

SCLEROPOGON (GRAMINEAE), A MONOTYPIC GENUS  
WITH DISJUNCT DISTRIBUTION

John R. Reeder & L. J. Toolin  
Herbarium, University of Arizona, Tucson, AZ 85721

Abstract

Examination of herbarium specimens of *Scleropogon* from both North and South America, along with field work in southern Arizona, has confirmed the long-held view that the genus is monotypic. Our studies failed to substantiate the existence in southwestern U.S. and Mexico of a distinct entity, marked by a coherent suite of characters, that is specifically distinct from *Scleropogon brevifolius* as it exists in South America. *S. longisetus* Beetle is, therefore, reduced to synonymy.

The genus *Scleropogon* was established by Philippi (1870), based on material collected in the vicinity of Mendoza, near the border between Argentina and Chile. The type species is *S. brevifolius*. Until 1981, when A. A. Beetle described a second species, *Scleropogon* was considered to be monotypic, having a disjunct distribution with populations in both North and South America. The plants are diclinous, having unisexual flowers which may be borne on the same or different plants. Moreover, the staminate and pistillate spikelets are quite different, the lemmas of the former having short awns, or none, whereas the latter are long awned.

In describing his new species, *Scleropogon longisetus* (based on Reeder & Reeder 3626 from Coahuila, Mexico) Beetle (1981) stated that it was confined to North America, in contrast to *S. brevifolius*, which occurs in both the Northern and Southern Hemispheres. He includes the following key:

"Dioecious, rhizomatous, the panicles scarcely exserted above the leaves, the awns 3—5 cm long, at maturity twisted and strongly recurved  
*Scleropogon brevifolius*

Monoecious, stoloniferous, the panicles well exserted above the leaves, the awns 5—15 cm long, twisted but not strongly recurved  
*Scleropogon longisetus*"

(Although in his key, Beetle gives the awn length for *S. brevifolius* as 3—5 cm, in his description it appears as "5—15 cm"!)

Botanists familiar with "dioecious" plant species will know that this condition is somewhat fragile. In a number of such grasses (e.g. *Buchloë*, *Opizia*, *Pringleochloa*) staminate and pistillate inflorescences may occur on the same plant within populations in which other plants of the same species bear either ♂ or ♀ flowers, but not both.

That the well-known and wide-ranging genus *Scleropogon*, considered to be monotypic since it was originally described, actually



consists of two clearly marked species (one dioecious and rhizomatous; the other monoecious and stoloniferous) is a concept that invites skepticism. Beetle's new species deserves critical re-examination, especially since the name *S. longisetus* has been taken up by Lehr & Pinkava (1982) in their Supplement to a Catalogue of the Flora of Arizona. They comment: "*Scleropogon longisetus* Beetle replaces *S. brevifolius* Phil. which is south of us." Those following Lehr's Catalogue (1978) and its supplements will quite logically conclude that the correct name for the common "Burro Grass" is *S. longisetus* and not *S. brevifolius*, as listed in all of our standard Floras and Manuals.

Beetle states (1981, p. 43): "Based on Reeder & Reeder 4607 from Chihuahua, Mexico, the chromosome count,  $2n$  equals 40, for *longisetus* is the same as that for *S. brevifolius* (cf. Reeder, J. R. 1967 and 1968. Notes on Mexican Grasses VI and VIII, Bull. Torrey Botanical Club)." Referring to these two articles, one finds that the cited specimens (all under the name *Scleropogon brevifolius*) are Reeder & Reeder 4528 in the earlier paper, and R. & R. 4607 and 4805 in the later one. Beetle has referred R. & R. 4607 to *S. longisetus*, and by inference clearly suggests that the other two (4528 and 4805) are good *S. brevifolius*. At ARIZ, a sheet of R. & R. 4805 (Fig. 1) has four specimens: two bear only ♂ flowers, one only ♀ flowers, and the fourth is monoecious. All plants have stolons as well as rhizomatous bases. The inflorescences of the ♀ plants are exserted about 1.5 cm above the leaves, and the awns are from 2 to 6.5 cm in length. R. & R. 4528 is from Crockett County, Texas, an area which Beetle indicates should be far north of the range of *S. brevifolius*. We have examined two sheets of this collection: one (ARIZ) has a single monoecious plant with short stolons, inflorescences exserted as much as 10.5 cm above the leaves, and awns up to 10 cm long. A YU specimen of the same number (on deposit at RM) has two plants, both of which are monoecious, obscurely stoloniferous, inflorescences exserted 8--10 cm, and awns mostly 6--9 cm long. Although Beetle implies that these specimens are *S. brevifolius*, they most closely fit his description of *S. longisetus*. One is led to wonder whether Beetle actually examined this material.

