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## **NOMENCLATURAL AND TAXONOMIC CHANGES IN BRAZILIAN SISYRINCHIUM L. (SISYRINCHIEAE, IRIDACEAE)**

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**Abstract:** *Sisyrinchium* L. (Iridaceae) is a pan-tropical genus distributed at all altitudes but especially in southern regions. Johnston (1938) studied *Sisyrinchium* for Brazil, also including neighboring countries such as Paraguay, Argentina and Uruguay; in this paper the author recognized 28 species and included another 11 doubtful species. In previous publications (Chukr 1988, 1992, 2003) several species weren't recognized because of the analysis of the type-materials and its original description. In *Flora of Brazil* (Eggers & Inacio, 2020) it recognized 71 species of *Sisyrinchium*, revalidating many previously invalid species and proposing some new names. Discussion of eighteen species names and their taxonomic problems, table, figures and graphs are presented in this work.

**Keywords:** Iridaceae, *Sisyrinchium*, taxonomy, Brazil.

## INTRODUCTION

*Sisyrinchium* L. is a genus with around 140 species distributed especially in the American continent, in temperate or tropical climates, being the latter found in higher elevations and lower temperatures, throughout South, Central and North America (Goldblatt et al., 2008), being found in various habitats, as grasslands, prairies, swamps, from the sea level to high altitude areas (Inacio et al. 2017). This genus is characterized by rhizome as its subterranean system, patent and unstripped tepals, undivided styles which alternate with the stamens (Henrich & Godblatt, 1987; Goldblatt et al., 1990).

*Sisyrinchium* belongs to tribe Sisyrinchieae with five other genera (Goldblatt & Manning, 2008). According Eggers and Inacio (2020) in *Sisyrinchium* identification is important to note the presence or not of caulinar leaves, the blade of the leaves (linear or terete), the presence

or not of trichomes in the staminal column, its grade of union and the color of the tepals.

*Sisyrinchium* is a monophyletic genus (Goldblatt et al., 1990), but the infrageneric taxa however has led to conflicting interpretation, what results in a higher number of names (Rudall et al., 1986, Goldblatt & Manning, 2008). Species limits are unclear due the marked polymorphism variations (Rudall et al, 1986; Henrich & Goldblatt, 1987). This polymorphism has led to the proposition of numerous taxa. In other cases, the same species were renamed by different authors through the years. Furthermore, most of taxonomic studies and new descriptions were based on herbarium material, which demands a modern revision on the genus, based on the revision of old works. Inacio et al. (2017) studied *Sisyrinchium* sections in a sample of 107 species, based on phylogenetic trees were built on generally congruent DNA regions of plastid, mitochondria and nuclear regions also with morphological and biogeographic characters. Spite of DNA markers were useful to resolve generic relationships in Sisyrinchieae, they were not enough informative to support most of the infrageneric relationships (Inacio et al., 2017).

## METHODS AND MATERIALS

The term tectriz bract is here applied to the stem bract of the foliaceous aspect, whose pedunculate inflorescences start at the axillar point in the scape. This work followed classic methodology for taxonomic studies, associating herbarium research with field trips. The herbaria consulted for this work were the following: B, BHCB, BM, BOTU, CEN, CESJ, ESA, F, FLOR, FUEL, HEPH, HB, HRCB, HUEFS, HUFU, HUTO, IAC, IBGE, ICN, INCT, K, MBM, MO, NY, PAMG, PMSP, R, RB, S, SP, SPF, SPSF, UB, UEC, UFBA, UPCB, UFPB, W. Original descriptions and

type materials were studied for all names of species or infra-specific taxa treated in synonymy in this paper.

## RESULTS

1. **Sisyrinchium hasslerianum** Baker, Bull. Herb. Boissier 2: 1106. 1903.

*Sisyrinchium hoehnei* I. M. Johnston, J. Arnold Arbor. 19:388. 1938. Fl. Fanerog. S. Paulo 3: 139.2003

**Sisyrinchium hasslerianum** was described by Baker (1903) based on several syntypes of which I examined Hassler 7494 deposited in BM and elect as the lectotype of the species. The species is characterized by the presence of plane leaves, terete scapes with apical and congest inflorescence, yellow flowers and tomentose stamiferous tube, the latter being the most distinctive feature of the species (fig. 12). *Sisyrinchium hoehnei* was subsequently described by Johnston (1938) and since it shares the same vegetative and floral characters of *S. hasslerianum*, in order thus being proposed its synonymization, according Chukr (2003). Inacio et al (2017) treated *S. hoehnei* as a valid species, but occurs close to *S. hasslerianum* in proximal clades.

