日本産タツナミソウ属タツナミソウ亜属(シソ科)の核型

Norihito Miura : **Karyotypes of *Scutellaria* subgenus *Scutellaria* (Labiatae) in Japan**

三浦憲人：日本産タツナミソウ属タツナミソウ亜属(シソ科)の核型

The genus *Scutellaria* L., a constituent of the family Labiatae distributed all over the world, has 360 species (Paton 1990). Of these, 18 species and 6 varieties occur indigenously in Japan (Murata and Yamazaki 1993) and one other species was introduced to Japan (Sato et al. 2001). In this genus, the subgen. *Scutellaria* in Japan has three sections : sect. *Minores* (Juz.) T. Yamaz., 1 sp. (*S. dependens* Maxim.) ; sect. *Galericularia* A. Ham., 2 spp. (*S. strigillosa* Hemsl., *S. yezoensis* Kudo), and sect. *Stachymacris* A. Ham., 14 spp. (ser. *Shikokianae* T. Yamaz. : *S. shikokiana* Makino, ser. *Pekinenses* T. Yamaz. : *S. pekinensis* Maxim., ser. *Indicae* Juz. : *S. amabilis* H. Hara, *S. iyoensis* Nakai, *S. muramatsui* H. Hara, *S. indica* L., *S. rubropunctata* Hayata, *S. tsusimensis* H. Hara, *S. brachyspica* Nakai et H. Hara, *S. laeteviolacea* Koidz., *S. kuromidakensis* (Yahara) T. Yamaz., *S. kiusiana* H. Hara ; ser. *Longitubae* T. Yamaz. : *S. longituba* Koidz., ser. *Prostratae* T. Yamaz. : *S. kikai-insularis* Hatus. ex T. Yamaz.) (Murata and Yamazaki 1993). Interestingly, the Japanese *Scutellaria* subgen. *Scutellaria* has dysploid changes in their chromosome counts with 2n=26, 28 and 30 (Sawanomukai et al., 2003). However, all the taxa of ser. *Indicae* are known to have consistently 2n=26 chromosomes.

This study presents karyotype descriptions of the three forms of Japanese *Scutellaria* subgen. *Scutellaria* with different chromosome counts, which may yield fundamental insights into the process of dysploid changes in chromosome counts.

Materials and methods

The subgen. *Scutellaria* taxa used in this study were conserved in the experimental garden of University of Toyama and included the following : *S. strigillosa*, *S. yezoensis*, *S. dependens*, *S. pekinensis* var. *transitra* (Makino) H. Hara, *S. shikokiana* var. *shikokiana*, *S. amabilis*, *S. barbata*, D. Don, *S. brachyspica*, *S. indica* var. *parvifolia* (Makino) Makino, *S. indica* var. *satokoae* Wakasugi et Naruh., *S. iyoensis*, *S. kiusiana*, *S. laeteviolacea* var. *maekawae* (H. Hara) H. Hara, *S. muramatsui*, *S. rubropunctata* var. *rubropunctata* and *S. tsusimensis*. Most of them were the same plants used in the study of chromosome numbers in Japanese *Scutellaria* by Sawanomukai et al. (2003) and Naruhashi et al. (2004). The origins of the plants used in this study are listed in Table 1.

Root tip cells were examined and karyotypes noted. New root tips sprouted from the conserved subgen. *Scutellaria* plants were collected and pretreated in 2.1 mM 8-hydroxyquinoline solution at room temperature (ca. 25℃) for 1 h and then kept at ca. 6℃ for 15 h. They were fixed in a mixture of glacial acetic acid and ethyl alcohol (1 : 3) for 1 h, soaked in 1 N hydrochloric acid solution at room temperature for 1 h, macerated in 1 N hydrochloric acid solution at 60℃ for 10 minutes, and then washed in tap water. The root tips were stained with 1.5% lacto-propionic orcein. Standard squash technique was applied to examine karyotypes.

In many metaphase chromosomes, centromeric constrictions were not clearly visualized. Thus, the length between the ends of somatic chromosomes was measured to include any centromeric constrictions rather than summing the lengths of each chromosomal long arm and short arm.

