

Chromosome numbers of 41 cultivated taxa of Prunus subg. Cerasus in Japan

著者	Iwatsubo Yoshikane, Kawasaki Tetsuya, Naruhashi Naohiro
journal or publication title	植物地理・分類研究 = The journal of phytogeography and taxonomy
volume	51
number	2
page range	165-168
year	2003-12-25
URL	http://hdl.handle.net/2297/48615

Yoshikane Iwatsubo¹, Tetsuya Kawasaki² and Naohiro Naruhashi¹ : **Chromosome numbers of 41 cultivated taxa of *Prunus* subg. *Cerasus* in Japan**

¹Department of Biology, Faculty of Science, Toyama University, Gofuku 3190, Toyama 930-8555, Japan;

²Takasago 4-16-5, Saitama City, Saitama 336-0011, Japan

Hundreds of cultivated taxa of flowering cherries are currently known in Japan (Nihon Hana no Kai 1982; Kawasaki 1994). Chromosome studies on the flowering cherries have been done by many workers (Ishikawa 1916; Okabe 1927, 1928; Sax 1931; Tanaka and Oginuma 1975; Oginuma and Tanaka 1976; Nishikawa 1985; Oginuma 1987 a,b, 1988; Somego 2000). Recently, the authors reported on the chromosome numbers of 193 taxa of flowering cherries in Japan (Iwatsubo et al. 2002). In some cultivated taxa, the chromosome counts presented by the authors, however, are different from the counts reported by previous researchers. Along with the taxa whose chromosome numbers are unknown, those taxa will require further cytological study, in understanding the cause of disagreement of the chromosome numbers. This second paper of a series, that deals with chromosome numbers of flowering cherries in Japan, comprises 41 taxa of *Prunus* subg. *Cerasus*.

Materials and methods

Meristems of leaf buds of 41 taxa of *Prunus* subg. *Cerasus* collected from the plants preserved in the Yuki Experimental Station of the Flower Association of Japan (Nihon Hana no Kai) were used in the study. After being collected, the leaf buds were readily pretreated in a 2 mM 8-hydroxyquinoline solution for a few hours at room temperature and kept at ca. 5°C for about 15 h, and then fixed and kept in Newcomer's fluid at room temperature until used. After immersion in 1 N HCl for a few hours, the leaf buds were macerated in 1 N HCl at 60°C for 10 minutes, and then washed in tap water. They

were stained in a drop of 1.5% lacto-propionic orcein on the slide glass and ordinary squash technique was applied in preparation.

Results and discussion

The taxa studied, the number of plants examined, and their code numbers in the Yuki Experimental Station of the Flower Association of Japan, along with the voucher specimens of some taxa kept in TNS, are presented in Table 1. The chromosome numbers determined in the study and reported previously are also listed in Table 1. All the taxa studied showed $2n=16$ or $2n=24$ chromosomes. As seen in Table 1, chromosome counts are reported here for the first time for 19 taxa: 17 are diploid taxa, and two are triploid taxa.

The present result supports our previous study (Iwatsubo et al. 2002) on the chromosome numbers of *P. ×introrsa* 'Introrsa' and *P. lannesiana* 'Sirayuki' being both triploid plants with $2n=24$; *P. ×subhirtella* 'Autumnalis' and *P. ×subhirtella* 'Subhirtella' being both diploid plants with $2n=16$. These plants were initially reported as follows: *P. ×introrsa* 'Introrsa' as a diploid plant with $2n=16$ (Somego 2000), *P. lannesiana* 'Sirayuki' as a diploid plant with $2n=16$ (Okabe 1927), *P. ×subhirtella* 'Autumnalis' as a triploid plant with $2n=24$ (Oginuma and Tanaka 1976; Oginuma 1987), and *P. ×subhirtella* 'Subhirtella' as a triploid plant with $2n=24$ (Oginuma and Tanaka 1976; Oginuma 1987). The disagreement in chromosome numbers of the four cultivars suggests that each is composed of two chromosome strains.