**Sisyrinchium luzula** Klotzsch ex Klatt, Linnaea 31: 89, 376. 1861-62.

*Sisyrinchium subnudum* I. M. Johnston, J.

Arnold Arbor.19: 376-401. 1938. Fl. Fanerog. S. Paulo 3:140.200.

**Sisyrinchium luzula** is characterized by the presence of terete leaves and scapes, with congest inflorescence disposed in axial fasciculum and basally tomentose staminal tube (fig. 11). All of these features are shared with *S. subnudum*, which is not morphologically distinct from *S. luzula*. *Sisyrinchium subnudum* was described by Johnston (1938) based on material from Mato

Grosso state, the isotype (Archer & Gert s.n., SP 36.372) and the paratypes (J. G. Kuhlmann 103, SP, R) were studied. In table 1 several morphological parameters of the two species are presented, where the values obtained are congruent, with *S. luzula* presenting a range of values for both. Klatt (1861-62) when describing *S. luzula*, indicated a series of syntypes, and the Blanchet 3313 material, located in BM with a duplicate in B, presents the peculiar characteristics of the species, and was chosen as a lectotype. This synonymization was proposed by Chukr (2003), but not followed by Eggers and Inacio (2020) in Flora of Brazil.

**Sisyrinchium micranthum** Cav., Diss. 6: 144, tab. 191, fig. 2. 1788.

*Sisyrinchium iridifolium* Kunth in Humb., Bonpl. & Kunth, Nov. Gen. et Sp. 1: 324. 1816. Fl. Fanerog. S. Paulo 3: 140. 2003.

*Sisyrinchium laxum* Otto ex Sims, Bot.

Mag. 49, t.2312. 1822. TYPE: without precise locality, Otto s.n. (not seen).

The name **Sisyrinchium micranthum** Cav. (Cavanilles, 1788) and *S. iridifolium* H.B.K. were applied to a group of plants, which have ancipitous leaves, scapes and bracts, the latter separated one from the another by several internodes. The coloration of the flowers can vary between lilac, white or yellow. The distribution of the trichomes of the staminal column can also vary, being frequently tomentose in the base with rare trichomes in the medium and apical portions (fig. 10).

Several authors (Sprengel, 1825, Klatt 1861-1862, Baker 1877,1892, Ravenna 1981,

Henrich & Goldblatt 1987) recognized *S. micranthum* and *S. iridifolium* as a distinct species. Baker (1877) treated *S. laxum* in the synonymy of *S. iridifolium*, but Johnston

(1938) accepted *S. laxum* and treated *S. iridifolium* as synonym of *S. micranthum*. Eggers & Inacio (2020) puted *S. iridifolium* and *S. laxum* as a synonymy of *S. micranthum*, what is accepted in this work.

The holotype of *S. micranthum* was seen by microfiche deposited in K (Jussieu s.n.), as well the holotype of *S. iridifolium* (Humboldt & Bonpland 683, B). It was not possible to see the holotype of *S. laxum* but the original description was analyzed. The sharing of the same floral and vegetative characters between the three species is a strong evidence of the union of the names and elect the oldest name *Sisyrrinchium micranthum* as the valid one. It is probable that these characteristics may vary in function of the development stage of individuals or in ambient conditions, also the wide geographic distribution of the species, which extends from Mexico to almost all of South America (Henrich & Goldblatt, 1987). Inacio et al (2017) observed in *S. micranthum* seven morphotypes distributed in different ecoregions, what probably explains this pattern of phenotypic variations.

***Sisyrrinchium palmifolium*** L. Mant. Pl. pl.: 122. 1767.

*Sisyrrinchium congestum* Klatt, Linnaea 31: 98, 380.1861-62. Fl. Fanerg. S. Paulo: 141. 2003.

*Sisyrrinchium palmifolium* L. var. *nidulare* Hand.-Mazz., Denkschr. Akad. Wiss. Wien Math.-Nat. 79: 216. 1908. Fl. Fanerg. S. Paulo 3: 141. 2003

*Sisyrrinchium nidulare* (Hand.-Mazz.) I.M. Johnston, J. Arnold Arbor 19: 376-401. 1938. Fl. Fanerg. S. Paulo 3: 141. 2003

*Sisyrrinchium wettsteinii* Hand.-Mazz., Denkschr. Akad. Wiss. Wien Math.Nat. 79: 216. 1908. Fl. Fanerog. S. Paulo:141. 2003

*Sisyrrinchium plicatulum* Ravenna, Wrightia 7(1): 3-4. 1981. Fl. Fanerog. S. Paulo: 141. 2003

*Sisyrrinchium minense* Ravenna, Onira 1(2): 16. 1988; Fl. Fanerg. S. Paulo: 141. 2003.