Results and discussion

(1) *S. strigillosa* (Fig. 1 A)

Chromosomes of this species ranged from 0.6 μm to 1.6 μm in length (Table 2). Total length of the 30 somatic chromosomes was 28.8 μm with a ratio of 2.7 between the longest and shortest chromosomes. The 30 chromosomes were divided into two groups on the basis of their chromosome length, with 6 chromosomes ranging from 1.4 μm to 1.6 μm, and 24 small chromosomes ranging from 0.6 μm to 1.1 μm.

(2) *S. yezoensis* (Fig. 1 B)

Somatic metaphase chromosomes showed a gradual shift in length ranging from 0.6 μm to 1.3 μm in length (Table 2). Total length of the chromosome complement was 24.9 μm and the ratio of the longest to shortest chromosome was 2.2. The karyotype of this taxon showed a gradual shift in chromosome length.

(3) *S. dependens* (Fig. 1 C)

Somatic metaphase chromosomes ranged from 0.6 μm to 1.6 μm in length (Table 2). Total length of the chromosome complement was 24.6 μm and the ratio of the longest to shortest chromosome was 2.7. They were divided into two groups of 4 large chromosomes ranging from 1.5 μm to 1.6 μm and 24 small chromosomes ranging from 0.6 μm to 1.2 μm.

(4) *S. pekinensis* var. *transitra* (Fig. 1 D)

Somatic metaphase chromosomes ranged from 0.5 μm to 1.2 μm in length (Table 2). Chromosome complement had a total length of 20.5 μm with a ratio of 2.4 between the longest and shortest chromosomes. The karyotype of this taxon showed a gradual shift in chromosome length.

(5) *S. shikokiana* var. *shikokiana* (Fig. 1 E)

Somatic metaphase chromosomes varied from 0.6 μm to 1.1 μm in length (Table 2). Total length of the chromosome complement was 23.6 μm and the ratio of the longest to shortest chromosome was 1.8. This karyotype showed a gradual shift in chromosomal length.

(6) *S. amabilis* (Fig. 1 F)

Somatic metaphase chromosomes ranged from 0.6 μm to 1.5 μm in length (Table 2). Total length of the chromosome complement was 24.1 μm and the ratio of the longest chromosome to shortest chromosome was 2.5. These were divided into two groups: 2 large chromosomes at 1.5 μm and 24 small chromosomes ranging from 1.2 μm to 0.6 μm.

(7) *S. barbata* (Fig. 1 G)

The somatic metaphase chromosomes ranged from 0.6 μm to 1.4 μm in length (Table 2). The total length of the chromosome complement was 22.7 μm and the ratio of the longest to shortest chromosome was 2.3. The karyotype of this taxon showed a gradual shift in chromosome length.

(8) *S. brachyspica* (Fig. 1 H)

Somatic metaphase chromosome lengths ranged from 0.6 μm to 1.6 μm (Table 2). Total length of the

Table 1. Collection localities of subgen. *Scutellaria* in Japan

Taxon (Chromosome number); Collection locality
S. strigillosa (2n=30); Shioyakaigan, Kaga City, Ishikawa Pref.
S. yezoensis (2n=30); Kirigamine, Suwa City, Nagano Pref. (cult.)
S. dependens (2n=28); Hamakurosaki, Toyama City, Toyama Pref.
S. pekinensis var. *transitra* (2n=28); Ichijodani, Fukui City, Fukui Pref.
S. shikokiana var. *shikokiana* (2n=28); Akadani, Gojo City, Nara Pref.
S. amabilis (2n=26); Aono, Echizen-cho, Nyu-gun, Fukui Pref.
S. barbata (2n=26); Ezuko, Kumamoto City, Kumamoto Pref.
S. brachyspica (2n=26); Maeba-cho, Fukui City, Fukui Pref.
S. indica var. *parvifolia* (2n=26); Suribachidani, Takamatsu City, Kagawa Pref.
S. indica var. *satokoae* (2n=26); Yoshiminenobiraki, Tateyama-machi, Nakaniikawa-gun, Toyama Pref.
S. iyoensis (2n=26); Nakazukita, Shunan City, Yamaguchi Pref.
S. kiusiana (2n=26); Nodakoya, Manno-cho, Nakatado-gun, Kagawa Pref.
S. laeteviolacea var. *maekawae* (2n=26); Sugitani, Ohara-noshiocho, Nishikyo-ku, Kyoto City, Kyoto Pref.
S. muramatsui (2n=26); Muroda, Uozu City, Toyama Pref.
S. rubropunctata var. *rubropunctata* (2n=26); Oura, Nago City, Okinawa Pref.
S. tsusimensis (2n=26); Kamitsushimamachiimizu, Tsushima City, Nagasaki Pref.

