

# 富山県で栽培されているジャノヒゲ(クサスギカズラ科) の染色体数

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*Ophiopogon japonicus* (L.f.) Ker Gawl. (Asparagaceae), indigenous to China, Taiwan, Korea, and Japan is a perennial evergreen plant cultivated for medicinal use or as an ornamental garden plant in Japan. Reported chromosome numbers for this species include  $2n = 36$  (Satô 1942), 67 (Nagamatsu and Noda 1971), 68 (Nagamatsu and Noda 1971; Liang et al. 1998), 70 (Yamashita and Tamura 2001) and 72 chromosomes (Satô 1942; Oinuma 1949; Sharma and Chaudhuri 1964; Hasegawa 1968; Hsu 1971; Yang et al. 1990; Yamashita and Tamura 2001). The basic chromosome number for this genus is believed to be  $x = 18$  (Darlington and Wylie 1955). Of the five somatic chromosome numbers reported in this taxon, the chromosome count  $2n = 36$  was reported only once from a cultivated plant in the Nikko Botanical Garden in Japan. This plant is inferred to be a diploid plant. Those with  $2n = 67$ , 68 and 70 chromosomes are all considered hypo-tetraploid plants, and that with  $2n = 72$  chromosomes is considered tetraploid.

The present study aimed to clarify which of the five chromosome forms found in *O. japonicus* are cultivated in Toyama Prefecture, located on the Japan Sea side of central Honshu, Japan.

## Materials and methods

We used 82 cultivated ornamental plants of *O. japonicus* collected widely from temples, shrines, public parks and private houses in Toyama Prefecture (Table 1). Following collec-

tion, each plant was grown in a plastic pot at the experimental garden of the University of Toyama. Chromosome counts were examined in meristematic cells of the root tips with fully spread metaphase chromosomes.

Newly-formed root tips collected from potted plants were pretreated in 2.1mM 8-hydroxyquinoline solution at room temperature (about 25°C) for 1 to 1.5 h. and then kept at ca. 5°C for 15 h. These root tips were fixed in a mixture of glacial acetic acid and absolute ethyl alcohol (1:3) at room temperature for 1 h, macerated in 1N hydrochloric acid at 60°C for 10 minutes, and then washed in tap water. Root tip meristems were stained in a drop of 1.5% lacto-propionic orcein on a glass slide, and prepared using a common squash technique. Voucher specimens of the plants examined have been deposited in the Toyama Science Museum (TOYA).

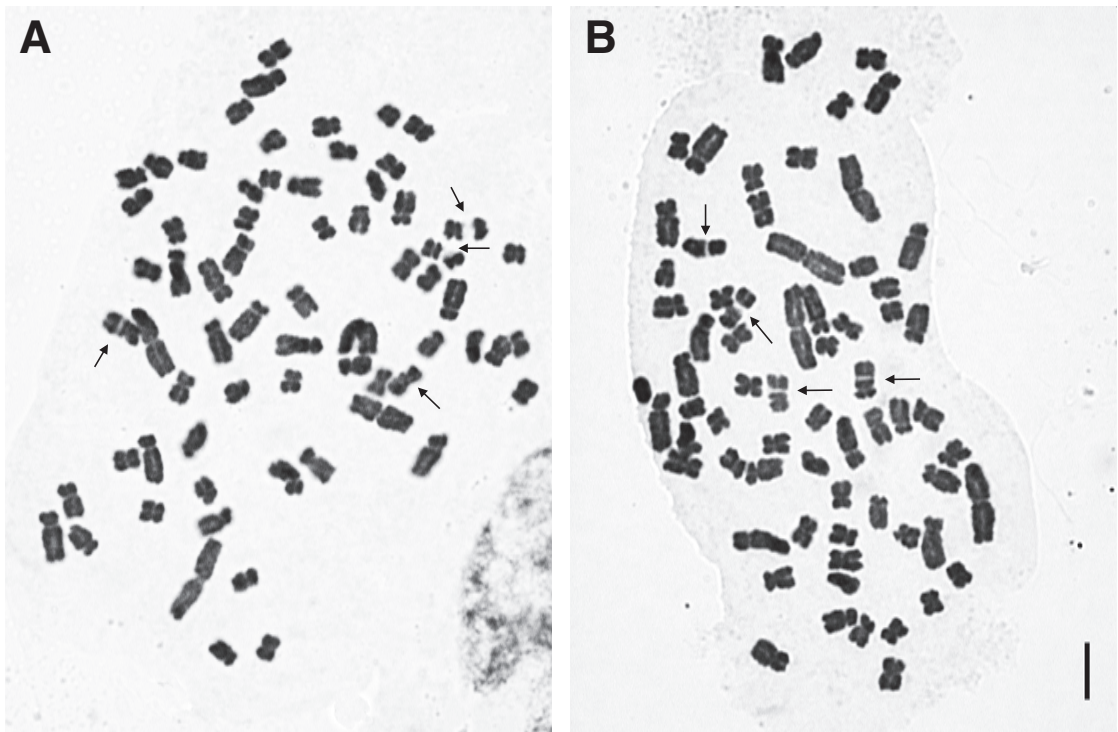
## Results and discussion

The *O. japonicus* examined in the present study showed chromosome numbers of  $2n = 67$  and 68 chromosomes (Table 1). Of the 82 plants collected from 26 sites in Toyama Prefecture, 77 plants (94%) had  $2n = 68$  chromosomes (Fig. 1A) and 5 plants (6%) from 3 sites had  $2n = 67$  chromosomes (Fig. 1B). This study showed that two chromosome forms of *O. japonicus* were cultivated in the studied area.

