–4.5 mm long; second glume 3.8–4.7 mm long ..... 12. *T. mattheii*
  - 5b. Lemma glabrous or scabrous, never hairy, but rarely covered with very short hairs, the hairs shorter than 0.5 mm long.
    - 13a. Panicles no more than 3 to 4 times as long as wide, dark purplish; plants velvety; lemma scabrous or covered with very short trichomes giving a velvety texture ..... 6. *T. andinum*
    - 13b. Panicles more than 3 to 4 times as long as wide, green to more or less purplish; plants glabrous or pilose, not velvety; lemmas glabrous or scabrous, not velvety.
    - 14a. Glumes longer than the florets, subequal in length and width.
      - 15a. Plant totally pubescent; glumes ciliate on the keel; first glume 4–6.5 mm long, second glume 5–6.5 mm long ..... 15. *T. phleoides*
      - 15b. Plants not totally pubescent; glumes scabrous on the keel, not ciliate; glumes more than 6–9.5 mm long.
        - 16a. Glumes 7.5–8 mm long, ovate, exceeding the florets by 1/3–1/2 in length; blades pilose ..... 11. *T. macbridei*
        - 16b. Glumes 6–9.5 mm long, lanceolate, exceeding the florets by 1/4–1/3 in length; blades glabrous.

- 17a. Spikelets 6.5–8 mm long; awn borne on the upper 1/3 of the lemma; callus trichomes short (ca. 0.2 mm long); ovary glabrous at the apex ..... 9. *T. dianthemum*
- 17b. Spikelets 9–10 mm long; awn borne on the middle of the lemma; callus trichomes long, reaching 1/2–3/4 the length of the lemma; ovary with or without trichomes at the apex.
- 18a. Panicles ovoid, dense, subspiciform, many-flowered; ovary and caryopsis with short, curved and shining trichomes near the apex; caryopsis 2–2.7 mm long; anthers (0.5–)0.8–1 mm long ..... 10a. *T. longiglume* var. *longiglume*
- 18b. Panicles linear, narrow, few-flowered; ovary and caryopsis glabrous near the apex; caryopsis 3.5–4.2 mm long; anthers 1.3–1.7 mm long ..... 10b. *T. longiglume* var. *glabratum*
- 14b. Glumes equal or shorter than the florets, dissimilar in length and width, or the first glume shorter and the second glume longer than the florets and first glume shorter and narrower than the second glume.
- 19a. Spikelets 1-flowered; ovary with a few trichomes at the apex; lemma conspicuously nerved toward the apex, the intermediate and marginal nerves prolonged beyond the apex as four short apical awns ..... 5. *T. ambiguum*
- 19b. Spikelets 2- or 3(to 5)-flowered; ovary glabrous at the apex; lemma inconspicuously nerved toward the apex, the intermediate nerves prolonged beyond the apex as 2 setae or short apical awns, the marginal nerves not prolonged beyond the apex.
- 20a. Second glume longer than the spikelet, the first glume shorter than the spikelet.
- 21a. Plants rhizomatous; panicle pyramidal, contracted, not spiciform, 7–11 cm long, 2–3 cm wide; paleas always shorter than the lemma ..... 17. *T. pyramidatum*
- 21b. Plants caespitose; panicle spiciform, dense, 4–10 cm long, 0.8–2 cm wide; paleas a little shorter than the lemma in the first floret and longer than the lemma in the upper floret ..... 18b. *T. spicatum* var. *cumingii*
- 20b. Glumes (second and first) shorter than the florets.
- 22a. Glumes similar in width, the first glume 0.5–1 mm wide, first glume as wide as second glume or a little narrower; culms densely pubescent below the panicles; blades glabrous or pilose; spikelets 2- or 3-flowered ..... 18a. *T. spicatum* var. *spicatum*
- 22b. Glumes dissimilar in width, the first glume 0.3–0.5 mm wide, narrower than the second glume; culm glabrous to subglabrous below the panicles; blades pilose; spikelets 2- to 4(5)-flowered.
- 23a. Ovary and caryopsis glabrous at the apex ..... 8a. *T. caudulatum* var. *caudulatum*
- 23b. Ovary and caryopsis with trichomes at the apex ..... 8b. *T. caudulatum* var. *correae*

**Trisetum** subg. **Trisetum** sect. **Trisetum**

**1. *Trisetum cernuum*** Trin., Mém. Acad. Imp. Sci. St. Pétersbourg Sér. 6, Sci. Math. 1 (1): 61. 1830. *Avena cernua* (Trin.) Kunth, Rev. Gen. 1, suppl. 26. 306. 1833. TYPE: U.S.A. Alaska, Sitka, *J. F. G. von Eschscholtz s.n.* (holotype, LE not seen; isotypes, BAA-3366!, Pl., US-81779!).

*Avena leptostachys* Hook. f., Fl. Antarct.: 378. 1846. TYPE: Chile. Strait of Magalhaens. Port Famine, 1826, *Capt. King s.n.* (holotype, K not seen; isotypes, SGO ex K!, US-fragm. ex K!).

*Trisetum fraudulentum* Steud., Syn. Pl. Glumac. 1: 424. 1854. TYPE: Chile. Sandy Point, Magellan, *W. Lechler 1283* (holotype, Pl.; isotypes, CONC fragm. ex Pl., US-868480 fragm. ex LE!, US fragm. ex P-STEUD-434 & photo!).

Perennial, with short rhizomes; culms 35–85 cm tall, glabrous, up to 3 mm diam. near base, somewhat geniculate; nodes 2 to 4, glabrous. Leaf

sheaths longer or shorter than the internodes, glabrous or more rarely sparsely pilose; ligule 1.5–7 mm long, longer in the upper leaves, oval, fimbriate, ciliate on the margins, the dorsal surface glabrous or more frequently pilose; blades 10–22 × 0.3–1.2 cm, flat, soft, glabrous or sparsely pubescent adaxially. Panicles 6–30 × 2–5 cm, lax, open, nodding, green or purple; the branches capillary, flexuous, the lower branches usually naked toward the base or with spikelets to the base. Spikelets 4.5–12 × 2–4 mm, (2)3- or 4-flowered; pedicels 1–4.5 mm long, capillary, flexuous, glabrous or scabrous; rachilla 1.5–2 mm long, pilose with stiff trichomes 1–2 mm long; glumes shorter than the florets, 1/2 to 2/3 as long as the spikelet, very unequal to subequal in length and very unequal in width, the first glume narrower than the second; keel smooth to scaberulous; margins hyaline, sometimes scabrous-ciliate; first glume 0.5–5 × 0.1–0.5 mm, usually 1/2–2/3 as long as the second glume,

linear-lanceolate, attenuate, 1-nerved, sometimes reduced; second glume  $3\text{--}7.5 \times 0.5\text{--}1$  mm, oval-lanceolate, 3-nerved; florets  $5\text{--}8.5 \times 0.7\text{--}1$  mm; lemmas linear-lanceolate, glabrous, scabrous toward the apex, awned, green or tinged with purple on the margins and apex; apex 2-aristulate, the aristae  $0.5\text{--}1.5$  mm long; awn  $6\text{--}16$  mm long, borne on the upper 1/3 ca.  $1.5\text{--}2.5$  mm below the apex, curved, not strongly twisted nor geniculate, scabrous, up to 3 times as long as the lemma; callus obtuse, pubescent, the trichomes  $0.2\text{--}0.7$  mm long; paleas  $3.5\text{--}5.7$  mm long, shorter than the lemma, hyaline, 2-nerved, the nerves scabrous; apex bidentate; anthers  $0.5\text{--}1.5$  mm long; lodicules  $0.7\text{--}0.8$  mm long; apex bilobed; ovary with short and curved trichomes near the apex. Caryopses  $2.5 \times 1$  mm, hairy at the apex; endosperm soft.

**Distribution and habitat.** Disjunct, occurring in western North America, west of the Rocky Mountains, from southwestern Alaska to northern California, and in southern South America. In South America, *Trisetum cernuum* occurs in Patagonia of Argentina and Chile usually below 2000 m, from  $38^\circ\text{S}$  to approximately  $55^\circ\text{S}$ , south of Estrecho de Magallanes. In Chile, it grows from the Region IX (Malleco, ca.  $38^\circ\text{S}$ ) to the Region XII (Isla Navarino, ca.  $54^\circ55'\text{S}$ ). In Argentina, *T. cernuum* is found in Chubut, Neuquén, Río Negro, and Tierra del Fuego (Nicora, 1978; Zuloaga et al., 1994), from  $38^\circ\text{S}$  in Chubut to  $54^\circ47'\text{S}$  in Ushuaia. This species is frequently associated with moist woods of *Araucaria araucana* (Mol.) K. Koch-*Nothofagus dombeyi* (Mirb.) Oerst. and *Nothofagus pumilio* (Poepp. & Endl.) Krasser, and "mallines" forests between sea level and 1500 m.

**Phenology.** Flowering between January and March.

**Illustrations.** Hitchcock and Chase (1950: 289, fig. 389); Nicora (1978: 242, fig. 156 A–D).

**Comments.** *Trisetum cernuum* is a well-defined species, easily recognized by its lax, open, nutant panicles with subverticillate and paucispiculate branches, the lower ones without spikelets below the middle, spikelets with dissimilar glumes, glumes shorter than the spikelets, and caryopses with short hairs at the apex. These hairs, very typical in the genus *Trisetum*, are also present in other South American species such as *T. ambiguum*, *T. caudulatum* var. *correoe*, *T. borbinode* var. *hirtiflorum*, and *T. longiglume* var. *longiglume*. All these species are restricted to Chile and Argentina, and they are easily distinguished from *T. cernuum* by their spiciform panicles. *Trisetum cernuum* shows extreme variation in glume length, especially in the

first glume. The first glume, usually  $2\text{--}3.8$  mm long, can be reduced to  $0.5$  mm long. However, we found spikelets with reduced and non reduced glumes in the same plants (e.g., *Bolander 6122*, collected in California, U.S.A.). *Trisetum cernuum* is morphologically similar to *T. flavescens* and *T. irazuense*. *Trisetum cernuum* differs from *T. flavescens* in having paucispiculate panicles, hairy caryopses, and shorter glumes that are sometimes reduced. *Trisetum flavescens* has multispiculate panicles, glumes that are never reduced, and caryopses that are glabrous at the apex. *Trisetum flavescens* is a European species, introduced in southern South America as a forage plant (Nicora, 1978). *Trisetum irazuense* differs from *T. cernuum* in having lemmas strongly scabrous and the ovary glabrous at the apex. It shares with *T. cernuum* lax, open panicles, spikelets with glumes shorter than the florets, and dissimilar glumes that are never reduced. *Trisetum irazuense* is distributed in Mexico, Costa Rica, Panama, Honduras, Colombia, Venezuela, Ecuador, and Peru (Hitchcock, 1927; Pohl, 1980; Hernández-Torres & Koch, 1983; Davidse et al., 1994; Jørgensen & Ulloa, 1994; Finot et al., 2004).

**Additional specimens studied.** ARGENTINA. **Chubut:** Lago Fontana. 10 Feb. 1932, *Castellanos s.n.* (BA, S). **Neuquén:** Los Lagos, Villa La Angostura, *Pedersen 1523* (CTES). **Río Negro:** Bariloche, Valle del Chollhuaco, Refugio Neumeyer. *Rúgolo de Agrasar et al. 12381* (CONC); Región montañosa cercana al Lago Nahuel Huapí. *Parodi 11827* (BAA); P.N. Nahuel Huapí, Cerro López. *Pérez Moreau 1949* (BA); Lago Nahuel Huapí, Cerro Catedral. *Cabrera 11511* (LP). **Tierra del Fuego:** Bahía Lapataia. 2 Feb. 1948. *Pérez Moreau & Guarrera s.n.* (BA); Valle de Tierra Mayor, *Ruiz Leal & Roig 15023* (MERL, BAA); Ushuaia, source gauche du Río Grande, 7 Mar. 1896. *Alboff s.n.* (CORD); Ushuaia, cerros alrededores de Ushuaia, *Grondona 5695* (BAA). CHILE. **IX Región:** Malleco. Cordillera de Las Raíces, *Matthei & Bustos 111* (CONC). **X Región:** Valdivia, Chihuido, Hito de Portezuelo Ipela, *Godoy 119* (CONC); Palena, Las Escalas, Futaleufú. *Hildebrand-Vogel 31* (CONC); Río Chico, Futaleufú. *Hildebrand-Vogel 45* (CONC). **XI Región:** Aysén, Reserva Forestal Mano Negra. *Schlegel 7194* (CONC); Reserva Forestal Mano Negra. *Schlegel 7187* (CONC); Prov. Coihaique, Sector Lago Palena. *Godoy, Hildebrand-Vogel & Vogel 3* (CONC); Parque Nacional Trapananda, *Schlegel 8070* (CONC); General Carrera, Estero Cofré. *Vogel 540* (CONC); Estero Cofré. *Vogel 519* (CONC); Río Ibáñez. *Vogel 5* (CONC); Capitán Prat, Villa O'Higgins. *Vogel s.n.* (CONC). **XII Región:** Magallanes, Punta Arenas, Minas de carbón, *Ricardi & Matthei 335* (CONC); Puerto Williams, Isla Navarino, Cerro Bandera, *Schlegel 8122* (CONC).

**2. *Trisetum flavescens* (L.) P. Beauv., Ess. Agrostogr. 88, 153, t. 18, f.1. 1812.** Basionym: *Avena flavescens* L., Sp. pl. 80. 1753. *Trisetaria flavescens* (L.) Baumg., Enum. Stirp. Transsilv. 3: 263. 1816. *Rebentischia flavescens* (L.) Opiz,



Lotos 4: 104. 1854, as synonym of *Trisetum flavescens* (L.) P. Beauv. TYPE: Herb. A. Van Royen no. 913.7-458 (lectotype, LINN-97.14, designated by Cope in Cafferty et al., Taxon 49(2): 247. 2000, not seen).

Perennial, caespitose; culms (20-)80-110 cm tall; nodes 2 to 5, glabrous. Leaf sheaths shorter than the internodes, glabrous or sparsely pilose below; ligule 0.5-2 mm long, truncate, ciliate, the dorsal surface glabrous; blades (3-)10-16 × 0.2-0.4 cm, flat, glabrous abaxially, scabrous and sparsely pilose adaxially. Panicles 5-18 × 2-8 cm, dense, lax, open or narrow, gold-yellow, shining. Spikelets 5-7(-8.5) mm, 2- to 4-flowered; rachilla ca. 1.2 mm long, pilose, with trichomes up to 1 mm long; glumes shorter than the florets, unequal; keel scabrous; first glume 2-4 × 0.1-0.2 mm, linear-lanceolate, narrow, 1-nerved, subulate, usually 1/2 as long as the second glume; second glume 4-6.6 × 1 mm, oval-lanceolate, 3-nerved; lemmas 4-6 mm long, glabrous, awned, somewhat scabrous toward the apex; apex 2-dentate to 2-aristulate; awn 5-9 mm long, borne on upper 1/3 or 1/4, geniculate and twisted toward the base; callus pubescent, the trichomes ca. 0.5 mm long; paleas a little shorter than the lemma, hyaline, 2-nerved, the nerves scabrous; apex 2-dentate to 2-setulate; lodicules bilobed at the apex; anthers 2-3 mm long; ovary glabrous. Caryopses 2-3 mm long, glabrous; endosperm liquid.

*Chromosome number.*  $2n = 24, 28$  (Bolkhovskikh et al., 1969; Tsvelev, 1983; Dixon, 1995; Frey, 1992).

*Distribution and habitat.* A European species that was introduced from Europe in North and South America (Frey, 1992). In South America it occurs in the Chilean and Argentinean Patagonia and is an important forage plant (Nicora, 1978). Zuloaga et al. (1994) cited this species for Neuquén, Argentina.

*Phenology.* Flowering in December.

*Illustrations.* Hitchcock and Chase (1950: 291, fig. 393); Nicora (1978: 242, fig. 157 A-C).

*Additional specimens studied.* ARGENTINA. **Neuquén:** Península Panguinal, costa N Lago Nahuel Huapi. *Diem* 463 (BAA); Nahuel Huapi, cultivated. *Gallinal, Aragona, Bergalli, Campal & Rosengurt* 5594 (US). GERMANY. Magdeburg, 23 June 1932, *Schwing s.n.* (CONC). U.S.A. **Washington:** Walla Walla, 31 May 1900, *Lechenby s.n.* (US).

**3. *Trisetum foliosum*** Swallen, Contr. U.S. Natl. Herb. 29(6): 256. 1948. TYPE: Venezuela. Mérida: rocky slopes along stream above La-

guna Mucubaji, toward Laguna Negra, 3625-3655 m, 21 July 1944, *J. A. Steyermark 57482* (holotype, US-1911640!; isotypes, MO-3846028!, MO-3873805 fragm. ex VEN!; VEN not seen, F-1216139!).

Perennial, with short rhizomes; culms glabrous, 35-80 cm tall; nodes glabrous, basal. Leaf sheaths sometimes with auricles, lower sheaths covered with short retrorse trichomes, the upper sheaths glabrous to puberulous; ligule 2-4 mm long, hyaline, oval to triangular, denticulate on the margins, the dorsal surface glabrous; blades 7-20 × 0.1-0.6 cm, flat; lower blades on culm densely pubescent, upper blades glabrous. Panicles 10-19 × 1-1.5 cm, lax, contracted, not spiciform, linear, purple; rachis glabrous. Spikelets 7-7.5 mm long, 2-flowered; pedicels 0.5-5 mm long, glabrous; rachilla 1-1.8 mm long, covered with trichomes 1-1.5 mm long; glumes subequal, the first glume a little shorter than the second glume, membranous; margins hyaline; keel scabrous near apex; apex acute; first glume 5.5-6.4 × 0.6-1.2 mm, oval-lanceolate, attenuate, 1-nerved; second glume 6.5-7 × 1-1.6 mm, oval, 3-nerved, almost equaling the spikelet in length; florets 6-6.7 × ca. 1 mm; upper floret shorter; lemmas glabrous, awned dorsally; apex bidentate, the teeth aristulate with projection of the intermediate nerves; awn 8-11 mm long, borne on the upper 1/3, at 2-2.5 mm from the apex, twisted at the base, curved or weakly geniculate, scabrous; callus obtuse, with trichomes 0.5-0.8 mm long; paleas ca. 4.5 mm long, shorter than the lemma, hyaline, 2-nerved, the nerves scabrous; anthers 1.2-1.5 mm long; lodicules 0.7-0.8 mm long, obovate, with 3 or 4 short apical teeth; ovary glabrous, the styles well apart. Caryopses not seen.

*Distribution and habitat.* *Trisetum foliosum* is endemic to Venezuela. It has been collected in páramos on rocky slopes and near streams and lakes, between 3500 and 3655 m.

*Phenology.* Flowering between November and July.

*Comments.* *Trisetum foliosum* resembles *T. flavescens* and *T. cernuum* in having lax panicles and spikelets with glumes shorter than the florets. It differs from *T. cernuum* in having subequal glumes, the first glume a little shorter than the second glume, the first glume never reduced, and the ovary is glabrous (glumes very unequal, the first glume conspicuously shorter than the second glume, the first glume sometimes reduced, and the ovary is hairy in *T. cernuum*). *Trisetum foliosum* differs from *T. flavescens* in having more contracted (1-1.5 cm wide) and purple panicles and longer ligules (2-4

mm long) versus open (2–8 cm wide) and gold-yellow panicles, and shorter ligules (0.5–2 mm long) in *T. flavescens*.

*Additional specimen studied.* VENEZUELA. **Mérida:** pass on the Mérida–Barinas Hwy., páramo above Laguna Grande and Universidad de Los Andes Experimental Station, *Davidse* 3226 (US).

**4. *Trisetum irazuense*** (Kuntze) Hitchc., Proc. Biol. Soc. Wash. 40: 82. 1927. Basionym: *Calamagrostis irazuensis* Kuntze, Revis. Gen. Pl. 2: 763. 1891. TYPE: Costa Rica. Volcán Irazú, Waldregion, 3000 m, 24 June 1874, *C. E. O. Kuntze* 2334 (holotype, NY-346300 ex Herb. Kuntze!).

*Trisetum scabriflorum* Hitchc., Contr. U.S. Natl. Herb. 24: 358. 1927. TYPE: Colombia. Cauca: collected below Pitayó. Río Palo Basin, Tierra Adentro, 2400 m, Feb. 1906, *H. Pittier* 1435 (holotype, US-531631!).

*Trisetum fournierianum* Hitchc., Contr. U.S. Natl. Herb. 17: 326. 1913, new name for *Trisetum gracile* E. Fourn., Mexic. Pl. 2: 108. 1886, *nam. illeg.* TYPE: “San Luis de Potosí,” *M. Virlet d’Aoust* 1382 (lectotype, Pl. designated by Finot et al., Ann. Missouri Bot. Gard. 91: 13. 2004; isotype, US-726971b fragment ex Pl.).

Perennial; caespitose; culms 75–100 cm tall, glabrous, up to 2 mm diam. on the lower internodes; nodes 3, glabrous. Leaf sheaths shorter or slightly longer than the internodes, glabrous or pubescent; basal sheaths pubescent; ligule 2–4 mm long, membranous, pubescent to densely pubescent, the apex truncate, dentate or ciliate; blades 20–30 cm × 2.5–6 mm, flat, glabrous or pubescent; upper blades 5–10 cm long. Panicles (7–)3–25 × (1–)2–5 cm, lax, narrow, yellow-green to deep green and purple; rachis glabrous to sparsely pubescent; the branches appressed and ascending. Spikelets 4–7(–9) mm long, 2- or 3-flowered; pedicels 2–7 mm long, glabrous to sparsely pubescent, sometimes scabrous; rachilla 1–1.7 mm long, covered with stiff trichomes, the trichomes 0.5–1 mm long; glumes very unequal, shorter than the florets; the keel scabrous on the upper half, the margins hyaline; first glume 2.5–5 mm long, narrow, linear, 1-nerved, acute at the apex, half as long as the spikelet; second glume 3.5–6.5 mm long, lanceolate to ovate-lanceolate, abruptly attenuate, 3-nerved, 3/4 as long as the spikelet; lemmas 4.3–6 mm long, 5-nerved, the nerves inconspicuous toward the base, strongly scabrous on the upper half, green and purplish toward the apex, sometimes with short trichomes toward the base; apex awned, hyaline, bistriate or toothed, the apical awns ca. 0.5 mm long, conspicuous; awn (2.5–)5.5–8.5 mm long, borne on the upper 1/3 or 1/4, straight or twisted

and geniculate; callus obtuse, with short trichomes, the trichomes ca. 0.2–0.3 mm long; paleas 3.2–4.6 mm long, slightly shorter than the lemma, hyaline, 2-keeled, the keels scabrous on the upper half, 2-dentate to 2-awned at the apex; anthers (0.8–)1.2–1.8 mm long; lodicules ca. 0.7 mm long, bilobed at the apex, the lobes acute; ovary glabrous. Caryopses 2.2–3 mm long; endosperm soft.

*Chromosome number.*  $2n = 28, 42$  (Hernández-Torres & Koch, 1988).

*Anatomy and micromorphology.* Hernández-Torres & Engleman (1995); Finot et al. (2004).

*Distribution and habitat.* *Trisetum irazuense* ranges from Mexico to Peru (Calderón de Rzedowski & Rzedowski, 2001; Finot et al., 2004). In South America it is found in Colombia, Venezuela, Ecuador, and Peru between 1500 and 3800 m.

*Phenology.* Flowering between November and August.

*Illustrations.* Pohl, W. (1980: 578, fig. 217 C).

*Comments.* *Trisetum irazuense* resembles *T. cernuum* in having lax, open panicles bearing long pedicellate spikelets with dissimilar glumes shorter than the florets. Anatomically both species have very similar characteristics in anatomical transverse section, and abaxial and adaxial epidermes. However, these two species are easily separated. *Trisetum irazuense* has strongly scabrous lemmas (relatively glabrous in *T. cernuum*) and a glabrous ovary (hairy in *T. cernuum*) (see additional comments under *T. cernuum*).