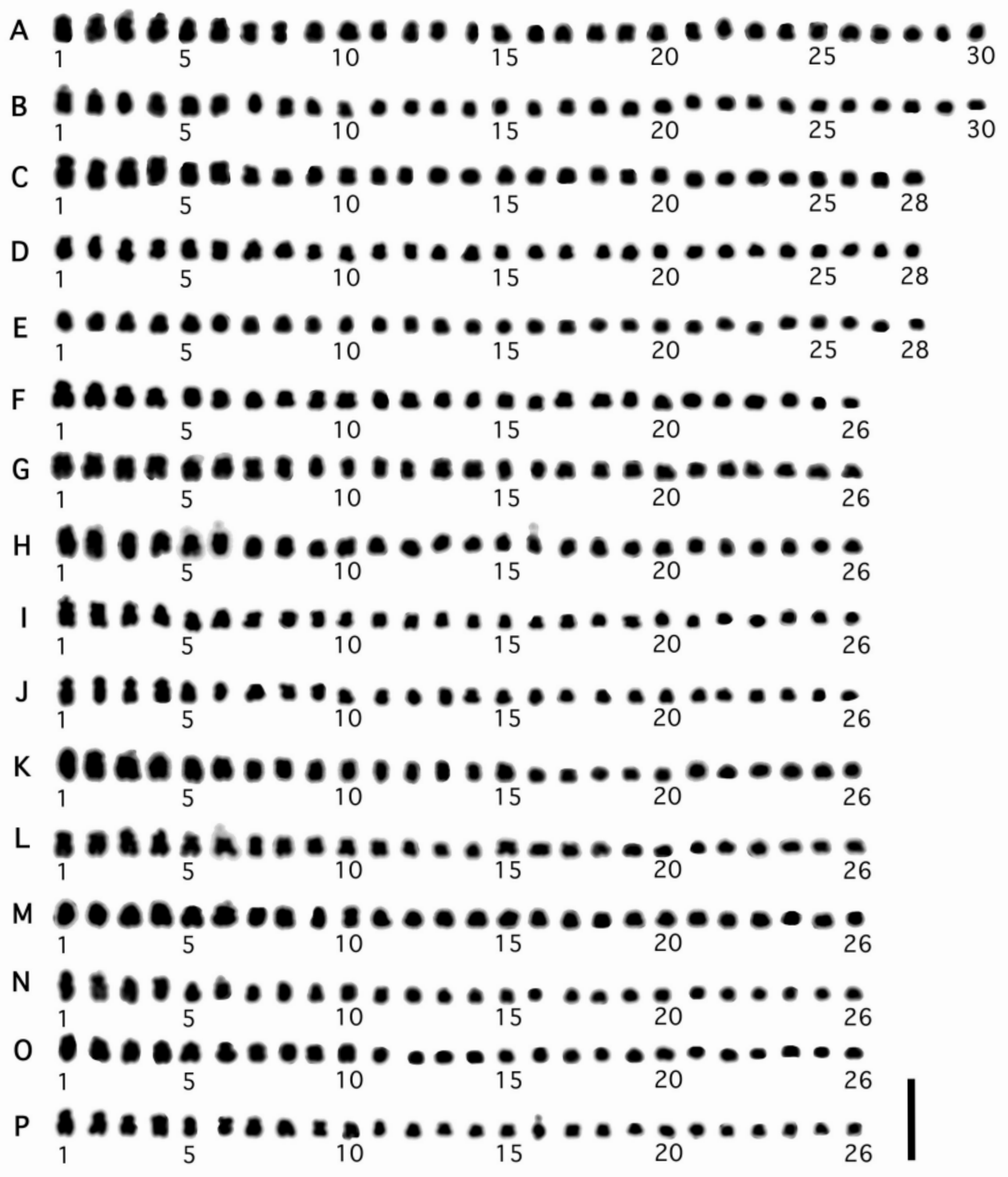

Fig. 1. Karyotypes of subgen. *Scutellaria* in Japan. A, *S. strigillosa* ; B, *S. yezoensis* ; C, *S. dependens* ; D, *S. pekinensis* var. *transitra* ; E, *S. shikokiana* var. *shikokiana* ; F, *S. amabilis* ; G, *S. barbata* ; H, *S. brachyspica* ; I, *S. indica* var. *parvifolia* ; J, *S. indicia* var. *satokoae* ; K, *S. iyoensis* ; L, *S. kiusiana* ; M, *S. laeteviolacea* var. *maekawae* ; N, *S. muramatsui* ; O, *S. rubropunctata* var. *rubropunctata* ; P, *S. tsusimensis*. Bar indicates 5 μm.

