PHENETIC SIMILARITY PATTERNS OF DIOECIOUS SPECIES OF *POA* FROM ARGENTINA AND NEIGHBORING COUNTRIES[1]

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ABSTRACT

Dioecious species of *Poa* L. are mainly American with a total of 41 taxa in South America, 11 in North America, 2 in New Zealand, and 1 species in the Peri-Antarctic Islands. South American species, considered within *Poa* sect. *Dioicopoa*, are found mostly in Argentina but occur elsewhere in Bolivia, Brazil, Chile, Paraguay, and Uruguay. The present treatment considers the phenetic variation of dioecious species of *Poa* in South America. Thirty-seven taxa (34 species and three varieties) were examined, using numerical techniques. Multivariate analyses revealed a phenetic pattern among species based on linear relationships. Relationships of independent species as well as species complexes were established. As a consequence, new synonymy within most of these complexes, and a new variety, *Poa rigidifolia* var. *ibari*, are proposed herein. Bivariate analyses showed other non-linear patterns of variation. These results, together with univariate analyses, were used to select diagnostic characters. Sexual dimorphism was the major source of species variation, and ranges for pistillate and staminate specimens were also calculated. An identification key for all taxa is included.

Key words: Poa, dioecious species, numerical taxonomy, morphological variability, synonymy, sexual dimorphism.

Poa L. is one of the largest genera within Poaceae, including over 200 species according to Hartley (1961), Nicora (1978), and Kellogg (1985). Additionally, Clayton and Renvoize (1986), Soreng (1990), Watson and Dallwitz (1992), and Anton and Connor (1995) mentioned 400 to 500 taxa within *Poa*.

Poa is distributed worldwide, particularly at high altitudes and latitudes in both hemispheres; the taxon is largely absent from low areas of tropical regions (Hartley, 1961). It is a recognizable, well-defined (Clayton & Renvoize, 1986; Nicora & Rúgolo de Agrasar, 1987; Soreng, 1990), and monophyletic genus (Hartley, 1961; Kellogg, 1990).

Interspecific variation in *Poa* is due principally to quantitative diagnostic characters (Kellogg, 1990). Discrete morphological variables are mostly unreliable, often varying widely with the environment, and even within a single plant (Kellogg, 1985; Rúa, 1996). Species are frequently grouped into complexes based on their morphological similarities. These species complexes further comprise different chromosome numbers (Åkerberg, 1942; Kellogg, 1985). Taxonomists who have studied the genus (Bor, 1952; Marsh, 1952; Torres, 1969, 1970; Vickery, 1970; Nicora, 1978; Moore, 1983; Kellogg, 1985; Tateoka, 1985; Edgar, 1986) agree on the difficulty in delimiting taxonomic boundaries within *Poa*. Clausen (1961) and Soreng (1990) both considered that this variability in chromosome number results from polyploidy, introgression as well as apomixis. Phenotypic plasticity as stimulated by environmental variability also obscures species delimitation within *Poa* (Vickery, 1970; Giussani & Collantes, 1997).

Breeding systems are highly diverse within *Poa*. Perfect flowers are typical, but dioecism, gynomonoecism, and gynodioecism are also found among American species (Anton & Connor, 1995). Apomixis on exclusively pistillate plants or facultative apomixis on perfect flowers are both well documented (Connor, 1979, 1981; Kellogg, 1987).

Evolution of dioecism within *Poa* could have derived from gynodioecious species, following species

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migration from North to South America (Anton & Connor, 1995). Dioecism is well represented in the Americas: 11 dioecious species are distributed in the Northern Hemisphere, while 41 range southward. These South American species were generally treated as *Poa* subg. *Dioicopoa* (E. Desv.) J. R. Edm., although Soreng (1998a, b) considered them within *Poa* sect. *Dioicopoa* E. Desv., to conserve *Poa* subg. *Poa* as monophyletic. In order to maintain a uniform treatment of the genus *Poa*, the taxonomic delimitation proposed by Soreng (1998a, b) and based on a phylogenetic approach will be followed.

South American dioecious species are mainly distributed in Argentina and Chile (Marticorena & Quezada, 1985; Zuloaga et al., 1994). Parodi (1936) and Rosengurtt et al. (1970) cited three endemic species for Uruguay: *P. arechavaletae* Parodi, *P. uruguayensis* Parodi, and *P. megalantha* (Parodi) Herter. Smith et al. (1981) and Longhi-Wagner and Boldrini (1988) mentioned one endemic species in southern Brazil: *P. reitzii* Swallen. Nicora (1995) described one new species from Paraguay, *P. pedersenii* Nicora; and Hitchcock (1927) and Renvoize (1998) cited one dioecious species in Bolivia, *P. buchtienii* Hack. Although it was originally intended herein to consider all South American species of *Poa* sect. *Dioicopoa*, some taxa were not included due to the lack of material or difficulties in the identification of doubtful taxa, especially with Chilean material, and endemic species of Uruguay and Brazil.

Partial taxonomic revisions of some South American taxa (Parodi, 1936; Torres, 1969, 1970; Nicora, 1978; Moore, 1983) used quantitative characters as diagnostic features, although there was much overlap in their character ranges among species. Differences in pistillate floret hairiness were also utilized for species classification, with staminate specimens, which are generally glabrous, discounted (Nicora, 1978).

The aim of this study is to analyze the pattern of morphological variation within *Poa* sect. *Dioicopoa* based on pistillate and staminate plants. Grouping from multivariate analyses was used to look for similarity among taxa and this, along with study of types, helped circumscribe species and establish synonymy when necessary. An identification key is presented as the result of numerical analyses. This key is based on groups of selected characters that are strongly correlated, while unique characters were only used when they presented conspicuous discontinuities.

Materials and Methods

Species and Specimens Analyzed

Morphological variation among 34 dioecious species and three varieties was analyzed. A list of species is presented herein as Appendix 1 at the end of this manuscript. Species included in this study derive from the following regional taxonomic treatments: Nicora (1978) and Moore (1983) for Patagonia; Torres (1969, 1970) for Entre Ríos and Buenos Aires, Argentina; Parodi (1932, 1937, 1940, 1950, 1961, 1962) and Zuloaga et al. (1994) for Argentina; Hitchcock (1927) and Renvoize (1998) for Bolivia; Smith et al. (1981) and Longhi-Wagner and Boldrini (1988) for Brazil; Marticorena and Quezada (1985) for Chile; and Parodi (1936) and Rosengurtt et al. (1970) for Uruguay.

Three hundred seventy-six exsiccatae out of approximately 800 specimens examined by the author were analyzed and regarded as operational taxonomic units (OTUs) for numerical analysis (Appendix 2). The number of specimens considered per species varies according to their representation in herbaria. Some endemic species are represented by only a few specimens, while other widespread species are represented by 15 or more. Types of all taxa were seen, and most of these were included in the numerical analysis. Only types of *Poa bonariensis* (Lam.) Kunth, *P. iridifolia* Hauman, *P. lanuginosa* Poir., *P. prichardii* Rendle, and *P. stuckertii* (Hack.) Parodi were not recorded. An attempt was made to cover the full range of morphological variation used by earlier authors to discriminate taxa, and to reflect distributional range for all species considered. Voucher specimens are deposited in the following herbaria: BAA, BAB, CORD, LP, LPB, and SI.

Morphological Variables

Forty-four morphological characters, including anatomical and epidermal leaf characters, were measured for this numerical analysis. Of these, 29 are quantitative multistate characters and 15 are discrete variables (see Appendix 3). Most of them were considered diagnostic in previous taxonomic studies (Torres, 1969, 1970; Nicora, 1978; Moore, 1983). Others were added to increase the character database. Vegetative characters were measured on the penultimate leaf of a sterile innovation. Leaf anatomical characters were sampled on a cross section from the blade midregion. Epidermal characters represent the average of 10 measurements from the abaxial epidermis of the leaf blade midregion. Epidermal and anatomical characters follow the character descriptions from Ellis (1976, 1979). Reproductive characters were measured on the tallest fertile culm.

ASSESSMENT OF THE TAXONOMIC COMPLEXES AND SPECIES

Phenetic similarities were examined by principal component analysis (PCA). This ordination technique represents distances between major groups more accurately than any clustering method (Sneath & Sokal, 1973). A correlation coefficient is suggested for mixed data with predominantly quantitative multistate characters (Crisci & López Armengol, 1983). Numerical analysis was performed on a standardized character matrix. Data were transformed by the Pearson-moment correlation coefficient on a similarity matrix, which was used to obtain the principal components. The basic data matrix is deposited in the Facultad de Ciencias Exactas y Naturales, Universidad de Buenos Aires, Argentina (Giussani, 1997: appendix B), and is also available from the author upon request.

PCA analysis was repeated several times in order to detect different morphological patterns within the species studied. Toward this, different steps of multivariate analysis were followed:

(1) A single species or similar species groups were recognized by means of PCA.

(2) Each species or species group was characterized by the contribution of each character to the first five principal components.

(3) Distinctive species or species groups were separated and re-analyzed to recognize another variation pattern.

(4) Species that were not initially delimited were re-analyzed until all taxonomic entities assorted into species complexes or were recognized as independent species.

Invariant characters were removed before PCA was performed. PCA distortion was measured due to the relatively low variability seen in the first five principal components. For this purpose, a Euclidean distance matrix deriving from the first five PCA axes was compared with a similarity matrix by a cophenetic correlation coefficient (Sneath & Sokal, 1973). Two dissimilarity matrixes were obtained based on two indexes: taxonomic distance coefficient and Manhattan distance, with r_T, and r_M the cophenetic correlation values, respectively. Of these, only the highest scored value is presented.

Minimum spanning tree or MST procedure (Gower & Ross, 1969; Rohlf, 1992) was additionally used to examine the similarity relationships among OTUs. This distance tree was imposed on the PCA plot with the OTUs linked by lines representing their minimum total distance (Clifford & Stephenson, 1975). MTS was performed on dissimilarity matrixes derived from taxonomic distance coefficient or Manhattan distance.

DISCRIMINATION AMONG TAXONOMIC ENTITIES

Taxonomic groups were first defined by PCA and then considered as a priori groupings for discriminant analysis or DA (Sneath & Sokal, 1973; Affifi & Clark, 1984). DA was performed to identify levels of certainty within previously recognized groups as well as to select diagnostic characters based on standardized coefficients of the canonical variables.

For discriminant analysis, only those characters that contributed most to the variability of the first five components of the PCA ($r > 0.5$) and that had the least correlation among each other ($r < 0.5$) were included. The only discrete characters analyzed by DA were those of diagnostic value for previous classifications (Torres, 1969, 1970; Nicora, 1978; Moore, 1983), but quantitative multistate characters were preferred.

The empirical method (Affifi & Clark, 1984) was used to estimate goodness of fit of the classification procedure. Thus, the discriminant function was applied to the same samples used for deriving it, and the proportion of individuals correctly classified for each group was computed.

UNIVARIATE AND BIVARIATE ANALYSES. A KEY FOR IDENTIFICATION OF SPECIES AND TAXONOMIC COMPLEXES

Mean and standard deviations for quantitative characters, as well as mode for discrete variables, were calculated for each species and species complex: these were plotted to reveal discontinuities and the pattern of variation among taxonomic entities (Sokal & Rohlf, 1969). Variation of a single character was also analyzed to consider dimorphism between pistillate and staminate plants. Thus, averages of pistillate and staminate plants were calculated. Bivariate analysis was used to detect morphological patterns based on different character combinations. After numerical analyses were completed, diagnostic characters were selected, and a key to identify species or taxonomic complexes was manually constructed.

Numerical analyses were made using either NTSYS-pc (Rohlf, 1992) or STATGRAPHICS (Statistical Graphics System by Statistical Graphics Corporation, 1992).

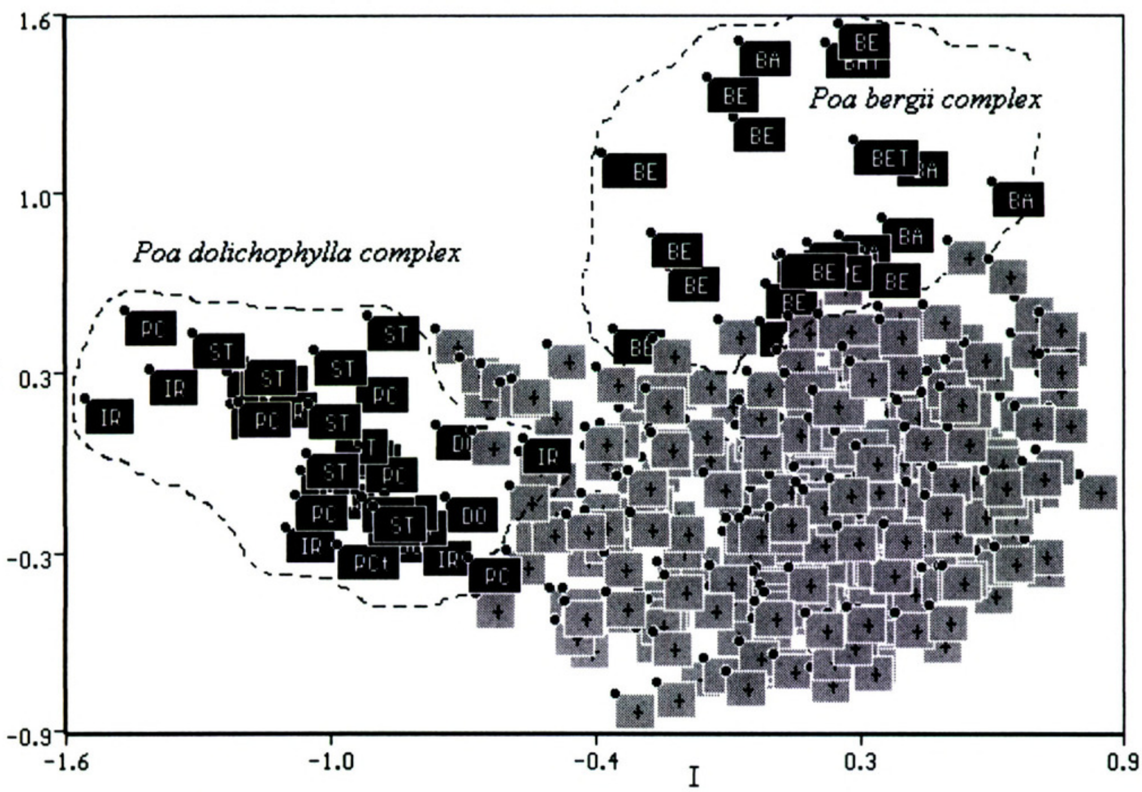


Figure 1. First set of multivariate analyses. Plot of 376 individuals on the first two principal components. Two groups of species are distinguished: the *Poa dolichophylla* complex (DO, IR, PC, ST), and the *P. bergii* complex (BE, BA). Each label corresponds to the species name, with the first two letters abbreviated as in Appendix 1 (pistillate individuals in all capital letters, and staminate individuals in lowercase letters); the third T or t letter indicates the type species; + = a non-grouped specimen.

Results

Taxonomic groups were selected based on the distribution of OTUs in the first five axes of PCA, since distortion of these axes was less than 10%.

First set of multivariate analyses

The *Poa dolichophylla* Complex, the *Poa bergii* Complex, and *Poa schizantha*. Ordination of all 376 OTUs on the first five axes, utilizing 44 characters, would account for 52.4% of total variability. Although this is a small percentage of total variability, PCA distortion was low: $r_M = 0.92$.

The first three principal components showed two groups of similar species. Axes I and II show the *Poa dolichophylla* complex, containing *P. dolichophylla* Hack., *P. pilcomayensis* var. *calamagrostoidea* Hack., *P. stuckertii*, and *P. iridifolia* (Fig. 1). These principally grouped along the negative edge of axis I. From analysis of character loadings, they are characterized by long leaves, blades, and sheaths; plant stature over 50 cm tall; broad blades; long and broad panicles; numerous vascular bundles with sclerenchyma girders on both abaxial and adaxial epidermis; short and truncate ligules; groups of sclerenchyma cells extending on abaxial and adaxial epidermis at blade margin; small stomata; and short spikelets, glumes, florets, and lodicules.

The second species group was defined by axes I, II, and III and comprises three taxa: *P. bergii* Hieron. var. *bergii*, *P. barrosiana* Parodi, and *P. schizantha* Parodi. Specimens from these species clustered at the positive end of these axes (Fig. 1). They also present long leaves, blades, and sheaths, tall plants, and long panicles. However, these species are distinguished from the previous group by longer ligules, thicker blades, larger stomata, longer spikelets, glumes, and florets, additional nerving on the first glume, as well as numerous vascular bundles with sclerenchyma girders only on abaxial epidermis.

The second group was analyzed separately. PCA was performed on a subset of 33 OTUs based on 39 morphological variables. *Poa bergii* var. *bergii*, *P. barrosiana*, and *P. schizantha* share some attributes that were revealed as invariant characters before PCA was performed: long rhizomes (HAB 2, see Appendix 3), no viviparous florets (FLOv 0), glabrous lemmas between nerves (HAIbet 0), no vascular bundles with only adaxial sclerenchyma girders (SCLad 0), and numerous silico-suberose

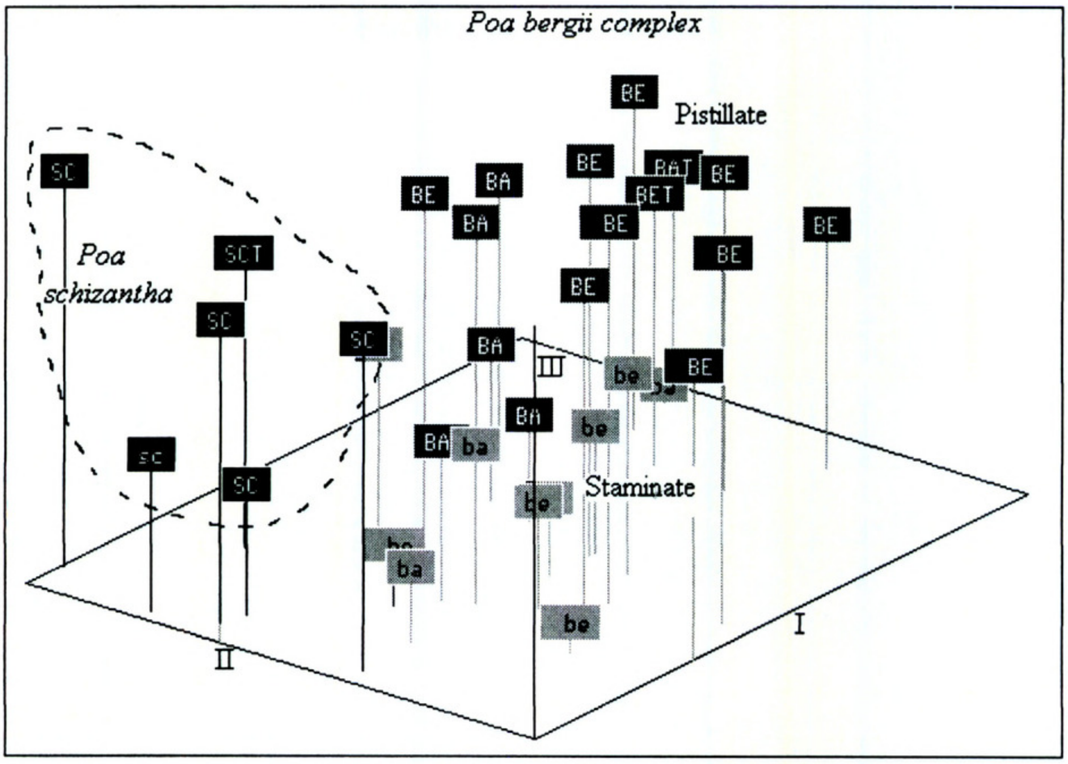


Figure 2. First set of multivariate analyses. Plot of 33 individuals on the first three PCA axes: *Poa schizantha* (SC) and pistillate and staminate individuals of the *P. bergii* complex are in different shades of gray. See Figure 1 caption for explanation of labels.

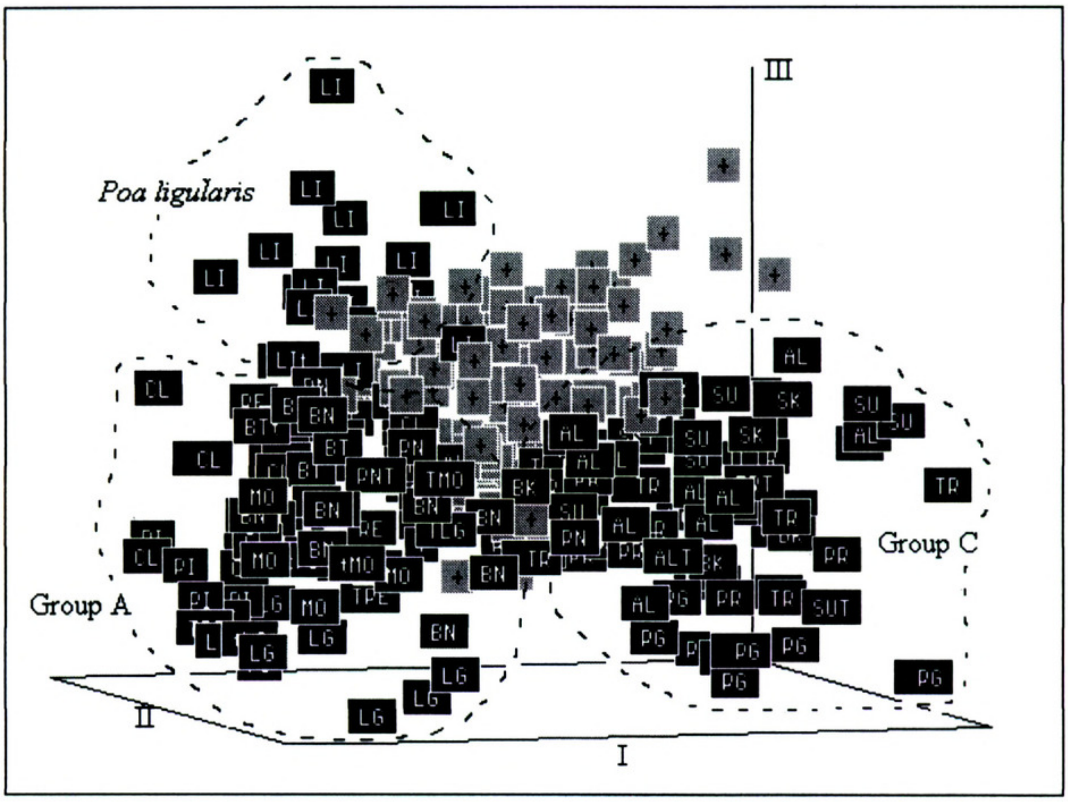
paired cells (SISU 2). These first five components accounted for 55% of total variation; meanwhile, distortion of PCA was low: $r_M = 0.93$. Specimens of *P. schizantha* were distinguished from those of the *Poa bergii* complex: *P. bergii* var. *bergii* and *P. barrosiana*; sexual dimorphism within the *P. bergii* complex was also supported. Figure 2 shows OTU distribution on the first three principal components. *Poa schizantha* falls on the negative end of axis I, and toward the positive ends of axes II and III. It is clearly defined by a smaller plant size; smaller, narrower, and thinner leaves; smaller fertile structures; long and rigid callus hairs; and convolute blades. It also has smaller stomata and bulliform cells only slightly or not differentiated from other epidermal cells. A clear dimorphism between pistillate and staminate plants of the *P. bergii* complex was also distinguished. Pistillate specimens associate with the positive end of axes I and III: they are larger plants, with more hairy florets than staminate specimens.