*Additional specimens studied.* COLOMBIA. **Bogotá:** Peña, *Lindig* 1862 (P). **Caldas:** Laguneta, Salento, *von Sneider* 3027 (S). **Santander:** Minas San Juan 5 km above California, *Rabinsan & Beltran* 3041 (US). **Departamento del Valle:** Cordillera Central, vertiente occidental, Hoya del río Bugalagrande, Barragán, cerro de La Laguna, *Cuatrecasas* 20847 (F); Cordillera Central, vertiente occidental, Hoya del río Bugalagrande, Loma de Barragán, desde La Parrilla a La Machuca, *Cuatrecasas* 20680 (F). ECUADOR. **Carchi:** Hacienda La Esperanza, sector El Voladero, páramo de El Angel, *Dávalos* 20 (US); 22 km SW of Tulcan on road to El Angel, *Petersan et al.* 9146 (US); Valle de Maldonado, km 53 on the road Tulcán–Maldonado, *Halm-Nielsen et al.* 5553 (S); Las Penas between La Rinconada and San Gabriel, *Asplund* 7215 (S); above el Pun toward Tulcán, *Asplund* 16868 (S). **Pichincha:** below San Juan, *Asplund* 16093 (S); vicinity of Quito, *Asplund* 6156 (S); Mt. Corazón, páramo, *Asplund* 9686 (S); Nono, *Asplund* 7441 (P, S); Reserva Geobotánica Paschocha, *Laegaard* 101414 (QCA); Pululagua, *Asplund* 6733 (US). **Riobamba:** Hacienda Toldo, Oct. 1891, *Sadira s.n.* (P). **Azuay/Morona:** near the pass on road Sigis–Gualaquiza, *Laegaard et al.* 103031 (QCA). **Bolívar:** La Magdalena, *Asplund* 8280 (P, S). **Tungurahua:** vicinity of Patate, Hacienda Leito, *Asplund* 7978 (P). PERU. **Piura:** Prov. Huancabamba, 23 km E of Sondor, on road toward Tabacones, *Petersan & Refulio-Rodríguez* 15135 (US). VENEZUELA. **Mérida:** entre Timotes y Chachopo, *Bur-*

*kart & Tamaya 16733* (BAA). **Monagas:** Cerro Negro, above La Sabana de las Piedras, NW of Caripe, *Steyermark 62083* (F). **Sucre:** Cerro Turumuquire, north-facing slopes between La Trinidad and zone of cloud forest, *Steyermark 62488* (F).

***Trisetum*** subg. ***Trisetum*** sect. ***Trisaetera*** Asch. & Graebn., Syn. Mitteleur. Fl. 2: 270. 1895. TYPE: *Trisetum spicatum* (L.) K. Richt.

**5. *Trisetum ambiguum*** Rúgolo de Agrasar & Nicora, Bol. Soc. Argent. Bot. 25: 468. 1988. TYPE: Argentina. Prov. Santa Cruz: Dpto. Güer Aike, Ea. Sofía, Secc. Cuadrado, 5 km al S de Est. Punta del Monte, 350 m, 51°41'S, 71°18'W, 12 Feb. 1978, O. Boelcke, D. Moore & F. Roig 3119 (holotype, BAB not seen; isotype, SI!).

Perennial, with short rhizomes; culms 12–34 cm tall, with short, retrorse trichomes below the inflorescence. Leaf sheaths glabrous or pubescent; ligule 1–2.5 mm long, denticulate, laciniate, the dorsal surface glabrous; blades 40–50 × 1.5–2 mm, short, flat to conduplicate, scabrous on the margins, glabrous to pilose abaxially, scabrous-pubescent to pilose adaxially. Panicles 4–7.5 × 1–1.5 cm, spiciform, dense; rachis pilose. Spikelets ca. 6 mm long, 1-flowered; pedicels scabrous; rachilla ca. 1.5 mm long, pilose with trichomes 1.5 mm long; glumes longer than the floret isomorphic; first glume 5–5.5 × ca. 0.5 mm, equal or slightly shorter than the floret, and slightly shorter and narrower than the second glume, lanceolate to oval-lanceolate, equaling or slightly shorter than the florets, 1-nerved; second glume 5–5.5 × ca. 0.8 mm, slightly longer or equaling the floret, lanceolate to oval-lanceolate, 3-nerved; florets 4–5 mm long; lemmas glabrous, scabrous toward the apex, 5-nerved, the nerves conspicuous toward the apex, awned dorsally; apex hyaline with the intermediate and marginal nerves prolonged as 4 short awns; awn 4–5 mm long, borne on the upper 1/3, strongly twisted and curved; callus obtuse, with trichomes ca. 0.5 mm long; paleas 3–3.5 mm long, shorter than the lemma, 2-nerved, the nerves scabrous toward the apex; flowers cleistogamous; anthers 0.5–0.8 mm long; lodicules ca. 0.8 mm long, minutely bilobed near the apex; ovary with 1 to several curved trichomes at the apex. Caryopses ca. 2.5 mm long, pubescent at the apex; endosperm dry.

*Distribution and habitat.* Endemic to southern Argentina and Chile (Zuloaga et al., 1994; Finot, 2002). In Argentina it is found in Santa Cruz and Tierra del Fuego, between 51°S and 53°55'S (Rúgolo de Agrasar & Nicora, 1988). In Chile it grows

in Región XII, Prov. de Última Esperanza, between 50°S and 51°S, and between 500 and 900 m.

*Phenology:* Flowering between January and February.

*Illustrations.* Rúgolo de Agrasar and Nicora (1988: 469, fig. 2A–K).

*Comments.* *Trisetum ambiguum* is closely related to *T. spicatum* var. *cumingii* and differs from the latter by having 1-flowered spikelets, isomorphic glumes, the awn several times curved, and the ovary and caryopsis with a few trichomes. *Trisetum spicatum* var. *cumingii* has 2- or 3-flowered spikelets, unequal glumes, a geniculate awn, and a glabrous ovary and caryopsis.

*Additional specimens studied.* ARGENTINA. **Santa Cruz:** Güer Aike, Valle Superior Río Turbio, *Ambrasetti & Méndez 29875* (MERL); Valle Superior Río Turbio, *Ambrasetti & Méndez 29883* (MERL); Estancia La Carlota, sección San Elías, *Roig et al. 103* (SI). **Tierra del Fuego:** Norte de Río Grande, Ea. María Behety, *Sariano 4847* (BAA, paratype); Castillo, 30 Jan. 1942, *Castellanos s.n.* (BA); Río Grande, 1 Mar. 1917, *Banarelli s.n.* (SI); Cerro Mesa, 31 Jan. 1942, *Castellanos s.n.* (BA). CHILE. **XII Región:** Prov. de Última Esperanza, Sierra de los Baguales, La Cumbre, Campo de La Tropilla, *Landera 790* (CONC); Sierra de los Baguales, Cerro Santa Lucía, 15 Jan. 1985, *Araya s.n.* (CONC 85160); Sierra del Toro, *Araya et al. 9276* (CONC); Sierra del Toro, 10 Feb. 1992, *Araya et al. s.n.* (CONC 92112).

**6. *Trisetum andinum*** Benth., Pl. Hartw. 261. 1847. *Trisetum spicatum* var. *andinum* (Benth.) Louis-Marie, Rhodora 30: 239. 1929. *Trisetum spicatum* (L.) K. Richt. subsp. *andinum* (Benth.) Hultén, Svensk Bot. Tidskr. 53: 224. 1959. TYPE: Ecuador. Hacienda de Antisana, C. T. Hartweg 1449 (holotype, K not seen; isotypes, P!, BAA-3345!, US fragm. ex P-STEUD!).

Perennial, caespitose, velvety, sometimes with short rhizomes; culms (9–)20–42 cm tall, erect, robust, up to 4 mm diam. near the base, pubescent almost all its length, densely hairy below the panicle; nodes 1, basal. Lower leaf sheaths ca. 20 cm long, lax, pilose; upper sheaths 5–10 cm long, pilose; ligule 0.5–2 mm long, truncate, ciliate on the margin, dorsal surface densely pilose; blades 3–15 cm × 2–3.5 mm, flat, pilose abaxially, sparsely pilose adaxially; margins of lower blades usually involute. Panicles 3–6 × 1–2.5 cm, spiciform, very dense, ovate, no more than 3 times as long as wide, included or exerted in the upper sheath, tinged with gold and purple, rounded at the apex; rachis pubescent; spikelets 5–7 mm long, 2- or 3-flowered; rachilla 0.6–0.8 mm long, with a few stiff trichomes, the trichomes as long as the rachilla;

glumes equaling or longer than the florets, sometimes only the first glume longer than the florets, unequal; first glume  $3.5\text{--}6 \times 0.5\text{--}0.6$  mm, shorter and narrower than the second glume, linear-lanceolate, attenuate, 1-nerved; second glume  $4\text{--}7 \times 0.8\text{--}1$  mm, oval, 3-nerved, rarely shorter than the florets; florets  $5\text{--}5.5$  mm long; lemma scabrous or covered with very short trichomes giving a velvety texture, dorsally awned, purple and green, the apex 2-aristulate with the projection of the intermediate nerves, the mucros  $0.4\text{--}0.5$  mm long; awns  $3.5\text{--}4.5$  mm long, inserted on upper 1/3, usually not geniculate nor twisted but diversely curved, scabrous; callus obtuse, with few short trichomes, the trichomes ca. 0.2 mm long; paleas  $3.7\text{--}6$  mm long, shorter than the lemma, hyaline, 2-nerved, the nerves scabrous; apex 2-dentate, sometimes short-mucronate; anthers  $0.7\text{--}1$  mm long; lodicules ca. 0.8 mm long, hyaline, 2-lobulate at the apex; ovary glabrous. Caryopses  $2.2\text{--}2.5 \times$  ca. 0.5 mm, glabrous.

*Distribution and habitat.* Endemic to Ecuador, *Trisetum andinum* is found between 3900 and 4700 m, in páramo and superpáramo vegetation, on volcanic soil.

*Phenology.* Flowering between December and September.

*Comments.* *Trisetum andinum* resembles *T. spicatum*. It has been treated as a synonym of *T. spicatum* by Jørgensen and Ulloa (1994), Renvoize (1998), and Jørgensen and León-Yañez (1999). Hitchcock (1927) accepted *T. andinum* as a good species, but it was later treated by Louis-Marie (1928, 1929) as a variety and by Hultén (1959) as a subspecies of *T. spicatum*. The most remarkable differences between *T. andinum* and *T. spicatum* are the shape of the panicles and the hairiness of the plant. *Trisetum andinum* is totally covered with a dense indumentum (*T. spicatum* is glabrous except below the panicle). *Trisetum andinum* possesses oval, dark purple panicles, usually no more than 2 or 3 times longer than wide (*T. spicatum* possesses panicles green or purple, narrow, more than 3 times longer than wide). *Trisetum andinum* possesses glumes as long as the florets or the second glume longer than the florets (glumes shorter than the florets in *T. spicatum*). The isotype of *T. andinum* at P has both glumes longer than the florets (first glume  $6 \times 0.8$  mm, second glume  $7 \times 0.8$  mm).

*Additional specimens studied.* ECUADOR. **Cotopaxi:** P.N. Cotopaxi, Ehrenburg 49 (QCA); Volcán Cotopaxi, Sklenar & Kosteczkova 80–12 (QCA); Páramos del Cotopaxi, Roig 12356 (MERL); Cotopaxi, SW slope of the vol-

cano, Asplund 7499 (S). **Ibambura:** NE side of Cayambe Mountain, 10 Dec. 1961, Cazalet & Pennington 5740 (US); W side of Mount Cayambe, in páramos, Little & Paredes 6832<sup>1/2</sup> (US). **Pichincha:** Pichincha, André 3907 (US); Summit of Pichincha, Jameson s.n. (US-868479); Mt. Pichincha, near Quito, Hitchcock 21059 (US); 36 km E of El Refugio, on the SW slope of Volcán Cayambe, Peterson, Judziwicz & King 9075 (US); Faldas SE Volcán Guagua-Pichincha, Nowak & Marcillo 79 (QCA); Guagua Pichincha, E slopes of the volcano, Sklenar & Kosteczkova 812 (QCA); Guagua Pichincha, Asplund 7401 (S. US); W parts of Rucu Pichincha massif, summit and upper W slopes of Padre Encantado, Molau & Eriksen 3297 (QCA); Guagua Pichincha, Harling 4537 (S); Lloa-Guagua Pichincha km 10, Laegaard, Romoleroux & León 102731 (QCA); somnet du Pichincha, Oct. 1856, J. Remy s.n. (P); Pichincha, Benoist 2389, 4389 (P); monte Rucu Pichincha, Holmgren 553 (S). **Pichincha/Napo:** Antisana, Ehrenburg 137 (QCA); Volcán Antisana, between Campamento IMAP and Laguna Micacocha, Laegaard 101604 (QCA).

**7a. *Trisetum barbinode* Trin. var. *barbinode*,** Linnaea 10(3): 300. 1836. TYPE: Chile Austral. Andes de Antuco, 1828, E. Poeppig s.n. (holotype, LE-TRIN-1886.01!; isotypes, US-81770 ex W!, US-868486 fragm. ex LE-TRIN!, BAA-3351 fragm. ex LE-TRIN!, SGO-73101 photo ex LE-TRIN!, W not seen).

Perennial; culms (18–)25–45(–55) cm tall, sometimes with short rhizomes, pilose or sericeous below the panicle, the trichomes first antrorse, then retrorse; nodes 1 or 2, basal, pubescent. Leaf sheaths glabrous; ligule 0.5–2 mm long, truncate, dentate-ciliate, dorsally glabrous; blades (2–)10–15 cm  $\times$  2–3(–5) mm, flat, soft, glabrous, margins and adaxial surface scabrous. Panicles  $4.5\text{--}15 \times 0.8\text{--}2.5\text{--}(3)$  cm, pale green, contracted, dense, linear-lanceolate to oval; rachis pubescent, the trichomes up to 1.5 mm long; spikelets 6–8(–11) mm long, 2- or 3-flowered; pedicels up to 5 mm long, pubescent; rachilla 1–2 mm long, pubescent, the trichomes up to 3 mm long; glumes unequal, with hyaline margins, the apex shortly aristulate or acute, the keel scabrous on the upper half, both glumes or only the second glume longer than the florets; first glume (5.5–)6.5–8.5  $\times$  0.5–0.9 mm, slightly shorter and narrower than the second glume, linear-lanceolate, 1- or 3-nerved, usually equaling the first floret, sometimes longer; second glume  $6.5\text{--}10 \times 0.7\text{--}1.2$  mm, lanceolate, 3-nerved; florets (5–)6.5–7.5  $\times$  (0.5–)0.8–1 mm; lemmas pubescent, dorsally awned, the apex biaristulate with apical awns 0.5–1 mm long; awn (2–)6.5–10(–14) mm long, curved or geniculate, not twisted; callus obtuse, pubescent, the trichomes 1.5–3 mm long; paleas (4–)5–6.5 mm long, shorter than the first lemma, equal or longer than the lemma in the second or third floret, hyaline, 2-nerved, the nerves scabrous, the apex bi-

dentate, the teeth 2-setulate; anthers (0.7–)1–1.6 mm long; lodicules 0.7–1 mm long, 2- or 3-lobate at the apex; ovary glabrous or with a few short trichomes at the apex. Caryopses 2.5–3.5 mm long, glabrous or with few trichomes at the apex; endosperm liquid.

*Distribution and habitat.* Endemic from central-southern Chile and Argentina, it is distributed along the Cordillera de los Andes, between 36°S and 41°S. In Argentina, *T. barbinode* var. *barbinode* grows in Neuquén, Río Negro, and Chubut, and in Chile between the Regions VII and IX, usually between 550 and 3500 m, on volcanic soils.

*Phenology.* Flowering between January and March.

*Illustrations.* Nicora (1978: 256, fig. 165A–C).

*Comments.* Morphologically, *Trisetum barbinode* var. *borbinode* is characterized by having contracted, pale green panicles with large spikelets 6–8(–11) mm long, hairy lemmas, and 3-nerved glumes longer than the florets. *Trisetum barbinode* resembles other taxa with hairy lemmas, such as *T. sclerophyllum* and *T. hirtiflorum*. Due to the variation in the shape, color, and size of the panicle and the length of the spikelets and glumes, it is often extremely difficult to distinguish among these three species. *Trisetum hirtiflorum* resembles *T. barbinode* s. str., and the only difference between these two species is the presence of a few short hairs at the apex of the ovary and caryopsis in *T. hirtiflorum*. According to Nicora (1978), *T. hirtiflorum* has shorter and narrower panicles and more rigid leaves than *T. borbinode*. However, these characters are so variable that recognition of these two species is nearly impossible. Louis-Marie (1929) first treated *T. hirtiflorum* as a variety of *T. barbinode*.

The close relationship between *Trisetum sclerophyllum* and *T. barbinode* was first observed by Louis-Marie, as it is clear from the annotation he made on the type deposited at US: "*T. barbinode* var. *sclerophyllum*" signed "Lalonde." However, Louis-Marie (1928, 1929) did not include this combination or the Hackel binomial in his treatment of genus *Trisetum*. This type fragment at US from W contains only a fragment of the panicle. The spikelets are 2-flowered; the glumes are nearly equal and longer than the florets, the first glume 6–8 × 0.6–0.7 mm, the second glume 7–8 × 0.7–1 mm, and both are 3-nerved, with scabrous keel, hyaline margins, and hyaline, aristulate apex. The lower floret is ca. 5 mm long and the lemmas are pubescent, with a bi-aristulate apex, with apical awns up to 1 mm long. The dorsal awn (6–8 mm long) is borne on the upper 1/3 of the lemma. On the basis of this

type fragment at US it is not possible to distinguish *T. sclerophyllum* from *T. borbinode* Trin. The varietal status for *T. sclerophyllum* was also suggested by Parodi since there is an annotation label on the type fragment deposited at BAA with his script. This, also, was never published.

*Additional specimens studied.* ARGENTINA. **Neuquén:** Catán Lil, Sierra del Chachil, *Rúgolo de Agrasar 451* (BAA); Loncopué, Cajón Chenque Pehuén, *Rúgolo de Agrasar & Agrasar 148* (BAA); Los Lagos, Villa La Angostura, cerro Belvedere, *Rúgolo de Agrasar 1234-1* (SI); P.N. Lanín, Volcán Huanquihue, al W del Lago Curruhúe, *Eskuiche & Klein 1520-7* (CORD); a 5 km de Las Ovejas, camino a las lagunas Epu-Lauquén, *Boelcke 10764* (CONC ex BAA); Baños Calientes, Río Valvarco, *Boelcke et al. 11452<sup>1/2</sup>* (BAA); entre Lagunas Epu-Lauquén y Cajón Lumavia, *Ragonese 234* (BA); Lagunas Epu-Lauquén, *Boelcke et al. 10927* (CONC ex SI). **Río Negro:** P.N. Nahuel Huapi, Cuenca Río Manso Superior, camino a Ventisqueros del Tronador, *Diehl & Bravo 10843* (BA). CHILE. **VII Región:** Talca, Laguna del Maule, *Schlegel 3475* (CONC); Laguna del Maule, *Schlegel 3537* (CONC). **VIII Región:** Ñuble, Termas de Chillán, *Jaffuel 1806-b* (SGO), 9 Jan. 1949, *Pfister s.n.* (CONC); Baños de Chillán, Jan. 1877, *F. Philippi s.n.* (SGO); Baños de Chillán, *Philippi 218* (SGO); Termas de Chillán, Faldeos del Volcán Chillán, *Ricardi 5604* (CONC); Termas de Chillán, *Philippi 229* (SGO); Termas de Chillán, zona de las fumarolas, *Finot & Baeza 2069* (CONC); entre Valle Hermoso y Termas de Chillán, *Finot & Baeza 2070* (CONC); Refugio Club Andino de Chillán, Shangri-La, *Garaventa 4681* (CONC); Bío-Bío, Laguna del Laja, *Fabris & Crisci 7608* (LP); Lago Laja, 2 Feb. 1968, *Zoellner s.n.* (ZOELLNER); Laguna del Laja, *Ricardi & Marticorena 5812/1973* (CONC), *Burkart 27451* (CONC ex SI); faldeos del Volcán Antuco, frente a la laguna del Laja, *Ricardi & Marticorena 5723/1884* (CONC); Las Lagartijas, *Finot & Baeza 2073* (CONC). **IX Región:** Malleco, Lonquimay, Estepa cerca Laguna Icalma, 10 Jan. 1947, *Pfister s.n.* (CONC); Curacautín, Paso Las Raíces, 14 Feb. 1992, *Zoellner s.n.* (ZOELLNER); Termas de Río Blanco, *Pfister s.n.* (CONC); Icalma, cerro del lado sur, *Pfister s.n.* (CONC); Cautín, Volcán Llaima, Refugio Cautín, *Montero 4497, 4487* (CONC); Volcán Llaima, *Gunckel 12426* (CONC), *Sparre 4873* (S); Villarrica, Tromén, Límite Chileno-Argentino, *Ricardi & Matthei 3, 15* (CONC); Curarrehue, 29 Dec. 1946, *Cañulaf s.n.* (CONC).

**7b. *Trisetum barbinode* var. *hirtiflorum*** (Hack.) Louis-Marie, *Rhodora* 30: 240. 1929. Basionym: *Trisetum hirtiflorum* Hack., *Repert. Spec. Nov. Regni Veg.* 10 (243–247): 169. 1911. TYPE: Chile. *C. Reiche s.n.* (holotype, W not seen; isotypes, BAA!, SGO fragm. & photo ex W!, US fragm. ex W!).

Panicles 4–5 cm long, gold-purple, spiciform, dense. Leaf blades soft. Second glume 5–8 mm long; ovary with short trichomes on the apex.

*Distribution and habitat.* Southern Chile (VIII Región) and Argentina (Neuquén) between 500 and 2000 m (Nicora, 1978).

*Phenology.* Flowering in January.

*Additional specimen studied.* CHILE. **VIII Región:** Prov. Ñuble. Termas de Chillán, por la loma de las fumarolas, 17 Jan. 1945, *Pfister s.n.* (CONC, SGO).

**7c. *Trisetum barbinode* var. *sclerophyllum*** (Hack.) Finot, comb. nov. Basionym: *Trisetum sclerophyllum* Hack., Anales Mus. Nac. Hist. Nat. Buenos Aires 21: 108. 1911. TYPE: Argentina. Chubut: Dpto. Languiñeo, Región del río Corcovado, 20 Jan. 1902, *Illin 148* (holotype, W ex Stackert Herb. Arg. 17991 not seen; isotypes, BAA-3414!, US-91365 fragm. ex W!).

Culms 18–30 cm tall. Leaf blades stiff. Panicles (2–)3–5(–8) cm long, gold-purple, spiciform, dense. Glumes subequal in width; second glume 5–8 mm long; ovary glabrous.

*Distribution and habitat.* Endemic to Argentina, *T. barbinode* var. *sclerophyllum* occurs along the Cordillera de Los Andes in Mendoza, Neuquén, Río Negro, and Chubut, between 32°S and 42°S latitudes and between 1170 and 3500 m.

*Phenology.* Flowering between January and March.

*Additional specimens studied.* ARGENTINA. **Mendoza:** Las Heras. Faldeo SSW morrena cerro Tolosa, *Boelcke et al. 9778* (MERL, CONC); San Rafael, Cerro Volcán Overo, *Roig 1* (MERL); alto valle de Calmuco. *Burkart et al. 13930* (BAA ex SI); alto valle del Atuel. *Paci 15731* (BAA, MERL); Laguna Atuel. *Ruiz Leal 16886* (MERL); Tupungato, Las Tres Quebradas, *Ruiz Leal 3616* (MERL). **Neuquén:** Sierra de Cochicó, *Boelcke et al. 14083* (BAA, CONC ex SI); Ñorquín, entre Las Maquinitas y Copahue, *Calderón & Rúgolo 57* (BAA); Copahue, *Calderón & Rúgolo 72* (BAA); Pino Hachado, Feb. 1920, *Hauman s.n.* (BA). *Parodi 2700* (BAA); Paso Pino Hachado, en el hito, *Nicora 7432* (BAA); San Martín de Los Andes, P.N. Lanín, arroyo Rucu-Leufi, *Correa et al. 5647* (CONC ex BAB); P.N. Lanín, Cerro Chapelco, 12 Feb. 1961, *León & Calderón s.n.* (BAA); Cerro Chapelco, *Schajowski 86, 133, 134, 178* (BA), *Cabrera & Crisci 19145* (LP), *Cabrera et al. 23024* (LP); Lago Lácar, Cerro Malo, *Rúgolo de Agrasar 315, 318* (BAA); Cerro Repollo, Estancia Meliquina, *Rúgolo & Agrasar 570* (BAA); Los Lagos, Villa La Angostura, cerro Belvedere, *Rúgolo de Agrasar 1234–2* (SI); Pto. Manzano, en la cima del cerro O'Connor, *Diem 3229* (BAA); P.N. Nahuel Huapi, Filo refugio Cerro Colorado a Cerro, *Boelcke & Correa 6959* (BAA); mallines en ladera Cerro, *Boelcke & Correa 6964* (BAA). **Río Negro:** Cerro de Las Hormigas, *Hosseus 559, 560* (CORD); P.N. Nahuel Huapi, Cerro Catedral, *Cabrera 19754* (LP), *Parodi 15321* (BAA), *Pérez Moreau s.n., 1949* (BA). **Prov. Chubut:** Dpto. Futaleufú, Esquel, La Hoya, *Cabrera et al. 23170* (LP); P.N. Los Alerces, Lago Futaleufú, *Soriano 4352* (BAA).

**8a. *Trisetum caudulatum* Trin. var. *caudulatum***, Linnaea 10(3): 300. 1836. *Koeleria cau-*

*dulata* (Trin.) Griseb., Abh. Konigl. Ges. Wiss. Gottingen 24: 292. 1879. TYPE: Chile. Andes Chile boreal, *E. F. Poeppig s.n.* (holotype, LE-TRIN-1887.01!; isotype, BAA-3364 fragm. ex LE-TRIN!).

*Trisetum chromostachyum* E. Desv., Fl. Chil. 6: 350. 1854. TYPE: Chile. Santiago, in arvis, Jan. 1829, *C. Gay s.n.* (holotype, Pl; isotypes, CONC-148153 fragm. ex Pl, SGO fragm. ex Pl, US fragm. ex P-DESV-156!, US fragm. ex P-GAY!).