Table 2. Measurements of chromosomes of subgen. *Scutellaria* in Japan

	S. strigillosa		*S. yezoensis*		*S. dependens*		*S. pekinensis* var. *transitra*		*S. shikokiana* var. *shikokiana*		*S. amabilis*		*S. barbata*		*S. brachyspica*	
No.	L.	R. l.	L.	R. l.	L.	R. l.	L.	R. l.	L.	R. l.	L.	R. l.	L.	R. l.	L.	R. l.
1	1.6	5.6	1.3	5.2	1.6	6.5	1.2	5.9	1.1	4.7	1.5	6.2	1.4	6.2	1.6	6.4
2	1.6	5.6	1.3	5.2	1.6	6.5	1.2	5.9	1.1	4.7	1.5	6.2	1.4	6.2	1.6	6.4
3	1.5	5.2	1.2	4.8	1.5	6.1	1.2	5.9	1.1	4.7	1.2	5.0	1.4	6.2	1.5	6.0
4	1.5	5.2	1.2	4.8	1.5	6.1	1.1	5.4	1.1	4.7	1.2	5.0	1.3	5.7	1.4	5.6
5	1.4	4.9	1.1	4.4	1.2	4.9	1.0	4.9	1.0	4.2	1.2	5.0	1.2	5.3	1.3	5.2
6	1.4	4.9	1.1	4.4	1.2	4.9	1.0	4.9	1.0	4.2	1.1	4.6	1.2	5.3	1.3	5.2
7	1.1	3.8	1.0	4.0	0.8	3.3	0.9	4.4	1.0	4.2	1.0	4.1	1.0	4.4	1.1	4.4
8	1.1	3.8	0.9	3.6	0.8	3.3	0.9	4.4	1.0	4.2	1.0	4.1	1.0	4.4	1.1	4.4
9	1.0	3.5	0.8	3.2	0.8	3.3	0.7	3.4	0.9	3.8	0.9	3.7	0.9	4.0	1.0	4.0
10	1.0	3.5	0.8	3.2	0.8	3.3	0.7	3.4	0.9	3.8	0.9	3.7	0.9	4.0	1.0	4.0
11	1.0	3.5	0.8	3.2	0.8	3.3	0.7	3.4	0.9	3.8	0.9	3.7	0.8	3.5	1.0	4.0
12	1.0	3.5	0.8	3.2	0.8	3.3	0.7	3.4	0.9	3.8	0.9	3.7	0.8	3.5	1.0	4.0
13	1.0	3.5	0.8	3.2	0.8	3.3	0.7	3.4	0.8	3.4	0.9	3.7	0.8	3.5	0.9	3.6
14	1.0	3.5	0.8	3.2	0.8	3.3	0.7	3.4	0.8	3.4	0.9	3.7	0.8	3.5	0.9	3.6
15	0.9	3.1	0.8	3.2	0.7	2.8	0.6	2.9	0.8	3.4	0.8	3.3	0.7	3.1	0.8	3.2
16	0.9	3.1	0.8	3.2	0.7	2.8	0.6	2.9	0.8	3.4	0.8	3.3	0.7	3.1	0.8	3.2
17	0.8	2.8	0.7	2.8	0.7	2.8	0.6	2.9	0.8	3.4	0.8	3.3	0.7	3.1	0.8	3.2
18	0.8	2.8	0.7	2.8	0.7	2.8	0.6	2.9	0.8	3.4	0.8	3.3	0.7	3.1	0.8	3.2
19	0.8	2.8	0.7	2.8	0.7	2.8	0.6	2.9	0.7	3.0	0.8	3.3	0.7	3.1	0.7	2.8
20	0.8	2.8	0.7	2.8	0.7	2.8	0.6	2.9	0.7	3.0	0.8	3.3	0.7	3.1	0.7	2.8
21	0.7	2.4	0.7	2.8	0.7	2.8	0.6	2.9	0.7	3.0	0.8	3.3	0.6	2.6	0.7	2.8
22	0.7	2.4	0.7	2.8	0.7	2.8	0.6	2.9	0.7	3.0	0.8	3.3	0.6	2.6	0.7	2.8
23	0.7	2.4	0.7	2.8	0.7	2.8	0.5	2.4	0.7	3.0	0.7	2.9	0.6	2.6	0.6	2.4
24	0.7	2.4	0.7	2.8	0.7	2.8	0.5	2.4	0.7	3.0	0.7	2.9	0.6	2.6	0.6	2.4
25	0.7	2.4	0.7	2.8	0.7	2.8	0.5	2.4	0.7	3.0	0.6	2.5	0.6	2.6	0.6	2.4
26	0.7	2.4	0.7	2.8	0.7	2.8	0.5	2.4	0.7	3.0	0.6	2.5	0.6	2.6	0.6	2.4
27	0.6	2.1	0.6	2.4	0.6	2.4	0.5	2.4	0.6	2.5						
28	0.6	2.1	0.6	2.4	0.6	2.4	0.5	2.4	0.6	2.5						
29	0.6	2.1	0.6	2.4												
30	0.6	2.1	0.6	2.4												
total	28.8	100.0	24.9	100.0	24.6	100.0	20.5	100.0	23.6	100.0	24.1	100.0	22.7	100.0	25.1	100.0

