

CYTOTAXONOMY OF *URGINEA GOVINDAPPAE* SP. NOV.

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ABSTRACT

Urginea govindappae Boraiah and Fathima sp. nov. was collected from Lal Baugh, Bangalore, Mysore State, India and described as a new species. It shows similarities with *Urginea indica* Kunth and *U. coromandeliana* Hook. f. in having $2n=20$. It differs from these species both morphologically and cytologically in having the following features:

- a. Oval, elongated, 5-6 cm long, 2-4 cm broad bulb.
- b. 20-30 cm long, deeply grooved, 0.5-1 cm broad leaves.
- c. Sparsely arranged, 7-9 flowered scapes.
- d. 3-4 cm long pedicels.
- e. 1 cm long, 0.2 cm broad perianth lobes with pointed tips.
- f. 1.3 cm to 1.5 cm long, 0.8-1 cm broad capsules.
- g. Two pairs of chromosomes with secondary constrictions.

This species could further be distinguished from *U. coromandeliana* in the following features:

- a. Presence of evanescent bracts.
- b. Absence of perianth lobes with rounded bearded tips.
- c. Presence of only subterminal constrictions in all the chromosomes.

The Holotype of the species nova collected by Boraiah and Fathima from Lal Baugh, Bangalore, Mysore State, India, on 17-5-68 under the number 601A and the Isotypes 601B-F are deposited at the Herbarium, University of Agricultural Sciences, Bangalore 24, Mysore State, India. The plants were found growing in association with *Urginea indica* and other grasses.

INTRODUCTION

The tribe Scillae of the family Liliaceae includes three genera viz., *Dipcadi*, *Urginea* and *Scilla* (Hooker, 1892). The genus *Urginea* is represented by about 24 species of S. European, W. Asian and African distribution (Hooker, 1892). Engler (1930) includes *Urginea* in the subfamily Scilloideae with 40-50 species of mostly tropical and South African distribution. Five species viz., *U. indica*, *U. coromandeliana*, *U. wightiana*, *U. congesta* and *U. polyphylla* respectively (Hooker, 1892) have been recorded in India. Of these, the first two and *U. congesta* occur in South India (Gamble, 1928). The presence of B-chromosomes in *Urginea* has made this genus a particularly desirable material cytologically (Battaglia, 1966). However, the work on the Indian species is far from adequate. Only *U. indica* and *U. coromandeliana* have received some attention (Raghavan, 1935, Datta, 1965). So far only *U. indica* has been recorded in Mysore State. A new taxon of *Urginea* was found growing in Lal Baugh, Bangalore, Mysore State, India in association with *U. indica*. The present investigation therefore, is a cytotaxonomical study of this new species of *Urginea* viz., *U. govindappae* Boraiah and Fathima.

MATERIAL AND METHODS

The Holotype of the species nova 601A and the Isotypes 601B-F were collected from Lal Baugh,

Bangalore, Mysore State, India on 17-5-1968. These were grown in the green house of the department. *U. indica* Kunth was also collected from Lal Baugh, Bangalore, Bannerghatta, Nandi hills and Ranganathittu, Mysore State. All the herbarium specimens of *U. indica* Kunth and *U. coromandeliana* Hook. f. deposited at the Central National Herbarium, Botanical Survey of India, Calcutta and Southern Circle, Coimbatore, were brought on loan and examined.

Excised root tips were pretreated with 0.1-0.2% colchicine for 1-1½ hours and stained according to Feulgen's schedule after fixing in 1:3 acetic alcohol. The slides were made permanent by passing through 1:1 acetic acid and butanol and butanol series, mounted in euparal. Young anthers were fixed in Carnoy's fixative and stained following Feulgen's procedure. Smear preparations were made after intensifying the stain in 1% acetocarmine.

Photomicrographs and camera lucida drawings were made for the karyotype analysis. The chromosomes are arranged in the order of the increasing length of the short arm.

OBSERVATIONS

Urginea govindappae Boraiah et Fathima sp. nov.

Valde *Urgineae indicae* affinis, attamen differt forma staturaque bulbi, foliis angustissimis et morphologia unius chromosomatarum paris. Differt etiam ab *U. coromandeliana* forma bulbi, bracteis

evanescentibus, filamentis applanatis, stylo conico et morphologia chromosomatarum.

Bulbi ovati, elongati, 5-6 cm longi, 2-4 cm lati. *Folia* 20-30 cm longa, 0.5-1 cm lata, linearia, acuta, profunde sulcata subbifaria, e medio recurvata. *Inflorescentiae* ante folia apparentes, bracteis evanescentibus, scapis erectis, violaceo-fuscis, 55-60 cm longis. *Flores* sparsae, 7-9 in singulis racemis, pedicellis 3-4 cm longis. Perianthia violaceo-virida, uninervia, lobis oblongis, ad apicem acutis, 1 cm longis, 0.2 cm latis. Antherae versatiles, infra profunde lobatae. Filamenta applanata. Styli ovario conico breviores. *Capsulae* ellipsoideae, 1.3-1.5 cm longae, 0.8-1 cm latae. *Semina* 4-6.

