

IOPB COLUMN

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All materials CHN; collector: Ag = P.M. Aguilera.

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ASTERACEAE

Viguiera anchusaefolia var. *immarginata* (DC.) Blake, $n = 11$, $2n = 22$, 22+1B, 22+2B. Argentina, Misiones, Ag 18 (MNES).

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ACANTHACEAE

- Achatoda vasica* Nees, $n = 17$; SB 21977, SB 21978, SB 21979.
Asteracantha longifolia (L.) Nees, $n = 16$; SB 21960.
Dicliptera bupleroides Nees, $n = 13$; SB 21959.
Eranthemum nervosum (Vahl) R. Br. ex Roem. & Schult., $n = 11$; SB 21968.
Hemigraphis latebrosa (Roth) Nees, $n = 12$; SB 21975; $n = 12+0-2B$; SB 21976.
Justicia diffusa Willd., $n = 16$; SB 21972, SB 21973.
Lepidagathis cuspidata Nees, $n = 11$; SB 21967.
Lepidagathis hyalina Nees, $n = 30$; SB 21969.
Peristrophe bicalyculata (Retz.) Nees, $n = 15$; SB 21974.
Strobilanthes alatus Nees, $n = 16$; SB 21963, SB 21964.

APOCYNACEAE

Catharanthus roseus (L.) G. Don, $n = 8$; SB 26124.

ASTERACEAE

Tribe Anthemideae

- Achillea millefolium* L., $n = 9$; SB 24999.
Artemisia roxburghiana Wall., $n = 9$; SB 24904.
Artemisia vestita Wall. ex Besser, $n = 27$; SB 20864.
Chrysanthemum leucanthemum L., $n = 18$; SB 26145.

Tribe Astereae

- Aster peduncularis* Wall. ex Nees, $n = 27$; SB 25000.
Conyza canadensis (L.) Cronq., $n = 9$; SB 24924.
Conyza japonica Less., $n = 9$; SB 24957, SB 24958.
Conyza stricta var. *pinnatifida* Kitam., $n = 9$; SB 24959, SB 24960.
Conyza stricta Willd. var. *stricta*, $n = 9$; SB 24961.
Cyathocline lyrata Cass., $n = 9$; SB 26151.
Dicrocephala chrysanthemifolia (Blume) DC., $n = 9$; SB 24915, SB 24916.
Dicrocephala integrifolia (L. f.) Kuntze, $n = 9$; SB 24911, SB 24912, SB 24913.
Erigeron annuus (L.) Pers., $2n = 27$; SB 24920, SB 24921, SB 24922, SB 24925.
Erigeron bonariensis L., $n = 27$; SB 24923, SB 24949, SB 24951, SB 24952.
Myriactis nepalensis Less., $n = 18$; SB 24901, SB 24902.
Solidago canadensis L., $n = 27$; SB 24986.
Solidago virgaurea L., $n = 9$; SB 24989, SB 24990.

Tribe Cardueae

- Arctium lappa* L., $n = 16$; SB 26146.
Cirsium wallichii DC., $n = 17$; SB 26148.
Saussurea candicans (DC.) Sch.-Bip., $n = 16$; SB 24953, SB 24954.
Tricholepis elongata DC., $n = 16$; SB 24972.

Tribe Cichorieae

- Crepis japonica* (L.) Benth., $n = 8$; SB 24962, SB 24963, SB 24964, SB 24965.
Lactuca dissecta D. Don, $n = 8$; SB 26143, SB 26144.
Lactuca dolichophylla Kitam., $n = 8$; SB 26155.
Launaea procumbens (Roxb.) Ramayya & Rajagopal, $n = 9$; SB 26142.
Sonchus asper (L.) Hill, $n = 9$; SB 24939, SB 24940, SB 24941.
Sonchus brachyotus DC., $n = 9$; SB 24931, SB 24933, SB 24934.
Sonchus oleraceus L., $n = 16$; SB 24932, SB 24935, SB 24937, SB 24938, SB 24942, SB 24944, SB 24945.
Taraxacum officinale Wigg., $n = 8$; SB 24982, SB 24983, SB 24984, SB 24985.

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 appended to this article. 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.

Tribe Eupatorieae

- Ageratum conyzoides* L., *n* = 10; SB 20878, SB 24948; *n* = 20; SB 24946, SB 24947.
Eupatorium adenophorum Spreng., *n* = 51; SB 24966, SB 24967, SB 24968, SB 24969.

Tribe Heliantheae

- Bidens biternata* (Lour.) Merr. & Sherff, *n* = 36; SB 24917, SB 24918, SB 24919.
Bidens pilosa L., *n* = 36; SB 26150.
Bidens tripartita L., *n* = 36; SB 26149.
Cosmos bipinnatus Cav., *n* = 12; SB 26139, SB 26140.
Cosmos sulphureus Cav., *n* = 12+0–1B; SB 26141.
Eclipta alba (L.) Hassk., *n* = 11; SB 24907, SB 24908, SB 24909, SB 24910.
Galinsoga parviflora Cav., *n* = 8; SB 21820, 21822; *n* = 16; SB 21819, SB 21821.
Parthenium hysterophorus L., *n* = 17; SB 24987.
Sigesbeckia orientalis L., *n* = 15; SB 24991, SB 24992, SB 24993, SB 24994.
Synedrella vialis A. Gray, *n* = 12; SB 24973.
Tridax procumbens L., *n* = 18; SB 24980, SB 24981.
Xanthium strumarium L., *n* = 18; SB 24978, SB 24979.

Tribe Inuleae

- Blumea laciniata* (Roxb.) DC., *n* = 9; SB 24956.
Blumea mollis (D. Don) Merr., *n* = 9; SB 24955.
Carpesium abrotanoides L., *n* = 18; SB 20888.
Gnaphalium coarctatum Wiild., *n* = 14; SB 24928, SB 24929, SB 24930.
Gnaphalium hypoleucum DC., *n* = 7; SB 20889.
Gnaphalium pensylvanicum Willd., *n* = 9; SB 20890.
Vicoa indica (L.) DC., *n* = 9; SB 24975, SB 24976, SB 24977.
Vicoa vestita (Wall. ex DC.) Benth., *n* = 9; SB 24974.

Tribe Mutiseae

- Gerbera gossypina* (Royle) Beauverd, *n* = 9; SB 26154.