*Trisetum heteronymum* Steud., Syn. Pl. Glumac. 1: 229. 1854. TYPE: Chile. "Rancagua, in pascuis et ad fossas," Oct. 1828, *C. L. G. Bertero 53* (published as *Bertero 83*) (holotype, P-STEUD-437!; isotypes, SGO fragm. ex Pl, US fragm. ex Pl; US fragm. ex Pl).

*Trisetum variabile* E. Desv., Fl. Chil. 6: 351. 1854. *Trisetum variabile* var. (alpha) *flavescens* E. Desv., Fl. Chil. 6: 351. 1854. TYPE: (Chile) Valparaíso, 1829, *C. L. G. Bertero 998* (lectotype, designated here, Pl; isotypes, BAA-3422 fragm. ex Pl, SGO fragm. ex Pl, US fragm. ex Pl, US fragm. ex P-STEUD-440!).

*Trisetum variabile* var. *virescens* E. Desv., Fl. Chil. 6: 351. 1854. TYPE: Chile. Prov. Valdivia, In herbosis Guaneque, Feb. 1889, *C. Gay s.n.* (lectotype, designated here, Pl; isotypes, BAA-3423 fragm. ex Pl, CONC fragm. ex Pl; SGO fragm. ex Pl, US fragm. ex Pl).

*Trisetum malacophyllum* Steud., Syn. Pl. Glumac. 1: 229. 1854. non Phil., Anales Univ. Chile 48: 566. 1873. TYPE: (Chile) Valparaíso, "*Festuca* nr. 997 Hbr. Bertero, In sylvaticis calidis Collinum loco dicto La Laguna," Oct. 1829, *C. L. G. Bertero 997* (lectotype, designated here, Pl; isotypes, GH not seen, SGO fragm. ex Pl).

*Trisetum splendidulum* Steud., Syn. Pl. Glumac. 1: 229. 1854. TYPE: Chile. "*Festuca*" *C. L. G. Bertero 996* (holotype, P-STEUD-441!; isotypes, BAA-3416 fragm. ex Pl, CONC fragm. ex Pl, SGO fragm. ex Pl, US fragm. ex Pl).

*Trisetum chilense* Phil., Linnaea 29: 93. 1858. *Trisetum variabile* E. Desv. var. *chilense* (Phil.) Louis-Marie, Rhodora 30: 240. 1928. TYPE: Chile. "in pascuis insulae Chiloé, ad Castro" *C. Gay 147* (holotype, SGO-PHIL-215!; isotypes, BAA-3371 ex SGO!, US fragm. ex SGO-PHIL-215 & photo!).

*Trisetum monticola* Phil., Linnaea 33: 291. 1864. TYPE: Chile. Prope Santiago, in andibus, Nov. 1861, *R. A. Philippi s.n.* (holotype, SGO-PHIL-227!; isotypes, SGO-37049!; US fragm. & photo ex SGO-PHIL-227!).

*Trisetum ochrostachyum* Phil., Linnaea 33: 290. 1864. TYPE: Chile. "E Valdivia attuli," *R. A. Philippi s.n.* (holotype, SGO-PHIL-220!; isotype, SGO-37062!).

*Trisetum vidalii* Phil., Anales Univ. Chile 94: 27. 1896. *Trisetum variabile* E. Desv. var. *vidalii* (Phil.) Louis-Marie, Rhodora 30: 240. 1929. TYPE: Chile. "Ad ostium fluminis Maullín," 41°30'S, *Franc. Vidal Gormaz s.n.* (holotype, SGO 37066!; isotypes, BAA-3424 ex SGO!, BAA-3425 ex SGO!, SGO-PHIL-231!; US fragm. & photo ex SGO-PHIL-231!; US photo ex SGO-37066!).

*Trisetum lechleri* (Steud.) Nicora, Fl. Patag. 3: 252. 1978. Basionym: *Koeleria lechleri* Steud., Syn. Pl. Glumac. 1: 294. 1854. TYPE: Chile. X Región: Arique, W *Lechler 311* (holotype, P-STEUD-175!; isotype, US fragm. ex Pl).

Perennial, sometimes with short rhizomes; culms 30–80 cm tall, glabrous, the upper internode usually very long; nodes 2 or 3, pubescent. Leaf sheaths 60–150 mm long, shorter than the internodes, pubescent; ligule 1–4 mm long, truncate to obtuse, dorsally glabrous or pilose, margins ciliate; blades 5–20 cm × 0.2–5 mm, flat to conduplicate, soft, pubescent. Panicles (4–)6–15 cm × 1–4 mm, contracted to spiciform, interrupted or not, usually dense, the lower branches 2–3 cm long, green, sometimes slightly purple, shining; rachis glabrous to scabrous. Spikelets 5.5–9 mm long, 2- to 4(to 5)-flowered, open at the apex; pedicels 1–4 mm long, scabrous; rachilla 0.7–1 mm long, pubescent, the trichomes up to 1.5 mm long; glumes shorter than the florets, unequal, aristulate at the apex or acute; first glume 3–6 × 0.3–0.5 mm, 1(or 3)-nerved, linear-lanceolate, attenuate; second glume 4–8 × 0.8–1.1 mm, 3(or 5)-nerved, oval-lanceolate to oval; florets 6.5–9.5 × 0.6–0.8 mm; lemmas linear-lanceolate, somewhat rounded on the back, glabrous, awned dorsally, dorsally scabrous; apex biaristulate, apical awns up to 1 mm long; awn borne on the upper 1/3 or 1/4 ca. 2–3.5 mm from the apex, geniculate, curved, weakly twisted, scabrous; callus pubescent, the trichomes 0.1–0.5 mm long; paleas 4.5–6.5 mm long, hyaline, 2-nerved, the nerves scabrous; 2-setulate; anthers (0.7–)1.2–1.7 mm long; lodicules 0.6–1.4 mm long, bilobed at the apex, the lobes acute; ovary glabrous. Caryopses ca. 4 × 0.6–0.7 mm, glabrous; endosperm liquid.

*Chromasome number.*  $2n = 42$  (Baeza et al., 2001).

*Distribution and habitat.* *Trisetum caudulatum* var. *caudulatum* grows in Argentina (Neuquén, Río Negro, and Chubut) and Chile (Region II to XII) in prairies, woods, and heath along roadsides, frequently in sandy soils between 10 and 2200 m. Marticorena et al. (1998) reported the species for Isla Robinson Crusoe (Masatierra), Archipiélago de Juan Fernández, Chile.

*Phenology.* Flowering between October and March.

*Illustrations.* Nicora (1978: 251, fig. 164A–E).

*Comments.* The type of *Trisetum caudulatum* is represented in the Trinius Herbarium (LE-TRIN) by a fragment containing four spikelets (Nicora, 1978). One spikelet of this type is housed at BAA-3364 annotated by Parodi on 31 Jan. 1936, who wrote “La especie está representada en Leningrado por 4 espiquillas en un pequeño sobre (Nicora, 1978). No trae datos. El nombre bajo el cual figura es *T. caudulatum*.” The spikelet in BAA is 5.5 mm long, contains two florets with glumes unequal,

shorter than the florets and each glume has a short awn at the apex. The first glume is 3.5 mm long, 1-nerved, lanceolate and the second glume is 4 mm long, 3-nerved, oval-lanceolate. The lemma is glabrous, 2-aristulate at the apex, awned on the upper 1/3 and the palea is shorter than the lemma in both florets. On the basis of the characters seen in the type specimens of *T. variable* and *T. vidalii* at P, and the original Latin descriptions of the species, it is not possible to distinguish *T. variable* and *T. vidalii* from *T. caudulatum*.

In reference to *Deschampsia lasiantha* (= *Trisetum preslei*), *T. andicala* (= *Trisetum langiglume*), *T. andinum*, *T. bifarum* (= *Trisetum dianthemum*), *T. hirsutum* (= *Trisetum phleaidae*), *T. malacaphyllum* (= *Trisetum spicatum* var. *cumingii*), *T. chilense*, *T. achrastachyum*, *T. manticala*, *T. variable*, and *T. vidalii* (all five species = *Trisetum caudulatum* var. *caudulatum*), the disposition of the R. A. Philippi collections has been a logistic problem for agrostologists for over 80 years. After her visit to Vienna in 1922, Agnes Chase indicated in an unpublished report (1923, Agnes Chase memorandum to the Bureau of Plant Industry, original at US!) on Edward Hackel’s unpublished “Report on Grasses of Chile, 1920” (copy at US!), that Philippi’s grass types were loaned to Hackel in Vienna by Philippi via K. F. Reiche (Herb. Mus. Nat. Chile, SGO), after these were returned from US to SGO. The US photographed the entire herbarium and retained fragments of most of the collections including types. Chase (1923, unpublished) noted that Hackel’s annotated copy of Reiche’s list of the Philippi collections was sent by Hackel to Reiche in Santiago de Chile in 1914. Reiche replied that he was leaving Chile for Mexico, and Hackel never heard from him again. The specimens were never returned to SGO and remain at W stamped “Herb. Hackel” (verified by Bruno Wallnöfer, pers. comm. with RJS, 2001).

Louis-Marie (1929: 240) created the new name *Trisetum variable* var. *intansum* to replace the illegitimate *T. variable* var. *virescens* (Nees ex Steud.) Macloskie (Macloskie, 1904: 206; not *T. variable* var. *virescens* E. Desv. (Desvaux, 1854: 351)), based on *T. virescens* Nees ex Steud., a plant described for India and placed in *Helictatrichan* by Henrard (1940) and in *Arrhenatherum* by Potzlat (1968). Thus, *T. variable* var. *intansum* Louis-Marie is not a species from the New World.

Steudel (1853–1855) described *Trisetum heteranymum* with a variety (Variet: statura et omnibus partibus minoribus, spiculis trifloris, *Bramus* nr. 117, Bert., Chili). In P. BAA, and SGO there exists a specimen designated as *T. heteranymum* Steud.

var. *minor triflora*. This name is not a valid name, and the specimen is *Bertero 116*, not *Bertero 117* as the protologue indicates. These specimens were determined to be synonyms of *T. caudulatum*.

*Additional specimens studied.* ARGENTINA. **Chubut:** Lago Futalaufquén, en la cascada, *Krapovickas 3933* (SI); P.N. Los Alerces, Lago Cisne, *Raquera 452* (BA); Carrenleufú, *Illin s.n.* (LP); Pampa Chica, *Soriano 2490* (BAA); Lago Futalaufquén, claros del bosque de coigüe y ciprés, *Burkart 19905* (BAA); P.N. Los Alerces, Río 2, *Lahitte & Raquero 363* (BA); Corcovado, *Illin s.n.* (LP); Cerro Leleg, 14 Jan. 1949, *Pérez-Mareau s.n.* (BA). **Neuquén:** Lago Guillén, 28 Dec. 1937, *Kalela s.n.* (S); San Martín de Los Andes, *Bridaralli 2147* (LP 39146); San Martín de Los Andes, *Dawsan 1285* (LP); P.N. Lanín, Lago Lácar, camino a Angostura, 17 Feb. 1961, *León & Calderán s.n.* (BAA); Isla Victoria, *Carte 34* (LP); Nahuel Huapí, Puesto Pañuelo, 18 Jan. 1930, *Offermann s.n.* (BAA); Fuerte Chacabuco, *Parodi 15611* (BAA); Parque Nacional Lanin, Arroyo Grande, S.L. Lacar, *Eskuche & Klein 316* (CTES); Parque Nac. Lanin, Pampa Hui Hui, *Eskuche & Klein 1417–27* (CTES); Nahuel Huapí, F. Chacabuco, *Vellerini 297* (BAA); Los Lagos, Villa La Angostura, Lago Nahuel Huapí, bahía próxima a Península Cumlén, *Rúgolo 1188* (CONC); Los Lagos, Villa La Angostura, cerro Bayo, *Rúgola 1283* (CONC); Lago Epulafquén, *Dawson & Schwabe 2481* (BAA); P.N. Lanín, Lago Paimún, *Lahitte, Raquero & López 486* (BA); P.N. Lanín, San Martín de Los Andes, *Lahitte, Raquero & López 67* (BA); P.N. Lanín, San Martín de Los Andes, Lago Lácar, Quila-Quina, *Roquera 326* (BA); P.N. Lanín, Lago Lácar, Puncará camino a Angostura, *León & Calderón 1285* (BAA). **Río Negro:** Lago Gutierrez, 27 Nov. 1937, *Kalela s.n.* (S); Lago Gutierrez, *Kalela 1277* (S); Puerto Moreno (Los Juncos), San Ramón, Loma Grande, *Vellerini 265* (BAA); Puerto Moreno (Los Juncos), Ea. San Ramón, *Vellerini 257* (BAA); 6 km from Bariloche, *Pedersen s.n.* (CTES); Leleque, *Soriano 2409* (BAA); Catedral Hotel, P.N. Nahuel Huapí, *Pedersen 1468* (CTES); P.N. Nahuel Huapí, *Boelcke & Carrea 5864* (BAA); picada a lo largo de Martín Grande, *Baelcke & Carrea 6142* (BAA); Bariloche, arroyo Guillermo, camino a El Bolsón, *Nicara 7478* (BAA). **CHILE. II Región:** El Rincón, just N of Papos, along trail to old Parañas Mine, *Johnstan 5539* (BAA); Antofagasta, Dpto. Taltal, vic. of Aguada de Miguel Díaz, *Jahnstan 5407* (SGO). **IV Región:** Ovalle, bosque de Talinay, lado sur de la desembocadura del Limarí, *Muñoz & Caranel 1232* (BAA); Limarí, Cordillera de Ovalle, Tuluahuén-Leiva, *Jiles 4694* (CONC). **V Región:** Valparaíso, In sylvaticus calidis collium loco dicto La Laguna, Valparaíso, 1829, *Bertero 997* (P, BAA ex P, SGO ex P); cerro Roble above Calco, *Hutchinson 59* (SGO); Valparaíso, *Lechler 2846* (US fragm. ex P, F); Cuesta La Dormida, camino entre Quillota y Santiago, *Muñoz & Schick 1545* (SGO); Aconcagua, Petorca, carretera Panamericana, 5 km N de Longotoma, *Ricardi, Marticorena & Matthei 1829* (CONC); Quillota, Limache, Cerro Cruz, *Garaventa 2248* (CONC); Quillota, cerro La Campana, *Zaellner 13135, 18030* (CONC); Cocalán, 9 Nov. 1913, *Baeza s.n.* (CONC); Archipiélago de Juan Fernández, Oct. 1872, *F. Philippi s.n.* (SGO); Quillota, Limache, cerca del pueblo, *Garaventa 6457* (CONC); Valparaíso, Cerro La Campana, *Hutchinson 45* (US); Cerro Las Vizcachas, *Hutchinson 110* (SGO); Quebrada Verde, *Muñoz & Johnson 2524* (SGO). **Región Metropolitana:** Cuesta de Chacabuco, a 3 km

de la cumbre, *Muñoz & Johnson 2583* (SGO); in hills E of Tiltill, Oct. 1958, *Bailey s.n.* (CONC); Santiago, El Canelo, *Gunckel 21997* (CONC); Santiago, Río Clarillo, Quebrada Las Tinajas, *Araya 140* (CONC); Santiago, Quebrada La Plata, *Schlegel 4065* (CONC); Santiago, Macul, *Gunckel 40532* (CONC); Santiago, *Mantera 538* (CONC); Santiago, Las Vertientes, *Gunckel 44566* (CONC); Farellones, *Villagrán & Mesa 414* (SGO); Santiago, Nido de Aguilas, Peñalolén, hacia Casa de Piedra, *Muñoz & Schick 2558, 2562* (SGO). **VI Región:** Prov. Colchagua, San Fernando, cerro Echaurren, *Mantera 1354* (CONC); Agua Buena, al interior de San Fernando, *Muñoz & Johnson 2635, 2630* (SGO). **VII Región:** Prov. Linares, La Vequilla, camino de Linares al Melado, *Muñoz 2709* (SGO); Cajón de Los Cipreses, *van Dessauer s.n.* (SGO); Prov. Linares, Valle Gualquivilo, Baños de Azufre, *Schlegel 3645* (CONC). **VIII Región:** Prov. Concepción, La Toma, 29 Oct. 1934, *Junge s.n.* (CONC); Concepción, Nov. 1896, *Neger s.n.* (fragm. CONC-148139 ex M); Concepción, 10 Oct. 1951, *Pfister s.n.* (CONC); Concepción, *Barros 1987* (CONC); Talcahuano, Parque Hualpén, *Carrasca 266* (CONC); San Pedro, Oct. 1943, *Pfister s.n.* (CONC); San Pedro, *Ricardi, Marticorena & Torres s.n.* (CONC); San Pedro, 12 Nov. 1944, *Pfister s.n.* (CONC); San Pedro, 10 Dec. 1946, *Pfister s.n.* (CONC); Concepción, a orillas de camino Concepción-Florida, *Matthei 174* (CONC); Concepción, Cerro Caracol, *Pfister 370* (CONC); Bío-Bío, Hacienda Las Canteras, entre Antuco y Los Angeles, *Muñoz & Johnson 2737* (SGO); Entre Antuco y Tumbunleo, *Muñoz & Johnson 2732* (SGO); La Laja, Malacura, *Muñoz & Schick 1493* (SGO); Parque Nacional Laguna del Laja, Antuco, *Finat & Baeza 1* (CONC); Camino Canteras-Antuco, 20 km antes de Antuco, *Finat & Baeza 2* (CONC); Malacura, cerros, *Finat & Baeza 7* (CONC); Parque Nacional Laguna del Laja, Los Barros, sector Aduana, *Finat & Baeza 14* (CONC); entre Chacay y canchas de Sky, *Finat & Baeza 2074* (CONC); cercanías de Rere, Yumbel, *Muñoz 2717* (SGO); Isla Quiriquina, *Gunckel 13797* (CONC); Ñuble, camino a las Termas, 30 km de Chillán, *Muñoz & Johnson 2676* (SGO); Atacalco, 26 Nov. 1944, *Pfister s.n.* (CONC); 5 km E de Quillón, *Hutchinson 212* (SGO, F); Concepción, 1 Nov. 1927, *Barros s.n.* (CONC); Tomé, 24 Nov. 1925, *Barros s.n.* (CONC); Liriquén, 11 Dec. 1950, *Ricardi s.n.* (CONC); Tomé, 14 Nov. 1925, *Barros s.n.* (CONC). **IX Región:** Malleco, Lumaco, Santa Clara, *Gunckel 630* (CONC); Laguna Galletué, *Mantera 4956* (CONC); Quechumalal, Pampa del Olvido, Mar. 1958, *Schlegel s.n.* (CONC); Valle de Lonquimay, *Pfister s.n.* (CONC); Cautín, Temuco, Cerro Ñielol, *Mantera 4508* (CONC); Malleco, Parque Nacional de Nahuelbuta, Piedra del Aguila, *Ricardi, Marticorena & Matthei 1976* (CONC); Termas de Tollhuaca, *Gunckel 16027* (CONC); Prov. Cautín, Temuco, Padre Las Casas, *Mantera 1962* (CONC); Cautín, Volcán Llaima, *Gunckel 15101* (CONC); Villarica, Tromén, Límite Chileno-Argentino, *Ricardi & Matthei 27* (CONC). **X Región:** Valdivia, Jan. 1860, *R. A. Philippi s.n.* (SGO); Llanquihue, Puerto Varas, Petrohué, *Marticorena, Weldt & Crisci 1982* (CONC); Río Palena, Jan. 1887, *Delfin s.n.* (SGO); Chiloé, Lago Río Negro, *Villagrán, Aguila & Leiva 6954* (CONC); Valdivia, San Juan, Jan. 1855, *R. A. Philippi s.n.* (SGO); Lago Llanquihue, without date, *Philippi s.n.* (SGO); Puerto de Corral, *Muñoz & Johnson 3211* (SGO); Puerto Montt, Feb. 1858, *Philippi s.n.* (SGO); Puerto Montt, *Fonck 71* (SGO). **XI Región:** Aisén, Cohaique, *Schlegel 2371* (CONC). **XII Región:** Tierra del Fuego, San Sebastián, *Ricardi & Matthei 236* (CONC); Caleta Josefina, *Ricardi & Matthei 166* (CONC).



**8b. *Trisetum caudulatum*** Trin. var. **correae** Nicora, Fl. Patag. 8(3): 254, fig. 164e. 1978. TYPE: Argentina. Chubut: Futaleufú, Lago Futalaufquén, A. Sariana 4334 (holotype, BAA-3365!).

Ovary and caryopses with trichomes at the apex.

*Distribution and habitat.* Nicora (1978) described this variety on the basis of material collected in Neuquén, Río Negro, and Chubut, Argentina. In Chile this plant grows between Región V and Región X generally between 1000 and 2000 m. Rodolfo Amando Philippi appears to be the first to have collected this species in Región X, Chile (Finot, 2002). *Trisetum caudulatum* var. *correae* grows along the Andes and is a forage species.

*Phenology.* Flowering between December and March.

*Additional specimens studied.* ARGENTINA. **Chubut:** P.N. Los Alerces, Lago Futalaufquén, entre Río Desaguadero y Arroyo del Salto. *Lahitte & Roquero* 277 (BA); Lago Futalaufquén, 7 Jan. 1964. *Lahitte s.n.* (BA). **Neuquén:** Dpto. Los Lagos, 3 km W de Confluencia. *González* 766 (LP); Lago Trafal Sur, orilla del lago. *Rúgolo de Agrasar* 233 (BAA); P.N. Nahuel Huapí, Lago Trafuel, El Mirador, *Boelcke & Hunziker* 3657 (BAA); P.N. Nahuel Huapí, Campamento Río Villegas, 29 Jan. 1941. *Pérez-Moreau s.n.* (BAA, paratype). **Río Negro:** P.N. Nahuel Huapí, faldeos cerro Santa Elena. *Fabris & Solbrig* 1171 (LP). CHILE. **V Región:** Punta Imán. Cerro Roble, *Zoellner* 18196 (ZOELLNER). **IX Región:** Valle de Lonquimay, 5 Jan. 1947, *Pfister s.n.* (CONC). **X Región:** Lago Llanquihue, without date, *Philippi s.n.* (SGO); Posada del Valle, Jan. 1877, *Philippi s.n.* (SGO).

**9. *Trisetum dianthemum*** (Louis-Marie) Finot, Contr. U.S. Natl. Herb. 48: 664. 2003. Basionym: *Trisetum spicatum* var. *dianthemum* Louis-Marie, Rhodora 30: 239. 1929. TYPE: Chile. X Región: Provincia de Llanquihue, grama a orillas del Río Puelo, 1872, *F. Vidal Gormaz s.n.* (holotype, SGO-PHIL-239b!; isotypes, BAA-3358!, SGO-37069!, SGO-68170 photo!, US fragm. ex SGO-PHIL-239b & photo!, US photo ex SGO-37069!).

Perennial, caespitose; culms 18–60 cm tall, geniculate, sericeous or pilose below the panicle; nodes 1 or 2, nearly basal, glabrous. Leaf sheaths 3–4 cm long, glabrous; ligule 1–1.5 mm long, membranous, truncate to obtuse, ciliate-denticulate, dorsally glabrous; blades 5–15 cm × 1.5–2.5 mm, glabrous, smooth, scabrous or ciliate on the margins. Panicles 4–8 × 1–2 cm, somewhat lax, subspiciform, shining; rachis pubescent. Spikelets 6.5–8 mm long, 2- or 3-flowered, open at the apex; pedicels 1.5–4 mm long, scabrous; rachilla 0.9–1 mm long, pubescent, the trichomes 0.2–1 mm long;

glumes longer than the florets, subequal, lanceolate, the first glume nearly as long as and slightly narrower than the second glume; keel scabrous; margins hyaline; apex aristulate; first glume 6–7.5 × 0.6–0.8 mm, 1(3)-nerved; second glume 6.5–8 × 0.8–1 mm, 3-nerved; florets (first) 5.6–6.3 × 0.5–0.7 mm, upper floret ca. 5.5 mm long; lemmas glabrous, slightly scabrous on the keel, dorsally awned; apex hyaline, 2-setulate; margins hyaline; awn 3.5–7 mm long, borne on the upper 1/3 or 1/4, divaricate, weakly twisted, scabrous; callus obtuse, with a few trichomes ca. 0.2 mm long; paleas 4.2–4.5 mm long, shorter than the lemma; apex 2-setulate, 2-nerved, the nerves scabrous; anthers ca. 0.8 mm long; lodicules ca. 0.6–0.8 mm long; apex 3-lobed; ovary glabrous. Caryopses not seen.

*Distribution and habitat.* Endemic to southern Chile and Argentina, where it is known only from Region X in Chile and from Chubut, Argentina, between 3 and 210 m.

*Comments.* Louis-Marie (1929) established the new name *Trisetum dianthemum* for the illegitimate *T. biflorum* Phil. (Philippi, 1873: 568) and simultaneously placed it in varietal rank (*T. spicatum* var. *dianthemum* (Phil.) Louis-Marie). *Trisetum dianthemum* differs from *T. spicatum* (L.) K. Richt. by having glumes longer than the florets (vs. both glumes shorter than the florets in *T. spicatum*), longer spikelets (6.5–8 mm long in *T. dianthemum* vs. 4.5–6 mm in *T. spicatum*), isomorphic glumes (vs. subequal glumes in *T. spicatum*), and panicles somewhat lax, and somewhat spiciform (vs. spiciform in *T. spicatum*).

