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Ridha El Mokni<sup>1,2</sup>, Filip Verloove<sup>3</sup>

<sup>1</sup> University of Monastir, Department of Pharmaceutical Sciences 'A', Laboratory of Botany, Cryptogamy and Plant Biology, Faculty of Pharmacy of Monastir, Avenue Avicenna, 5000-Monastir, Tunisia

<sup>2</sup> University of Carthage, Laboratory of Forest Ecology, National Research Institute of Rural Engineering, Water and Forests, 2080-Ariana, Tunisia

<sup>3</sup> Meise Botanic Garden, Nieuwelaan 38, B-1860 Meise, Belgium

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# ***Sisyrinchium micranthum* (Iridaceae, Iridoideae, Sisyrinchieae) in Tunisia, a first record for the African continent**

Ridha El Mokni<sup>1,2\*</sup>, Filip Verloove<sup>3</sup>

<sup>1</sup> University of Monastir, Department of Pharmaceutical Sciences 'A', Laboratory of Botany, Cryptogamy and Plant Biology, Faculty of Pharmacy of Monastir, Avenue Avicenna, 5000-Monastir, Tunisia

<sup>2</sup> University of Carthage, Laboratory of Forest Ecology, National Research Institute of Rural Engineering, Water and Forests, 2080-Ariana, Tunisia

<sup>3</sup> Meise Botanic Garden, Nieuwelaan 38, B-1860 Meise, Belgium

\* Corresponding author e-mail: [ridha.elmokni@fphm.rnu.tn](mailto:ridha.elmokni@fphm.rnu.tn)

Running title: *SISYRINCHIUM MICRANTHUM* IN AFRICA

**Abstract** – This study reports the first discovery of *Sisyrinchium micranthum* in Tunisia, marking the species' inaugural record on the African mainland and along the southern Mediterranean coast. The paper provides a concise morphological description of the species, an account of its phenology, and detailed information on its distribution, habitat, and ecological context in Tunisia. Additionally, we present original photographs of this diminutive annual species. An updated key to the diversity of the *Iridaceae* family in North Africa is also included.

**Keywords:** alien, floristics, North Africa, *Sisyrinchium rosulatum*, Tunisia

## **Introduction**

The genus *Sisyrinchium* L., which is native to the Hawaiian Islands, temperate and subtropical regions of the Americas, and the Falkland Islands, encompasses approximately 212–232 accepted species (WPO Plant List 2025, POWO 2025). Several of these species have become cosmopolitan weeds across Europe, Asia, Russia, and Australia. The genus is considered one of the largest and most taxonomically complex within the Iridaceae family, due to frequent polyploidy, overlapping morphological traits, and the difficulty in identifying reliable distinguishing features between closely related species. This has made taxonomic classification and delimitation challenging (see e.g. Chauveau et al. 2011, Karst and Wilson 2012, Tacuatiá et al. 2012, 2017, Alves et al. 2014, Shin et al. 2016, Burchardt et al. 2018, Weakley et al. 2023).

In the Mediterranean region of Europe, *Sisyrinchium* is represented by approximately seven species and one variety: *S. californicum* (Ker Gawl.) Dryand., *S. angustifolium* Mill., *S. montanum* Greene var. *crebrum* Fernald, *S. micranthum* Cav. (including *S. rosulatum* E.P.Bicknell), *S. platense* I.M.Johnston, *S. septentrionale* E.P.Bicknell, and *S. striatum* Sm., with varying statuses of naturalization (Euro+Med PlantBase, World Checklist of Selected Plant Families 2010, POWO 2025). To date, no records of *Sisyrinchium* have been reported along the southern Mediterranean coast, nor elsewhere in Africa, except in Madagascar, Réunion, and Mauritius, where *S. micranthum* has been recorded as introduced, although its precise status remains unclear (POWO 2025).

This study identifies *Sisyrinchium micranthum* as the first documented occurrence in Tunisia and the continental interior of Africa among the vascular monocotyledonous flora, where it is now established as a naturalized alien species. Furthermore, we provide an updated

account of the generic diversity within the Iridaceae family in North Africa, building upon previously published records.