Nagamatsu and Noda (1971) reported that cultivated *O. japonicus* collected from the Tokyo metropolitan area and Kanagawa, Gifu,

Table 1. Chromosome numbers and collection sites of cultivated *Ophiopogon japonicus* in Toyama Prefecture

Chromosome number	Cultivated place	No. of individuals examined	Collection locality	
2n = 67	Temple / Shrine	3	Inami, Nanto City	
	Public garden	1	Kanayamachi, Takaoka City	
		1	Kamikoizumi, Namerikawa City	
	2n = 68	Private house	4	Bakurouhonmachi, Takaoka City
			1	Kanayamachi, Takaoka City
			1	Miyukimachi, Takaoka City
			5	Toide, Takaoka City
			9	Daimon, Imizu City
			8	Taikouyama, Imizu City
			5	Inami, Nanto City
4			Fukuno, Nanto City	
2			Ishimaru, Tonami City	
2			Izumicho, Oyabe City	
2n = 68	Temple / Shrine	7	Yatsuomachi-mita, Toyama City	
		8	Kamifutasugi, Toyama City	
		2	Oojima, Namerikawa City	
		1	Bakurouhonmachi, Takaoka City	
		1	Yokotahonmachi, Takaoka City	
		3	Toide, Takaoka City	
		2	Daimon, Imizu City	
		2	Taikouyama, Imizu City	
		1	Yatsuomachi-mita, Toyama City	
		3	Kamifutasugi, Toyama City	
2n = 68	Public garden	1	Oojima, Namerikawa City	
		1	Takiouyama, Imizu City	
2n = 68	Public garden	4	Kitadai, Toyama City	

Fig. 1. Photographs of somatic metaphase chromosomes of two chromosome forms of cultivated *Ophiopogon japonicus*. A: 2n = 67, B: 2n = 68. Arrows indicate secondary constrictions. Bar represents 5  $\mu$ m.

Ishikawa, Shiga, Osaka, Nara and Wakayama Prefectures in Honshu; and that from Fukuoka, Saga, and Kumamoto Prefectures in Kyushu, Japan, all had  $2n = 67$  chromosomes. The present study, however, found that the majority of cultivated *O. japonicus* in Toyama Prefecture has  $2n = 68$  chromosomes, with a mere 6% of examined plants having  $2n = 67$  chromosomes.

Our results and the previous report of Nagamatsu and Noda (1971) demonstrate that, out of the chromosome forms of *O. japonicus* with  $2n = 36, 67, 68, 70$  and  $72$  in Japan, the forms with primarily  $2n = 68$  and rarely  $2n = 67$  are cultivated in Toyama Prefecture.

The difference in chromosome form between the cultivated *O. japonicus* from Toyama Prefecture examined in the present study and that reported by Nagamatsu and Noda (1971) is unclear. Toyama Prefecture is situated on the Japan Sea side of central Honshu, and this area has more snowfall than the majority of areas where *O. japonicus* was collected by Nagamatsu and Noda (1971). *Ophiopogon japonicus* with  $2n = 68$  chromosomes may be more adapted to colder place than the form with  $2n = 67$  chromosomes.

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- 山梨裕太<sup>1</sup>・岩坪美兼<sup>1</sup>・畠知恵美<sup>1,2</sup>・佐藤杏子<sup>1,4</sup>・内藤寛文<sup>1,3</sup>・三浦憲人<sup>1,5</sup>：富山県で栽培されているジャノヒゲ（クサスギカズラ科）の染色体数  
 ジャノヒゲ (*Ophiopogon japonicus*) は、わが国では本州以南に自生しており、園芸植物または薬用植物として栽培もされている。ジャノヒゲの染色体数には、 $2n=36, 67, 68, 70, 72$  が知られている。栽培されているジャノヒゲでは日光植物園において  $2n=36$  (Satô 1942) が、 $2n=67$  は東京都、神奈川県、石川県、岐阜県、滋賀県、大阪府、奈良県、和歌山県、福岡県、佐賀県、熊本県の栽培株で報告されていた (Nagamatsu and Noda 1971)。  
 本研究では、富山県内の民家、公園、寺院・神社、合わせて26カ所で栽培されていた82株のジャノヒゲの染色体数を調査した。その結果77株 (94%) は  $2n=68$ 、5株 (6%) は  $2n=67$  であった。富山県内で栽培されているジャノヒゲは報告されている他の地域の栽培ジャノヒゲとは異なり、 $2n=68$  が一般的であることが判った。  
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