

Yoshikane Iwatsubo, Asami Teraoka and Kana Muraguchi : **Chromosome numbers of *Paeonia* cultivars (Paeoniaceae)**

The genus *Paeonia* L. (Paeoniaceae), distributed in North and West America, South Europe and Asia (Mabberley 2008), comprises 25 species including the two wild paeonies of *P. japonica* (Makino) Miyabe et Takeda and *P. obovata* Maxim., which occur in Japan (Ohwi and Kitagawa 1992; Mabberley 2008). This genus has many cultivars used for ornaments, and are often planted in flower beds and gardens in

Europe and the Americas. They are also used medicinally in China and Japan.

Among the cultivated plants, new cultivars are often created through crossbreeding between the cultivated taxa. As such, information on chromosome number for each *Paeonia* cultivar is inevitable for efforts to improve paeony cultivar breeding.

This study recorded chromosome numbers of

Table 1. Chromosome numbers of *Paeonia lactiflora* f. *hortensis* cultivars

Cultivar	Japanese name	Chromosome number (2n)
'Aratama'	新珠	10
'Bonten'	梵天	10
'Esugata'	絵姿	10
'Gion'	祇園	10
'Haresugata'	晴れ姿	10
'Haru-no-niji'	春の虹	10
'Haru-no-sato'	春の里	10
'Haru-no-yosooi'	春の粧	10
'Himatsuri'	火祭	10
'Hinamatsuri'	ひなまつり	10
'Hyōten'	氷点	10
'Kagerō'	かげろう	10
'Kōga'	紅河	10
'Komazawa'	駒澤	10
'Meigetsu'	明月	10
'Mine-no-yuki'	峰の雪	10
'Miyama-no-yuki'	深山の雪	10
'Momoyama'	桃山	10
'Rinbu'	輪舞	10
'Sanadanishiki'	真田錦	10
'Shinano No. 3'	信濃3号	10
'Shinano-no-haru'	信濃の春	10
'Shinano-no-yuki'	信濃の雪	10
'Shinsetsu'	新雪	10
'Shirayuki'	白雪	10
'Sugadaira No. 30'	菅平30号	10
'Taki-no-yosooi'	滝の粧	10
'Takizawa-aka'	滝沢赤	10
'Uonuma No. 3'	魚沼3号	10
'Yamabiko'	やまびこ	10
'Yūbae'	夕映	10

paeony cultivars of *P. lactiflora* preserved in the Toyama Medicinal Plant Guidance Center.

Materials and methods

Paeony plants used in this study were the cultivars both of *P. lactiflora* Pall. f. *hortensis* Makino (Table 1) and *P. lactiflora* f. *sinensis* Sims (Table 2). Newly-sprouted root tips were

excised from each potted plant, pretreated in a 2mM 8-hydroxyquinoline solution at room temperature for one hour, and subsequently stored at 5°C for 15 hours. Root tips were fixed in a mixture of glacial acetic acid and absolute ethyl alcohol (1:3) at room temperature for one hour, macerated in 1N hydrochloric acid at 60°C for ten minutes, and then washed in tap water.