***Sisyrrinchium palmifolium*** is characterized by having flat leaves and scapes, with a densely aggregated sessile or subsessile inflorescences at the apex of the scape (fig. 6, 7)). In floral morphology, the species has glabrous filaments attached to the base and sagittate anthers (fig.9) alternate with the styles (fig. 8, 9). The species has a wide geographic distribution area in South America (Heaton & Mathew 1998), with great variation in the size of the individuals. This provided the creation of numerous taxa covering intervals of this phenotypic variation. The evaluation of type materials and descriptions of the taxa reported did not allow for a specific separation basis, and their synonymizations were proposed in previous work (Chukr, 2003). It should be noted that *S. minense* Ravenna was considered a nomenclatural synonym of *S. nidulare* (Hand.-Mazz.) I. M. Johnston by Chukr (1992) in an earlier treatment, but both taxa are considered synonymous of *S. palmifolium* in Chukr (2003).

***Sisyrrinchium restioides*** Spreng., Syst. Veg. 1(3): 166. 1825. URUGUAI, Montevideo,s.d., Sellow s.n. (B, n.v.; F, holotype photographie!). fig. 13)

*Sisyrrinchium vaginatum* Spreng. subsp. *restioides* (Spreng.) Beauv., Bull. Herb. Boissier 2: 1082- 1083.190. Fl. Fanerog. S. Paulo 3: 142.2003.

*Sisyrrinchium glaziovii* Baker, J. Bot. 14: 268. 1876. Fl. Fanerog. S. Paulo 3: 142. 2003.

***Sisyrrinchium restioides*** is a distinctive species with basal leaves and scapes with several plane bracts alternate among them. The species's characteristics could be observed by the analysis of the holotype's photography deposited in F (fig.13) . The vegetative pattern and floral morphology of *S. restioides*

look likes *S. vaginatum* features, although *S. restioides* has basal plane leaves. Many herbarium materials are misidentification as *S. vaginatum* by the vegetative similarity and the identic floral pattern with *S. restioides*, because isn't noted the presence the plane leaves at the base of the scape. Vieira et al. (2003) studied the pollinic patterns of several *Sisyrinchium* species and maintained the delimitation between *S. restioides* and *S. vaginatum* by the vegetative differences cited above and by the exine sculpture of the pollen.

The synonymization of *Sisyrinchium vaginatum* Spreng. subsp. *restioides* (Spreng.) Beauv. as *S. restioides* was proposed by Chukr (2003) and accepted by Eggers & Inacio (2020) in Flora of Brazil. Eggers & Inacio (2020) indicate the state of São Paulo as the locality of the holotype occurrence, but is not what was observed in the material identification.

*Sisyrinchium glaziovii* was described by Baker (1876) based on the material Glaziou 6732 (K). The analysis of *S. glaziovii*'s type material and the original description showed that all of the morphological characters are shared with *S. restioides*, only being the leaves bigger in length and width in *S. glaziovii*, a phenotypic feature that may vary in function of the development stage of individuals or by ambient conditions. Eggers & Inacio (2020) indicate for *S. glaziovii* the presence of stamens completely united in a column, but this is not confirmed by the analysis of the holotype material.

**4. *Sisyrinchium vaginatum*** Spreng., Syst. Veg. 1(3): 166. 1825.

*Sisyrinchium alatum* Hook. Bolm. Bot. Univ. S. Paulo 13: 112. 1992

*Sisyrinchium incurvatum* Gard. Bolm. Bot. Univ. S. Paulo 13: 112. 1992

*Sisyrinchium marchio* (Vell.) Steud. Bolm. Bot. Univ. S. Paulo 13: 112. 1992

*Sisyrinchium weirii* Baker, J. Bot. 14:

268.1876. Fl. Fanerog. S. Paulo 3: 142. 2003

*Sisyrinchium balansae* Baker, Handb. Irid.133. 1892. Fl.Fanerog. S. Paulo 3: 142. 2003