*Phenology.* Flowering between December and January.

*Additional specimens studied.* ARGENTINA. **Chubut:** Lago Los Niños, *Nicora* 9610 (SI). CHILE. **X Región:** Puerto Varas. Islote frente a Punta Guano. *Martícorena, Weldt & Crisci* 1967 (CONC); Prov. Valdivia, Barra del Río Bueno. *Hollermayer* 1252 (CONC, LP); Queñi. Jan. 1887. *O. Philippi s.n.* (BAA-3357 fragm. ex SGO, SGO, US photo ex SGO); Panguipulli, 14 Dec. 1927, *Hollermayer s.n.* (CONC); Panguipulli. *Hollermayer* 26-a (CONC).

**10a. *Trisetum longiglume*** Hack. var. **longiglume**, Repert. Spec. Nov. Regni Veg. 7: 319. 1909. TYPE: Argentina. Mendoza: “in monte Piedra del Burrero prope San Rafael,” Jan. 1897, *E. Wilczek* 571 (holotype, W not seen).

*Trisetum andicola* Louis-Marie, Rhodora 30: 244. 1929. *Deschampsia andicola* (Louis-Marie) Valencia. Revista Argent. Agron. 8: 129, f. 2. 1941. TYPE: Chile. Santiago: Laguna Negra, 2700–4000 m, Mar. 1873. *F. Vidal Gormaz* 265 (holotype, US-556459 fragm. &

photo ex SGO-PHIL-265!; isotypes, BAA-3344 fragm.!, SGO-37123!, SGO-37124!).

Perennial, caespitose; culms 20–30 cm tall, glabrous, erect or geniculate at the base; node 1, basal. Leaf sheaths 2–6 cm long, glabrous; apex with sheath auricles; ligule 0.2–2 mm, dorsally glabrous, denticulate at the apex; blades 3.5–12 cm × 1.5–2 mm, flat, glabrous, abaxially smooth, slightly scabrous on adaxial surface and margins. Panicles 3.5–6 × 1–3 cm, subspiciform, ovoid, dense, green to pale purple, the branches ascending; rachis glabrous; pedicels ca. 3 mm long, glabrous. Spikelets ca. 9 mm long, 2- or 3-flowered; rachilla 1.5 mm long, conspicuously pubescent, the trichomes up to 4 mm long; glumes usually longer than the florets, lanceolate, isomorphic, slightly tinged with green and purple; keel mostly smooth except near apex; apex attenuate, somewhat aristulate; first glume 8.5–9.5 × 0.6–0.7 mm, 1- to 3-nerved; second glume 8.5–9.5 × 0.8–1.2 mm, 3-nerved; florets 5–6.2 mm long; lemmas lanceolate, laterally compressed, dorsally awned, glabrous, slightly keeled, 5-nerved; apex 4-aristulate, apical awns are projection of the intermediate nerves; marginal apical awns hyaline, shorter than the middle apical awns: awn 8–9.5 mm long, borne near the median, 2.5–3 mm from the apex, twisted at base; callus obtuse, with trichomes 2–3.5 mm long, about 2/3–3/4 as long as the lemma; paleas 5–5.3 mm long, shorter than the lemma, hyaline, 2-nerved, the nerves scabrous; apex bidentate; anthers (0.5–)0.8–1 mm long; lodicules 0.6–0.8 mm long, hyaline, tridentate at the apex, the teeth small, the middle tooth a little larger than the lateral teeth; ovary pubescent, with a few trichomes near apex. Caryopses 2.0–2.7 mm long, rostrate, pubescent, apex with a few short curved and shining trichomes; trichomes curved and shining; hilum short, ovate; endosperm soft.

*Distribution and habitat.* *Trisetum longiglume* var. *longiglume* is endemic and rare to south-central Chile (Metropolitana) and Argentina (Mendoza, Neuquén, and Chubut) between 2000 and 4000 m. This species is primarily found in Andean valleys.

*Phenology.* Flowering between January and March.

*Comments.* Louis-Marie (1929) described *Trisetum andicola* on the basis of material collected in the Cordillera de Los Andes of the Región Metropolitana in Chile. Valencia (1941) transferred the taxon to *Deschampsia*. Later Parodi (1949b) thought it should be treated again as *Trisetum*. This species shows unique characters, making it easily recognized: glumes isomorphic, longer than the spikelet, the lemmatal awn borne near the middle of the lem-

ma, long trichomes on the callus, and, in the typical variety, trichomes at the apex of the ovary and on the caryopsis.

*Additional specimens studied.* ARGENTINA. **Chubut:** Mt. La Torta, Rivadavia Range, 30, *Beetle & Soriano HS-381a* (US). **Neuquén:** Dpto. Minas, Paso del Macho, *Boelcke et al. 13932* (BAA); Copahue, 3 Jan. 1930, *Hutchinson s.n.* (BAA). CHILE. **Región Metropolitana:** Cajón Las Leñas, *Arroyo et al. 94447, 94454* (CONC).

**10b. *Trisetum longiglume* var. *glabratum*** Nicora, Fl. Patagonica 3: 245, f. 158. 1978. TYPE: Argentina. Neuquén: Dpto. Lácar, Estancia Meliquina, Co. Repollo, *Z. E. Rúgolo de Agrasar & E. Agrasor 573* (holotype, BAA!).

Perennial, with short rhizomes; culms 10–38 cm tall, erect, glabrous. Leaf sheaths glabrous; ligule ca. 2 mm long, glabrous, minutely denticulate at the apex; blades stiff, flat to conduplicate, abaxially glabrous, adaxially with 10 to 12 prominent, scabrous ribs; margins scabrous; lower blades 5–6 cm × 1–2 mm; upper (flag) blade 1 cm long. Panicles few-flowered (12 to 21 spikelets), linear, narrow; rachis glabrous; pedicels scabrous. Spikelets ca 10 mm long, 2-flowered; rachilla 2–2.5 mm long, pilose, the trichomes up to 3 mm long; glumes ca. 10 mm long, as long as the spikelet, isomorphic; first glume 1- to 3-nerved; second glume 3-nerved; florets 6.5–8.6 mm long; lemmas dorsally awned, glabrous, 5-nerved, the median and marginal nerves very conspicuous toward the apex, the nerves projected as 4 short apical awns; apical awns 1–2 mm long; awns 8–11 mm long, borne near the median, geniculate and twisted; callus very pubescent, the trichomes 1/2 the length of the lemma; paleas hyaline, a little shorter than the lemma; anthers 1.3–1.7 mm long; ovary glabrous. Caryopses 3.5–4.2 mm long; hilum oval.

*Distribution and habitat.* *Trisetum longiglume* var. *glabratum* is endemic to Argentina (Neuquén and Chubut) (Nicora, 1978; Zuloaga et al., 1994). This species occurs in rocky soils in the high Andes.

*Illustrations.* Nicora (1978: 247: fig. 158A–E).

**11. *Trisetum macbridei*** Hitchc., Contr. U.S. Natl. Herb. 24(8): 359. 1927. TYPE: Peru. Huarón, collected on rocky NE slope, 4200 m, 12 June 1922, *J. F. Macbride & Featherstone 1131* (holotype, US-1161510!; isotypes, F-050168!, F-517642!, P!, S-fragm.!).

Perennial, with short rhizomes; culms 20–40 cm tall, glabrous, erect; nodes 1 or 2, basal. Leaf

sheaths pilose; apex with sheath auricles as long as ligule; ligule 1–1.5 mm long, truncate-obtuse, denticulate, ciliate, dorsally pilose; blades 2–10 cm × ca. 3 mm, long, flat to conduplicate, stiff, sparsely pilose abaxially, scabrous adaxially, ciliate on the margin; upper blade 2–3 cm long. Panicles 6–8 × ca. 1 cm, spiciform, narrow, green-purple, shining; rachis glabrous. Spikelets ca. 8 mm long, 2-flowered; pedicels distally scabrous; rachilla ca. 1.5 mm long, pubescent, the trichomes ca. 1 mm long; glumes exceeding the florets by 1/3–1/2 in length, equal to subequal, ovate; keel somewhat scabrous; apex acute, aristulate, scabrous; first glume 7.5–8 × 1.1–1.5 mm, 1-nerved; second glume 7.8–8 × 1.3–1.5 mm, 3-nerved; florets ca. 4–5.5 × 0.9 mm; lemmas glabrous, green on back, somewhat purple on margins, dorsally awned; apex 2-aristulate, the apical awns 0.4–0.5 mm long; awn borne on the upper 1/3, twisted and geniculate, a little scabrous; callus obtuse, with trichomes 0.1–1 mm long; paleas 3 mm long, 1/2–2/3 as long as the lemma, hyaline, 2-nerved, the nerves scabrous; apex erose, minutely ciliate; anthers ca. 1 mm long, ovate; lodicules 0.6–0.7 mm long, with 2 or 3 small lobes at the apex, one of the lobes larger than the other two, sometimes cleistogamous flowers with anthers ca. 0.5 mm long; ovary glabrous. Caryopsis not seen.

*Distribution and habitat.* *Trisetum macbridei* is an endemic and rare species found only in the Andes of Central Peru. Tovar (1993) reported *T. macbridei* from Huancavélica and Pasco, between 4200 and 4500 m. This species is found on rocky slopes.

*Phenology.* Flowering in June.

*Comments.* *Trisetum macbridei* is related to *T. spicatum* (Hitchcock, 1927), from which it differs in having both glumes conspicuously longer than the florets (vs. glumes shorter than the florets in *T. spicatum*), glumes similar in shape (vs. glumes dissimilar in *T. spicatum*), culm glabrous below the panicle (vs. culm pubescent or pilose below the panicle in *T. spicatum*), and leaves pubescent (vs. glabrous in typical *T. spicatum*). On the basis of the isomorphic glumes, equal in length and width, Louis-Marie (1928, 1929) classified this species in *Trisetum* subgenus *Isolytrum*.

*Additional specimens studied.* PERU. **Ancash:** Huaylas, Huascarán National Park, quebrada Alpamayo above Lago Jancarurish, Smith, Valencia & Gonzáles 9772 (F). **Junín:** Prov. Cerro Huarón, rocky lakeshore. Asplund 11784 (S), 11793 (S, US).

**12. *Trisetum mattheii*** Finot, sp. nov. TYPE: Chile. Región I: Tarapacá, camino de Arica al Portezuelo de Chapiquiña, km 111, 18°18'S, 69°30'W, 4100 m, 9 Feb. 1964, C. Martico-

rena, O. Matthei & M. Quezada 86 (holotype, CONC-88160!). Figure 1.

Gramen caespitosum; culmi 20–36 cm alti, erecti, pilosi; vaginae inferiores pilosae, superiores glabrae; ligula hyalina, triangularis, dentato-ciliata, 1.5–2 mm longa; laminae conduplicatae, inferiores pilosae, superiores glabrae; panicula spiciformis 3–5.5 × 0.5–0.8 cm, pauciflora; spicula 2-flora, 4.5–5 mm longa; glumae inaequales, inferior angustior, 1-nervia, 3.5–4.5 × 0.5–0.6 mm, lineari-lanceolata, superior 3-nervia, ovato-lanceolata, 3.8–4.7 × 0.7–0.9 mm; lemma hirsuta, aristata ad 1/3 superiorem; arista divaricata, non torta, scabra; callus obtusus, pilosus, pilis 0.2 mm longis; palea brevior quam lemma, hialina, binervata, nervis scabris, bidentato-biaristulata ad apicem; lodiculae 0.6–0.8 mm longae, bilobulatae ad apicem, lobulis acutis; stamina 3, antheris 1.1 mm longis; ovarium apice glabro.

Perennial, caespitose; culms 20–36 cm tall, purple, pubescent below the panicle, the trichomes ca. 0.5 mm long, first antrorse, then retrorse; nodes 2, glabrous. Leaf sheaths 1–4 mm long, longer than the internodes; lower sheaths pilose, with age glabrous; culm sheaths glabrous; ligule 1.5–2 mm long, subtriangular, dentate and minutely ciliate at the apex; dorsally glabrous; blades 1–6 cm × 0.5–1 mm, conduplicate, almost filiform, somewhat stiff, scabrous on the margin and adaxial surface; lower blades pilose; upper blades glabrous. Panicles 3–5.5 × 0.5–0.8 cm, tinged with purple and yellow, spiciform, narrow, linear, few-flowered, sometimes interrupted at the base, acute at the apex; rachis densely pubescent, the trichomes ca. 0.5 mm long. Spikelets 4.5–5 mm long, 2-flowered; pedicels densely pubescent; rachilla 0.6–0.9 mm long, with stiff trichomes at the base, glabrous toward the apex; beyond upper floret rachilla with an aristiform appendix up to 0.5 mm long; glumes a little shorter than the spikelet, dissimilar; apex acute, sometimes short-awned; first glume 3.5–4.5 × 0.5–0.6 mm, linear-lanceolate, 1-nerved; second glume 3.8–4.7 × 0.7–0.9 mm, ovate-lanceolate, 3-nerved; florets 3.5–4 × 0.6–0.7 mm; lemmas green at the base, purplish toward the apex, awned dorsally, hirsute, the trichomes 0.3–0.5 mm long; apex 2-aristulate, the apical awns ca. 0.3 mm long; awn 2.5–3.5 mm long, borne on upper 1/3, 1–1.5 mm from the apex, divaricate, not twisted nor geniculate, scabrous; callus pubescent, with trichomes ca. 0.2 mm long; paleas 2.8–3 mm long, shorter than the lemma, 2-nerved; keels scabrous below; apex 2-dentate, the teeth prolonged as hyaline setae; anthers ca. 1.1 mm long; lodicules 0.6–0.8 mm long, deeply bilobed at the apex; ovary glabrous. Caryopses not seen.

*Distribution and habitat.* Known only from the

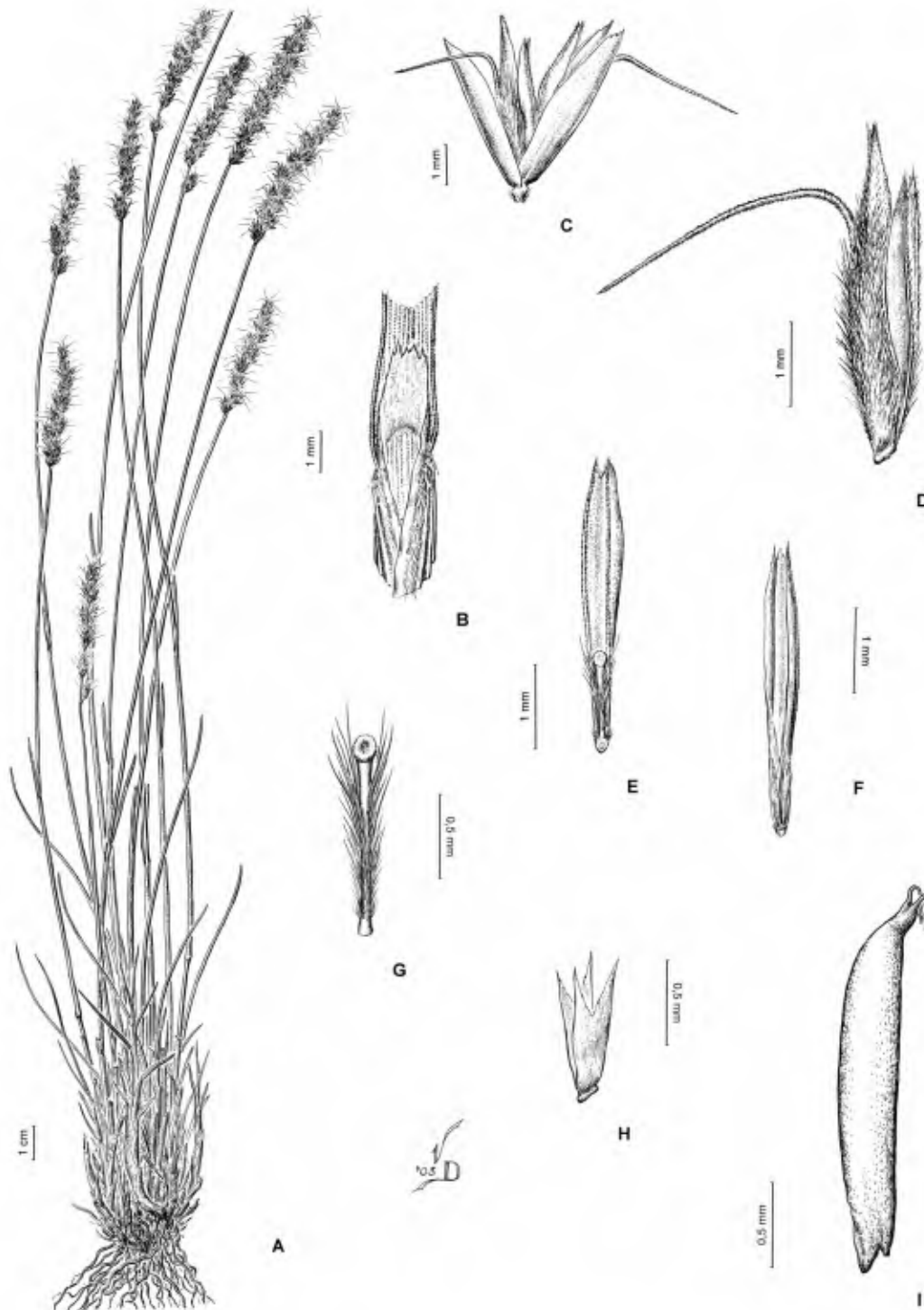


Figure 1. *Trisetum matthei*. —A. Habit. —B. Sheath, ligule, and portion of the blade. —C. Spikelet. —D. Floret. —E. Rachilla and palea, dorsal view. —F. Lodicules and palea, ventral view. —G. Rachilla. —H. Lodicules. —I. Caryopsis. *Martcorena, Matthei & Quezada 86* (holotype, CONC).

type locality, in Cordillera de Los Andes, northern Chile, Region I, at 4100 m.

*Phenology.* Flowering in February.

*Comments.* *Trisetum mattheii* is allied to *T. oreophilum* Louis-Marie var. *johnstonii* Louis-Marie, and can be separated from the latter by having taller culms (20–36 cm), with linear, narrow and few-flowered panicles, glabrous sheaths and upper blades, and subtriangular ligules. *Trisetum oreophilum* var. *johnstonii* is smaller (10–20 cm tall), with densely flowered, ovate panicles, pubescent sheaths and blades, and truncate ligules.

*Etymology.* The specific epithet honors the Chilean agrostologist, Oscar Matthei Jensen, retired Professor at the Universidad de Concepción, Chile.

**13. *Trisetum nancaguense*** Finot, sp. nov. TYPE: Chile. Región VI: Prov. Cardenal Caro, 12 km E of Pichilemu on Hwy. toward Nancagua, 34°23'S, 71°59'W, 45 m, 15 Nov. 1990, *T. G. Lammers, C. M. Baeza y P. Peñailillo 7894* (holotype, CONC-113221!; isotype F-2183048!). Figure 2.

Gramen caespitosum, 40–75 cm altum; culmus erectus vel geniculatus, glaber. folia multo excedens; vaginae laxae, pilosae; ligula 2–3 mm longa, hialina, truncata, dentato-ciliata; laminae 4–15 cm × 2–5 mm, planae, pilosae; panicula 6.5–9 × 0.8–2 cm, contracta; spicula 5.5–8 mm longa, 2- v. 3-flora, lateraliter compressa; rachilla 1 mm longa, dense pilosa; glumae inaequales; inferior gluma 3.5–6 × 0.2–0.4 mm, lineari-lanceolata, 1-nervata, angustior; superior gluma 5.3–7.6 × 0.7–1.1 mm, ovato-lanceolata, 3-nervata, apice acuminata; lemma hirsuta, aristata ad 1/3 superiorem; arista flexuosa vel geniculata, non torta, scabra; callus obtusus, pilosus; palea brevior quam lemma, hialina, binervata, nervis scabris, bidentato-biaristulata ad apicem; stamina 3, antheris 1.5 mm longis; lodiculae 0.8–1 mm longae, bilobulatae ad apicem, lobulis acutis; ovarium apice glabro; caryopsis 2.5–3 × 0.5–0.6 mm, glabra; endospermium liquidum.

Perennial, caespitose; culms 40–75 cm tall, glabrous; nodes 2 to 4, glabrous or pilose. Leaf sheaths shorter than the internodes, pubescent; lower sheaths 3–8 cm long; upper sheaths 15–20 cm long; ligule 2–3 mm long, truncate, dentate-ciliate; blades 4–15 cm × 2–5 mm, flat, soft, pubescent abaxially, sparsely pilose adaxially. Panicles 6.5–9 × 0.8–2 cm, subspiciform, contracted, sometimes interrupted at the base, silvery-green to weakly purple; rachis scabrous. Spikelets 5.5–8 mm long, 2- or 3-flowered; pedicels 2–3.5 mm long, pilose to scabrous; rachilla ca. 1 mm long, pilose, the trichomes 2–3 mm long; glumes dissimilar, shorter than the florets, greenish; margins membranous, margins and apex tinged with purple; first glume 3.5–6 × 0.2–0.4 mm, linear-lanceolate, subulate, 1-nerved; keel scabrous on upper half; apex acute

to shortly awned, the awn up to 1 mm long; second glume 5.3–7.6 × 0.7–1.1 mm, oval-lanceolate, awned at the apex, 3-nerved; keel scabrous; florets 6.5–7.5 × 0.6–0.7 mm; lemmas dorsally awned, hirsute, green dorsally; margins and apex hyaline, tinged with purple; apex biaristulate, the awns ca. 1 mm long; awn 6–9 mm long, borne on the upper 1/3, 1.5–2.5 mm below the apex, geniculate, not twisted; paleas 4–5 mm long, shorter than the lemma, hyaline; apex biaristulate; anthers ca. 1.5 mm long, yellow; lodicules 0.8–1 mm long, apex bilobed, the lobes acute; ovary glabrous. Caryopses 2.5–3 × 0.5–0.6 mm, glabrous; endosperm liquid.

*Distribution and habitat.* *Trisetum nancaguense* is endemic to Chile, ranging from Región Metropolitana to VIII Región, between 33°20'S and 36°50'S and from 45 to 2450 m altitude.

*Phenology.* Flowering in November and February.

*Comments.* *Trisetum nancaguense* appears related to *T. barbinode* Trin., from which it differs in having pubescent blades (vs. glabrous), leaf sheaths shorter than the internodes (vs. longer), glumes shorter than the florets (vs. equaling or longer than the spikelet), first glume 1-nerved (vs. 1- or 3-nerved), lemma hirsute, i.e., covered with short and stiff trichomes (vs. lemmas pubescent, i.e., covered by short and softer trichomes), and by its distribution in the Central Valley (Depresión Intermedia) and coast in Central Chile at low elevations (*T. barbinode* occurs in the Cordillera de Los Andes, usually above 1000 m).

*Paratypes.* CHILE. **Región Metropolitana:** Cordillera, Valle Nevado, *E. Bayer 4608* (CONC). **VII Región:** Maule, Cerro al SW de Coronel de Maule, *G. L. Stebbins 9061* (SCO). **VIII Región:** Concepción, camino entre Concepción y Bulnes km 42, *Villarreal & Weldt 151* (CONC).

**14a. *Trisetum oreophilum*** Louis-Marie var. ***oreophilum***, *Rhodora* 30: 221. 1929. TYPE: Peru. Cuzco: moist grassland, high up ravine above Olloutaytambo, 3600 m, 5 Dec. 1923, *A. S. Hitchcock 22535* (holotype, US-1164163!).

