

CHROMOSOME NUMBERS IN CERTAIN INDIAN SPECIES OF *UTRICULARIA* L. (LENTIBULARIACEAE)

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ABSTRACT

Chromosome numbers from meiotic studies have been reported for the following species of *Utricularia*: *U. aurea* Lour. ($n = 21$); *U. baouleënsis* A. Chev. ($n = 10$); *U. caerulea* L. ($n = 20$); *U. inflexa* var. *stellaris* (Linn.f.) P. Taylor ($n = 21$); *U. minutissima* Vahl ($n = 8$); *U. scandens* Benj. ($n = 6, 7$); and *U. stricticaulis* Stapf ($n = 7$). There are two cyto-races in *U. scandens*.

INTRODUCTION

ABOUT 25 species of *Utricularia* occur in the Indian subcontinent; while some of them are aquatic, the majority are terrestrial and semi-marshy, and the remaining few are epiphytic. C. B. Clarke (1884) describes 22 species and in addition reports 10 imperfectly known species. Comparatively there is a dearth of information on the chromosome numbers of various Indian species of *Utricularia*. Kausik (1938) reports $n = 20$ for *U. caerulea* L., and Siddiqui (1959) $n = 21$ for *U. flexuosa* Vahl. Siddiqui found persistence of nuclei, nucleolar budding and fragmentation are normally present in *U. flexuosa* whose present nomenclature is *U. aurea* Lour. He further finds that abnormal cytokinesis occurs in some cases in this plant and cleavage starts at the dyad stage. Chromosome numbers during meiosis are reported for 7 species of the genus in the present study.

MATERIALS AND METHODS

Materials were collected from various places of India and these are given in Table I. The flower-buds for meiotic study were fixed in 1 : 3 acetic alcohol and also in Bouin's fluid on warm sunny mornings between 9 A.M. and 11-30 A.M. It was found that Bouin's fluid proved to be a better fixative. The fixed materials were treated with alkali-aldehyde following Tandler's method (1959) and the staining procedure by Snow

(1963) was followed. The anthers were squashed in 1% aceto-carminine instead of 45% acetic acid and permanent preparations were made after removing the coverslip in tertiary butyl alcohol and finally mounted in euparal.

TABLE I

Sl. No.	Taxon	Number	Origin and Voucher	Fig. No.
1.	<i>Utricularia aurea</i> Lour. (= <i>U. flexuosa</i> Vahl)	n=21	India: West Bengal, Calcutta, Jadhavpur, 29/10, 1965, <i>Kamble</i> 9944. CBLH*.	1
2.	<i>U. baouleënsis</i> A. Chev.	n=10	India: Assam, Elephant Falls, Shillong, 16/9, 1966, <i>A. S. Rao</i> 36658. CBLH.	2
3.	<i>U. caerulea</i> L.	n=20	India: Madras State, Salem Dist., Yercaud, 22/12, 1967, <i>A. V. N. Rao</i> and <i>K. Ramamurthy</i> 4. CBLH.	3
4.	<i>U. inflexa</i> var. <i>stellaris</i> (L.f.) P. Taylor (= <i>U. stellaris</i> L.f.)	n=21	India: West Bengal, Calcutta, Jadhavpur, 24/11, 1965, <i>Kamble</i> 9950. CBLH.	4
5.	<i>U. minutissima</i> Vahl	n=8	India: Orissa, on the way to Konarak, 26/10, 1967, <i>L. K. Banerjee</i> and <i>A. K. Mukherjee</i> , 6085. CBLH.	5
6.	<i>U. scandens</i> Benj.	n=6	India: Madras, Salem District, Sanyasi Malai, Yercaud, 22/12, 1967, <i>A. V. N. Rao</i> and <i>K. Ramamurthy</i> 1. CBLH.	6, 7
		n=7	India: Assam, Elephant Falls, Shillong, 12/9, 1965, <i>Kamble</i> 10. CBLH.	8, 9
7.	<i>U. stricticaulis</i> Stapf	n=7	India: Orissa, Balukhand R. F., 13/10, 1965, <i>V. Abraham</i> 266. CBLH.	10