L. : Length (μm). R. l. : Relative length.

Table 2. (continued)

	S. indica var. *parvifolia*		*S. indica* var. *satokoae*		*S. iyoensis*		*S. kiusiana*		*S. laeteviolacea* var. *maekawae*		*S. muramatsui*		*S. rubropunctata* var. *rubropunctata*		*S. tsusimensis*	
No.	L.	R. l.	L.	R. l.	L.	R. l.	L.	R. l.	L.	R. l.	L.	R. l.	L.	R. l.	L.	R. l.
1	1.3	7.0	1.5	6.5	1.6	7.2	1.4	6.5	1.3	5.3	1.5	7.3	1.5	6.8	1.5	6.1
2	1.3	7.0	1.5	6.5	1.6	7.2	1.4	6.5	1.3	5.3	1.5	7.3	1.4	6.4	1.4	5.7
3	1.2	6.4	1.4	6.1	1.3	5.9	1.4	6.5	1.3	5.3	1.3	6.3	1.3	5.9	1.2	4.9
4	1.2	6.4	1.4	6.1	1.3	5.9	1.4	6.5	1.3	5.3	1.3	6.3	1.3	5.9	1.2	4.9
5	1.0	5.3	1.1	4.8	1.2	5.4	1.2	5.6	1.2	4.9	1.0	4.9	1.1	5.0	1.2	4.9
6	1.0	5.3	1.1	4.8	1.2	5.4	1.1	5.1	1.2	4.9	1.0	4.9	1.1	5.0	1.2	4.9
7	0.8	4.3	0.9	3.9	1.0	4.5	0.9	4.2	1.1	4.5	1.0	4.9	1.0	4.6	1.1	4.5
8	0.8	4.3	0.9	3.9	1.0	4.5	0.9	4.2	1.1	4.5	1.0	4.9	1.0	4.6	1.1	4.5
9	0.8	4.3	0.9	3.9	0.8	3.6	0.8	3.7	1.1	4.5	0.8	3.9	0.9	4.1	1.0	4.1
10	0.7	3.7	0.9	3.9	0.8	3.6	0.8	3.7	1.1	4.5	0.8	3.9	0.9	4.1	1.0	4.1
11	0.7	3.7	0.9	3.9	0.8	3.6	0.7	3.3	0.9	3.7	0.7	3.4	0.7	3.2	1.0	4.1
12	0.6	3.2	0.9	3.9	0.8	3.6	0.7	3.3	0.9	3.7	0.7	3.4	0.7	3.2	1.0	4.1
13	0.6	3.2	0.8	3.5	0.7	3.2	0.7	3.3	0.9	3.7	0.6	2.9	0.7	3.2	0.8	3.3
14	0.6	3.2	0.8	3.5	0.7	3.2	0.7	3.3	0.9	3.7	0.6	2.9	0.7	3.2	0.8	3.3
15	0.6	3.2	0.7	3.0	0.7	3.2	0.7	3.3	0.9	3.7	0.6	2.9	0.7	3.2	0.8	3.3
16	0.6	3.2	0.7	3.0	0.7	3.2	0.7	3.3	0.9	3.7	0.6	2.9	0.7	3.2	0.8	3.3
17	0.6	3.2	0.7	3.0	0.7	3.2	0.7	3.3	0.8	3.3	0.6	2.9	0.7	3.2	0.8	3.3
18	0.5	2.7	0.7	3.0	0.7	3.2	0.7	3.3	0.8	3.3	0.6	2.9	0.7	3.2	0.8	3.3
19	0.5	2.7	0.7	3.0	0.6	2.7	0.6	2.8	0.7	2.9	0.6	2.9	0.7	3.2	0.8	3.3
20	0.5	2.7	0.7	3.0	0.6	2.7	0.6	2.8	0.7	2.9	0.6	2.9	0.7	3.2	0.8	3.3
21	0.5	2.7	0.7	3.0	0.6	2.7	0.6	2.8	0.7	2.9	0.6	2.9	0.6	2.7	0.7	2.9
22	0.5	2.7	0.7	3.0	0.6	2.7	0.6	2.8	0.7	2.9	0.6	2.9	0.6	2.7	0.7	2.9
23	0.5	2.7	0.6	2.6	0.6	2.7	0.6	2.8	0.7	2.9	0.5	2.4	0.6	2.7	0.7	2.9
24	0.5	2.7	0.6	2.6	0.6	2.7	0.6	2.8	0.7	2.9	0.5	2.4	0.6	2.7	0.7	2.9
25	0.4	2.1	0.6	2.6	0.5	2.3	0.5	2.3	0.6	2.5	0.5	2.4	0.5	2.3	0.7	2.9
26	0.4	2.1	0.6	2.6	0.5	2.3	0.5	2.3	0.6	2.5	0.5	2.4	0.5	2.3	0.7	2.9
27																
28																
29																
30																
total	18.7	100.0	23.0	100.0	22.2	100.0	21.5	100.0	24.4	100.0	20.6	100.0	21.9	100.0	24.5	100.0