Table 1. List of studied taxa of *Prunus* subg. *Cerasus*, Japanese name, number of individuals examined, individual code number (voucher specimen number), and present and previous chromosome counts

Taxon	Japanese name	Present count (2n)	No. of plants examined	Individual code numbers in 'YES' (Voucher number)	Previous report	Reference
<i>P. apetala</i> (Siebold et Zucc.) Franch. et Sav.	Choji-zakura (丁香桜)	16	1	434	16	Okabe 1927 (as <i>P. crassipes</i>); Oginuma and Tanaka 1976; Oginuma 1987
<i>P. incisa</i> Thunb.	Mame-zakura (豆桜)	16	1		16	Okabe 1927, 1928; Sax 1931; Oginuma and Tanaka 1976; Oginuma 1987
<i>P. incisa</i> Thunb. × <i>P. lannesiana</i> (Carrière) E.H.Wilson var. <i>speciosa</i> (Koidz.) Makino 'Umineko'	Umineko (海猫)	16	1	411 (Kawasaki 5257)	16	Iwatsubo et al. 2002
<i>P. × introrsa</i> Yagi ex Ohwi 'Introrsa'	Tsubaki-kanzakura (椿寒桜)	24	2	70 (Kawasaki 5213), 83	16 24	Somego 2000 Iwatsubo et al. 2002
<i>P. jamasakura</i> Siebold ex Koidz. 'Floridula'	Seigan-zakura (誓願桜)	16	1	267		
'Kamatari-zakura'	Kamatari-zakura (鎌足桜)	16	1	9809		
'Sendaiya'	Sendaiya (仙台屋)	16	2	1318, 1558		
'Shizuka-nioi'	Shizuka-nioi (静香匂)	16	1	1560		
<i>P. × koboku-zakura</i> Ohwi	Koboku-zakura (子福桜)	16	1	86 (Kawasaki 841)	16	Iwatsubo et al. 2002
<i>P. lannesiana</i> (Carrière) E.H.Wilson 'Beni-tamanishiki'	Beni-tamanishiki (紅玉鋪)	16	1	1474		
'Gosiozakura'	Gosho-zakura (五所桜)	16	1	9704		
'Iyo-kumagai'	Iyo-kumagai (伊予熊谷)	16	1	9705		
'Matsumae-hayazaki'	Matsumae-hayazaki (松前早咲)	24	1	939	24	Iwatsubo et al. 2002
'Matsumae-ohsio'	Matsumae-ōshio (松前大潮)	16	1	1691		
'Mitsukabizakura'	Mikkabi-zakura (三ヶ日桜)	16	1	9624	16	Iwatsubo et al. 2002
'Ohsawazakura'	Osawa-zakura (大沢桜)	16	1	9706		
'Senriko'	Senrikō (千里香)	24	1	738	24	Okabe 1927 (as <i>P. serrulata</i> f. <i>picta</i>)
'Shiogama'	Shiogama-zakura (塩釜桜)	16	1	9521		
'Shizuka'	Shizuka (静香)	16	1	9536	16	Iwatsubo et al. 2002
'Sirayuki'	Shirayuki (白雪)	24	3	664, 655, 794	16 24	Okabe 1927 (as <i>P. serrulata</i> 'Shirayuki') Iwatsubo et al. 2002
'Sirotae'	Shirotae (白妙)	24	1	699	24	Okabe 1927 (as <i>P. serrulata</i> 'Shirotae'); Oginuma 1928 (as <i>P. serrulata</i> f. <i>albida</i>); Oginuma 1987; Iwatsubo et al. 2002