Tribe Senecioneae

- Emilia sonchifolia* (L.) DC., *n* = 5; SB 21955.
Gynura nepalensis DC., *n* = 20; SB 21954.
Senecio graciliflorus (Wall.) DC., *n* = 20; SB 21816.
Senecio laetus Edgew., *n* = 20; SB 21814, SB 21815.
Senecio nudicaulis Buch.-Ham. ex D. Don, *n* = 5; SB 21951; *n* = 20; SB 21817.
Senecio rufinervis DC., *n* = 20; SB 21818.

Tribe Tageteae

- Tagetes minuta* L., *n* = 24; SB 24995, SB 24996, SB 24997, SB 24998.

Tribe Vernonieae

- Vernonia cinerea* (L.) Less., *n* = 9; SB 20895.

BORAGINACEAE

- Anchusa ovata* Lehm., *n* = 9; SB 26121.
Cynoglossum furcatum Wall., *n* = 12; SB 26113, SB 26114, SB 26115, SB 26116.
Myosotis sylvatica Ehrh. ex Hoffm., *n* = 18; SB 26120.
Trichodesma indicum (L.) Lehm., *n* = 22; SB 26118.

CAPRIFOLIACEAE

- Leycesteria farmosa* Wall., *n* = 9; SB 26123.

GENTIANACEAE

- Canscora diffusa* (Vahl) R. Br. ex Roem. & Schult., *n* = 30; SB 21896.

- Gentiana pedicellata* (Wall. ex D. Don) Griseb. var. *pedicellata*, *n* = 9; SB 21897.
Gentiana argentea var. *albescens* Franch., *n* = 10; SB 21898.
Gentiana aprica Decne., *n* = 10; SB 21899, SB 21900.

LAMIACEAE

- Ajuga bracteosa* Wall. ex Benth., *n* = 32+0–2B; SB 21853, SB 21854, SB 21855.
Ajuga macrosperma Wall. ex Benth., *n* = 16; SB 21850.
Ajuga parviflora Benth., *n* = 16; SB 21851, SB 21852.
Anisomeles indica (L.) Kuntze, *n* = 17; SB 21824, SB 21825, SB 21826.
Calamintha clinopodium Benth., *n* = 18+0–1B; SB 21856, SB 21857.
Lamium amplexicaule L., *n* = 9; SB 21839.
Leonurus cardiaca L., *n* = 9; SB 21864.
Leucas cephalotes (Roth) Spreng., *n* = 11; SB 21859.
Leucas lanata Benth., *n* = 14; SB 21837, SB 21838.
Micromeria biflora (Buch.-Ham. ex D. Don) Benth., *n* = 15; SB 21866, SB 21868.
Nepeta hindostana (Roth) Haines, *n* = 18; SB 21840, SB 21842, SB 21843.
Nepeta leucophylla Benth., *n* = 18; SB 21862.
Plectranthus rugosus Wall. ex Benth., *n* = 12; SB 21861.
Plectranthus striatus Benth., *n* = 12; SB 21860.
Pogostemon benghalensis (Burm. f.) Kuntze, *n* = 32; SB 21869.
Prunella vulgaris L., *n* = 14; SB 21863.
Salvia coccinea Juss. ex Murray., *n* = 11; SB 21827, SB 21828.
Salvia plebeia R. Br., *n* = 8; SB 21830, SB 21834.
Scutellaria repens Buch.-Ham. ex D. Don, *n* = 10; SB 21999.
Stachys sericea Wall. ex Benth., *n* = 15; SB 21846, SB 21848.

PHRYMATACEAE

- Phryma leptostachya* L., *n* = 14; SB 26112.

PLANTAGINACEAE

- Plantago depressa* Willd., *n* = 12; SB 21802; *n* = 12+0–1B; SB 21803; *n* = 18; SB 21801.
Plantago lanceolata L., *n* = 6; SB 21809, SB 21810, SB 21811, SB 21812.
Plantago major L., *n* = 6; SB 21804, SB 21805, SB 21806; *n* = 12; SB 21807.

PRIMULACEAE

- Anagallis arvensis* L., *n* = 20; SB 26122.

SCROPHULARIACEAE

- Lindenbergia indica* Vatke, *n* = 25; SB 21994, SB 21995, SB 21997, SB 21998.
Mazus japonicus (Thunb.) Kuntze, *n* = 20; SB 21983, SB 21984, SB 21985.
Scrophularia himalensis Royle, *n* = 24; SB 21987.
Verbascum thapsus L., *n* = 18; SB 21988, SB 21989, SB 21991, SB 21992, SB 21993.
Veronica anagallis-aquatica L., *n* = 18+2B; SB 21986.
Veronica persica Poir., *n* = 7; SB 21981; *n* = 14; SB 21982.

SOLANACEAE

- Nicotiana tabaccum* L., *n* = 24; SB 21890.
Physalis angulata L., *n* = 24; SB 21892, SB 21893.
Physalis peruviana L., *n* = 24; SB 21813.
Solanum indicum L., *n* = 12; SB 21881.
Solanum nigrum L., *n* = 12; SB 21877; *n* = 24; SB 21878.
Solanum surattense Burm. f., *n* = 12; SB 21882, SB 21883.
Solanum viarum Dunal, *n* = 12; SB 21884, SB 21885.

VERBENACEAE

- Lantana camara* L., *n* = 22; SB 26108, SB 26109.
Verbena bonariensis L., *n* = 21; SB 26103; *n* = 28; SB 26104.
Verbena officinalis L., *n* = 6; SB 26105; *n* = 7; SB 26106.
Vitex negundo L., *n* = 16+2B; SB 26111.

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RUBIACEAE

- Borreria multiflora* (DC.) Bacigalupo & E.L. Cabral, *2n* = *2x* = 28; Bolivia, Santa Cruz, JDS, RMS, DC & WM 1059 (CTES, LPB, USZ).
Diodia kuntzei K. Schum., *2n* = *2x* = 28; Argentina, Corrientes, RMS & ACF 322 (CTES).
Diodella radula (Willd. ex Roem. & Schult.) Delprete, *n* = *2x* = 14; Brazil, Rio Grande do Sul, PZ 638 (CTES).
Galianthe brasiliensis (Spreng.) E.L. Cabral & Bacigalupo, *2n* = *2x* = 24; Argentina, Misiones, EC, ACF, S & RMS 758 (CTES).
Richardia brasiliensis Gomes, *2n* = *2x* = 28; Argentina, Corrientes, ACF & RMS 10 (CTES).
Richardia grandiflora (Cham. & Schldt.) Steud., *n* = *2x* = 14; Argentina, Misiones, EC, ACF, S & RMS 753 (CTES).
Spermacoce glabra Michx., *n* = *2x* = 14; Argentina, Misiones, EC, ACF, S & RMS 757 (CTES); Argentina, Corrientes, RMS 173 (CTES).
Spermacoce paganuccii E.L. Cabral & Bacigalupo, *2n* = *2x* = 28; Brazil, Bahia, LPQ, H, ACF, RMS & DC 14609 (CTES, HUEFS, SI).