Perennial, caespitose; culms 15–60 cm tall, puberulent to densely pubescent below the inflorescence; nodes 2, glabrous. Leaf sheaths shorter than the internodes; lower sheaths pubescent; upper sheaths glabrous; ligule 2–4.5 mm long, dorsally glabrous, denticulate at the apex; blades flat, glabrous, usually with long trichomes near the base; lower blades 8–16 cm × 2 mm; upper leaf blades 3.5–5 cm long. Panicle (5–)7–11 × 0.8–1.5 cm,

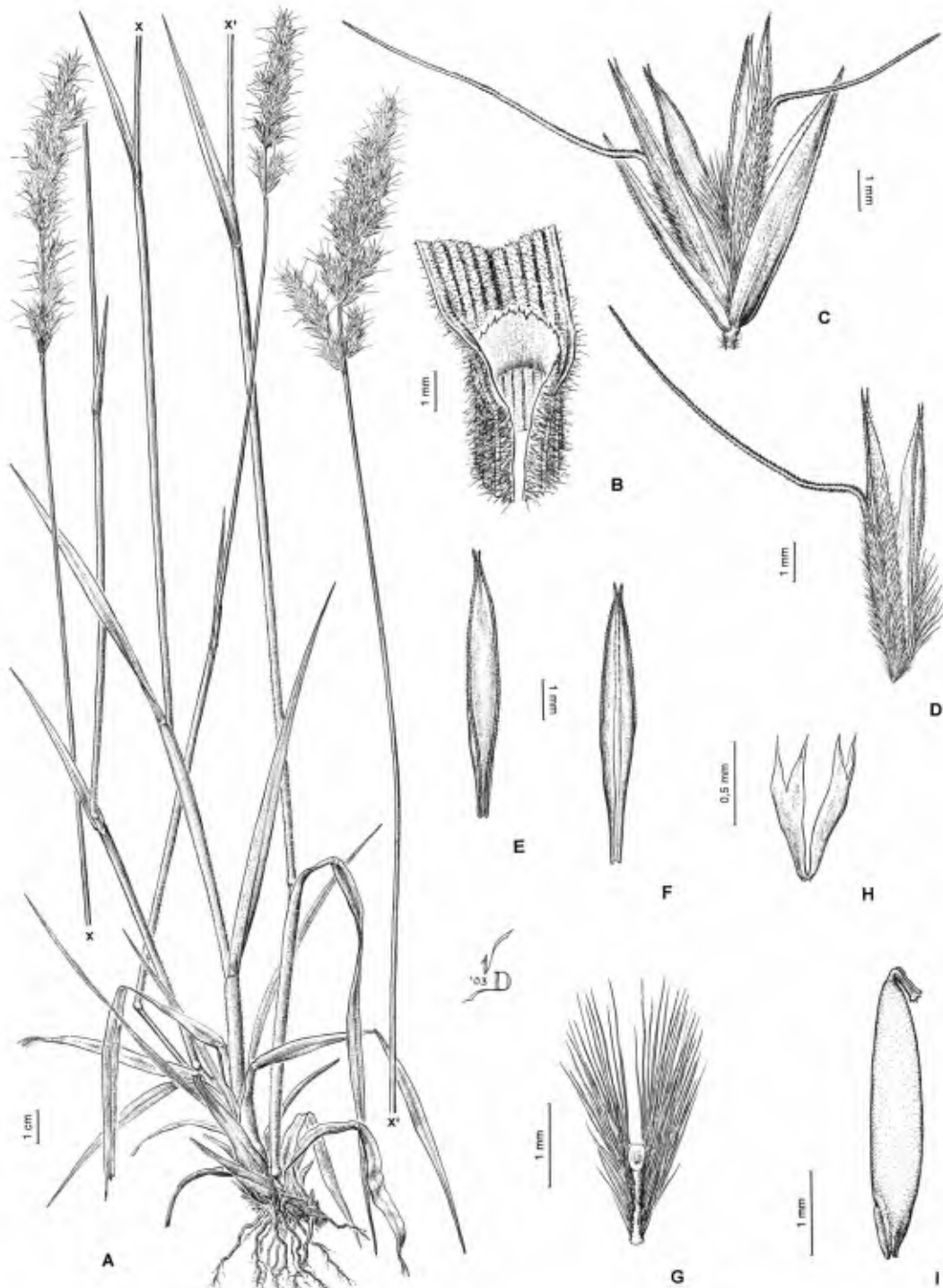


Figure 2. *Trisetum nancaguense*. —A. Habit. —B. Sheath, ligule, and portion of the blade. —C. Spikelet. —D. Floret. —E. Palea, dorsal view. —F. Palea, ventral view. —G. Rachilla. —H. Lodicules. —I. Caryopsis. *Lammers, Baeza & Peñailillo 7894* (holotype, CONC).

subspiciform to spiciform, linear, narrow, densely flowered, interrupted at the base, purplish-green, shining, rachis pubescent. Spikelets 3.5–4.5 mm long, 2- or 3-flowered, purple; pedicels pubescent; rachilla ca. 0.7 mm long, with long trichomes at the base; glumes unequal, shorter than the florets, dorsally green and purple; margins hyaline; apex acute; first glume  $2.2\text{--}3.6 \times 0.4\text{--}0.6$  mm, narrower and usually shorter than the second glume, 1-nerved; second glume  $2.8\text{--}4.1 \times 0.6\text{--}0.9$  mm; florets 3.5–4.6 mm long; lemmas pubescent to sparsely pubescent, dorsally awned; margins hyaline; apex 2-aristulate; callus obtuse, with short trichomes; awn 1.5–4 mm long, scabrous, borne on the upper 1/3, 1–1.5 mm below the apex, not twisted nor geniculate, curved, scabrous, sometimes with short trichomes at the base; paleas 2.8–3 mm long, shorter than the lemma, hyaline, 2-nerved, the nerves scabrous; apex 2-dentate; anthers 1–1.2 mm long, yellow; lodicules ca. 0.6 mm long; apex bilobed, hyaline; ovary glabrous. Caryopses ca. 2.5 mm long, glabrous; endosperm liquid.

*Distribution and habitat.* *Trisetum oreophilum* var. *oreophilum* is found in Ecuador, Peru, and Bolivia, along the Cordillera de Los Andes, between 2900 and 4600 m. This species occurs in moist grasslands and ravines.

*Phenology.* Flowering between November and May.

*Comments.* Renvoize (1998) considers *Trisetum oreophilum* a synonym of *T. spicatum*. As Louis-Marie (1928, 1929) correctly pointed out, *T. oreophilum* is a very homogeneous taxon, apparently more closely allied to *T. rosei* Scribn. & Merr. (both species share pubescent lemmas and a caespitose growth habit) than to *T. spicatum*. *Trisetum oreophilum* can be distinguished from *T. rosei* by having scabrous awns (plumose in *T. rosei*), smaller spikelets (3.5–4.5 mm long vs. 5–7 mm long in *T. rosei*), subequal glumes (unequal in *T. rosei*), and glumes and paleas with scabrous keels (vs. ciliate in *T. rosei*). *Trisetum rosei* grows in Guatemala and Mexico (Espejo-Serna et al., 2000; Finot et al., 2004).

*Additional specimens studied.* BOLIVIA. **La Paz:** Región Andina, *Buchtien* 6468 (US); Andean Region, *Buchtien* 8839 (S); vicinity of La Paz, *Mandon* 1309 (CONC), 1857 (BAA); Murillo, Valle de Palca, Huasipampa, *Asplund* 1028, 2057 (S); Chijini, *Asplund* 2010 (S); Challapampa, *Asplund* 3798 (S); Omasuyos, Isla del Sol, Yumani, *Asplund* 3585 (S); Murillo, La Paz Calacoto 18 km hacia Collana, *Beck* 13788 (SD); Cerro Calvario, *Parodi* 10127; 10122 (BAA). ECUADOR. **Azuay:** P.N. Cajas, NW Cuenca along Río Miguir, *Peterson, Annable & Poston* 8866 (US). **Bolívar:** Hacienda Talahua, *Penland* 584 & *Summers* (F). **Chimborazo:** 15.5 km SE of main square of Chambo and SE of Río Bamba on rd. to Alao, *Peterson,*

*Judziewicz, King & Jørgensen* 9176 (US); 9 km NE of San Juan de Velasco on rd. to Lago Colta, *Peterson, Judziewicz, King & Jørgensen* 9239 (US); Urbina, tow. Mt. Chimborazo, *Asplund* 7896 (S). **Cotopaxi:** Lag. Quilotoa, *Lae-gaard* 101347 (QCA); P.N. Cotopaxi, Limpio-pungo, *Roig J.* 12000 (MERL). **Pichincha:** *Sodiro* 1893 (US-1163177, paratype); N slope of Mount Corazón, *Asplund* 17550 (S); San Juan, tow. Chiriboga, *Asplund* 16131 (S); slope of the Pichincha above Lloa, *Asplund* 7547 (F, S); Quito, Panecillo, *Asplund* 6023 (F). PERU. **Ancash:** Huari, Huascarán Natl. Park, Quebrada Rima Rima, a lateral valley of Quebrada Carhuazcancha, *Smith, Valencia, González & Buddensiek* 12224 (F); Huaylas, Huascarán Natl. Park, Quebrada Los Cedros, *Smith, Valencia & Minaya* 9943 (F). **Cajamarca:** Celendín, Jalca de Kumulca, *Sagásteguí, Mostacero & Leiva* 12056 (F); Lagunas Maqui-Maqui, *Sánchez-Vega & Cabanillas* 6790 (F); Hualgayoc, a 31 km de Bambamarca, arriba de la ciudad de Hualgayoc, sobre la ladera sur, *Sánchez-Vega, Molau & Ohman* 3800 (F); Celendín, Quebrada de Sendamal, sobre la carretera a Celendín, *Sánchez-Vega, Molau & Ohman* 3812 (F); Sexcemayo, cerro Mahoma al W de Cajamarca, *Sánchez-Vega & Castillo* 6370 (F); Cajamarca-Chotén, en el arboretum de CICAFOR, a 4 km de la carretera Pacasmayo-Cajamarca, desvío la altura del km 155, *Sánchez-Vega, Torrel & Medina* 2557 (F); Cajamarca, a la altura del Paso El Gavilán, *Sánchez-Vega et al.* 1380 (F). **Cuzco:** north of city, *Hitchcock* 22471 (US); Rodadero, *Marin* 1432 (US); cerro, *Vargas* 7045 (US); Urubamba, large eroded rock called Marraqa on Inca plaza called Capellanpampa, *Davis et al.* 1381 (F). **Huancavelica:** Prov. Huancavelica, entre Huaytanayoc y Manta, *Tovar* 2539 (US); Prov. Tayacaja, Hacienda Huari, *Salaverry* 17 (US); Hacienda Alalay, entre Mejorada y Pampas, *Tovar* 2474 (US); Prov. Castrovirreina, Choclococha, *Tovar* 2933 (US). **Junín:** Rfo Blanco, *Swallen* 7064 (US); Res. Nac. Junín, Ondores, *Pettersson* 41, 57 (S); Goyllarisquisca, NW part of Junín, *Hitchcock* 22323 (US-1164158, paratype); Cerro de Pasco, *Hitchcock* 22254 (US-1164159, BAA-3408, paratype); La Quinhua, Cerro de Pasco, *Hitchcock* 22271 (US); Oroya, *Hitchcock* 22184 (US); Hacienda Atocsaico, near Junín, *Hitchcock* 22199 (US).

**14b. *Trisetum oreophilum* var. *johnstonii*** Louis-Marie, *Rhodora* 30: 237. 1929. TYPE: Argentina. San Juan: Andes of NW San Juan, Arroyo Tambillos, 4300 m, 10 Jan. 1926, *I. M. Johnston* 6097 (holotype, GH not seen; isotypes, BAA-3409!, SGO-59037!, SI fragm. ex US!, US-1297379!).

Perennial, caespitose; culms 10–20 cm tall, glabrous or pubescent below the inflorescence; node 1. Leaf sheaths pilose; upper sheath inflated, striate; ligule 0.5–1 mm long, truncate, dentate-ciliate; blades flat, pilose; lower blades 3–8 cm  $\times$  1–1.5 mm, flat to conduplicate; upper blade 1–5 cm  $\times$  ca. 1 mm, conduplicate. Panicles 2–4.5  $\times$  0.8–1.5 cm, oval, spiciform, dense, interrupted at the base, green and purple; rachis glabrous or pubescent. Spikelets 3.5–4.5 mm long, 2- or 3-flowered, sessile or with pedicels up to 3 mm long, scabrous; rachilla ca. 1 mm long, densely pubescent, with

trichomes up to 1.5 mm long; glumes subequal, shorter than the florets or the second glume as long as the florets; keel scabrous; apex acute; first glume 2.7–4 × 0.4–0.9 mm, 1- or 3-nerved, the lateral nerves, if present, very short; second glume 3.3–4.7 × 0.5–1.2 mm, 3-nerved; florets 3.5–4 × ca. 0.7 mm; lemmas awned dorsally, purplish near the apex; apex biaristulate, pubescent; awn 2–3.5 mm long, somewhat twisted at the base, geniculate or curved, scabrous; callus obtuse, with trichomes ca. 0.5 mm long; paleas 2.2–3.5 mm long, shorter or about as long as the lemma, hyaline, 2-nerved, the nerves scabrous; apex bidentate; anthers ca. 1.1 mm long; lodicules ca. 0.5 mm long, bilobed at the apex, hyaline. Caryopses 1.6–2 × 0.3–0.5 mm, glabrous or with 4 to 6 shining curved trichomes at the apex; endosperm liquid.

*Distribution and habitat.* *Trisetum oreophilum* var. *johnstonii* is found in northern Chile and Argentina (27°S–33°50'S) along the Cordillera de Los Andes, between 2900 and 4600 m.

*Phenology.* Flowering between December and February.

*Comments.* Finot (2003) cited by error *Johnston 6079* instead of *Johnston 6097* as the type of *T. oreophilum* var. *johnstonii*. This species is frequently confused with *T. preslei*, from which it differs in having hairy leaves (vs. leaves glabrous in *T. preslei*), glumes shorter than the florets (vs. glumes equaling or exceeding the florets in *T. preslei*), first glume 2.7–4 mm long (vs. first glume 4.5–6 mm long in *T. preslei*), and second glume 3.3–4.7 mm long (vs. second glume (4.5–)5.5–6.5 mm in *T. preslei*).

*Additional specimens studied.* ARGENTINA. **Mendoza:** Dpto. San Rafael. Paso Cruz de Piedra, Refugio Perón, *Raig 50* (MERL); San Carlos, camino a Laguna Diamante, *Baelcke 4132* (BAA); San Carlos, Laguna Diamante, *Baelcke et al. 10011, 10039* (BAA); Laguna Diamante, El Paraniillo, *Baelcke et al. 10061* (BAA); Luján, Lagunita del Plata, *Trombatta & Ahumada 11105* (MERL); Luján, Cordillera Frontal, Cordón del Plata, Lagunita del Plata, 22 Feb. 1984, *Trambatta s.n.* (MERL); Las Cuevas, Quebrada Benjamín Matienzo, *Pérez-Moreau 144* (BA, pro parte); Cordillera del Portillo de la Llaleta entre el Paso del Portillo y la Laguna del Diamante, entre Arroyo de La Cascada y Corrales Negros, *Kurtz 11086* (SI). **Neuquén:** Chos Malal, cajón inferior del Arroyo Turbio (Arroyo Domeyko), *Baelcke et al. 11318* (BAA). **San Juan:** Calingasta, entre Paso Espinacito Sur y Quebrada Honda, 12 Feb. 1950, *Pérez-Moreau & Perrone s.n.* (BA); Cordillera de Colanguil, quebrada del Salto, *Pérez-Moreau 30–258* (BA, BAA); Espinacito, Los Frías, Río Las Leñas, *Raig 11950* (BAA); alta cordillera de San Juan, Laguna Pachón, *Kapitaluti & Gómez 5816* (SD); Dpto. Iglesia, Mina Fierro Nuevo, Quebrada de los Chilenos, 26 Feb. 1950, *Perrone s.n.* (BA). CHILE. **III Región:** Copiapó, Laguna del Negro Francisco, *Muñoz 3981* (SGO); Huasco, Que-

brada Cantarito, entre Quebrada Marancel y Portezuelo de Cantarito, *Marticarena et al. 83462-B* (CONC); Km 42 Río del Estrecho, *Arancia, Squeo & León 94250* (CONC, USL); Quebrada Los Barriales, *Arancia, Squeo & León 94043* (USL). **IV Región:** Choapa, Cordillera de Illapel, Caletón Blanco, *Jiles 4246* (CONC); Cordillera de Combarbalá, Ha. Ramadilla, *Jiles 4801* (CONC); Cajón de Los Pelambres, *Teillier 1536* (CONC); Elqui, Cordillera Doña Ana, Quebrada del Negro, *Arancia 92129* (CONC, USL); Cordillera de Ovalle, San Miguel-Los Pingos, *Jiles 5889* (CONC); Cordillera de Ovalle, Los Pingos, *Jiles 5888* (CONC); Cordillera de Doña Ana, 23 Mar. 1994, *Arancia s.n.* (USL); Cordillera de Doña Ana, *Arancia 93021* (USL); Limarí, Cordillera de Ovalle, Punta de Huana-Río Molles, *Jiles 4136* (CONC); Doña Rosa, nacimiento de Quebrada Larga, *Jiles 2952* (CONC); Vegas San Miguel, *Jiles 3649* (CONC, SGO). **Región Metropolitana:** Santiago, Paso de las Nieves Negras, *Gunckel 20465a* (CONC); Cajón del Maipo, *Gunckel 20295* (US).

**15. *Trisetum phleoides*** (d'Urv.) Kunth, Revis. Gramin. 1: 101. 1829. Basionym: *Avena phleoides* d'Urv., Fl. Iles Malouin. 30(19). 1825. *Trisetum subspicatum* var. *phleoides* (d'Urv.) Hack., Svenska Exped. Magell. 3(5): 222. 1900. *Trisetum spicatum* subsp. *phleoides* (d'Urv.) Macloskie, Rep. Princeton Univ. Exp. Patagonia, Botany 8: 206. 1904. TYPE: South America, Falkland Islands [Islas Malvinas], Soledad, *d'Urville 3*: (holotype, P not found; isotypes, BAA-3411!, US-fragm. ex P!).

*Trisetum hirsutum* Phil., Anales Univ. Chile 46(43): 565. 1873, non (Gaudin) Sebrad., Linnaea 12: 443. 1838. *Trisetum spicatum* (L.) K. Richt. var. *hirsutum* Louis-Marie, Rhodora 30: 239. 1929. TYPE: Chile, "Estrecho de Magallanes, de los alrededores de la colonia chilena." *R. A. Philippi s.n.* (holotype, SGO-PHIL-235!; isotypes, SGO-63600!, 37057!, US-81775!, US fragm. ex SGO-PHIL-235 & photo!, US photo ex SGO-37057!).

Perennial, with short rhizomes; culms 5–24 cm tall, erect, densely pilose below the panicle; trichomes 0.5–0.7 mm long, antrorse below the panicle, then retrorse below. Leaf sheaths pilose; ligule 1.5–2 mm long, truncate, ciliate, dorsally pubescent; blades flat or conduplicate, pilose, ciliate on margins near the ligule. Panicles 2–6 × 0.5–1.5 cm, spiciform, dense, green-yellowish, sometimes tinged with purple, sometimes included in the upper sheath. Spikelets ca. 6.5 mm long, 2- to 4-flowered; rachilla ca. 0.8 mm long, pubescent, the trichomes up to 2 mm long; glumes subequal, longer than the florets, rarely the first glume a little shorter than the spikelet; keels ciliate; apex short aristulate; first glume 4–6.5 × 0.5–0.6 mm, 1-nerved; second glume 5–6.5 × ca. 0.7 mm, 3-nerved; lemmas dorsally awned, glabrous; apex 2-aristulate, the awns 0.5–1 mm long; awn ca. 6 mm long, curved, not strongly twisted or geniculate,



scabrous, borne on the upper 1/3; callus with short trichomes, the trichomes ca. 0.2 mm long; florets ca. 4 mm long; paleas ca. 3.5 mm long, shorter than the lemma, 2-nerved, the nerves scabrous; apex bidentate; anthers ca. 1.2 mm long; ovary glabrous. Caryopses not seen.

*Distribution and habitat.* *Trisetum phleoides* is endemic to southern Argentina and Chile, occurring between 50°S and 55°S latitudes and between 15 and 1000 m.

*Phenology.* Flowering between November and March.

*Illustrations.* Nicora (1978: 247, fig. 161A–D).

*Comments.* *Trisetum phleoides* is perhaps related to *T. spicatum*. Both species have spiciform panicles and culms densely pilose below the inflorescence. *Trisetum phleoides* was placed as a variety or subspecies of *T. spicatum* by Macloskie (1904), Louis-Marie (1928, 1929), and Hultén (1959). Nicora (1978) accepted this taxon at the species level. It is evident from an annotation label written in 1935 by L. Parodi on the type of *Avena phleoides* at BAA that he considered *T. phleoides* a good species and closely related to *T. spicatum*: “Es una buena especie limitada a las Malvinas y Región Fueguina, afín a *T. subspicatum*.” *Trisetum phleoides* differs by having pilose blades (vs. glabrous or puberulent in *T. spicatum*), dorsally pubescent ligules (vs. glabrous in *T. spicatum*), glumes that are ciliate on the keels (vs. scabrous in *T. spicatum*) and longer than the florets (vs. glumes shorter than the florets in *T. spicatum*).

*Additional specimens studied.* ARGENTINA. **Santa Cruz:** Río Fósiles, 1905, *Dusén s.n.* (S); Güter Aike, Estancia Las Viscachas, Pan de Azúcar, Arroyo, Boelcke, Gómez, Moore & Romanczuk 491 (SI); Guer Aike, curso superior del Río Turbio, entre Estancia La Primavera y puesto Tres Marías, Roig et al. 444 (SI); P.N. Perito Moreno, Río Chico, Villamil 8396 (CONC). **Tierra del Fuego:** Ushuaia, cerro Martral, 5 Feb. 1986, Roig J. s.n. (MERL); Valle de Olavaia, Alboff 1039 (SI); Río Fuego, 9 Jan. 1919, Pico s.n. (BAA); Ushuaia, Mar 1902, Skottsberg s.n. (S); Ushuaia, Skottsberg 236 (S), Feb. 1896, Alboff s.n. (LP); Hito XIX, 6 Feb. 1942, Castellanos s.n. (BAA); alrededores de Ushuaia, Hunziker 8200 (BAA); Ushuaia, canal Beagle, Punta Segunda, Grondona 7340 (BAA); Isla de los Estados, Puerto Abrigado, Castellanos 1937 (BA); Salto del Río Grande, 30 Jan. 1912, Hicken s.n. (CONC); Islas Malvinas, Skottsberg 69 (S); Ushuaia, Monte Olivia, orillas del Río Olivia, Ferraro, Messuti & Vobis 4676 (CTES); Ushuaia, Río Pipo, Camping Mun. Monseñor Aleman, 11 Mar. 1995, Ferraro, Messuti & Vobis 4703 (CTES); Ushuaia, península detras del aeródromo (La Misión), Luti 1640 (CORD); Ushuaia, cerros proximos al monte Olivia, Luti 1426 (CORD); Ushuaia, Ruta Nacional J. Puerto Haberton, Fortunato 4823 & Elechosa (CORD); Ushuaia, Pennington 450b (SI); Turbera de Oldenbourg, F. Roig, C. Roig & F. A. Roig 14911 (MERL); camino del

bosque al salto del Río Grande, 30 Jan. 1912, Hicken s.n. (SI); Isla de Los Estados, Puerto Cook, Mar. 1882, Spezzazzini s.n. (LP). CHILE. **XII Región:** Patagonia Occ., 5 Jan. 1897, Dusén s.n. (S); Magallanes, Anderson 387 (S); Punta Arenas, cerros de canchas de sky, Ricardi & Matthei 316 (CONC); cerros de canchas de sky, 120 m, Pfister & Ricardi s.n. (CONC); Punta Arenas, Río de las Minas, Barrientos 224 (CONC); Tierra del Fuego, 1769, Banks & Solander s.n. (S); Tierra del Fuego, sector Vicuña, Lote 12, Forestal Trillium, Pisano, Henríquez & Domínguez 7566 (CONC); Isla Navarino, Tsujii 172 (CONC); Isla Navarino, Mont au dessus du Port Williams, Nov. 1958, de La Rüe s.n. (P); Fuegia Orientalis, Feb. 1879, P. Ortega s.n. (SGO); Prov. Tierra del Fuego, Río Hondo, Pisano 2451 (CONC).

**16. *Trisetum preslei*** (Kunth) E. Desv., in Gay, Fl. Chil. 6: 347. 1854. Basionym: *Avena preslei* Kunth, Enum. Pl. 1: 304. 1833. TYPE: Chile. “Hab. in Cordilleris chilensibus,” *T. Haenke s.n.* (holotype, PR-198805!; isotypes, BAA-3413 fragm.!, LE-TRIN-1933.02!, MO-2106485 not seen, US-81803!).

*Trisetum lasiolepis* E. Desv., Fl. Chil. 6: 346. 1854. Syn. nov. TYPE: Chile. *C. Gay s.n.* (holotype, Pl; isotypes, BAA fragm. ex P not seen, CONC fragm. ex Pl, GH not seen, Pl, SGO photo ex Pl, US-91366 fragm. ex Pl!).

*Deschampsia lasiantha* Phil., Linnaea 33: 290. 1864. *Trisetum preslei* var. *lasianthum* (Phil.) Louis-Marie, Rhodora 30: 238. 1929. TYPE: Chile. Andes de Hurtado, *C. Gay s.n.* (holotype, SGO-63603!; isotype, SGO-71900 phot!).

*Trisetum buchtienii* Hack., Z. Bot. 54: 290. 1904. *Trisetum preslei* var. *buchtienii* (Hack.) Louis-Marie, Rhodora 30: 238. 1929. TYPE: Chile. “Las Calaveras, 3200 m, Uspallata Pass, der chilenischen Hoch-Cordillere,” 14 Feb. 1903, *O. Buchtien s.n.* (holotype, S!; isotypes, BAA-3361!, US-1099519!).