Table 2. Chromosome numbers of *Paeonia lactiflora* f. *sinensis* cultivars

Cultivar	Japanese name	Chromosome number (2n)
'Alps'	アルプス	10
'Avalanche'	アバンランチェ	10
'Bridal Shower'	ブライダル シャワー	10
'Bunker Hill'	バンカー ヒル	10
'Cheddar Surprise'	CHEDDAR サプライズ	10
'Duchesse de Nemours'	ダッチェス ド ネモウズ	10
'Elsa Sass'	エルサ セス	10
'Eclipse'	エクリップス	10
'Festiva Maxima'	フェスティバ マキシマ	10
'Festiva Supreme'	フェスティバ シュープリーム	10
'Flora'	フローラ	10
'General McMahon'	ゼネラル マクマホン	10
'Honey Gold'	ハニー ゴールド	10
'Kansas'	カンサス	10
'La Tendresse'	ラ テンドレス	10
'Madam Purple'	マダム パープル	10
'Maréchal Vaillant'	マーシャル ヴァイルラント	10
'Martha Reed'	マーサ リード	10
'Miss America'	ミス アメリカ	10
'Miss Crème'	ミス クレーメ	10
'Miss Eckhart'	ミス エクハルト	10
'Mr. G. F. Hermeric'	ミスター ハーメリック	10
'Mrs. F. D. Roosevelt'	ミセス ルーズベルト	10
'Peter Brand'	ピーター ブランド	10
'Pink Doctor'	ピンク ドクター	10
'Richard'	リチャード	10
'Rose Glory'	ローズ グローリ	10
'Ruigeje'	ルイゲイジ	10
'Silver'	シルバー	10
'Sorbet'	ソルベット	10
'Yatoris'	ヤトリス	10
'America'	アメリカ	15
'Coral Fay'	コーラル フェイ	15
'Coral 'N Gold'	コーラル エヌ ゴールド	15
'Coral Supreme'	コーラル シュープリーム	15
'Cytherea'	シザレア	15
'Early Scout'	アーリー スコート	15
'Etched Salmon'	エッチド サーモン	15
'Gerry'	ゲリー	15
'Red Grace'	レッド グレース	15

They were then stained and squashed in 1% lacto-propionic orcein. The chromosome count for each cultivar was examined in fully spread chromosomes of root tip meristem cells.

Results and discussion

Chromosome counts of 71 paeony cultivars investigated in this study showed $2n = 10$ and 15 chromosomes. The genus *Paeonia* is known to have a basic chromosome number of $x = 5$ (Darlington and Wylie 1955). Chromosome counts of the cultivars of *P. lactiflora* f. *hortensis* were $2n = 2x = 10$ in all examined cultivars of the following: 'Aratama', 'Bonten', 'Esugata', 'Gion', 'Haresugata', 'Haru-no-niji', 'Haru-no-ato', 'Haru-no-yosooi', 'Himatsuri', 'Hinamatsuri', 'Hyōten', 'Kagerō', 'Kōga', 'Komazawa', 'Meigetsu', 'Mine-no-yuki', 'Miyama-no-yuki', 'Momoyama' (Fig. 1A), 'Rinbu', 'Sanadanishiki', 'Shinano No. 3', 'Shinano-no-haru', 'Shinano-no-yuki', 'Shinsetsu', 'Shirayuki', 'Sugadaira No. 30', 'Takinoyosooi', 'Takizawa-aka', 'Uonuma No. 3', 'Yamabiko', and 'Yūbae' (Table 1). Examined cultivars of *P. lactiflora* f. *sinensis* comprised $2n = 10$ plants and $2n = 15$ plants as follows: $2n = 10$ plants included 'Alps', 'Avalanche' (Fig. 1B), 'Bridal Shower', 'Bunker Hill', 'Cheddar Surprise', 'Duchesse de Nemours', 'Elsa Sass', 'Eclipse', 'Festiva Maxima', 'Festiva Supreme', 'Flora', 'General McMahon', 'Honey Gold', 'Kansas', 'La Tendresse', 'Madam Purple', 'Maréchal

Vaillant', 'Martha Reed', 'Miss America', 'Miss Crème', 'Miss Eckhart', 'Mr. G. F. Hermeric', 'Mrs. F. D. Roosevelt', 'Peter Brand', 'Pink Doctor', 'Richard', 'Rose Glory', 'Ruigeje', 'Silver', 'Sorbet', 'Yatoris'; and $2n = 15$ plants were 'America', 'Coral Fay', 'Coral N Gold' (Fig. 1C), 'Coral Supreme', 'Cytherea', 'Early Scout', 'Etched Salmon', 'Gerry', and 'Red Grace' (Table 2).