The following specimens (all Reeder & Reeder collections) were cited by Beetle as representing his new species, *S. longisetus*: 2938, 3641, 4060, 4607, 4713. Based on his protologue, these plants should be monoecious, stoloniferous, and have the ♀ inflorescences exserted well above the leaves. No. 2938 (ARIZ) fits his description reasonably well, but the others appear to have characters of both "species". A sheet of 4060 at YU (Fig. 2) has two ♂ and two ♀ plants in which the inflorescences are not exserted, or are borne only one cm above the leaves; at least some of the awns are strongly recurved, and none of them exceeds 5 cm in length. The ARIZ specimens of this number are essentially identical to those at YU. A specimen of 4607 at YU has the characters Beetle ascribed to *S. longisetus* except that it has a rhizomatous base, and some of the inflorescences are rather shortly exserted. A sheet of this same number at ARIZ has one ♂,





Figs. 1, 2. *Scleropogon* from Mexico. 1. R. & R. 4805 (ARIZ) which Beetle implies is *S. brevifolius*. Note plant in upper right is monoecious, and that most plants have stolons. 2. R. & R. 4060 (YU) cited by Beetle as *S. longisetus*. Note scarcely exserted inflorescences and short awns, some recurved. Scale line = 5 cm.

one ♀, and one monoecious plant; both of the pistillate and monoecious plants have rhizomatous bases, and the ♀ plant has an evident stolon. A sheet of 4713 at ARIZ has plants with ♀ inflorescences not, or but slightly exserted, and some of the awns are strongly recurved. The sheet of 4713 at YU has a ♂, a ♀, and a monoecious plant, the ♀ inflorescence is only shortly exserted, and some of the awns are clearly recurved. Finally, 3641 (ARIZ, YU) has ♂ and ♀ plants, the inflorescences scarcely exserted, and some of the awns are recurved. It seems clear that these specimens possess characteristics of both *Scleropogon brevifolius* and *S. longisetus*, and some (e. g. R. & R. 3641) most closely fit Beetle's description of the former! Examination of additional specimens from North America confirms the lack of consistent association of characters within each of the suites purportedly delimiting two species of *Scleropogon*.