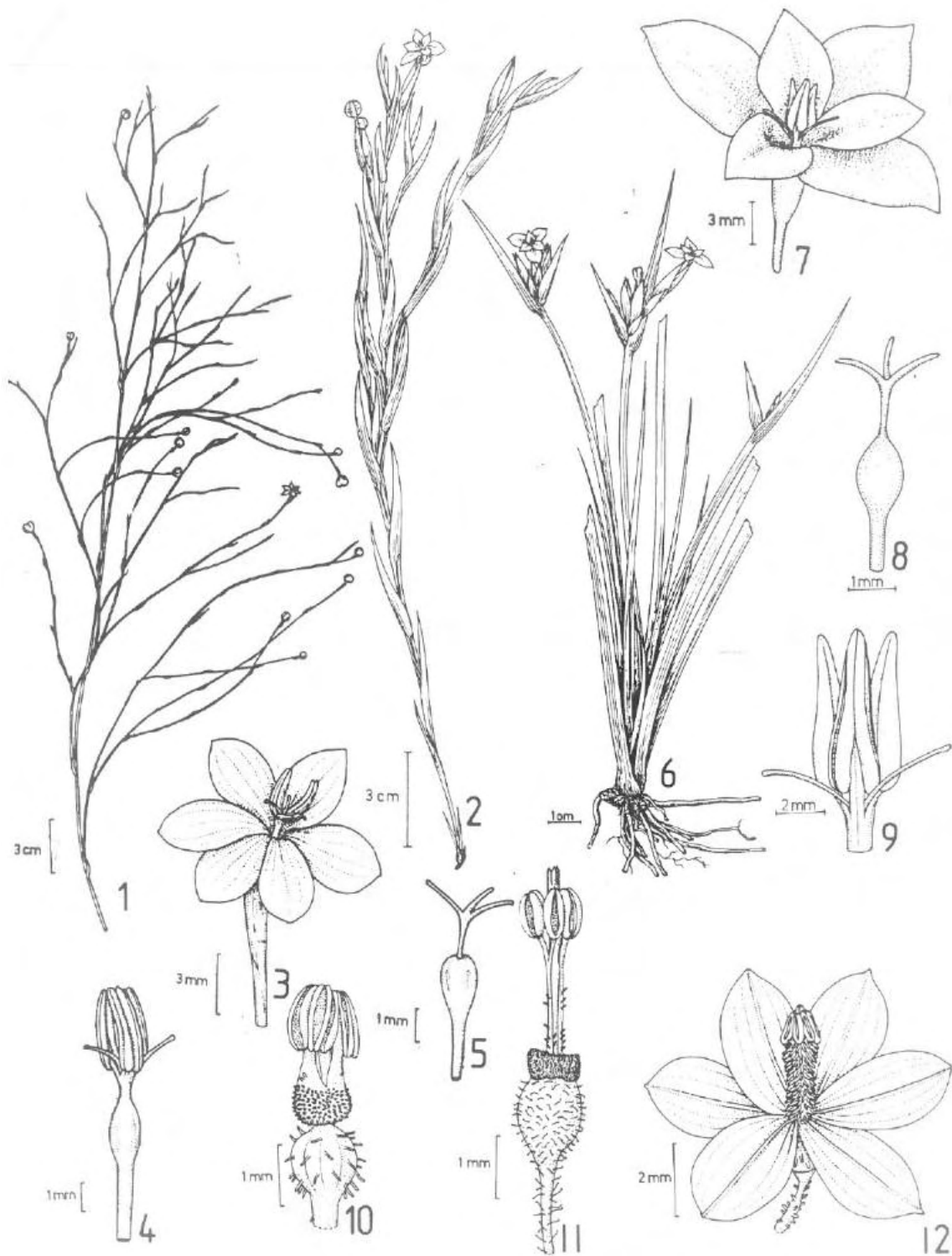
*Sisyrinchium parviflorum* Baker, Bull. Herb. Boissier 2(3): 1104. 1903. Fl. Fanerog. S. Paulo 3: 142. 2003

***Sisyrinchium vaginatum*** is a distinctive species with ancipite alternate bracts (fig. 1, 2) basal leaves absent, yellow flowers and glabrous staminal tube (fig. 1, 2, 3, 4, 5). The species characteristics could be observed by the photography of the holotype (fig. 14), deposited in F. BFG (2015) and, Eggers & Inacio (2020) in studies of the Flora of Brasil mention the species *Sisyrinchium alatum*, *S. marchio*, *S. incurvatum* as valid species, but they were synonymized in previous work by Chukr (1992), from an extensive study in herbarium material (Chukr, 1987, 1988). From the analysis of the 150 specimens formally related to *S. vaginatum* in function of the length and width of the leaves, it was possible to obtain the figure 15. Note the continuous of phenotypic variation between the classes without interruptions, which would justify the validation of different taxa. But, despite the polymorphism of these characters, the floral organization is always the same, with no one variation. The proliferation of names, which Johnston (1938) called "Vaginatum Complex" is in part due to the partial evaluation of the polymorphic spectrum. Kenton and Heywood (1984) observed that in *Sisyrinchium* polymorphism may be associated with a polygenic control, which improves the development of graduate variations.

The species *Sisyrinchium balansae*, *S. weirii*, and *S. parviflorum* were also synonymized in previous work (Chukr, 2003), due of the development of alternate bracts in scape and in floral organization, especially in the presence of a glabrous staminal tube.

