

# New Record to the Brazilian Flora: *Gelasine uruguaiensis* Ravenna ssp. *uruguaiensis* (Iridaceae- Tigridieae)

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**ABSTRACT** - *Gelasine uruguaiensis* Ravenna has two recognized subspecies: *G. uruguaiensis* ssp. *uruguaiensis* and *G. uruguaiensis* ssp. *orientalis* Ravenna. During sampling in the Aceguá municipality, Rio Grande do Sul, Brazil, the first subspecies was found. *G. uruguaiensis* ssp. *uruguaiensis* is easily separated from *G. elongata* (Graham) Ravenna by its style, which substantially surpasses the anthers, by the larger perigone diameter, and by spreading tepals, where the inner tepals are smaller than the outer tepals. *Gelasine uruguaiensis* ssp. *uruguaiensis* differs from *G. uruguaiensis* ssp. *orientalis* by its larger perigone, shape and larger outer tepals. The subspecies is described, illustrated, and the taxonomic affinities and ecological data are discussed, with a map of the Brazilian geographical distribution.

Key words: Pampa biome, Rio Grande do Sul, taxonomy

**RESUMO** - Novo registro para a Flora Brasileira: *Gelasine uruguaiensis* Ravenna ssp. *uruguaiensis* (Iridaceae- Tigridieae). *Gelasine uruguaiensis* Ravenna tem reconhecida duas subespécies *G. uruguaiensis* ssp. *uruguaiensis* e *G. uruguaiensis* ssp. *orientalis* Ravenna. Durante expedições de coleta no município de Aceguá, Rio Grande do Sul, Brasil, foi constatada a ocorrência da primeira subespécie. *G. uruguaiensis* ssp. *uruguaiensis* é facilmente distinta de *G. elongata* (Graham) Ravenna pelo estilete mais longo que as anteras, pelo maior diâmetro do perigônio e pelas tépalas abertas, sendo as internas menores que as internas. Difere de *G. uruguaiensis* ssp. *orientalis* pelo maior diâmetro do perigônio, e pela forma e maior tamanho das tépalas externas. A subespécie é descrita e ilustrada, as afinidades taxonômicas e dados ecológicos são discutidos e o mapa da distribuição geográfica no Brasil é fornecido.

Palavras chave: bioma Pampa, Rio Grande do Sul, taxonomia

## INTRODUCTION

The *Iridaceae* family has a widespread geographic distribution, and encompasses 66 genera and 2,000 species (Goldblatt & Manning 2008), with two main centers of diversity: southern Africa and South America (Chukr & Capellari Jr. 2003). In Brazil this family is represented by 19 genera and 160 species (Souza & Lorenzi 2005, Eggers *et al.* 2012). According to Eggers *et al.* (2012), 11 genera and 52 species occur in Rio Grande do Sul, and eight genera and 33 species are native to the Pampa Biome.

*Iridaceae* comprises perennial evergreen or deciduous herbs, rarely annuals or shrubs, often with roots-

tock of the rhizome, bulb, or corm types. The leaves are flat, cylindrical or plicate, the flowers have a petaloid perigone of two whorls of three tepals each, and the fruit is a loculicidal capsule (Ckukr & Capellari Jr. 2003, Souza & Lorenzi 2005, Goldblatt & Manning 2008).

According to Goldblatt & Manning (2008), the *Iridaceae* include seven subfamilies: *Isophysidoideae*, *Patersonioideae*, *Geosiridoideae*, *Aristeioideae*, *Nivenioideae*, *Crocoideae*, and *Iridoideae*. All native taxa of Brazil belong to *Iridoideae*. The subfamily *Iridoideae* is segregated into five tribes: *Diplarreneae*, *Irideae*, *Sisyrinchieae*, *Trimezieae*, and *Tigridieae*; however, *Diplarreneae* and *Irideae* lack autochthonous species in the country.