'Spiralis'	Uzu-zakura (渦桜)	16	1	9519	16	1	9519	Iwatsubo et al. 2002
'Taihaku'	Tai-haku (太白)	24	2	708, 1537	24	2	708, 1537	Okabe 1927 (as <i>P. serrulata</i> 'Washi-no-o'), 1928 (as <i>P. serrulata</i> f. <i>arguta</i>); Iwatsubo et al. 2002
'Wasinowo'	Washi-no-o (鶯の尾)	24	1	618	24	1	618	Okabe 1927 (as <i>P. serrulata</i> 'Washi-no-o'), 1928 (as <i>P. serrulata</i> f. <i>arguta</i>); Iwatsubo et al. 2002
cv	Tokyo-zakura (東京桜)	16	1	9707	16	1	9707	Oginuma and Tanaka 1976
cv	Sumaura-fugenzo (須磨裏普賢象)	16	2	877, 9526	16	2	877, 9526	Iwatsubo et al. 2002
	Akami-ōshima (赤実大島)	16	1	1652	16	1	1652	Oginuma and Tanaka 1976; Iwatsubo et al. 2002
var. <i>speciosa</i> (Koidz.) Makino 'Akami-ohshima'	Miyama-zakura (深山桜)	16	1	1618	16	1	1618	Oginuma and Tanaka 1976; Iwatsubo et al. 2002
<i>P. × media</i> Miyoshi 'Media'	Kaba-zakura (蒲桜)	16	1	1700	16	1	1700	Oginuma and Tanaka 1976; Iwatsubo et al. 2002
<i>P. × miyoshii</i> Ohwi 'Ambigua'	Taizan-fukun (泰山府君)	16	1	211	16	1	211	Oginuma and Tanaka 1976; Iwatsubo et al. 2002
<i>P. × parvifolia</i> (Matsum.) Koehne 'Parvifolia'	Fuyu-zakura (冬桜)	24	1	92	24	1	92	Oginuma and Tanaka 1976; Iwatsubo et al. 2002
<i>P. sargentii</i> Rehder	Ōyama-zakura (大山桜)	16	1	978	16	1	978	Okabe 1927, 1928 (as <i>P. sachalinensis</i> Miyoshi); Oginuma and Tanaka 1976; Oginuma 1987
<i>P. × sasago-oshidori</i> H. Kubota 'Sasago-oshidori'	Sasago-oshidori (笹賀鶯鶯)	16	1	9533	16	1	9533	Okabe 1928 (as <i>P. serrulata</i> f. <i>caespitosa</i>); Iwatsubo et al. 2002
<i>P. × sieboldii</i> (Carrière) Wittm. 'Caespitosa'	Takasago (高砂)	24	1	76	24	1	76	Iwatsubo et al. 2002
<i>P. × subhirtella</i> Miq. 'Autumnalis'	Jūgatsuzakura (十月桜)	16	2	47, 64	16	2	47, 64	Oginuma and Tanaka 1976; Oginuma 1987
'Subhirtella'	Ko-higan (小彼岸)	16	2	110 (Kawasaki 7273), 116 (Kawasaki 3856)	16	2	110 (Kawasaki 7273), 116 (Kawasaki 3856)	Okabe 1928 (as <i>P. subhirtella</i>); Sax 1931 (8 II, as <i>P. subhirtella</i>); Iwatsubo et al. 2002
<i>P. verecunda</i> (Koidz.) Koehne 'Antiqua'	Nara-no-yaе-zakura (奈良の八重桜)	16	1	970	16	1	970	Oginuma and Tanaka 1976; Oginuma 1987
<i>Prunus</i> sp.	Sakunami-kiku-zakura (作並菊桜)	16	1	9523	16	1	9523	Iwatsubo et al. 2002
<i>Prunus</i> sp.	Aizu-usuzumi (会津薄墨)	24	1	9633	24	1	9633	Oginuma and Tanaka 1976; Oginuma 1987
<i>Prunus</i> sp.	Kurama-uzu (鞍馬雲珠)	16	1	9522	16	1	9522	Oginuma and Tanaka 1976; Oginuma 1987
<i>Prunus</i> sp.	Itō-zakura (伊東桜)	24	1	638	24	1	638	Iwatsubo et al. 2002

*YES: Yuki Experimental Station of the Flower Association of Japan (Nihon Hana no Kai), Ibaraki Prefecture.

**Voucher specimens kept in TNS.

Acknowledgements

The authors are grateful to Mr. Seiji Saito (Yuki Experimental Station of the Flower Association of Japan) and Mr. Hideaki Tanaka (Flower and Green Institute of the Flower Association of Japan), who had provided help and encouragement during this work. We should like to thank the authority of the Yuki Experimental Station of the Flower Association of Japan for permission to collect plant materials from the reserves.

