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中国西部高山 8 种龙胆属植物的染色体数目*

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摘　要

本文报道了我国西部高山上的 8 种龙胆属植物的染色体数目。其中宽筒龙胆(*Gentiana ampla*)的染色体数目为 2n=48,提钟龙胆(*G. stipitata* Subsp. *tizuensis*)的染色体数目为 2n=26,小齿龙胆(*G. microdonta*)和四数龙胆(*G. lineolata*)的染色体数目为 2n=24,南山龙胆(*G. grumii*)的染色体数目为 2n=18,上述 5 种植物的染色体数目为首次报道。其余蓝玉簪龙胆(*G. veitchiorum*)的染色体数目为 2n=24,线叶龙胆(*G. lawrenci* Burk. var. *farreri*)的染色体数目为 2n=48,钻叶龙胆的染色体数目为 2n=18。

关键词　龙胆属,染色体数目

THE CHROMOSOME NUMBER OF EIGHT SPECIES IN *GENTIANA* (GENTIANACEAE)* FROM ALPINE MOUNTAINS OF THE WESTERN CHINA

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Abstract

In this paper, chromosome numbers are reported for eight species of *Gentiana* from the alpine mountains of the western China. Among them, *Gentiana ampla* H. Smith has a chromosome number of 2n=48, *G. stipitata* Edgew. subsp. *tizuensis* (Franch.) T. N. Ho has a chromosome number of 2n=26, *G. microdonta* Franch. ex Hemsl. and *G. lineolata* Franch. have a chromosome number of 2n=24, *G. grumii* Kusnez. has a chromosome number of 2n=18, The chromosome number of these five species is reported here for the first time. *G. veitchiorum* Hemsl. has a chromosome number of 2n=24, *G. lawrencei* Burk. var. *farreri* (Balf. f.) T. N. He has chromosome number of 2n=48, *G. haynaldii* Kanitz has a chromosome number of 2n=18.

Key words　*Gentiana*, chromosome number

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1 Introduction

Gentiana, comprising 361 species, is the largest genus in family Gentianaceae. It is found mostly in the temperate and alpine regions of the world (He and Liu, 1990)[1].

There is no doubt that chromosome number plays an important role in modern plant taxonomy. But, referring to the genus *Gentiana*, chromosome data have contributed little towards resolving the problems of classification and phylogeny, because for many species, especially some key species from Asia, the existing chromosome data are extremely incomplete.

The present studies were carried out in order to know chromosome number of Chinese species. We attempted, by observing as many species as possible, to find key chromosome number and the links between them, in order to explain the cytotaxonomical and cytogeographical relationships among different species of the genus, and to understand the evolutionary history of the genus better. On this basis we hope to then establish a natural and useful classification.

2 Materials and Methods

The voucher specimens are preserved in the herbarium of Northwest Plateau Institute of Biology, the Chinese Academy of Sciences, The People's Republic of China (HNWP).

The materials used in this study were the young ovaries and the growing root tips collected in the field. For the observations, these growing root tips utilized and young ovaries were pretreated in 1 : 1 mixture of 0.002 mol/L 8-hydroxyquinoline and the saturated p-dichlorobenzene solution at about 4°C for 2—3 hours, and then were fixed with Carnoy (glacial acetic acid : ethanol = 1 : 3) for at least four hours. After washing out the fixer completely with water, the root tips were macerated in 1 mol/L hydrochloric acid at 60°C for 10 minutes and then were stained and squashed in a dilute solution of Carbol's fuchsine.

The chromosome numbers were counted from examined 50 — 100 cells for each species.

3 Results

The chromosome numbers and the localities are counted to be as follows:

(1) *Gentiana ampla* H. Smith [Sect. *Kudoa*][2], Plate 1 : 3.

The growing root tips of the plants of this species showed the chromosome number of $2n = 48$ at mitotic-prophase. These plants are considered as the tetraploids with the basic chromosome number of $x = 12$. This chromosome number is reported here for the

first time.