*Gelasine* Herb. is a South American genus belonging to the tribe *Tigridieae* and has species distributed in Argentina, Brazil, Paraguay, and Uruguay. The genus comprises bulbous plants with reddish cataphylls, plicate leaves, and blue or violet-blue flowers on two valved spathes, which compose an inflorescence with up to ten flowers (Ravenna 1984, Eggers 2008). The number of taxa in *Gelasine* is still controversial; Ravenna (1984, 2005) recognized the following species: *Gelasine coerulea* (Vell.) Ravenna, *G. caldensis* Ravenna, *G. elongata* (Graham) Ravenna, *G. gigantea* Ravenna, *G. paranaënsis* Ravenna, *G. rigida* Ravenna, and *G. uruguaiensis* Ravenna, with the exception of the latter, the remaining species are native to Brazil. Chukr (Chukr & Capellari Jr. 2003) transferred *Gelasine coerulea* to *Alophia* Herb. Goldblatt & Manning (2008) estimated six species to *Gelasine*, native to northern Argentina, Brazil, and Uruguay, while Chukr (2012 a, b) recognized only *G. elongata* from Brazil, and the other Brazilian species were treated by her as synonymy of *Alophia coerulea* (Vell.) Chukr. Most recently, Chauveau *et al.* (2012) indicated that *G. coerulea* seems unrelated to *G. elongata* and suggested that the generic delimitation of *Gelasine* be revised.

Ravenna (1984) described *Gelasine uruguaiensis* based on collections undertaken in Molle, Durazno Department, Bella Vista, and Puente de Pedra, Cerro Largo Department. These materials were collected in November of 1959 and cultivated in Buenos Aires.

This study aims to report the natural occurrence of *Gelasine uruguaiensis* ssp. *uruguaiensis* in Brazil, for the state of Rio Grande do Sul, adding data on the geographical distribution, habitat, and taxonomical affinities.

## MATERIAL AND METHODS

Sampling was conducted between October 2011 and November 2012 in all physiographical regions of Rio Grande do Sul, Brazil. The collected specimens were geo-referenced, photographed, and identified by use of literature, and the voucher specimens were deposited in the PACA Herbarium. Moreover, vouchers of *Gelasine* from the herbaria CTES, FLOR, HAS, ICN, MVM, PACA, and SI (Thiers 2012) were analyzed, but no additional specimens of *Gelasine uruguaiensis* were found. The morphological description is based on all material examined, and the terminology used follows Ravenna (1984), Chukr & Capellari Jr. (2003), and Goldblatt & Manning (2008). A stereoscopic QUIMIS 766 was used for the elaboration of Figure 1, and the details were drawn based on dry plant material, as well as living plants collected and cultivated in the Aceguá

municipality. Images were registered using a SONY DSC-W210 photography camera. Geographical coordinates of the collection sites were recorded using a Garmin eTrex 30 GPS (Global Positioning System). In laboratory, all coordinates were released on a regional cartographical base of Rio Grande do Sul (Hasenack & Weber 2010), using the Software GPS TrackMaker Professional, GTM PRO, version 4.8 (developed by Odilon Ferreira Júnior), allowing the elaboration of the geographical distribution map of the species. The map was created in GTM (GPS Track Maker) file format, processed in Autocad DXF (Drawing Interchange Format/Drawing Exchange Format) file format, and transferred to the software Corel DRAW X5 for final graphic edition.

## RESULTS AND DISCUSSIONS

*Gelasine uruguaiensis* Ravenna ssp. *uruguaiensis*, Nord. J. Bot. 4 (3): 349. 1984.