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POACEAE**Subfamily Panicoideae****Tribe Andropogoneae**

- Apluda mutica* L., *n* = 10; India, Maharashtra, K.V.C. Gosavi 2684.
Arthraxon hispidus (Thunb.) Makino var. *hispidus*, *n* = 9; India, Maharashtra, K.V.C. Gosavi 2747.
Arthraxon hispidus var. *santapau* (Bor) Welzen, *n* = 9; India, Maharashtra, K.V.C. Gosavi 2730.

- Arthraxon jubatus* Hack., *n* = 9; India, Maharashtra, K.V.C. Gosavi 2706.
Arthraxon lanceolatus (Roxb.) Hochst. var. *lanceolatus*, *n* = 9; India, Maharashtra, K.V.C. Gosavi 2682, K.V.C. Gosavi 2867; *n* = 13; India, Maharashtra K.V.C. Gosavi 2725.
Arthraxon lanceolatus var. *meeboldii* (Stapf) Welzen, *n* = 9; India, Maharashtra, K.V.C. Gosavi 2864.
Arthraxon lanceolatus var. *raizadae* (Jain, Hemadri & Deshpande) Welzen, *n* = 9; India, Maharashtra, K.V.C. Gosavi 2912.
Arthraxon lanceolatus var. *villosus* (C.E.C. Fisch.) Welzen, *n* = 9; India, Maharashtra, K.V.C. Gosavi 2865.
Arthraxon lancifolius Hochst., *n* = 9; India, Maharashtra, K.V.C. Gosavi 2716A.
Bhidea burnsiiana Bor, *n* = 10; India, Maharashtra, K.V.C. Gosavi 2969.
Chrysopogon aciculatus (Retz.) Trin., *n* = 8; India, Maharashtra, K.V.C. Gosavi 2872.
Chrysopogon castaneus Veldkamp & Salunkhe, *n* = 10; India, Maharashtra, K.V.C. Gosavi 2803.
Chrysopogon velutinus (Hook. f.) Bor, *n* = 9; India, Karnataka, K.V.C. Gosavi 3000.
Cymbopogon martini (Roxb.) Will. Watson, *n* = 20; India, Maharashtra, K.V.C. Gosavi 2683.
Dichanthium annulatum Stapf, *n* = 20; India, Maharashtra, K.V.C. Gosavi 3867.
Dichanthium armatum Blatt. & McCann, *n* = 20; India, Maharashtra, K.V.C. Gosavi 2975.
Dichanthium assimile (Steud.) Deshp., *n* = 20; India, Maharashtra, K.V.C. Gosavi 2861.
Dichanthium caricosum A. Camus, *n* = 15; India, Maharashtra, K.V.C. Gosavi 3865.
Dichanthium jainii (Deshp. & Hemadri) Deshp., *n* = 10; India, Maharashtra, K.V.C. Gosavi 2852.
Dichanthium odoratum (Lisboa) S.K. Jain & Deshp., *n* = 10; India, Maharashtra, K.V.C. Gosavi 2976.
Dichanthium oliganthum (Hochst. ex Steud.) Cope, *n* = 10; India, Maharashtra, K.V.C. Gosavi 2783.
Dichanthium panchganiense Blatt. & McCann, *n* = 10; India, Maharashtra, K.V.C. Gosavi 2989.
Dichanthium tuberculatum (Hack.) Cope, *n* = 10; India, Maharashtra, K.V.C. Gosavi 2883.
Dimeria blatteri Bor, *n* = 6; India, Maharashtra, K.V.C. Gosavi 2972.
Dimeria santapau M.R. Almeida, *n* = 6; India, Maharashtra, K.V.C. Gosavi 2830.
Dimeria stapfiana C.E. Hubb. ex Pilg., *n* = 6; India, Maharashtra, K.V.C. Gosavi 2957.
Dimeria woodrowii Stapf, *n* = 6; India, Maharashtra, K.V.C. Gosavi 2827.
Eulalia shrirangii Salunkhe & Potdar, *n* = 8; India, Maharashtra, K.V.C. Gosavi 2920.
Ischaemum dalzellii Stapf ex Bor, *n* = 10; India, Maharashtra, K.V.C. Gosavi 2733.
Ischaemum diplopogon Hook. f., *n* = 8; India, Maharashtra, K.V.C. Gosavi 2934.
Ischaemum impressum Hack., *n* = 10; India, Maharashtra, K.V.C. Gosavi 2799, K.V.C. Gosavi 2808.
Ischaemum kingii Hook. f., *n* = 10; India, Maharashtra, K.V.C. Gosavi 2816.
Ischaemum raizadae Hemadri & Billore, *n* = 10; India, Maharashtra, K.V.C. Gosavi 2705.
Ischaemum ritchiei Stapf ex Bor, *n* = 9; India, Maharashtra, K.V.C. Gosavi 2848.
Ischaemum santapau Bor, *n* = 8; India, Maharashtra, K.V.C. Gosavi 2936.
Ischaemum semisagittatum Roxb., *n* = 8; India, Maharashtra, K.V.C. Gosavi 2849.

Ischaemum travancorense Stapf ex C.E.C. Fischer, *n* = 10; India, Maharashtra, *K.V.C. Gosavi* 2977.
Iseilema antheophoroides Hack., *n* = 12; India, Maharashtra, *K.V.C. Gosavi* 2692.
Lakshmia venusta (Thwaites) Veldkamp, *n* = 24; India, Maharashtra, *K.V.C. Gosavi* 2953.
Lophopogon tridentatus Hack., *n* = 5; India, Maharashtra, *K.V.C. Gosavi* 2752.
Mnesithea clarkei (Hack.) de Koning & Sosef, *n* = 8; India, Maharashtra, *K.V.C. Gosavi* 2697.
Mnesithea veldkampii Potdar, S.P. Gaikwad, Salunkhe & S.R. Yadav, *n* = 9; India, Maharashtra, *K.V.C. Gosavi* 2757.
Ophiuros exaltatus (L.) Kuntze, *n* = 7; India, Maharashtra, *K.V.C. Gosavi* 2888.
Pogonachne racemosa Bor, *n* = 10; India, Maharashtra, *K.V.C. Gosavi* 2818.
Pseudodichanthium serrafalcoides (Cooke & Stapf) Bor, *n* = 10; India, Maharashtra, *K.V.C. Gosavi* 2819.
Rottboellia cochinchinensis (Lour.) Clayton, *n* = 10; India, Maharashtra, *K.V.C. Gosavi* 2959.
Sorghum deccanense Stapf ex Raizada, *n* = 5; India, Maharashtra, *K.V.C. Gosavi* 2691.
Sorghum halepense (L.) Pers., *n* = 20; India, Maharashtra, *K.V.C. Gosavi* 2687.
Spodiopogon rhizophorus (Steud.) Pilg., *n* = 10; India, Maharashtra, *K.V.C. Gosavi* 2817.
Thelepogon elegans Roth ex Roem. & Schult., *n* = 5; India, Maharashtra, *K.V.C. Gosavi* 2686.
Triplopogon ramosissimus (Hack.) Bor, *n* = 10; India, Maharashtra, *K.V.C. Gosavi* 2918.

