

CHROMOSOME COUNTS REPORT OF SOME ANGIOSPERM SPECIES IN THE FLORA OF IRAN

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This study represents chromosomal data for seven species of five genera of Apiaceae, Cistaceae, Lamiaceae families. The chromosome numbers for three taxa including, *Oliveria decumbens* $2n=18$, *Acinus graveolens* $2n=18$, and *Gonscharovia popovii* $2n=30$ are reported here for the first time and the chromosome number of *Helianthemum aegyptiacum* $2n=40$, *Helianthemum ledifolium* $2n=40$, *Helianthemum salicifolium* $2n=40$ and *Lagoecia cuminoides* $2n=16$ are reported for the first time in the flora of Iran. Karyotypic analyses of all species are presented.

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Keywords: Angiosperms; Chromosome number; Cistaceae; karyotype; Iran

گزارش شمارش‌های کروموزومی چند گونه از نهان‌دانگان ایران

سارا صادقیان: کارشناس پژوهش، بخش تحقیقات منابع طبیعی، مرکز تحقیقات و آموزش کشاورزی و منابع طبیعی استان فارس، سازمان تحقیقات، آموزش و ترویج کشاورزی، شیراز، ایران

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داده‌های کروموزومی پنج جنس از سه خانواده Apiaceae، Cistaceae و Lamiaceae بررسی شد. شمارش کروموزومی برای سه گونه، ($2n=18$) *Oliveria decumbens*، *Gonscharovia popovii* ($2n=30$) و *Acinus graveolens* ($2n=18$)، برای اولین بار گزارش می‌شود. عدد کروموزومی گونه‌های *Helianthemum aegyptiacum* ($2n=40$)، *Helianthemum ledifolium* ($2n=40$)، *Helianthemum salicifolium* ($2n=40$) و *Lagoecia cuminoides* ($2n=16$) نیز برای اولین بار برای فلور ایران گزارش می‌شود. تحلیل کاریوتایی تمام گونه‌ها انجام شد.

INTRODUCTION

The primary objectives of our research are to investigate the chromosome number, and ploidy level and provide general information on the karyotype characteristics of species in the flora of Iran. According to the IPCN (Index to Plant Chromosome Numbers, www.tropicos.org/Project/IPCN) and Index to Plant Chromosome Number of Iran (Ghaffari 2020) chromosome numbers have not been previously

reported for *Oliveria decumbens*, *Gonscharovia popovii* and *Acinus graveolens*. Two ploidy levels have been reported for the genus *Helianthemum* $2n=2x=20$ and $2n=4x=40$ with the basic chromosome number $x=10$ (Kliphuis 1977; Romero & Olivencia 1986; Luque & Lifante 1991; Lifante & al. 1992; Ghaffari & Tajik 2007). The basic chromosome number of *Lagoecia cuminoides* has been reported as $n=8$ (Diosdado & al. 1993).

MATERIALS AND METHODS

This study was carried out by using seeds collected from natural habitats in Iran, Fars province. Vouchers are deposited in the Herbarium of Fars Agricultural and Natural Resources Research and Education Centre. For the cytological study, rootlets were collected from germinated seeds on wet filter paper in Petri dishes at 22°C temperature. The root tips meristems were treated with 0.5% saturated α -Bromo naphthalene at 4°C for 3-4 h. Then they were fixed in 10% formaldehyde and chromium trioxide (1:1) for 16 to 24 h at 4°C. Hydrolysis was carried out with NaOH (1 Normal) at 60°C for 15-30 minutes and hematoxylin-iron was used for chromosome staining. Root tips were squashed in a droplet of 45% acetic acid. The chromosome morphology was studied based on Levan & al. (1964). Stebbins's karyotype asymmetry levels were used to define asymmetry levels (1971).

RESULTS

Mitotic chromosome counts for examined species are presented as follows:

Apiaceae

Lagoecia cuminoides L., (Fig. 1a).

