

## CHROMOSOME COUNTS OF SOME IRANIAN PLANTS

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The present study reports somatic chromosome numbers of 7 species belong to 6 families from Iran. The chromosome numbers of *Epilobium palustre* ( $2n=36$ ), *Geranium pyrenaicum* ( $2n=26$ ), *Sium sisarum* ( $2n=20$ ), *Veronica beccabunga* ( $2n=18$ ) were reported for the first time for the flora of Iran. *Ferula persica* ( $2n=22$ ) and *Tragopogon jesdianus* ( $2n=12$ ) are reported for the first time. The report for *Bromus scoparius* ( $2n=28$ ) is the second count for the species in Iran. Ideograms are depicted for each species.

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**Key words:** Chromosome numbers; new counts; Apiaceae; Asteraceae; Geraniaceae; Onagraceae; Poaceae; Scrophulariaceae; Iran

شمارش کروموزومی چند گونه گیاهی از ایران

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تحقیق حاضر عدد کروموزومی سلول‌های غیر جنسی ۷ گونه متعلق به ۶ خانواده از ایران را گزارش می‌کند. عدد کروموزومی  
( $2n=18$ ) *Veronica beccabunga* ( $2n=20$ ); *Sium sisarum* ( $2n=26$ ); *Geranium pyrenaicum* ( $2n=36$ ); *Epilobium palustre*  
برای اولین بار برای فلور ایران و *Ferula persica* ( $2n=22$ ); *Tragopogon jesdianus* ( $2n=12$ ) برای اولین بار و گونه *Bromus scoparius* ( $2n=28$ ) برای دومین بار از ایران گزارش می‌شوند و ایدیوگرام آنها ارائه می‌گردد.

### INTRODUCTION

Chromosome numbers are the simplest karyotype parameters which provide valuable data in cytotaxonomical studies (Guerra, 2008) and provide substantial information about the genome of a species. They can also be inferred in the evolutionary process of species.

During investigation on wetland plants of Central Alborz Mountain, their chromosome numbers were investigated. We concentrated on taxa with unknown chromosome counts from Iran.

### RESULTS

#### Apiaceae

*Ferula persica* Willd. var. *persica*,  $2n=22$  (fig. 1. c).

*Specimen studied:* Tehran province, Lar valley, 3136 m, 14.09.2015, 35°58'34.04"N, 51°56'52.23"E. Mirzadeh & Ashrafi 105202 (TARI).

*Ferula persica* is an endemic species and its chromosome count is reported here for the first time.

It had a karyotypic formula of  $8m+3sm$  (fig. 1. c). It is categorized in type 1A (Stebbins, 1971).

*Sium sisarum* L.  $2n=20$  (fig. 1. a).

*Specimen studied:* Tehran province, Chalus road,

beside panel 51, 3085 m, 2.10.2015, 36° 9'4.77"N, 51°16'42.59"E. Mirzadeh & Ashrafi 105233 (TARI).

The *Sium* is a monospecific genus in Iran. According to the previous reports, this species have  $2n=20$  and  $n=11$  (Goldblatt & Johnson 1990-2003).

The karyotype consists of chromosomes mostly of *m* and *sm* type. The karyotype formulas are  $6m+4sm$ . (fig. 1. a). Most of them are metacentric. It is categorized in type 1A (Stebbins, 1971).

### Asteraceae

*Tragopogon jesdianus* Boiss. & Buhse,  $2n=12$  (fig. 1. f)

*Specimen studied:* Tehran province, Firuzkuh, Beside Khatereh Garden, 1846 m, 11.09.2015, 35°43'48.36"N, 52°40'28.74"E. Mirzadeh & Ashrafi 105239 (TARI).

*Tragopogon jesdianus* is an endemic species from Iran. The chromosome number of this species is reported for the first time.

Most chromosomes are submetacentric ( $4sm+2m$ ) (fig. 1. f). It is categorized in type 2B (Stebbins, 1971).

### Geraniaceae

*Geranium pyrenaicum* Burm. f.,  $2n=26$  (fig. 1. b).

*Specimen studied:* Tehran province, After Dizin, 2337 m, 2.10.2015, 36° 7'18.26"N, 51°19'2.39"E. Mirzadeh & Ashrafi 105204 (TARI).

According to literature, there are different reports for chromosome counts of *Geranium pyrenaicum* as  $2n=26$ , 22, 24 and 28. Our results confirm the data from Goldblatt 1981-1988, Goldblatt & Johnson 1990-2003.

The karyotype formulas are  $12m+sm$ . (fig. 1. b). Most chromosomes are metacentric. It is categorized in type 1A (Stebbins, 1971).

### Onagraceae

*Epilobium palustre* L.,  $2n=36$  (fig. 1. d).

*Specimen studied:* Tehran province, in road from Tar lake to Damavand, 2451 m, 7.09.2015, 35°42'36.53"N, 52°19'55.24"E. Mirzadeh & Ashrafi 105200 (TARI).