Tribe Maydeae

Chionachne koenigii (Spreng.) Thwaites & Hook. f., *n* = 10; India, Maharashtra, *K.V.C. Gosavi* 2690.
Coix gigantea J. Koenig, *n* = 10; India, Maharashtra, *K.V.C. Gosavi* 2685; *n* = 9; India, Maharashtra, *K.V.C. Gosavi* 2978.
Coix lacryma-jobi L., *n* = 5; India, Maharashtra, *K.V.C. Gosavi* 2689.
Trilobachne cookei (Stapf) M. Schenck ex Henrard, *n* = 10; India, Maharashtra, *K.V.C. Gosavi* 2958.

Tribe Paniceae

Alloteropsis cimicina (L.) Stapf, *n* = 18; India, Maharashtra, *K.V.C. Gosavi* 2720, *K.V.C. Gosavi* 2866.
Chloris barbata Sw., *n* = 20; India, Maharashtra, *K.V.C. Gosavi* 3866.
Chloris virgata Sw., *n* = 10; India, Maharashtra, *K.V.C. Gosavi* 3851.
Echinochloa colona (L.) Link, *n* = 24; India, Maharashtra, *K.V.C. Gosavi* 3868.
Panicum maximum Jacq., *n* = 14; India, Maharashtra, *K.V.C. Gosavi* 2992.
Panicum psilopodium Trin., *n* = 14; India, Maharashtra, *K.V.C. Gosavi* 2991.
Paspalum canarae (Steud.) Veldkamp var. *canarae*, *n* = 8; India, Maharashtra, *K.V.C. Gosavi* 2909.
Paspalum canarae var. *fimbriatum* (Bor) Veldkamp, *n* = 8; India, Maharashtra, *K.V.C. Gosavi* 2702.
Pennisetum alopecuroides (L.) Spreng., *n* = 18; India, Maharashtra, *K.V.C. Gosavi* 2930.
Pennisetum pedicellatum Trin., *n* = 25; India, Maharashtra, *K.V.C. Gosavi* 2973.
Pennisetum purpureum Schumach., *n* = 16; India, Maharashtra, *K.V.C. Gosavi* 2863.
Pseudoraphis spinescens (R. Br.) Vickery, *n* = 14; India, Maharashtra, *K.V.C. Gosavi* 2862.
Rhynchelytrum repens (Willd.) C.E. Hubb., *n* = 20; India, Maharashtra, *K.V.C. Gosavi* 2700.

Subfamily Pooideae

Arundinella ciliata Nees ex Miq., *n* = 10; India, Maharashtra, *K.V.C. Gosavi* 3869.
Arundinella leptochloa Hook. f., *n* = 8; India, Maharashtra, *K.V.C. Gosavi* 2823.
Arundinella nepalensis Trin., *n* = 9; India, Maharashtra, *K.V.C. Gosavi* 2943.
Arundinella nervosa Nees ex Hook. & Arn., *n* = 8; India, Maharashtra, *K.V.C. Gosavi* 2902.
Arundinella tuberculata Munro ex Lisboa, *n* = 10; India, Maharashtra, *K.V.C. Gosavi* 2927.
Coelachne minuta Bor, *n* = 25; India, Maharashtra, *K.V.C. Gosavi* 2809.
Danthonidium gammiei (Bhide) C.E. Hubb., *n* = 10; India, Maharashtra, *K.V.C. Gosavi* 2777.
Garnotia arborum Stapf ex Woodrow, *n* = 10; India, Maharashtra, *K.V.C. Gosavi* 2951.
Garnotia tenella Janowski, *n* = 16; India, Maharashtra, *K.V.C. Gosavi* 2681.
Hubbardia diandra Chandore, Gosavi & S.R. Yadav, *n* = 10; India, Maharashtra, *K.V.C. Gosavi* 2731.
Indopoa paupercula (Stapf) Bor, *n* = 10; India, Maharashtra, *K.V.C. Gosavi* 2971.
Isachne albens Trin., *n* = 10; India, Maharashtra, *K.V.C. Gosavi* 2796.
Isachne bicolor Naik & Patunkar, *n* = 10; India, Maharashtra, *K.V.C. Gosavi* 2963.
Isachne borii Hemadri, *n* = 10; India, Maharashtra, *K.V.C. Gosavi* 2893.
Isachne elegans Dalzell, *n* = 10; India, Maharashtra, *K.V.C. Gosavi* 2892.
Isachne globosa (Thunb.) Kuntze, *n* = 10; India, Maharashtra, *K.V.C. Gosavi* 2979.
Isachne lisboae Hook. f., *n* = 18; India, Maharashtra, *K.V.C. Gosavi* 2805.
Isachne pulchella Roth ex Roem. & Schult., *n* = 10; India, Maharashtra, *K.V.C. Gosavi* 2889.
Isachne waminathanii V. Prakash & S.K. Jain, *n* = 10; India, Maharashtra, *K.V.C. Gosavi* 2982.
Jansenella griffithiana (Müll.Hal.) Bor, *n* = 10; India, Maharashtra, *K.V.C. Gosavi* 2703.
Jansenella neglecta S.R. Yadav, Chivalkar & Gosavi, *n* = 20; India, Maharashtra, *K.V.C. Gosavi* 2913.
Melanocenchris jacquemontii Jaub. & Spach, *n* = 14; India, Maharashtra, *K.V.C. Gosavi* 2719.
Oryza granulata Ness, *n* = 12; India, Karnataka, S.R. Yadav 3884.
Oryza rufipogon Griff., *n* = 12; India, Maharashtra, *K.V.C. Gosavi* 2775.
Tripogon capillatus Jaub. & Spach, *n* = 18; India, Maharashtra, *K.V.C. Gosavi* 2895.
Tripogon lisboae Stapf, *n* = 18; India, Maharashtra, *K.V.C. Gosavi* 2840.
Zenkeria elegans Trin., *n* = 10; India, Kerala state, S.R. Yadav 3885.