Specimen examined: Iran, Fars, Shiraz, 1650 m, Hatami 10161.

Karyological analysis of specimens showed a diploid chromosome number of $2n=2x=16$. This count is consistent with previous reports by Baltisberger (1991) and Pimenor & al. (1998). The basic chromosome number is $x=8$. Most chromosomes were acrocentric (st) with the Karyotype formula $2sm+6st$. They were categorized in type 4A. According to the available data, the chromosome number of this species is reported here for the first time for the flora of Iran.

Oliveria decumbens Vent., (Fig. 1b).

Specimen examined: Iran, Fars, Kazeroon, 900 m, Hatami 8641.

This species was diploid with $2n=2x=18$. Four pairs of chromosomes were metacentric (m), 3 pairs were submetacentric (sm) and 2 pairs were acrocentric (st) with karyotype formulas $4m+3sm+2st$. They were categorized in type 3A. This chromosome count is reported here for the first time.

Cistaceae

Helianthemum aegyptiacum (L.) Mill., (Fig. 1c).

Specimen examined: Iran, Fars, Sarvestan, 1700 m, Hatami 20112.

This species was observed to be tetraploid with a chromosome count of $2n=4x=40$ and a basic

chromosome number of $x=10$. The chromosomes were metacentric (m) and submetacentric (sm) and the karyotypic formula was $7m+3sm$. They were categorized in type 1A. Our results are in agreement with the previous report of $2n=40$ by Lifante & al. (1992). The chromosome number of this species is reported here for the first time for the flora of Iran.

Helianthemum ledifolium (L.) Mill., (Fig. 1d).

Specimen examined: Iran, Fars, Sarvestan, 1700 m, Hatami 15378.

The results of this study showed a tetraploid chromosome number of $2n=4x=40$. This count agrees with the previous report by Kliphuis (1977). The karyotypic formula was $6m+4sm$ and is categorized in type 1A. The chromosome number of this species is reported here for the first time for the flora of Iran.

Helianthemum salicifolium (L.) Mill., (Fig. 1e).

Specimen examined: Iran, Fars, Sarvestan, 1700 m, Hatami 15279.

This species was observed to be tetraploid with $2n=4x=40$. The chromosomes were metacentric (m) and submetacentric (sm) and the karyotypic formula was $6m+4sm$ and are categorized in type 2A. The tetraploid level of this species is reported here for the first time. Meanwhile, $n=10$ for this species has been reported previously by Ghaffari & Tajik (2007).

Lamiaceae

Acinus graveolens (M.B.) Link, (Fig. 1f).

Specimen examined: Iran, Fars, Shiraz to Dashte-Arjan, 2000 m, Hatami 20111.

The chromosome count for this species is $2n=2x=18$ and the basic chromosome number of $x=9$ with 6 metacentric (m) and 3 submetacentric (sm) chromosome pairs. The karyotypic formula was $6m+3sm$ and is categorized in type 1A. The chromosome number of this species is presented here for the first time

Gontscharovia popovii (B. Fedtsch. & Gontsch.) Boriss., (Fig. 1g).

Specimen examined: Iran, Fars, Estahban, 2500 m, 16692.

The studied specimens showed a diploid chromosome number of $2n=2x=30$ and a basic chromosome number of $x=15$. The chromosomes were metacentric (m) and submetacentric (sm) and the karyotypic formula was $8m+7sm$ and are categorized in type 2A. The chromosome number of this taxon is reported here for the first time.