Perennial, caespitose; culms 3–19(–30) cm tall, erect or geniculate at the base, densely pilose or tomentose below the inflorescence, glabrous below; nodes 1 or 2. Leaf sheaths up to 6 cm long, glabrous; upper sheaths usually inflated and striate; ligule 0.5–1.5 mm long, a little longer on the upper leaves, oval, truncate, dentate-laciniate, ciliate; blades glabrous, adaxially scabrous especially toward the base; margins scabrous; lower blades 2–6 cm × 1–1.5 mm; upper blades 0.5–3 cm long. Panicles 2–7 × 0.5–1.5 cm, contracted, subspiciform or spiciform, densely-flowered, green or purple, exerted or included in the upper sheath; rachis covered by long trichomes or subglabrous; pedicels up to 2 mm long, pubescent. Spikelets 5–6 mm long, (1)2(3)-flowered; rachilla 1–1.5 mm long, with trichomes 1.5–2 mm long; glumes subequal, equaling or more frequently longer than the florets, delicate, translucent, with wide hyaline margins; keel scabrous; apex acute or aristulate; first glume 4–6

× 0.4–0.7 mm, linear-lanceolate, equaling or a little longer than the spikelet, a little narrower than the second glume, 1-nerved; second glume (4.5–) 5.5–6.6 × (0.6–)0.8–1.1 mm, usually longer than the spikelet, 3-nerved; florets 4.2–5.5 × ca. 0.7 mm; lemmas dorsally awned, green-yellowish, somewhat purplish toward the apex, dorsally pubescent, trichomes long, soft, up to 1 mm long; margins hyaline; apex 2-aristulate; awn 2.5–4.5 mm long, nearly as long as the lemma, borne on the upper 1/3, divaricate, geniculate and weakly twisted or more frequently curved not geniculate or twisted, pilose at the base, scabrous above; callus obtuse, pilose, with trichomes ca. 1 mm long; paleas 3.2–4.5 mm long, a little shorter than the lemma, 2-nerved, the nerves scabrous-ciliate; apex 2-dentate; lodicules 0.6–1 mm long; apex bilobed, one of the lobes larger; ovary glabrous. Caryopses 2.5–2.7 × ca. 0.5 mm, glabrous; endosperm dry.

*Distribution and habitat.* *Trisetum preslei* is endemic to Chile and Argentina. In Chile *T. preslei* is found along the Cordillera de Los Andes between 2200 and 3700 m, and in Argentina it occurs between 33°S and 42°S at 1800–4000 m.

*Phenology.* Flowering between December and February.

*Illustrations.* Nicora (1978: 262, fig. 169A–C).

*Comments.* A note by Desvaux (1854) accompanying the original description of *T. lasiolepis* indicates a close relationship of this species with *T. preslei*. In Desvaux's opinion *T. lasiolepis* could be considered as a variety of *T. preslei*. *Trisetum lasiolepis* was recognized as a good species by Louis-Marie (1928, 1929) and by Nicora (1978). Nicora (1978) distinguished *T. lasiolepis* from *T. preslei* as being taller (plants 20–40 cm tall in *T. lasiolepis* vs. 10–20 cm tall in *T. preslei*), culms glabrous or pilose just below the panicle (vs. retrorse tomentose in *T. preslei*), panicles somewhat loose, with rachis pubescent to almost glabrous (vs. panicle dense, with rachis densely tomentose in *T. preslei*), and keels of glumes and palea scabrous (vs. keels of glumes and palea normally ciliate in *T. preslei*). The type of *T. lasiolepis* at P has culms 20–30 cm tall, narrow subspiciform panicles 5–7 cm long and less than 1 cm wide, glabrous blades (lower blades 4–5 cm long; upper blades 1–2 cm long), 2-flowered spikelets 5–6 mm long, and glumes equaling the florets or the second glume longer than the florets (first glume 4 × 0.4 mm; second glume 6 × 0.8 mm). Since the morphological characters taken from the type of *T. lasiolepis* fall within the range given for *T. preslei*, we consider this a new synonym of the latter species.

*Additional specimens studied.* ARGENTINA. **Mendoza:** on road above Las Cuevas, below Cristo Redento, H. & B. Mooney 546 (CONC); La Cumbre, Las Cuevas, Dec. 1908, Spegazzini s.n. (LP); Valle del Atuel, cerca Laguna Atuel. Böcher et al. 1971 (BAA); Atuel Valley, near El Angulo, Böcher et al. 1894 (BAA); Las Heras, entre Las Cuevas y Cristo Redentor. Ruiz Leal 79 (MERL); Las Heras, entre Las Cuevas y Cristo Redentor. Ruiz Leal 6625 (MERL); Las Heras, Cristo Redentor. Martínez Carrero 1272 (MERL); San Rafael, valle del río Atuel, Boelcke et al. 10226 1/2 (BAA); San Rafael, Antes de llegar Indígena-Estribaciones Norte Volcán Overo-El Sosneado. Lagiglia 2239 (LP); Agua Amarilla, Volcán Overo, El Sosneado. Lagiglia & D'Antoni 1326 (LP); entre Puesto de Ubilla y La Manzanilla, en el arroyo Tordillo, Kurtz 7599 (CORD); Calmucó, Covas 101 (BAA); Malallhue, proximidades de la cresta de la Sierra Azul, Méndez & Willoud c-320–7196 (MERL). **Neuquén:** Chos Malal, Cajón del Arroyo del Cruce, faldeo S del Domeyko, Boelcke et al. 11285 (BAA); Lácar, Cerro Repollo, Estancia Meliquina, Rúgolo de Agrasar & Agrasar 5846 (BAA); Minas, Lagunas Epu-Lauquén. Puesto de Gendamería, Boelcke et al. 11033 (BAA); Pino Hachado, Parodi 3196 (US); Chos Malal, a 34 km de Tricao Malal camino a Mina de Azufre. Boelcke et al. 11674 (SI). **Rio Negro:** El Bolsón, Cerro Piltriquitrón, Cabrera et al. 23110 (LP); Parque Nacional Nahuel Huapi, Cerro López, Boelcke 1972 (BAA). **CHILE. IV Región:** Coquimbo, Los Molles, Ovalle, Zoellner 5859 (CONC). **V Región:** Los Andes, Laguna Castro, Peñaloza et al. 91126, 91121 (CONC); entre Laguna Las Truchas y Laguna de la Turquesa, Arroyo, Maldonado & Henríquez 91156, 91158 (CONC); Laguna Castro, Peñaloza et al. 91122 (CONC); Aconcagua, Portillo, Laguna del Inca, Sparre 1678 (S). **Región Metropolitana:** Cordillera de Santiago, Mar. 1899, Reiche s.n. (SGO); Parque Nacional El Morado, Cordillera de Los Andes frente a Santiago, Teillier et al. 2548 (SGO); San José de Maipo, Cajón del Río Morales, Saavedra & Pauchard 6 (CONC, SGO); Cordillera, Lo Valdés, Feb. 1950, Gunckel s.n. (CONC); Cajón del Maipo, Gunckel 20297 (US); Cajón del Maipo, Hito Paso Internacional Maipo, Villagrán et al. 8462 (SGO); Maipo, Joseph 2948 (US); Prov. Santiago, Camino de Santiago a Mina La Disputada, 2 km antes de Pérez Caldera, Marticorena & Matthei 664 (CONC); Cajón del Yeso, Termas El Plomo, M. Muñoz et al. 3491 (SGO); Laguna Negra, Lechler 2948 (US). **VIII Región:** Ñuble, Termas de Chillán, Cabrera 3662 (LP), Feb. 1947, Castillo s.n. (CONC, US); Baños de Chillán, Jan. 1877, F. Philippi s.n. (SGO), Jan. 1878, F. Philippi s.n. (LP).

**17. *Trisetum pyramidatum*** Louis-Marie ex Finot, sp. nov. TYPE: Chile. Punta Arenas, Leña Dura, 28 Jan. 1946, M. Barros 5706 (holotype, US-1869901!). Figure 3.

Planta perennis, rhizomatosa, 37–50 cm alta; culmi pilosi, inferiores glabri; folia glabra; laminae planae; ligula 2–3 mm longa, glabra; panícula pyramidata, 7–11 × 2–3 cm; spicula 6–6.5 mm longa, 2- v. 3-flora; glumae subaequales vel inaequales, spiculum aequantes, ad apicem aristulatae; gluma I: (5–)5.5–7.5 × 0.8–1 mm, 1-nervia; gluma II: 6.5–9 × 1.1–1.3 mm, 3-nervia, quam lemma sua minores vel excedentes; lemma ad dorsum scabra, ad terciam superiorem aristata; arista geniculata vel recurvata, scabra, 6–7 mm longa; callus brevi-pilosus; rhachilla pilosa 1 mm longa; palea quam lemma minor, binervia, ad

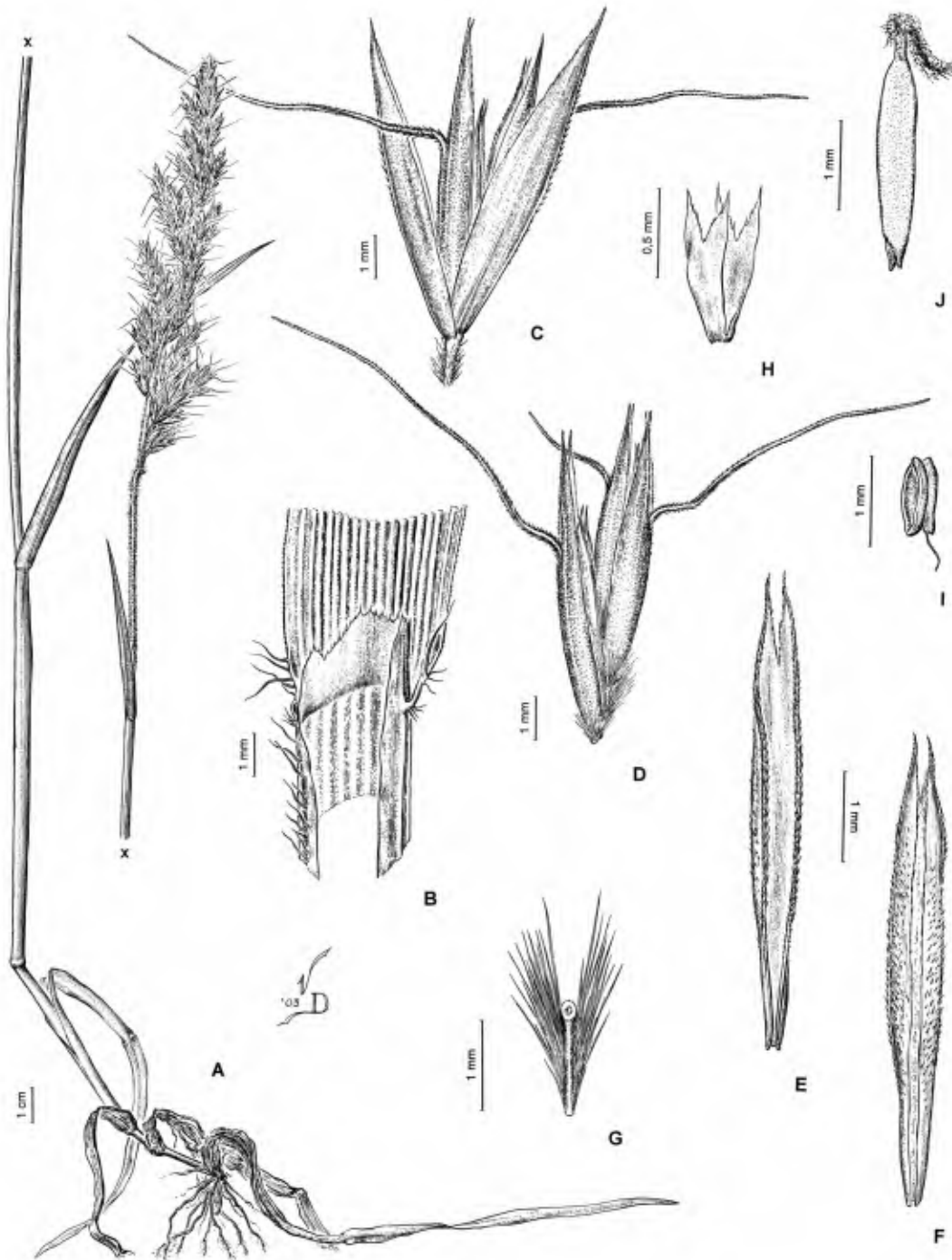


Figure 3. *Trisetum pyramidatum*. —A. Habit. —B. Sheath, ligule, and portion of the blade. —C. Spikelet. —D. Florets. —E. Palea, dorsal view. —F. Palea, ventral view. —G. Rachilla. —H. Lodicules. —I. Stamen. —J. Caryopsis. Barros 5706 (holotype, US).

apicem bisetulosa; stamina 3. antheris 0.5 mm longis; lodiculae 0.8 mm longae. ad apicem bilobatae; ovarium glabrum; caryopsis 2.5 mm longa. glabra; endospermium granulosum.

Perennial, with short rhizomes; culms 37–50 cm tall, pubescent below the panicle, with trichomes first antrorse, then retrorse; nodes 2, glabrous. Leaf sheaths glabrous, pubescent when young; ligule 2–3 mm long, membranous, with rounded, dentate and ciliate margin; dorsally glabrous; blades 4–7 cm × 2–2.3 mm, flat, glabrous; lower blades 6–7 cm × 2–2.3 mm; upper blades 4–5 cm long, conduplicate toward the apex. Panicles 7–11 × 2–3 cm, contracted, pyramidal, yellowish-green and tinged with purple, bright; branches in trimerous whorls, the basal branches up to 3 mm long. Spikelets 6–6.5 mm long, 2- or 3-flowered; glumes subisomorphic or dissimilar, equaling or longer than the spikelet or at least the second glume longer than the spikelet, wide, lanceolate, adaxially purplish; margin hyaline; apex aristulate, hyaline; first glume (5–)5.5–7.5 × 0.8–1 mm, 1-nerved; second glume 6.5–9 × 1.1–1.3 mm, 3-nerved; florets 6.5–7 mm long; lemmas dorsally awned, scabrous; apex hyaline, biaristate; awn 6–7 mm long, borne on the upper 1/3, geniculate or only diversely curved, not twisted, scabrous, purplish; callus obtuse, with very short trichomes, the trichomes 0.2–0.3 mm long; rachilla ca. 1 mm long, pubescent, with trichomes ca. 1.5 mm long; paleas 4–5 mm long, shorter than the lemma, 2-setulate at the apex, 2-nerved, the nerves scabrous; anthers ca. 0.5 mm long; lodicules ca. 0.8 mm long, 2-lobed, the lobes acute; ovary glabrous. Caryopses ca. 2.5 mm long, glabrous; endosperm dry, granular.

*Distribution and habitat.* *Trisetum pyramidatum* is endemic to Chile and Argentina, between 40°S and 53°S at low elevations less than 200 m.

*Phenology.* Flowering between December and March.

*Comments.* *Trisetum pyramidatum* is morphologically similar to *T. phleoides*. This new species can be distinguished from *T. phleoides* by having wider, pyramidal-shaped panicles, (vs. spiciform in *T. phleoides*) and by having glabrous blades (vs. densely pubescent in *T. phleoides*).

*Paratypes.* ARGENTINA. **Río Negro:** Nord Patagonia. San Carlos de Bariloche, Feb. 1905. *Buchtien s.n.* (US). CHILE. **XI Región:** Aisén, Quitraco. 15 Dec. 1947, *Behn s.n.* (CONC). **XII Región:** Punta Arenas, Leña Dura, *Barras 5709* (US); Punta Arenas y Río de la Mina, 1 Mar. 1917, *Banarelli 185* (SI); Río Leña Dura, al sur de Punta Arenas, *Banarelli 181* (SI); Río Tres Brazos, al sur de Punta Arenas, *Banarelli 182* (SI).

**18a. *Trisetum spicatum* (L.) K. Richt. var. *spi-***

**catum**, Pl. Eur. 1: 59. 1890. Basionym: *Aira spicata* L. Sp. Pl. 1: 64. 1753. *Aira subspicata* L., Syst. Nat. ed. 10. 2: 873. 1759, nom. illeg. superfl. *Avena airaides* Koeler, Descr. Gram. 298, 1802, nom. illeg. superfl. *Trisetum subspicatum* (L.) P. Beauv., Ess. Agrostogr. 88, 149. 1812, nom. illeg. superfl. *Trisetaria airaides* (Koeler) Baumg., Enum. Stirp. Transsilv. 3: 265. 1816, nom. illeg. superfl. *Trisetum airaides* (Koeler) P. Beauv. ex Roem. & Schult., Syst. Veg. 2: 666. 1817, nom. illeg. superfl. *Kaeleria subspicata* (L.) Reichb., Fl. Germ. Excurs. 49. 1830, nom. illeg. superfl. *Kaeleria spicata* Reichb. ex Willk. & Lange, Prodr. Fl. Hispan. 1: 72. 1861, nom. inval. *Trisetaria spicata* (L.) Paunero, Anales Jard. Bot. Madrid 9: 516. 1959. TYPE: Sweden. Lapland: 1732, *Linnaeus s.n.* (lectotype, LINN 85.7! designated (as holotype) by Edgar, New Zealand J. Bot. 36: 556. 1998; isotype, S!).

*Trisetum albidum* Sodiro, Revista Col. Nac. Vicente Rocafuerte 12: 84. 86. 1930. TYPE: Ecuador. Pichincha: crece en los potreros interandinos, Quito, Chilloallo, Cotocollao, and Pifo, *Sadiro s.n.* (holotype, not located; isotype, US-1163185 fragm.!).

*Trisetum andinum* Phil., Linnaea 29: 93. 1858. hom. illeg. non Benth. 1847. TYPE: Chile. In andibus prope Antuco invenit *C. Gay Herb. Chil. 210* (holotype, SGO-PHIL-241!; isotypes, SGO photo!, US fragm. ex SGO-PHIL-241! & photo!).

*Trisetum spicatum* subsp. *bolivianum* Hultén, Svensk Bot. Tidskr. 53: 224. 1959. TYPE: Bolivia. La Paz: Murillo, at the railway station La Cumbre, ca. 4700 m, 28 Apr. 1921, *Buchtien 8839* (holotype, S!).

Perennial, caespitose or with short rhizomes; culms 9–60 cm tall, erect, tomentose to densely pubescent below the panicle, with trichomes antrorse below the panicle, then retrorse below; nodes 1 or 2. Leaf sheaths 1–3(–6) cm long, glabrous; ligule ca. 1 mm long, finely denticulate; blades 1–5 cm × 1–1.5 mm, flat or conduplicate toward the apex, glabrous or rarely pubescent or scabrous, sometimes ciliate on margins. Panicles 2.5–7(–10) × 0.5–1.5(–2) cm, spiciform, gold-purplish to brown-purple, bright, usually interrupted at the base; rachis pubescent; pedicels pubescent. Spikelets 4.5–6 mm long, 2-flowered; rachilla 0.8–1 mm long, pubescent, the trichomes 0.5–1 mm long; glumes subequal, shorter than the florets, as long as 3/4 to 4/5 of the spikelet, subequal or the first a little shorter and narrower than the second glume; sometimes, the second glumes equal or a little longer than the florets, scabrous or less frequently ciliate on the keel; first glume 3.7–5 × 0.5–1 mm, lanceolate, 1- to 3-nerved; second glume 4.5–6 × 0.5–1.3 mm, 3-nerved; florets 3.8–5 × 0.7–0.8

mm, the second floret 4–4.5 mm long; lemmas dorsally awned, glabrous, scabrous, purplish toward the base, stramineous toward the apex; margin hyaline; apex 2-aristulate; awn 3.5–5 mm long, borne on the upper 1/3 or 1/4, geniculate or merely curved, sometimes twisted, scabrous, purple; callus obtuse, with trichomes 0.3–0.5 mm long; paleas 3–4 mm long, shorter or a little longer than the lemma, hyaline, 2-nerved, the nerves scabrous; anthers 0.5–1 mm long; lodicules ca. 0.6 mm long, hyaline; apex 2-lobed; ovary glabrous. Caryopses 2–2.8 × ca. 0.6 mm, glabrous; endosperm liquid.

**Distribution and habitat.** Cosmopolitan, probably native to Europe, introduced in America (Tovar, 1993). *Trisetum spicatum* has a circumpolar distribution (Hultén, 1959; Clebsch, 1960). In the Southern Hemisphere it is found in South America, Australia, and New Zealand (Clebsch, 1960). In North America it grows in Canada, United States, Greenland, and Mexico. In South America *T. spicatum* extends from Colombia to southern Chile and Argentina (5–4700 m) and reaches its southern limit in Tierra del Fuego at 55°S, where it is found in bogs associated with *Empetrum* L. (Empetraceae) and *Azorella* Lam. (Apiaceae). Pohl and Davidse (1994) reported *T. spicatum* for Guatemala, Tovar (1993) found this species in central and southern Peru along the Cordillera de Los Andes between 3900 and 4700 m, and Renvoize (1998) recorded this species for Bolivia (La Paz, Cochabamba, Oruro). In Argentina, Zuloaga et al. (1994) reported *T. spicatum* as occurring in Neuquén, Río Negro, Santa Cruz, and Tierra del Fuego.

**Phenology.** Flowering between October and March.

**Comments.** *Trisetum spicatum* has been treated as a complex including a vast number of subspecies and/or varieties (Louis-Marie, 1928, 1929; Hultén, 1959). Louis-Marie recognized 14 varieties, and most of these were not recognized as valid entities by later authors. Hultén (1959) divided the species into 22 infraspecific taxa, including 14 subspecies and 8 varieties. Based on a multivariate analysis of 33 morphological characters, Randall and Hilu (1986) could not differentiate any clear-cut forms or infraspecific taxa within *T. spicatum*. Louis-Marie (1928, 1929) transcribed the description made by Scheuchzer in 1719 and cited by Linnaeus (1753) in his diagnosis of *Aira spicata*: “The plant (17–30 cm high) is described as having glabrous, striate blades; ligule (ca. 1 mm long) obtuse; culms densely tomentose; panicles spike-like (ca. 1.5 × 0.7–1 cm), purplish, shining; spikelets (ca. 4 mm long) 2-flowered; glumes unequal (first shorter and narrow-

er, second ca. 4 × 2 mm) glabrous; lemmas (ca. 4 mm long) awned dorsally on the upper 1/4; awn (ca. 4 mm long) reflexed; palea equal or subequal to the lemma; rachilla densely villous; anthers 0.6–1 mm long.” This description corresponds well with the isotype of *Aira spicata* L., kept in Stockholm (S).

The type specimen of *Trisetum albidum* (US-1163185) has somewhat lax panicles and shorter spikelets (ca. 4 mm long) than in typical *T. spicatum* (4.5–6 mm long). The glumes are, in consequence, shorter (first glume 3–3.2 × 0.4–0.5 mm; second glume 3.6–4 × 0.8 mm). Since these measurements fall within the range of the original description given for *T. spicatum* in the last paragraph, we choose to relegate this form to synonymy, even though earlier VLF tentatively accepted *T. albidum* (Finot, 2003).