## Material and Methods

Extensive botanical surveys were conducted across various regions of northeastern Tunisia (specifically the Mogods area) over the past two years (since August 2023). The primary objective was to update the records of the wild and non-native flora, particularly focusing on undocumented species. These surveys led to the discovery of a previously unrecorded, widespread population of an unfamiliar annual, *Iris*-like plant characterized by typical sword-shaped leaves, which overlap at the base and are oriented in a single plane. Data on the plant population and its habitat were systematically compiled.

For species identification, the relevant literature was consulted (e.g. Shin et al. 2016, Stoyanov et al. 2023, under *Sisyrinchium rosulatum* E.P.Bicknell; Eminağaoğlu & Akyildirim Beğen 2024), and specimens were examined at several accessible herbaria (LY, MPU, P; herbarium acronyms follow Thiers 2025+). The collected specimens have been deposited in the personal herbarium of the author (Herb. R. El Mokni) at the Faculty of Pharmacy, Monastir University (not listed in Index Herbariorum), with duplicates stored at BR. Nomenclature follows POWO (2025). Habitat descriptions are based on the first author's personal observations (REM).

## Results

***Sisyrinchium micranthum*** Cav., Diss. 6: 345 (1788)

≡ *S. iridifolium* Kunth, F.W.H.von Humboldt, A.J.A.Bonpland & C.S.Kunth, Nov. Gen. Sp. 1: 324 (1816), *Marica micrantha* (Cav.) Ker Gawl. in Irid. Gen.: 22 (1827), *Bermudiana micrantha* (Cav.) Kuntze in Revis. Gen. Pl. 2: 700 (1891), *Sisyrinchium rosulatum* E.P.Bicknell, Bull. Torrey Bot. Club 26: 228. (1899), *S. exile* E.P.Bicknell, Bull. Torrey Bot. Club 28: 573 (1901).