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Galaverna, *H* = A.I. Honfi, *Hojs* = D.H. Hojsgaard, *Jcc* = J.C. Cerutti, *Ins* = I.S. Insaurralde, *MG* = M. Grabielle, *Pe* = A. Pérez, *Ro* = M. Rodriguez, *S* = J.G. Seijo.

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ORCHIDACEAE

- Aspidogyne kuczynskii* (Porsh) Garay, *n* = 21; Argentina, Corrientes, *A 151* (MNES).
Brassavola tuberculata Hook., *n* = 20; Argentina, Misiones, *Hojs 228* (MNES), *S, D & Ro 706* (BAB, CTES, MNES).
Campylocentrum neglectum (Rchb. f. & Warm.) Cogn., *n* = 19; Argentina, Chaco, *Ins 676* (MNES).
Capanemia micromera Barb. Rodr., *n* = 12; Argentina, Misiones, *Jcc 13* (MNES), *G, De & S 232* (MNES), *Jcc 70* (MNES).
Cyclopogon calophyllus (Barb. Rodr.) Barb. Rodr., *n* = 14; Argentina, Misiones, *Jcc 74* (MNES); Argentina, Corrientes, *Jcc 28* (MNES).
Cyclopogon oliganthus (Hoehne) Hoehne & Schltr., *n* = 32; Argentina, Misiones, *Hojs, Jcc & MG 339* (MNES), *Jcc, MG & Hojs 71* (CTES, MNES).
Cyrtopodium hatschbachii Pabst, *n* = 23; Argentina, Misiones, *A, Jcc & MG 153* (MNES), *G, De & Ins 406* (CTES, MNES), *Hojs 185* (MNES), *Ins, C & H 600* (CTES, MNES, SI), *Ins, Ga & G 626* (CTES, MNES).
Galeandra beyrichii Rchb. f., *n* = 27; Argentina, Misiones *Ins 705* (MNES).
Mesadenella cuspidata (Lindl.) Garay, *n* = 23; Argentina, Misiones, *Hojs, MG & Jcc 349* (MNES); Argentina, Corrientes, *Jcc 68* (CTES, MNES), *Jcc 30* (MNES), *Pe, G, Ins & S 114B* (MNES).
Oeceoclades maculata (Lindl.) Lindl., *n* = 28; Argentina, Misiones *De & D 486* (MNES), *D 613* (MNES).
Pelexia bonariensis (Lindl.) Schltr., *n* = 23; Argentina, Misiones, *Jcc 29* (MNES), *Hojs 289* (CTES, MNES, SI).
Sarcoglottis fasciculata (Vell.) Schltr., *n* = 23+3B; Argentina, Misiones, *Hojs 291B* (CTES, MNES, SI).

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All materials CHN; collected in India; collector: SMJ = Syed Mudassir Jeelani

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APIACEAE

- Pleurospermum densiflorum* Benth. ex C.B. Clarke, *n* = 11; SMJ 26466.

BALSAMINACEAE

- Impatiens bicornuta* Wall., *n* = 9; SMJ 27795.
Impatiens scabrida DC., *n* = 6; SMJ 24770.
Impatiens sulcata Wall., *n* = 8; SMJ 24772.

BRASSICACEAE

- Barbarea intermedia* Boreau, *n* = 8; SMJ 24509.
Cardamine loxostemonoides O.E. Schulz, *n* = 8; SMJ 24792.

- Descurainia sophia* (L.) Webb ex Prantl, *n* = 10; SMJ 26437.
Rorippa islandica (Oeder) Borbas, *n* = 8; SMJ 27775.
Sisymbrium orientale L., *n* = 14; SMJ 26473.
Sisymbrium strictum Hook. f. & Thomson, *n* = 7; SMJ 24790.

CARYOPHYLLACEAE

- Arenaria kashmirica* Edgew., *n* = 20; SMJ 26907.
Silene edgeworthii Bocquet, *n* = 24; SMJ 26970.
Silene moorcroftiana Wall., *n* = 24; SMJ 24780.
Silene nepalensis Majumdar, *n* = 12; SMJ 26976.
Stellaria media (L.) Vill., *n* = 13; SMJ 26492.
Stellaria monosperma Buch.-Ham. ex D. Don, *n* = 13; SMJ 26929.
Stellaria semivestita Edgew., *n* = 13; SMJ 26495.

CRASSULACEAE

- Sedum ewersii* Ledeb., *n* = 36; SMJ 27778.
Sedum wallichianum Hook., *n* = 36; SMJ 27781.

FABACEAE

- Astragalus strobiliferus* Royle, *n* = 8, SMJ 26453.
Hedysarum cachemirianum Benth. ex Baker, *n* = 8; SMJ 27792.
Lotus corniculatus L. var. *corniculatus*, *n* = 6; SMJ 24799.
Lotus corniculatus var. *japonicus* Regel, *n* = 6; SMJ 27696.
Lotus corniculatus var. *minor* Baker, *n* = 6; SMJ 24475; *n* = 12; SMJ 24776.
Lotus corniculatus var. *tenuifolius* L., *n* = 12; SMJ 24777.
Lupinus polyphyllus Lindl., *n* = 24; SMJ 27774.

FUMARIACEAE

- Corydalis cashmeriana* Royle, *n* = 8, SMJ 27789.
Fumaria indica (Hauskn.) Pugsley, *n* = 6; SMJ 27784.

GERANIACEAE

- Geranium lucidum* L., *n* = 14; SMJ 26449.
Geranium ocellatum Jacquem., *n* = 14; SMJ 26428.
Geranium sibiricum L., *n* = 14; SMJ 27799.

HYPERICACEAE

- Hypericum perforatum* L., *n* = 16; SMJ 26488.

ONAGRACEAE

- Epilobium alpinum* L., *n* = 9; SMJ 27786.
Epilobium angustifolium L., *n* = 18; SMJ 24780; *n* = 36; SMJ 24781.
Epilobium cylindricum D. Don, *n* = 18; SMJ 26503.
Epilobium hirsutum L., *n* = 18; SMJ 24789.
Epilobium palustre L., *n* = 9; SMJ 24793.
Oenothera drummondii Hook., *n* = 7; SMJ 24785.

RANUNCULACEAE

- Delphinium roylei* Munz, *n* = 8; SMJ 26752.
Delphinium uncinatum Hook. f. & Thomson, *n* = 8; SMJ 26756.
Thalictrum minus L., *n* = 7; SMJ 26760.