The materials studied were collected from Yulong Snow-mountain of Lijiang county of Yunnan province, alt. 3700 m, Liu Jianquan 343.

(2) *Gentiana veitchiorum* Hemsl. [Sect. *Kudoa*], Plate 2 : 1.

The chromosomes at mitotic-prophase were counted to be 2n=24, which confirmed that examined by Yuan (1993)[3].

The materials used for this study were the young ovaries. They were collected from Bei Shan of Litang county of Sichuan province, on alpine meadow, alt. 3800 m, Liu Jianquan 299.

(3) *Gentiana stipitata* Edgew. Subsp. *tizuensis* (Franch.) T. N. He [Sect. *Kudoa*], Plate 1 : 5.

This subspecies exhibited the chromosome number of 2n=26 at mitoticprophase. This number is rather special in the section to which this subspecies belongs because most of the species in section kudoa have the chromosome number of 2n=24[3]. The chromosome number of this subspecies is reported here for the first time.

The materials used for this study were the growing root tips. They were collected from Bei Shan of Litang county of Sichuan province, on alpine meadow, alt. 3800 m, Liu Jianquan 298.

(4) *Gentiana lawrencei* Burk. var. *farreri* (Balf. f.) T. N. He [Sect. *Kudoa*], Plate 2 : 3, 4.

All plants of this variety studied showed the chromosome number of 2n=48, which confirmed that examined by Yuan (1993).

The materials used in this study were the young ovaries. They were collected from two populations in the different localities of Qinghai province: Zekong county, Lu Xuefeng s. n. (Plate 2 : 4) and Menyuan county, on alpine meadow, alt. 3500 m, Liu Jianquan 260 (Plate 2 : 3).

(5) *Gentiana microdonta* Franch. ex Hemsl. (Sect. *Frigida*), Plate 1 : 2.

The chromosomes of this species were 2n=24 at mitotic-prophase. This chromosome number is reported here for the first time.

The materials used in this study were the growing root tips. They were collected from Yulong Snow-mountain of Lijiang county, on grassland, alt. 3700 m, Liu Jianquan 341.

(6) *Gentiana lineolata* Franch. (Sect. *Microsperma*), Plate 2 : 2.

This species exhibited the chromosome number of 2n=24 at mitotic-prophase. This chromosome number is reported here for the first time.

The materials used in this study were the growing root tips. They were collected from Qiongzhusi of Kunming, alt. 2000 m, Liu Jianquan 244.

(7) *Gentiana haynaldii* Kanitz (Sect. *Dolichocarpa*), Plate 1 : 4.

The chromosome number at mitotic-prophase was 2n=18, which confirmed that examined by He et al. (1996).

The materials used in this study were the young ovaries. They were collected from Bei Shan of Litang county of Sichuan province, on alpine meadow, alt. 3800 m, Liu Jianquau 304.

(8) *Gentiana grumii* Kusnez. (Sect. *Chondrophylla*), Plate 1 : 1.

Observation on meiosis of megaspores in the young ovaries indicated that this species had the chromosome number of n=9 and the chromosomes exhibited the bivalents so that these plants might be the diploids. This chromosome number is reported here for the first time.

The materials were collected from Yushu county of Qinghai province, on alpine meadow, alt. 3800 m, M. B. L. 335.

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Explanation of Plates

Plate I 1. *Gentiana grumii* n=9; 2. *G. microdonta* 2n=24; 3. *G. ampla* 2n=48; 4. *G. haynaldii* 2n=18; 5. *G. stipitata* subsp. *tizuensis* 2n=26. (1, 2, 3, 5, Bars=10 μm; 4, Bar=10 μm)

Plate II 1. *G. veitchiorum* 2n=24; 2. *G. lineolata* 2n=24; 3, 4. *G. lawrencei* var. *farreri* 2n=48. (All bars=10 μm)