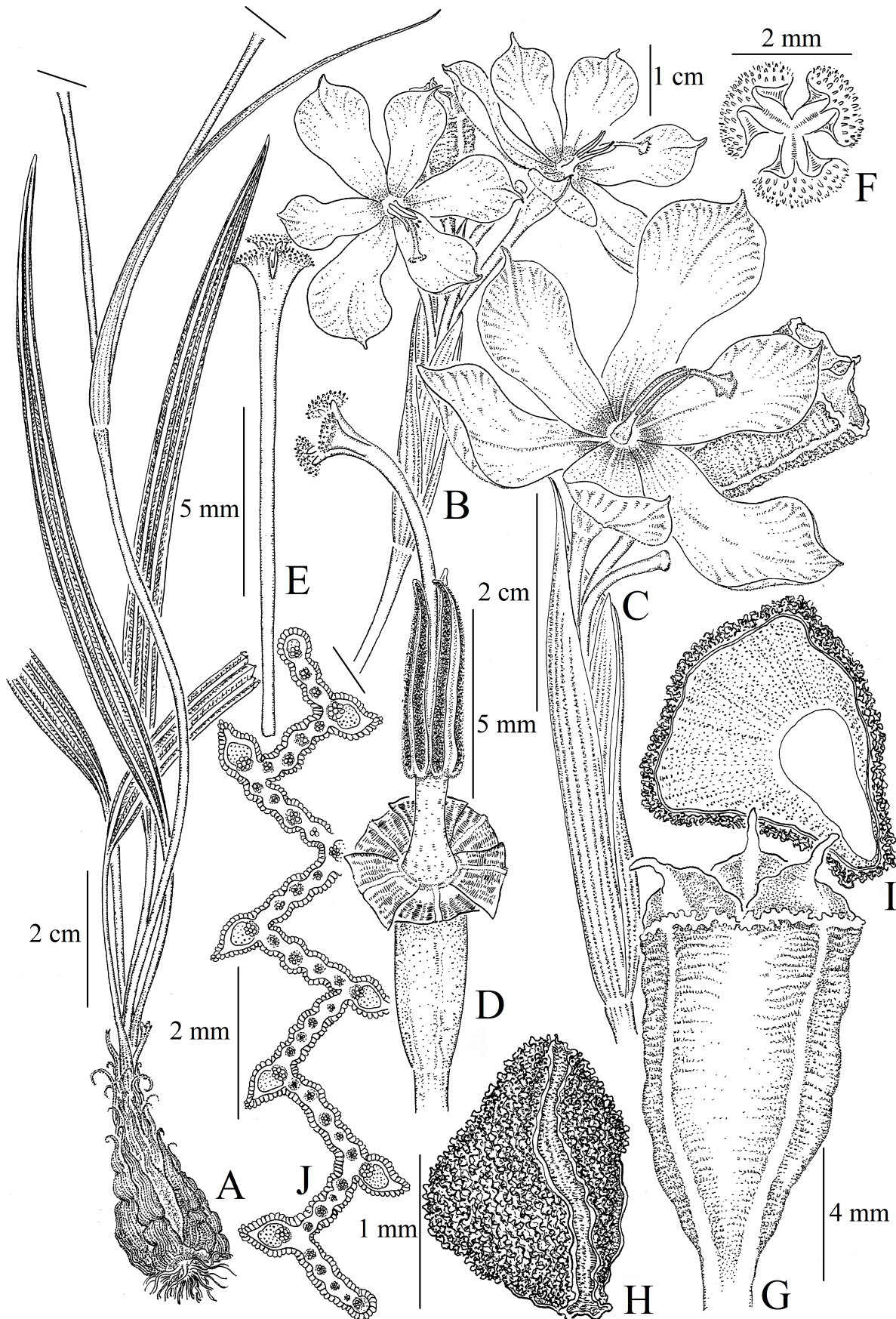
Type: Uruguay, Durazno, Molles “Culta in Bonaria ex bulbis in arenosis prope Molles civit. Durazno Uruguay collectis” XI-1959, *P. Ravenna* 5 (holotype Herb. Ravenna, not seen)

(Figs. 1, 2)

Plant up to 30-40 cm high, underground stem up to 8 cm long. Bulb ovate-oblong, 30-40 mm × 14-18 mm, prolonged in a collar; outer cataphylls brown, inner reddish-brown. Basal leaves green at anthesis 2-4; linear-elliptic, flaccid, plicate, slightly acute at apex, 10-20 × 0.3-1 cm, the upper rather reduced. Spathes 2, herbaceous, green or pallid-green, bivalved, 3-7-flowered, pedunculate, peduncles 10-16 cm long; outer valve 2.8-3.8 cm long, the inner 3.5-4 cm long, both with hyaline edges, and the inner with a hyaline, fimbriate portion. Pedicels slightly longer than the spathes.

