IOPB COLUMN

Edited by Karol Marhold & Gonzalo Nieto Feliner

IAPT/IOPB chromosome data 4

edited by Karol Marhold

Robert K. Vickery, Jr. & Mathew Miller

University of Utah, Department of Biology, 257 South 1400 East, Room 201 SB, Salt Lake City, Utah 84112-0840, U.S.A.

All materials CHN.

PLANTAGINACEAE

Mimulus eastwoodiae Rydberg, *n* = 8; U.S.A., *J. Ramsay s.n.* (UT 120216)
Mimulus lewisii Pursh, *n* = 8; U.S.A., *Vickery s.n.* (UT 120147)
Mimulus rupestris Greene, *n* = 8; Mexico, *S. Sutherland s.n.* (UT 120142); Mexico, *S. Sutherland s.n.* (UT 120151)
Mimulus verbenaceus Greene, *n* = 8; U.S.A., *M.A. Keebler s.n.* (UT 120141) (yellow flower morph), *M.A. Keebler s.n.* (UT 120140) (red flower morph)
Mimulus cardinalis Douglas, *n* = 16; U.S.A., *Siskiyou Rare Plants Nursery s.n.* (UT 120155) (yellow morph), (UT 120155) (red flower morph)

Judita Lihová & Jaromír Kučera

Institute of Botany, Slovak Academy of Sciences, Dúbravská cesta 14, 845 23 Bratislava, Slovak Republic. judita.lihova@savba.sk

All materials CHN; collectors *JL = J. Lihová*, *KM = K. Marhold*, *HKu = H. Kudoh*, *HKa = H. Kato*, *PZ = P. Zika*, vouchers in SAV.

BRASSICACEAE

Cardamine hirsuta L., 2*n* = 16; Japan, 19 Apr 2002, *JL, KM & HKa s.n.*; Japan, 18 Apr 2002, *JL, KM & HKa s.n.*; Japan, 17 Apr 2002, *JL, KM & HKa s.n.*; Japan, 29 Apr 2002, *JL, KM & HKu s.n.*; Japan, 20 Apr 2002, *JL, KM & S. Kato, s.n.*; Japan, 24 Apr 2002, *JL, KM, HKu & S. Fujii s.n.*; Japan, 27 Apr 2002, *JL, KM, HKu & N. Kurosaki s.n.*; Spain, 23 May 2003, *JL & M. Perný s.n.*; U.S.A., *PZ 16765*
Cardamine scutata Thunb., 2*n* = 32; Japan, 29 Apr 2002, *JL, KM & HKu s.n.*; Japan, 24 Apr 2002, *JL, KM & HKu s.n.*
Cardamine niigatensis H. Hara, 2*n* = 32; Japan, 1 Oct 2003, *KM & HKu s.n.*
Cardamine flexuosa With., 2*n* = 32; Norway, 24 July 2003, *K. Hansen s.n.*
Cardamine oligosperma Nutt., 2*n* = 16; U.S.A., *PZ 18241*
Cardamine pensylvanica Willd., 2*n* = 32; U.S.A., *PZ 18321*

Iva Hodálová[1], Alexandra Vinikarová[2], Vít Grulich[2], Pavol Mereďa, Jr.[1] & Lucie Horová[2]

[1] *Institute of Botany, Slovak Academy of Sciences, Dúbravská cesta 14, 845 23 Bratislava, Slovak Republic. iva.hodalova@savba.sk*
[2] *Institute of Botany and Zoology, Masaryk University, Kotlářská 2, 611 37 Brno, Czech Republic*

All materials collected in Ukraine; chromosome number counted by I. Hodálová; ploidy levels estimated in 2005 by L. Horová and V. Grulich and in 2007 by A. Vinikarová; vouchers in SAV.

