

## Yoshikane Iwatsubo<sup>1</sup>, Kimie Sakai<sup>1,2</sup> and Naohiro Naruhashi<sup>1</sup> : **Chromosome number of *Sanguisorba tenuifolia* var. *grandiflora* (Rosaceae)**

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*Sanguisorba tenuifolia* Fisch. ex Link, distributed in eastern Siberia including the Amur and Ussuri basins, Sakhalin, the Kurils and Kamchatka, northern and northeastern China, Korea, and Japan (Yü and Li 1985; Ohwi and Kitagawa 1992; Lee 1996; Yakubov 1996), is known to have a polyploid series of  $2n=28, 56, ca. 84,$  and  $84$  (Larsen 1959; Sokolovskaya 1966; Gurzenkov 1973; Oginuma 1990; Mishima et al. 1996). In Japan, this species has two varieties: var. *tenuifolia* distributed in Hokkaido, Honshu, Shikoku and Kyushu; var. *grandiflora* Maxim. occurring in the alpine meadow of Hokkaido (Shimizu 1982; Naruhashi 2001). In the two varieties, var. *tenuifolia* of Japan is known to have two cytotypes,  $2n=56, 84$  (Mishima et al. 1996), while var. *grandiflora* has not been cytologically studied. This report presents the chromosome number of *S. tenuifolia* var. *grandiflora* of Japan.

### Materials and methods

Nine individuals of *S. tenuifolia* var. *grandiflora* from three localities in Hokkaido: two from Nishibetsudake, Shibecha-cho; five from Bihorotoge, Bihoro-cho; and two from Sharidake, Kiyosato-cho, were used for the study. All plants from the three localities were grown in the experimental garden of Toyama University. Root tips sprouted from the potted plants were collected and pretreated in 2mM 8-hydroxyquinoline solution at room temperature (ca. 25°C) for 1 h and then kept at ca. 5°C 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 HCl at room temperature for a few hours, macerated in 1 N HCl at 60°C for 10 minutes, and then washed in

tap water. The root tips were stained and squashed in 1.5% lacto-propionic orcein, and ordinary squash technique was applied for the examination of somatic chromosomes.

### Results and discussion

As shown in Fig. 1 and Table 1, *S. tenuifolia* var. *grandiflora* studied had two different chromosome numbers: the plants from Nishibetsudake and one plant out of 5 plants from Bihorotoge had  $2n=56$  chromosomes, while the rest of plants collected from Bihorotoge, and the plants from Sharidake showed  $2n=84$ .

In *S. tenuifolia* var. *tenuifolia* of Japan, Mishima et al. (1996) showed that var. *tenuifolia* is composed of two cytotypes:  $2n=56$  plant, distributed in the western part of Honshu, Shikoku, and Kyushu;  $2n=84$  plant, spread in the northern part of Honshu, and Hokkaido. The difference of geographical distributions of the two cytotypes in *S. tenuifolia* var. *tenuifolia* explained by their adaptation to different environments:  $2n=84$  plant is adapted to cool and more snowy area in winter than the distribution area of  $2n=56$  plant (Mishima et al. 1996). In the present study, *S. tenuifolia* var. *grandiflora* collected from Bihorotoge shows that the two cytotypes grow together in the same alpine meadow. The result reveals that the two cytotypes of this variety do not have discrete allopatric distributions, as found in the distributions of two cytotypes of var. *tenuifolia* in Japan.

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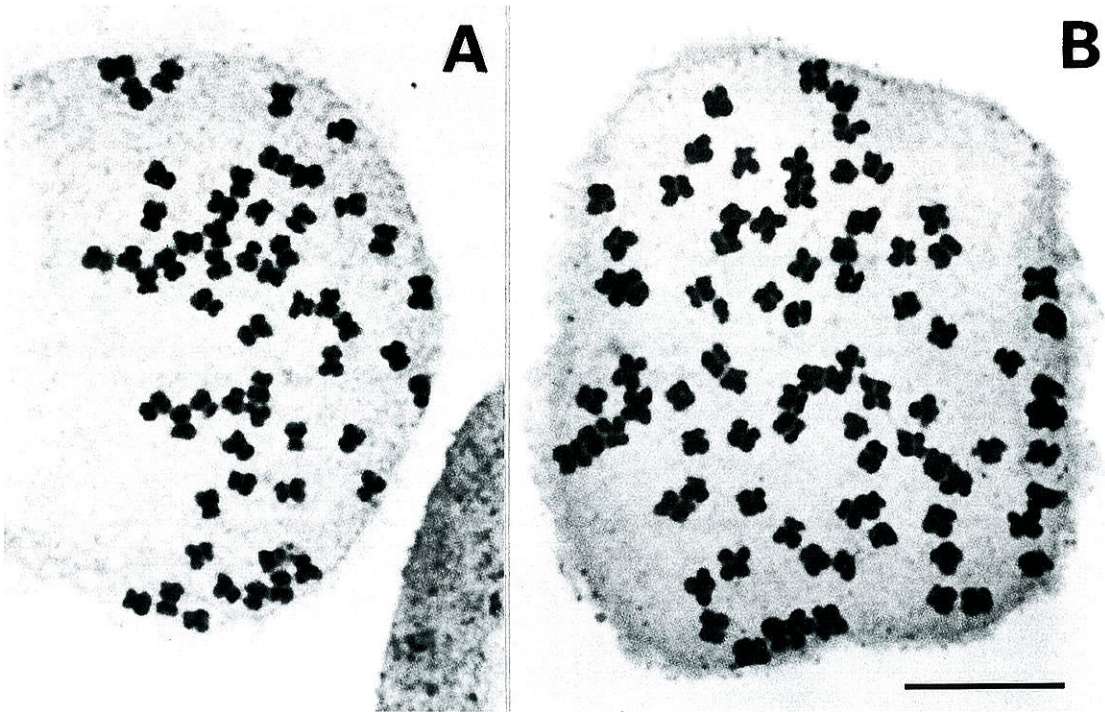