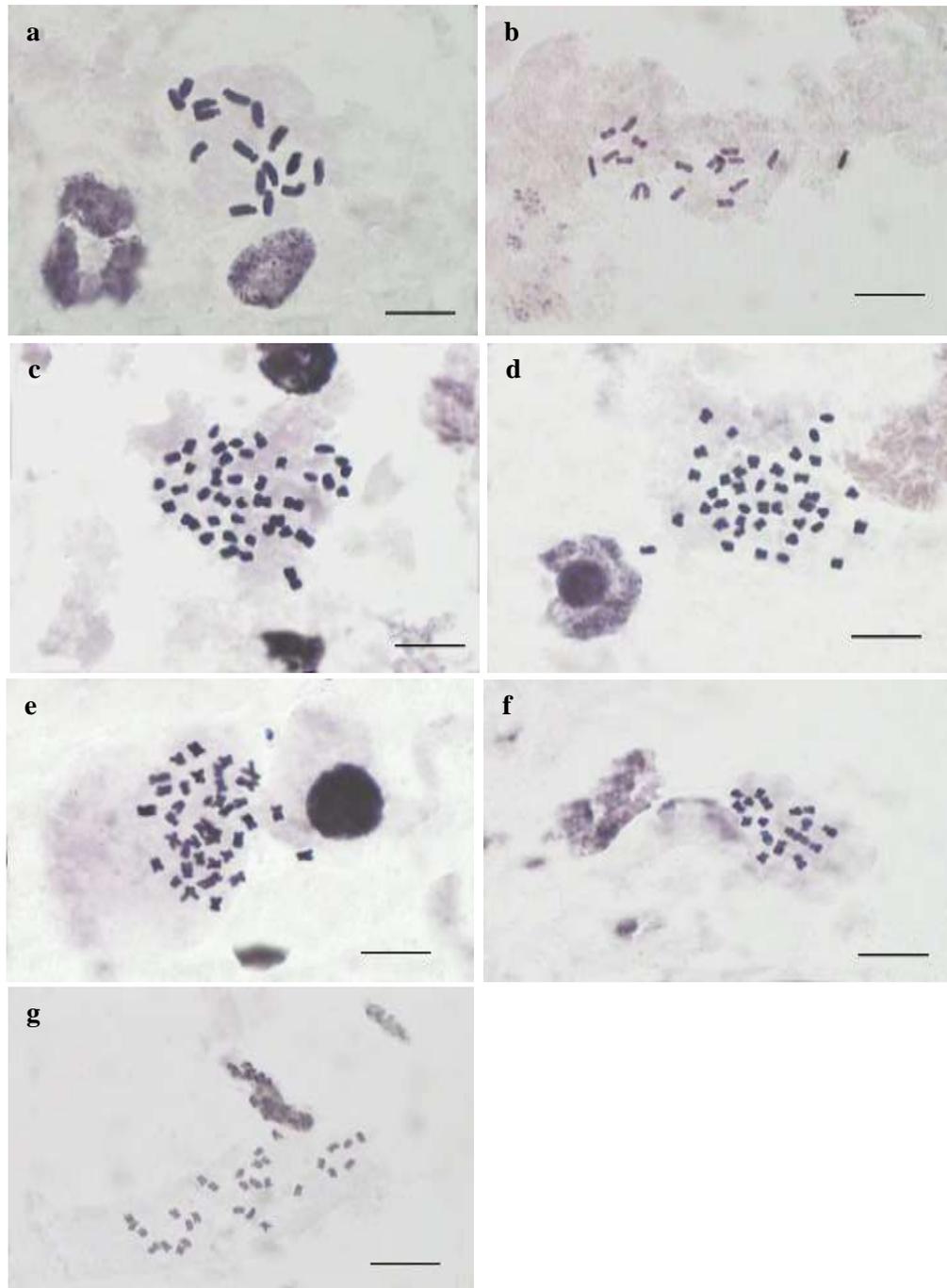


Fig. 1. Somatic metaphases of the studied species. a, *Lagoecia cuminoides* (2n=16); b, *Oliveria decumbens* (2n=18); c, *Helianthemum aegyptiacum* (2n=40); d, *Helianthemum ledifolium* (2n=40); e, *Helianthemum salicifolium* (2n=40); f, *Acinus graveolens* (2n=18); g, *Gonscharovia popovii* (2n=30). Scale bars=10 µm.

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