Discrimination among taxonomic entities. The *Poa dolichophylla* complex, the *P. bergii* complex (*P. bergii* and *P. barrosiana*), *P. schizantha*, and a remaining group of miscellaneous species comprised the four a priori groups for an initial discriminant analysis. Standardized coefficient values for the first three canonical variables were used to characterize groups. Species within the *P. dolichophylla* complex have wide leaves and blade margins with a group of sclerenchyma cells extending on the adaxial and abaxial epidermis; the *P. bergii* complex has long ligules, sheaths, lemmas, stomata, as well as numerous glume nerves. *Poa schizantha* is characterized by intermediate ligule, lemma, and stomata lengths, as well as narrower blades and thinner long cells. These groups appeared appropriately classified by discriminant functions. Eighty-eight percent of specimens of the *P. dolichophylla* complex, 85% of the *P. bergii* complex, and 100% of *P. schizantha* correctly assorted to the a priori groups.

SECOND SET OF MULTIVARIATE ANALYSES

After subtracting specimens of the *Poa dolichophylla* complex, the *P. bergii* complex, and *P. schizantha* from the original data matrix, the 302 remaining specimens were re-analyzed with the original 44 morphological and anatomical characters. The first five PCA axes accounted for 49% of total variability; in spite of this percentage, distortion was low at $r_M = 0.89$.

OTU distribution on the first three axes of PCA discriminates three groups of species (Fig. 3): GROUP A, constituted by *P. bonariensis*, *P. buchtienii*, *P. calchaquiensis* Hack., *P. lanigera* Nees, *P.*



Figures 3. Second set of multivariate analyses. Plot of 302 individuals on the first three principal components showing Group A (*Poa bonariensis, P. buchtienii, P. calchaquiensis, P. lanigera, P. patagonica* var. *neuquina, P. pedersenii, P. pilcomayensis, P. montevidensis*, and *P. resinulosa*), Group B (*P. ligularis*), and Group C (*P. alopecurus, P. boelckei, P. pogonantha, P. prichardii, P. shuka, P. superbiens*, and *P. tristigmatica*). See Figure 1 caption for explanation of labels.

patagonica var. *neuquina* Nicora, *P. pedersenii, P. pilcomayensis* Hack., *P. montevidensis* Arechav., and *P. resinulosa* Nees ex Steud; GROUP B, consisting only of specimens of *P. ligularis* Nees ex Steud.; and GROUP C, which includes *P. alopecurus* (Gaudich.) Kunth, *P. boelckei* Nicora, *P. pogonantha* (Franch.) Parodi, *P. prichardii, P. shuka* (Speg.) Parodi, *P. superbiens* (Steud.) Hauman & Parodi, and *P. tristigmatica* E. Desv. ex Gay.

Analysis of character correlation with the first three PCA axes revealed that species of Group A, placed on the positive end of axis I and the negative end of axis III, are characterized by long blades; short, truncate ligules; and smaller spikelets, glumes, florets, and lodicules. Group B, on the positive end of axes I and III but the negative end of axis II, also has shorter spikelets and florets, but is distinguished by its longer ligules, filiform leaves, smaller stomata, as well as smaller plants and inflorescences. Species of GROUP C aligned on the negative end of axis I but the positive end of axis II. These species are distinguished by their larger spikelets, glumes, and florets; wider, thicker blades; additional vascular bundles with sclerenchyma girders on both abaxial and adaxial epidermis; and longer stomata.

Discrimination among taxonomic entities. Groups A, B, C, and all remaining species were the four a priori groups used for the discriminant analysis (DA). Specimens assorting to Group A and B separated along the first canonical variable. They are characterized by long blades, long hairs along lemma nerves, and sharp leaf blade apices. Specimens of Group C are distinguished by longer glumes. *Poa ligularis*, separated by the second canonical variable, is discriminated by a long ligule and numerous vascular bundles with sclerenchyma girders only on the abaxial epidermis. Group A is also characterized by wide blades associated with the second variable. All groups were assigned by the classification procedure with the percentages of correct classification being 86%, 90%, and 80% for groups A, B, and C, respectively.

The *Poa bonariensis* Complex, *Poa lanigera*, *Poa pilcomayensis* var. *pilcomayensis*, and the *Poa resinulosa* Complex. Species assorted within Group A include *Poa bonariensis, P. buchtienii, P. calchaquiensis, P. lanigera, P. montevidensis, P. patagonica* var. *neuquina, P. pedersenii, P. pilcomayensis* var. *pilcomayensis*, and *P. resinulosa*. Their phenetic relationships were investigated by

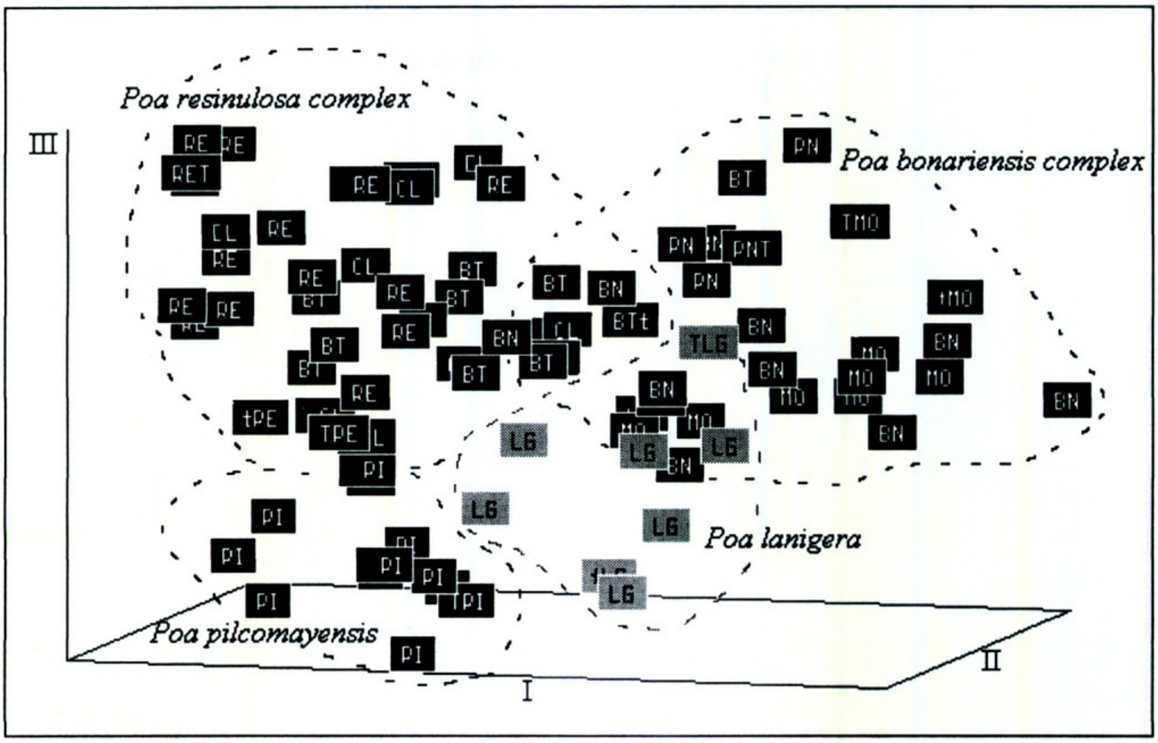


Figure 4. Second set of multivariate analyses. Plot of 84 individuals of Group A on the first three PCA axes showing the *Poa resinulosa* complex (BT, CL, PE, RE), the *P. bonariensis* complex (BN, MO, PN), *P. lanigera* (LG), and *P. pilcomayensis* (PI). See Figure 1 caption for explanation of labels.

PCA. A data matrix was based on 84 OTUs and 43 variables. Only 1 character out of the 44 was invariant: the absence of viviparous florets (FLOv 0, see Appendix 3). The first five components accounted for 53% of total variability. PCA distortion was low, being $r_M = 0.94$.

A plot of the first three principal components showed four distinct groups of species (Fig. 4). The *P. resinulosa* complex consists of *P. buchtienii, P. calchaquiensis, P. pedersenii,* and *P. resinulosa.* A *P. bonariensis* complex contains *P. bonariensis, P. patagonica* var. *neuquina,* and *P. montevidensis.* Two other groups each consist of two independent taxa, *P. pilcomayensis* var. *pilcomayensis* and *P. lanigera.* The *P. resinulosa* complex, located at the negative end of axis I and the positive end of axis III, comprises specimens of relatively small stature, with small stomata, narrow blades, as well as shorter spikelets, glumes, and florets. The *P. bonariensis* complex distributed to the positive end of axes I and III. This complex includes rhizomatous, larger plants, with longer stomata, wider blades, as well as larger spikelets, glumes, and florets. Vascular bundles with sclerenchyma girders are more numerous in blade cross section. *Poa pilcomayensis* var. *pilcomayensis* and *P. lanigera* both fell at the negative end of axis III. They share flat, narrow blades. However, *P. lanigera* is distinguished along the first principal component by its longer glumes, florets, and spikelets than are seen for *P. pilcomayensis* var. *pilcomayensis.*

Specimens within the *P. resinulosa* complex, including *P. buchtienii, P. calchaquiensis, P. pedersenii,* and *P. resinulosa,* were separately re-analyzed. PCA revealed a sexual dimorphism among specimens with staminate individuals presenting smaller fertile structures and less hairy florets than pistillate ones. The first five PCA axes accounted for 54% of the whole variance, and the cophenetic correlation coefficient showed a low PCA distortion, $r_M = 0.92$.

Specimens of the *P. bonariensis* complex were also separately analyzed. Principal differences among OTUs were again due to sexual dimorphism. This *P. bonariensis* group distributed on PCA axes I, II, and IV and was also sustained on a minimum spanning tree (Fig. 5). Staminate specimens, in contrast with pistillate specimens, again show smaller spikelets, glumes, and florets, as well as less hairiness on these florets.

Discrimination among taxonomic entities. A priori groups for DA corresponded to those obtained from PCA: (1) *P. bonariensis* complex; (2) *P. resinulosa* complex; (3) *P. pilcomayensis* var. *pilcomayensis*; and (4) *P. lanigera.* Two groups were separated along the first two canonical variables. The *P. resinulosa* complex is discriminated by a rela-

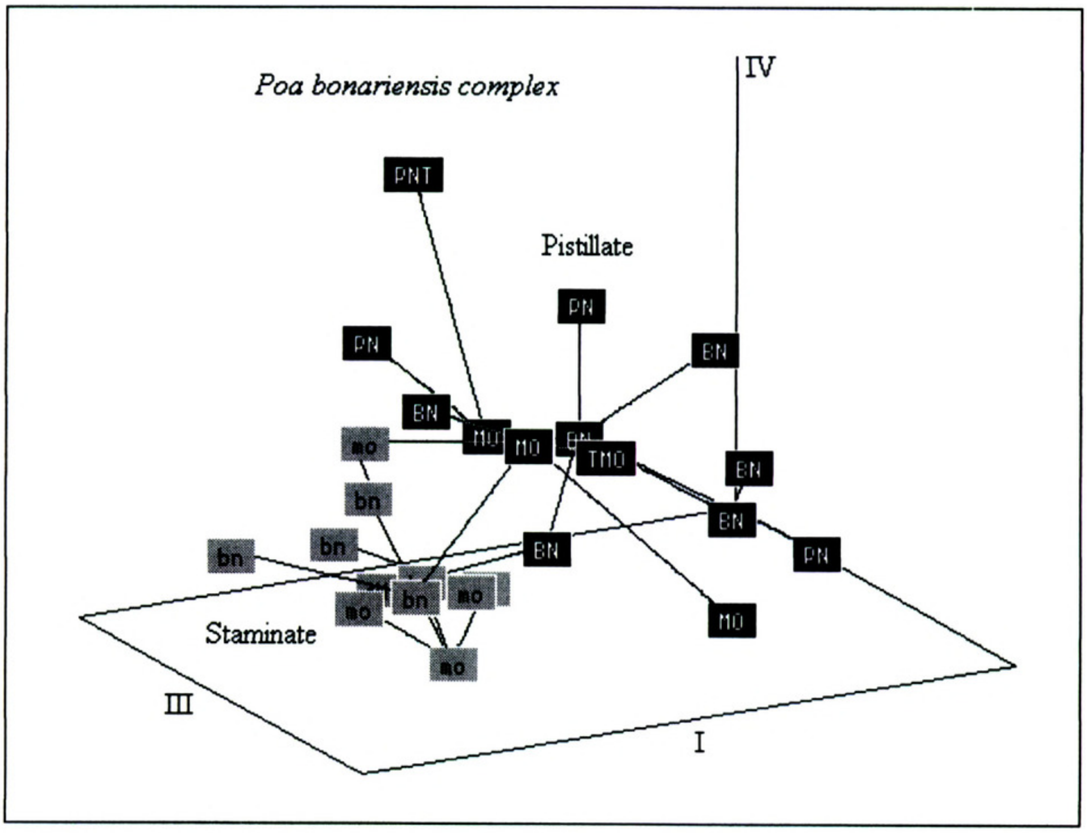


Figure 5. Second set of multivariate analyses. Plot of 25 individuals of the *Poa bonariensis* complex (BN, MO, PN) distributed on the I, III, and IV principal components. MST is superimposed on the PCA plot (lines). Dimorphism between pistillate and staminate specimens is the main source of variation among specimens of the complex. See Figure 1 caption for explanation of labels.

tively long ligule and subconvolute blades. The *P. bonariensis* complex is characterized by large panicles and glumes, wide paleas, numerous silico-suberose paired cells, and vascular bundles with sclerenchyma girders on the abaxial epidermis. *Poa pilcomayensis* var. *pilcomayensis* and *P. lanigera* aligned along the third canonical variable. *Poa lanigera* has broader paleas and hairier lemma nerves than *P. pilcomayensis*. Discriminant classification of the a priori groups showed a good fit: 92% of specimens for the *P. resinulosa* complex, 90% for the *P. bonariensis* complex, 92% for *P. pilcomayensis*, and 75% for *P. lanigera* were correctly assigned. Some misidentified specimens of the *P. resinulosa* complex associated with the *P. bonariensis* complex. Others of *P. pilcomayensis* were related to *P. lanigera*. Some specimens of *P. lanigera* intermixed with the *P. bonariensis* complex.

The *Poa alopecurus*, *Poa pogonantha*, and *Poa tristigmatica* Complexes. PCA ordination of specimens of Group C revealed two species groupings. The *Poa pogonantha* complex consists of *P. pogonantha* and *P. prichardii*, whereas specimens of *P. alopecurus*, *P. boelckei*, *P. shuka*, *P. superbiens*, and *P. tristigmatica* fall into the second group. OTU distribution (Fig. 6) is based on PCA axes I, II, and IV. Analysis of character loadings revealed that specimens within the *P. pogonantha* complex are characterized by viviparous florets and long panicles, but few have sclerenchyma girders associated with vascular bundles. A second species grouping features larger plants, longer ligules, as well as longer glumes, florets, and lodicules. The first five PCA axes explained only 47% of total variation. Nevertheless, its distortion remained low, $r_M = 0.87$.

Specimens of *P. alopecurus*, *P. boelckei*, *P. shuka*, *P. superbiens*, and *P. tristigmatica* were individually analyzed. Ordination along the first three principal component axes revealed two groups of species (Fig. 7): a *P. tristigmatica* complex with two species, *P. boelckei* and *P. tristigmatica*; and a *P. alopecurus* complex including *P. alopecurus*, *P. shuka*, and *P. superbiens*. The *P. tristigmatica* complex associated with the positive end of the first component axis due to smaller plants, leaves, and fertile structures. The *P. alopecurus* group principally located at the opposite side of axis I, associated with larger plants, leaves, and fertile structures. Pistillate and staminate specimens of *P. boelckei* and *P. tristig-*

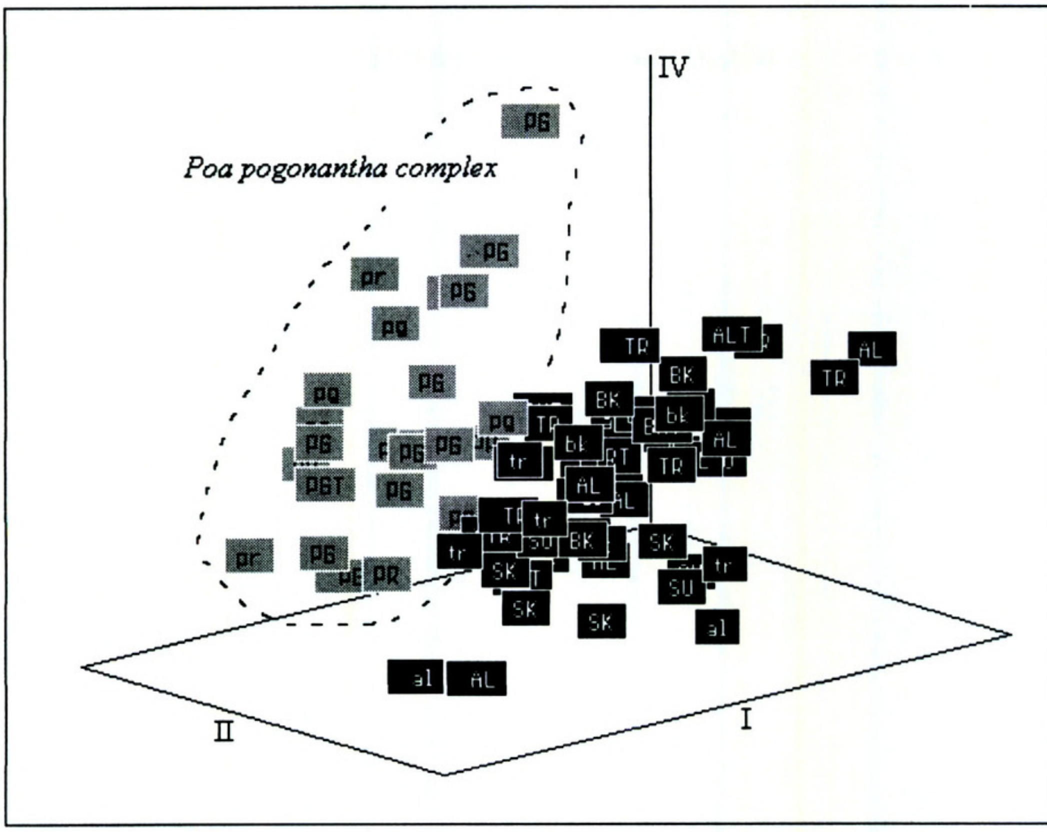


Figure 6. Second set of multivariate analyses. Plot of 76 individuals of Group C (*Poa alopecurus, P. boelckei, P. pogonantha, P. prichardii, P. shuka, P. superbiens,* and *P. tristigmatica*) on the I, II, and IV PCA axes. The *P. pogonantha* complex (PG, PR) is clearly distinguished from the remaining species. See Figure 1 caption for explanation of labels.

matica differentiated on axis II (Fig. 7). Pistillate plants present wider glumes and florets, longer lodicules, and thicker blades than staminate specimens. PCA distortion was low, at $r_M = 0.92$, although the first five axes accounted for just 49% of total variability.

When based only on specimens of the *P. pogonantha* complex, PCA revealed morphological differences between pistillate and staminate individuals. Pistillate specimens have hairy calluses, hairy lemma nerves, and vascular bundles with sclerenchyma girders on both abaxial and adaxial epidermis. Staminate specimens are distinguished by having more nerves on the first glume and well-differentiated bulliform cells. The first five axes accounted for 57% of total variability with PCA distortion being low, $r_T = 0.92$. Only three variables, navicular apices (API 1, see Appendix 3), no vascular bundles with few sclerenchyma cells (SCLin 0), and group of sclerenchyma cells at blade margin not extending on abaxial and adaxial epidermis (CAP 1) were invariant and removed from the matrix before performing PCA.

Discrimination among taxonomic entities. DA was performed to discriminate relevant groups emerging from the second ordination set. A priori groups were defined as: (1) the *P. tristigmatica* complex (*P. boelckei* and *P. tristigmatica*); (2) the *P. pogonantha* complex (*P. pogonantha* and *P. prichardii*); and (3) the *P. alopecurus* complex (*P. alopecurus, P. shuka,* and *P. superbiens*). Characters that best reflect specific differences were selected following standardized coefficients of canonical variables. The *P. tristigmatica* complex is characterized by broad glumes, paleas, and blades. The *P. pogonantha* complex is defined by long spikelets in association with viviparous florets, and long blades. Finally, the *P. alopecurus* complex has more nodes on the panicle along the principal axis, as well as more nerves on the first glume. These groups classified correctly: 91% were related to the *P. tristigmatica* complex; 82% to the *P. pogonantha* complex; and 96% to the *P. alopecurus* complex.