ASTERACEAE

Senecio jacobaea L.
2*n* = 80, CHN. *Hodálová & Mereďa, Jr. 71-07*
2*n* ~ 4*x* ~ 40, FCM. *Hodálová & Mereďa, Jr. 97-07, 24-07, 25-07, 26-07, 27-07, 29-07, 30-07, 31-07, 32-07, 33-07, 34-07, 12-05, 13-05, 1-07, 2-07, 4-07, 5-07, 6-07, 7-07, 9-07, 10-07, 12-07, 14-07, 35-07, 36-07, 37-07, 38-07, 39-07, 40-07, 41-07, 42-07, 43-07, 54-07, 55-07, 56-07, 57-07, 5-05, 91-07, 93-07, 94-07, 95-07, 96-07*
2*n* ~ 8*x* ~ 80, FCM. *Hodálová & Mereďa, Jr. 109-07, 111-07, 98-07, 100-07, 101-07, 102-07, 104-07, 105-07, 106-07, 107-07, 108-07, 1-05, 3-05, 7-05, 8-05, 9-05, 8-07, 13-07, 15-07, 16-07, 17-07, 19-07, 20-07, 21-07, 22-07, 23-07, 44-07, 45-07, 46-07, 47-07, 48-07, 49-07, 50-07, 51-07, 52-07, 53-07, 58-07, 59-07, 61-07, 62-07, 63-07, 14-05, 64-07, 65-07, 66-07, 68-07, 69-07, 70-07, 71-07, 72-07, 73-07, 74-07, 75-07, 76-07, 77-07, 78-07, 79-07, 80-07, 81-07, 82-07, 83-07, 84-07, 85-07, 86-07, 87-07, 88-07, 89-07, 90-07, 10-05*

All materials for the chromosome column should be submitted electronically to: Karol Marhold, karol.marhold@savba.sk (Institute of Botany, Slovak Academy of Sciences, SK-845 23 Bratislava, Slovakia, and Department of Botany, Charles University, CZ 128-01 Prague, Czech Republic). The full version of this contribution is available in the online edition of TAXON. The following citation format is recommended: Baltisberger, M. & Voelger, M. 2006. *Sternbergia sicula*. In: Marhold, K. (ed.), IAPT/IOPB chromosome data 1. *Taxon* 55: 444, E2.

IOPB COLUMN

Edited by Karol Marhold & Gonzalo Nieto Feliner

IAPT/IOPB chromosome data 4

edited by Karol Marhold

Robert K. Vickery, Jr. & Mathew Miller

University of Utah, Department of Biology, 257 South 1400 East, Room 201 SB, Salt Lake City, Utah 84112-0840, U.S.A.

PLANTAGINACEAE

Mimulus eastwoodiae Rydberg

n = 8, CHN. U.S.A., Utah, Grand County, Arches National Park, Willow Spring, south of the old Park entrance road, ca. 38°37′ N, 109°37′ W, ca. 1,540 m, 1991, *J. Ramsay s.n.*, R.K. Vickery, Jr. culture number 14190 (UT 120216).

Note: Uncommon species of desert seeps.

Mimulus lewisii Pursh

n = 8, CHN. U.S.A., California, Tuolumne County, Yosemite National Park, Smokey Jack Campground, ca. 37°48′24″ N, 119°29′ W, ca. 2,582 m, Oct 1994, *R.K. Vickery, Jr. s.n.*, R.K. Vickery, Jr. culture number 13515 (UT 120147).

Note: Rare white flower color morph.

Mimulus rupestris Greene

n = 8, CHN. Mexico, State of Morelos, hanging garden along Tepozteco-El Parque trail, ca. 2,400 m, Apr 1985, *S. Sutherland s.n.*, R.K. Vickery, Jr. culture number 13516 (UT 120142); Mexico, State of Morelos, crest of hill along Tepozteco-El Parque trail, ca. 2,450 m, Apr 1985, *S. Sutherland s.n.*, R.K. Vickery, Jr. culture number 13517 (UT 120151).

Note: Very rare endemic species.