### Description (Figs. 1-3)

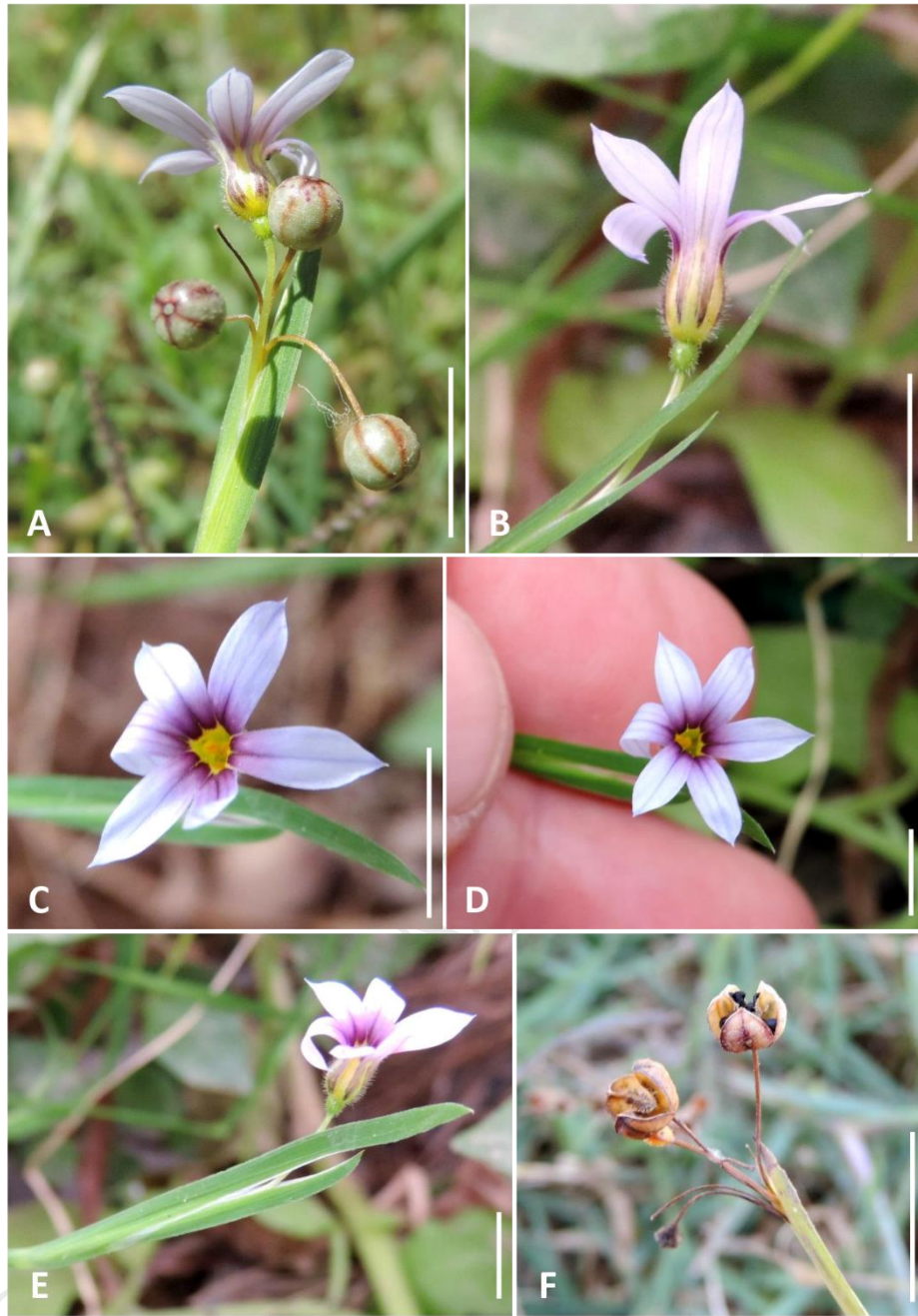
An herbaceous grass-like annual plant (Fig. 1C) with branched, flattened to winged stems. Stems 10–18(–25) cm, compressed, usually 2–3 in a tuft, up to 10 in more vigorous individuals (Fig. 2A), rarely simple, glabrous, with 1–2 nodes. Leaf blades 15–50(–70) × 1–2.5 mm, linear-lanceolate, glabrous, straight, acuminate, sparsely scabrous on margins (Fig. 1A, B). Inflorescences terminal, with 2–5 pedunculate flowers (Fig. 3A), spathes 15–25(–30) mm long, conspicuously compressed, keeled, glabrous, usually entire, with thin, 0.2–0.3 mm wide, scarious margins (Fig. 2B–E). Perianth urceolate-campanulate basally, spreading in the upper half, tepals 5–10 mm long, acute to aristate, the spreading part pale lavender, tinged purple at the base, urceolate part yellowish to ochroleucous with purple patterns or strips, hairy outside (Fig. 3B–E), filaments connate basally, occasionally to 1/2 their length, the ovary ovate, up to 1 mm long, green, patent-hairy. Capsules 2–3 mm, globose, tan with purplish sutures, pedicels spreading to arcuate (Fig. 3F). Seeds 0.5–1 mm, ± globose to slightly compressed, black, surface rugulose to finely alveolate (see also, Shin et al. 2016: 296–299, Stoyanov et al. 2023: 495–496, sub *Sisyrinchium rosulatum*, Eminağaoğlu and Akyildirim Beğen 2024: 714–716, Weakley et al. 2023: 215–218).



**Fig. 1.** *Sisyrrinchium micranthum* in Tunisia. A-B – General habit of an individual before flowering period, C – General habit of an individual during flowering period, scale bar: 20 mm. (Sejnane, 06.08.2024 and 03.06.2025, photos: R. El Mokni).



**Fig. 2.** *Sisyrrinchium micranthum* in Tunisia. A – Habit during flowering period, B-E – Different steps of first blooming, scale bar: 10 mm. (Sejnane, 21.05-03.06.2025, photos: R. El Mokni).



**Fig. 3.** *Sisyrrinchium micranthum* in Tunisia. A – Terminal inflorescence, B-E – Profile view and front view of single flowers with basally urceolate-campanulate perianth, and acute to aristate tepals, F – dehiscent capsule, scale bar: 10 mm. (Sejnane, 21.05-03.06.2025, photos: R. El Mokni).

**Phenology**

Flowering and fruiting from May-June.

**Iconography**

Shin et al. (2016: 298, Fig. 4.).

## Habitat

In its native range, *Sisyrinchium micranthum* is typically found in roadsides, old fields, disturbed areas, stream banks, and wet zones bordering woodlands. Elsewhere, the species has been reported from disturbed areas, including lawns, roadsides, village greens, construction sites, and sunny road verges in Korea (Shin et al. 2016) and Turkey (Eminağaoğlu and Akyildirim Beğen 2024).