THIRD SET OF MULTIVARIATE ANALYSES

Specimens of species previously analyzed were removed from the data matrix. The 121 remaining OTUs were then considered for this subsequent study. PCA was performed; the first five components accounted for 48% of total variability. PCA distortion was low, $r_T = 0.91$. A group was differentiated along the I, II, and V axes, including *P.*

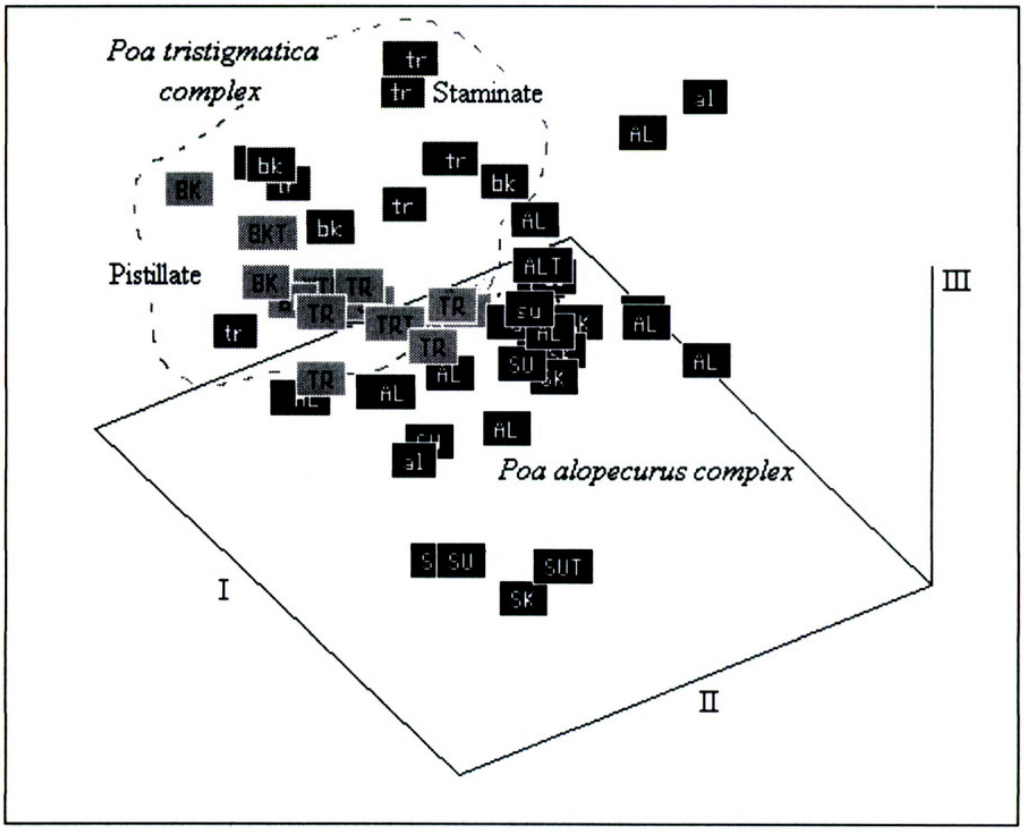


Figure 7. Second set of multivariate analyses. Plot of 52 individuals on the first three PCA axes showing two groups of species: the *Poa alopecurus* complex (AL, SK, SU) and the *P. tristigmatica* complex (BK, TR). See Figure 1 caption for explanation of labels.

bergii var. *chubutensis* Speg., *P. boecheri* Parodi, *P. hubbardiana* Parodi, *P. lanuginosa,* and *P. patagonica* Phil. var. *patagonica.* According to their character loadings, these species have longer leaves and inflorescences, wider and thicker blades, and larger stomata than the remaining species.

***Poa hubbardiana* and the *Poa lanuginosa* Complex.** The previously defined group (*Poa bergii* var. *chubutensis, P. boecheri, P. hubbardiana, P. lanuginosa,* and *P. patagonica* var. *patagonica*) was further analyzed by PCA. Figure 8 is based on the first three principal components. Two groups of species appear, with sexual dimorphism being the main source of variation within these groups. Caespitose *P. hubbardiana* separated along the third component and placed on its negative edge. This species is differentiated because it has a short ligule, small stomata, and long hairs lying between the nerves of the lemma. A *P. lanuginosa* complex (*P. bergii* var. *chubutensis, P. boecheri, P. lanuginosa,* and *P. patagonica* var. *patagonica*) principally distributed along the positive edge of axis III. Examining their character loadings, this group is defined by long ligules and small florets. Axes I and II showed a clear dimorphism between pistillate and staminate specimens of *P. hubbariana* as well as the *P. lanuginosa* complex. Pistillate plants are more robust, with longer spikelets, glumes, and florets, with these florets being distinctly hairy.

The first five components accounted for just 52% of total variability. However, the cophenetic correlation coefficient derived from PCA was high (r_M = 0.86), showing little distortion.

Discrimination among taxonomic entities. Species of the *P. lanuginosa* complex, *P. hubbardiana,* and the remaining specimens were used as a priori groups for DA. The first two canonical variables clearly discriminated these groups. The *P. lanuginosa* complex presents long panicles and large stomata. *Poa hubbardiana* has long florets, brief ligules, and sharp blade apices. Classification of the groups showed a few mismatches. Nevertheless, 91% of specimens of the *P. lanuginosa* complex were correctly classified. Meanwhile, 78% of expected specimens were associated with *P. hubbardiana.*

FOURTH SET OF MULTIVARIATE ANALYSES

Poa holciformis, Poa huecu,* and *Poa indigesta. After discrimination and removal of *Poa hub-*

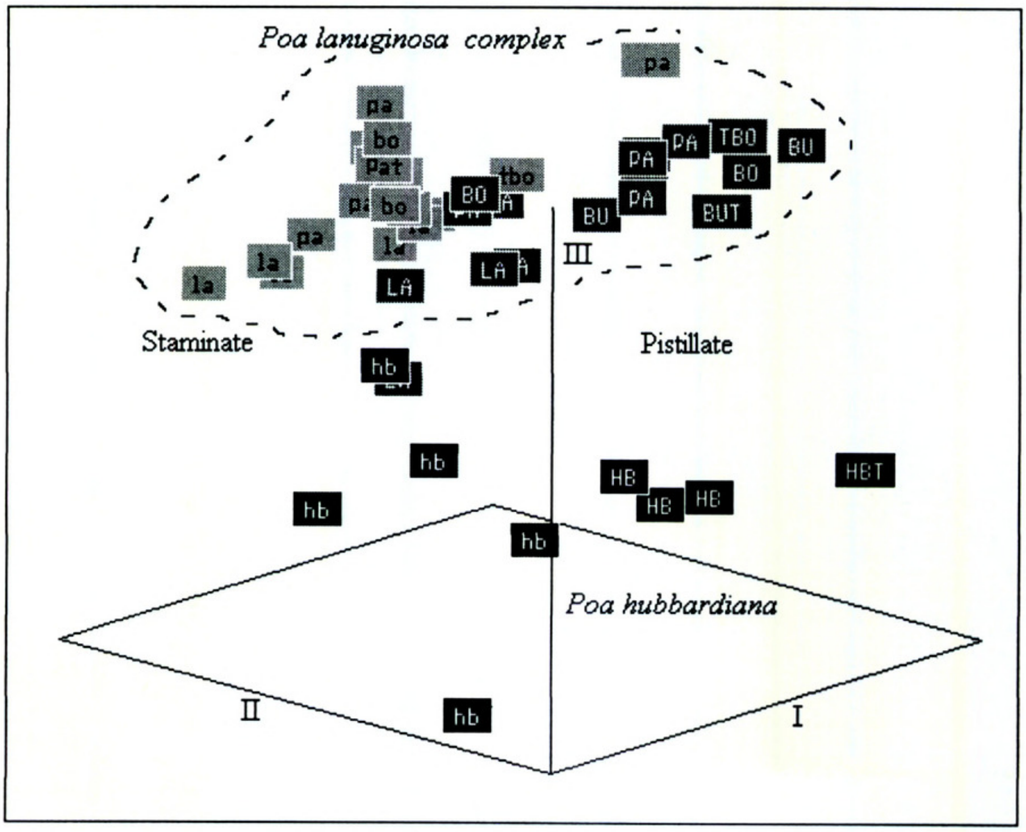


Figure 8. Third set of multivariate analyses. Plot of 43 individuals on the first three PCA axes: sexual dimorphism is clearly defined in *Poa hubbardiana* (HB) and the *P. lanuginosa* complex (BO, BU, LA, PA). See Figure 1 caption for explanation of labels.

bardiana and the *P. lanuginosa* complex, a new ordination analysis was performed on the 78 remaining specimens based on 43 morphological variables. One invariant character was excluded before performing PCA: groups of sclerenchyma cells at blade margins do not extend on abaxial and adaxial epidermis (CAP 1, see Appendix 3). The first five PCA axes explained 49% of total variability, with PCA distortion being low, $r_M = 0.91$.

OTU distribution on the first three axes showed a group of three caespitose species, *P. holciformis* Presl, *P. huecu* Parodi, and *P. indigesta* Parodi (Fig. 9). Specimens for those species principally associated with the positive end of axis I but the negative end of axis III. They are distinguished by their relatively long leaves and inflorescence, and relatively wide, thick blades. Spikelets, glumes, and florets are smaller than the same structures on the remaining species. Pistillate and staminate florets are glabrous.

Three species were independently analyzed: *P. holciformis*, *P. huecu*, and *P. indigesta*. These are recognized as single discrete entities on the first three PCA axes. *Poa indigesta* is the largest in size among the three taxa, and also has the longest, widest, and thickest leaves. *Poa holciformis* is differentiated from *P. huecu* by its longer spikelets, glumes, and florets, and wider blades. The first five components analyzed accounted for 59% of total variability, but their distortion was very low, with $r_M = 0.93$.

Discrimination among taxonomic entities. These previous three species were considered the a priori groups to discriminant analysis. Standardized coefficients of canonical variables revealed *P. indigesta* to present long blades, abundant cuticular prickles, and broad panicles. *Poa holciformis* is characterized by long lemmas and ligules. In contrast, *P. huecu*, at the opposite site, has shorter lemmas and more nerves on the first glume. Classification of specimens based on discriminant functions showed a good fit to data. One hundred percent of the specimens of a priori groups were included in *P. huecu* and *P. indigesta*, respectively. Eighty-three percent were correctly assigned to *P. holciformis*, but some specimens here associated with *P. huecu*.

FIFTH SET OF MULTIVARIATE ANALYSES

The *Poa denudata* and *Poa rigidifolia* Complexes. Upon the removal of *P. holciformis*, *P. huecu*, and *P. indigesta*, a new PCA involving the 54 remaining specimens and using 41 morpholog-

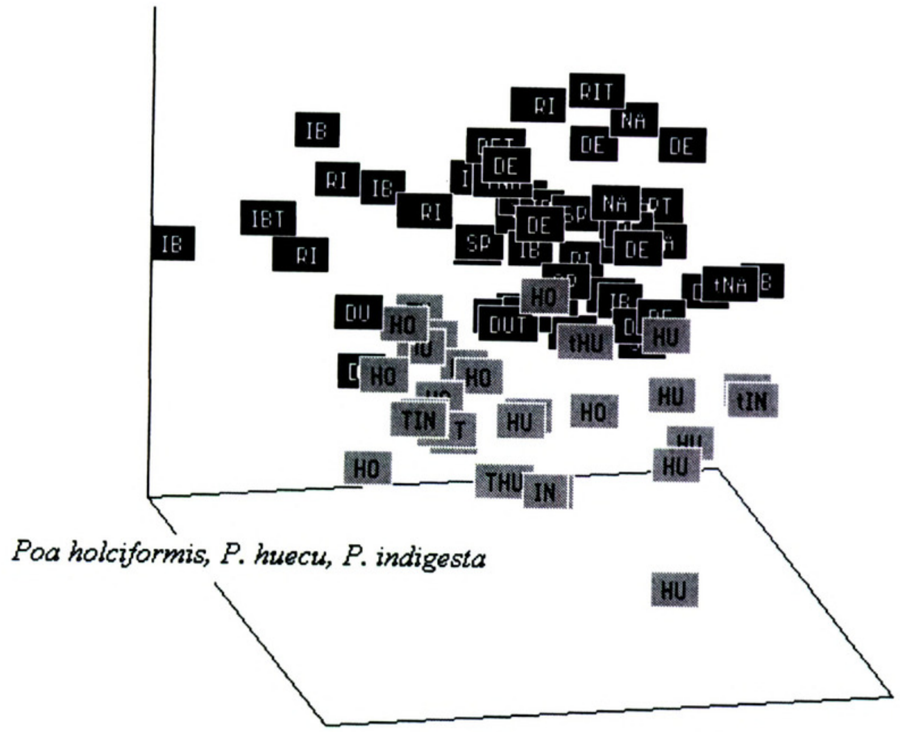


Figure 9. Fourth set of multivariate analyses. Plot of 78 individuals on the first three PCA axes showing *Poa holciformis, P. huecu,* and *P. indigesta,* clearly separated from the rest of species. See Figure 1 caption for explanation of labels.

ical variables was conducted. Three characters were excluded as invariant for the whole group. Apice blades are all navicular (API 1, see Appendix 3), viviparous florets are absent (FLOv 0), and all groups of sclerenchyma cells at blade margins do not extend on abaxial and adaxial epidermis (CAP 1). The first five principal components accounted for 50% of variance among specimens, yielding a low distortion for the analysis of $r_T = 0.91$.

Distribution of OTUs is represented on the first three principal components (Fig. 10). Specimens are gathered into two groups. The *Poa rigidifolia* complex (as defined by Giussani et al., 1996) consists of *P. dusenii* Hack., *P. ibari* Phil., and *P. rigidifolia* Steud. The *P. denudata* complex comprises *P. denudata* Steud. and *P. nahuelhuapiensis* Nicora. The *P. rigidifolia* complex principally associated with the negative end of axis I. This complex is distinguished by longer spikelets, glumes, and florets than seen in the *P. denudata* complex. Conversely, *P. denudata* and *P. nahuelhuapiensis* have longer leaves and inflorescences, wider blades, and more sclerenchyma girders on both sides of the vascular bundles. Minimum spanning tree or MST technique confirmed species groupings. This technique was performed because two specimens, the types of *P. dusenii* and *P. rigidifolia,* appeared isolated from their respective groups. Analysis of minimum distances among these OTUs showed relationship of the isolated types to the *P. rigidifolia* complex (Fig. 10).

Specimen ordination for only the *P. denudata* complex, *P. denudata* and *P. nahuelhuapiensis,* showed a clear dimorphism among pistillate and staminate individuals along the first three principal components. Pistillate specimens are characterized by hairy florets and longer leaves, inflorescences, and florets than staminate plants.

Discrimination among taxonomic entities. Specimens of both the *P. rigidifolia* and the *P. denudata* complexes were considered as a priori groups for DA and were characterized by analysis of standardized coefficients. The *P. denudata* complex presents long blades, large stomata, and broad panicles. Meanwhile, the *P. rigidifolia* complex presents long lemmas. Classification percentages showed a good fit between groups: 90% were included in the *P. denudata* complex, and 94% correctly classified into the *P. rigidifolia* complex.

UNIVARIATE AND BIVARIATE ANALYSIS

Previous analyses showed a phenetic pattern among dioecious species based on linear relationships, and it was possible to recognize complexes of similar species, as well as independent species.

Bivariate analysis revealed the correlation between different pairs of morphological and anatom-

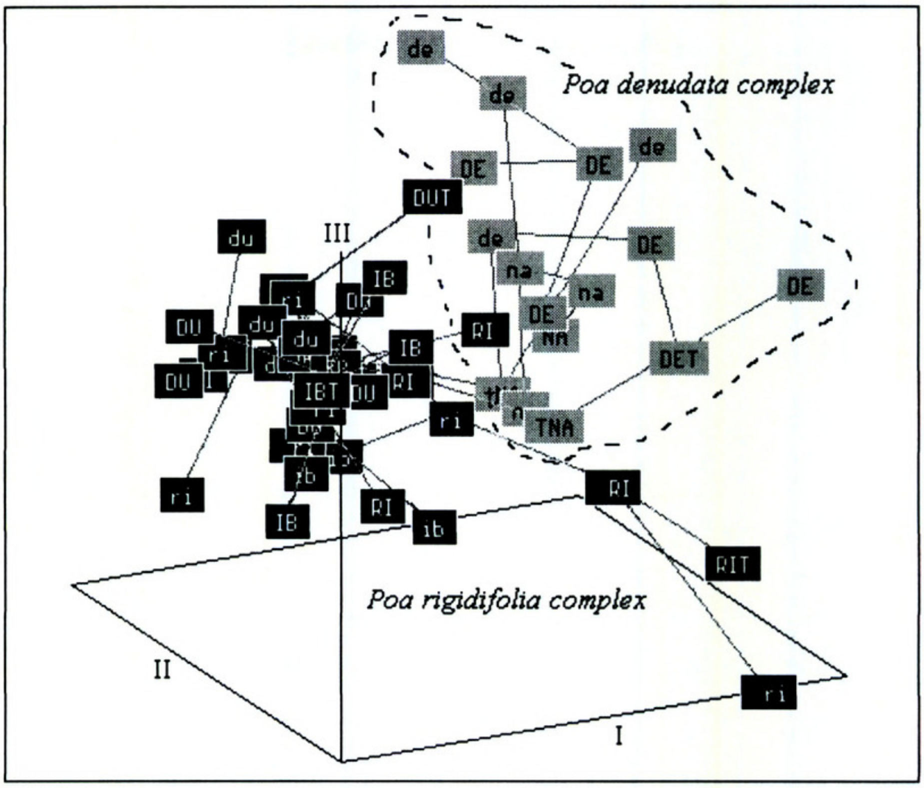


Figure 10. Fifth set of multivariate analyses. Plot of 54 individuals on the first three PCA axes and minimum total distances between individuals obtained from the minimum spanning tree represented by lines. The *Poa rigidifolia* complex is represented on black labels (DU, IB, RI), and the *P. denudata* complex is on gray labels (DE, NA). See Figure 1 caption for explanation of labels.

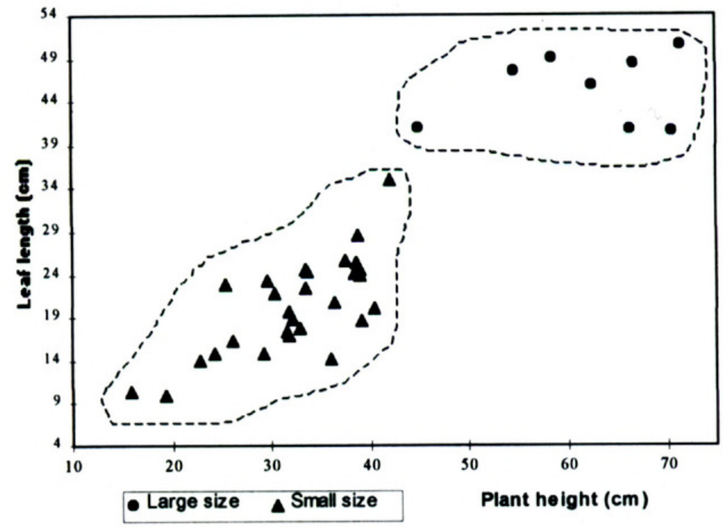
ical characters. Pairwise combinations were drawn for fertile characters (GLUle, GLUw, LEMle, LEMw, PALle, PALw, LODle, and LODw) as well as paired combinations of characters for relative plant sizes (LEAle, BLAle, SHEle, HEIG, PANle, PANn, PANw, BLAw, SCL2). All analyses showed linear relationships. Fertile characters are continuously distributed along the whole range of variation. In contrast, those characters for plant size present a conspicuous discontinuity between two main groups (Fig. 11). One of these main groups contains plants of large size including the *P. dolichophylla* complex (*P. stuckertii*, *P. iridifolia*, *P. pilcomayensis* var. *calamagrostoidea*, and *P. dolichophylla*), the *P. bergii* complex (*P. barrosiana* and *P. bergii* var. *bergii*), the *P. bonariensis* complex (*P. bonariensis*, *P. montevidensis*, and *P. patagonica* var. *neuquina*), and *P. indigesta*. Smaller plants distinguish the second group and include all remaining species.

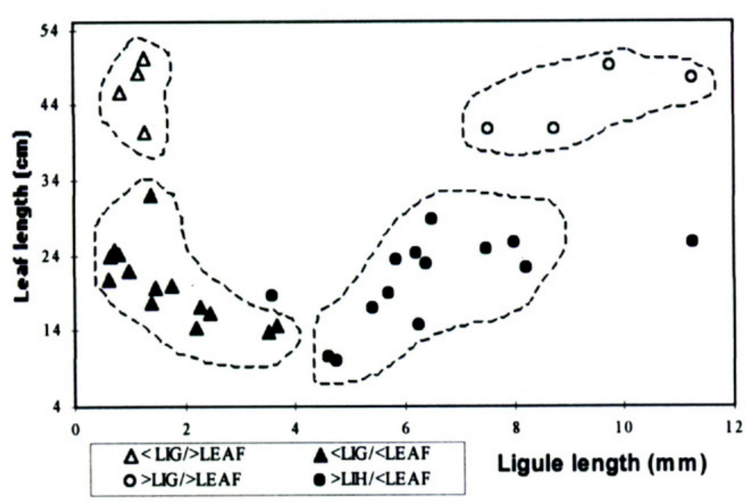
Another series of pairwise character combination showed a non-linear pattern of variation. Four taxonomic groupings are shown in Figure 12 and are based on the relation between ligule length and leaf length. One group includes species with short ligules but long leaves; a second species group, by contrast, has short ligules and short leaves. A third group combines species with both long ligules and long leaves. Finally, a fourth group consists of species with long ligules but short leaves. A similar grouping pattern was observed from the relationship between ligule length and any other character related to plant size (LEAle, BLAle, SHEle, HEIG, PANle, PANn). Another important character combination involves leaf length and stomata size (Fig. 13). Here, groups of species assembled according to: (1) small stomata but long leaves, (2) large stomata and long leaves, (3) large stomata but short leaves, and (4) short leaves but stomata of medium size.

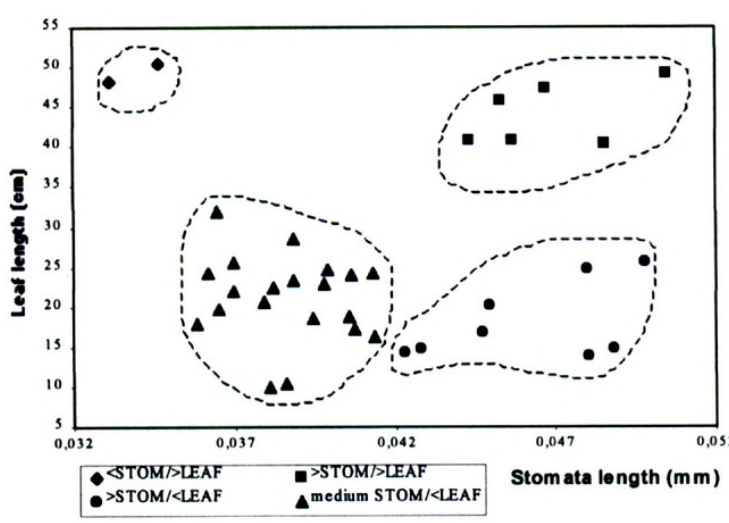
Univariate analysis considered the average (for quantitative variables) or mode (for discrete variables) for all complexes and individual species, as well as pistillate and staminate specimens, separately. Sexual dimorphism was noted on fertile characters related to spikelet, glume, and floret, as well as floret hairiness. Table 1 shows a list of selected characters representing the range of variation among complexes and species, as well as sexual dimorphism within entities.

