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Karyotype Analysis of *Lilium cernum* Komarov by Means of C-banding Method

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Giemsa 分染法에 依한 솔나리의 核型 分析

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ABSTRACT

The karyotype of *Lilium cernum* has been analysed by means of C-banding technique. Most of clones oberved were 2n=24 chromosomes which consist of two pairs of submetacentric and ten pairs of subtelocentric chromosomes, among which two pairs of chromosomes (B and E) showed secondary constriction in the short arm. In addition to these chromosomes a small supernumerary telocentric chromosome was seen in the eight clones.

Sixtyeight bands were observed in the twentytwo chromosomes of complement and one band in the supernumerary chromosome. A pair of chromosome (L) did not show any band. The bands on the chromosomes were distributed in the centromere, secondary constriction and intercalary regions of arms. Of the twelve pairs of chromosomes ten pairs showed symmetric banding patterns in each, but two pairs (I and K) showed asymmetric banding patterns.

INTRODUCTION

Lilium cernum is a species which belong to *Martagon* group and distributes from Korea to Manchuria. The conventional karyotype of this species was investigated (Sato 1933, Son 1972). The somatic chromosome number is 2n=24 and the basic chromosome complement consist of two submetacentric and ten subtelocentric chromosomes. Recently, chromosome identification has been improved by the use of Giemsa banding technique. It is thought that karyotype analysis based on banding will facilitate to clarify the similarities between the related species. Therefore, as a part of studies for cytological relationships in genus *Lilium*, C-banding technique was applied for the karyotype analysis of *Lilium cernum*. The present paper describes the details of banding patterns in metaphase chromosomes in root tips of *Lilium cernum*.

MATERIALS AND METHODS

Plant materials used in this study were collected from Mt. Gaya and Mt. Gaji in Korea.

A modified BSG technique (Filion 1972, Son 1977) was used for chromosome preparations. Root tips, excised and pretreated with 0.2% colchicine for 3.5 hours, were fixed in aceto-alcohol (1 : 3) for 3~24 hours. Fixed root tips were squashed in few drops of 45% acetic acid on albuminized slide after macerating in 5% aquous solution of pectinase which was adjusted to pH 4.0 with N-HCl at 25°C for 12 hours. Cover slips were removed in 10% acetic acid. Both cover and slide glasses were air-dried over night and immersed in 0.064M barium hydroxide

solution for 40 minutes at room temperature and rinsed in distilled water.

And then they were incubated in 2×SSC for 20 minutes at 60°C and rinsed again in distilled water. Staining was carried out by immersing in freshly prepared Giemsa solution (Stock solution diluted 50× with 1/15M Sörensen phosphate buffer, pH 6.8). A satisfactory differentiation is obtained in about 40 minutes at room temperature, but at times, for the resolution of the smaller bands, it was found necessary to prolong staining time for up to 60 minutes. Surplus stain was washed off in distilled water. Preparations were dried and mounted in immersion oil.

RESULTS AND DISCUSSION

Most of clones investigated in this study were 2n=24, but among them eight clones were 2n=25 involving a small supernumerary telocentric chromosome. Except a supernumerary chromosome, the somatic chromosome complement was consisted of two pairs of submetacentric and ten subtelocentric chromosomes. Secondary constrictions were seen in the short arms of chromosome B and E.

C-banded karyotype of *Lilium cernum* is shown in figure 1. Each chromosome showed one or more bands with an exception of chromosome L. The detailed descriptions on the banding patterns are as follows:

Chromosome A: A pair of submetacentric chromosomes. Six bands were seen in each chromsome: one in the proximal and two in the intermediate region of short arm, one in the proximal and one in the median region of long arm, and one in the centromere.

Chromosome B: A pair of submetacentric chromosomes with a secondary constriction in the subterminal region of short arm. Five bands were seen in each chromosome: two in the intermediate and one in the subterminal region of long arm, one in the centromere, and one in the secondary constriction.

Chromosome C: A pair of subtelocentric chromosomes. Each chromosome showed two bands: one in the intermediate region of long arm and one in the median region of short arm.

Chromosome D: A pair of subtelocentric chromosomes. Each chromosome showed only one band in the median region of short arm.

Chromosome E: A pair of subtelocentric chromosome with a secondary constriction near the centromere in short arm. Five bands were seen in each chromosome: two in the median and one in the subterminal region of long arm, one in the centromere, and one in the secondary constriction.

Chromosome F: A pair of subtelocentric chromsomes. Each chromosome showed three bands:

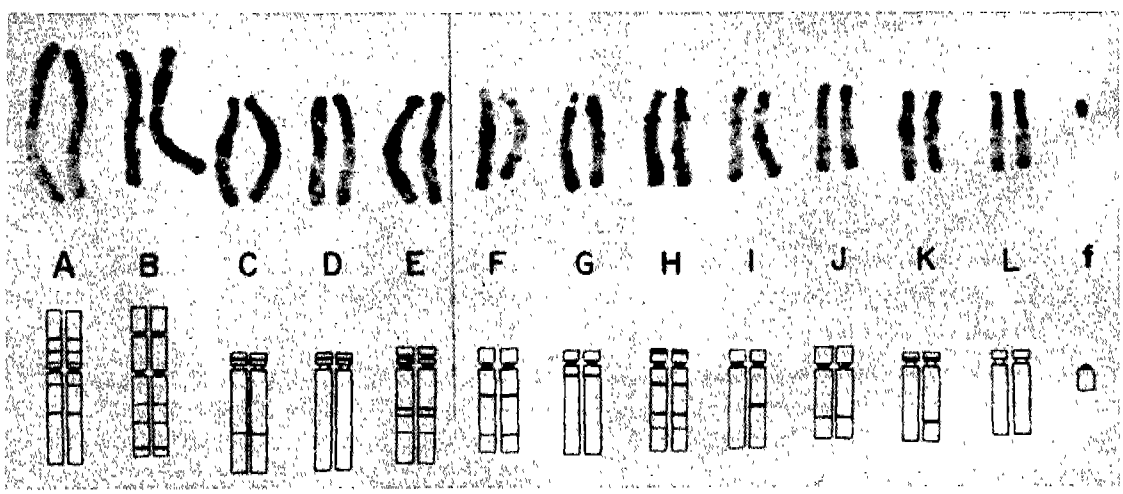

Fig. 1. C-banded karyotype of *Lilium cernum* Komarov.

one in the submedian and one in the subterminal region of long arm, and one in the centromere.

Chromosome G: A pair of subtelocentric chromosomes. Each chromosome showed two bands: one in the centromere and one in the proximal region of long arm.

Chromosome H: A pair of subtelocentric chromosomes. Five bands were seen in each chromosome: one in the terminal region of short arm, one in the proximal and one in the intermediate and one in the subterminal region of long arm, and one in the centromere.

Chromosome I: A pair of subtelocentric chromosomes showing asymmetirc banding patterns. One chromosome showed only one band in the centromere. The other showed two bands: one in the centromere and one in the median region of long arm.

Chromosome J: A pair of subtelocentric chromosomes. Two bands were seen in each: one in the centromere and one in the subterminal region of long arm.

Chromosome K: A pair of subtelocentric chromosomes showing asymmetric banding patterns. One chromosome showed only one band as a whole of short arm. The other showed two bands: one as a whole of short arm and one in the subterminal region of long arm.

Chromosome L: A pair of subtelocentric chromosomes which did'nt show any conspicuous band.

Chromosome f: A supernumerary telocentric chromosome with one terminal band.

In chromosome I and K, each pair were asymmetric banding patterns. These asymmetric features were not observed by the conventional karyotype analysis of this species. For the clarification of the genetical homology between these chromosomes of each pair, the further studies

Table 1. Measurement of somatic chromosomes and number of bands in *Lilium cernum* Komarov

Chromosomes	Length in μ			Arm ratio	No. of bands			
	Short arm	Long arm	Total		Short arm	Centromere	Long arm	Total
A	11.9	17.8	29.7	1.5	3	1	2	6
	9.9	15.8	25.7	1.6	3	1	2	6
B	(4.5++5.9)	13.9	24.3	1.3	1(sc)	1	3	5
	(4.5+ 5.9)	14.9	25.3	1.4	1(sc)	1	3	5
C	2.0	17.8	19.8	9.0	1	0	1	2
	2.0	17.8	19.8	9.0	1	0	1	2
D	2.0	17.3	19.3	8.8	1	0	0	1
	2.0	17.8	19.8	9.0	1	0	0	1
E	(1.5+0.5)	16.3	18.3	8.3	1(sc)	1	3	5
	(1.5+0.5)	16.3	18.3	8.3	1(sc)	1	3	5
F	3.0	14.4	17.4	4.8	0	1	2	3
	3.0	14.9	17.9	5.0	0	1	2	3
G	1.5	15.8	17.3	10.6	0	1	1	2
	1.5	15.8	17.3	10.6	0	1	1	2
H	2.5	14.5	17.0	5.8	1	1	3	5
	2.5	14.7	17.2	5.9	1	1	3	5
I	2.5	13.9	16.4	5.6	0	1	0	1
	2.0	13.9	15.9	7.0	0	1	1	2
J	3.0	11.9	14.9	4.0	0	1	1	2
	3.0	12.4	15.4	4.2	0	1	1	2
K	1.5	12.9	14.4	8.6	1	0	0	1
	1.5	14.4	15.9	9.6	1	0	1	2
L	1.5	12.4	13.9	8.3	0	0	0	0
	1.5	12.9	14.4	8.6	0	0	0	0
f			3.5		0	1	0	1
Total number of bands					18	17	34	69

involving the analysis of meiosis are necessary.

Table 1 shows the length, the arm ratio and the number of bands of each chromosome. On the whole, every secondary constriction and most of centromeres showed band, while the other regions had no definite place for banding.

REFERENCES

Chung, T.H. 1962. Korean flora (Herbs). 978. Chang-won sa, Seoul.

Filion, W.G. 1974. Differential Giemsa staining in plants. *Chromosoma(Berl)* 49 : 51—60.

Sato, M. 1932. Chromosome studies in *Lilium* (1). *Botanical Magazine* 66 : 66—88.

Son, J. 1972. Karyotype of *Lilium cernum* Komarov. *Educational Journal* 14 : 119—122.

Son, J. 1977. Karyotype analysis of *Lilium lancifolium* Thunberg by means of C-banding method. *Japan. J. Genetics* 52 : 217—221.

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