

## KARYOLOGICAL STUDY ON SOME ENDEMIC *IRIS* L. (*IRIDACEAE*) SPECIES FROM TURKEY

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### Abstract

Karyotype structure of two *Iris* L., species viz., *Iris galatica* Siehe and *Iris kerneriana* Ascherson & Sint ex Baker collected from Central Black Sea Region of Turkey have been analysed. Chromosome number determined is *I. galatica*  $2n=24$ , *I. kerneriana*  $2n=18$ .

### Introduction

Turkey has a rich floristic composition with nearly 33.5% endemic plant species. Of these, *Iris* L., is represented by 38 species, 14 of which are endemic including *I. galatica* and *I. kerneriana* (Davis, 1984). *I. galatica* is a bulbous and *I. kerneriana* is a rhizomatous species used as ornamental plants (Kandemir *et al.*, 1998; Özkan *et al.*, 1999). Both of these species have been placed in nt categories (rare or not to be endangered) by Ekim *et al.*, (1989).

Some studies have been carried out on chromosomes number and morphology of *Iris* L., species (Sauer *et al.*, 1979; Love, 1972; 1973; Goldblatt, 1971; Zakharyeva, 1969). One of the first cytotaxonomical study of the genus *Iris* L., was performed by Randolph *et al.*, (1956). Mitra (1958) reported chromosome number of *Iris* L., species. Senel & Özyurt (1990, 1995) and Dalgic (1992) have also studied the karyotype structure of *Iris* L., species from Turkey. The present report gives an account of the chromosome number and morphology of *Iris galatica* and *I. kerneriana* which has not been reported before.

### Materials and Methods

Samples of *I. galatica* and *I. kerneriana* used in this study were collected in the vicinities of Amasya and Bafra in Samsun, Tavsan Mountain in Merzifon, Amasya. Plant samples were kept in the herbarium at the Ondokuz Mayıs University Faculty of Education and numbered 3220 and 3450, respectively. Somatic chromosomes were studied from actively dividing root tip cells obtained from natural habitats. Number of samples collected per plant was five. The analysis of chromosome number and morphology were carried out during the mitotic phase and processed according to the following squash technique (Senel *et al.*, 1995). The root tips were pretreated in 0.5%-bromonaphthalene solution for 16 hours at 4°C and then fixed in acetic alcohol (1:3). After washing in alcohol they were hydrolyzed in 1N HCl for 12-14 minutes at 6°C. The root tips were stained with the leuco-basic fuchsin for 1 hour and squashed in 45 % acetic acid. Karyotype analysis were performed according to the method described by Levan *et al.*, (1964). Permanent slides for karyotype analysis for each plant were prepared from at least five well-spread cells. The photographs of the preparations were taken with a Nikon microscope. The karyograms were drawn from the metaphase.

## Results

Chromosome numbers of two *Iris* L., species, details of chromosome morphology and their measurements are presented in Figs. 1,2,3,4 and Table 1.

**Table 1. Karyotypic details of somatic chromosomes of *Iris galatica* and *Iris kerneriana*.**

Chromosome number	Long arm (L)	Short arm (S)	Total length (C)	L/S	Sat	Centromeric index (I)	Centromere position
<i>Iris galatica</i>							
1	3.9	2	5.9	1.95	-	33	Submedian region
2	3	2.2	5.2	1.36	-	42	Median region
3	4	1	5	4.00	-	20	Subterminal region
4	3	2	5	1.50	-	40	Median region
5	2	2	4	1.00	-	50	Median region
6	3	1	4	3.00	-	25	Subterminal region
7	3	1	4	3.00	-	25	Subterminal region
8	3	1	4	3.00	-	25	Subterminal region
9	2.2	1.8	4	1.22	-	45	Median region
10	2	1	3	2.00	-	33	Submedian region
11	2	1	3	2.00	-	33	Submedian region
12	1	1	2	1.00	-	50	Median point
<i>Iris kerneriana</i>							
1	3	3	6	1.00	-	50	Median region
2	3	2.2	5.2	1.36	-	42	Median region
3	3	2	5	1.50	-	40	Median region
4	3	2	5	1.50	-	40	Median region
5	2	2	4	1.00	-	50	Median region
6	2.5	1	3.5	2.50	-	28	Subterminal region
7	2.5	1	3.5	2.50	-	28	Subterminal region
8	2	1	3	2.00	-	33	Subterminal region
9	2	1	3	2.00	-	33	Subterminal region

C: Total chromosome length, S: Short arm length, I: Centromeric index, L: Long arm length, L/S: Arm ratio.

### 1. *Iris galatica* Siehe

The chromosome number of this species is  $2n=24$  (Figs. 1, 2). The karyotypes of this species consists of 4 pairs of subterminal (ST), 3 pairs of submedian (SM) and 5 pairs of median (M) (Figs. 2-3). The 2nd, 4th, 5th, 9th and 12 chromosomes are median-centromeric, the 1st, 10th and 11th chromosomes are submedian-centromeric and the 3rd 6th, 7th and 8th chromosome is subterminal-centromeric. Total chromosome length are about 2-5.9 $\mu$ .



