

Altoparadisium Filg., Davidse, Zuloaga & Morrone

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This treatment is composed of the following taxa: *Altoparadisium*, *Altoparadisium chapadense*, *Altoparadisium scabrum*.

HOW TO CITE

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DESCRIPTION

Caespitose perennials. Culms erect; internodes hollow. Leaves primarily cauline; sheaths round on the back, the margins free; auricles absent; ligule a minute fringe of hairs; collar undifferentiated; blades linear-lanceolate. Inflorescence a contracted, terminal panicle; rachis glabrous, tough; nodes pilose; branches verticillate. Axillary inflorescences absent. Pedicels of unequal length. Spikelets paired or solitary, all alike, dorsally compressed, narrowly oblong-lanceolate in outline, disarticulating below the bracts and falling as a unit, with only one bisexual flower; callus undifferentiated except for a dense whorl of colorless hairs at the base of the spikelet; spikelet bracts 2 to 4; lower glume absent to setaceous; upper glume as long as the spikelet, embracing the lower lemma almost entirely, membranous, 3 to 5-nerved, the lateral nerves pilose-hispid or scabrous, the central nerve pilose-hispid toward the apex, projected into a straight or irregularly twisted awn; lower floret reduced to only a lemma; lower lemma membranous or herbaceous, 3-nerved, the mid-nerve prominent, pilose-hispid, the internerves sulcate, the margins hyaline and sharply folded at the lateral nerves, the apex pointed; lower palea absent; lower flower absent; upper lemma hyaline, 3-nerved, or absent; upper palea reduced, up to 1/5 as long as the upper lemma, hyaline, or absent; flower bisexual; lodicules 2, conduplicate; stamens 3; ovary glabrous; stigmas 2, separate, purple. Caryopsis narrowly oblong-lanceolate in outline, dorsally compressed, light brown, with persistent stylar bases, loosely fitting inside the glumes when fully developed; hilum elliptical to oblanceolate, dark brown, ca. 1/5 as long as the caryopsis; embryo about 1/3 as long as the caryopsis.

COMMENTS

Distribution: Brazil and Bolívia (Santa Cruz) (Filgueiras *et al.* 2001; Zuloaga *et al.* 2003).

Life Form

Herb

Substrate

Terrestrial

DISTRIBUTION

Native, Is endemic from Brazil

Phytogeographic Domains

Central Brazilian Savanna

Vegetation Types

Grassland, Highland Rocky Field, Cerrado (lato sensu), Inundated Forest (Várzea), Amazonian Savanna

Geographic DistributionConfirmed occurrences

North (Tocantins)

Central-west (Goiás, Mato Grosso do Sul, Mato Grosso)

IDENTIFICATION KEY**Key to the species and varieties of *Altoparadisium* Filg., Davidse, Zuloaga & Morrone:**

1. Lower glume and upper lemma absent; upper palea absent; upper glume with a twisted awn
..... *A. chapadense*
- 1'. Lower glume and lemma present; upper palea present; upper glume with a straight awn
..... 2
- 2(1'). Leaf blades tightly involute..... *A. scabrum* var. *bolivianum*
- 2'. Leaf blades flat..... 3
- 3(2'). Spikelets 6-7 mm long; leaf blades scabrous; inflorescences 15-25 cm long
..... *A. scabrum* var. *scabrum*
3. Spikelets 4-5 mm long; leaf blades smooth; inflorescences 7-9 cm long
..... *A. scabrum* var. *rupestre*

REFERENCE

- Filgueiras T.S., Davidse G., Zuloaga F.O & Morrone O.** 2001. The establishment of the new genus *Altoparadisium* and a reevaluation of *Arthropogon* (Poaceae:Paniceae). *Ann. Missouri Bot. Gard.* 88(2): 351-372.
- Zuloaga F.O., Morrone O., Davidse G., Filgueiras T.S., Peterson P.M., Soreng R.J., & Judziewicz E.J.** 2003. Catalogue of New World grasses (Poaceae): III. Subfamilies Panicoideae, Aristidoideae, Arundinoideae, and Danthonioideae. *Contr. U.S. Natl. Herb.* 46: 01-662.