chromosome complement was 25.1 μm and the ratio of the longest to shortest chromosome was 2.7. The karyotype of this taxon showed a gradual shift in chromosome length.

(9) *S. indica* var. *parvifolia* (Fig. 1 I)

Somatic metaphase chromosomes ranged from 0.4 μm to 1.3 μm in length (Table 2). Total length of the chromosome complement was 18.7 μm and the ratio of the longest to shortest chromosome was 3.3. The karyotype of this taxon showed a gradual shift in chromosome length.

(10) *S. indica* var. *satokoae* (Fig. 1 J)

Somatic metaphase chromosomes ranged from 0.6 μm to 1.5 μm in length (Table 2), with 4 large and 22 small chromosomes. Total length of the chromosome complement was 23.0 μm and the ratio of the longest to shortest chromosome was 2.5.

(11) *S. iyoensis* (Fig. 1 K)

Somatic metaphase chromosomes varied from 0.5 μm to 1.6 μm in length (Table 2), with 2 large chromosomes and 24 small chromosomes. Total length of the chromosome complement was 22.2 μm and the ratio of the longest to shortest chromosome was 3.2.

(12) *S. kiusiana* (Fig. 1 L)

The lengths of somatic metaphase chromosomes ranged from 0.5 μm to 1.4 μm (Table 2). The total length of the chromosome complement was 21.5 μm and the ratio of the longest to shortest chromosome was 2.8. The karyotype of this taxon showed a gradual shift in chromosome length.

(13) *S. laeteviolacea* var. *maekawae* (Fig. 1 M)

Somatic metaphase chromosomes ranged from 0.6 μm to 1.3 μm in length (Table 2). Total length of the chromosome complement was 24.4 μm and the ratio of the longest to shortest chromosome was 2.2. The karyotype of this taxon showed a gradual shift in chromosome length.

(14) *S. muramatsui* (Fig. 1 N)

Somatic metaphase chromosomes ranged from 0.5 μm to 1.5 μm in length (Table 2). Chromosome complement consisted of 4 large chromosomes and 22 small chromosomes, with a total length of 20.6 μm. The ratio of the longest to shortest chromosome was 3.0.