Discussion

Taxonomic problems within *Poa* were accurately expressed by Bor (1952: 7–8), and his words re-







Figures 11–13. Bivariate analyses showing different patterns of morphological variation. —11 (top). Linear correlation pattern: plant height vs. leaf length. —12 (middle). Non-linear correlation pattern: ligule length vs. leaf length. —13 (bottom). Non-linear correlation pattern: stomata length vs. leaf length.

main relevant, as emphasized by more recent authors (Vickery, 1970; Soreng, 1990):

> "The systematic treatment of the species . . . is one of the most bewildering and difficult of taxonomic studies. While many species are clear-cut and can be recognized at a glance, there are groups of species about which one can only conclude that their evolutionary history has been so complex that they do not lend themselves to systematic treatment by present taxonomic methods. One cannot rely upon a single character to separate species in such groups, but combinations of more or less variable characters must be used. . . ."

This study of *Poa* sect. *Dioicopoa* utilized multivariate taxonomic techniques, as well as univariate and bivariate analyses, to better understand the morphological variation pattern—a different methodology from traditional taxonomic treatments. Analyses of both pistillate and staminate specimens denote complexes of species of great similarity, but it was also possible to clearly recognize some valid species. A multivariate key for identification among taxonomic entities of *Poa* sect. *Dioicopoa* was produced (see key herein).

Identification of varieties for three species analyzed here could not be supported. Thus, *Poa bergii* and *P. bergii* var. *chubutensis*, *P. patagonica* and *P. patagonica* var. *neuquina*, and *P. pilcomayensis* and *P. pilcomayensis* var. *calamagrostoidea* did not group together by similarity and were either included in different species complexes or maintained as independent entities. *Poa bergii* was grouped with *P. barrosiana* in a *P. bergii* complex, while its variety *P. bergii* var. *chubutensis* associated differently within the *P. lanuginosa* complex. *Poa patagonica* was more similar to species of the *P. lanuginosa* complex than to its variety *P. patagonica* var. *neuquina*, which clustered within the *P. bonariensis* complex. Finally, *P. pilcomayensis* was recognized as independent, while its variety *P. pilcomayensis* var. *calamagrostoidea* related to a *P. dolichophylla* complex.

Poa schizantha, a particular case within *Poa* sect. *Dioicopoa*, has been found only twice, and appears restricted to the dunes of Monte Hermoso, Argentina (Parodi, 1940). It is recognized by present results as a single species, related to the *P. bergii* complex. The three species (*P. barrosiana*, *P. bergii*, and *P. schizantha*) were found in similar environments and geographic areas. However, *P. schizantha* is clearly distinguished by a particular bilobed lemma, an interrupted panicle, and a different anatomical blade structure; among other characters, it lacks a well-developed midrib and bulliform cells. These features could originate by hybridization or odd mutation. Possibly, its offspring had low fertility and, whatever the case, it has never been collected again.

Plant stature of less than versus greater than 50 cm was a significant criterion by which to discriminate species within *Poa* sect. *Dioicopoa*. Plant height correlates with characters such as leaf blade and sheath length, panicle length, and number of nodes per panicle (Fig. 11). Other characters, of no linear variation, also address species discontinuities. Ligule length divides *Poa* sect. *Dioicopoa* into those species with short ligules (less than 2(–3) mm) and those with long ligules (more than (3–)4 mm).

Plant habit did not show, despite traditional treatments (Parodi, 1936; Torres, 1969, 1970; Nicora, 1978), a clear pattern of variation, nor any character correlation that could clarify the taxonomic structure within *Poa* sect. *Dioicopoa*. Some species could be differentiated only by the presence or absence of a rhizome. For example, species of the *P. resinulosa* complex, *P. pedersenii* and *P. resinulosa*, are caespitose, while *P. buchtienii* and *P. calchaquiensis* are rhizomatous. Parodi (1936) suggested that the rhizome is systematically valuable, dividing *Poa* sect. *Dioicopoa* by rhizomatous and caespitose habits. Later, Hunziker (1978) observed that crossings of rhizomatous and caespitose species of *Poa* produced fertile offspring, although the pattern of inheritance depended on the species that were crossed. Therefore, it remains preferable to group otherwise similar rhizomatous and caespitose species in the same taxonomic complex.

Sexual dimorphism was the principal source of variation within species and taxonomic complexes of *Poa* sect. *Dioicopoa*. Thus, it was necessary to establish ranges of variation for reproductive characters in pistillate and staminate specimens separately. Sizes of spikelets, glumes, and florets, as well as hairiness of florets, indicated major differences between pistillate and staminate plants. Traditionally, hairiness of the pistillate anthoecium was considered a useful discriminant character (Torres, 1970; Nicora, 1978). Since staminate florets are usually glabrous, it was not possible to investigate interspecific limits based on similar characters from staminate specimens. This study showed a great variation in hairiness of pistillate florets within, and among, analyzed groups. Therefore, these characters are less informative for interspecific variability. Callus hairiness on pistillate florets could be a synapomorphy for the whole genus or part of it (Kellogg, 1990), and is also valueless for interspecific variation. The absence of hairs on pistillate florets occurs only in *P. huecu*, *P. holciformis*, and *P. indigesta*. Both pistillate and staminate anthoecia in

Table 1. Morphological variation of species of *Poa* sect. *Dioicopoa* characterized by vegetative and reproductive characters. Median and standard deviation between parentheses for quantitative characters. Mode, and minimum and maximum values are between parentheses for variable discrete characters. Pi corresponds to number of pistillate specimens analyzed per species; St to number of staminate specimens. Character abbreviations as in Appendix 3.

Taxa	Leaf length (LEAle)	Ligule length (LIGle)	Plant height (HEIG)	Panicle length (PANle)	Nodes/ Panicle (PANn)	Blade width (BLAw)	Stomata length (STOM)
Poa alopecurus	24	6	34	7.2	10	1.3	0.042
(Pi = 22, St = 8)	(± 9.86)	(± 2.2)	(± 16.11)	(± 2.28)	(6–15)	(± 0.35)	(± 0.0055)
P. bergii	48.3	10.4	56.9	15.9	15	1.3	0.049
(Pi = 16, St = 11)	(± 14.92)	(± 3.48)	(± 14.46)	(± 5.1)	(11–20)	(± 0.44)	(± 0.0051)
P. bonariensis	42.7	1.1	67.1	16.3	13	1.3	0.047
(Pi = 14, St = 11)	(± 13.42)	(± 0.61)	(± 20.59)	(± 4.13)	(10–18)	(± 0.29)	(± 0.0044)
P. denudata	16.7	2.4	28.9	6.5	11	0.8	0.041
(Pi = 8, St = 8)	(± 7.06)	(± 1.61)	(± 6.29)	(± 1.81)	(9–14)	(± 0.18)	(± 0.055)
P. dolichophylla complex	49.2	1.2	69.3	20.4	17	3.4	0.034
(Pi = 23, St = 18)	(± 18.57)	(± 0.66)	(± 19.56)	(± 5.85)	(11–20)	(± 0.98)	(± 0.0028)
P. holciformis	16.2	5.7	29.2	7.6	10	1.3	0.044
(Pi = 8, St = 4)	(± 7.68)	(± 2.35)	(± 14.31)	(± 3.3)	(7–14)	(± 0.28)	(± 0.0044)
P. hubbardiana	30.9	1.1	37.3	9.1	11	1	0.036
(Pi = 4, St = 5)	(± 11.62)	(± 0.41)	(± 13.51)	(± 2.57)	(8–13)	(± 0.21)	(± 0.0051)
P. huecu	18.8	5	34.5	8.7	12	1.1	0.040
(Pi = 6, St = 3)	(± 8.32)	(± 2.2)	(± 11.94)	(± 1.02)	(10–16)	(± 0.17)	(± 0.0049)
P. indigesta	40.8	7.9	57.6	18.5	15	1.5	0.048
(Pi = 2, St = 1)	(33.5–48.0)	(6.3–8.7)	(40–71.7)	(11.5–29)	(15–20)	(1.11–1.76)	(0.042–0.046)
P. lanigera	24.3	0.7	36.2	9.2	13	1.5	0.040
(Pi = 5, St = 5)	(± 10.56)	(± 0.28)	(± 13.48)	(± 2.87)	(10–18)	(± 0.46)	(± 0.0039)
P. lanuginosa	25	7.8	38	10.3	13	0.9	0.048
(Pi = 20, St = 14)	(± 10.21)	(± 3.19)	(± 15.44)	(± 4.11)	(9–18)	(± 0.22)	(± 0.0048)
P. ligularis	22.6	7.4	29.8	7.3	12	0.7	0.038
(Pi = 12, St = 9)	(± 14.78)	(± 3.01)	(± 12.34)	(± 3.22)	(7–20)	(± 0.31)	(± 0.0037)
P. pilcomayensis	21.3	0.8	33.3	9.3	8	0.9	0.037
(Pi = 5, St = 5)	(± 8.25)	(± 0.41)	(± 10.43)	(± 4.26)	(8–14)	(± 0.31)	(± 0.003)
P. pogonantha	16.5	2	37.7	7	8	1	0.043
(Pi = 14, St = 9)	(± 6.58)	(± 1.08)	(± 16.37)	(± 2.32)	(6–12)	(± 0.30)	(± 0.0049)
P. resinulosa complex	18.8	1.4	32.3	7.9	12	0.79	0.036
(Pi = 19, St = 20)	(± 12.39)	(± 1.01)	(± 17.71)	(± 4.23)	(8–16)	(± 0.22)	(± 0.0042)
P. rigidifolia	9.7	4.7	17.2	4.3	9	0.7	0.037
(Pi = 23, St = 15)	(± 6.17)	(± 1.95)	(± 8.68)	(± 1.79)	(6–14)	(± 0.17)	(± 0.0056)
P. schizantha	28.1	7.3	38.7	20.5	13	0.8	0.038
(Pi = 5, St = 1)	(± 6.45)	(± 2.31)	(± 6.94)	(± 6.57)	(9–13)	(± 0.26)	(± 0.0028)
P. tristigmatica	14	3.6	26	6.5	10	1.6	0.048
(Pi = 14, St = 9)	(± 5.57)	(± 2.15)	(± 10.65)	(± 1.78)	(7–12)	(± 0.38)	(± 0.0048)

these three species are completely glabrous. This absence of hairs in these taxa could represent a loss with respect to the evolution of the entire genus, as suggested by Kellogg (1990) for other species of *Poa*. Pistillate anthoecia of *P. hubbardiana* are remarkably hairy, and clearly differentiated from other species. Its woolly hairs on the floret callus are numerous, long, and folded, while hairs on and between palea and lemma nerves are curled, and twice or three times longer than those seen in other species.

Out of the 34 species analyzed, only 8 were discriminated by numerical taxonomic methods: *Poa holciformis*, *P. hubbardiana*, *P. huecu*, *P. indigesta*, *P. lanigera*, *P. ligularis*, *P. pilcomayensis*, and *P. schizantha*. The remaining species showed congruent morphologies, aggregating into species complexes by phenetic similarities. Any hierarchical assignment to taxonomic varieties was not consistent with current species alignments. The validity of species assorting into complexes remains controversial. For classification purposes, a species comprises a taxonomic grouping of pistillate and staminate specimens of sympatric populations, sharing

Table 1. Extended.

Glume length (GLUle)		Lemma length (LEMle)		Hairs on callus (HAIcal)		Hairs on nerves (HAInrv)	
Pistillate	Staminate	Pistillate	Staminate	Pistillate	Staminate	Pistillate	Staminate
6.8	6	7.5	7	4	4	2	1
(± 1.16)	(± 1.27)	(± 0.98)	(± 1.42)	(0–4)	(0–4)	(0–3)	(0–3)
8	5	8	6	4	0	3	0
(± 1.25)	(±1.00)	(± 0.99)	(± 0.95)	(0–4)	(0–3)	(0–3)	(0–1)
4.3	3.2	5.3	4	4	4	3	0
(± 0.62)	(± 0.48)	(± 0.74)	(± 0.25)		(0–4)	(2–3)	(0–2)
4.3	3.6	5.3	4.5	4	0	2	0
(± 0.73)	(± 0.39)	(± 0.48)	(± 0.33)	(0–4)	(0–4)		(0–2)
3.4	2.9	4.1	3.6	4	0	2	0
(± 0.72)	(± 0.78)	(± 0.68)	(± 0.53)	(0–4)	(0–4)	(2–3)	(0–1)
4.7	3.7	5.4	4.7	0	0	0	0
(± 0.69)	(± 0.72)	(± 0.77)	(± 0.86)				
5.8	4.2	6.6	5	4	4	3	0
(± 1.31)	(± 0.51)	(± 1.35)	(± 0.23)		(0–4)		(0–3)
3.4	2.8	4.1	4.1	0	0	0	0
(± 0.67)	(± 0.70)	(± 0.63)	(± 0.68)				
3.7	2.5	4.5	3	0	0	0	0
4.2	3.2	5.3	3.8	4	0	3	2
(± 0.37)	(± 0.43)	(± 0.53)	(± 0.42)		(0–4)	(2–3)	(0–2)
5.1	3.8	5.8	4.7	4	4	3	0
(± 1.03)	(± 0.71)	(± 0.99)	(± 0.61)	(0–4)	(0–4)	(2–3)	(0–2)
3.6	2.7	4.8	3.4	4	0	3	0
(± 0.67)	(± 0.35)	(± 0.83)	(± 0.24)		(0–4)	(2–3)	
2.9	2.5	4.1	3.4	4	4	2	0
(± 0.37)	(± 0.51)	(± 0.51)	(± 0.46)		(0–4)		(0–1)
6	5.6	7	6	2	0	2	0
(±0.79)	(± 1.28)	(± 1.12)	(± 0.59)	(0–4)	(0–3)	(1–2)	(0–2)
3	2.4	4	3.3	4	0	3	0
(± 0.71)	(± 0.42)	(± 0.79)	(± 0.43)	(0–4)	(0–4)	(0–3)	(0–2)
5.1	4.9	5.9	5.6	4	0	2	0
(± 0.95)	(± 0.82)	(± 0.79)	(± 0.85)	(0–4)	(0–3)	(2–3)	(0–2)
5.7	4.1	6.6	5	2	0	0	0
(±1.32)		(± 1.51)				(0–2)	
5.5	4.5	6.7	5.4	2	0	2	0
(± 0.86)	(± 0.69)	(± 0.97)	(± 0.83)	(0–4)	(0–4)	(1–2)	(0–1)

similar variation pattern for several characters, not a single one. In general, morphological variation presents clear discontinuities identifying species. Moreover, the predominant variation pattern of a species is clearly associated with sexual dimorphism. Morphological variation within only pistillate plants or staminate specimens, correlated with environmental factors, appears significant only at the infraspecific level. By these criteria, sympatric species of *Poa* sect. *Dioicopoa* within the same taxonomic complex are synonymized herein. One new variety of *P. rigidifolia* is further proposed based on sexual dimorphism associated with environmental discontinuities. Precise ranges of morphological and anatomical variation are established herein and also correspond to Giussani (1997).

Taxonomic Treatment

Poa alopecurus (Gaudich. ex Mirb.) Kunth, Revis. Gramin. 1: 116. 1829. *Arundo alopecurus* Gaudich. ex Mirb., Ann. Sci. Nat., Bot. 5: 100: 1825. TYPE: Falkland Islands, East Falkland: Port Louis, 14 Feb.–28 Apr. 1820, *C. Gaudichaud s.n.* (holotype, P not seen, isotype, US 78849 [fragment ex P] not seen).

Poa shuka (Speg.) Parodi, Revista Argent. Agron. 20(4): 180. 1953. *Festuca shuka* Speg., Anales Mus. Nac. Hist. Nat. Buenos Aires 5: 95. 1896. TYPE: Argentina. Tierra del Fuego e Is. del Atlántico Sur: Ushuaia, Isla de los Estados, Port Vancouver, Blossom Bay, *C. Spegazzini s.n.* (holotype, LPS 14322 not seen; isotype, LP!).

Poa superbiens (Steud.) Hauman & Parodi, Physis (Buenos Aires) 9: 344. 1929. *Aira superbiens* Steud., Syn. Pl. Glumac. 1: 424. 1854. TYPE: Chile. Magallanes: Sandy Point, Dec., *W. Lechler 1194* (holotype, P not seen; isotype, BAA fragment!, US 2695872 ex Hb. Cosson P not seen, US 76311 ex W not seen).

This species inhabits the southern portion of Patagonia, covering western and southern regions of Santa Cruz, western areas of Tierra del Fuego e Islas del Atlántico Sur, Argentina, as well as boundary zones of XII Región, Chile.

Poa bergii Hieron., Bol. Acad. Nac. Ci. 3: 374. 1879. TYPE: Argentina. Río Negro: boca de Río Negro, *C. Berg 205* (holotype, CORD!).

Poa barrosiana Parodi, Physis (Buenos Aires) 11: 134. 1932. TYPE: Argentina. Buenos Aires: Miramar, 31 Jan. 1930, *L. R. Parodi 9820* (holotype, BAA!; isotype, US 89694 not seen).

Poa bergii inhabits costal dunes of Buenos Aires and Río Negro provinces, Argentina. It may extend to similar habitats in Uruguay and Brazil.

Poa bonariensis (Lam.) Kunth, Revis. Gramin. 1: 115. 1829. *Festuca bonariensis* Lam., Tabl. Encycl. 1: 192. 1791. TYPE: Argentina. E. Bonaria Circa Monte-Video, inter rupes et maritimas, 1767, *E. Commerson s.n.* (holotype, P not seen; US 2875384 ex P not seen; isotype, BAA fragment!).

Poa montevidensis Arechav., Anales Mus. Nac. Montevideo 1: 479. 1897. TYPE: Uruguay. Montevideo: en parajes húmedos, Nov., *Arechavaleta 5101* (lectotype, designated by Parodi (1936), MVM not seen; isolectotype, fragment LP!, type photo, LP!).

Poa patagonica Phil. var. *neuquina* Nicora, Hickenia 1(18): 107. 1977. TYPE: Argentina. Neuquén: Departamento Lácar, San Martín de los Andes, *A. Ruiz Leal 20315* (holotype, BAA!).

Distributed in the northeastern Buenos Aires province, this species reaches its southern limit at the system of Tandilia and Sierras Australes. It extends to the north and east, into southern Entre Ríos, Uruguay, and Brazil. One of its synonyms, *P. patagonica* var. *neuquina,* was found in a Ciprés forest near San Martín de Los Andes, Neuquén, disjunct from its main area of distribution.

Poa denudata Steud., Syn. Pl. Glumac. 1: 259. 1854. TYPE: Chile. Valdivia, *W. Lechler 578* (holotype, LE not seen; pistillate fragment, BAA!; isotype, US not seen).

Poa nahuelhuapiensis Nicora, Hickenia 1(18): 106. 1977. TYPE: Argentina. Neuquén: Departamento Los Lagos, Península Quetrihué, 1 Nov. 1949, *O. Boelcke & J. H. Hunziker 3458* (holotype, BAA!).

Poa denudata grows in western Neuquén, Río Negro, and Chubut, Argentina, and along the Chilean boundary in Regions VIII to X (Toledo & Zapater, 1991), near lake margins, among rocks, or in grasslands below elevations of 1000 m.

Poa lanuginosa Poir., Encycl. 5: 91. 1804. TYPE: Uruguay. Montevideo: *E. Commerson s.n.* (holotype, P not seen; fragment BAA!, US 88769 fragment ex P not seen).

Poa bergii Hieron. var. *chubutensis* Speg., Revista Fac. Agron. Univ. Nac. La Plata 3: 628. 1897. TYPE: Argentina. Chubut: Departamento Florentino Ameghino, Cabo Raso, *C. Spegazzini 938* (holotype, LP not seen; fragment BAA!).

Poa boecheri Parodi, Revista Argent. Agron. 28: 100. 1961 [1962]. TYPE: Argentina. Mendoza: Departamento San Rafael, Valle del Atuel, El Sosneado, 35° lat. S, 4 Oct. 1955, *T. W. Böcher, J. P. Hjerting & K. Rahn 801* (holotype, BAA!; isotype, C not seen).

Poa patagonica Phil., Anales Univ. Chile 94: 168. 1896. TYPE: Chile. Departamento Ultima Esperanza, Lago Pinto, 11 dic. 1877, *H. Ibar s.n.* (holotype, SGO not seen; fragment BAA!, US 88748 fragment ex SGO not seen).

Poa lanuginosa is a widespread species, distributed in Argentina from 35°S to the steppes in Tierra del Fuego. It grows in highly degraded soils, and on dunes and sandy soils in Patagonia.

Poa pogonantha (Franch.) Parodi, Revista Argent. Agron. 20: 180. 1953. *Festuca pogonantha* Franch., Miss. Sci. Cape Horn, Bot. 5: 387. 1889. TYPE: Argentina. Patagonia, Port Eden, 24 Jan. 1879, *Savatier 1844* (holotype, P not seen, fragment ex P, BAA!; isotype, US s.n. fragment and photo ex P not seen).

Poa prichardii Rendle, J. Bot. 42: 324. 1904. TYPE: Argentina. Santa Cruz: Lago Argentino, Monte Buenos Aires, 1900–1, *H. Prichard s.n.* (holotype, BM not seen; fragment BAA!).

This species occurs in humid forests of Río Negro, Chubut, Santa Cruz, and Tierra del Fuego, Argentina (Nicora, 1978), and in the XII Region of Chile (Toledo & Zapater, 1991). This area is included within the Subantarctic phytogeographic province (Cabrera & Willink, 1973; Cabrera, 1994).

Poa rigidifolia Steud. var. **rigidifolia,** Syn. Pl. Glumac. 1: 260. 1854. TYPE: Argentina. Tierra del Fuego e Is. del Atlántico Sur: Islas Malvinas, Is. Soledad, Pto. William, Sep. 1850, *W. Lechler s.n.* (holotype, P not seen; fragment BAA!, US 88734 fragment not seen).

Due to the results obtained in this research, the *P. rigidifolia* complex is considered a single taxonomic species. Two varieties are proposed in agreement with the previous study of Giussani et al. (1996). Pistillate individuals of each variety showed a different pattern of variation to that present in staminate specimens, although correlation between morphology and environment was high for both pistillate and staminate plants. *Poa rigidifolia* var. *rigidifolia* includes *P. spiciformis* (Steud.) Hauman & Parodi (= *P. poecila* Phil., Giussani, 1993), previously synonymized by Giussani and Collantes (1997). It is distinguished by the woolly hairs on the floret callus but an absence of hairs between the palea and lemma nerves on pistillate florets, thinner blades, longer sheaths, ligules, and blades, and smaller stomata than pistillate specimens of *P. rigidifolia* var. *ibari.*

Poa rigidifolia var. **ibari** (Phil.) Giussani, comb. et stat. nov. Basionym: *Poa ibari* Phil., Anales Univ. Chile 94: 170. 1896. TYPE: Chile. Departamento Ultima Esperanza, Lago Pinto, Jan. 1844, *H. Ibar s.n.* (holotype, SGO not seen; isotype, BAA!).