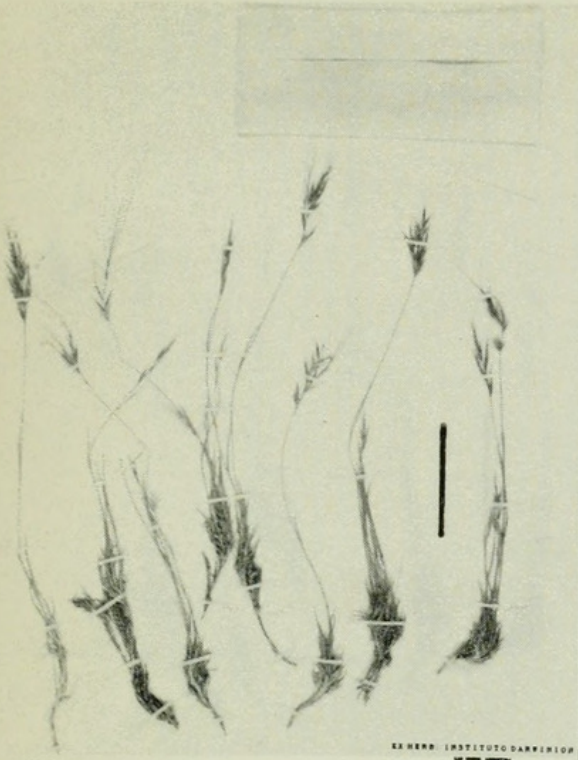
Field studies of seven populations of *Scleropogon* in widely scattered areas in Cochise County, southern Arizona, during the late summer and fall of 1986 by one of us (Reeder) added significant information. In every stand examined there were separate colonies of ♂, ♀, and monoecious individuals. Plants exhibiting the latter condition may have separate culms bearing either a ♂ or a ♀ panicle, or an inflorescence might be a combination of ♂ and ♀ spikelets. In some cases, a spikelet was a mixture of ♂ and ♀ florets, the ♀ normally being borne toward the top of the spikelet. In all of these populations of *Scleropogon*, there was a preponderance of strictly pistillate plants. It is significant that late in the season, as the ♀ spikelets mature, the awns reflex markedly, a phenomenon observed in all areas visited. It should be remembered that Beetle indicated this to be an exclusive characteristic of South American *Scleropogon*. We found it to be a matter of maturity; it is clearly a generic character, not a specific one.

Although we hoped to see a large number of specimens of South American *Scleropogon* in order to compare them with those of our region, we were not particularly successful. We requested a loan of all South American material of this genus from US, but received only three sheets! Fortunately, one of those (G. Covas 15053) was from Mendoza, the type locality. Those specimens, plus one at ARIZ, were all we were able to assemble. Perusal of this meager sample, however, has been most enlightening and permits us, we believe, to make sound judgments regarding the validity of Beetle's *S. longisetus*, a taxon he indicates is confined to North America.

All of the South American material, according to Beetle, should be *Scleropogon brevifolius* and, perforce, be about one dm tall, strictly dioecious, rhizomatous, have inflorescences scarcely exceeding the leaves, and awns 3--5 cm in length. The plants from this area we were able to examine were at least 1.5 dm, most were about 2, and some were as much as 2.5 dm in height. Bodenbender 8982 (US), from La Rioja, consists of three fragmentary plants: two ♂, and one monoecious with ♂ and ♀ flowers in the same inflorescence. The panicle of the monoecious plant is exserted ca. 12 cm above the leaves, and the awns are 3--5 cm long. All three of these fragments

**Figs. 3--6.** *Scleropogon* from South America (on left) and North America (on right). 3. Covas 15053 (US) from Argentina. Note all plants are monoecious, have well-exserted inflorescences, and are stoloniferous. 4. R. & R. 7962 (ARIZ) from Arizona, U.S.A.. Note strong rhizomatous base. 5. Ruiz Leal 22098 (ARIZ) from Argentina. 6. R. & R. 3626 (YU) from Mexico (type of *S. longisetus* Beetle). Note similarity of these last two specimens. Both have one ♀ and one monoecious plant, are stoloniferous, and the pistillate plants have long awns, some of which are recurved. Scale line = 5 cm.