Holotypus in horto Lalbagh in urbe Bangalorense, die 17a maii 1968 a Boraiah et Fathima lectus in

herbario Universitatis Scientiarum Agriculturae ejusdem urbis sub numero 601-A positus est.

***Urginea govindappae* Boraiah and Fathima sp. nov.**

Bulb oval, elongated, 5-6 cm long, 2-4 cm broad. *Leaves* 20-30 cm long, 0.5-1 cm broad, linear, acute, deeply grooved, subbifarious, curling from the middle backwards. *Inflorescence* appearing before leaves, bracts evanescent, scape erect, 55-60 cm long, purplish brown; *flowers* sparsely arranged, 7-9 in each raceme; pedicels 3-4 cm long; perianth purplish green, one-nerved, lobes 1 cm long, 0.2 cm broad, oblong; tips pointed; anthers versatile, deeply lobed below; filaments flattened; style shorter than the ovary, ovary conic. *Capsule* ellipsoidal, 1.3-1.5 cm long, 0.8-1 cm broad. *Seeds* 4-6.

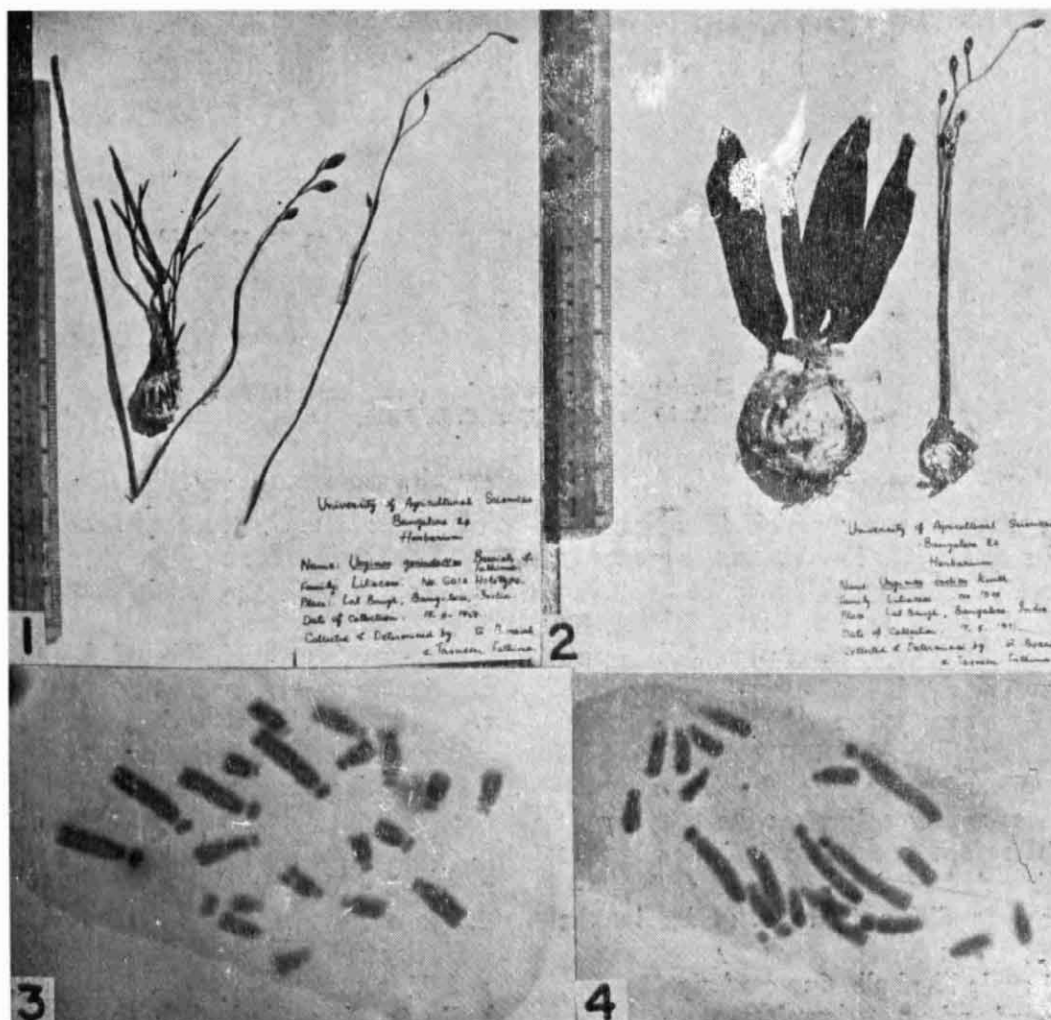


Plate I : Figs. 1-4 : Cytotaxonomy of *Urginea govindappae* Boraiah & Fathima : 1. Photograph of *Urginea govindappae*. 2. Photograph of *U. indica*. 3. Photomicrograph of somatic metaphase in *U. govindappae*. 4. Photomicrograph of somatic metaphase in *U. indica*.