Mimulus verbenaceus Greene

n = 8, CHN. U.S.A., Arizona, Coconino County, Grand Canyon National Park, Vassey's Paradise, ca. 36°39′ N, 111°51′30″ W, ca. 985 m, Hanging Garden, 5 Sep 1989, *M.A. Keebler s.n.*, R.K. Vickery, Jr. culture number 14088 (UT 120141) yellow flower color morph; 5 Sep 1989, *M.A. Keebler s.n.*, R.K. Vickery, Jr. culture number 14089 (UT 120140), red flower color morph.

Mimulus cardinalis Douglas

n = 16, CHN. U.S.A., Oregon, Jackson County, Siskiyou Mountains, *Siskiyou Rare Plants Nursery s.n.*, R.K. Vickery, Jr. culture number 13770 (UT 120155), yellow flower color morph; R.K. Vickery, Jr. culture number 13770 (UT 120156), red flower morph.

Note: These are the only known polyploids in *Mimulus cardinalis*. They come from the northern periphery of the species range.

Judita Lihová & Jaromír Kučera

Institute of Botany, Slovak Academy of Sciences, Dúbravská cesta 14, 845 23 Bratislava, Slovak Republic. judita.lihova@savba.sk

The authors thank collectors and collaborators in the field sampling.

Cardamine hirsuta is a species native to Europe and probably also W Asia. Its occurrence in North America as an introduced weed has been known for a long time; however, its introduction to Japan dates back to the middle of the 20th century. These are the first chromosome number records of this species from Japan.

The chromosome number of *Cardamine niigatensis* has been counted for the first time.

The study was supported by the exchange programme of the Japan Society for the Promotion of Science and Slovak Academy of Sciences and by the grant RPEU-0003-06 by the Slovak Research and Development Agency.

BRASSICACEAE

Cardamine hirsuta L.

2*n* = 16, CHN. Japan, Niigata pref., Nishikubiki-gun, Omi-machi, Hashidate, 36°59.25′ N, 137°45.98′ E, 140 m, 19 Apr 2002, *J. Lihová, K. Marhold & H. Kato s.n.* (SAV).

2*n* = 16, CHN. Japan, Nagano pref., Minamiazumi-gun, Azumi-mura, Shimashima-dani, 36°11.80′ N, 137°46.15′ E, 740–820 m, 18 Apr 2002, *J. Lihová, K. Marhold & H. Kato s.n.* (SAV).

2*n* = 16, CHN. Japan, Nagano pref., Suwa-gun, Fujimi-machi, Tatsuzawa, 35°57.31′ N, 138°16.64′ E, 980–1,000 m, 17 Apr 2002, *J. Lihová, K. Marhold & H. Kato s.n.* (SAV).

2*n* = 16, CHN. Japan, Gumma pref., Tone-gun, Katashina-mura, Higashiogawa, 29 Apr 2002, *J. Lihová, K. Marhold & H. Kudoh s.n.* (SAV).

All materials for the chromosome column should be submitted electronically to: Karol Marhold, karol.marhold@savba.sk (Institute of Botany, Slovak Academy of Sciences, SK-845 23 Bratislava, Slovakia, and Department of Botany, Charles University, CZ 128-01 Prague, Czech Republic). The full version of this contribution is available in the online edition of TAXON. The following citation format is recommended: Baltisberger, M. & Voelger, M. 2006. *Sternbergia sicula*. In: Marhold, K. (ed.), IAPT/IOPB chromosome data 1. *Taxon* 55: 444, E2.

2*n* = 16, CHN. Japan, Toyama pref., Higashitonami-gun, Taira-mura, Kaminashi, 36°24.01′ N, 136°55.17′ E, 300 m, 20 Apr 2002, *J. Lihová, K. Marhold, H. & S. Kato s.n.* (SAV)

2*n* = 16, CHN. Japan, Shiga pref., Takashima-gun, Shinashahi-cho, east of Harie, 35°21.5′ N, 136°03.5′ E, 85 m, 24 Apr 2002, *J. Lihová, K. Marhold, H. Kudoh & S. Fujii s.n.* (SAV).