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2716759

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Herbario de Arizona  
P.O. BOX 161987

3

HERB. INSTITUTO DANIELINO  
Scleropogon brevifolius

Los Argentina, Mendoza Las Barras  
10 km. al N. de Tupahato 16-1-1960  
Leg. O. Doras 15055

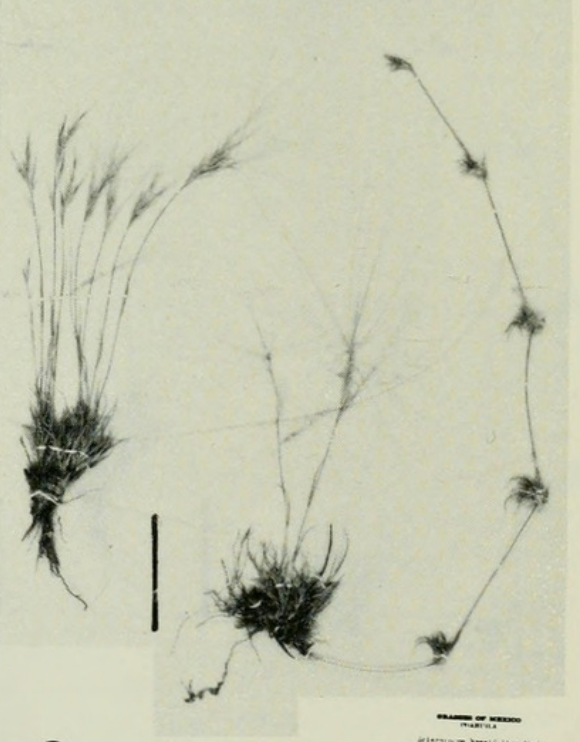


4



5

Herbario de San Luis  
Grassland  
Scleropogon brevifolius Phil.  
Provincia Formosa de San Juan, Camino E.  
Glosia-Culungasta, 2 km. n. - forma de tallos  
de panderos. Aristas de las espigas purpuras!  
M. 22.098 Feb. - 5 8 562  
Dr. Perotti, 1962



6

GRASSLAND OF MEXICO  
Scleropogon brevifolius Phil.  
Along road to Comarca de San Juan, 20 miles north of Saltillo,  
Bismarck, Arizona v. 1000 m. (altitudinal), Texas,  
and Cholla. Occasional, forming isolated  
colonies.  
September 5, 1962  
Dr. J. R. Reeder & C. C. Reeder

HERBARIUM OF YALE UNIVERSITY



are borne on stolons. A handwritten note on the label reads: "creeping like *Monanthochloë*!" G. Covas 15053 (US), from Mendoza (the type locality) is unquestionably monoecious (Fig. 3). The sheet has eight plants, most of which have a stoloniferous base, and no rhizomes are evident. None of the inflorescences is either ♂ or ♀, but ♂ and ♀ florets are borne in the same inflorescence, often in the same spikelet. The inflorescences are borne 10—12 cm above the leaves, and the awns are up to 6 cm long. A. L. Cabrera 30110 (US) has only ♀ plants, some with stolons, in which the exertion of the inflorescence varies from 3—9 cm. The awns are straight and mostly 6—9 (10) cm in length. Beetle characterized the South American plants (*S. brevifolius*) as lacking stolons and having "freely branching rhizomes." His new species, in contrast, is said to form elongate stolons, but lack rhizomes. We did not find plants of this genus to differ in these respects whether from the U.S.A. or from South America. All are stoloniferous, but none appears to form long branching rhizomes. Rhizomatous bases are characteristic of all, however, and it is not uncommon to find short rhizomes in plants from the U.S.A. Reeder & Reeder 7962, a staminate plant from Cochise Co., Arizona (Fig. 4), shows a more strongly developed rhizome than any we found among the South American plants examined.

Ruiz Leal 22098 (ARIZ) is strikingly similar to specimens from our area. It has two plants, one pistillate and the other monoecious (♂ and ♀ florets in the same inflorescence). Both plants have short basal stolons, well-exserted panicles (4—12 cm), and awns 4—10 cm long (Fig. 5). Compare this specimen with R. & R. 3626 from Coahuila, Mexico, which Beetle designated as the type of his new species, *S. longisetus* (Fig. 6). In each case, the plants are monoecious, stoloniferous, have inflorescences borne well above the leaves, and the awns are widely spreading. An obvious difference is that the Mexican sheet shows a plant with a long stolon. We found this to be a variable character in all populations of *Scleropogon*. Presence or absence of stolons on herbarium specimen, and their length when present, is often a reflection of the care taken by the collector, and may not represent the plants' true characteristic.