**Chromosomes.** 2n = 28, 42 (Tateoka, 1978).

**Illustrations.** Hitchcock and Chase (1950: 290, fig. 390); Hultén (1959: 207, fig. 1); Nicora (1978: 247: 169A–D).

**Additional specimens studied.** ARGENTINA. **Chubut:** Lago La Berta, *Nicora* 9603 (SI); Lago Vinter, *Raig et al.* 14266 (SI, MERL); Lago Vinter, *Nicora* 10235, 10284, 10344, 10348 (SI), *Nicora* 9485 (CONC); Languineo, Lago El Guacho, *Nicora* 9519 (CONC); Lago Cuatro, *Nicora* 9344 (CONC); Río Corcovado, *Ilin* 169 (BAF); Lago La Para, *Nicora* 10081 (SI); Valle Huemules, *Soriano* 3184 (BAA). **Córdoba:** San Alberto, Sierra Grande, Pampa de Achala, Ea. La Trinidad, 25 Jan. 1984, *Cabida s.n.* (CORD). **Neuquén:** Los Lagos, Arroyo Pantojo, cascada Santa Ana, *Rúgola de Agrasar* 1093 (SI); Dpto. Minas, a 21 km de Las Ovejas, camino a las lagunas Epu-Lauquén, arroyo de Las Bandurrias, *Baelcke et al.* 10801 (BAA); Cerro Malo, *Shtajavskoy* 55-a (BA); Lago Nahuel Huapí, Paso de las Nubes, *Cabrera* 5928 (LP); Pino Hachado, Puesto Gendarmería, junto al arroyo, *Yalla et al.* 3065 (CTES); Andacollo, Arroyo Guaraco, *Cabrera* 11143 (LP). **Río Negro:** P.N. Nahuel Huapí, paso de Las Nubes, *Baelcke & Carrea* 5590 (BAA); Valle del Río Alerce, *Baelcke & Carrea* 5631 (BAA); Cerro Tronador, Mallín Chileno, *Baelcke & Carrea* 5775 (BAA); Cerro Tronador, *Jab* 2431 (LP); Lago Frías, Feb. 1943, *Sariana s.n.* (BAA). **Santa Cruz:** *Spegazzini s.n.* (LP); Lago Viedma, 19 Feb. 1905, *Dusén s.n.* (S); Lago Frías, *Raquera* 31 (BA); Cerro San Lorenzo, *Raquera* 297 (BA); Sierra Colorada, *Dimítri & Carrea* Luna 119 (BA); P.N. Los Glaciares, Lago Argentino, Ea. Cristina, *Raquera* 434 (BA); Río Chico, Dec. 1897, *Ameghina s.n.* (LP); Lago Argentino, Sierra de Buenos Aires, *Raquera* 169 (BA); Lago Argentino, *James* 189 (SI); La Vizcachas, *Burmeister* 3 (SI); Guer Aike, Ea. Sofia, Secc. Cuadrado, 5 km S de Estancia Punta del Monte, *TBPA* 3117 (SI); Ea. La Verdadera Argentina, Cerro de La Virgen, *Arraya et al.* 215 (TBPA 2260) (SI); Ea. Stag River, 10 km N del casco sobre el río de los Venados, *TBPA* 3140 (SI). **Tierra del Fuego:** Isla de los Estados, Puerto San Juan, 28 Dec. 1933, *Castellanos s.n.* (BAA); Río Grande, lado camino, entre Punta Centolla y Cabo Via-monte, 25 Dec. 1970, *Panza s.n.* (BAA). **BOLIVIA. La Paz:** Nor Yungas, 8 mi. E of Pass on road to the Yungas

(Unduavi), *Peterson, Soreng & Laegaard 13173* (US); Murillo. Pass at the head of the Valle del Zongo and lower slopes of Nevado Hayna Potosi, *Solomon 13221* (SI ex MO); 2 km N of Millumi, *Lara & Parker 41J* (F). CHILE. **V Región:** Valparaíso, near summit La Campana, 10 mi. E of El Granizo, *Eyerdam 10047* (F, SGO). **Región Metropolitana:** Santiago, Quebrada El Yeso, *Araya 16* (CONC). **VII Región:** Curicó, Andes de Curicó, *Vidal 233, 234* (US, SGO). **VIII Región:** Ñuble, Termas de Chillán, *Jaffuel 1806-a* (SGO); Concepción, Tomeco, *Barros 3982* (LP); Parque Nacional Laguna del Laja, Los Barros, sector Aduana, *Finot & Baeza 12* (CONC); entre Chacay y canchas de sky, *Finot & Baeza 2071* (CONC). **IX Región:** Malleco, Fundo Solano, Los Alpes, Cordillera de Nahuelbuta, *Eyerdam 10257* (F). **X Región:** Valdivia, Volcán Quetrupillán, fundo Trafín, *Schlegel 7523* (CONC); Valdivia, Panguipulli, lago Riñihue, lado norte, *Montero 9557* (CONC); Osorno, Antillanca, *Sparre & Constance 10778* (CONC); Antillanca, *Schlegel 7322* (CONC); Llanquihue, Volcán Yates, *Werdermann 655* (SI); Cerro Vichadero, Casa Pangué, 14 Jan. 1953, *Pfister s.n.* (CONC). **XI Región:** Aysén, *Muñoz s.n.* (CONC); Puyuhuaqui, Cerro Tesoro, *Schwabe 69* (CONC); Coihaique, *Barros 5719* (US); Estero Cofré, *Vogel 545* (CONC). **XII Región:** Parque Nacional Torres del Paine, Cerro Diente, *Arroyo & Squeo 860055-a* (CONC); Isla en el lago Grey, *Rúgolo de Agrasar 1176* (CONC); Magallanes, Rubens, 10 Jan. 1952, *Pfister & Ricardi s.n.* (CONC); Tierra del Fuego, Caleta Josefina, *Ricardi & Matthei 177* (CONC). COLOMBIA. **Caldas:** Cordillera Central, vertiente occidental, páramos del Nevado del Ruiz, *Cuatrecasas 9280* (F). ECUADOR. **Chimborazo:** *Fagerlund & Wibon 833* (S). **Cotopaxi:** 19 km east of Pilalo, *Peterson, Annable & Poston 8765* (US); Carchi, Hacienda La Esperanza, El Voladero, páramo El Angel, *Dávalos 27* (US). PERU. **Junín:** Reserva Nacional de Junín, Ondores, *Pettersson 15* (S).

**18b. *Trisetum spicatum* var. *cumingii*** (Nees ex Steud.) Finot, comb. nov. Basionym: *Koeleria cumingii* Nees ex Steud., Syn. Pl. Glumac. 1: 294. 1854. *Trisetum cumingii* (Nees ex Steud.) Nicora, Fl. Patagonica 3: 250. 1978. TYPE: Chile. Prope Valparaíso, 1831, *H. Cuming 460* (lectotype, designated here, BAA-3396 fragm. ex Herb. Nees at B! with illustration of spikelet).

*Trisetum mollifolium* Louis-Marie, Rhodora 30: 218. 1928, nom. nov. *Trisetum malacophyllum* Phil., Anales Univ. Chile 48: 566. 1873, non Steud., Syn. Pl. Glumac. 1: 229. 1854. TYPE: Chile, Tierra del Fuego: Fue igualmente hallada en la vecindad de la colonia chilena, en el Estrecho de Magallanes, *Lechler 1195* (holotype, SGO-PHIL-221!; isotypes, BAA-3398!, BAA-3399!, CONC-148141 fragm. & photo ex M!, CONC-148150 fragm. & photo ex B: SI, SGO-37056!, US-1126269!, US-868482 fragm. ex Pl., US-81778 fragm. ex SGO-PHIL-221!, F-881353!).

*Trisetum cumingii* var. *santacrucense* Nicora, Fl. Patagonica 3: 250. 1978. TYPE: Argentina, Santa Cruz: Dpto. Lago Argentina, El Calafate, *M. N. Correa 2953* (holotype, BAB not seen, isotype, BAA-3370!).

Perennial, caespitose; culms 15–50 cm tall, erect, glabrous or with a few short appressed tri-

chomes; upper internodes 12–28 cm long; nodes 2 or 3, glabrous or pilose. Leaf sheaths shorter or a little longer than the internodes, glabrous to sparsely pilose; ligules 1.5–3 mm long, glabrous or pilose dorsally, dentate, ciliate; blades 5.0–15 cm × 1–1.5 mm, flat or conduplicate, pilose; margins ciliate; upper blades 1–3.5 cm long. Panicles 4–10 × 0.8–2 cm, spiciform, green and purplish, usually interrupted at the base, shining; rachis glabrous or pilose; pedicels scabrous or with a few short trichomes. Spikelets 6–8 mm long, 2- or 3-flowered; rachilla 1–1.5 mm long, pilose, the trichomes 0.8–1 mm long; glumes unequal, acute or aristulate; keel scabrous-ciliate; first glume 4.5–7 × 0.2–0.6 mm, linear-lanceolate, narrow, shorter and narrower than the second glume, shorter than the florets, 1-nerved, attenuate toward the apex; second glume (5–)6–8 × 0.9–1 mm, ovate to ovate-lanceolate, longer than the florets, 3-nerved; lemmas dorsally awned, glabrous, scabrous toward the apex; apex 2-aristulate, the awns 0.5–1.5 mm long; awn 6–8 mm long, borne on the upper 1/3, twisted and geniculate to merely curved, scabrous, purple; callus obtuse, with trichomes ca. 0.7 mm long; paleas hyaline, 2-nerved; anthers ca. 1.5 mm long; lodicules ca. 1 mm long; apex bilobed; ovary glabrous. Caryopses glabrous; endosperm liquid.

*Distribution and habitat.* *Trisetum spicatum* var. *cumingii* is endemic to Chile and Argentina. In Argentina it is found south of the 40th parallel and in Chile it extends from 33°S (V Región) to southern 50°S, in Ultima Esperanza (XII Región) between 10 and 1100 m.

*Phenology.* Flowering between December and March.

*Comments.* The type of *Koeleria cumingii* in Berlin-Dahlem (B) was destroyed during WWII (Oberprieler, herb. B, pers. comm.). A fragment of this type was deposited in Buenos Aires (BAA), with a label indicating “Herb. Nees, Valparaíso, Chile, 1831, *Cuming*.” This fragment was also annotated by Prof. Lorenzo Parodi in which he noted “inflorescencia de 10 cm de largo por 1.5 cm de ancho; hoja única plana, vaina pubescente—Berlín, 1936.” Other annotations by Parodi include: “raquis y ramas pilosos; carena glabra; gluma (1)6–6.5 mm; gluma (2)7–7.7 mm; arista de la lemma 6–7 mm de longitud; lemma aspera?, escabriuscula.” This taxon was accepted as a species by Nicora (1978), who comments that the acute glumes are longer than 4 mm and the second glumes are longer than the contiguous florets. We were able to study a large number of specimens of *T. spicatum* from South America, many of which showed the

characters commonly used to separate *T. cumingii* from *T. spicatum*, specifically the second glume longer than the contiguous floret. Nicora (1978) commented that many specimens collected in Lago Belgrano showed intermediate characteristics between *T. spicatum* and *T. cumingii*. Since there are intermediate specimens, we propose to recognize *T. cumingii* as a variety of *T. spicatum*.

*Additional specimens studied.* ARGENTINA. **Chubut:** Dpto. Paso de Indios, desvío a 35 km SW Ruta 24, Sa de la Butrera, Estancia La Altura, Corral de Piedra, Arroyo, *Mon & Romanczuk* 200 (CONC); Lago Puelo, Estancia La Esperanza, picada al S del lago Esperanza, *Cusato & Rossow* 4524 (BAF). **Neuquén:** Dpto. Los Lagos, Pto. Manzano, Lago Nahuel Huapi, *Rúgolo de Agrasar* 1252 (CONC); P.N. Nahuel Huapi, entre Puerto Blest y Lago Frías, *Dimitri & Correa* 176 (BA); Quetrihué, *Diem* 458 (BAA). **Río Negro:** Cordón Serrucho, El Bolsón, *Roig Juárez* 13353 (MERL); Lago Fonk, 21 Jan. 1942. *Pérez-Moreau s.n.* (BA); Bariloche, Puerto Blest, Nahuel Huapi, *Villamil et al.* 2844 (CONC); Bariloche, cerca Río Ñirihuau, *Parodi* 15582 (BAA); Río Negro, Bariloche, cerca Río Ñirihuau, *Parodi* 15560 (BAA). **Santa Cruz:** Güer Aike, Río Turbio, *Roig et al.* 14748 (MERL); Valle Superior del Río Turbio, faldeo de la Cordillera Chica, *Méndez & Ambrosetti s.n.* (MERL); Cordillera Chica, Cerro Punta Alta, *Ambrosetti & Méndez* 29884 (MERL); Valle Superior del Río Turbio, Meseta Latorre, *Ambrosetti & Méndez* 29889 (MERL); Valle Superior del Río Turbio, puesto Tres Marías, *Ambrosetti & Méndez* 407 (SI); Valle Superior del Río Turbio, entre Pto. 16 La Primavera y Pto. 3 Marián, *Ambrosetti & Méndez* 29874 (MERL); Cordillera Chica, *Ambrosetti & Méndez* 29885 (TBPA) (MERL); Estancia Stag River, faldeos Meseta Latorre, *Ambrosetti & Méndez* 27457 (MERL); Bañado 28 de Noviembre, *Ambrosetti & Méndez* 29882 (MERL); Valle Superior del Río Turbio, *Ambrosetti & Méndez* 29876 (MERL); Lago Argentino, *James* 247 (SI); Lago Argentino, Sierra Buenos Aires, *Roquero* 132 (BA); P.N. Perito Moreno, Lago Burmeister, *Rumboll* 120 (BA); Ea. La Carlota, sección San Elías, *Roig, Anchorena, Méndez & Ambrosetti* 115 (SI); Estancia Las Viscachas, Cerro Las Viscachas, *TBPA* 2404 (CONC); Cañadón Quitapenas, *Correa* 4016 (CTES). **Tierra del Fuego:** Moat, *Roig* 15589 (MERL), *Roig et al.* 14912 (MERL); cerca Cerro Mesa, 31 Jan. 1942. *Castellanos s.n.* (BA); Ushuaia, *A. Roig & F. Roig* 14980 (MERL, BAA); Río Grande, *Castellanos s.n.* (BAA); Lago Fagnano, Monte Huehuepen, *Moore & Goodall* 398 (CONC). CHILE. **VIII Región:** Lirquén, alto del camino a Tomé, *Pfister s.n.* (CONC). **X Región:** Chiloé, Isla Guafo, trayecto desde Caleta Samuel al Faro, *Villagrán & Leiva* 7525 (CONC). **XII Región:** Magallanes, 15 km south of Punta Arenas, *Eyerdam, Beetle & Grondona* 24133 (US); Punta Arenas, Magallanes 1864/65, *Philippi s.n.* (SGO); Cerro Castillo, *Magens* 3197 (CONC); Tierra del Fuego, Ea. Cameron, *Ricardi & Matthei* 184 (CONC); Tierra del Fuego, Santa Catalina, *Ricardi & Matthei* 263 (CONC); Laguna Blanca, *Riggi* 27/1052 (BA); Morro Chico, *Magens* 3032 (CONC); Última Esperanza, *Arroyo et al. s.n.* (CONC 92112); Última Esperanza, Sierra de Los Baguales, Cerro Santa Lucía, *Arroyo s.n.* (CONC 85168); Sierra de Los Baguales, Cerro Santa Lucía, *Arroyo s. n.* (CONC 85159); Cordillera del Paine, *von Bohlen & Cavieres s.n.* (CONC 92312); Cerro Donoso, Sector Río de Las Chinas, *Arroyo, Veloso &*

*Peñaloza* 870266 (CONC); Las Cumbres, Baguales, *Ricardi & Matthei* 385 (CONC); Península Muñoz Gamero, entrada al lago, *Dollenz* 11 (CONC); Sector Vicuña, Lote 12, Forestal Trillium, *Pisano, Henríquez & Domínguez* 7436 (CONC); Manantiales, *Magens* 3428, 3433 (CONC); P.N. Torres del Paine, Río Grey, *Dollenz* 1393 (CONC); Lazo, cerca Lago Toro, potrero El Chingue, *Muñoz* 4104, 4144 (SGO); Magallanes, *F. Philippi s.n.* (SGO).

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APPENDIX I. ALPHABETICAL INDEX OF ACCEPTED SPECIES AND VARIETIES. NUMBER IN PARENTHESES CORRESPONDS TO THE NUMBER OF THE SPECIES IN THE TAXONOMIC TREATMENT.

- Trisetum ambiguum* Rúgolo de Agrasar & Nicora (5)  
*Trisetum andinum* Benth. (6)  
*Trisetum barbinode* Trin. (7)  
*Trisetum barbinode* Trin. var. *barbinode* (7a)  
*Trisetum barbinode* var. *hirtiflorum* (Hack.) Louis-Marie (7b)  
*Trisetum barbinode* var. *sclerophyllum* (Hack.) Finot (7c)  
*Trisetum caudulatum* Trin. (8)  
*Trisetum caudulatum* Trin. var. *caudulatum* (8a)  
*Trisetum caudulatum* Trin. var. *correae* Nicora (8b)  
*Trisetum cernuum* Trin. (1)  
*Trisetum dianthemum* (Louis-Marie) Finot (9)  
*Trisetum flavescens* (L.) P. Beauv. (2)  
*Trisetum foliosum* Swallen (3)  
*Trisetum irazuense* (Kuntze) Hitchc. (4)  
*Trisetum longiglume* Hack. (10)  
*Trisetum longiglume* var. *glabratum* Nicora (10b)  
*Trisetum longiglume* Hack. var. *langiglume* (10a)  
*Trisetum macbridei* Hitchc. (11)  
*Trisetum mattheii* Finot (12)  
*Trisetum nancaguense* Finot (13)  
*Trisetum oenophilum* Louis-Marie (14)



*Trisetum oreophilum* var. *johnstonii* Louis-Marie (14b)  
*Trisetum oreophilum* Louis-Marie var. *oreophilum* (14a)  
*Trisetum phleoides* (d'Urv.) Kunth (15)  
*Trisetum preslei* (Kunth) E. Desv. (16)  
*Trisetum pyramidatum* Louis-Marie ex Finot (17)  
*Trisetum spicatum* (L.) K. Richt. (18)  
*Trisetum spicatum* var. *cumingii* (Nees ex Steud.) Finot (18b)  
*Trisetum spicatum* (L.) K. Richt. var. *spicatum* (18a)

APPENDIX 2. INDEX TO SPECIMENS EXAMINED. NUMBER IN PARENTHESES CORRESPONDS TO NUMBER OF THE SPECIES IN THE TAXONOMIC TREATMENT AS INDICATED IN THE ALPHABETICAL INDEX (SEE APPENDIX 1).

Alboff 1039 (15), s.n. 7 Mar. 1896 (1), s.n. Feb. 1896 (15); Ambrosetti & Méndez 407 (18b), 27457 (18b), 29874 (18b), 29875 (5), 29876 (18b), 29882 (18b), 29883 (5), 29884 (18b), 29885 (18b), 29889 (18b); Ameghino s.n. Dec. 1897 (18a); Anderson 387 (15); André 3907 (6); Anonymous 10 Feb. 1955 (16); Arancio 92129 (14b), 93021 (14b), s.n. 23 Mar. 1994 (14b); Arancio, Squeo & León 94043 (14b), 94250 (14b); Araya 16 (18a), 140 (8a); Arroyo 85159 (18b), 85160 (5), 85168 (18b); Arroyo et al. 215 (18a), 9276 (5), 92112 (5), 94454 (10a), 94477 (10a); Arroyo & Squeo 860055-a (18a); Arroyo, Boelcke, Gómez, Moore & Romanczuk 491 (15); Arroyo, Maldonado & Henríquez 91156 (16), 91158 (16); Arroyo, Mon & Romanczuk 200 (18b); Arroyo, Veloso & Peñalosa 870266 (18b); Arroyo, von Bohlen, García & Gigoux 92112 (18b); Asplund 1028 (14a), 2010 (14a), 2057 (14a), 3585 (14a), 3798 (14a), 6023 (14a), 6156 (4), 6733 (4), 7215 (4), 7401 (6), 7441 (4), 7499 (6), 7547 (14a), 7896 (14a), 7978 (4), 8280 (4), 9686 (4), 11784 (11), 11793 (11), 16093 (4), 16131 (14a), 16868 (4), 17550 (14a).  
Baeza s.n. 9 Nov. 1913 (8a); Bailey s.n. Oct. 1958 (8a); Banks & Solander s.n. 1769 (15); Barrientos 224 (15); Barros 1987 (8a), 3982 (18a), 5706 (17), 5709 (17), 5719 (18a), s.n. 14 Nov. 1925 (8a), s.n. 24 Nov. 1925 (8a), s.n. 1 Nov. 1927 (8a); Bayer 4608 (13); Beck 13788 (14a); Beetle & Soriano HS-381a (10a); Behn s.n. 15 Dec. 1947 (17); Benoist 2389 (6), 4389 (6); Bertero 53 (8a), 996 (8a), 997 (8a), 998 (8a.); Bücher et al. 1894 (16), 1971 (16); Boelcke 1972 (16), 4132 (14b), 10764 (7a); Boelcke & Correa 5590 (18a), 5631 (18a), 5775 (18a), 5864 (8a), 6142 (8a), 6959 (7c), 6964 (7c); Boelcke & Hunziker 3657 (8b); Boelcke et al. 9778 (7c), 10011 (14b), 10039 (14b), 10061 (14b), 10927 (7a), 11033 (16), 11285 (16), 11318 (14b), 11452<sup>1/2</sup> (7a), 11674 (16), 13932 (10a), 14083 (7c); Boelcke, Bacigalupo, Correa 10226 1/2 (16); Boelcke, Correa, Bacigalupo et al. 10801 (18a); Bohlen & Cavieres 92312 (18b); Bonarelli 181 (17), 182 (17), 185 (17), s.n. 1 Mar. 1917 (5); Bridarolli 2147 (8a); Buchtien 6468 (14a), 8839 (14a), 8839 (18a), s.n. 14 Feb. 1903 (16), s.n. Feb. 1905 (17); Burkart 19905 (8a), 27451 (7a); Burkart & Tamayo 16733 (4); Burkart et al. 13930 (7c); Burmeister 3 (18a).  
Cabido s.n. 25 Jan. 1984 (18a); Cabrera 3662 (16), 5928 (18a), 11143 (18a), 11511 (1), 19754 (7c); Cabrera & Crisci 19145 (7c); Cabrera et al. 23024 (7c), 23170 (7c); Calderón & Rúgolo 57 (7c), 72 (7c); Cañulaf s.n. 29 Dec. 1946 (7a); Carrasco 266 (8a); Castellanos 1937 (15), s.n. 10 Feb. 1932 (1), s.n. 12 Jan. 1933 (18b), s.n. 28 Dec. 1933 (18a), s.n. 30 Jan. 1942 (5), s.n. 31 Jan. 1942 (18b), s.n. 31 Jan. 1942 (5), s.n. 6 Feb. 1942 (15); Castillo s.n. Feb. 1947 (16); Cazalet & Pennington 5740 (6); Correa 2953 (18b); Correa 4016 (18b); Correa et al. 5647

(7c); Corte 34 (8a); Covas 101 (16); Cuatrecasas 9280 (18a), 20680 (4), 20847 (4); Cuming s.n. (18b); Cusato & Rossow 4524 (18b).

Dávalos 20 (4), 27 (18a); Davidse 3226 (3); Davies s.n. 17 Feb 1938 (15); Davis et al. 1381 (14a); Dawson 1285 (8a); Dawson & Schwabe 2481 (8a); Delfin s.n. Jan. 1887 (8a); Dessauer s.n. (8a); Diehl & Bravo 10843 (7a); Diem 458 (18b), 463 (2), 3229 (7c); Dimitri & Correa 176 (18b); Dimitri & Correa Luna 119 (18a); Dollenz 11 (18b), 1393 (18b); Dusén s.n. 5 Jan. 1897 (15), s.n. 19 Feb. 1905 (18a), s.n. Apr. 1937 (15); d'Urville 3 (15).

Ehrenburg 49 (6), 137 (6); Eschscholtz s.n. (1); Eschuche & Klein 316 (8a), 1417-27 (8a), 1520-7 (7a); Eyerdam 10047 (18a), 10257 (18a); Eyerdam, Beetle & Grondona 24133 (18b).

Fabris & Crisci 7608 (7a); Fabris & Solbrig 1171 (8b); Fagerlind & Wibon 833 (18a); Ferraro, Messuti & Vobis 4676 (15), 4703 (15); Finot & Baeza 1 (8a), 2 (8a), 7 (8a), 12 (18a), 14 (8a), 2069 (7a), 2070 (7a), 2071 (18a), 2073 (7a), 2074 (8a); Fonck 71 (8a); Fortunato 4823 & Elechosa (15).

Gallinal, Aragone, Bergalli, Campal & Rosengurt 5594 (2); Garaventa 2248 (8a), 4681 (7a), 6457 (8a); Gay 147 (8a), Gay 210 (18a), Gay s.n. (16), Gay s.n. (8a); Giatiotti et al. 23110 (16); Godoy 119 (1); Godoy, Hildebrand-Vögel & Vögel 3 (1); González 766 (8b); Grondona 5695 (1), 7340 (15); Gunckel 630 (8a), 12426 (7a), 13797 (8a), 15101 (8a), 16027 (8a), 20295 (14b), 20297 (16), 20465a (14b), 21997 (8a), 40532 (8a), 44566 (8a), s.n. Feb. 1950 (16).

Haenke s.n. (16); Harling 4537 (6); Hartweg 1449 (6); Hauman s.n. Feb. 1920 (7c); Hicken s.n. 30 Jan. 1912 (15), s.n. 30 Jan. 1912 (15); Hildebrand-Vogel 31 (1), 45 (1); Hitchcock 21059 (6), 22184 (14a), 22199 (14a), 22254 (14a), 22271 (14a), 22323 (14a), 22471 (14a), 22535 (14a); Holmgren 553 (6); Holm-Nielsen et al. 5553 (4); Hollermayer 26-a (9), 1252 (9), s.n. 14 Dec. 1927 (9); Hosseus 559 (7c), 560 (7c); Hunziker 8200 (15); Hutchinson 45 (8a), 59 (8a), 110 (8a), 212 (8a), s.n. 3 Jan. 1930, (10a).

Illin 148 (7c), 169 (18a), s.n. 1 Mar. 1900 (8a), s.n. 1901 (8a).

Jaffuel 1806-a (18a), 1806-b (7a); James 189 (18a), 247 (18b); Jameson s.n. (6); Jiles 2952 (14b), 3649 (14b), 4136 (14b), 4246 (14b), 4694 (8a), 4801 (14b), 5888 (14b), 5889 (14b); Job 2431 (18a); Johnston 5407 (8a), 5539 (8a), 6097 (14b); Joseph 2948 (16); Junge s.n. 29 Oct. 1934 (8a).

Kalela 1277 (8a), s.n. 27 Nov. 1937 (8a), s.n. 28 Dec. 1937 (8a); King s.n. 1826 (1); Koptaluti & Gómez 5816 (14b); Krapovickas 3933 (8a); Kurtz 7599 (16), 11086 (14b).

Laegaard 101347 (14a), 101414 (4), 101604 (6); Laegaard et al. 103031 (4); Laegaard, Romoleroux & León 102731 (6); Lagiglia 2239 (16); Lagiglia & D'Antoni 1326 (16); Lahitte s.n. 7 Jan. 1964 (8b); Lahitte & Roquero 277 (8b), 363 (8a); Lahitte, Roquero & López 67 (8a), 486 (8a); Lammers, Baeza & Peñailillo 7894 (13); Landero 790 (5); Lara & Parker 41J (18a); Lechenby s.n. 31 May 1900 (2); Lechler 311 (8a), 1195 (18b), 1283 (1), 2846 (8a), 2948 (16); León & Calderón 1285 (8a), s.n. (7c), s.n. 17 Feb 1961 (8a); Lindig 1862 (4); Linnaeus s.n. (18a); Little & Paredes 6832<sup>1/2</sup> (6); Luti 1426 (15), 1640 (15).