## REFERENCES

- BAKER, J.G. 1876. New Aristeae and Sisyrinchia. *Journ. Bot.* 4: 267-269.
- BAKER, J.G. 1877. *Systema Iridacearum*. *J. Linn. Soc. London*, 16: 61-180
- BAKER, J.G. 1892. *Handbook of Irideae*: 121-133. George Bell & Sons. London.
- BAKER, J.G. 1903. Iridaceae in *Plant Hasslerianae*. *Bull. Herb. Boiss.* 2a Série, 3: 1102-1106.
- BFG. Growing knowledge: an overview of Seed Plant diversity in Brazil. *Rodriguésia*, v.66, n.4, p.1085-1113. 2015. (<https://doi.org/10.1590/2175-7860201566411>), Access jul.09<sup>th</sup>. 2022
- CHUKR, N.S. 1987 — “Iridaceae” In *Flora da Serra do Cipó, Minas Gerais: Caracterização das Espécies*. **Bol. Botânica Univ. S. Paulo** 9: 123-124.
- CHUKR, N. S. 1988. *A Família Iridaceae na Serra do Cipó, MG. Brasil Dissertação de Mestrado*. Instituto de Biociências. Univ. S. Paulo. 275 p.
- CHUKR, N.S. 1992 — *Flora da Serra do Cipó, Minas Gerais, Brasil: Iridaceae*. **Bol.Bot. Univ. S. Paulo** 13: 111-131.
- CHUKR, N.S. 2003. *Sisyrinchium*. In: Wanderley, M.G.L.; Sheperd, G.J.; Giuletta, A.M.; Melhem, T.S. (Coord.). **Flora Fanerogâmica do Estado de São Paulo**. São Paulo: FAPESP: RiMa. p.138-143.
- EGGERS, L.; INÁCIO, C.D. 2020. *Sisyrinchium in Flora e Funga do Brasil*. Jardim Botânico do Rio de Janeiro. Disponível em: <<https://floradobrasil.jbrj.gov.br/FB58110>>. Access jun.07<sup>th</sup>. 2022
- INACIO, C. D.; CHAUVEAU, O; SOUZA-CHIES, T. SAUQUET, H.& EGGERS, L.2017. An updated phylogeny and infrageneric classification of the genus *Sisyrinchium* (Iridaceae). **Taxon** 66(6): 1317-1348. <https://onlinelibrary.wiley.com/doi/epdf/10.12705/666.4>, access July..08<sup>th</sup>.2022
- GOLDBLATT, P.; RUDALL, P. & HENRICH, J.E. 1990. The genera of the *Sisyrinchium* alliance (Iridaceae: Iridoideae). Phylogeny and relationships. **Syst. Bot.** 15(3): 497-510.
- GOLDBLATT, P.; RODRIGUES, A.; POWELL, M.P.; DAVIES, T.J.; MANNING, J.C.; BANK, M. van der & SAVOLAINEN, V. 2008. Iridaceae ‘Out of Australasia?’ Phylogeny, Biogeography, and Divergence Time Based on Plastid DNA Sequences. **Syst. Bot** 33(3): 495-508.
- HEATON, E. & MATHEW, B. 1998. *Sisyrinchium palmifolium*. **Bot. Mag.** 5(2): 104-108.
- HENRICH, J.E. & GOLDBLATT, P. 1987. Mesoamerican *Sisyrinchium* (Iridaceae): new records and notes on typification. **Ann. Missouri Bot. Gard.** 74: 903-910.
- JOHNSTON, L.M. 1938. The Species of *Sisyrinchium* in Uruguay, Paraguay and Brazil. **J.Arn. Arb. Harv. Univ.** 19: 376-401
- KENTON, A.Y. & HEYWOOD, C.A. 1984. Cytological studies in South American Iridaceae. **Plant Syst. Evol.** 146: 87-104.
- KLATT, F.W. 1861-62. Specimen et familia Iridearum. **Linnaea** 31: 533-570.
- RAVENNA, P.F. 1981. Revisional studies in the genus *Sisyrinchium* (Iridaceae). **Wrightia** 7 (1):1-9.
- RUDALL, P.; KENTON, A.Y.; LAWRENCE, T. J. 1986. An anatomical and chromosomal investigation of *Sisyrinchium* and allied general. **Bot. Gaz.** 147: 466-477.
- VIEIRA, E.R.; SANTOS, E.P.; TARDIVO, R.C. 2003. Flórula do Morro dos Perdidos, Serra de Araçatuba, Paraná, Brasil: Iridaceae. **Estudos de Biologia** 25 (51): 17-29.