## General distribution

*Sisyrinchium micranthum* is native to regions from Mexico to Argentina, spanning much of Central and South America, while *S. rosulatum*—now considered conspecific—was originally recognized as a North American species. In many parts of its native range, the species has become a widespread and often weedy presence in disturbed areas, including roadsides, meadows, and wetland margins. Beyond its native distribution, *S. micranthum* has been introduced and naturalized in various regions worldwide. It has been reported as introduced in several European countries, such as France (Parent 1977), Italy (Nicolella and Ardenghi 2013), Spain (Verloove and Sánchez Gullón 2012), and Portugal (Verloove and Gonçalves Silva 2022). More recent records also include Bulgaria (Stoyanov et al. 2023) and Turkey (Eminağaoğlu and Akyildirim Beğen 2024). Additionally, it has been reported as introduced in parts of Asia (including Southeast China and Tibet), as well as in Queensland, South Australia, and New Zealand (POWO 2025). The species is known to have naturalized in various regions, including Japan, Korea, New Zealand, Samoa, and South Africa (Shin et al. 2016).

## Habitat and distribution in Tunisia

In Tunisia, *Sisyrinchium micranthum* has been found in several sites, particularly in littoral wet meadows, disturbed wet grassy areas, and wet depressions within cork oak forests in the Sejnane (including mainly Cap-Serrat and Oued Ziatine) region (Bizerte, northeastern Tunisia). These habitats are typically characterized by the presence of wet, nutrient-rich soils in association with diverse wetland species.

## Ecology

*Sisyrinchium micranthum* grows on peaty, sandy-loam soils at elevations between 10–20 m a.s.l., often in association with species including: *Alnus glutinosa* (L.) Gaertn., *Alopecurus bulbosus* Gouan, *Arctotheca calendula* (L.) K.Lewin (invasive alien), *Baldellia ranunculoides* (L.) Parl., *Briza minor* L., *Cladanthus mixtus* (L.) Chevall., *Cynodon dactylon* (L.) Pers., *Cynosurus polybracteatus* Poir., *Elatine macropoda* Guss., *Eryngium pusillum* L., *Eudianthe laeta* (Aiton) Rchb. ex Willk., *Falona echinata* (L.) Dumort., *Hypericum afrum* Lam. (an Algerian-Tunisian endemic), *Hypochaeris achyrophorus* L., *H. radicata* L. *Isolepis cernua* (Vahl.) Roemer & Schultes, *Juncus bufonius* L., *J. tenageia* Ehrh. ex L. f., *Lotus angustissimus* L., *L. hispidus* Desf. ex DC., *Lysimachia loeflingii* F.J.Jiménez & M.Talavera, *Lythrum hyssopifolia* L., *L. junceum* Banks & Sol., *L. portula* (L.) D.A.Webb, *Medicago polymorpha* L., *Mentha pulegium* L., *Myosotis arvensis* (L.) Hill, *Nerium oleander* L., *Persicaria decipiens* (R.Br.) K.L.Wilson, *Pteridium aquilinum* (L.) Kuhn, *Phyla nodiflora* (L.) Greene var. *nodiflora*, *Plantago coronopus* subsp. *cupanii* (Guss.) Nyman, *Poa trivialis* L., *Polypogon maritimus* Willd., *Quercus suber* L., *Rubus ulmifolius* Schott, *Rumex dentatus* L. subsp. *dentatus*, *Silene gallica* L., *Solenopsis laurentia* (L.) C.Presl, *Sparganium erectum* L., *Trifolium campestre* Schreb., *T. tomentosum* L., and *T. subterraneum* L.

## Pathways of introduction and current naturalization status in Tunisia

The exact pathway through which *Sisyrinchium micranthum* was introduced to Tunisia and continental Africa remains unclear. However, horticulture is probably one of the primary

pathways for the introduction of many alien species worldwide (Reichard and White 2001, Dehnen-Schmutz et al. 2007a, b, Hulme 2011, Richardson and Rejmánek 2011, Hulme et al. 2018). The escape of ornamental plants from cultivation is a well-documented phenomenon (Kowarik 2005, Dehnen-Schmutz et al. 2007b), and *S. micranthum* may have dispersed in this way, through wind, water, or animal-mediated seed dispersal (Kowarik, 2005). Currently, the presence of *S. micranthum* with hundreds of individuals in several wet depressions within the Sejnane region suggests an established, long-term introduction, following the terminology of Pyšek et al. (2004). The species now forms part of the early summer floristic vegetation in these wetland areas within cork oak forests.