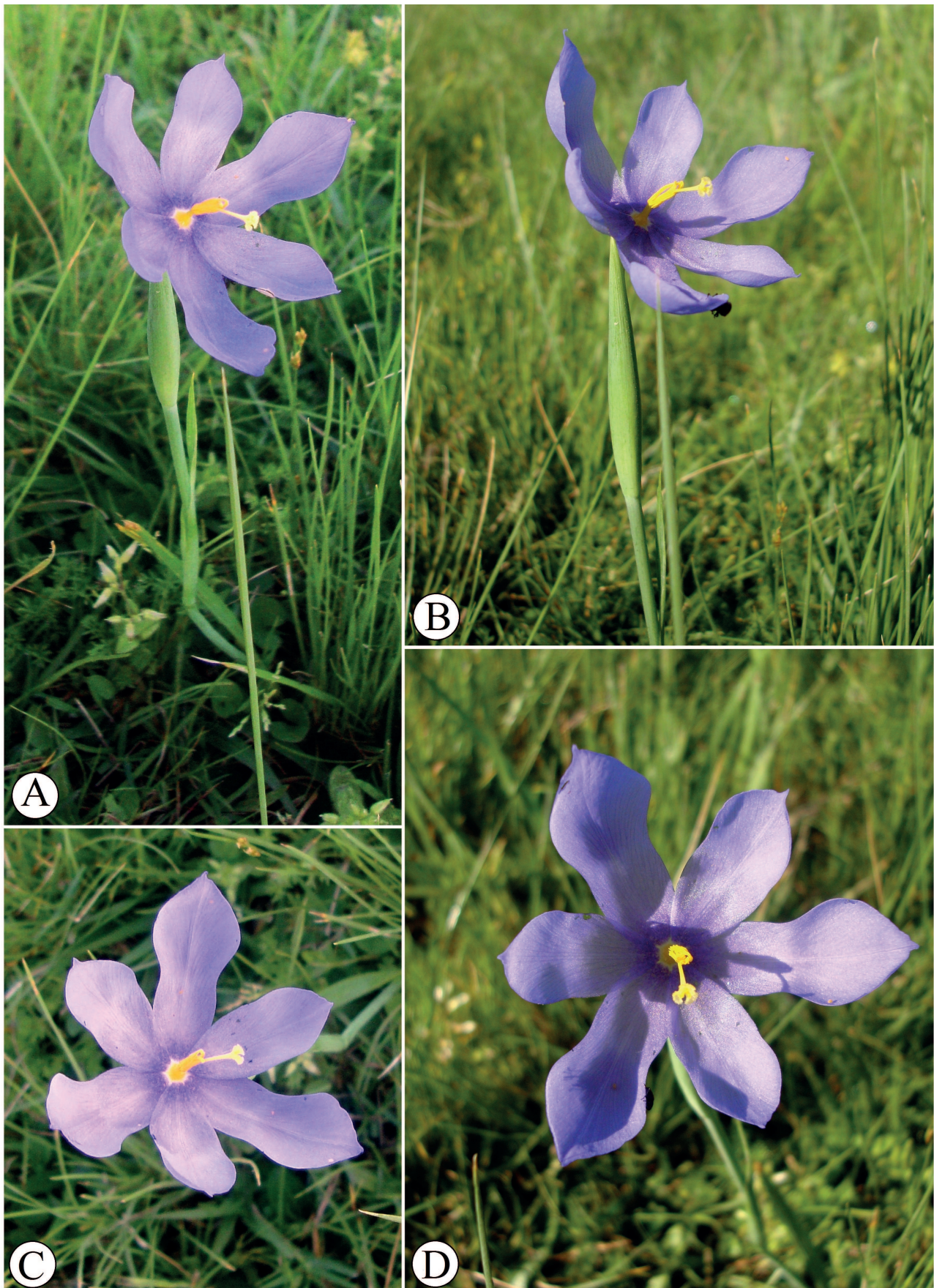
Flowers predominately violet-blue, nearly disk-shaped, 38-45 mm diameter. Tepals violet-blue, basally light yellow surrounded by violet stripes, the inner tepals shorter than the outer; outer tepals oblong, slightly pandurate, 22-26 × 11-13 mm; the inner obovate-oblong, 14-16 × 8-10 mm. Filaments united in a column, 2.2-2.8 mm long, yellow and thickened at the base; anthers erect, oblong, 5-6 mm × 1.2-1.6 mm; connective cream-yellow, locules and pollen golden-yellow. Ovary obovate-oblong, greenish, 5-6 mm × 2-2.5 mm. Style 10.5-12 mm long. Style arms oblique 1.5-2 mm long, stigmatic area reniform or broadly elliptic. Capsule obovate, 9-12 mm × 5-6 mm. Seeds oblong, 2-2.5 mm long, angled, reddish-brown, epidermis tuberculate-striate.

**Distribution & Habitat:** According to revised herbaria and extensive collection trips in Rio Grande



**Figs. 1 A-J.** *Gelasine uruguayensis* Ravenna ssp. *uruguayensis*. **A.** Habit; **B.** Distal part of the plant; **C.** Spathe and flower, lateral view; **D.** Flower with perigone partially removed; **E.** Gynoecium; **F.** Stigma, frontal view; **G.** Capsule; **H.** Seed; **I.** Seed, longitudinal section; **J.** Leaf, transversal section. Scale near H from I. (from L. P. Deble, J. B. Rodriguez & T. G. Lima13577).