Poa dusenii Hack., in Dusén, Ark. Bot. 7(2): 8. 1908. TYPE: Argentina. Santa Cruz: Mazaredo portum, 47°41′S, Jan. 1905, *Dusén 5318* (holotype, W not seen; fragment BAA!; isotypes, US 89702 not seen, US 1161178 not seen).

Poa rigidifolia var. *ibari* is characterized by not having woolly callus hairs on the floret callus but having them on, and between, principal palea and lemma nerves of pistillate florets.

Further treatment of morphological and environmental variation within *P. rigidifolia* and a discussion of character assessment can be found in Giussani and Collantes (1997). *Poa rigidifolia* inhabits steppes of Chubut, Santa Cruz, and Tierra del Fuego, and similar environments in neighboring Chile. *Poa rigidifolia* var. *rigidifolia* is present in subhumid austral areas, whereas *P. rigidifolia* var. *ibari* grows in more xeric environments (Giussani et al., 1996; Giussani & Collantes, 1997).

Poa tristigmatica E. Desv., in Gay, Fl. Chil. 6: 419. 1853. SYNTYPES: Chile. Magallanes, Cordillera de Talcarengue, Feb. 1831, *Gay 49* (P not seen; fragment, BAA!, US 88717 fragment not seen); Bahía Duclos, Estrecho de Magallanes, *Commerson s.n.* (P not seen).

Poa boelckei Nicora, Hickenia 1(18): 104. 1977. TYPE: Argentina. Neuquén: Departamento Lácar, Chapelco, encima del refugio, 1800–1870 m, 23 Feb. 1974, *M. N. Correa et al. 5926* (holotype, BAB!).

Poa tristigmatica is found in Chile and in Argentina from Mendoza to Tierra del Fuego. Its distributional area falls within the Altoandina phytogeographic province (Cabrera & Willink, 1973; Cabrera, 1994), ranging from 1600 to 2000 m in Neuquén, and at 500 m, or higher, at the highest-latitude areas of Tierra del Fuego. *Poa boelckei* was collected only in Cerro Chapelco at approximately 1800 m.

For the remaining *P. dolichophylla* and *P. resinulosa* complexes, species show allopatric distribution, and a study of population variability and their ecological relationship is required to resolve taxonomic problems. In addition, types of older named taxa, particularly those of Philippi, need to be studied. For this reason, synonymy has not yet been established.

However, the *P. dolichophylla* complex is well segregated from other species within *Poa* sect. *Dioicopoa.* Species distributions are clearly distinct biogeographically. *Poa dolichophylla* and *P. pilcomayensis* var. *calamagrostoidea* inhabit Sistema de Cumbres Calchaquíes-Aconquija-Famatina in northwestern Argentina (González Bonorino, 1958). *Poa stuckertii* is restricted to central Argentina, on hills of Córdoba and San Luis, reaching 1500 m. This taxon is associated with lowland humid soils. *Poa iridifolia* occurs in the Sierras Australes and Tandilia, in Buenos Aires, Argentina (González Bonorino, 1958).

Species of the *P. resinulosa* complex are morphologically similar but inhabit disjunct areas. *Poa resinulosa* grows in central Argentina, between 30° and 45°S, in steppes, on stony, dry soils (Nicora, 1978), and in the Sierras de Tandil and Ventana, in Buenos Aires. *Poa pedersenii* was only collected in Yhu, Paraguay. *Poa calchaquiensis* grows in the Argentinian Puna (the southern extreme of the Peruvian–Bolivian Altiplano) in Jujuy, Salta, Tucumán, and La Rioja and could also be spread over Catamarca. *Poa buchtienii* is distributed on the Altiplano and the Cordillera Oriental of Bolivia.

Morphological variation of both complexes must be addressed by populational and biological studies to better resolve the degree of similarities and taxonomic boundaries among these species complexes within *Poa* sect. *Dioicopoa*.

Multivariate Key: Classification of the Dioecious Species of Argentina

Diagnostic characters for taxa were selected according to the results of univariate, bivariate and multivariate analyses to generate an identification key. Because most diagnostic characters are quantitative, and ranges of variation usually overlap among entities, this key is based on suites of correlated characters, increasing the accuracy of identification.

Thus, this multivariate key is not a conventional key. It presents several measures for character variation: the frequent range of variation and, between parentheses, the average or mode value (for quantitative or discrete variables, respectively) as well as the minimum and maximum values found within the group. Species identification must be principally guided through the frequent range of variation (numbers in bold); the average or mode shows the most representative value for a species or sample; the minimum and maximum values indicate the largest range observed.

To identify dioecious species of *Poa*, it is desirable to have in hand both pistillate (Pi) and staminate (St) specimens of the population examined. When only a pistillate specimen is available, gynodioecious species from *Poa* subg. *Andinae* Nicora cannot be excluded.

1. Plants **45–80 cm tall** (64 (31–136)); leaves **35–70 cm long** (46.7 (14–93)); blades **20–40 cm long** (28.2 (8–61)); sheaths **12–28 cm long** (18.4 (5.5–39)); panicles **13–25 cm long** (18.4 (6–37)); nodes per panicle, **13–18** (16 (10–20)) 2

1′. Plants **15–55 cm tall** (32.4 (4.3–75)); leaves **5–35 cm long** (20.5 (3.5–54.5)); blades **5–20 cm long** (12.8 (1.3–37)); sheaths **4–12 cm long** (7.6 (1.7–22)); panicles **5–13 cm long** (8.6 (1.7–29)); nodes per panicle, **9–13** (11 (6–20)) 6

2(1). Ligules truncate to obtuse, **0.6–2 mm long** (1.2 (0.4–4.5)); panicle **2.5–6 cm wide** (4 (0.8–10)); abaxial sclerenchyma girders, **1–3** (5) 3

2′. Ligules acuminate, **6–12 mm long** (6.6 (4.5–19.6)); panicle **1.5–3 cm wide** (2.5 (1–4.5)); abaxial sclerenchyma girders: **3–7** 4

3(2). Plants caespitose, iridaceous, laterally compressed with coriaceous sheaths, and wide open panicles at maturity. Leaf blades flat and carinate, **3.5–8 mm wide** (6.6 (1.8–13)). Glume I, **1-nerved; pistillate (Pi) and staminate (St) glumes 2.5–4 mm long** (3.2 (1.4–5.2)), **0.4–0.7 mm wide** (0.6 (0.3–0.8)). Pistillate and staminate lemmas **3–4.5 mm long** (4 (2.5–5)), **0.7–0.9 mm wide** (0.8 (0.6–1.1)). Pistillate and staminate paleas **2.5–3.5 mm long** (3 (2–3.8)), **0.45–0.65 mm wide** (0.5 (0.35–0.8)). Keel and marginal nerve hairs of pistillate florets, when present, less than 0.5 mm long. Sclerenchyma girders at both sides of each vascular bundle: **15–35** (23 (6–45)); sclerenchyma cell groups at blade margin, extending on abaxial and adaxial epidermis. Stomata infrequent on abaxial epidermis, **0.03–0.037 mm long** (0.034 (0.027–0.042)) .... *Poa dolichophylla* complex

3′. Plants rhizomatous, not laterally compressed, with herbaceous sheaths, panicles contracted to somewhat open at maturity. Leaf blades conduplicate, **2–3.5 mm wide** (2.7 (1.2–4)). Glume I, **1–3-nerved, Pi: 3.7–5 mm long** (4.3 (3.4–5.4)), **St: 2.8–3.7 mm long** (3.2 (2.6–4)); **Pi and St, 0.6–0.8 mm wide** (0.7 (0.6–0.9)). Lemmas, **Pi: 4.5–6 mm long** (5.3 (4–6.7)), **St: 3.8–4.2 mm long** (4 (3.7–4.5)); **Pi and St, 0.85–1.1 mm wide** (1 (0.8–1.3)). Paleas, **Pi: 3.4–4.2 mm long** (3.8 (3–4.6)), **St: 3.1–3.6 mm long** (3.4 (3–4)); **Pi and St: 0.6–0.7 mm wide** (0.65 (0.5–0.9)). Keel and marginal nerve hairs of pistillate florets more than 0.5 mm long. Sclerenchyma girders at both sides of each vascular bundle: **6–12** (9 (5–15)); sclerenchyma cell groups at blade margin, not extending on abaxial and adaxial epidermis. Stomata infrequent on adaxial epidermis. Stomata frequent on adaxial epidermis, **0.042–0.050 mm long** (0.047 (0.037–0.054)) .... *Poa bonariensis*

4(2). Plants with long and deep rhizomes. Pistillate and staminate spikelets **5- to 6-flowered, 5.5–11 mm long** (7.9 (4.3–12)), **3–8 mm wide** (5.1 (2.2–10)). Glume I, **3–5-nerved; Pi: 4–9 mm long** (6.5 (3.6–10)), **St: 3–6 mm long** (4.4 (2.8–7)); **Pi and St: 0.7–1.45 mm wide** (1 (0.6–1.7)). Lemmas, **Pi: 5–9 mm long** (6.9 (4.2–10), **St: 4–7 mm long** (5.4 (3.9–8)); **Pi and St: 0.9–1.6 mm wide** (1.3 (0.7–2.2)). Paleas **Pi: 4–6 mm long** (4.8 (3.3–6.7)), **St: 3–5.3 mm long** (4.2 (3–6.3)); **Pi and St: 0.8–1.3 mm wide** (0.96 (0.5–1.8)) 5

4′. Plants caespitous. Pistillate and staminate spikelets **3-flowered; Pi: 4.5–6 mm long** (St: 4 mm); **Pi and St: 1.6–3.5 mm wide.** Glume I, **3-nerved, Pi: 3.5–4 mm long, St: 2.5 mm long; Pi: 0.7–0.8 mm wide** (St: 0.5 mm wide). Lemmas, **Pi: 4–5 mm long, St: 3 mm long; Pi and St: 0.9–1.1 mm wide.** Paleas, **Pi: 3.5–4 mm long, St: 3 mm long; Pi: 0.6–0.8 mm wide, St: 0.5 mm wide.** Restricted to Zapala, Neuquén, Argentina .... *Poa indigesta*

5(4). Pistillate and staminate spikelets **5.5–8.5 mm long** (6.8 (4.3–9.6)), **3–5.5 mm wide** (4.2 (2.2–6.3)). Glume I, **3-nerved; Pi: 4–6 mm long** (5 (3.6–6.8)), **St: 3–5 mm long** (3.8 (2.8–5)); **Pi: 0.8–1.1 mm wide** (0.95 (0.67–1.23)), **St: 0.7–0.9 mm wide** (0.82 (0.6–1.15)). Lemmas, **Pi: 5–7 mm long** (5.8 (4.2–7.5)), **St: 4–5.5 mm long** (4.7 (3.9–5.8)); **Pi and St: 0.9–1.2 mm wide** (1.2 (0.7–2.2)). Paleas, **Pi: 4–5 mm long** (4.2 (3.3–5.1)), **St: 3–4 mm long** (3.6 (3–5.2)); **Pi and St: 0.8–0.9 mm wide** (0.83 (0.5–1.4)). Plants of sandy soils of semiarid Patagonia and Cuyo, Argentina ... *Poa lanuginosa*

5′. Pistillate and staminate spikelets **8–11 mm**

long (9 (6–12)), **3.5–8 mm wide** (6 (3–10)). Glume I, **3–5** (7)**-nerved, Pi: 6.5–9 mm long** (8 (6–10)), **St: 4–6 mm long** (5 (4–7)); **Pi: 1.1–1.45 mm wide** (1.3 (1–1.7)), **St: 0.8–1.1 mm wide** (1 (0.7–1.4)). Lemmas, **Pi: 7–9 mm long** (8 (6–10)), **St: 5–7 mm long** (6 (4.5–8)); **Pi and St: 1.1–1.6 mm wide** (1.4 (1–2)). Paleas, **Pi: 4.6–6 mm long** (5.4 (4–6.7)), **St: 3.6–5.3 mm long** (4.7 (3.3–6.3)); **Pi: 0.9–1.3 mm wide** (1.1 (0.7–1.8)), **St: 0.6–1.1 mm wide** (0.9 (0.6–1.7)). Plants of coastal dunes of Buenos Aires, Argentina .... *Poa bergii*

6(1). Ligules acuminate, **3–8 mm long** (5.7 (1–16)) **7**

6′. Ligules truncate to obtuse, **0.5–2 mm long** (1.5 (0.2–5.8)). [Only *P. denudata* and *P. pogonantha*, rhizomatous species, present ligules 2 to 3 mm long.] 15

7(6). Plants with long and deep rhizomes. Panicles contracted and interrupted, lower branches shorter than first panicle internode; **15–25 cm long** (20.5 (13–29)). Leaf blades subconvolute; **0.14–0.21 mm thick** (0.17 (0.12–0.24)). Bulliform cells not differentiated, abaxial epidermal prickles long, numerous. Lemma **bilobed,** pistillate floret callus with abundant long and rigid hairs; keel, marginal nerves, and intercostal epidermis zones glabrous. Staminate floret glabrous. This species was found only once in dunes of Monte Hermoso and Bahía Blanca, Argentina .... *Poa schizantha*

7′. Plants caespitous or long-rhizomatous. Panicles spiciform, dense, lower branches as long as or longer than first panicle internode, **5–15 cm long** (7.2 (2–20)). Leaf blades conduplicate; **0.15–0.35 mm thick** (0.25 (0.11–0.5)). Bulliform cells well differentiated; abaxial epidermal prickles frequent, short. Lemma **lanceolate,** not bilobed; pistillate floret callus glabrous or with woolly and long hairs; keel, marginal nerves, and intercostal epidermis zones glabrous or with hairs 0.5 mm or less. Staminate floret glabrous or scarcely pubescent 8

8(7). Plants caespitous. Glume I, **Pi: 2.7–4 mm long** (3.5 (2.4–4.4)), **St: 2.2–3.2 mm long** (2.75 (2–3.5)); **Pi and St: 0.45–0.8 mm wide** (0.7 (0.4–1.1)). Lemmas, **Pi and St: 3.5–5.5 mm long** (4.4 (3–6.4)); **Pi and St: 0.8–1.1 mm wide** (1 (0.6–1.3)). Paleas, **Pi and St: 2.3–4 mm long** (3.3 (1.8–4.2)); **Pi and St: 0.55–0.8 mm wide** (0.65 (0.4–0.9)) 9

8′. Plants caespitous or long-rhizomatous. Glume I, **Pi: 4–8 mm long** (5.6 (3.2–9)), **St: 3–7 mm long** (4.8 (2.8–8.2)); **Pi and St: 0.7–1.2 mm wide** (0.9 (0.5–1.4)). Lemmas, **Pi and St: 5–7 mm long** (6 (4–8.5)); **Pi and St: 1–1.5 mm wide** (1.2 (0.7–2.2)). Paleas, **Pi and St: 3–6 mm long** (4.5 (2.6–6.7)); **Pi and St: 0.7–1.2 mm wide** (0.8 (0.5–1.5)) 10

9(8). Ligules **3–6 mm long** (5 (3–9.3)). Pistillate and staminate florets glabrous. Steppes on plains and mountains from San Juan to Neuquén, between 1000 and 3000 m, Argentina .... *Poa huecu*

9′. Ligules **5–10 mm long** (7 (2–15)). Pistillate florets markedly hairy; callus with woolly, long hairs; keel, marginal nerves, and intercostal epidermis zones glabrous or with hairs 0.5 mm or less. Staminate floret glabrous or scarcely pubescent. Steppes of semiarid Patagonia and central regions of Argentina .... *Poa ligularis*

10(8). Leaf blades **2–4 mm wide** (2.8 (1.6–5)). Florets frequently viviparous. Glume I, **Pi: 5.5–8 mm long** (6.2 (3.7–9)), **St: 4.5–6.5 mm long** (5.2 (3.6–8)). Lemmas, **Pi: 6–8 mm long** (7.1 (5.5–9.2)), **St: 4.7–7.5 mm long** (6.2 (4.4–9)). Paleas, **Pi and St: 4–6 mm long** (5 (3.7–6.7)); **Pi and St: 0.7–1.2 mm wide** (0.9 (0.5–1.5)). Plants of Patagonian Andes mountains; also widespread on steppes of Santa Cruz and Tierra del Fuego, Argentina 11

10′. Leaf blades **1–2.5 mm wide** (1.6 (0.8–3)). Florets not viviparous. Glume I, **Pi: 4–6 mm long** (5.1 (3.1–6.8)), **St: 3–5.5 mm long** (4.4 (2.8–6.3)). Lemmas, **Pi: 4.5–6.5 mm long** (6 (4–7.1)), **St: 4–6 mm long** (5 (3.7–7.3)). Paleas, **Pi and St: 3.5–4.5 mm long** (4 (2.6–6)); **Pi and St: 0.65–1 mm wide** (0.75 (0.5–1.4)). Plants of Patagonian steppe and semiarid areas of Cuyo and central Argentina 12

11(10). Ligules **2–5.5 mm long** (3.6 (1.2–9)). Plants **18–38 cm tall** (26 (15–62)); leaves **8–18 cm long** (14 (5.5–30)); leaf blades **5–10 cm long** (8.3 (3–15)), **0.25–0.40 mm thick** (0.33 (0.14–0.5)); sheaths **4–8 cm long** (6 (2.5–16)). Stomata **0.044–0.053 mm long** (0.048 (0.042–0.062)). Glume I, **Pi: 4.5–6.2 mm long** (5.5 (3.7–7)), **St: 4–5.3 mm long** (4.5 (3.6–5.6)). Lemmas, **Pi: 5.8–7.8 mm long** (6.7 (5.5–9)), **St: 4.7–6 mm long** (5.4 (4.4–6.7)). Paleas, **Pi and St: 4–5.5 mm long** (4.7 (3.8–6)). Patagonian Altoandina biogeographic province, Argentina and Chile .... *Poa tristigmatica*

11′. Ligules **4–8 mm long** (6 (1.5–11)). Plants **25–50 cm tall** (34 (9–73)); leaves **15–35 cm long** (24 (4.5–52)); leaf blades **8–20 cm long** (13.4 (2.2–30)), **0.20–0.28 mm thick** (0.25 (0.17–0.36)); sheaths **6–14 cm long** (10 (2.5–22)). Stomata **0.036–0.046 mm long** (0.042 (0.032–0.052)). Glume I, **Pi: 6–8 mm long** (6.8 (4.8–9)), **St: 4.7–7 mm long** (6 (4.3–8.2)). Lemmas, **Pi: 6.5–8.5 mm long** (7.5 (5.7–9.2)), **St: 5.5–8 mm long** (7 (5–9)). Paleas, **Pi and St: 4.5–6 mm long** (5.2 (4.2–6.7)). Southeast Patagonia and Chile .... *Poa alopecurus*

12(10). Leaf blades **2–3 mm wide** (2.6 (1.8–4)). Pistillate and staminate florets glabrous. Steppes and mountains from San Juan to Mendoza, between 1900 and 3900 m, Argentina .... *Poa holciformis*

12′. Leaf blades **1.2–2 mm wide** (1.6 (0.8–3)). Pistillate floret callus with woolly, long hairs; keel, marginal nerves, and intercostal epidermis zones glabrous or with hairs 0.5 mm or longer; staminate florets glabrous or scarcely pubescent. Steppes of semiarid Patagonia 13

13(12). Plants long-rhizomatous, **20–50 cm tall** (38 (13–61)); panicles **7–14 cm long** (10.3 (4.5–19.8)); panicle nodes: **11–15** (13 (9–18)). Leaves **15–35 cm long** (25 (7.2–47)); leaf blades **7–27 cm long** (17 (4.7–35)) and **0.23–0.34 mm thick** (0.28 (0.18–0.41)); sheaths **4–14 cm long** (8.25 (2.5–20)); ligules **5–11 mm long** (7.8 (3.3–16.4)). Stomata **0.044–0.054 mm long** (0.048 (0.040–0.060)); keel and marginal nerves of pistillate florets with hairs longer than 0.5 mm long, intercostal epidermis zones glabrous. Widespread on semiarid Patagonia, and coasts of Argentina, Brazil, and Uruguay .... *Poa lanuginosa*

13′. Plants caespitous, **8–25 cm tall** (17.6 (6–42)); panicles **3–7 cm long** (4.4 (1.7–9)); panicle nodes: **7–11** (8 (6–14)). Leaves **5–18 cm long** (10.2 (3.5–36.5)); leaf blades **3–8 cm long** (5.6 (1.3–24)), **0.15–0.23 mm thick** (0.19 (0.11–0.28)); sheaths **2–7 cm long** (4.6 (1.7–14.8)); ligules **3–7 mm long** (4.7 (1.1–10.3)). Stomata **0.033–0.044 mm long** (0.038 (0.030–0.054)); keel and marginal nerves of pistillate florets with hairs shorter than 0.5 mm long, intercostal epidermis zones pubescent or glabrous. Southern Patagonia, Argentina 14

14(13). Callus of pistillate florets hairy, with woolly, long hairs, intercostal epidermis zones of lemma and palea generally glabrous. On pistillate specimens: sheaths **3.5–6.5 cm long,** blades **0.8–0.11 mm thick,** and stomata **0.029–0.038 mm long**; on staminate specimens: spikelets **5.4–7.8 mm long** and leaf blades **1–1.5 mm long.** Subhumid localities of Santa Cruz and Tierra del Fuego, Argentina .... *Poa rigidifolia* var. *rigidifolia*

14′. Callus of pistillate florets glabrous, intercostal epidermis zones of lemma and palea usually pubescent. On pistillate specimens: sheaths **1.8–4.8 cm long,** blades **0.12–0.16 mm thick;** stomata **0.034–0.042 mm long;** on staminate specimens: spikelets **4.7–6.5 mm long** and leaf blades **0.8–1.3 mm long.** Xeric localities of Santa Cruz and Chubut, Argentina ..... *Poa rigidifolia* var. *ibari*

15(6). Florets not viviparous. Glume I, **Pi: 2.5–4.5 mm long** (3.4 (1.8–4.8)), **St: 2–3.5 mm long** (2.7 (1.5–3.8)); **Pi and St: 0.45–0.8 mm wide** (0.58 (0.33–1)). Lemmas, **Pi: 3–5.5 mm long** (4.5 (2.8–6)), **St: 3–4 mm long** (3.5 (2.8–4.1)); **Pi and St: 0.6–1 mm wide** (0.78 (0.54–1.2)). Paleas, **Pi and St: 2.8–3.8 mm long** (3.1 (1.8–4.1)); **Pi and St: 0.4–0.7 mm wide** (0.54 (0.3–1)) 16