It seems clear that plants of the genus *Scleropogon* from South America differ in no significant respect from those in southwestern U.S.A. and Mexico. Indeed, Beetle's characterization of *S. longisetus* describes quite accurately some Argentinian specimens we examined. We note that Pilger (1951) commented that plants of this genus may be monoecious, and illustrated a spikelet which is transitional with ♂ florets below and ♀ ones at the apex. Although it is not certain that Pilger was describing a South American specimen, the fact that his paper appears in an Argentinian journal is strongly suggestive.

Highly significant with respect to a clear understanding of *Scleropogon* in South America is the description and figure in Roig & Roig's (1971) treatment of the plants of Mendoza, the type locality for *S. brevifolius*. These authors describe the plants as perennial, monoecious or dioecious, with many-noded stolons which attain a



length of 40—50 cm and root at the nodes producing new plantlets. The panicles, they state, are masculine, feminine, or a mixture, and in the latter case the ♂ flowers are borne at the base. They give the awn length as 30 to 50 mm, and point out that a specimen (No. 10,352 in the Herbarium of Ruiz Leal) has some ♀ spikelets with 10 or 11 florets, and awns reaching a length of 110 mm. Their illustration (Fig. 17, p. 51) shows a plant one-half natural size with a long stolon and five flowering culms. Four of the culms bear ♀ panicles, and the fifth is wholly ♂. Clearly this plant is monoecious and stoloniferous and, according to Beetle, should not occur in South America. The panicles, when measured on the figure, are borne 3 to 4 cm above the leaves, but since the habit drawing depicts the plant one-half size, the actual length of the flowering culms would be 6 to 8 cm. Ruiz Leal (1972), in a popular Flora of the Mendoza area, also describes *Scleropogon* as being 10 to 20 cm tall and stoloniferous, the plants dioecious or monoecious. The inflorescences, he writes, are "muy superantes", staminate, pistillate, or a mixture. He indicates that the species is an important pasture grass and is known locally as "pasto de oveja" [sheep grass]. Indeed, in the original description, Philippi states that the plants are 15 to 20 cm tall, and that the awns attain a length of 108 mm. Unfortunately, there is no discussion of whether the plants are monoecious or dioecious, nor is there any mention of rhizomes or stolons.

It is quite evident that the studies reported here do not support the recognition of a second species of *Scleropogon*. We failed to substantiate the existence in southwestern U.S.A. and Mexico of a distinct entity marked by a coherent suite of character (stoloniferous vs strongly rhizomatous habit; monoecious vs strictly dioecious; long-exserted vs scarcely-exserted inflorescences; long-awned vs short-awned lemmas) that is separable from *S. brevifolius* as it exists in South America. Beetle's interpretation of *S. brevifolius* is quite inaccurate; his description of *S. longisetus* merely adds another synonym. The traditional concept of *Scleropogon* as a monotypic genus is clearly the correct one.

Although Beetle (1981) cited Reeder & Reeder 3626 as the type of *Scleropogon longisetus*, he failed to indicate the herbarium in which the holotype is deposited. Among the specimens received on loan from RM was a specimen of R. & R. 3626 in a folder marked "Type Specimen." There is no indication on the sheet, however, that this specimen is indeed the holotype, nor does the name *Scleropogon longisetus* appear on the label or on any annotation. The original determination by Reeder was *S. brevifolius*, and this remains the only name on the sheet. Since Beetle had a long association with the University of Wyoming, it is logical to assume that the above specimen is the one he studied and considered to be the type. The identity of the actual holotype remains, however, somewhat ambiguous. We therefore designate Reeder & Reeder 3626 (YU), presently on deposit at RM, as lectotype of *S. longisetus* Beetle. The complete citation for the single species and its synonyms is given below:



- Scleropogon brevifolius** Philippi, Anal. Univ. Chile 36: 206. 1870.  
[Type from Mendoza, Argentina]
- Lesourdia karwinskyana* Fourn., Bull. Soc. Bot. France 27: 102.  
pl. 4, f. 12. 1880. [Type: Mexico, Tam., Cañon de las Minas,  
Karwinsky 992]
- Lesourdia multiflora* Fourn., Bull. Soc. Bot. France 27: 102.  
pl. 3, 4. 1880. [Type: Mexico, Tampico, Bernier]
- Scleropogon karwinskyanus* (Fourn.) Benth. ex S. Wats., Proc.  
Amer. Acad. Sci. 18: 181. 1883. (Based on *Lesourdia*  
*karwinskyana* Fourn.)
- Scleropogon longisetus* Beetle, Phytologia 49: 42. 1981. [Type:  
Mexico, Coah., Reeder & Reeder 3626]
- Festuca macrostachya* Torr. & Gray, U.S. Report Expl. Miss. Pacific  
2(4): 177. 1855. nom. nud. Texas, Pecos. (staminate specimen)
- Tricuspis monstra* Munro ex Hemsley, Diag. Pl. Mex. 56. 1880.  
(as synonym of *Scleropogon brevifolius* Philippi)

#### IMPORTANT COLLECTIONS

When no collector is cited, the specimens are gatherings of John R. Reeder & Charlotte G. Reeder. A number followed by an asterisk (\*) indicates a chromosome count of  $2n=40$ .

USA: Texas: Crockett Co., 20 mi S of Big Lake, 4528\* (ARIZ, YU).  
Arizona: Cochise Co., near mile marker 13, on Charleston Road, SW  
of Tombstone, 7878 [♂ & ♀ plants] (ARIZ); Whetstone Mt. area, Mine  
Canyon road, 7929 [♂ & ♀ plants], 7930 [monoecious] (ARIZ); 8 km E  
of Dragoon on Triangle T Road, 7933 [♂ & ♀ plants], 7934 [monoe-  
cious] (ARIZ); 6.5 km E of McNeal, 7946 [♂ & ♀ plants], 7947  
[monoecious] (ARIZ); 5 km N of Ft. Bowie Trailhead, 7962 [♂ & ♀  
plants], 7963 [monoecious] (ARIZ); ca. 7 km SW of San Pedro River  
crossing on Charleston Road, 7987 [♂ & ♀ plants], 7988 [monoecious]  
(ARIZ); along Rte. 80 S of St. David, just S of Curtis Road jct.,  
8001 [♂ & ♀ plants], 8002 [monoecious] (ARIZ).

MEXICO: Coahuila: 28 mi S of Saltillo, along road to Concepción  
del Oro, 3626 [Type of *S. longisetus* Beetle] (ARIZ, YU); 16 mi SE  
of Saltillo 3641 (ARIZ, YU). Chihuahua: ca. 5 mi SW of Jimenez,  
4607\* (ARIZ, YU). Zacatecas: ca. 40 mi N of Fresnillo, 4713 (ARIZ,  
YU). San Luis Potosí: ca. 15 mi NE of Cd. San Luis Potosí 2938  
(ARIZ); 17 mi NE of Cd. San Luis Potosí 4805\* (ARIZ); 2 mi SW of Cd.  
San Luis Potosí, 4060 (ARIZ, YU).

ARGENTINA: La Rioja, Cuesta de Amanao, "Creeping like Monantho-  
chloë!", Bodenbender 8982 (US); Mendoza, Las Heras, 10 km al N de  
Uspallata, G. Covas 15053 (US); Prov. San Juan, Dept. Iglesia,  
Ruta a Chile, A. L. Cabrera 30110 (US); Prov. San Juan, Camino  
Iglesia-Calingasta, Ruiz Leal 22098 (ARIZ).



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