Altoparadisium chapadense Filg., Davidse, Zuloaga & Morrone

DESCRIPTION

Leaf: surface of the blade foliar rough. **Inflorescence:** length of the spikelet 3 - 3.5 mm; glume lower and lemma upper absent; awn of the glume upper twining; pale upper absent.

ADDITIONAL DESCRIPTION

Moderately caespitose, rhizomatous perennials. Rhizomes small, knotty, superficial; young rhizomes covered with cataphylls. Culms 75-80 cm tall, erect, some branched at around mid-height, others unbranched, with 6-9 elongated internodes; internodes 3-4.5 cm long, hollow, glabrous, stramineous; prophyll 2.5-4 cm long, strongly 2-keeled, ciliate along the keels, the margins hyaline, glabrous; nodes dark, pilose. Leaves cauline only, symmetrically distributed along the culm or congested at around mid-culm; sheaths round on the back, persistent, striate, glabrous, the margins free, hyaline, both glabrous or one margin ciliate; auricles absent; ligule a minute fringe of hairs, curved, the hairs 0.3-0.5 mm long, colorless, dense; the hairs behind the ligular area 2-6 mm long, colorless, the hairs sometimes caducous in older leaves; collar undifferentiated, but seen in fresh material as a lighter or purplish area; blades 6-10 cm long and 3-8 mm wide, linear-lanceolate, glabrous on both surfaces but rough on the adaxial surface, the margins glabrous but rough, the apex subpungent to pungent; blades of the lower leaves caducous, the upper blades persistent. Peduncle 2-4.5 cm long, from partially enclosed in the flag leaf to exerted, glabrous. Inflorescence, 6.5-14.5 cm long and 1.5-3.5 cm wide, a contracted, terminal panicle, oblong-lanceolate, pointed at the apex, light colored, smooth; rachis glabrous, tough; ramification verticillate; nodes pilose, the hairs 1-3 mm long, colorless; branches 4-9 mm long, 2-8 per node, glabrous. Axillary inflorescences absent. Pedicels 1-3 mm long, of unequal length, with a few colorless hairs at the base, the hairs 1-3 mm long, the apex of the pedicels discoid, surrounded by a crown of colorless hairs, the hairs 2-4 mm long. Spikelets paired or solitary, all alike, dorsally compressed, smooth, light-colored, 3-3.2 mm long (exclusive of awn), narrowly oblong-lanceolate in outline, disarticulating below the bracts and falling as a unit, with only one bisexual flower; callus undifferentiated but the hairs at the base of the spikelet 1-1.5 mm long, dense, forming a crown, colorless; spikelet bracts 2 [here interpreted as an upper glume and lower lemma—see discussion]; lower glume absent; upper glume as long as the spikelet, embracing the lower lemma almost entirely, membranous, the margins flat but slightly curved around the lateral nerves of the upper lemma in closed spikelets and fitting into the internervial grooves of the lower lemma, 3 to 5-nerved, the lateral nerves pilose-hispid, the central nerve pilose-hispid toward the apex, projected into a straight or irregularly twisted awn; awn 18-26 mm long, antrorsely barbed, highly hygroscopic; lower palea absent; lower floret reduced to only a lemma; lower lemma 3-3.1 mm long, thin, membranous, 3-nerved, the mid-nerve prominent, pilose-hispid, the internerves shallowly sulcate, the margins hyaline and sharply folded at the lateral nerves, the apex pointed, ciliate; lower palea absent; lower flower absent; upper floret reduced to only the flower; upper lemma absent; upper palea absent; flower bisexual; lodicules 2, conduplicate; stamens 3, the anthers 1.8-2.1 mm long, purple; ovary 0.5-0.8 mm long, glabrous; stigmas 2, separate, purple. Caryopsis 1.8-1.9 mm long, narrowly oblong-lanceolate in outline, dorsally compressed, light brown, with persistent stylar bases, loosely fitting inside the glumes when fully developed; hilum elliptical to oblanceolate, dark brown, ca. 1/5 as long as the caryopsis; embryo ca. 1/3 as long as the caryopsis.