15′. Florets usually viviparous [not in *P. hubbardiana*, infrequently in *P. denudata*]. Glume I, **Pi: 4–7 mm long** (5.4 (3.3–7.5)), **St: 3.5–6.5 mm long** (4.5 (2.9–7.5)); **Pi and St: 0.7–1.1 mm wide** (0.82 (0.52–1.3)). Lemmas, **Pi: 4.5–8 mm long** (6.3 (5–8.8)), **St: 4–6.5 mm long** (5.1 (4–7)); **Pi and St: 0.9–1.3 mm wide** (1.1 (0.72–1.5)). Paleas, **Pi and St: 3.5–5 mm long** (4.1 (2.6–5.3)); **Pi and St: 0.7–0.8 mm wide** (0.75 (0.5–1)) 17

16(15). Plants caespitous or long-rhizomatous. Leaf blades **1–2 mm wide** (1.6 (0.9–3.2)). Stomata **0.032–0.040 mm long** (0.037 (0.027–0.046)). Spikelets, **Pi: 4–6.5 mm long** (5.6 (3.3–7.2)), **St: 4–5 mm long** (4.6 (3.4–5.4)). Glume I, **Pi: 2.5–3.5 mm long** (3 (1.8–4.8)), **St: 2–3 mm long** (2.5 (1.5–3.3)); **Pi and St: 0.4–0.7 mm wide** (0.54 (0.33–1)). Lemmas, **Pi: 3–5 mm long** (4.1 (2.8–5.4)), **St: 2.8–3.5 mm long** (3.4 (2.8–4.1)). Paleas, **Pi and St: 2.5–3.5 mm long** (2.9 (1.8–3.7)) 18

16′. Plants caespitous. Leaf blades **2–4 mm wide** (3.1 (2–4.4)). Stomata **0.037–0.044 mm long** (0.040 (0.036–0.046)). Spikelets, **Pi: 6.4–7 mm long** (6.8 mm (6.3–7.2)), **St: 4.5–6 mm long** (5.6 (4.8–6.3)). Glume I, **Pi: 3.5–4.5 mm long** (4.2 (3.8–4.6)), **St: 2.8–3.5 mm long** (3.2 (2.8–3.8)); **Pi and St: 0.5–0.8 mm wide** (0.67 (0.40–0.9)). Lemmas, **Pi: 4.8–5.8 mm long** (5.3 (4.7–6)), **St: 3.5–4 mm long** (3.8 (3.2–4.1)). Paleas, **Pi: 3.2–4 mm long** (3.6 (3.1–4.1)), **St: 2.8–3.5 mm long** (3.2 (2.8–3.8)) .... *Poa lanigera*

17(15). Plants caespitous. Inflorescences usually not longer than leaf length. Ligules obtuse, **0.6–1 mm long** (1.1 (0.5–1.9)). Stomata scarce on abaxial epidermis, **0.33–0.040 mm long** (0.036 (0.027–0.045)). Leaf blades with apex acuminate to acute. Florets not viviparous. Pistillate floret hairy, cottonlike; callus with woolly, long hairs; keel, marginal nerves, and intercostal epidermis zones with hairs over 1 mm long. Staminate florets glabrous or with a few long, woolly hairs on callus. Grasslands above 1500 m in Córdoba and San Luis hills, Argentina .... *Poa hubbardiana*

17′. Plants rhizomatous. Inflorescences longer than the leaf length. Ligules acuminate, **1–4 mm long** (2.2 (0.5–5.8)). Stomata frequent on the abaxial epidermis, **0.035–0.045 mm long** (0.042 (0.034–0.055)). Leaf blades with apex navicular to obtuse. Florets usually viviparous. Pistillate floret callus without hairs, or with short or long, woolly hairs; keel, marginal nerves, and intercostal epidermis zones glabrous, or with hairs shorter than 0.5 mm. Staminate florets glabrous or scarcely pubescent. Patagonian Andes mountains, up to 1000 m 19

18(16). Plants caespitous or long-rhizomatous. Leaf blades conduplicate; **0.15–0.24 mm thick** (0.20 (0.17–0.48)). Glume I, **1-nerved.** Lemmas, **Pi and St: 0.7–0.9 mm wide** (0.8 (0.65–1.2)). Paleas, **Pi and St: 0.45–0.7 mm wide** (0.6 (0.4–1)) .... *Poa resinulosa* complex

18′. Plants caespitous. Leaf blades flat; **0.13–0.17 mm thick** (0.15 (0.13–0.48)). Glume I, **3-nerved** (1). Lemmas, **Pi and St: 0.6–0.7 mm wide** (0.65 (0.54–0.86)). Paleas, **Pi**

and St: 0.35–0.45 mm wide (0.4 (0.3–0.7)) .... *Poa pilcomayensis* var. *pilcomayensis*

19(17). Florets usually viviparous. Spikelets, **Pi and St: 7–20 mm long** (14 (5.6–28.6)). Glume I, **Pi: 5–6.8 mm long** (6 (4.3–7.1)), **St: 4–6.5 mm long** (5.6 (3.9–7.5)); **Pi and St: 0.7–1 mm wide** (0.90 (0.64–1.3)). Lemmas, **Pi: 5.5–8 mm** (7 (5–8.8)), **St: 5–6.5 mm** (6 (4.8–6.9)). Pistillate floret callus with short or long, woolly hairs .... *Poa pogonantha*

19′. Viviparous florets absent, occasionally present. Spikelets, **Pi and St: 5–7 mm long** (6 (5–7.7)). Glume I, **Pi: 3.5–5 mm long** (4.3 (3.3–5.3)), **St: 3–4 mm long** (3.6 (3–4.1)); **Pi and St: 0.6–0.8 mm wide** (0.72 (0.51–0.83)). Lemmas, **Pi: 4.5–5.5 mm long** (5.3 (4.3–5.8)), **St: 4–5 mm long** (4.5 (4–5.2)). Pistillate floret callus with long and woolly hairs .... *Poa denudata*

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Appendix 1.

List of species. Letters in parentheses correspond to the abbreviation of the species name used in the phenetic analysis.

Poa alopecurus (Gaudich.) Kunth (AL)
P. barrosiana Parodi (BA)
P. bergii Hieron. (BE)
P. bergii var. *chubutensis* Speg. (BU)
P. boecheri Parodi (BO)
P. boelckei Nicora (BK)
P. bonariensis (Lam.) Kunth (BN)
P. buchtienii Hack. (BT)
P. calchaquiensis Hack. (CL)
P. denudata Steud. (DE)
P. dolichophylla Hack. (DO)
P. dusenii Hack. (DU)
P. holciformis J. Presl (HO)
P. hubbardiana Parodi (HB)
P. huecu Parodi (HU)
P. ibari Phil. (IB)
P. indigesta Parodi (IN)
P. iridifolia Hauman (IR)
P. lanigera Nees (LG)
P. lanuginosa Poir. (LA)
P. ligularis Nees ex Steud. (LI)
P. montevidensis Arechav. (MO)
P. nahuelhuapiensis Nicora (NA)
P. patagonica Phil. (PA)
P. patagonica var. *neuquina* Nicora (PN)
P. pedersenii Nicora (PE)
P. pilcomayensis Hack. (PI)
P. pilcomayensis var. *calamagrostoidea* Hack. (PC)
P. pogonantha (Franch.) Parodi (PG)
P. prichardii Rendle (PR)
P. resinulosa Nees ex Steud. (RE)
P. rigidifolia Steud. (RI)
P. schizantha Parodi (SC)
P. shuka (Speg.) Parodi (SK)
P. stuckertii (Hack.) Parodi (ST)
P. superbiens (Steud.) Hauman & Parodi (SU)
P. tristigmatica E. Desv. ex Gay (TR)

Appendix 2.

Specimens listed here were used as OTUs in the phenetic analysis. They are sorted alphabetically by species or species complexes as identified in this research. Previous specimen determination is indicated between brackets corresponding to the species abbreviation as set in the list of species. Pistillate specimens "Pi" or staminate specimens "St" are also indicated between brackets. Islas Malvinas represents a similar location to the Falkland Islands on specimen labels.

Poa alopecurus

ARGENTINA. **Santa Cruz:** Depto. Güer Aike, Entre Glencross y Pta. Alta, 51°46'S, 71°43'W, 1976, *Latour et al. 1004* (BAB) [AL, Pi and St]; Barranca al norte de 28 de Noviembre, 51°35'S, 72°11'W, 13 Jan. 1976, *Latour et al. 382* (BAB) [SK, Pi]; ruta 3, a 8 km al W de Río Gallegos, 51°37'S, 69°25'W, 5 Nov. 1977, *Roig & Méndez 2361* (BAB) [SK, Pi and St]; Estancia Cerro Castillo, Laguna Figueroa, 51°28'S, 72°27'W, 12 Jan. 1977, *Latour et al. 1367* (BAB) [SU, St.]; Lago Argentino, Puerto Bandera, 50°18'S, 72°47'W, *Correa et al. 3032* (BAA) [SU, Pi]; Estancia Las Viscachas, Cerro Las Viscachas, 50°46'S, 72°01'W, 25 Jan. 1977, *Arroyo et al. 2428* (BAB) [SU, Pi]; Cerro sin nombre, 50°46'S, 72°08'W, 29 Jan. 1977, *Arroyo et al. 2643* (BAB) [SU, Pi]. **Tierra del Fuego e Isla del Atlántico Sur:** Islas Malvinas, Isla Soledad, 52°00'S, 59°00'W, *Gaudichaud C. s.n.* (*Arundo alopecurus* Gaudich. ex Mirb., syntype, BAA, fragment) [AL, Pi]; Islas Malvinas, 52°00'S, 59°00'W, *Hooker s.n.* (*Festuca antarctica* var. γ Hook. f., isotype, BAA fragment) [AL, Pi and St]; Ushuaia, Is. de los Estados, Port Vancouver, 54°49'S, 64°20'W, *Spegazzini s.n.* (*Festuca shuka* Speg., isotype, LP) [SK, Pi]; Canal de Beagle, Isla de los Gaviotines, 54°52'S, 68°18'W, *Vervoorst 161* (BAA) [AL, St]; Islas de los Estados, Bahía Liberty, 54°50′S, 64°25′W, 2 Nov. 1971, *Dudley et al. 1301* (BAB) [AL, St]; Islas de los Estados, Puerto Vancouver, 54°49′S, 64°20′W, 16 Jan. 1934, *Castellanos 12868* (BAB) [AL, St]; Islas de los Estados, Puerto Cook, 54°50′S, 64°20′W, 4 Jan. 1934, *Castellanos 12829* (BAB) [AL, St]; Is. de los Estados, Pto. Cook, 54°49′S, 64°20′W, 4 Jan. 1934, *Castellanos 12829b* (SI) [SK, Pi]; Bahia Thetis, Región del Río del Fuego, 54°12′S, 67°23′W, Mar. 1902, *Holmberg & Calcagnini 3604* (BAB) [AL, Pi]; Ea. Harberton, Campo Rancho Tambo, shore of Bahía Cambaceres, 54°52′S, 67°16′W, 8 Jan. 1968, *Moore 1373* (BAB) [AL, Pi]; Bahía Agüirre, Puerto Español, E end beyond settlement Ostoic, 54°53′S, 65°58′W, 19 Feb. 1968, *Moore 1875* (BAB) [AL, St]; Remolino, 54°50′S, 67°53′W, 21 Dec. 1932, *Castellanos 7579* (BAB) [AL, St]. CHILE. **XII Región:** Sandy Point, 53°10′S, 70°54′W, *W. Lechler 1194* (*Aira superbiens* Steud., isotype, BAA fragment) [SU, Pi]; Islote Pto. Luisa, 54°56′S, 67°38′W, *Roig et al. 2838* (BAA,) [AL, St]; Sierra Baguales, Ea. La Cumbre, Co. sin nombre, 50°42′S, 72°22′W, 18 Dec. 1975, *Boelcke et al. 682* (BAB) [AL, Pi and St]; Punto Bella Vista, 51°30′S, 73°15′W, 5 Dec. 1979, *Roig et al. 5097* (BAB) [AL, Pi]; Estancia Cerro Castillo, Lago Sofía, 51°32′S, 72°37′W, 14 Jan. 1977, *Latour et al. 1493* (BAB) [SK, Pt]; Laguna Figueroa, 51°28′S, 72°27′W, 12 Jan. 1977, *Latour et al. 1367* (BAB) [SU, St.]; Sección Tres Pasos, Hotel, 51°25′S, 72°29′W, 14 Jan. 1977, *Latour et al. 1600* (BAB) [SU, Pi]; *Latour et al. 1574* (BAB) [SU, Pi].

Poa bergii

ARGENTINA. **Buenos Aires:** Bahía Blanca, Punta Alta, 38°53′S, 62°04′W, Feb. 1902, *Spegazzini et al. 2381* (BAB) [BE, Pi]; Partido General Dorrego, Monte Hermoso, 38°59′S, 61°17′W, 30 Oct. 1985, *Villamil 3393* (SI) [BE, Pi and St], 31 Oct. 1985, *Villamil 3413* (SI) [BE, Pi], 9 Nov. 1986, *Villamil 4291* (SI) [BE, Pi]; Camino a Monte Hermoso, Balneario Sauce Grande, 38°59′S, 61°17′W, 31 Oct. 1986, *Villamil 3432* (SI) [BE, Pi], 30 Oct. 1965, *Cabrera et al. 17061* (LP) [BE, Pi], *Cabrera et al. 17063* (LP) [BE, St], *Cabrera et al. 17065 1/2* (LP) [BE, St], 24 Nov. 1963, *Fabris & Schwabe 4821* (LP) [BE, Pi]; Partido Pellegrini, Pellegrini, 36°16′S, 63°10′W, 28 Nov. 1940, *Cabrera 6948* (LP), [BE, Pi]; Partido Coronel Rosales, Pehuen-Co, 39°00′S, 61°33′W, 19 Nov. 1962, *Cabrera & Fabris 14914* (LP) [BE, Pi]; Partido Villarino, Médanos, 38°50′S, 62°42′W, 6 Nov. 1940, *Cabrera 6673* (LP) [BE, Pi]; Partido General Madariaga, Pinamar, 37°07′S, 56°51′W, 11 Dec. 1950, *Cabrera 10707* (LP) [BE, Pi]; Partido Tres Arroyos, Claromecó, 38°52′S, 60°04′W, 8 Nov. 1986, *Villamil 4211* (SI) [BE, Pi]; Partido General Alvarado, Miramar, 38°16′S, 57°52′W, 31 Jan. 1930, *Parodi 9820* (holotype, BAA) [BA, Pi], 11 Nov. 1939, *Cabrera 5555* (BAA) [BA, St], Sep. 1922, *Hauman 5762* (BAA) [BA, Pi]; Partido Lobería, Quequén, 38°32′S, 58°42′W, Jan. 1930, *Cabrera 1317* (SI) [BA, St], Feb. 1925, *Parodi 6398* (BAA) [BA, St], 7 Nov. 1943, *Boelcke s.n.* (SI) [BA, Pi and St]; Partido General Pueyrredón, Mar del Plata, 38°00′S, 57°34′W, 9 Dec. 1947, *Boelcke 2838* (BAA) [BA, Pi], Jan. 1923, *Barros 4898* (BAA) [BA, Pi], 9 Dec. 1947, *Boelcke 2837* (BAA) [BA, St]. **Río Negro:** Adolfo Alsina, médanos en la boca del Río Negro, 41°03′S, 62°48′W, *Berg 205* (holotype, CORD) [BE, Pi]. URUGUAY. **Colonia:** Riachuelo, 34°25′S, 57°52′W, 12 Oct. 1936, *Cabrera 3872* (BAA) [BE, Pi].

Poa bonariensis

ARGENTINA. **Buenos Aires:** Río Viedma, Sep. 1934, *Ruiguelet 409* (BAA) [BN, Pi and St]; Partido Avellaneda, Avellaneda, 34°40′S, 58°23′W, 14 Oct. 1922, *Parodi 4747* (BAA) [BN, Pi and St]; Partido Dolores, Laguna Sevigné, 36°12′S, 57°44′W, 11 Oct. 1962, *Cano 1* (BAA) [BN, St]; Partido La Plata, La Plata, en el Jardín Zoológico, 34°55′S, 57°57′W, Nov. 1962, *Torres 1023* (LP) [MO, St]; Partido Cañuelas, Ruta 3, km 64, entre Brandsen y Monte, 35°03′S, 58°46′W, 13 Nov. 1962, *Cano-Cámara 3* (SI) [MO, Pi]. **Entre Ríos:** Depto. Gualeguaychú, E. Carbó, 33°09′S, 59°14′W, 23 Oct. 1949, *Burkart 18132* (SI) [BN, Pi]; Paranacito, 33°42′S, 59°01′W, Oct. 1949, *Ragonese & Crovetto 25* (BAB) [BN, Pi and St]; Médanos, 33°25′S, 59°04′W, 2 Dec. 1930, *Parodi 9445* (BAA) [BN, Pi and St]; Delta inferior, Arroyo Martínez, 33°52′S, 58°40′W, Oct. 1944, *Burkart 15044* (SI) [MO, St], *Burkart 15043* (SI) [MO, St]; Depto. Gualeguay, La Verde, 33°09′S, 59°20′W, 21 Oct. 1949, *Burkart 18068* (SI) [BN, Pi]; Depto. La Paz, Arroyo Feliciano, 30°44′S, 59°38′W, 17 Oct. 1980, *Muñoz 1353* (SI) [MO, Pi and St]. **Neuquén:** Depto. Lácar, San Martín de Los Andes, 40°10′S, 71°21′W, 30 Jan. 1959, *Ruiz Leal 20315* (holotype, BAA) [PN, Pi], 6 Jan. 1938, *Giacobbi 12961* (BAA) [PN, Pi], 22 Jan. 1966, *Eskuche 591* (BAA) [PN, Pi]; Cerro al Norte de San Martín de los Andes, 40°10′S, 71°21′W, 10 Dec. 1946, *Dawson 1287 1/2* (BAA) [PN, Pi]. URUGUAY. **Montevideo:** Montevideo, 35°00′S, 56°05′W, en parajes húmedos, Nov., *Arechavaleta 5101* (isotype, LP fragment) [MO, Pi and St]; Fray Bentos, 33°10′S, 58°15′W, 5 Oct. 1934, *Meyer 1037* (BAA) [MO, St]. **Soriano:** Arroyo Grande, Paso de Los Loros, 19 Nov. 1937, *Rosengurtt 2294* (BAA) [MO, St].

Poa denudata

ARGENTINA. **Neuquén:** Depto. Picunches, Pino Hachado, Orilla afluente Arroyo Haichol, 38°40′S, 70°54′W, 21 Jan. 1963, *Valla et al. 3024* (BAA) [DE, Pi and St]; Depto. Los Lagos, Villa Puerto Manzano, 40°49′S, 71°37′W, 8 Dec. 1963, *Diem 3190* (BAA) [DE, Pi and St]; Cerro O'Connor, 40°49′S, 71°37′W, 25 Nov. 1963, *Diem 3009* (BAA) [DE, Pi and St]; Isla Victoria, 40°54′S, 71°34′W, 11 Nov. 1946, *Perrone 15212* (BAA) [NA, St]; Depto. Minas, Lago Epu-Lauquen, Arroyo Pincheira, 36°50′S, 71°03′W, 18 Jan. 1964, *Boelcke et al. 11003* (SI) [DE, Pi]; Península Quetrihué, 40°52′S, 71°38′W, 1 Jan. 1949, *Boelcke & Hunziker 3458* (holotype, BAA) [NA, Pi and St]; Puerto San Patricio, 40°52′S, 71°38′W, 7 Nov. 1940, *Diem 285* (BAA) [NA, St], 30 Nov. 1942, *Diem 415* (BAA) [NA, St]. **Río Negro:** Depto. Nahuel Huapi, Lago Gutiérrez, 41°08′S, 71°20′W, 28 Oct. 1949, *Boelcke & Hunziker 3418* (BAA) [DE, Pi and St]. CHILE. **X Región:** Valdivia, 39°49′S, 73°14′W, *Lechler W. 578* (BAA, fragment) [DE, Pi].