ROSACEAE

- Argimonia eupatoria* L., *n* = 42; SMJ 24786.
Filipendula vestita Maxim., *n* = 7; SMJ 24768.
Potentilla argyrophylla Wall., *n* = 14; SMJ 26507.
Potentilla atosanguinea Lodd., *n* = 7; SMJ 27725.
Potentilla gelida C.A. Mey., *n* = 7; SMJ 26446.
Potentilla nepalensis Hook., *n* = 14; SMJ 27723.
Rosa macrophylla var. *minor* Lindl., *n* = 7; SMJ 26447.
Rosa pendulina L., *n* = 7; SMJ 26445.
Rubus caesius L., *n* = 7; SMJ 26511.
Rubus idaeus L., *n* = 7; SMJ 26469.
Rubus saxatilis L., *n* = 14; SMJ 27776.

SAXIFRAGACEAE

Saxifraga sibirica L., n = 16; SMJ 27773.

TAMARICACEAE

Myricaria germanica Desv., n = 12; SMJ 27770.

VITACEAE

Parthenocissus semicordata Planch., n = 24; SMJ 25041.

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POACEAE

- Acrachne racemosa* (B. Heyne ex Roth) Ohwi, n = 6; HK 27020.
Agrostis debilis (Hook. f.) Bor, n = 14; HK 25046.
Agrostis pilosula var. *royleana* (Trin.) Bor, n = 21; HK 24868.
Alopecurus nepalensis Trin. ex Steud., n = 14; HK 24872.
Andropogon munroi C.B. Clarke, n = 10; HK 24857.
Avena fatua var. *fatua* L., n = 21+1B; HK 24828.
Bothriochloa pertusa (L.) A. Camus, n = 20; HK 24819.
Brachiaria remota Haines, n = 16; HK 25622.
Briza minor L., n = 5; HK 27019.
Bromus catharticus Vahl, n = 21; HK 27003, HK 27096.
Capillipedium assimile A. Camus, n = 10; HK 24801.
Cymbopogon distans Duthie, n = 20+2B; HK 24863.
Dactylis glomerata L., n = 7; HK 27072.
Dichanthium annulatum Stapf, n = 20; HK 24809.
Digitaria adscendens Henrard, n = 27; HK 24805.
Digitaria longiflora Pers., n = 9; HK 24841.
Digitaria setigera Roth, n = 36; HK 24844.
Echinochloa frumentacea Link, n = 27; HK 24853.
Eleusine indica (L.) Gaertn., n = 14; HK 24834.
Isachne albens Trin., n = 5; HK 27001.
Ischaemum thomsonianum Stapf ex C.E.C. Fisch., n = 10; HK 25047.
Lolium remotum var. *aristatum* (Döll) Asch., n = 7; HK 24876.
Miscanthus nepalensis Hack., n = 20; HK 24866.
Mnesithea laevis Kunth, n = 9; HK 27067.
Muhlenbergia himalayensis Hack. ex Hook. f., n = 20; HK 25618.
Oplismenus burmannii (Retz.) P. Beauv., n = 9; HK 24832.
Oplismenus compositus (L.) P. Beauv., n = 36; HK 24827.
Paspalum distichum L., n = 30; HK 24821.
Phalaris minor var. *nepalensis* (Trin.) Bor, n = 14; HK 24825.
Piptatherum microcarpum (Pilg.) Tzvelev, n = 12; HK 25082.
Poa annua L., n = 14+0–3B; HK 24881, HK 24879.
Poa nepalensis (Wall. ex Griseb.) Duthie, n = 14; HK 24882, HK 24883.
Poa setulosa Bor, n = 14; HK 24884.
Polypogon fugax Steud., n = 21; HK 24822.
Rottboellia exaltata L. f., n = 30; HK 24871.
Saccharum bengalense Retz., n = 10; HK 24855.
Setaria barbata (Lam.) Kunth, n = 18; HK 25051.
Setaria glauca (L.) P. Beauv., n = 36; HK 24837.
Setaria megaphylla T. Durand & Schinz, n = 18; HK 25052.
Setaria tomentosa Kunth, n = 18; HK 27049.
Urochloa panicoides var. *pubescence* (Kunth) Bor, n = 24; HK 24850.
Vetiveria zizanioides Nash, n = 10; HK 24815.

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APIACEAE

- Chaerophyllum acuminatum* Lindl., n = 11; SK 27463.
Chaerophyllum aromaticum L., n = 11; SK 27462.
Pimpinella acuminata C.B. Clarke, n = 9; SK 27467.
Pimpinella diversifolia DC., n = 9; SK 25074.

BALSAMINACEAE

- Impatiens arguta* Hook. f. & Thomson, n = 7; SK 24662.
Impatiens balsamina L., n = 7; SK 24663.
Impatiens bicornuta Wall., n = 7; SK 24669.
Impatiens laxiflora Edgew., n = 7; SK 24664; n = 8; SK 24665.
Impatiens scabrida DC., n = 7; SK 24668.

BRASSICACEAE

- Capsella bursa-pastoris* (L.) Medik., n = 16; SK 25063.
Nasturtium officinale R. Br., n = 8; SK 27415.
Sisymbrium irio L., n = 14; SK 27414.

CAESALPINIACEAE

- Caesalpinia decapetala* (Roth) Alston, n = 12; SK 25072.

CARYOPHYLLACEAE

- Silene vulgaris* (Moench) Garcke, n = 24; SK 26955.

CRASSULACEAE

- Sedum multicaule* Wall ex Lindl., n = 14; SK 27368.

FABACEAE

- Lathyrus aphaca* L., n = 7; SK 25057; n = 14; SK 25045.
Medicago polymorpha L., n = 7; SK 25061.
Melilotus indica (L.) All., n = 8; SK 25062.
Trifolium repens L., n = 8; SK 25056; n = 16; SK 25084.
Vicia hirsuta (L.) Gray, n = 6; SK 27473.
Vicia sativa L., n = 6; SK 25067.
Vicia tetrasperma (L.) Schreb., n = 7; SK 25068.

GERANIACEAE

- Geranium nepalense* Sweet, n = 14; SK 25059.
Geranium ocellatum Jacquem., n = 28; SK 27421.
Geranium wallichianum D. Don, n = 13; SK 25058.

MALVACEAE

- Sida cordata* (Burm. f.) Borss.Waalk., n = 8; SK 27449.
Sida cordifolia L., n = 8; SK 27450.

ONAGRACEAE

- Epilobium palustre* L., n = 18., SK 27372.
Oenothera drummondii (Spach) Walp., n = 7; SK 25073, SK 25083.
Oenothera rosea Aiton, n = 7; SK 27403.