Plank of *Sisyrrinchium* species. 1-5: *Sisyrrinchium vaginatum* - 1: habit (CFSC 9661, SPF); 2: habit (CFSC 1967, SP), 3: flower (CFSC 9661, SPF); 4: gynoecium and androecium (CFSC 9661, SPF); 5: Gynoecium; 6-9: *Sisyrrinchium palmifolium* - 6: habit (CFSC 7539, SPF); 7: flower (CFSC 7539, SPF); 8: gynoecium (CFSC 7539, SPF); 9: stamens and styles (CFSC 7539, SPF); 10: *Sisyrrinchium micranthum*. gynoecium and androecium (N.S. Chukr 672, PMSP); 11: *Sisyrrinchium luzula*: gynoecium and androecium (Hoehne 10.828, SPF); 12: *Sisyrrinchium hasslerianum*. flower (A.C. Brade s.n., SP 7281).

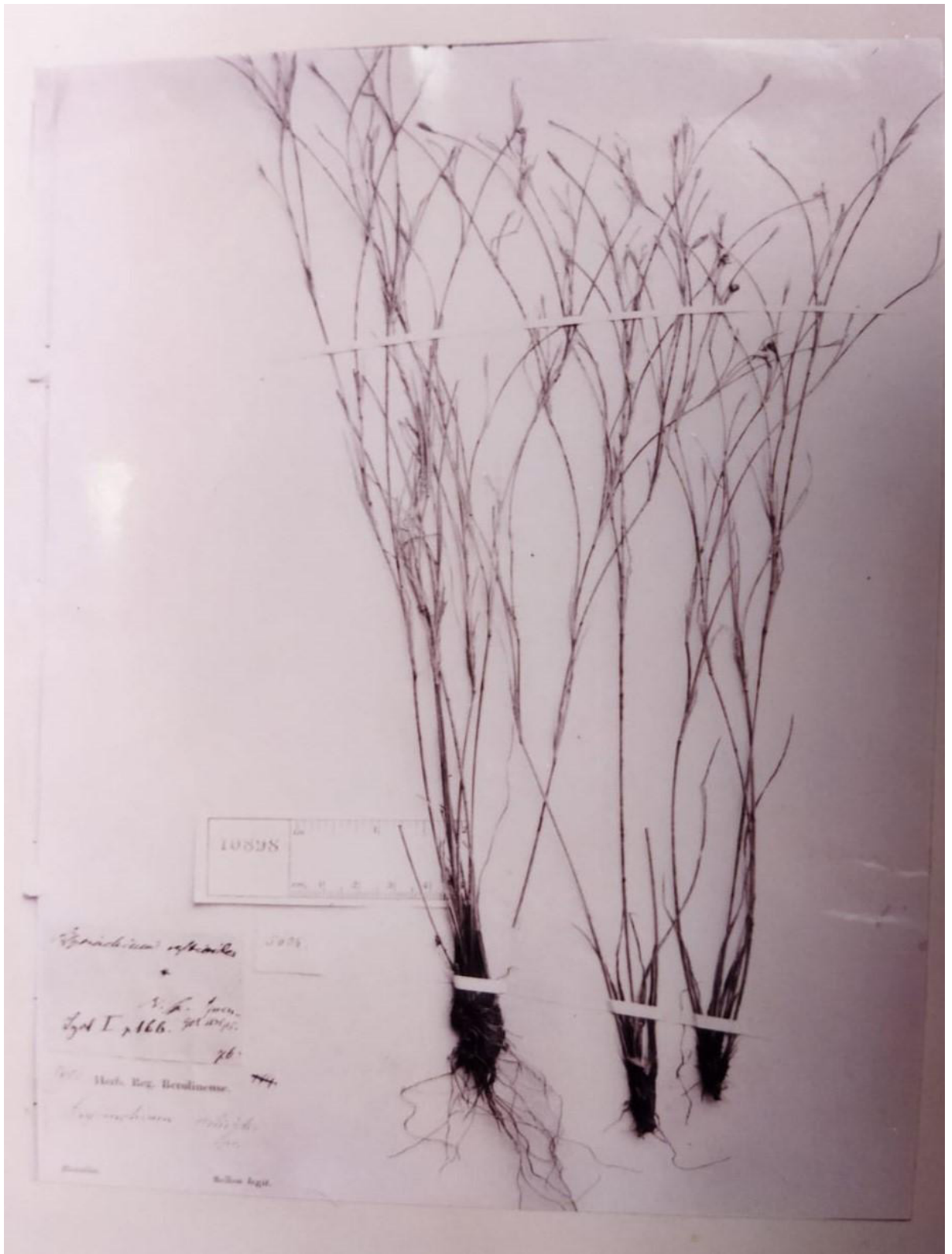


Fig. 13 – *Sisyrrinchium restioides* (Holotype photograph, F!, Sellow s.n.).