References

- Ishikawa, M. 1916. A list of the number of chromosomes. *Bot. Mag. Tokyo* **30**: 404-448.
- Iwatsubo, Y., Kawasaki, T. and Naruhashi, N. 2002. Chromosome numbers of 193 cultivated taxa of *Prunus* subg. *Cerasus* in Japan. *J. Phytogeogr. Taxon.* **50**: 21-34.
- Kawasaki, T. 1994. *Nihon no Sakura* (Flowering cherries of Japan). 383 pp. Yama-kei Publishers, Tokyo. (in Japanese)
- Nihon Hana no Kai. 1982. *Sakura no hinshu ni kansuru chosakenkyu hokoku*. 448 pp. Nihon Hana no Kai, Tokyo. (in Japanese)
- Nishikawa, T. 1985. Chromosome counts of flowering plants of Hokkaido (8). *Journ. Hokkaido Univ. Educ., Sect. 2 B*, **35**: 31-42. (in Japanese)
- Oginuma, K. 1987 a. Karyomorphological studies on *Prunus* in Japan. *J. Sci. Hiroshima Univ., Ser. B, Div. 2, Bot.* **21**: 1-66.
- Oginuma, K. 1987 b. Karyomorphological studies on some species of Japanese *Prunus*. *Plant Chromosome Research* 1987: 131-134.
- Oginuma, K. 1988. A cytological study of the tetraploid *Prunus pseudo-cerasus* (2n=32). *La Kromosomo II* -**51-52**: 1710-1714.
- Oginuma, K. and Tanaka, R. 1976. Karyomorphological studies on some cherry trees in Japan. *J. Jpn. Bot.* **51**: 104-109.
- Okabe, S. 1927. Cytological studies on *Prunus*. *Bot. Mag. Tokyo* **41**: 398-404. (in Japanese with English summary)
- Okabe, S. 1928. *Zür Cytologie der Gattung Prunus*. *Sci. Repts. Tohoku Univ., Ser. IV, Biol.* **3**: 733-743.
- Sax, K. 1931. The origin and relationships of the Pomoideae. *J. Arn. Arb.* **12**: 3-22.
- Somego, M. 2000. Cytogenetic studies of the *Prunus yedoensis* Matsum. (Somei-yoshino). *Sakura Science* **7**: 14-22. (in Japanese with English summary)
- Tanaka, R. and Oginuma, K. 1975. Karyological study in *Prunus* × *yedoensis*. *Chromosome Information Service* **19**: 13-15.
- (Received November 7, 2003; accepted December 15, 2003)
- 岩坪美兼¹・川崎哲也²・鳴橋直弘¹: サクラ属 *Cerasus* 亜属 41 分類群の染色体数
- サクラ属 *Cerasus* 亜属 41 分類群 (野生種を含む) について、染色体数の観察を行った。観察の結果は以下のとおりである。これらのうち 19 分類群の染色体数は初めての報告である。
- 二倍体 (2n=16) のサクラ:
- アカミオオシマ, イヨクマガイ, ウズザクラ, ウミネコ, オオサワザクラ, オオヤマザクラ, カバザクラ, カマタリザクラ, クラマウズ, ゴショザクラ, コヒガン, コブクザクラ, サクナミキクザクラ, ササガオシドリ, シオガマザクラ, シズカ, シズカニオイ, ジュウガツザクラ, スマウラフゲンゾウ, セイガンザクラ, センダイヤ, タイザンフクン, チョウジザクラ, トウキョウザクラ, ナラノヤエザクラ, ベニタマニシキ, マツマエオオシオ, マメザクラ, ミッカビザクラ, ミヤマザクラ。
- 三倍体 (2n=24) のサクラ:
- アイヅウスズミ, イトウザクラ, シラユキ, シロタエ, センリコウ, タイハク, タカサゴ, ツバキカンザクラ, フユザクラ, マツマエハヤザキ, ワシノオ。
- 以上の 41 分類群のなかで、シラユキとツバキカンザクラには二倍体が報告されており、コヒガンとジュウガツザクラには三倍体の報告がある。これらについては今回も調査を行ったが、前回 (Iwatsubo et al. 2002) と同様、シラユキとツバキカンザクラは三倍体、コヒガンとジュウガツザクラは二倍体であった。
- (¹〒930-8555 富山市五福 3190 富山大学理学部生物学科; ²〒336-0011 さいたま市高砂 4-16-5)