RANUNCULACEAE

- Anemone obtusiloba* D. Don, n = 7; SK 26986.
Anemone rivularis Buch.-Ham. ex DC., n = 7; SK 26989.

Anemone vitifolia Buch.-Ham. ex DC., *n* = 7; SK 26992.
Clematis orientalis L., *n* = 8+(0–1B); SK 26985.
Ranunculus hyerboreus Rottb., *n* = 16; SK 25071.
Ranunculus laetus Wall., *n* = 14; SK 25064.
Ranunculus muricatus L., *n* = 16; SK 27475.

ROSACEAE

Agrimonia eupatoria L., *n* = 14; SK 25675; *n* = 28; SK 25676.
Duchesnea indica (Andrews) Focke, *n* = 14; SK 27311.
Potentilla argyrophylla Wall. ex Lehm., *n* = 28; SK 27360.
Potentilla atosanguinea Lodd. ex D. Don, *n* = 14; SK 27332.
Potentilla fruticosa Gray, *n* = 14; SK 27301.
Potentilla fulgens Wall. ex Hook., *n* = 7; SK 27336.
Potentilla nepalensis Hook., *n* = 7; SK 27316; *n* = 14; SK 27317.
Prinsepia utilis Royle, *n* = 16; SK 25066.
Rubus ellipticus Sm., *n* = 7; SK 25065.
Sibbaldia micropetala (D. Don) Hand.-Mazz., *n* = 7; SK 27334;
n = 14; SK 27335.
Sibbaldia parviflora Willd., *n* = 14; SK 27343.

SAXIFRAGACEAE

Bergenia ciliata (Haw.) Sternb., *n* = 17; SK 27347.
Saxifraga diversifolia Wall. & Ser., *n* = 8; SK 27441.
Saxifraga sibirica L., *n* = 8; SK 27402.

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ASTERACEAE

Carduus edelbergii Rech. f., *n* = 20; RAM 28690.
Saussurea kingii C.E.C. Fisch., *n* = 17; RAM 28691.
Senecio krascheninnikovii Schischk., *n* = 10; RAM 21952.
Senecio vulgaris L., *n* = 20; RAM 21953.

BORAGINACEAE

Mertensia echioides (Benth.) Benth. & Hook. (= *Lithospermum echioides* Benth.), *n* = 12; RAM 28692.

GENTIANACEAE

Swertia ciliata (D. Don ex G. Don) B.L. Burtt., *n* = 13; RAM 25110.

LAMIACEAE

Coleus blumei Benth., *n* = 21; RAM 25168.
Elsholtzia ciliata (Thunb.) Hyl., *n* = 16; RAM 25183.
Thymus linearis L., *n* = 13; RAM 25184.

SCROPHULARIACEAE

Digitalis grandiflora Mill., *n* = 28; RAM 25138.
Scrophularia incisa Weinm., *n* = 25; RAM 28693.
Scrophularia scopoli Hoppe, *n* = 13; RAM 25182.
Verbascum thapsus L., *n* = 17+0–2B; RAM 25126.
Veronica cana Wall. ex Benth., *n* = 23; RAM 25158.
Veronica persica Poir., *n* = 7; RAM 25192.

VALERIANACEAE

Valeriana hardwickii Wall., *n* = 30; RAM 25174.

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ALISMATACEAE

Alisma orientale (Sam.) Juz., *2n* = 14; Russia, Primorskii Krai, Rudyka 5446, Shatalova 7679, 7500.

ALLIACEAE

Allium anisopodium Ledeb., *2n* = 16; Russia, Primorskii Krai, VB 8833, VN 11086.
Allium condensatum Turcz., *2n* = 16; Russia, Khabarovskii Krai, NP & VS 7072; Russia, Primorskii Krai, VN 11349.
Allium komarovianum Vved., *2n* = 16; Russia, Primorskii Krai, VN 10438.
Allium macrostemon Bunge, *2n* = 32; Russia, Primorskii Krai, Nest-erova 10745, Lelikov & VL 9019.
Allium maximowiczii Regel, *2n* = 16; Russia, Primorskii Krai, VN 10755.
Allium ramosum L., *2n* = 32; Russia, Primorskii Krai, VN 11044.
Allium sacculiferum Maxim., *2n* = 32; Russia, Primorskii Krai, VN 11666.
Allium schoenoprasum L., *2n* = 16; Russia, Kamchatskii Krai, Kamchatka Peninsula, VB 11461.
Allium senescens L., *2n* = 16; Russia, Khabarovskii Krai, NP & VS 7071; Russia, Primorskii Krai, VB 11804, NP & VS 9538, VN 11087. *2n* = 32; Russia, Primorskii Krai, Pavlova 8155, Pavlova 8360, VN 10556.
Allium spirale Willd., *2n* = 32; Russia, Primorskii Krai, VS 9991.

APIACEAE

Anthriscus sylvestris (L.) Hoffm., *2n* = 16; Russia, Primorskii Krai, VB 7759.

ARACEAE

Arisaema amurense Maxim., *2n* = 56; Russia, Primorskii Krai, Semeykin 11582, Volynets 11361.

ASCLEPIADACEAE

Metaplexis japonica Makino, *2n* = 24; Russia, Primorskii Krai, Rudyka 11110.
Vincetoxicum acuminatum C. Morr. & Decne., *2n* = 22; Russia, Primorskii Krai, SK 11370.

ASTERACEAE

Artemisia keiskeana Miq., *2n* = 18; Russia, Primorskii Krai, VN 11807.
Artemisia laciniata Willd., *2n* = 18; Russia, Primorskii Krai, Pavlova 7638.

Artemisia selengensis Turcz. ex Besser, $2n = 36$; Russia, Primorskii Krai, *VB 7818*.

Artemisia sieversiana Ehrh. ex Willd., $2n = 18$; Russia, Evreyskaya Avtonomnaya Oblast', *VS 10059*.

Artemisia sylvatica Maxim., $2n = 16$; Russia, Khabarovskii Krai, *NP & VS 7084*.

Aster alpinus L., $2n = 18$; Russia, Republic of Buryatia, *SK 11693*.

Aster amellus L. s.l., $2n = 18$; U.S.A., Texas, *Rudyka 11414*.

Chrysanthemum sichotense (Tzvelev) Vorosch., $2n = 36$; Russia, Primorskii Krai, *VB 11662*.

Cichorium intybus L., $2n = 18$; Russia, Primorskii Krai, *VN 11434*.