Holotype collected by Boraiah and Fathima in Lal Baugh Garden, Bangalore on 17-5-1968 and deposited in the herbarium of the University of Agricultural Sciences, Bangalore under the number 601-A (Plate I, fig. 1).

Urginea indica Kunth

Bulb rounded, 4-10 cm long, 3-6 cm broad, as big as an apple. *Leaves* 15-45 cm long, 2-4 cm broad, linear, acute, grooved, subbifarious, curling from the middle backwards. *Inflorescence* appearing before leaves, bracts evanescent, scape erect, 50-60 cm long, purplish green; *flowers* closely arranged, 10-18 in each raceme; pedicels 2 cm long; perianth brownish purple to dingy brown, one-nerved; lobes 0.6 cm long, 0.2 cm broad, tips rounded; anthers versatile,

deeply lobed below; filaments flattened; style shorter than the ovary, obconic. *Capsule* ellipsoidal, 0.8-1 cm long, 0.5 to 0.6 cm broad. *Seeds* 6-9.

The chromosome number in *Urginea govindappa* Boraiah and Fathima is $2n=20$. All the chromosomes show subterminal constrictions with an arm ratio ranging between 1: 4 to 1: 7. The third and the seventh pair of chromosomes show secondary constrictions (Plate I, fig. 3, Plate II A).

Meiosis is normal.

The chromosome number in *Urginea indica* Kunth is $2n=20$. It is in confirmation with the earlier report (Raghavan, 1935). The seventh pair of chromosomes shows secondary constrictions while the sixth pair shows satellites (Plate I, fig. 4, Plate II B). Meiosis is normal in this species also.



Plate II : Drawing of somatic metaphase chromosomes $\times 1,000$.
A. *Urginea govindappa* B. *U. indica*.

DISCUSSION

The major key character which identifies the various species of *Urginea* into two main groups is the appearance of flowers which may be before or together with the appearance of leaves. Of the five species in India, *U. indica*, *U. coromandeliana* and *U. wightiana* show the flowers appearing before the leaves while in *U. congesta* and *U. polyphylla* the leaves and the flowers appear together. The species nova under discussion fits into the first category since the leaves appear only after the flowering is completed. The plants are totally destitute of leaves when flowering and destitute of flowers when the leaves appear. It differs from *U. indica* in the following characters:

- a. Rounded apple like bulb, 6-10 cm long.
- b. 2-4 cm broad and 4-5 cm long leaves.
- c. 10-18 flowered purplish green scapes.
- d. 2 cm long pedicels.
- e. Perianth segments 0.6 cm long and 0.2 cm broad.

- f. 0.8-1 cm long and 0.5-0.6 cm broad capsules.

It differs from *U. coromandeliana* in not possessing the following features:

- a. Globose bulb, 3-7.5 cm in diameter.
- b. Persistent bracts.
- c. Sepals with rounded bearded tips.
- d. Clavate anther filaments.
- e. Narrowly abconic style.

It could be distinguished from *U. wightiana* in the following characters:

- a. Flowers on decurved or suberect racemes.
- b. Sepals bearded at the tip.
- c. Anther filaments dilated in the middle.
- d. Style elongate.

However, the herbarium specimens of *U. indica* and *U. coromandeliana* from the Botanical Survey India, Southern Circle, Coimbatore show an annotation by A. S. Rao, who considers these two species to be one and the same. According to him, the marked variation in the shape and size of the bulb,

leaf, size, posture and texture and colour of the scape, pedicel and flower are due to the wide distribution of this species. He also considers *U. coromandeliana* and *U. wightiana* to be mere diverse variations of *U. indica*.

Cytologically the new taxon shows similarities with both *U. indica* and *U. coromandeliana* in having $2n=20$. It differs from *U. indica* in having two pairs of chromosomes with secondary constrictions and showing the absence of satellites. However, the presence of only subterminal constrictions in all the chromosomes is a common feature shared by *U. indica* and the species nova. *U. coromandeliana* shows considerable variation from the new taxon as well as *U. indica*. While the absence of satellites brings this species closer to the new taxon, the presence of only one pair of chromosomes with secondary constrictions drifts it equally apart resulting in its similarity with *U. indica*. Further, the presence of submedian constrictions in *U. coromandeliana* make it thoroughly dissimilar to both *U. indica* and the species nova. Since the new species does not match with any of the species of *Urginea*

described earlier either cytologically or morphologically, it has been named as *U. govindappæ*.

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