Fig. 1. Somatic metaphase chromosomes of *Sanguisorba tenuifolia* var. *grandiflora*. A:  $2n=56$ . B:  $2n=84$ . Bar = 8  $\mu$ m.

Table 1. Collection localities, chromosome counts, and number of individuals examined of *Sanguisorba tenuifolia* var. *grandiflora*

Collection locality	Number of individuals observed	Chromosome count ( $2n$ )
Nishibetsudake, Shibeche-cho, Hokkaido	2	56
Shari-dake, Kiyosato-cho, Hokkaido	2	84
Bihorotoge, Bihoro-cho, Hokkaido	1 4	56 84

### References

- Gurzenkov, N. N. 1973. Studies of chromosome numbers of plants from the south of the Soviet Far East. Komarov Lecture 20: 47-61. (in Russian)
- Larsen, K. 1959. Cytology of the genus *Sanguisorba*. Nature 184: 743-744.
- Lee, W. 1996. Lineamenta Florae Koreae I. pp.535-538. Academy Book, Seoul. (in Korean)
- Mishima, M., Iwatsubo, Y., Horii, Y. and Naruhashi, N. 1996. Intraspecific polyploidy of *Sanguisorba tenuifolia* Fisch. (Rosaceae) in Japan. J. Phytogeogr. Taxon. 44: 67-71.
- Naruhashi, N. 2001. *Sanguisorba* L. Iwatsuki, K., Boufford, D. E. and Ohba, H. (eds.). Flora of Japan, vol. Iib, pp. 180-185. Kodansha, Tokyo.
- Oginuma, K. 1990. A cytological study on two species of *Sanguisorba* from western Japan. Bull. Coll. Child Develop., Kochi Women's Univ. 14: 87-92.
- Ohwi, J. and Kitagawa, M. 1992. New flora of Japan. p. 858. Shibundo, Tokyo. (in Japanese)
- Shimizu, T. 1982. The new alpine flora of Japan

- in color, vol. I. pp. 238-239. Hoikusha, Osaka. (in Japanese)
- Sokolovskaya, A. P. 1966. Geograficheskoe rasp-rostranenie poliploidnykh vidov rasteniy. (Issledovanie flory Primorskogo kraja). Vest-nik Leningr. Univ. ser. Biol. 1: 92-106. (in Russian)
- Yakubov, V. V. 1996. Charkevicz, S. S. (ed.). Plantae vasculares orientis extremi Sovietici tom. 8, pp.227-230. Nauka, Saint Petersburg. (in Russian)
- Yü, T.-T. and Li, C.-L. 1985. Flora reipublicae popularis Sinicae tom. 37, pp.463-474. Science Press, Beijing. (in Chinese)
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岩坪美兼<sup>1</sup>・酒井紀美栄<sup>1,2</sup>・鳴橋直弘<sup>1</sup>：バラ科ワレモコウ属チシマワレモコウの染色体数

チシマワレモコウの染色体数を明らかにするために、北海道東部の西別岳、美幌峠、斜里岳から採集した植物を用いて、根端の分裂中期細胞の観察を行った。染色体数は、西別岳産は  $2n=56$ 、美幌峠産は  $2n=56, 84$ 、斜里岳産は  $2n=84$  であった。わが国では、別変種のナガボノワレモコウにおいて、 $2n=56, 84$  が報告 (Mishima et al. 1996) されているが、今回、チシマワレモコウにおいてもナガボノワレモコウと同様の  $2n=56, 84$  が観察された。これらのサイトタイプは、ナガボノワレモコウでは地理的に完全に分かれて分布しているのに対し、チシマワレモコウでは同所的にも分布していた。

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