## Notes

*Sisyrinchium micranthum* (including *S. laxum* Otto ex Sims, as per Tacuatiá et al. 2017, and *S. rosulatum* E.P. Bicknell) forms a monophyletic group (Chauveau et al. 2011), all belonging to sect. *Morphanthus* C.D. Inácio, Chauveau & L. Eggers. This species can easily be confused with other closely related species of the genus, especially those with similarly colored perigones, such as *S. angustifolium* Mill. and *S. minutiflorum* Klatt. However, these species belong to different sections.

- *S. micranthum* is part of sect. *Morphanthus*, characterized by annual plants with fibrous and slender roots (never fleshy), a cup-shaped perigon, and connate filaments of varying lengths (but never reaching the top).
- *S. angustifolium* belongs to sect. *Sisyrinchium* Lem. ex Klatt, a group of perennial plants that may exhibit fleshy roots, a disk-shaped perigon, and connate filaments nearly reaching the top.
- *S. minutiflorum* is classified in sect. *Rhizilineum* C.D. Inácio, Chauveau & L. Eggers.

This group consists of annual, erect plants with obviously flat leaves, never setaceous, and a disk-shaped perigon.

Further distinctive characters between *S. angustifolium* and *S. micranthum* can be found in Eminağaoğlu & Akyildirim Beğen (2024: Tab. 1, p. 716), while more details on the differences between *S. angustifolium* and *S. minutiflorum* are available in Johnston (1938: 378–379).

Over the past two decades, numerous amendments and additions to the generic diversity of the *Iridaceae* family (Monocots, Ord. Asparagales sensu APGIII) in North Africa have been made (see e.g., El Mokni and El Aouni 2011, El Mokni and Hadj Khalifa 2020). The genus *Sisyrinchium*, reported here for the first time, represents one such addition. An updated analytical key to the generic diversity of the family in North Africa is provided below (adopted from New South Wales Flora Online (2025) and Fennane et al. (2014: 423)).

## Revised dichotomous key to the genera of Iridaceae in North Africa

1. Inflorescence with 1(–2) flowers ..... 8
  - Inflorescence with 2 or more flowers ..... 2
2. Inflorescence cymose; each pair of spathe bracts enclosing 2 or more usually pedicellate flowers; flowers wither and fall off quickly ..... 3
  - Inflorescence spicate; each pair of spathe bracts enclosing a single sessile flower; flower persistent, not withering quickly ..... 5
3. Style with petaloid branches, each covering a stamen, and bearing two erect crests exceeding the flap-like stigma (*Iris*-type flower) ..... 4

- Style without prominently crested petaloid branches; stamens exposed..... *Sisyrinchium* L. (*S. micranthum* Cav.)
- 4. Plant evergreen, with rhizomes; leaves several, erect; stamens free..... *Iris* Tourn. ex L.
- Plant deciduous, with corms; leaf usually solitary and lax; stamens fused..... *Moraea* Mill.
- 5. Style branches deeply bifid; stigmas 6 or more..... *Freesia* Ecklon ex Klatt (*F. alba* (G.L.Mey.) Gumbel.)
- Style branches entire; stigmas 3 ..... 6
- 6. Perianth tube straight; flowers more or less erect..... *Sparaxis* Ker Gawl. (*S. tricolor* (Curt.) Ker-Gawl.)
- Perianth tube curved; flowers spreading, often at right angles to the axis ..... 7
- 7. Perianth tube swollen on one side near the base, abruptly dilated c. 10 mm above the ovary..... *Chasmanthe* N.E.Br. (*Ch. floribunda* (Salisb.) N.E.Br. var. *floribunda*)
- Perianth tube gradually widening, never swollen on one side near the base..... *Gladiolus* L.
- 8. Floral tube (hypanthium) sunken into the ground; perianth tube greyish, usually longer than the lobes..... *Crocus* L.
- Floral tube  $\pm$  elongate above ground; perianth tube shorter than the lobes..... *Romulea* Maratti

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