2*n* = 16, CHN. Japan, Hyogo pref., Sayo-gun, Kouzuki-cho Kushida, Aza-Takitani, 34°57′ N, 134°21′ E, 100 m, 27 Apr 2002, *J. Lihová, K. Marhold, H. Kudoh & N. Kurosaki s.n.* (SAV).

2*n* = 16, CHN. Spain, prov. Zamora, Vigo de Sanabria, 42°08.14′ N, 6°41.40′ W, 1,070 m, 23 May 2003, *J. Lihová & M. Perný s.n.* (SAV).

2*n* = 16, CHN. U.S.A., California, Alameda county, Berkeley, Catalina Avenue, 37°52.3′ N, 122°16.3′ W, 150 m, 28 Mar 2002, *P. Zika 16765* (SAV).

Cardamine scutata Thunb.

2*n* = 32, CHN. Japan, Gumma pref., Tone-gun, Katashina-mura, Higashiogawa, 29 Apr 2002, *J. Lihová, K. Marhold & H. Kudoh s.n.* (SAV).

2*n* = 32, CHN. Japan, Shiga pref., Otsu-shi, Katsuragawa, Taira, SE foot of Mt. Minako, Ado river, 135°51-52′ E, 35°11.5′ N, 450–500 m, 24 Apr 2002, *J. Lihová, K. Marhold, H. Kudoh & S. Fujii s.n.* (SAV).

Cardamine niigatensis H. Hara

2*n* = 32, CHN. Japan, Niigata pref., Kitauonuma-gun, Yunotani-mura, Tochiomata-onsen, Yunosawagawa River, 37°10′ N, 139°05′ E, 360 m, 1 Oct 2003, *K. Marhold & H. Kudoh s.n.* (SAV).

Cardamine flexuosa With.

2*n* = 32, CHN. Norway, Fjaler, Sogn og Fjordane, 24 Jul 2003, *K. Hansen s.n.* (SAV).

Cardamine oligosperma Nutt.

2*n* = 16, U.S.A., Washington, Grays Harbor co., Highland Golf Course, 46°57′ N, 123°45.7′ W, T17N R9W S23, 25 m, 23 Apr 2003, *P. Zika 18241* (SAV).

Cardamine pensylvanica Willd.

2*n* = 32, U.S.A., Washington, Clark county, Vancouver, Marine Park, shaded floodplain of Columbia river, 45°36.9′ N, 122°37.3′ W, 5 m, 5 May 2003, *P. Zika 18321* (SAV).

Iva Hodálová[1], Alexandra Vinikarová[2], Vít Grulich[2], Pavol Mereďa, Jr.[1] & Lucie Horová[2]

[1] *Institute of Botany, Slovak Academy of Sciences, Dúbravská cesta 14, 845 23 Bratislava, Slovak Republic. iva.hodalova@savba.sk*

[2] *Institute of Botany and Zoology, Masaryk University, Kotlářská 2, 611 37 Brno, Czech Republic*

Chromosome number counted by I. Hodálová, ploidy levels estimated in 2005 by L. Horová and V. Grulich and in 2007 by A. Vinikarová. Authors thank to P. Šmarda and P. Bureš for help with flow-cytometric analyses and to D.R. Letz for assistance in the field. This study was supported by the Grant Agency of Ministry of Education of the Slovak Republic and Slovak Academy of Sciences VEGA (grant no. 6054) and by Ministry of Education, Youth and Sports of the Czech Republic (grant no. 0021622416).

ASTERACEAE

Senecio jacobaea L.

2*n* = 80, CHN. Ukraine, Khmel'nyts'ka oblast', Kam"yanets'-Podil's'kyi raion, Demshyn, E of the village, 48°36′52″ N, 26°46′52″ E, 270 m, 26 Jul 2007, *Hodálová & Mereďa, Jr. 71-07* (SAV).

Senecio jacobaea L.