Previous reports on *Epilobium palustre* are  $2n=36$  and  $2n=18$  (Goldblatt 1981-1988, Goldblatt & Johnson 1990-2003).

Its karyotype consists of chromosomes with the centromere in median regions (*m*) (fig. 1. d). Karyotype is mostly symmetrical and is placed in Stebbins 1A category of symmetry (Stebbins, 1971).

### Poaceae

*Bromus scoparius* L.  $2n=28$  (fig. 1. e).

*Specimen studied:* Tehran province, Entrance of Azadbar, 2220 m, 5.09.2014, 36° 6'20.29"N, 51°18'19.02"E. Mirzadeh & Ashrafi 105193 (TARI).

This is the second report on the chromosome numbers of this species. In the first one,  $2n=14$  has been reported by Sheidai (2008).

The karyotype is characterized by  $13m+1sm$  (fig. 1. e). It is categorized in type 1B (Stebbins, 1971).

### Scrophulariaceae

*Veronica beccabunga* L.,  $2n=18$  (fig. 1. g).

*Specimen studied:* Tehran province, Entrance of Azadbar, 2988 m, 5.09.2014, 36° 9'18.84"N, 51°11'36.11"E. Mirzadeh & Ashrafi 105243 (TARI).

The numbers of  $2n=16$ , 18 and 26 were established for this species from abroad samples (Goldblatt & Johnson, 1990-2003; kuzmanov & Kozuharov, 1969).

The karyotype consists of small chromosomes. All chromosomes are metacentric (*m*) (fig. 1. g). Karyotype is mostly symmetrical and is placed in Stebbins 1A category of symmetry (Stebbins, 1971).

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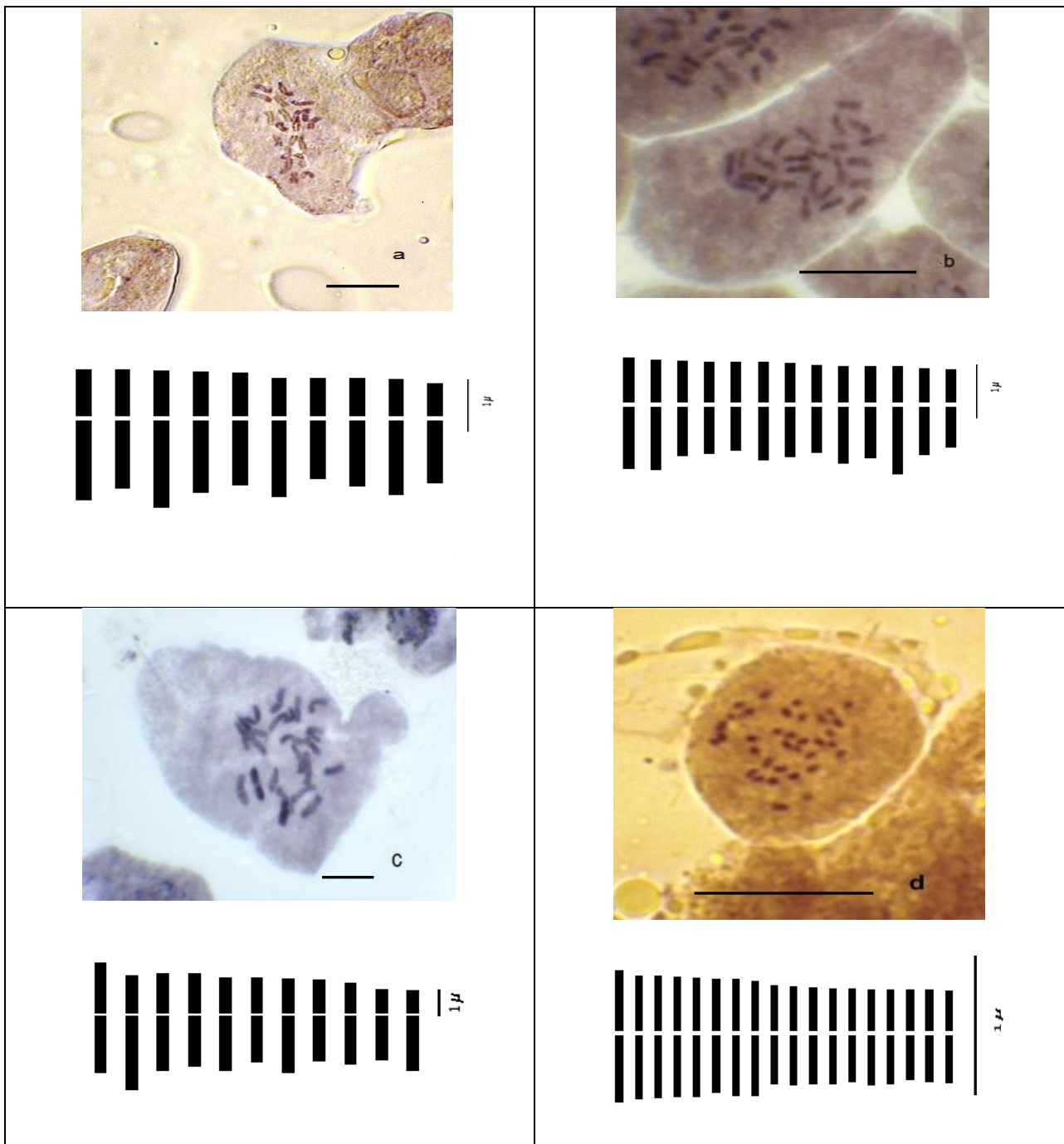