COMMENTS

Ecology: Flowering plants in the field have a rather bambusoid appearance, with stiff, congested leaves around mid-culm level. Non-flowering plants have normal looking blades. The branching of the culms seems to vary within the same clump; some plants in a given clump have branched culms whereas others do not.

The original population discovered was found growing in a campo rupestre habitat, on fine white sand and also on rocks. The soil, very shallow, stony and dry, was a mixture of gravel and sand. Four groups of plants made up this population, with 2, 5, 15, and 20 clumps respectively. Each of these clump seen had from 2 to 12 flowering culms. The groups of plants were situated 50 to 100 meters from each other and the entire population covered an area of approximately 200 m². It is very likely that other populations exist in the area, but at that time none were located. This was easily verified because at that time of the year the light-colored inflorescences of *A. chapadense* stand out against the dry, brown colors of the campo rupestre landscape.

Plants of *A. chapadense* were growing in association with the following species: *Axonopus brasiliensis* (Spreng.) Kuhl., *Echinolaena inflexa* (Poir.) Chase (the campo rupestre form), *Elionurus muticus* (Spreng.) Kuntze, *Lagenocarpus* sp., *Paspalum polyphyllum* Nees, etc. Except for *E. inflexa* which flowers almost year around, no plants of these species were in flower on 5

September 1994. Although the plants were collected during the peak of the flowering period for this population, the leaves had an old, dried out appearance and some had dropped their blades. Almost all the blades displayed some characteristic, irregularly shaped dark spots, suggestive of fungal infection.

Life Form

Herb

Substrate

Terrestrial

DISTRIBUTION

Native, Is endemic from Brazil

Phytogeographic Domains

Central Brazilian Savanna

Vegetation Types

Grassland, Highland Rocky Field

Geographic DistributionConfirmed occurrences

North (Tocantins)

Central-west (Goiás)

HERBARIUM MATERIALT.S. Filgueiras, 2987, ICN, 143599,  (ICN00000463), Goiás, **Typus**T.S. Filgueiras, 2987, MO, 5599368 (MO208215), Goiás, **Typus**T.S. Filgueiras, 2987, US, 3436794,  (US00731400), Goiás, **Typus****REFERENCE**

Filgueiras T.S., Davidse G., Zuloaga F.O., & Morrone O. 2001. The establishment of the new genus *Altoparadisium* and a reevaluation of *Arthropogon* (Poaceae, Paniceae). *Ann. Missouri Bot. Gard.* 88(2): 351-372.

Zuloaga F.O., Morrone O., Davidse G., Filgueiras T.S., Peterson P.M., Soreng R.J., & Judziewicz E.J. 2003. Catalogue of New World grasses (Poaceae): III. Subfamilies Panicoideae, Aristidoideae, Arundinoideae, and Danthonioideae. *Contr. U.S. Natl. Herb.* 46: 01-662.

Altoparadisium scabrum (Pilg. & Kuhl.) Filg., Davidse, Zuloaga & Morrone

This treatment is composed of the following taxa: *Altoparadisium scabrum*, *Altoparadisium scabrum* var. *rupestre*, *Altoparadisium scabrum* var. *scabrum*.

Has as synonym

basionym *Arthropogon scaber* Pilg. & Kuhl.

DESCRIPTION

Leaf: surface of the blade foliar rough/smooth. **Inflorescence: length of the spikelet** 4 - 7 mm; **glume lower and lemma upper** present; **awn of the glume upper** straight; **pale upper** present.

ADDITIONAL DESCRIPTION

Altoparadisium scabrum is related to *A. chapadense*, from which it differs in having the lower glume, upper lemma, and upper palea present and the upper glume with a straight awn (vs. the lower glume, upper lemma, and upper palea absent, and the upper glume with a twisted awn in *A. chapadense*).

