

Karyomorphology of *Youngia koidzumiana* (Compositae; Lactuceae)

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지리고들빼기의 體細胞染色體의 形態

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Abstract

The chromosome morphology of *Youngia koidzumiana* (Compositae; Lactuceae) is reported for the first time. Nuclei at the resting stage are prochromosome typed. Somatic chromosomes are $2n = 10$, consisting of two pairs of chromosome with centromere at the submedian position and three pairs of chromosome with centromere at the subterminal position (2 sm + 3 st). The morphology of somatic chromosomes supports the position of *Youngia koidzumiana* within genus *Crepidiatum sensu* Pak & Kawano.

Introduction

According to Kitamura (1955) *Youngia* sect. *Paraixeris* consists of five species, which occurs on sunny slopes and roadsides in mountains of East Asia (Pak, 1991). *Youngia koidzumiana* was first described by Kitamura (1942), based on a specimen of Koidzumi collected from Mt. Chiri, Sanchung-gun, Kyungsangnam-do, Korea. Recently a karyomorphological study of four species of *Youngia* sect. *Paraixeris* seven species of *Crepidiatum* was carried out by Pak & Kawano (1990b), interspecific relationships were discussed based on karyomorphology as well as fruit wall anatomy and other sources. However, there has been no investiga-

tion made on the chromosome of *Youngia koidzumiana* Kitamura to endemic to Mt. Chiri. In this paper the karyomorphological data from somatic cells of *Y. koidzumiana* are reported for the first time and compared with those of the other species.

Materials and Methods

More than 50 plants of *Youngia koidzumiana* (five individuals from each population) were collected from Mt. Chiri, and maintained in the experimental garden Department of Biology, Kyungpook National University, Taegu, Korea, from August 1990 to November 1991. For the karyological data, root tip cells were sampled from more than 30 individuals (three individuals from each population). Methods of observations were presented previous paper (Pak & Kawano, 1990a). Voucher specimens were preserved in the Herbarium of Department of Biology, Kyungpook National University (KNU).

Results and Discussion

The somatic chromosome number of *Youngia koidzumiana* was counted $2n = 10$ (Fig. 3, 4). Nuclei at the resting stage have many dark stained, round- or rod-shaped condensed bodies (Fig. 1). Regions surrounding these bodies were smooth and stained evenly, and this feature proved to be the prochromosome type (Tanaka, 1971). Chromosomes were clearly differentiated into early- and late-condensing parts at the prophase. Their condensation occurred at the proximal parts of both arms (Fig. 2). A total genomic size of *Y. koidzumiana* was about $25.3 \mu\text{m}$ at the metaphase. The length of chromosomes ranged from $2.1 \mu\text{m}$ to $3.0 \mu\text{m}$ (Table 1). A somatic chromosome complement consisted of two pairs of chromosome with centromere at submedian position (Nos. 1, 2; Fig. 4) and three pairs of chromosomes with centromere at subterminal position. The first chromosome pair had a secondary constriction at the distal portion of their short arms.

In the previous paper (Pak and Kawano, 1990b), the chromosome features of 4 species of *Youngia* sect. *Paraixeris* and 7 species of *Crepediastrum* were summarized as follows: 1) all species are diploid ($2n = 10$) with the basic number of $x = 5$; 2) nuclei of the resting stage are prochromosome type; 3) the total genomic length of metaphase chromosomes ranges from $22.3 \mu\text{m}$ to $37.1 \mu\text{m}$; 4) their chromosome length is within $1.5 \mu\text{m} - 4.6 \mu\text{m}$; 5) the basic karyotype complement consists of 2 submedian and 3 subterminal chromosomes (2 sm + 3 st); 6) they distinctively have the chromosome pair (No. 1) with a secondary constriction at the distal portion of the short arms. Also considered many other common characters of *Youngia* sect. *Paraixeris* and *Crepediastrum* such as fruit wall structure, involucre shape, deciduous pappus, flowering habit, we suggested that these two taxa should be united and called to a single genus, i.e., *Crepediastrum*. So an overall similarity found in chromosome mor-

Figs. 1-4. Karyomorphology of *Youngia koidzumiana*. 1: Photomicrographs of resting nuclei, 2: Pro-metaphase chromosomes, 3: Mitotic metaphase chromosomes, 4: Karyotype at mitotic metaphase. Arrows indicate secondary constriction. Scale equals 3 μ m.

Table 1. Measurements of somatic chromosomes of *Youngia koidzumiana*.

Chromosome Number	Length of arms*	Total length	Arm ratio	Type
1	0.9—0.0+1.7	2.6	1.9	sm
2	0.9—0.0+1.7	2.6	1.9	sm
3	0.7+1.5	2.2	2.2	sm
4	0.7+1.5	2.2	2.2	sm
5	0.5+1.6	2.1	3.1	st
6	0.5+1.6	2.1	3.1	st
7	0.7+2.3	3.0	3.2	st
8	0.7+2.3	3.0	3.2	st
9	0.5+2.3	2.8	4.5	st
10	0.5+2.0	2.5	4.3	st

* +: centromere, —: secondary constriction (after Fujishima, 1980)

phology clearly suggested that *Youngia koidzumiana* belongs to the genus *Crepidiastrum sensu Pak & Kawano* (1991, in press).

There was a speculation regarding on hybrid origin of *Youngia koidzumiana* (“= *Youngia x koidzumiana*”, Lee, 1979). Namely it was considered as a presumed hybrid between *Youngia chelidoniifolia* and *Y. sonchifolia*, based on its intermediate between two species. Recent biosystematic study of *Crepidiastrum* and *Youngia* sect. *Paraixeris* (Pak & Kawano, 1990b) revealed that *Y. sonchifolia* has a peculiar karyotype. According to the study the first chromosome pair of *Y. sonchifolia* possessed a small satellite at the distal portion of the short arm (cf. Babcock *et al.*, 1937). If this taxon has hybrid origin, it is likely to exhibit an intermediate karyotype. But the karyotype of *Y. koidzumiana* shows a normal genome. From the present work of the hybrid origin of this species was suggested ambiguous. For elucidating the true status of this species, approaches such as hybrid experiments and isozyme pattern analysis would be necessary.

적 요

지리고들빼기—*Youngia koidzumiana* Kitam.—(국화과, 상치족)의 체세포염색체의 형태를 조사하여 다음과 같은 결과를 얻었다. 휴지핵의 형태는 prochromosome 유형이고, 체세포염색체의 수는 $2n=10$ 이었다. 분열기중기 염색체는 2쌍의 차중부염색체와 3쌍의 차단부염색체로 구성됨이 밝혀졌다. 본 연구 결과를 종합하면 지리고들빼기는 긴갯고들빼기屬(*Crepidiastrum sensu Pak & Kawano*)이 가지는 핵형학적 형질을 공유함으로써, 긴갯고들빼기屬에 포함되는 것이 타당함이 밝혀졌다. 또한 이 분류군이 잡종에 의하여 유래했을 것이

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