Fig. 1. Microphotograph of somatic metaphase chromosomes of *Iris galatica* ( $2n=24$ ).

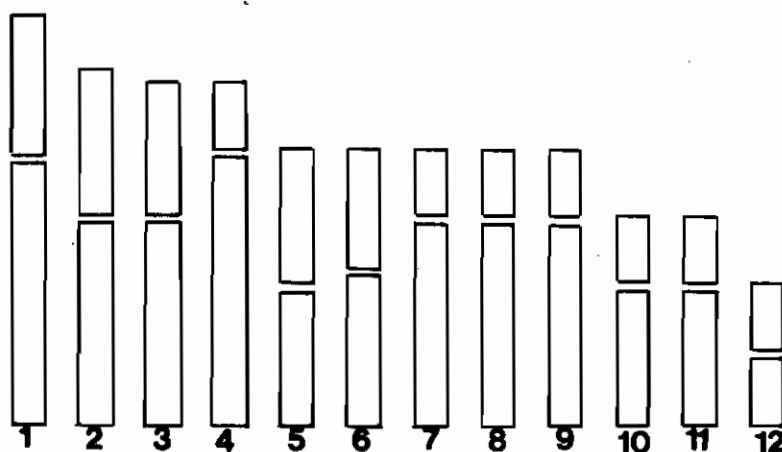


Fig. 2. Idiogram of chromosome complement of *I. galatica* at mitotic metaphase.

## 2. *Iris kernerlana* Ascherson & Sint. ex Baker

The chromosome number of this species is  $2n=18$  (Figs. 3, 4). The karyotypes consisted of 5 pairs of median (M) and 4 pairs of submedian (SM) (Table 2). The 1st, 2nd, 3rd, 4th, 5th chromosomes are median centromeric, 6th, 7th, 8th, 9th chromosomes are submedian centromeric.



Fig. 3. Microphotograph of somatic metaphase chromosomes of *Iris kerneriana* ( $2n=18$ ).

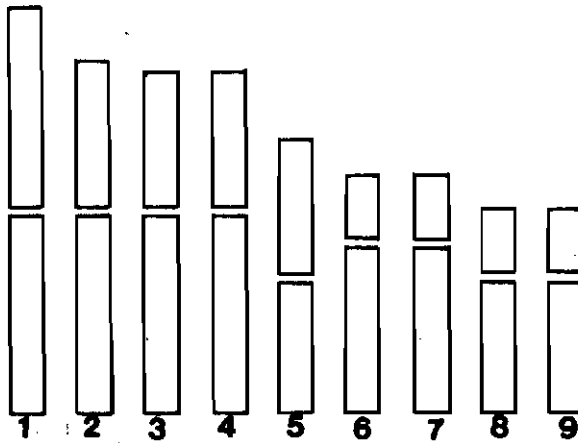


Fig. 4. Idiogram of chromosome complement of *I. kerneriana* at mitotic metaphase.

### Discussion

Karyological properties showed some differences between karyotype of *I. galatica* and *I. kerneriana*. The karyotype of *I. galatica* consists of 4 pair subterminal, 3 pairs submedian and 5 pairs median centromeric chromosomes. Chromosome number of this species is  $2n=24$ . The karyotype of *I. kerneriana* consists of median and submedian centromeric chromosomes. Chromosome number of this species is  $2n=18$ . Chromosome length of *I. kerneriana* is smaller 2-5.9  $\mu$ m than *I. galatica* 3-6  $\mu$ m.

*Iris* L., species are reported to have diploid and tetraploid chromosome number (Love, 1973). In Love's reports (1972; 1973; 1975), chromosome numbers of *Iris* L. species were given as  $2n=16, 24, 34, 44$ . The present study supports the previous report that the basic numbers for the genus are 8-12 (Mitra, 1958).

In recent years, karyological characters have been used to solve taxonomical problems. Stebbins (1971) suggests that karyological analysis should have been made for determining of chromosome numbers and morphology. Besides, researchers such as Stebbins (1971), Levan (1964) and Ising (1970) have reported that species with homogen karyotype belong to old flora (paleoendemic) and those with heterogen karyotype belong to new flora (neoendemic). We think that *I. kerneriana* is an old floristik element (paleoendemic) since it has homogen karyotype and *I. galatica* is a new floristik element (neoendemic) since it has heterogen karyotype.

Although some morphological and anatomical studies have been made about this species, no karyological studies have been carried out (Kandemir, 1998; Özkan, 1999). Endemic species have great importance in plant geography especially paleoendemics help to evaluate the information about flora origins and old geological area. The karyotype analysis obtained in this study will support the taxonomical studies. Furthermore, determination of chromosomal characters will provide a better identification and taxonomical position for a taxon that has been examined morphologically.

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