Poa dolichophylla complex

Poa dolichophylla: ARGENTINA. **La Rioja:** Depto. Famatina, Sierra Famatina, Mina El Oro, 28°55′S, 67°31′W, 6 Feb. 1956, *Calderón 1115* (BAA) [DO, Pi], 7 Feb. 1956, *Calderón 1168* (BAA) [DO, Pi]. **Tucumán:** Depto. Chicligasta, La Banderita, ruta 65, 27°20′S, 66°00′W, 14 Oct. 1966, *Boelcke et al. 5505* (BAA) [DO, Pi and St]; Depto. Tafí, Bajo de Anfama, 27°46′S, 65°34′W, 6 Aug. 1906, *Lillo 5066* (isotype, BAA) [DO, Pi]; Valle Calchaquí, Peñas Azules, 26°35′S, 65°40′W, 27

Jan. 1933, *Parodi 10926* (BAA) [DO, Pi]; Cerro El Negrito, 26°37′S, 65°44′W, 19 Jan. 1964, *Giusti et al. 3863* (BAA) [DO, Pi]; La Puerta, 29 Jan. 1933, *Parodi 10891* (LP) [DO, St]; Valle Calchaquí, Peñas Azules, 26°35′S, 65°40′W, 27 Jan. 1933, *Parodi 10927* (BAA) [DO, Pi and St]. *P. iridifolia*: ARGENTINA. **Buenos Aires:** Partido Balcarce, Quinta Sagenave, 37°52′S, 58°15′W, 12–25 Oct. 1943, *Hunziker 3930* (BAA) [IR, St]; Partido General Pueyrredón, Mar del Plata, Sierra La Brava, 37°50′S, 57°55′W, 4 Dec. 1930, *Hicken 40* (SI) [IR, Pi]; Partido Saavedra, Sierra de Curamalal, La Gruta, 37°52′S, 62°21′W, 12 Nov. 1938, *Cabrera 4756* (SI) [IR, St]; Partido Tandil, Sierra de las Animas, 37°29′S, 59°18′W, 21 Nov. 1940, *Cabrera 6810* (SI) [IR, Pi]; Tandil, 37°20′S, 59°08′W, 20 Nov. 1929, *Hunziker 8971* (BAA) [IR, St], 15 Nov. 1953, *Burkart 19263* (SI) [IR, Pi]; Sierras de Tandil, 37°20′S, 59°08′W, 1 Nov. 1919, *Hicken 21* (SI) [IR, St]; Partido Tornquist, Sierra de la Ventana, Abra de la Ventana, 38°08′S, 62°00′W, 7 Nov. 1938, *Cabrera 4687* (SI) [IR, Pi]; Cerro de la Ventana, 38°08′S, 61°47′W, 7 Oct. 1939, *Cabrera 5336* (SI) [IR, Pi], 9 Nov. 1938, *Cabrera 4746* (SI) [IR, St]; Cerro Napostá, Estancia Laurina, 38°08′S, 61°47′W, 17 Nov. 1972, *Gómez et al. 11719* (BAA) [IR, Pi]. *P. pilcomayensis* var. *calamagrostidea*: ARGENTINA. **Tucumán:** Depto. Chicligasta, Estancia Las Pavas, Puerto El Bayo, 27°19′S, 65°55′W, Mar. 1924, *Venturi 3077* (SI) [PC, St], *Venturi 3074* (SI) [PC, Pi]; Depto. Famaillá, Quebrada del Río Colorado, 27°10′S, 65°22′W, 26 Aug. 1939, *Meyer 14980* (BAA) [PC, Pi and St]; Quebrada de Lules, 26°56′S, 65°21′W, 5 Nov. 1929, *Venturi 9066* (LP) [PC, St]; Depto. Monteros, Quebrada de los Sosa, 27°09′S, 65°34′W, Dec. 1960, *Burkart 22098* (BAA) [PC, Pi]; Depto. Tafí, Bajo de Anfama, 27°46′S, 65°34′W, 6 Sep. 1906, *Lillo 5064* (isotype, SI fragment) [PC, St]; Puerta de San Javier, 26°46′S, 65°21′W, Dec. 1923, *Venturi 2540* (SI, LP) [PC, Pi and St]; Depto. Trancas, Playa del río de la Hoyada, 26°34′S, 66°24′W, 23 Nov. 1921, *Scheiter 1855* (BAA) [PC, Pi]. *P. stuckertii*: ARGENTINA. **Córdoba:** Depto. Pocho, Camino a los Gigantes, Cerro Blanco, próximo al Río Juspe, 31°27′S, 64°38′W, 5 Dec. 1958, *Nicora 6642* (BAA) [ST, Pi]; Depto. San Alberto, Pampa de Achala, 31°36′S, 64°45′W, 10 Nov. 1925, *Hicken 16565* (BAA) [ST, St], 1–4 Dec. 1926, *Parodi 7582* (BAA) [ST, Pi], *Parodi 7621* (BAA) [ST, Pi and St]; La Posta, 31°36′S, 64°45′W, 7 Dec. 1958, *Burkart 20901* (SI) [ST, St], 9 Dec. 1995, *Giussani stm2* (SI) [ST, St], *Giussani stm6* (SI) [ST, St]. **San Luis:** Depto. Chacabuco, Sierra Comechingones, 32°54′S, 65°04′W, 15 Nov. 1925, *Castellanos s.n.* (BAA) [ST, Pi]; Depto. Pringles, La Carolina, 32°49′S, 66°06′W, 8 Nov. 1940, *Burkart 10787* (BAA) [ST, Pi].

Poa holciformis

ARGENTINA. **Mendoza:** Depto. Las Heras, Las Cuevas, Refugio Militar General Lamadrid, 32°49′S, 70°03′W, 10 Jan. 1963, *Boelcke et al. 9720* (BAB, SI) [HO, Pi and St]; Depto. San Carlos, Los Paramillos, camino a Laguna Diamante, 34°10′S, 69°35′W, 23 Jan. 1989, *Gómez-Sosa 345* (SI) [HO, Pi]; 6 km W Refugio Militar General Alvarado, 34°10′S, 69°45′W, 17 Jan. 1963, *Boelcke et al. 9983* (BAB) [HO, Pi]. **Neuquén:** Depto. Chos Malal Cajón del Arroyo del cruce, 36°43′S, 70°23′W, 27 Jan. 1964, *Boelcke et al. 11265* (BAB) [HO, Pi]; Vegas del Pelán, camino a Riscos Bayos, 36°54′S, 70°20′W, 24 Jan. 1964, *Boelcke et al. 11157* (BAA) [HO, Pi and St]; Riscos Bayos, confluencia Arroyo Olletas con el Arroyo Curileuvú, 36°57′S, 70°20′W, 25 Jan. 1964, *Boelcke et al. 11175* (BAA, BAB) [HO, Pi]; Depto. Minas, Sierra de Cochicó, 36°21′S, 70°34′W, 29 Jan. 1970, *Boelcke et al. 14087* (BAA) [HO, St]; Nacimiento de la cordillera del Viento, 36°46′S, 70°31′W, 2 Feb. 1964, *Boelcke et al. 11540* (BAB) [HO, Pi and St]. CHILE. In Cordillera chilensibus, *Haenke s.n.* (isotype, BAA fragment) [HO, Pi].

Poa hubbardiana

ARGENTINA. **Córdoba:** Depto. San Alberto, Sierra de Achala, al bajar de la Pampa de Achala, 31°36′S, 64°45′W, 1–4 Dec. 1926, *Parodi 7501* (holotype, BAA) [HB, Pi]; Sierra de Achala, 31°36′S, 64°45′W, 15 Nov. 1878, *Hieronymus s.n.* (BAA) [HB, Pi and St]; Pampa de Achala, La Posta, 31°36′S, 64°45′W, 9 Dec. 1995, *Giussani s.n.* (SI) [HB, St]. **San Luis:** Depto. Chacabuco, Sierra de Comechingones, 32°54′S, 65°04′W, 23 Nov. 1925, *Castellanos s.n.* (BAA) [HB, St]; Depto. La Capital, Ciudad, 33°18′S, 66°22′W, *Parodi 2615* (BAA) [HB, St]; Depto. Pringles, La Carolina, 32°49′S, 66°06′W, 8 Nov. 1940, *Burkart 10792* (SI) [HB, Pi and St]; *Burkart 10781* (SI) [HB, Pi].

Poa huecu

ARGENTINA. **Mendoza:** Depto. Las Heras, Puente del Inca, Valle de los Horcones, 32°50′S, 69°55′W, 12 Jan. 1963, *Boelcke et al. 9818* (BAB) [HU, St]. **Neuquén:** Depto. Chos Malal, Cajón Grande, Cordillera del Viento, 36°58′S, 70°30′W, 25 Jan. 1935, *Ragonese A. 284A* (holotype, BAA) [HU, Pi]; Cajón de Atreuco, Cordillera del Viento, 36°58′S, 70°30′W, 25 Jan. 1935, *Ragonese 284* (BAA) [HU, St]; Cajón inferior del Arroyo Turbio llamado localmente Arroyo Domuyo, 36°44′S, 70°23′W, 28 Jan. 1964, *Boelcke et al. 11323* (BAA) [HU, Pi]; Depto. Minas, Laguna Varvarco Campos, Arroyo Enfermera curso inferior, 36°17′S, 70°39′W, 29 Jan. 1970, *Boelcke et al. 14061* (BAB) [HU, St]; Arroyo Enfermera, extremo sur, 36°23′S, 70°37′W, 28 Jan. 1970, *Boelcke et al. 14036* (BAB) [HU, Pi]; Baños Calientes, Río Varvarco, 36°42′S, 70°37′W, 31 Jan. 1964, *Boelcke et al. 11424* (BAB) [HU, Pi]; Depto. Zapala, Zapala, 38°55′S, 70°04′W, *Hicken 16564* (SI) [HU, Pi]; El Sauce, 39°02′S, 70°00′W, 11 Dec. 1952, *Cabrera 11175* (LP) [HU, Pi].

Poa indigesta

ARGENTINA. **Neuquén:** Depto. Zapala, Zapala, 38°55′S, 70°04′W, 7 Dec. 1946, *Dawson G. 1227* (holotype, BAA) [IN, Pi and St], 5 Feb. 1920, *Parodi 2721* (BAA) [IN, Pi].

Poa lanigera

ARGENTINA. **Buenos Aires:** Partido Pehuajó, Pehuajó, 35°48′S, 61°52′W, 15 Oct. 1950, *Burkart 18465* (SI) [LG, St]; Partido Tigre, Tigre, FNGBM, 34°25′S, 58°35′W, 13 Oct. 1946, *Lanfranchi 535* (SI) [LG, St]. **Entre Ríos:** Depto. Federación, Federación, 31°01′S, 57°53′W, 23 Sep. 1961, *Burkart 22437* (BAA) [LG, Pi and St]; Salto Grande, 31°13′S, 57°56′W, 10 Oct. 1950, *Hunziker 4431* (SI) [LG, Pi]; Depto. Uruguay, Concepción del Uruguay, 32°29′S, 58°14′W, 17 Oct. 1949, *Burkart 17969* (BAA) [LG, Pi and St]. PARAGUAY. **Alto Paraná:** Santa Teresa, 24°43′S, 54°21′W, 4 Aug. 1945, *Bertoni 1706* (BAA, SI) [LG, Pi]. URUGUAY. **Montevideo:** *Sellow s.n.* (isotype, BAA) [LG, Pi and St].

Poa lanuginosa

ARGENTINA. **Buenos Aires:** Partido Dorrego, Monte Hermoso, 38°59'S, 61°17'W, 30 Oct. 1965, *Cabrera et al. 17065* (LP) [LA, Pi and St]; Partido General Madariaga, Pinamar, 37°07'S, 56°51'W, 13 Oct. 1973, *Zardini 215* (LP) [LA, Pi]; Partido Junin, Médano Grande, 34°27'S, 61°04'W, 17 Oct. 1940, *Cabrera 6503* (LP) [LA, St]; Partido Tornquist, Sierra de la Ventana, estancia El Carol, 38°09'S, 61°55'W, 6 Oct. 1939, *Cabrera 5309* (LP) [LA, St]. **Chubut:** Depto. Río Sengüerr, Estancia La Laurita, 44°44'S, 70°15'W, 18 Jan. 1949, *Soriano 3849* (BAA) [PA, Pi]; Río Mayo, Estación Zootecnia Mallín, El Tacho, 45°41'S, 70°16'W, 4 Feb. 1954, *Grondona 3545* (BAA) [BO, Pi]; Depto. Florentino Ameghino, Cabo Raso, 44°20'S, 65°14'W, *Spegazzini 938* (holotype, BAA fragment) [BU, Pi], Jan. 1922, *Grether 3447* (BAA) [PA, PI]. **Mendoza:** Depto. San Rafael, Valle del Atuel, El Sosneado, 35°05'S, 69°34'W, 4 Oct. 1955, *Böcher et al. 801* (holotype, BAA) [BO, Pi and St]. **Neuquén:** Depto. Los Lagos, Nahuel Huapi, Estancia Fortín Chacabuco, 41°03'S, 71°09'W, 3 Nov. 1949, *Boelcke & Hunziker 3492* (BAA) [LA, Pi]; Depto. Minas, Confluencia ríos Pichi-Neuquén y Neuquén, Pampa de las Yeguas, 36°35'S, 70°48'W, *Boelcke et al. 13676* (BAA) [LA, Pi and St]; a 5 km de Las Ovejas, camino a la laguna Epu-Lauquén, 36°57'S, 70°45'W, 14 Jan. 1964, *Boelcke et al. 10772* (BAA) [LA, Pi]. **Río Negro:** Depto. Avellaneda, ruta 22, 50 km antes de Choel choel, 39°10'S, 65°05'W, *Bacigalupo N. & Nicora E. 11651 1/2* (BAA) [BO, Pi]; Depto. Ñorquinco, Río Chico, 41°42'S, 70°27'W, 9 Nov. 1949, *Soriano 3751* (BAA) [BO, Pi and St]; Depto. Avellaneda, ruta 250, 126 km antes de General Conesa, 39°45'S, 65°26'W, 7 Nov. 1972, *Bacigalupo & Nicora 11676* (BAA) [LA, Pi]; Isla Choel Choel, orilla del Río Negro, 39°16'S, 65°39'W, 7 Nov. 1972, *Bacigalupo & Nicora 11654* (BAA) [LA, Pi and St]; Choel choel, 39°10'S, 65°05'W, *Bacigalupo & Nicora 11651* (BAA) [BO, St]; Depto. Pichi Mahuida, a 20 km S de Río Colorado, 39°03'S, 64°20'W, 7 Nov. 1965, *Correa & Nicora 3168* (BAA) [LA, Pi and St]. **Santa Cruz:** Depto. Magallanes, San Julián, 5 km al sur por ruta 3, Bajo Salado, 49°19'S, 67°42'W, 22 Nov. 1963, *Correa et al. 2683* (BAB) [PA, Pi]; Depto. Corpen Aike, Río Chico, Establecimiento Las Vegas, 50°07'S, 68°37'W, Nov. 1922, *Dauber 165* (BAA) [PA, Pi and St]; Orilla del Río Chico, ruta 3, 49°49'S, 68°37'W, 3 Dec. 1971, *Boelcke et al. 15345* (BAB) [BU, Pi]; Depto. Deseado, Puerto Deseado, Cañadón del Veneciano, 47°45'S, 65°54'W, 12 Nov. 1965, *Correa & Nicora 3317* (BAA) [PA, St]; Depto. Lago Argentino, Campos de Bilbao, Monte Buenos Aires, 50°38'S, 72°54'W, 3 Feb. 1914, *Hauman et al. 152* (BAA) [PA, St]; Depto. Río Chico, Cañadón León, 48°46'S, 70°16'W, Mar. 1952, *Cittadini 18* (BAA) [PA, St], *Cittadini 21* (BAA) [BU, Pi]. **Tierra del Fuego e Islas del Atlántico Sur:** Depto. Río Grande Cabo Domingo, a 15 km NW de Río Grande, 53°41'S, 67°50'W, 3 Jan. 1968, *Moore 1493* (BAA) [PA, Pi]. CHILE. **XII Región:** Lago Pinto, cerca del origen del río, 52°00'S, 72°24'W, 11 Dec. 1877, *Ibar s.n.* (holotype, BAA fragment) [PA, St].

Poa ligularis

ARGENTINA. **Buenos Aires:** Partido Bahía Blanca, Bahía Blanca, 38°44'S, 62°16'W, *Hanslow 552* (type, BAA fragment) [LI, St], *Claraz 34* (*P. denudata* var *minor* Ball, BAA fragment) [LI, St]. **Chubut:** Depto. Biedma, Puerto Madryn, Laguna Blanca, 42°47'S, 65°02'W, 18 Oct. 1990, *Bertiller & Beeskow 1132* (SI) [LI, St], 30 Oct. 1992, *Bertiller 3150* (SI) [LI, Pi]; Estancia Sarasa a 40 km de Puerto Madryn, 42°37'S, 65°22'W, 11 Oct. 1995, *Bertiller 3395* (SI) [LI, St], *Bertiller 3411* (SI) [LI, Pi]; Depto. Rawson, Trelew, 43°15'S, 65°19'W, 16 Oct. 1946, *Soriano 1867* (SI) [LI, Pi]. **La Pampa:** Depto. Chical-Co, Cerro Los Guanacos, Oct. 1960, *Cano 1119* (BAB) [LI, St]; Depto. Utracán, Entre Atreucó y Quehué, 37°05'S, 64°11'W, 10 Jan. 1995, *Ragonese & Piccinini 18205* (BAB) [LI, Pi]. **Mendoza:** Depto. Las Heras, Puesto La Obligación, 20 Nov. 1943, *Covas 2097* (SI) [LI, Pi]. **Neuquén:** Depto. Confluencia, alrededores de la ciudad de Neuquén, 38°58'S, 68°03'W, Jan. 1978, *León 2232* (BAA) [LI, Pi], *León 2257* (BAA) [LI, Pi and St]. **Río Negro:** Depto. Avellaneda, ruta 22, 50 km antes de Choel Choel, 39°10'S, 65°05'W, 6 Nov. 1972, *Bacigalupo & Nicora 11646* (SI) [LI, Pi]; Depto. Conesa, ruta 251 a 13 km al N de General Conesa, camino a Río Colorado, 40°01'S, 64°27'W, *Bacigalupo & Nicora 12503* (BAA) [LI, Pi and St]; Depto. San Antonio, Sierra Grande, 41°38'S, 65°23'W, *Piccinini & Leguizamón 1610* (BAA) [LI, Pi]; ruta 3 a 8 km sur de San Antonio, 40°45'S, 64°56'W, *Correa & Nicora 3193* (BAA) [LI, Pi and St]. **Santa Cruz:** Depto. Deseado, Camino a Cabo Blanco, Tellier, entre Estancia El Chara y Tellier, 47°26'S, 66°02'W, *Correa et al. 3362* (BAA) [LI, Pi and St].

Poa pilcomayensis

ARGENTINA. **Entre Ríos:** Depto. Concordia, Parque Rivadavia, 31°23'S, 58°01'W, 22 Sep. 1961, *Burkart 22456* (SI) [PI, Pi and St]; Depto. Gualeguay, La Verde, 21 Nov. 1949, *Burkart 18064* (SI) [PI, Pi and St]; Islas Lechiguanas, Delta medio frente a Ramallo, 33°29'S, 60°01'W, 30 Dec. 1941, *Burkart 12874* (SI) [PI, St]; Depto. Victoria, Isla del Francés frente a Rosario, 32°57'S, 60°39'W, 15 Dec. 1937, *Burkart 8854* (SI) [PI, Pi and St], *Burkart 8817* (SI) [PI, Pi].

Poa pogonantha

ARGENTINA. **Patagonia:** Port Eden, 24 Jan. 1879, *Savatier 1844* (*Festuca pogonantha* Franch., holotype, BAA fragment) [PG, Pi]. **Chubut:** Depto. Futaleufú, Parque Nacional Los Alerces, Laguna Cisne, 42°36'S, 71°51'W, 16 Dec. 1962, *Roquero 5389* (BAA) [PG, Pi]; Depto. Río Sengüerr, Lago Fontana, Estancia La Pepita, 44°55'S, 70°58'W, 29 Jan. 1960, *Soriano 5662* (BAA) [PR, Pi]; Lago Fontana, Lote 15, 44°56'S, 71°30'W, *Martinoli & Boggiano 15080* (BAA) [PR, Pi and St], *Martinoli & Boggiano 15079* (BAA) [PR, St], 11 Feb. 1932, *Castellanos 9968* (BAA) [PR, Pi], *Martinoli & Boggiano 15077* (BAA) [PR, St]; *Martinoli et Boggiano 15078* (BAA) [PR, St]; Lago Fontana, Estancia La Pepita, 44°55'S, 70°58'W, 29 Jan. 1960, *Soriano 2618* (BAA) [PR, Pi]; Depto. Tehuelches, Lago Vintter, 43°58'S, 71°33'W, 2 Feb. 1989, *Nicora 9473 b* (SI) [PG, St]; Lago Vintter, playa arenosa, 43°58'S, 71°33'W, 7 Feb. 1989, *Nicora 9537* (SI) [PG, Pi]. **Río Negro:** Depto. Bariloche, Parque Nacional Nahuel Huapi, Ventisquero Frías, 41°11'S, 71°49'W, 13 Jan. 1952, *Boelcke & Correa 5500* (BAB) [PG, Pi and St]; Laguna Frías, 41°04'S, 71°49'W, 8 Jan. 1952, *Boelcke & Correa 5373* (BAB) [PG, Pi], *Boelcke & Correa 5380* (BAA) [PG, Pi]; Lago Roca, Arroyo Apoco, 41°23'S, 71°47'W, 26 Jan. 1952, *Boelcke & Correa 6045 1/2* (BAA) [PG, St]. **Tierra del Fuego e Islas del Atlántico Sur:** Depto. Ushuaia, Glaciar Martiales, 54°45'S, 68°18'W, 9 Dec. 1962, *Correa et al. 5365* (BAA) [PG, Pi]. CHILE. **XII Región:** Lago Azul, 51°27'S, 73°18′W, 10 Jan. 1977, *Moore & Pisano 1575* (BAB) [PG, Pi]; Islas Wollaston, Caleta Lientur, 55°44′S, 67°19′W, 23 Jan. 1980, *Pisano 5112* (SI) [PG, St]; Estancia Cerro Castillo, Cerro Solitario, 51°20′S, 72°37′W, 18 Jan. 1977, *Latour et al. 1739* (BAB) [PG, Pi]; Península W desembocadura Río Serrano, 51°25′S, 73°04′W, 23 Jan. 1977, *Moore & Pisano 1905* (BAB) [PG, Pi], *Moore 367* (SI) [PG, Pi].