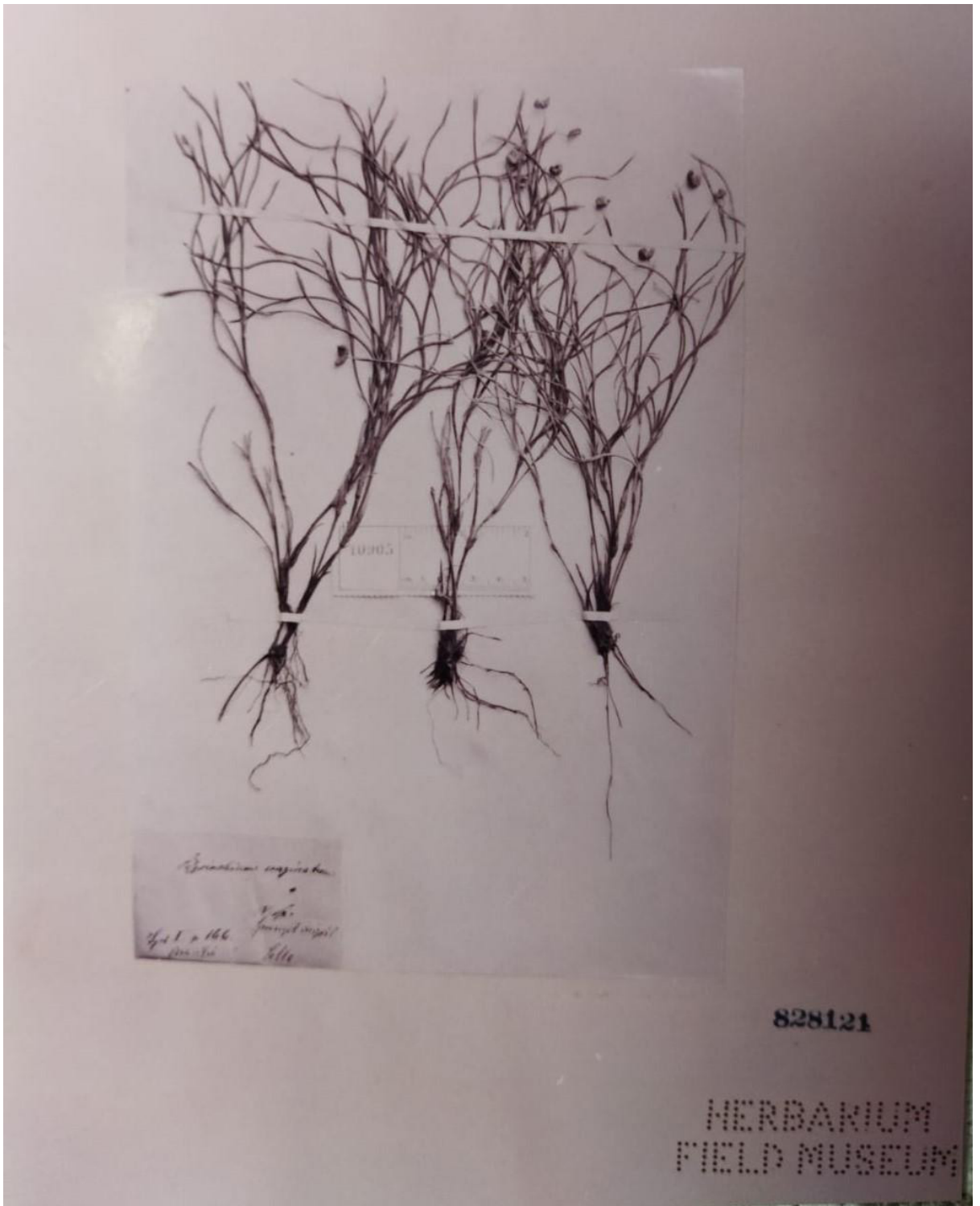


Fig. 14 – *Sisyrinchium vaginatum* Holotype photograph, F!, Sellow s.n.).