COMMENTS

Distribution: Brazil (*A. scabrum* var. *scabrum* in Mato Grosso and *A. scabrum* var. *rupestre* in Goiás) and *A. scabrum* var. *bolivanum* endemic to Bolívia (Santa Cruz) (Filgueiras *et al.* 2001; Zuloaga *et al.* 2003).

Life Form

Herb

Substrate

Terrestrial

DISTRIBUTION

Native, Is endemic from Brazil

Phytogeographic Domains

Central Brazilian Savanna

Vegetation Types

Highland Rocky Field, Cerrado (lato sensu), Inundated Forest (Várzea), Amazonian Savanna

Geographic Distribution

Confirmed occurrences

Central-west (Goiás, Mato Grosso do Sul, Mato Grosso)

IDENTIFICATION KEY

Key to the species and varieties of *Altoparadisium* Filg., Davidse, Zuloaga & Morrone:

1. Lower glume and upper lemma absent; upper palea absent; upper glume with a twisted awn
..... *A. chapadense*
- 1'. Lower glume and lemma present; upper palea present; upper glume with a straight awn
..... 2

2(1'). Leaf blades tightly involute.....*A. scabrum* var. *bolivianum*

2'. Leaf blades flat..... 3

3(2'). Spikelets 6-7 mm long; leaf blades scabrous; inflorescences 15-25 cm long

..... *A. scabrum* var. *scabrum*

3. Spikelets 4-5 mm long; leaf blades smooth; inflorescences 7-9 cm long

..... *A. scabrum* var. *rupestre*

HERBARIUM MATERIAL

J.G. Kuhlmann, 1853, US, 1257256,  (US00730651), Mato Grosso, **Typus**

Altoparadisium scabrum (Pilg. & Kuhlmann.) Filg., Davidse, Zuloaga & Morrone var. *scabrum*

DESCRIPTION

Altoparadisium scabrum var. *scabrum* shows affinities with *A. scabrum* var. *rupestre*, from which it mainly differs by having spikelets with 6-7 mm long, leaf blades scabrous, and inflorescences with 15-25 cm long (vs. spikelets 4-5 mm long, leaf blades smooth, and inflorescences 7-9 cm long in *A. scabrum* var. *rupestre*).

Life Form

Herb

Substrate

Terrestrial

DISTRIBUTION

Native, Is endemic from Brazil

Phytogeographic Domains

Central Brazilian Savanna

Vegetation Types

Cerrado (lato sensu), Inundated Forest (Várzea), Amazonian Savanna

Geographic Distribution

Confirmed occurrences

Central-west (Mato Grosso do Sul, Mato Grosso)

HERBARIUM MATERIAL

J.G. Kuhlmann, s.n., RB, 12469,  (RB00285442), Mato Grosso

.G. Kuhlmann, s.n., RB, 12469,  (RB00285442), Mato Grosso

REFERENCE

Filgueiras T.S., Davidse G., Zuloaga F.O., & Morrone O. 2001. The establishment of the new genus *Altoparadisium* and a reevaluation of *Arthropogon* (Poaceae, Paniceae). *Ann. Missouri Bot. Gard.* 88(2): 351-372.

Altoparadisium scabrum var. *rupestre* (Filg.) Filg., Davidse, Zuloaga & Morrone

DESCRIPTION

Very close to this species is *Altoparadisium scabrum* var. *scabrum*, which can be distinguished mainly by spikelets features, as previously discussed (see comments under *A. scabrum* var. *scabrum*).

Life Form

Herb

Substrate

Terrestrial

DISTRIBUTION

Native, Is endemic from Brazil

Phytogeographic Domains

Central Brazilian Savanna

Vegetation Types

Highland Rocky Field

Geographic Distribution

Confirmed occurrences

Central-west (Goiás)

HERBARIUM MATERIAL

H.S. Irwin, 7390, SP, 235501 (SP003058), Goiás

REFERENCE

Filgueiras T.S., Davidse G., Zuloaga F.O., & Morrone O. 2001. The establishment of the new genus *Altoparadisium* and a reevaluation of *Arthropogon* (Poaceae, Paniceae). *Ann. Missouri Bot. Gard.* 88(2): 351-372.