Poa resinulosa complex

Poa buchtienii: BOLIVIA. **La Paz:** Manco Kapac, Lago Titicaca, Isla del Sol, 16°03′S, 69°10′W, 26 Jan. 1986, *Liberman 1289* (LPB) [BT, St]; Murillo, La Paz-Calacoto, 64 km hacia el nevado Illimani, 16°40′S, 67°45′W, 19 Jan. 1983, *Beck 9076* (LPB) [BT, Pi]. **Oruro:** Avaroa entre Challapata y Tolapalca, 19°20′S, 66°50′W, Feb. 1979, *Ceballos et al. 236* (SI) [BT, Pi]; La Paz, 18°36′S, 66°55′W, Feb. 1911, *Buchtien O. 2467* (syntype, BAA) [BT, St]; Poopo, a 4.5 km al norte de La Paz, sobre la ruta hacia Oruro, 16°20′S, 68°05′W, 6 Mar. 1993, *Peterson et al. 12714* (LPB) [BT, Pi and St]. **Potosí:** Surchichas, Potosí, a 12 km al NW de Salo, 20°55′S, 66°18′W, 21 Mar. 1992, *Peterson & Annable 11823* (LPB) [BT, Pi and St]. **Tarija:** Avilez Cerca de Cobres, 21°38′S, 64°47′W, 29 Jan. 1986, *Bastión 614* (LPB) [BT, Pi and St]. *P. calchaquiensis*: ARGENTINA. **Jujuy:** Depto. DR. Manuel Belgrano, Camino de huella de Alto Lozano a Tiraxi, 24°05′S, 65°40′W, 3 Nov. 1974, *Correa et al. 6106* (SI) [CL, St]; Depto. Humahuaca, Mina Aguilar, 23°12′S, 65°41′W, 23 Feb. 1972, *Ruthsatz 14577* (BAA) [CL, Pi]; Abra entre Iruya e Iturbe, 22°58′S, 65°21′W, 25 Jan. 1972, *Ruthsatz 14589* (BAA) [CL, St]; Depto. Santa Bárbara, El Fuerte, 22°07′S, 65°26′W, 18 Feb. 1972, *Cabrera et al. 22236* (BAA) [CL, Pi]; Depto. Susques, Cerro Tuzgle, 23°26′S, 66°30′W, 3 Mar. 1967, *Werner 76* (LP) [CL, Pi]; Depto. Tumbaya, Volcán, Abra del Paraguay, 23°55′S, 65°27′W, Feb. 1927, *Venturi 4905* (SI) [CL, St]; Depto. Yavi, Yavi Chico, 22°06′S, 65°28′W, 7 Mar. 1940, *Meyer 14926* (BAA) [CL, St]; Quebrada de Roquero, 22°18′S, 65°35′W, 20 Feb. 1963, *Cabrera 15369* (SI) [CL, Pi]. **Salta:** Depto. Guachipas, Pampa Grande, 25°52′S, 65°30′W, Mar. 1900, *Holmberg 2616* (BAA) [CL, Pi]. **Tucumán:** Depto. Tafí, Cumbres Calchaquíes, 26°35′S, 65°40′W, 29 Jan. 1907, *Lillo 5065* (isotype, BAA) [CL, St]. *P. pedersenii*: PARAGUAY. **Caaguazú:** Yhu, 25°01′S, 55°58′W, 19 Sep. 1988, *Pedersen 15049* (holotype, SI) [PE, Pi and St]. *P. resinulosa*: ARGENTINA. **Buenos Aires:** Partido General Pueyrredón, Estancia La Brava, Sierra de Valdez, 37°54′S, 58°00′W, 18 Nov. 1977, *Boelcke et al. 791* (SI) [RE, Pi]; Partido Tornquist, Estancia Chica y Estancia Fortín Chaco, Cerro La Vieja, 38°06′S, 62°14′W, 17 Nov. 1981, *Villamil 2073* (SI) [RE, Pi and St]; Estancia Mamim-Co, Cerro del Potrero, 38°03′S, 61°56′W, 18 Nov. 1981, *Villamil 2110* (SI) [RE, St], *Villamil 2054* (SI) [RE, Pi and St]. **Chubut:** Depto. Futaleufú, Estancia Suñica, 43°03′S, 71°04′W, *Lahitte s.n.* (BAA) [RE, Pi]; Parque Nacional Los Alerces, Río Percey, Cerro Ceballos, 42°55′S, 71°20′W, *Lahitte & Roquero 192* (BAA) [RE, St]; Depto. Languiñeo, Río Tecka, Pampa Chica, 43°28′S, 70°51′W, 8 Nov., *Skottsberg s.n.* (*P. decolorata* Pilg., isotype, BAA fragment) [RE, St]. **Córdoba:** Depto. Río Seco, Caña Cruz a 10 km de Villa de María, 29°54′S, 63°44′W, 7 Nov. 1949, *Hunziker 8003* (SI) [RE, St]. **Mendoza:** Mendoza, *Gillies s.n.* (isotype, BAA, fragment) [RE, Pi]. **Neuquén:** Depto. Huiliches, Parque Nacional Lanin, a Lago Tromen, 39°34′S, 71°32′W, *Lahitte et al. 606* (BAA) [RE, Pi and St]; San Martín de los Andes, camino entre Lolog y Mamuil-Malal, 39°40′S, 71°22′W, *Neumeyer 31* (BAA) [RE, Pi and St]; Depto. Los Lagos, Estancia Fortín Chacabuco, 41°02′S, 71°15′W, *Boelcke 3210 1/2* (BAA) [RE, Pi and St]. **Santa Fe:** Depto. Vera, Calchaquí, 29°54′S, 60°18′W, 7 June 1965, *Alonso 866* (SI) [RE, Pi].

Poa rigidifolia

ARGENTINA. **Santa Cruz:** Depto. Güer Aike, Estancia Stag River, meseta Latorre, Cerro Punta Gruesa, 51°32′S, 72°05′W, 25 Jan. 1978, *Roig et al. 2950* (BAB) [RI, Pi]; Estancia Punta Alta, 51°43′S, 71°58′W, 24 Jan. 1976, *Latour et al. 536* (BAB) [RI, Pi]; Estancia Punta Loyola, 51°44′S, 68°56′W, 1976, *Nicora 828* (BAB) [RI, Pi]; 42 km oeste de Estancia Punta del Monte, cruce a Sección Magán, 51°32′S, 71°35′W, 1977, *Roig & Méndez 2494* (BAB) [RI, Pi and St]; entre Estancia Glencross y Laguna Cóndor, 51°48′S, 71°42′W, 14 Dec. 1976, *Latour et al. 1057* (BAB) [RI, St]; Estancia Primavera, ruta 293, 51°27′S, 72°15′W, 1976, *Latour et al. 1198* (BAB) [RI, Pi]; Punta Loyola, 51°50′S, 69°11′W, 6 Dec. 1976, *Latour et al. 906* (BAB) [RI, St]; Bajo La Leona, 51°31′S, 69°46′W, 11 Nov. 1977, *Roig & Méndez 2437* (BAB) [RI, St]; Río Gallegos, entre Estancia Maragata y Las Buitreras, 51°45′S, 70°10′W, 10 Dec. 1975, *Arroyo et al. 410* (BAB) [RI, St]; Estancia Guakenken Aike, 51°27′S, 69°48′W, 14 Nov. 1977, *Roig & Méndez 2485* (BAB) [RI, Pi and St]. **Tierra del Fuego e Islas del Atlántico Sur:** Depto. Río Grande, Estancia El Salvador, 53°39′S, 68°35′W, 20 Nov. 1971, *Boelcke et al. 15093* (BAB) [RI, Pi]; 51 km N de San Sebastián, Estancia Cullen, 52°53′S, 68°30′W, 21 Nov. 1971, *Boelcke et al. 15156* (BAA) [RI, Pi]; Estancia Secunda Argentina, Jan. 1933, *Castellanos 7597* (BAA) [RI, Pi]; Islas Malvinas, Port William, 52°00′S, 59°00′W, Sep. 1850, *Lechler s.n.* (*P. rigidifolia* Steud., holotype, BAA fragment) [RI, Pi]. CHILE. **XII Región:** Aestate, Mar. 1936, *Philippi s.n.* (*P. poecila* Phil., isotype, BAA fragment) [RI, Pi]; Sandy Point, 53°10′S, 70°54′W, Oct. 1852, *Lechler 1068b* (*Aira spiciformis* Steud., holotype, BAA fragment) [RI, Pi].

Poa rigidifolia var. *ibari*

ARGENTINA. **Chubut:** Depto. Ameghino, Lochiel, 44°39′S, 66°10′W, 19 Oct. 1946, *Soriano 1915* (BAA) [DU, Pi and St]. **Santa Cruz:** Depto. Güer Aike, Estancia Guakenken Aike, 51°25′S, 69°48′W, *Roig et al. 2488* (BAB) [DU, Pi]; ruta 3, cruce con camino a Puerto Coyle, 51°05′S, 69°27′W, 24 Nov. 1963, *Correa et al. 2790* (BAA) [IB, Pi]; Estancia La Carlota sección San Elías, 51°24′S, 71°24′W, 20 Jan. 1978, *Roig et al. 2865* (BAA) [IB, St]; Río Chico, Chimen Aike, 51°44′S, 69°18′W, 26 Nov. 1950, *Sleumer 790* (BAA) [IB, Pi]; Cumbre de la cordillera Chica, Cerro Punta Alta, 51°27′S, 72°06′W, 5 Feb. 1978, *Ambrosetti & Méndez 3747* (BAA) [IB, Pi]; Sección San Antonio, 51°24′S, 71°34′W, 19 Jan. 1978, *Roig et al. 2756* (BAA) [IB, Pi and St]; Estancia Cóndor, 51°50′S, 69°11′W, 8 Dec. 1976, *Latour et al. 877* (BAB) [IB, St]; Bajo La Leona, 51°31′S, 69°46′W, 1977, *Roig & Méndez 2436* (BAB) [IB, St]; Estancia Los Vascos, 51°25′S, 70°52′W, 21 Jan. 1978, *Roig et al. 2877* (BAB) [IB, St]; Depto. Lago Argentino, ruta 40, a 100 km al NW de La Esperanza hacia Lago Argentino, 50°21′S, 71°40′W, 28 Nov. 1963, *Correa et al. 2888* (BAA) [DU, Pi and St]; Depto. Deseado, Patagonia orientalis ad Mazaredo portum, 47°05′S, 66°42′W, Jan. 1905, *Dusén 5318* (*P. dusenii* Hack., holotype, BAA fragment) [DU, Pi]; Camino a

Puerto Deseado, 47°48′S, 66°12′W, 18 Nov. 1963, *Correa et al. 2590* (BAA) [DU, Pi and St]; Depto. Río Chico, Camino a Gobernador Gregores, Hotel Las Horquetas, 48°13′S, 71°19′W, *Correa & Nicora 3511* (BAA) [DU, Pi and St]. CHILE. **XII Región:** Lago Pinto, 52°00′S, 72°24′W, Jan. 1844, *Ibar s.n.* (*P. ibari* Phil., isotype, BAA fragment) [IB, Pi].

Poa schizantha

ARGENTINA. **Buenos Aires:** Partido Bahía Blanca, Bahía Blanca, 38°44′S, 62°16′W, Nov. 1941, *Zaffanella 268* (BAB) [SC, Pi]; Partido Dorrego, Monte Hermoso, en las dunas marítimas, 38°59′S, 61°17′W, 8 Nov. 1940, *Parodi 13672* (holotype, BAA, SI) [SC, Pi], *Parodi 13673* (BAA) [SC, St], *Parodi 13675* (BAB) [SC, Pi], *Cabrera 6752* (BAA) [SC, Pi], Jan. 1941, *Zaffanella 14402* (BAA) [Sc, Pi].

Poa tristigmatica

ARGENTINA. **Chubut:** Departamento Río Sengüerr, Pampa de Chalía, Estancia La Media Luna, 45°35′S, 71°27′W, 3 Dec. 1981, *Villamil 2236* (SI) [TR, St]; Lago La Plata, 44°51′S, 71°53′W, *Martinoli & Boggiano 15073* (BAA) [TR, Pi]; Depto. Tehuelches, Gobernador Costa a Río Pico, 44°07′S, 70°55′W, 14 Dec. 1972, *Latour et al. 3588* (SI) [TR, Pi]. **Neuquén:** Depto. Lácar, Cerro Chapelco, en el filo, 40°09′S, 71°20′W, 23 Feb. 1974, *Correa et al. 5926* (*P. boelckei* Nicora, holotype, BAB) [BK, Pi], *Correa et al. 5928* (BAB) [BK, Pi]; Cordón del Cerro Chapelco, Portezuelo Trahunco, Faldeo S, 40°09′S, 71°20′W, 13 Feb. 1978, *Gentili 695* (BAB) [BK, St]; Cerro Chapelco, 40°09′S, 71°20′W, Feb. 1961, *León & Calderón 963* (BAA) [BK, Pi], 26 Jan. 1966, *Eskuche 603-2* (BAA) [BK, St], *Eskuche 603-1* (BAA) [BK, St], *Eskuche 599-3* (BAA) [BK, Pi], 12 Jan. 1961, *León & Calderón 903* (BAA) [BK, Pi]; Depto. Minas, Paso del Macho, 36°26′S, 70°46′W, 26 Jan. 1970, *Boelcke et al. 13931* (BAA) [TR, Pi], *Boelcke et al. 13926* (BAA) [TR, St]; Laguna Varvarco Campos, Cajón Benítez, paso Puerta Vieja, 36°17′S, 70°41′W, 1 Nov. 1970, *Boelcke et al. 14281* (BAA) [TR, Pi]; Cordillera del Viento, cruzada de Tricao Malal al Cajón de Butaló, 36°58′S, 70°30′W, 3 Nov. 1964, *Boelcke et al. 11568* (BAB) [TR, St]; Cajón del Portillo, 2560 m, 36°12′S, 70°36′W, 31 Jan. 1970, *Boelcke et al. 14168* (BAA) [TR, Pi and St]; Cordillera del Viento cruzada de Tricao Malal al Cajón de Butaló, en vertiente, 36°58′S, 70°30′W, 3 Nov. 1964, *Boelcke et al. 11567* (BAA) [TR, St]; Depto. Ñorquín, Copahue, 37°49′S, 71°06′W, 3 Feb. 1930, *Hirschhorn 23* (BAA) [TR, Pi and St]. **Río Negro:** Depto. Nahuel Huapi, Cerro Catedral, 41°05′S, 71°45′W, Feb. 1954, *Parodi 15343* (BAA) [TR, Pi], *Parodi 15323* (BAB) [TR, Pi]. CHILE. **XII Región:** Cordillera de Talcaregue, Feb. 1831, *Gay 49* (*P. tristigmatica* E. Desv., in Gay, syntype, BAA fragment) [TR, Pi].

APPENDIX 3.

Morphological variables used in numerical analyses, their abbreviations in parentheses, codification, and brief explanations of character variation.

VEGETATIVE VARIABLES

1. Plant habit (HAB). Caespitose or short-rhizomatous (1), long-rhizomatous (2), stoloniferous (3). Plants range from typically caespitose like *P. ligularis* to long-rhizomatous as *P. lanuginosa*. Caespitose plants sometimes develop stolons as in *P. alopecurus* or long rhizomes as in *P. tristigmatica*.
2. Leaf length (LEAle, cm). This is a variable character within *Poa* sect. *Dioicopoa*, although there is a conspicuous discontinuity between large-sized species and smaller ones. This character usually correlates with sheath and leaf blade length, plant height, panicle length, and number of nodes on principal panicle axis. The highest value, 93 cm, was measured on *P. dolichophylla*; the minimum value, 3.5 cm, corresponded to *P. rigidifolia*.
3. Sheath length (SHEle, cm). The highest value found, 39 cm, corresponded to *P. bergii* and *P. stuckertii*, while the minimum value, 1.7 cm, was measured on *P. rigidifolia*.
4. Leaf blade length (BLAle, cm). The highest value found, 61 cm, corresponded to *P. dolichophylla*, while the minimum value, 1.3 cm, was measured on *P. rigidifolia*.
5. Ligule length (LIGle, mm). This character presents a conspicuous discontinuity, dividing *Poa* sect. *Dioicopoa* into short-liguled species and long-liguled ones. The longest ligule, 19.6 mm, was measured in *P. bergii*; the shortest, 0.20 mm, in *P. pedersenii*.
6. Ligule shape (LIGsp). Acuminate (1); truncate to obtuse (2). Long ligules are usually acuminate (*P. ligularis*), while shorter ligules are commonly truncate (*P. bonariensis*). Species like *P. denudata* can have acuminate ligules of short to medium lengths.
7. Leaf blade apex (API). Navicular or obtuse (1); sharp or acuminate (2). *Poa* sect. *Dioicopoa* is characterized by a navicular or obtuse leaf blade apex as in *P. lanigera*. Sharp or acuminate apices also occur within species such as *P. hubbariana* and *P. bergii*.

BLADE CROSS SECTIONS

8. Blade outline (OUTli). Flat (1); conduplicate (2); convolute or subconvolute (3). Species of the *P. dolichophylla* complex are characterized by flat blades. However, *P. schizantha* presents a convolute to subconvolute blade, probably associated with the absence of bulliform cells; blades in other species vary from conduplicate to subconvolute.
9. Blade width, measured on the adaxial epidermis between blade margin and midrib (BLAw, mm). This measure generally correlates with the number of vascular bundles with sclerenchyma girders on both adaxial and abaxial epidermis. The highest value was recorded in *P. iridifolia*, 6.8 mm, and the minimum value was found in *P. ligularis*, 0.37 mm.
10. Blade maximal thickness between abaxial and adaxial epidermis layers (BLAt, mm). This character frequently correlates with stomata length. The maximum value, 0.55 mm, was seen in *P. bergii*, and the minimum value, 0.10 mm, in *P. pilcomayensis*.
11. Bulliform cell development (BULc). Not to little differentiated (1); inflated, and well developed (2). *Poa* sect. *Dioicopoa* presents bulliform cell groups at both sides of the midrib as in *P. holciformis*. *Poa schizantha* is the only species that lacks bulliform cells, while these are generally little differentiated in *P. pogonantha*.
12. Shape of sclerenchyma at blade margin (CAP). Rounded to pointed cap, without sclerenchyma extending on abaxial or adaxial epidermis (1); crescent-shaped cap, with sclerenchyma briefly extending on

abaxial and adaxial epidermis (2) (terminology of states as in Ellis, 1976). *Poa* sect. *Dioicopoa* generally presents a group of sclerenchyma cells at blade margin, seen in cross section. Terminal sclerenchymatous caps are commonly rounded to pointed like in *P. rigidifolia*, with species of the *P. dolichophylla* complex presenting a crescent-shaped cap.

13. Number of vascular bundles with sclerenchyma girders on both adaxial and abaxial epidermis (SCL2). Highest values were recorded in species of the *P. dolichophylla* complex (45), whereas minimum values of only 1 or 2 were found in *P. rigidifolia*, *P. ligularis*, and the *P. resinulosa* complex, among others.
14. Number of vascular bundles with a sclerenchyma girder only on abaxial epidermis (SCLab). These are commonly few (1 or 2) in the *P. dolichophylla* complex, but are more numerous (5 to 8) in *P. bergii*.
15. Number of vascular bundles with a sclerenchyma girder only on adaxial epidermis (SCLad). Rare in *Poa* sect. *Dioicopoa*, they are often present (3 to 5) in the *P. dolichophylla* complex.
16. Number of vascular bundles with only a few sclerenchyma cells surrounding the bundles (SCLin). This character is variable in species of *Poa* sect. *Dioicopoa*, but generally few vascular bundles correspond to this type.

ABAXIAL BLADE EPIDERMIS

17. Stomata length (STOM, mm). This character, usually indicative for different ploidy levels, presents three ranges of variation. Large stomata are seen in *P. alopecurus*, *P. bergii*, *P. bonariensis*, *P. holciformis*, *P. indigesta*, *P. lanuginosa*, *P. pogonantha*, and *P. tristigmatica*. Small stomata are seen in the *P. dolichophylla* complex, whereas other species have intermediate values.
18. Thickness of the long cells (CELt, mm). This varies between 0.016 mm in *P. ligularis* and 0.033 mm in *P. lanuginosa*.
19. Abaxial epidermal prickles (PRIC). Absent to infrequent (1); frequent to numerous (2). Prickles are generally frequently distributed on abaxial epidermis, although they are infrequent in the *P. dolichophylla* complex, *P. bergii*, *P. hubbardiana*, *P. lanigera*, *P. pilcomayensis*, and *P. tristigmatica*.
20. Silico-suberose cell pairs on intercostal epidermis (SISU). Absent to infrequent (1); frequent to numerous (2). Silico-suberose paired cells are the usual condition in *Poa* sect. *Dioicopoa*, though they are infrequent in *P. lanigera* and *P. pilcomayensis*.

FERTILE VARIABLES

21. Plant height, measured from the longest culm of fertile plants (HEIG, cm). Culms usually exceed leaves, except in *P. hubbardiana*, where they are as long as leaves, occasionally longer. The tallest plant was recorded in the *P. dolichophylla* complex (136 cm); the smallest plant, in *P. rigidifolia* (6 cm).
22. Number of culm nodes (CULM). This varies between 2 and 3 in small plants and 4 to 5 in taller plants.
23. Panicle length (PANle, cm). The longest panicle (37 cm) was recorded in *P. dolichophylla*; the shortest (1.7 cm) was in *P. rigidifolia*.
24. Panicle width, measured on widest panicle (PANw, cm). Panicles are contracted within *Poa* sect. *Dioicopoa*, with the widest recorded in *P. bonariensis* (2–5 cm). The *Poa dolichophylla* complex presents broad panicles (5–8 cm), which are usually expanded.
25. Number of nodes on principal panicle axis (PANn). This varies from 20 in the *P. dolichophylla* complex, *P. bergii*, *P. bonariensis*, *P. ligularis*, and *P. indigesta*, to only 6 in *P. alopecurus*, *P. pogonantha*, and *P. rigidifolia*.
26. Length of terminal, well-developed spikelet of a branch panicle (SPIle, mm). Well-developed spikelets were selected from the upper half of a panicle, particularly from terminal spikelets of a branch. Spikelet length and correlated measures do not usually vary within the same panicle. The highest value was found in *P. pogonantha* (28 mm), although it is associated with vivipary. The longest non-viviparous spikelets were found in *P. bergii* and *P. schizantha* (12 mm), with the shortest among species of the *P. dolichophylla* complex (2.8 mm).
27. Width of terminal well-developed spikelet of a branch panicle (SPIw, mm). This character correlates with flower number per spikelet. The broadest spikelet was recorded in *P. bergii* (10 mm).
28. Number of florets per spikelet (FLOn°). Spikelets in *Poa* sect. *Dioicopoa* generally have 3 to 5 flowers. Fifteen flowers were found in *P. schizantha*, and 11 in *P. bergii*. The minimum value observed, (2), is commonly present among species of *Poa*.
29. Viviparous florets (FLOv). Absent (0); present (1). Vivipary is a reproductive alternative found in species inhabiting low-temperature areas with a short fertile season, such as *P. alopecurus*, *P. pogonantha*, and *P. tristigmatica*.
30. First glume length (GLUle, mm). This correlates with lemma and palea length as well as glume, lemma, and palea width, and is less correlated with lodicule length and width. This character set varies among pistillate and staminate plants. The longest glumes were observed on pistillate specimens of *P. bergii* (10.3 mm) and *P. alopecurus* (8.9 mm). The shortest glumes were recorded in a staminate specimen of *P. dolichophylla* (1.38 mm).
31. First glume width, measured from principal nerve to margin (GLUw, mm). This varies from 0.33 mm in *P. dolichophylla* and *P. bonariensis* to 1.45 mm in *P. alopecurus*, being as much as 1.68 mm in *P. bergii*.
32. Ratio of first glume length/second glume length (G1/G2). Equal to 1 (0); less than 1 (1); more than 1 (2). Having the first glume shorter than the second glume is typical in *Poa* sect. *Dioicopoa*. However, *P. stuckertii* commonly presents glumes of equal lengths.
33. Ratio of second glume length/lemma length (G2/LE). Equal to 1 (0); less than 1 (1); more than 1 (2). The second glume is generally shorter than the lower lemma in *Poa* sect. *Dioicopoa*.
34. Number of nerves on the first glume (GLUn). Glumes in *Poa* sect. *Dioicopoa* generally present a principal nerve and two marginal nerves (sometimes absent). *Poa bergii* features two additional marginal nerves (in total, 3 to 5, up to 7).
35. Prickles on the rachilla (RACH). Absent to infrequent (0); frequent to numerous prickles (1). *Poa* sect. *Dioicopoa* generally present these prickles on rachilla and panicle axes.
36. Lemma length (LEMle, mm). Dimorphism between pistillate and staminate plants impacts lemma lengths within species of *Poa* sect. *Dioicopoa*. Species discrimination is considered among specimens of the