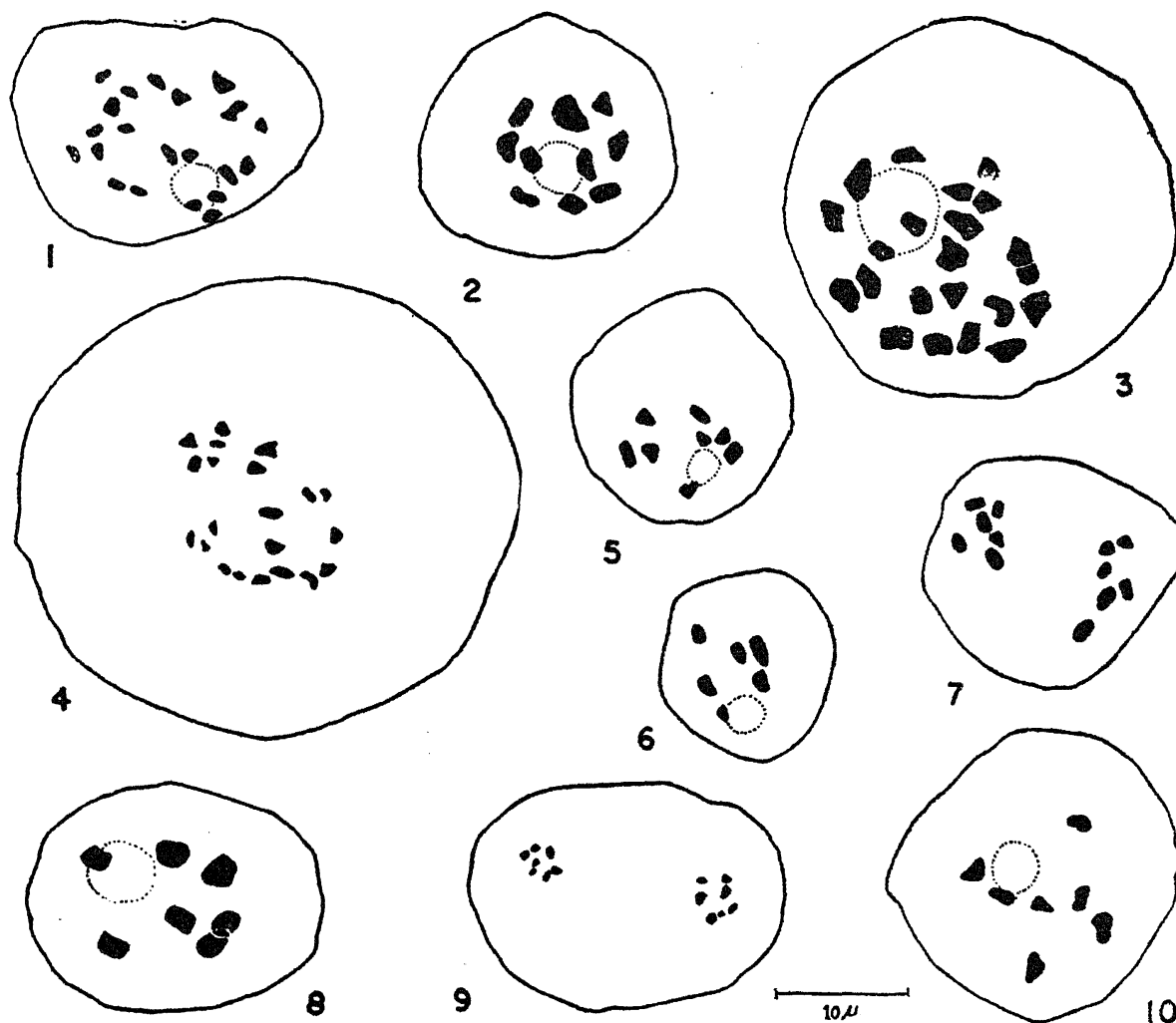
* Herbarium, Central Botanical Laboratory, Botanical Survey of India, Calcutta.

OBSERVATIONS

The chromosome numbers of various species of *Utricularia* along with field data are given in Table I.

RESULTS

Meiosis in all these species is normal. The chromosome numbers were determined at diakinesis and metaphase I; anaphase I shows clearly the distribution of equal number of chromosomes towards each pole. The tetrads of microspores are formed in the normal manner. Among these reports five are new. The haploid chromosome numbers for *U. aurea*



FIGS. 1-10. Fig. 1. *Utricularia aurea*: Diakinesis showing $n = 21$ bivalents. Fig. 2. *U. baouleënsis*: Diakinesis showing $n = 10$ bivalents. Fig. 3. *U. caerulea*: Diakinesis showing $n = 20$ bivalents. Fig. 4. *U. inflexa* var. *stellaris*: Metaphase I showing $n = 21$ bivalents. Fig. 5. *U. minutissima*: Diakinesis showing $n = 8$ bivalents. Fig. 6. *U. scandens*: Diakinesis showing $n = 6$ bivalents. Fig. 7. *U. scandens*: Anaphase I showing equal distribution of chromosomes. Fig. 8. *U. scandens*: Diakinesis showing $n = 7$ bivalents. Fig. 9. *U. scandens*: Anaphase I showing equal distribution of chromosomes. Fig. 10. *U. stricticaulis*: Diakinesis showing $n = 7$ bivalents.

$n = 21$ and *U. caerulea* $n = 20$ confirm the previous reports of Siddiqui (1959) and Kausik (1938) respectively. The chromosome numbers for these plants reported here are however for plants collected from widely separated geographical regions.

It is also interesting to note that in *U. scandens* there are two cytotypes. While the population of plants collected at Elephant Falls, Shillong, Assam, at an altitude of *ca.* 1710 M has $n = 7$, the population of the same species occurring in Sanyasi Malai Hills, Yercaud, Salem District, Madras State, at an altitude of *ca.* 1500 M, has $n = 6$, and this was observed in 98% of the dividing microsporocytes.

It will be also seen from chromosome numbers given in Table I that there are both aneuploids and polyploids. Since some more species are under investigation it may be possible for providing some information on the basic numbers of members of this genus.

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