(15) *S. rubropunctata* var. *rubropunctata* (Fig. 1 O)

Somatic metaphase chromosomes varied from 0.5 μm to 1.5 μm in length (Table 2). Total length of the chromosome complement was 21.9 μm and the ratio of the longest to shortest chromosome was 3.0. The karyotype of this taxon showed a gradual shift in chromosome length.

(16) *S. tsusimensis* (Fig. 1 P)

Somatic metaphase chromosomes had lengths ranging from 0.7 μm to 1.5 μm (Table 2). Total length of the chromosome complement was 24.5 μm and the ratio of the longest to shortest chromosome was 2.1. The karyotype of this taxon showed a gradual shift in chromosome length.

The present study shows that plants of the Japanese subgen. *Scutellaria* have the ratio of the longest to shortest chromosome ranging from 1.8 (*S. shikokiana* var. *shikokiana*) to 3.3 (*S. indica* var. *parvifolia*). In the taxa with 30 chromosomes, *S. yezoensis* shows a gradual shift in karyotype, in which chromosomes grow consecutively and cannot be grouped, whereas *S. strigillosa* possesses a heterogeneous grouping of chromosomes. In the three taxa with a count of 28, *S. pekinensis* var. *transitra* and *S. shikokiana* var. *shikokiana* show a gradual form, whereas those of *S. dependens* shows a heterogeneous form. In comparison, the eleven taxa with a count of 26, *S. barbata*, *S. brachyspica*, *S. indica* var. *parvifolia, S. kiusiana*, *S. laeteviolacea* var. *maekawae*, *S. rubropunctata* var. *rubropunctata* and *S. tsusimensis* show a gradual form, whereas those of *S. amabilis*, *S. indica* var. *satokoae*, *S. iyoensis* and *S. muramatsui*, possess a heterogeneous form. Thus, in the present study I found no consistent relationship between chromosomal count and karyotype forms.

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摘要

日本産タツナミソウ属は 18 種 6 変種(Murata and Yamazaki 1993) 1 帰化種(Sato et al. 2001) が知られている。このうち, Sawanomukai et al. (2003) は 18 分類群の染色体数を観察し, Murata and Yamazaki (1993) の分類体系における *Scutellaria* 亜属について 2n=26, 28, 30 の 3 種類の染色体数が存在しているが, *Indica* 列の 11 分類群はすべて 2n=26 であるとした。

Sawanomukai et al. (2003) が報告した *Scutellaria* 亜属における 3 種類の異数性の類縁関係を知るための基礎的情報を得ることを目的として, 今回, Sawanomukai et al. (2003) が用いた 18 分類群野うち 15 分類群に, 新たにホクリクタツナミソウ (Naruhashi et al. 2004) を加えた, 16 分類群の核型を明らかにした。

観察の結果, 本属は, 染色体のサイズおよびサイズの変化によって, 非均等勾配型と均等勾配型の 2 種類の核型に分けることができた。非均等勾配型はナミキソウ (*S. strigillosa*)・ヒメナミキ (*S. dependens*)・ヤマジノタツナミソウ (*S. amabilis*)・ホクリクタツナミソウ (*S. indica* var. *satokoae*)・ハナタツナミソウ (*S. iyoense*) およびデワノタツナミソウ (*S. muramatsui*) であった。均等勾配型はエゾナミキ (*S. yezoensis*)・ヤマタツナミソウ (*S. pekinensis* var. *transitra*)・ミヤマナミキ (*S. shikokiana* var. *shikokiana*)・セイタカナミキソウ (*S. barbata*)・オカタツナミソウ (*S. brachyspica*)・コバノタツナミ (*S. indica* var. *parvifolia*)・ツクシタツナミソウ (*S. kiusiana*)・ホナガタツナミソウ (*S. laeteviolacea* var. *maekawae*)・アカボシタツナミソウ (*S. rubropunctata* var. *rubropunctata*) およびアツバタツナミソウ (*S. tsusimensis*) であった。

今回の核型の観察から, 同一の染色体数を持つ分類群の中の核型は多様であり, 2n=26 をすべて含む *Indica* 列の中においても, 核型の多様性があることがわかった。つまり, 3 種類の染色体数の違いと核型のサイズの変化に, 直接的な類縁関係を推測するための要因が存在するとは考えられなかった。

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