Macbride & Featherstone 1131 (11); Magens 3032 (18b), 3197 (18b), 3428 (18b), 3433 (18b); Mandon 1309 (14a), 1857 (14a); Marin 1432 (14a); Marticorena & Matthei 664 (16); Marticorena et al. 83462-B (14b); Martico-

rena, Matthei & Quezada 86 (12); Marticorena, Weldt & Crisci 1967 (9), 1982 (8a); Martínez Carretero 1272 (16); Matthei & Bustos 111 (1); Matthei 174 (8a); Méndez & Ambrosetti s.n. 5 Feb. 1978 (18b); Méndez & Willoud c-320-7196 (16); Molau & Eriksen 3297 (6); Montero 538 (8a), 1354 (8a), 1962 (8a), 4487 (7a), 4497 (7a), 4508 (8a), 4956 (8a), 9557 (18a); Mooney, H. & B. Mooney 546 (16); Moore 848 (15); Moore & Goodall 398 (18b); Muñoz 2709 (8a), 2717 (8a), 3981 (14b), 4104 (18b), 4144 (18b), s.n. (18a); Muñoz, M. et al. 3491 (16); Muñoz & Coronel 1232 (8a); Muñoz & Johnson 2524 (8a), 2583 (8a), 2630 (8a), 2635 (8a), 2676 (8a), 2732 (8a), 2737 (8a), 3211 (8a); Muñoz & Schick 1493 (8a), 1545 (8a), 2558 (8a), 2562 (8a).

Neger s.n. Nov. 1896 (8a); Nicora 7432 (7c), 7478 (8a), 9344 (18a), 9485 (18a), 9519 (18a), 9603 (18a), 9610 (9), 10081 (18a), 10235 (18a), 10284 (18a), 10344 (18a), 10348 (18a), Nowak & Marcillo 79 (6).

Offermann s.n. 18 Jan. 1930 (8a); Ortega s.n. Feb. 1879 (15).

Paci 15731 (7c); Panza s.n. 25 Dec. 1970 (18a); Parodi 2700 (7c), 3196 (16), 10122 (14a), 10127 (14a), 11827 (1), 15321 (7c), 15560 (18b), 15582 (18b), 15611 (8a); Pedersen 1468 (8a), 1523 (1), s.n. 6 Feb. 1952 (8a); Penland 584 & Summers (14a); Pennington 450b (15); Peñaloza, Claros, Cavieres & Flores 91121 (16), 91122 (16), 91126 (16); Pérez Moreau 144 (14b, pro parte), 1949 (1), 30-258 (14b), s.n. 29 Jan. 1941 (8b), s.n. 21 Jan. 1942 (18b), s.n. 14 Jan. 1949 (8a), s.n. 1949 (7c); Pérez Moreau & Guarreva s.n. 2 Feb. 1948 (1); Pérez-Moreau & Perrone s.n. 12 Feb. 1950 (14b); Perrone s.n. 26 Feb. 1950 (14b); Peterson & Refulio-Rodríguez 15135 (4); Peterson et al. 9146 (4); Peterson, Annable & Poston 8765 (18a), 8866 (14a); Peterson, Judziewicz & King 9075 (6); Peterson, Judziewicz, King & Jørgensen 9176 (14a); 9239 (14a); Peterson, Soreng & Laegaard 13173 (18a); Pettersson 15 (18a), 41 (14a), 57 (14a); Pfister 370 (8a); s.n. (18b), s.n. 20 Oct. 1943 (8a), s.n. 12 Nov. 1944 (8a), s.n. 26 Nov. 1944 (8a), s.n. 17 Jan. 1945 (7b), s.n. 10 Dec. 1946 (8a), s.n. 5 Jan. 1947 (8a), s.n. 5 Jan. 1947 (8b), s.n. 10 Jan. 1947 (7a), s.n. 12 Jan. 1947 (7a), s.n. 1 Jan. 1948 (7a), s.n. 9 Jan. 1949 (7a), s.n. 10 Oct. 1951 (8a), s.n. 14 Jan. 1953 (18a); Pfister & Ricardi s.n. 31 Dec. 1951 (15), s.n. 10 Jan. 1952 (18a); Philippi 218 (7a), 229 (7a), s.n. SGO-PHIL 220 (8a), s.n. SGO-PHIL-235 (15), s.n. Jan. 1855 (8a), s.n. Feb. 1858 (8a), s.n. Jan. 1860 (8a), s.n. Nov. 1861 (8a), s.n. 1864/65 (18b), s.n. Jan. 1877 (8b), s.n. SGO (8a), s.n. SGO (8b); Philippi, F. s.n. (18b), s.n. Oct. 1872 (8a), s.n. Jan. 1877 (7a), s.n. Jan. 1877 (16), s.n. Jan. 1878 (16); Philippi, O. s.n. Jan. 1887 (9); Pico s.n. 9 Jan. 1919 (15); Pisano 2451 (15); Pisano, Henríquez & Domínguez 6941 (15), 6962 (15), 7396 (15), 7436 (18b), 7463 (18b), 7543 (15), 7566 (15); Pittier 1435 (4); Poeppig s.n. 1828 (7), s.n. BAA 3364 (8a).

Ragonese 234 (7a); Reiche s.n. (7b), s.n. Mar. 1899 (16); Remy s.n., Oct. 1856 (6); Ricardi 5604 (7a), s.n. 11 Dec. 1950 (8a); Ricardi & Marticorena 5723/1884 (7a), 5812/1973 (7a); Ricardi & Matthei 3 (7a), 15 (7a), 27 (8a), 166 (8a), 177 (18a), 184 (18b), 236 (8a), 263 (18b), 316 (15), 335 (1), 385 (18b); Ricardi, Marticorena & Matthei 1829 (8a), 1976 (8a); Ricardi, Marticorena & Torres s.n. 2 Nov. 1957 (8a); Riggi 27/1052 (18b); Robinson & Beltran 3041 (4); Roig 1 (7c), 50 (14b), 11950 (14b), 12356 (6), 15589 (18b); Roig et al. 103 (5); Roig et al. 444 (15); Roig J. 12000 (14a), s.n. 5 Feb. 1986 (15); Roig Juñent 13353 (18b), Roig Juñent, F. C. Roig Juñent & F. A. Roig 14912 (18b); Roig, A. & F. Roig 14980 (18b); Roig, An-

chorena, Méndez & Ambrosetti 115 (18b); Roig, F., C. Roig & F. A. Roig 14911 (15); Roig, Roig Juñent & Martínez Carretero 14266 (18a), 14748 (18b); Roquero 31 (18a), 132 (18b), 169 (18a), 297 (18a), 326 (8a), 434 (18a), 452 (8a); Rüe s.n. Nov 1958 (15); Rúgolo 1188 (8a), 1283 (8a); Rúgolo & Agrasar 315 (7c), 318 (7c), 570 (7c); Rúgolo de Agrasar 233 (8b), 451 (7a), 1093 (18a), 1176 (18a), 1234-1 (7a), 1234-2 (7c), 1252 (18b); Rúgolo de Agrasar & Agrasar 148 (7a), 573 (10b), 5846 (16); Rúgolo de Agrasar et al. 12381 (1); Ruiz Leal 79 (16), 3616 (7c), 6625 (16), 16886 (7c); Ruiz Leal & Roig 15023 (1); Rumboll 120 (18b).

Saavedra & Panchar 6 (16); Sagástegui, Mostacero & Leiva 12056 (14a); Salaverry 17 (14a); Sánchez-Vega et al. 1380 (14a); Sánchez-Vega, Torrel, & Medina 2557 (14a), Sánchez-Vega, Molau & Ohman 3800 (14a), 3812 (14a); Sánchez-Vega & Castillo 6370 (14a); Sánchez-Vega & Cabanillas 6790 (14a); Schajowski 55-a (18a), 86 (7c), 133 (7c), 134 (7c), 178 (7c); Schlegel 2371 (8a), 3475 (7a), 3537 (7a), 3645 (8a), 4065 (8a), 7187 (1), 7194 (1), 7322 (18a), 7523 (18a), 8070 (1), 8122 (1), s.n. Mar. 1958 (8a); Schwabe 69 (18a); Schwing s.n. 23 Jun. 1932 (2); Sklenar & Kosteckova 80-12 (6), 812 (6); Skottsberg 69 (15), 236 (15), s.n. Mar 1902 (15); Smith, Valencia & Gonzáles 9772 (11); Smith, Valencia & Minaya 9943 (14a); Smith, Valencia, González & Buddensiek 12224 (14a); Sneider 3027 (4); Sodiro 1893 (14a), Sodiro s.n. (18a), s.n. Oct. 1891 (4); Solomon 13221 (18a); Soriano 2409 (8a), 2490 (8a), 3184 (18a), 4334 (8b), 4352 (7c), 4847 (5), s.n. Feb. 1943 (18a); Sparre 1678 (16), 4873 (7a); Sparre & Constance 10778 (18a); Spegazzini s.n. (18a), s.n. Mar. 1882 (15), s.n. Dec. 1908 (16); Stebbins 9061 (13); Steyermark 57482 (3), 62083 (4), 62488 (4); Swallen 7064 (14a).

T.B.P.A. 2404 (18b), 3117 (18a), 3119 (5), 3140 (18a); Teillier 1536 (14b); Teillier et al. 2548 (16); Tovar 2474 (14a), 2539 (14a), 2933 (14a); Trombotto s.n. 19-22 Feb. 1984 (14b); Trombotto & Abumada 11105 (14b); Tsujii 172 (15).

Valla et al. 3065 (18a); Vargas 7045 (14a); Vellerini 257 (8a), 265 (8a), 297 (8a); Vidal 233 (18a), 234 (18a); Vidal Gormaz 265 (10a), s.n. SGO 37066 (8a), s.n. SGO-PHIL-239b (9); Villagrán & Leiva 7525 (18b); Villagrán & Mesa 414 (8a); Villagrán et al. 8462 (16); Villagrán, Aguila & Leiva 6954 (8a); Villamil 6 (7a), 8396 (15); Villamil et al. 2844 (18b); Villarroel & Weldt 151 (13); Virlet 1382 (4); Vogel 5 (1), 519 (1), 540 (1), 545 (18a), s.n. (1).

Werdermann 655 (18a).

Zoellner 5859 (16), 13135 (8a), 18030 (8a), 18196 (8b), s.n. 2 Feb. 1968 (7a), s.n. 14 Feb. 1992 (7a).

#### APPENDIX 3. LECTOTYPIFICATIONS OF SUBGENERIC TAXA.

**Trisetum** sect. **Anaulacoa** Louis-Marie, *Rhodora* 30(359): 211, 212, 1928. TYPE: *Trisetum flavescens* (L.) P. Beauv., lectotype, designated here.

**Trisetum** sect. **Aulacoa** Louis-Marie, *Rhodora* 30(359): 211, 1928; 30(360): 243, 1929. TYPE: *Trisetum floribundum* Pilg., lectotype, designated here.

**Trisetum** subg. **Heterolytrum** Louis-Marie, *Rhodora* 30(359): 211, 212, 1928. TYPE: *Trisetum flavescens* (L.) P. Beauv., lectotype, designated here.

**Trisetum** subg. **Isolytrum** Louis-Marie, *Rhodora* 30(259): 211, 1928; 30(360): 244, 1929. TYPE: *Trisetum longiglume* Hack., lectotype, designated here.

**Trisetum** subsect. **Koeleriformia** Louis-Marie, *Rhodora* 30(359): 211, 1928; 30(360): 241, 1929. TYPE:

*Trisetum micratherum* E. Desv., lectotype, designated here.

**Trisetum** subsect. **Sphenopholidea** Louis-Marie, *Rhodora* 30(259): 211. 1923; 30(360): 240. 1929. TYPE: *Trisetum interruptum* Buckl., lectotype, designated here.

APPENDIX 4. LIST OF NAMES AND SYNONYMS OF ALL TAXA MENTIONED IN THIS MANUSCRIPT.

**Accepted names** are presented in bold and synonyms are italicized.

*Acraspelia* Besser ex Schult. & Schult. f. = **Trisetum**

*Aira spicata* L. = **Trisetum spicatum** var. **spicatum**

*Aira subspicata* L. = **Trisetum spicatum** var. **spicatum**

**Amphibromus** Nees

*Arrhenatherum* P. Beauv.

*Avena* L.

*Avena airaides* Koel. = **Trisetum spicatum** var. **spicatum**

*Avena cernua* (Trin.) Kunth = **Trisetum cernuum**

*Avena flavescens* L. = **Trisetum flavescens**

*Avena leptastachys* Hook. f. = **Trisetum cernuum**

*Avena phleoides* d'Urv. = **Trisetum phleoides**

*Avena pilosa* J. Presl = **Trisetum preslei**

*Avena preslei* Kunth = **Trisetum preslei**

**Bromus** L.

**Bromus berterioanus** Colla

*Bromus trinii* E. Desv. = **Bromus berterioanus**

*Calamagrostis irazuensis* Kuntze = **Trisetum irazuense**

**Deschampsia** P. Beauv.

**Deschampsia airiformis** (Steud.) Benth. & Hook.f.

*Deschampsia andicala* (Louis-Marie) Valencia = **Trisetum longiglume** var. **longiglume**

*Deschampsia lasiantha* Phil. = **Trisetum preslei**

**Dielsiochloa** Pilg.

**Dielsiochloa floribunda** (Pilg.) Pilg.

**Graphophorum** Desv.

**Helictotrichon** Besser ex Schult. & Schult. f.

**Helictotrichon virescens** (Nees ex Steud.) Henrard

**Koeleria** Pers.

*Koeleria caudulata* (Trin.) Griseb. = **Trisetum caudulatum** var. **caudulatum**

*Koeleria cumingii* Nees ex Steud. = **Trisetum spicatum** var. **cumingii**

**Koeleria fueguina** C. E. Calderón ex Nicora

*Koeleria lechleri* Steud. = **Trisetum caudulatum** var. **caudulatum**

*Koeleria spicata* Reichb. ex Willk. & Lange = **Trisetum spicatum** var. **spicatum**

*Koeleria subspicata* (L.) Rehb. = **Trisetum spicatum** var. **spicatum**

**Leptophyllochloa** C. E. Calderón

**Leptophyllochloa micrathera** (E. Desv.) C. E. Calderón

**Peyritschia** E. Fourn.

**Peyritschia conferta** (Pilg.) Finot

**Peyritschia deyeuxioides** (Kunth) Finot

**Raimundochloa** A. M. Molina

*Rebentischia* Opiz = **Trisetum**

*Rebentischia flavescens* Opiz = **Trisetum flavescens**

**Relehela** Steud.

**Rostraria** Trin.

*Rupestrina* Prov. = **Trisetum**

*Rupestrina pubescens* Prov. = **Trisetum spicatum** var. **spicatum**

**Sphenopholis** Scribn.

*Trisetaria airaides* (Koeler) Baumg. = **Trisetum spicatum** var. **spicatum**

*Trisetaria flavescens* (L.) Baumg. = **Trisetum flavescens**

**Trisetum** Pers.

**Trisetum** subg. **Deschampsioidea** (Louis-Marie) Finot

*Trisetum* subg. *Heteralytrum* Louis-Marie = **Trisetum** subg. **Trisetum**

*Trisetum* subg. *Isalytrum* Louis-Marie = **Trisetum** sect. **Trisetaera**

**Trisetum** subg. **Trisetum**

*Trisetum* sect. *Anaulacaa* Louis-Marie = **Trisetum** sect. **Trisetum**

*Trisetum* sect. *Aulacaa* Louis-Marie = **Dielsiochloa**

**Trisetum** sect. **Carpatia** Chrtek

**Trisetum** sect. **Trisetaera** Asch. & Graebn.

**Trisetum** sect. **Trisetum**

*Trisetum* subsect. *Carpatia* (Chrtek) Probst. = **Trisetum** sect. **Carpatia**

*Trisetum* subsect. *Deschampsiaidea* Louis-Marie = **Trisetum** subg. **Deschampsioidea**

*Trisetum* subsect. *Graphopharum* (Desv.) Louis-Marie = **Graphophorum**

*Trisetum* subsect. *Koelerifarmia* Louis-Marie = **Leptophyllochloa**

*Trisetum* subsect. *Spenaphalidea* Louis-Marie = **Sphe-nopholis**

*Trisetum airiforme* Steud. = **Deschampsia airiformis**

*Trisetum airaides* (Koeler) P. Beauv. ex Roem. & Schult. = **Trisetum spicatum** var. **spicatum**

*Trisetum albidum* Sodiolo = **Trisetum spicatum** var. **spicatum**

**Trisetum ambiguum** Rúgolo & Nicora

*Trisetum andicala* Louis-Marie = **Trisetum longiglume** var. **longiglume**

**Trisetum andinum** Benth.

*Trisetum araeanthum* Phil. = **Leptophyllochloa micrathera**

*Trisetum barbatum* Steud. = **Bromus berterioanus** Colla

**Trisetum barbinode** Trin.

**Trisetum barbinode** Trin. var. **barbinode**

**Trisetum barbinode** var. **hirtiflorum** (Hack.) Louis-Marie

**Trisetum barbinode** var. **sclerophyllum** (Hack. ex Stuck.) Finot

*Trisetum biflorum* Phil. = **Trisetum dianthemum**

*Trisetum brachyatherum* Phil. = **Leptophyllochloa micrathera**

*Trisetum* [?] *brasiliense* Louis-Marie = **Deschampsia brasiliensis** (Louis-Marie) Valencia

*Trisetum buchtienii* Hack. = **Trisetum preslei**

**Trisetum caudulatum** Trin.

**Trisetum caudulatum** Trin. var. **caudulatum**

**Trisetum caudulatum** var. **correae** Nicora

**Trisetum cernuum** Trin.

*Trisetum chiloense* Phil. = **Trisetum caudulatum** var. **caudulatum**

*Trisetum chramostachyum* E. Desv. = **Trisetum caudulatum** var. **caudulatum**

*Trisetum confertum* Pilg. = **Peyritschia conferta**

*Trisetum cumingii* (Nees ex Steud.) Nicora = **Trisetum spicatum** var. **cumingii**

*Trisetum cumingii* var. *cumingii* = **Trisetum spicatum** var. **cumingii**  
*Trisetum cuningii* var. *santaerucense* Nicora = **Trisetum spicatum** var. **cumingii**  
*Trisetum depauperatum* Phil. = **Leptophyllochloa micrathera**  
**Trisetum deyeuxioides** (Kunth) Kunth  
**Trisetum dianthemum** (Louis-Marie) Finot  
*Trisetum erectum* Phil.—name of uncertain application  
*Trisetum evolutum* (E. Fourn.) Hitchc. = **Peyritschia deyeuxioides**  
**Trisetum flavescens** (L.) P. Beauv.  
*Trisetum flavescens* subsp. *pratense* (Pers.) Asch. & Graebn. = **Trisetum flavescens**  
*Trisetum floribundum* Pilg. = **Dielsiochloa floribunda**  
**Trisetum foliosum** Swallen  
*Trisetum fournieranum* Hitchc. = **Trisetum irazuense**  
*Trisetum fraudulentum* Steud. = **Trisetum cernuum**  
*Trisetum heterogonum* Steud. ex Lechler = **Trisetum caudulatum** var. **caudulatum**  
*Trisetum heteronymum* Steud. = **Trisetum caudulatum** var. **caudulatum**  
*Trisetum hirsutum* Phil. = **Trisetum phleoides**  
*Trisetum hirtiflorum* Hack. = **Trisetum barbinode** var. **hirtiflorum**  
*Trisetum hirtum* Trin. = **Bromus berterianus** Colla  
**Trisetum irazuense** (Kuntze) Hitchc.  
**Trisetum** [?] **juergensii** Hack.  
*Trisetum lasiolepis* E. Desv. = **Trisetum preslei**  
*Trisetum laxiflorum* Phil. = **Leptophyllochloa micrathera**  
*Trisetum laxum* Phil. = **Leptophyllochloa micrathera**  
*Trisetum lechleri* (Steud.) Nicora = **Trisetum caudulatum** var. **caudulatum**  
**Trisetum longiglume** Hack.  
**Trisetum longiglume** var. **glabratum** Nicora  
**Trisetum longiglume** Hack. var. **longiglume**  
**Trisetum macbridei** Hitchc.  
*Trisetum malacophyllum* Phil. = **Trisetum spicatum** var. **cumingii**  
*Trisetum malacophyllum* Steud. = **Trisetum caudulatum** var. **caudulatum**  
**Trisetum mattheii** Finot  
*Trisetum micratherum* E. Desv. = **Leptophyllochloa micrathera**  
*Trisetum mollifolium* Louis-Marie = **Trisetum spicatum** var. **cumingii**  
*Trisetum monticola* Phil. = **Trisetum caudulatum** var. **caudulatum**  
**Trisetum nancaguense** Finot  
*Trisetum nemorosum* Phil. = **Leptophyllochloa micrathera**  
*Trisetum ochrostachyum* Phil. = **Trisetum caudulatum** var. **caudulatum**  
**Trisetum oreophilum** Louis-Marie  
**Trisetum oreophilum** var. **johnstoni** Louis-Marie  
**Trisetum oreophilum** var. **oreophilum**  
*Trisetum paradoxum* Phil.—name of uncertain application  
**Trisetum phleoides** (d'Urv.) Kunth  
*Trisetum pratense* Pers. = **Trisetum flavescens**

**Trisetum preslei** (Kunth) E. Desv.  
*Trisetum preslei* var. *buchtienii* (Hack.) Louis-Marie = **Trisetum preslei**  
*Trisetum preslei* var. *lasianthum* (Phil.) Louis-Marie = **Trisetum preslei**  
**Trisetum pyramidatum** Louis-Marie ex Finot  
**Trisetum rosei** Scribn. & Merr.  
*Trisetum scabriflorum* Hitchc. = **Trisetum irazuense**  
*Trisetum sclerophyllum* Hack. = **Trisetum barbinode** var. **sclerophyllum**  
**Trisetum pyramidatum** Louis-Marie ex Finot  
**Trisetum spicatum** (L.) K. Richt.  
**Trisetum spicatum** var. **cumingii** (Nees ex Steud.) Finot.  
**Trisetum spicatum** K. Richt. var. **spicatum**  
*Trisetum spicatum* subsp. *andinum* (Benth.) Hultén = **Trisetum andinum**  
*Trisetum spicatum* subsp. *bolivianum* Hultén = **Trisetum spicatum** var. **spicatum**  
*Trisetum spicatum* var. *phleoides* (d'Urv.) Hack. = **Trisetum phleoides**  
*Trisetum spicatum* subsp. *phleoides* (d'Urv.) Hultén = **Trisetum phleoides**  
*Trisetum spicatum* subsp. *phleoides* (d'Urv.) Macloskie = **Trisetum phleoides**  
*Trisetum spicatum* var. *andinum* (Benth.) Louis-Marie = **Trisetum andinum**  
*Trisetum spicatum* var. *dianthemum* Louis-Marie = **Trisetum dianthemum**  
*Trisetum spicatum* var. *hirsutum* Louis-Marie = **Trisetum phleoides**  
*Trisetum splendidulum* Steud. = **Trisetum caudulatum** var. **caudulatum**  
*Trisetum subspicatum* (L.) P. Beauv. = **Trisetum spicatum** var. **spicatum**  
*Trisetum subspicatum* subsp. *phleoides* (d'Urv.) Hack. = **Trisetum phleoides**  
*Trisetum tomentosum* (E. Desv.) Nicora = **Koeleria fueguina**  
*Trisetum trinii* (E. Desv.) Louis-Marie = **Bromus berterianus** Colla  
*Trisetum variabile* E. Desv. = **Trisetum caudulatum** var. **caudulatum**  
*Trisetum variabile* E. Desv. var. *variabile* = **Trisetum caudulatum** var. **caudulatum**  
*Trisetum variabile* subsp. *virescens* Macloskie = (discussed under *T. caudulatum* var. *caudulatum*)  
*Trisetum variabile* var. *chiloense* (Phil.) Louis-Marie = **Trisetum caudulatum** var. **caudulatum**  
*Trisetum variabile* var. *flavescens* E. Desv. = **Trisetum caudulatum** var. **caudulatum**  
*Trisetum variabile* var. *intonsum* Louis-Marie = **Helictotrichon virescens** (Nees ex Steud.) Henrard  
*Trisetum variabile* var. *vidalii* (Phil.) Louis-Marie = **Trisetum caudulatum** var. **caudulatum**  
*Trisetum variabile* var. *virescens* E. Desv. = **Trisetum caudulatum** var. **caudulatum**  
*Trisetum vidalii* Phil. = **Trisetum caudulatum** var. **caudulatum**  
*Trisetum virescens* Nees ex Steud. = **Helictotrichon virescens** (Nees ex Steud.) Henrard  
*Trisetum weberbaueri* Pilg. = **Dielsiochloa floribunda**