**Figs. 2 A-D.** *Gelasine uruguayensis* Ravenna ssp. *uruguayensis*. **A.** General habit; **B.** Spathe and flower, lateral view; **C.** Flower, oblique view; **D.** Flower, upper view.



do Sul state, *Gelasine uruguayensis* ssp. *uruguayensis* is restricted to Aceguá municipality, southern Rio Grande do Sul state (Fig. 3). The specimens grow on native grasslands, with dark neutral soil, along with other species of Iridaceae, as *Herbertia lahue* (Mol.) Goldblatt, *H. pulchella* Sweet, *Cypella exilis* Ravenna, *C. herbertii* (Lindl.) Herb. ssp. *brevicristata* Ravenna, *Sisyrinchium micranthum* Cav., *S. palmifolium* L., and *S. sellowianum* Klatt.

**Phenology:** Specimens with flowers and capsules

can be found between October-November. The flowers open only once a day, during the morning, and close early afternoon.

**Examined material:** BRAZIL, RIO GRANDE DO SUL, Aceguá, 7.XI.2011, L. P. Deble, J. B. Rodriguez & T. G. Lima 13577 (PACA); Aceguá, 16.XI.2011, L. P. Deble & A. S. de Oliveira-Deble 13578 (PACA). URUGUAY, CERRO LARGO, Aceguá, 30.X.2011, J. B. Rodriguez 020 (PACA).



**Fig. 3.** Map of geographic distribution of *Gelasine uruguayensis* Ravenna ssp. *Uruguayensis* in Rio Grande do Sul, Brazil.

*Gelasine elongata* (Graham) Ravenna, *Phytologia* 65 (2): 154. 1988.

**Examined Material:** BRAZIL, RIO GRANDE DO SUL, Arroio dos Ratos, 02.XI.1982, J. Vasconcellos (ICN 68722). Caçapava do Sul, Guaritas, on the ramp of Pedra da Velha, 17.XI.2012, L. P. Deble 14438, A. S. de Oliveira-Deble & J. B. Rodriguez (PACA). Porto Alegre, 12.X.1947, B. Rambo (PACA 37018).

*Gelasine uruguayensis* ssp. *orientalis* Ravenna, *Nord. J. Bot.* 4 (3): 349. 1984.

**Examined material:** URUGUAY: CERRO LARGO, XI.1959, P. Ravenna 6 (MVM). Isidoro Noblia, 1.XII.2011, L.P. Deble 13635 & A. S. de Oliveira-Deble (PACA).

**Comments:** In the protologue of *Gelasine uruguayensis*, Ravenna (1984) proposed two subspecies: *orientalis* and *uruguayensis*, the former native in Cerro Largo Department, while the latter only in the Durazno Department. Based on the size of perigone and shape of tepals, the specimens collected in Brazil were determined as *G. uruguayensis* ssp. *uruguayensis*. *G. uruguayensis* ssp. *uruguayensis* differs from *G. uruguayensis* ssp. *orientalis* by a larger perigone, shape and length of outer tepals, and by a longer style, much longer than the anthers. *Gelasine uruguayensis* ssp. *uruguayensis* can be segregated of its allies based on the characters listed in the Table 1.

**Table 1.** Comparison of *Gelasine uruguayensis* ssp. *uruguayensis* and its morphologically related taxa.

Character/species	<i>G. uruguayensis</i> ssp. <i>uruguayensis</i>	<i>G. uruguayensis</i> ssp. <i>orientalis</i>	<i>G. elongata</i>
Leaf size (cm)	10-20 × 0.3-1	10-15 × 0.9-1	17-40×0.8-2.5
Perigone color	violet-blue	violet-blue	blue, basally white with dark-blue dots
Perigone diameter (mm)	38-45	32-36	20-28
Shape outer tepals	oblong, slightly pandurate	obovate-oblong	oblanceolate
Size of outer tepals (mm)	22-26 × 11-13	18-22 × 8-10	15-17×7-8
Shape of inner tepals	obovate	obovate-oblong	oblanceolate
Size of inner tepals (mm)	14-16 × 8-10	16-18 × 8-10	12-14×5-6
Style length (mm)	10.5-12	9-10	6-9
Staminal column length (mm)	2.2-2.8	2.2-2.8	2.5-3
Anther length (mm)	5-6 × 1.2-1.6	5-5.5 × 1.2	9-10 × 1.6-1.8
Habitat	grasslands	grasslands	stony grasslands
Geographical distribution	Cerro Largo (Uruguay) Rio Grande do Sul(Brazil)	Cerro Largo (Uruguay)	Rio Grande do Sul (Brazil) Uruguay and Argentina

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