Chromosome counts reported for the cultivars of *P. lactiflora* were all diploids ($2n = 10$) (Nakamura and Nomoto 1981,1982; Murin et al. 1984; Wang and Huang 1985 (as $n = 5$); Uspenskaya 1987; Hong et al 1988; Uchino and Miyazawa 2000; Zhang and Shao 2000; Chen et al. 2003). The *Paeonia* cultivars examined in this study shows that *P. lactiflora* f. *sinensis* has both of diploid ($2n = 10$) and triploid ($2n = 15$) cultivars, while *P. lactiflora* f. *hortensis* has diploid cultivars.

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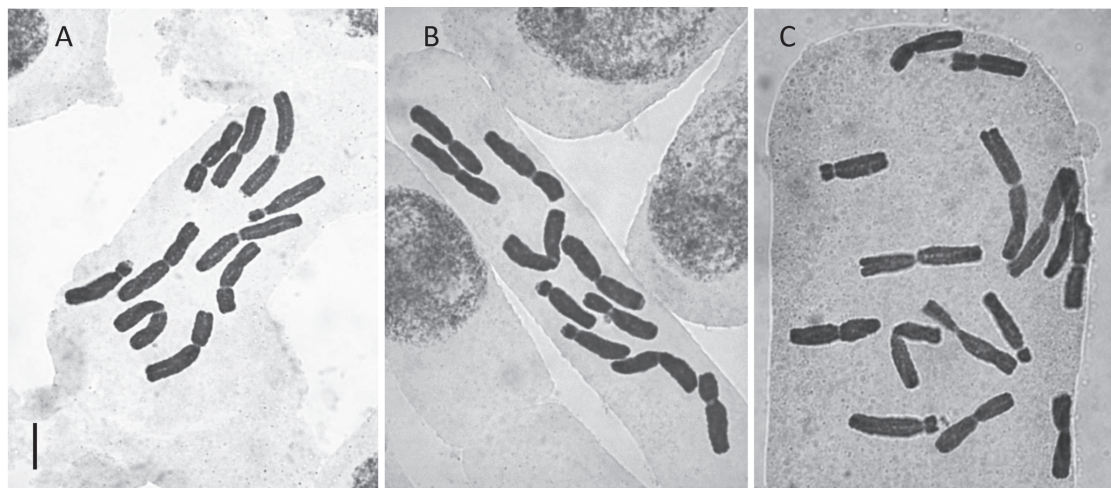


Fig. 1. Somatic metaphase chromosomes of *Paeonia lactiflora* f. *hortensis* 'Momoyama' (A), *P. lactiflora* f. *sinensis* 'Avalanche' (B) and *P. lactiflora* f. *sinensis* 'Coral N Gold' (C). Bar represents 5 μ m.

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- de Nemours', 'Early Scout', 'Eclipse', 'Elsa Sass', 'Festiva Maxima', 'Festiva Supreme', 'Flora', 'General McMahon', 'Gerry', 'Honey Gold', 'Kansas', 'La Tendresse', 'Madame Purple', 'Marechal Vaillant', 'Martha Reed', 'Miss America', 'Miss Claim', 'Miss Eckhart', 'Mr. G. F. Hermeric', 'Mrs. F.D. Roosevelt', 'Peter Brand', 'Pink Doctor', 'Red Grace', 'Richard', 'Rose Glory', 'Ruigeje', 'Silver', 'Sorbet', 'Yatoris' が二倍体 ($2n = 10$), 'America', 'Coral Fay', 'Coral 'N Gold', 'Coral Supreme', 'Cytherea', 'Early Scout', 'Etched Salmon', 'Gerry', 'Red Grace' は三倍体 ($2n = 15$) であり, *f. sinensis* には二倍体品種と三倍体品種が存在することが判った。
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岩坪美兼・寺岡亜沙美・村口加奈：シャクヤク栽培品種の染色体数

シャクヤク栽培品種71品種の染色体数を調べた。その結果, *f. hortensis* の31品種はすべて二倍体 ($2n = 10$) であった。*f. sinensis* では 'Alps', 'America', 'Avalanche', 'Bridal Shower', 'Bunker Hill', 'Cheddar Surprise', 'Coral Fay', 'Coral N' Gold', 'Coral Supreme', 'Cytherea', 'Duchesse