Fig. 1. Somatic metaphases (above) and Ideograms (bellow) in a: *Sium sisarum* ( $2n=20$ ); b: *Geranium pyrenaicum* ( $2n=26$ ); c: *Ferula persica* ( $2n=22$ ); d: *Epilobium palustre* ( $2n=36$ ). Scale Bar: 10  $\mu\text{m}$ .

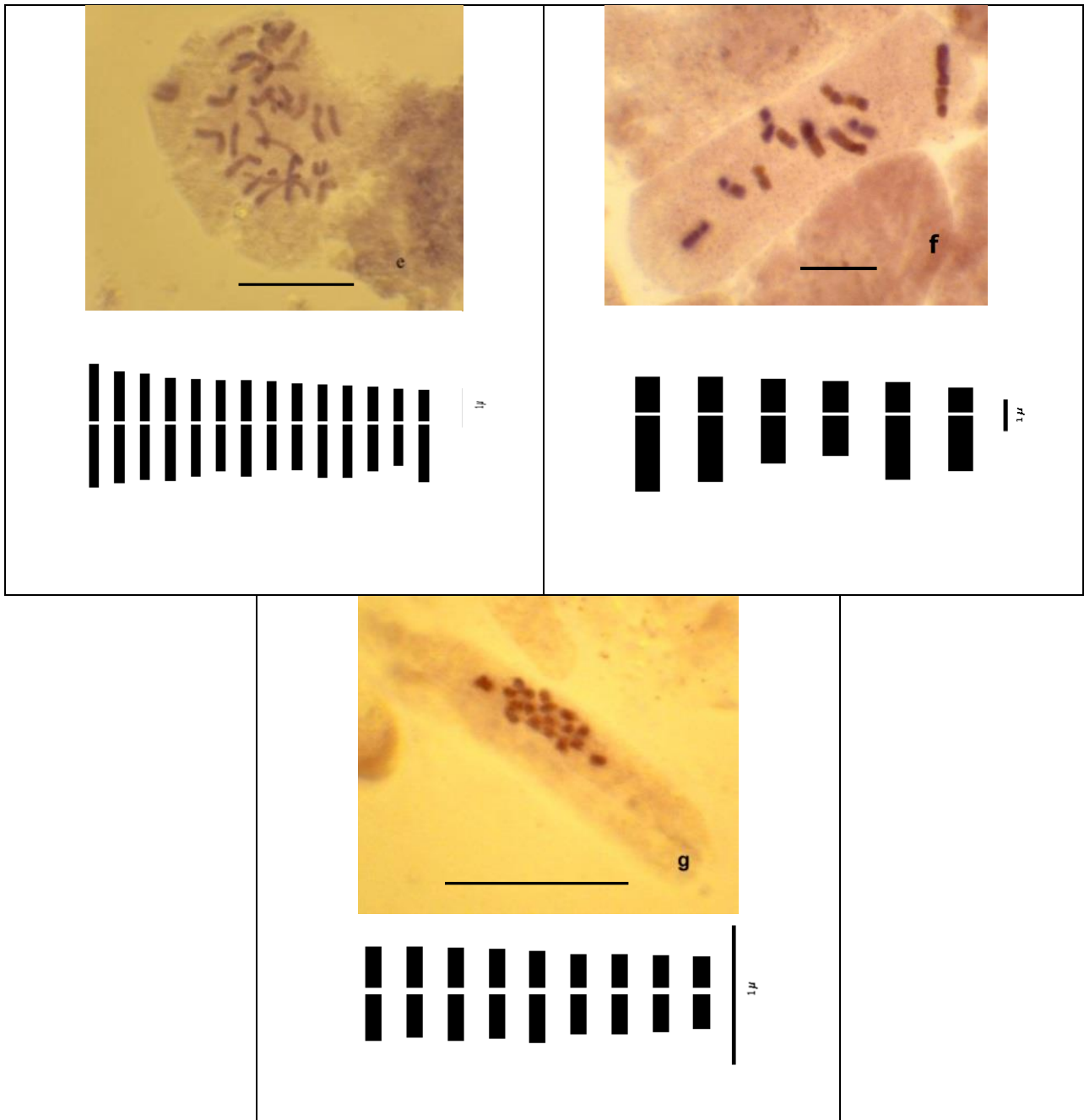


Fig. 1. Continued. e: *Bromus scoparius* ( $2n=28$ ); f: *Tragopogon jesdianus* ( $2n=12$ ); g: *Veronica beccabunga* ( $2n=18$ ). Scale Bar: 10 μm.