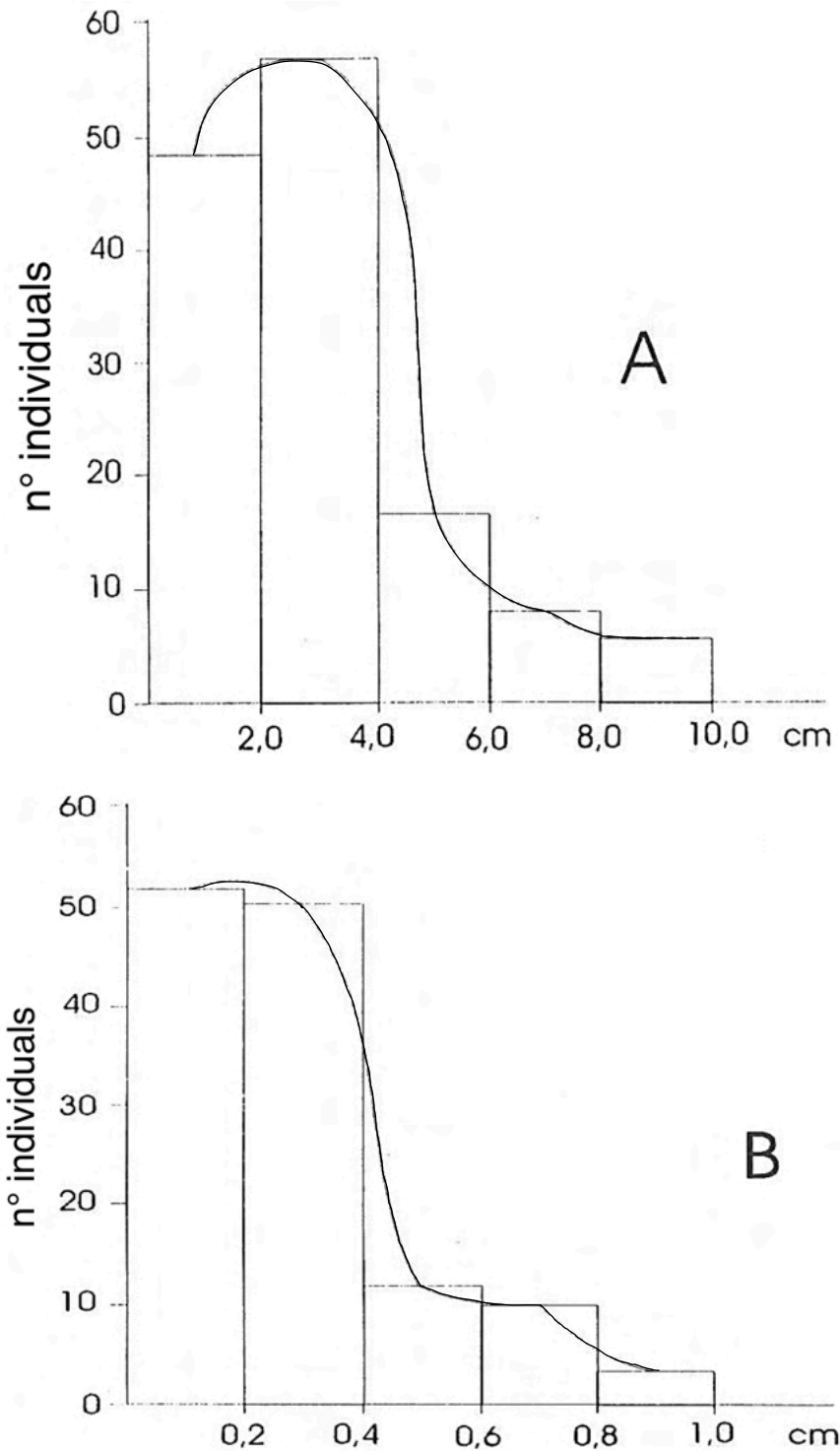


Fig. 15. Histograms of classes for (A) length and (B) width of caulinar leaves of *S. vaginatum* for Brazil (Chukr,1988). Note the continuous of phenotypic variation between the classes.

	S. SUBNUDUM (Archer & Gehrts.n., isotype)	S. LUZULA (E.M.)
Form of leaves and scapes	Terete	Terete
Length of leaves (cm)	20-30	(3)-21-(32,5)
Length of tectriz bract (cm)	2-5	1-9
Length of the scapes (cm)	7-24	(5)-9,5-(21)
Disposition of the inflorescence	Congest fasciculum	Congest fasciculum
Tepals (mm)	4-5x1,5	4-6x1-1,5
Color of the tepals	Lilac	Lilac or yellow
Length of staminal tube(mm)	1,7-2,1	1,2-2
Basal portion of stamina ltube	Tomentose	Tomentose
Form of the anthers	Oblong	Oblong
Length of the anthers (mm)	0,5	0,5-1

Table 1. Comparison between several characters of **Sisyrinchium subnudum** Johnston and **S. luzula** Klotzsch ex Klatt. Legend: E.M.=Examined Material.

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