FCM: DAPI. For *S. jacobaea* silica gel-dried material was used. Internal reference: *Glycine max* 'Polanka', 2C DNA = 2.50 pg (Doležel & al., 1994). Fluorescence intensity (against *Glycine max* 'Polanka' with unit value) for 4*x* cytotypes varied between 1.55–1.87 (mean 1.74) and for 8*x* cytotypes between 3.20–3.48 (mean 3.32). CVs of samples and internal standard were 1.29%–9.91% (mean 3.59%) and 1.83%–5.08% (mean 3.11%), respectively. Variation in the fluorescence intensity of samples within cytotypes is not interpreted here as infraspecific variation, most likely it is caused by the use of the silica gel-dried material.

2*n* ~ 4*x* ~ 40, FCM. Ukraine, Ternopil's'ka oblast', Borshchivs'kyi raion, Kryvche, NW of the village, 48°42′45″ N, 26°04′48″ E, 260 m, 27 Jul 2007, *Hodálová & Mereďa, Jr. 97-07* (SAV).

2*n* ~ 4*x* ~ 40, FCM. Ukraine, Ternopil's'ka oblast', Pidvolochys'kyi raion, Ostap"e, NE of the village, 49°23′51″ N, 26°05′00″ E, 390 m, 25 Jul 2007, *Hodálová & Mereďa, Jr. 24-07*, *25-07*, *26-07*, *27-07*, *29-07*, *30-07*, *31-07*, *32-07*, *33-07*, *34-07* (SAV).

2*n* ~ 4*x* ~ 40, FCM. Ukraine, Ternopil's'ka oblast', Husiatyns'kyi raion, Vikno, N of the village, Hostra hill, 49°21′24″ N, 26°04′25″ E, 320 m, 13 Aug 2005, *Hodálová & Mereďa, Jr. 12-05*, *13-05*, 24 Jul 2007, *Hodálová & Mereďa, Jr. 1-07*, *2-07*, *4-07*, *5-07*, *6-07*, *7-07*, *9-07*, *10-07*, *12-07*, *14-07* (SAV).

2*n* ~ 4*x* ~ 40, FCM. Ukraine, Khmel'nyts'ka oblast', Chemerovts'kyi raion, Vil'khivtsi, E of the village, 49°05′26″ N, 26°18′20″ E, 325 m, 25 Jul 2007, *Hodálová & Mereďa, Jr. 35-07*, *36-07*, *37-07*, *38-07*, *39-07*, *40-07*, *41-07*, *42-07*, *43-07* (SAV).

2*n* ~ 4*x* ~ 40, FCM. Ukraine, Khmel'nyts'ka oblast', Chemerovts'kyi raion, Ivakhnivtsi, NE edge of the village, 49°06′03″ N, 26°22′20″ E, 280 m, 25 Jul 2007, *Hodálová & Mereďa, Jr. 54-07*, *55-07*, *56-07*, *57-07* (SAV).

2*n* ~ 4*x* ~ 40, FCM. Ukraine, Khmel'nyts'ka oblast', Kam"yanets'-Podil's'kyi raion, Demshyn, E of the village, 48°36′52″ N, 26°46′52″ E, 270 m, 14 Aug 2005, *Hodálová & Mereďa, Jr. 5-05* (SAV).

2*n* ~ 4*x* ~ 40, FCM. Ukraine, Khmel'nyts'ka oblast', Vin'kovets'kyi raion, Adamovka, W of the village, 49°06′11″ N, 27°03′04″ E, 270 m, 27 Jul 2007, *Hodálová & Mereďa, Jr. 91-07*, *93-07*, *94-07*, *95-07*, *96-07* (SAV).

2*n* ~ 8*x* ~ 80, FCM. Ukraine, Ternopil's'ka oblast', Borshchivs'kyi raion, Ustya, NW of the village, 48°36′10″ N, 26°03′53″ E, 125 m, 27 Jul 2007, *Hodálová & Mereďa, Jr. 109-07*, *111-07* (SAV).

2*n* ~ 8*x* ~ 80, FCM. Ukraine, Ternopil's'ka oblast', Borshchivs'kyi raion, Babyntsi, NE of the village, 48°41′21″ N, 26°04′06″ E, 240 m, 27 Jul 2007, *Hodálová & Mereďa, Jr. 98-07*, *100-07*, *101-07*, *102-07*, *104-07*, *105-07*, *106-07*, *107-07*, *108-07* (SAV).

2*n* ~ 8*x* ~ 80, FCM. Ukraine, Ternopil's'ka oblast', Husiatyns'kyi raion, Vikno, N of the village, Hostra hill, 49°21′24″ N, 26°04′25″ E, 320 m, 13 Aug 2005, *Hodálová & Mereďa, Jr. 1-05*, *3-05*, *7-05*, *8-05*, *9-05*, 24 Jul 2007, *Hodálová & Mereďa, Jr. 8-07*, *13-07*, *15-07*, *16-07*, *17-07*, *19-07*, *20-07*, *21-07*, *22-07*, *23-07* (SAV).

2*n* ~ 8*x* ~ 80, FCM. Ukraine, Khmel'nyts'ka oblast', Chemerovts'kyi raion, Ivakhnivtsi, NW of the village, 49°06′02″ N, 26°20′58″ E, 320 m, 25 Jul 2007, *Hodálová & Mereďa, Jr. 44-07*, *45-07*, *46-07*, *47-07*, *48-07*, *49-07*, *50-07*, *51-07*, *52-07*, *53-07* (SAV).

2*n* ~ 8*x* ~ 80, FCM. Ukraine, Khmel'nyts'ka oblast', Kam"yanets'-Podil's'kyi raion, Smotrych, SE of the village, 48°39′03″ N, 26°35′05″ E, 180 m, 14 Aug 2005, *Hodálová & Mereďa, Jr. 6-05*, 25 Jul 2007, *Hodálová & Mereďa, Jr. 58-07*, *59-07*, *61-07*, *62-07*, *63-07* (SAV).

2*n* ~ 8*x* ~ 80, FCM. Ukraine, Khmel'nyts'ka oblast', Kam"yanets'-Podil's'kyi raion, Demshyn, E of the village, 48°36′52″ N, 26°46′52″ E, 270 m, 14 Aug 2005, *Hodálová & Mereďa, Jr. 14-05*, 26 Jul 2007, *Hodálová & Mereďa, Jr. 64-07*, *65-07*, *66-07*, *68-07*, *69-07*, *70-07*, *71-07*, *72-07*, *73-07*, *74-07*, *75-07*, *76-07*, *77-07*, *78-07*, *79-07*, *80-07*, *81-07*, *82-07*, *83-07*, *84-07*, *85-07*, *86-07*, *87-07*, *88-07*, *89-07*, *90-07* (SAV).

2*n* ~ 8*x* ~ 80, FCM. Ukraine, Khmel'nyts'ka oblast', Kam"yanets'-Podil's'kyi raion, Subych, NW of the village, 48°35′45″ N, 26°49′45″ E, 280 m, 14 Aug 2005, *Hodálová & Mereďa, Jr. 10-05* (SAV).

Note: Estimation of the tetraploid level (2*n* = 40) is based on the material from the following chromosome number count:

2*n* = 40, CHN. Slovakia, Devínska Kobyla Hills, Bratislava-Devínska Nová Ves, between the road and railway line Bratislava-Devínska Nová Ves, 48°12′14″ N, 17°00′44″ E, 160 m (Hodálová & al., 2007: 240).

Literature cited

Doležel, J., Doleželová, M. & Novák, F. J. 1994. Flow cytometric estimation of nuclear DNA amount in diploid bananas (*Musa acuminata* and *M. balbisiana*). *Biol. Pl.* 36: 351–357.

Hodálová, I., Grulich, V., Horová, L., Valachovič, M. & Marhold, K. 2007. Occurrence of tetraploid and octoploid cytotypes in *Senecio jacobaea* subsp. *jacobaea* (Asteraceae) in Pannonia and the Carpathians. *Bot. J. Linn. Soc.* 153: 231–242.