Cirsium kamtschaticum Ledeb. ex DC., $2n = ca. 34$; Russia, Kamchatskii Krai, Kamchatka Peninsula, *Yakubov 9250*.

Cirsium setosum M. Bieb., $2n = 34$; Russia, Irkutskaya Oblast', *SK 11839*.

Crepidiastrum denticulatum (Houtt.) Pak & Kawano, $2n = 10$; Russia, Primorskii Krai, *VB 7538*.

Crepis nana Richardson, $2n = 14$; Russia, Republic of Buryatia, *SK 11755*.

Crepis runcinata (James) Torr. & A. Gray, $2n = 22$; U.S.A., Texas, *Rudyka 9725*.

Erigeron lonchophyllus Hook., $2n = 18$; Russia, Irkutskaya Oblast', *SK & Krivenko 11685*.

Galatella dahurica DC., $2n = 18$; Russia, Primorskii Krai, *VN 11782*.

Heteropappus hispidus Less., $2n = 18$; Russia, Primorskii Krai, *VN 11771*.

Ixeris chinensis (Thunb.) Kitag., $2n = 16$; Russia, Zabaikal'skii Krai, *SK 11774*.

Lagedium sibiricum (L.) Soják, $2n = 18$; Russia, Primorskii Krai, *VB 9292*.

Leontodon autumnalis L., $2n = 12$; Russia, Irkutskaya Oblast', *SK 11656*.

Leontopodium leontopodioides Beauverd, $2n = 26$; Russia, Primorskii Krai, *VN 10994*.

Ligularia sibirica Cass., $2n = 60$; Russia, Republic of Buryatia, *SK 11825*.

Picris davurica Fisch. ex Hornem., $2n = 10$; Russia, Irkutskaya Oblast', *SK 11841*.

Picris japonica Thunb., $2n = 10$; Russia, Khabarovskii Krai, *NP & VS 7118*.

Rhaponticum uniflorum DC., $2n = 26$; Russia, Zabaikal'skii Krai, *SK 11830*.

Saussurea amara (L.) DC., $2n = 26$; Russia, Republic of Buryatia, *SK 11768*.

Saussurea baicalensis B.L. Rob., $2n = 36$; Russia, Republic of Buryatia, *Verkhovina 11699*.

Saussurea grandifolia Maxim., $2n = 26$; Russia, Primorskii Krai, *SK 11381*.

Saussurea schanginiana Fisch. ex Herder, $2n = 36$; Russia, Irkutskaya Oblast', *SK 11671*.

Scorzonera albicaulis Bunge, $2n = 14$; Russia, Primorskii Krai, *VN 11124*.

Scorzonera austriaca Willd., $2n = 14$; Russia, Irkutskaya Oblast', *SK 11695*.

Senecio erucifolius L., $2n = 40$; Russia, Irkutskaya Oblast', *SK 11820*.

Senecio viscosus L., $2n = 40$; Russia, Irkutskaya Oblast', *SK 11815*.

Syneilesis aconitifolia Maxim., $2n = 60$; Russia, Primorskii Krai, *SK 11377*.

Tephrosieris subscaposa (Kom.) Czerep., $2n = 48$; Russia, Primorskii Krai, *VN 11330*.

Tragopogon orientalis L., $2n = 12$; Russia, Irkutskaya Oblast', *SK 11742*. $2n = 12+0-2B$; Russia, Primorskii Krai, *VL 11105*.

Youngia tenuifolia (Willd.) Bab. & Stebbins, $2n = 10$; Russia, Irkutskaya Oblast', *Krivenko 11811*.

BORAGINACEAE

Lappula consanguinea Gürke, $2n = 24$; Russia, Republic of Buryatia, *SK 11816*.

Lappula redowskii (Hornem.) Greene, $2n = 24$; Russia, Republic of Buryatia, *SK 11818*.

BRASSICACEAE

Arabis pendula L., $2n = 16$; Russia, Irkutskaya Oblast', *SK 11770*.

Draba lonchocarpa Rydb., $2n = 16$; Russia, Kamchatskii Krai, Kamchatka Peninsula, *VB 11553*.

Isatis oblongata DC., $2n = 28$; Russia, Irkutskaya Oblast', *Krivenko 11809*, *Stepantsova 11873*.

Smelowskia alba B. Fedtsch., $2n = 12$; Russia, Irkutskaya Oblast', *SK 11672*.

CALLITRICHACEAE

Callitriche palustris L., $2n = 20$; Russia, Primorskii Krai, *VB 9297*, *Nesterova 9650*.

CAMPANULACEAE

Campanula turczaninovi Fed., $2n = 34$; Russia, Republic of Buryatia, *SK 11819*, *SK 11861*.

Codonopsis lanceolata Benth. & Hook. f., $2n = 16$; Russia, Primorskii Krai, *VN 11280*.

Platycodon grandiflorus A. DC., $2n = 18$; Russia, Primorskii Krai, *VN 11690*, *VN 11081*.

CARYOPHYLLACEAE

Dianthus amurensis Hort. ex Jacques, $2n = 30$; Russia, Khabarovskii Krai, *NP & VS 7185*.

Dianthus superbus L., $2n = 30$; Russia, Republic of Buryatia, *SK 11824*.

Gypsophila pacifica Komarov, $2n = 34$; Russia, Primorskii Krai, *VS 10486*.

Melandrium album (Mill.) Garcke, $2n = 24$; Russia, Primorskii Krai, *Pavlova 8427*.

Silene jeniseensis Willd., $2n = 24$; Russia, Zabaikal'skii Krai, *SK 11832*.

Spergula arvensis L., $2n = 18$; Russia, Irkutskaya Oblast', *Prelovskaya 11833*.

Spergularia salina J. Presl & C. Presl, $2n = 18$; Russia, Primorskii Krai, *Burkovskaya 9666*.

CHENOPODIACEAE

Corispermum sibiricum Iljin, $2n = 18$; Russia, Republic of Buryatia, *SK 11769*.

CONVALLARIACEAE

Disporum viridescens (Maxim.) B. Fedtsch., $2n = 16+0-4B$; Russia, Primorskii Krai, *VN 11344*.

Polygonatum humile Fisch. ex Maxim., $2n = 20$; Russia, Primorskii Krai, *SK 11369*.

CONVOLVULACEAE

Calystegia inflata G. Don, $2n = 22$; Russia, Khabarovskii Krai, *NP & VS 7178*.

CRASSULACEAE

Hylotelephium triphyllum (Haworth) Holub, $2n = 24$; Russia, Kamchatskii Krai, Kamchatka Peninsula, *Yakubov 8420*.

EPHEDRACEAE

Ephedra monosperma J.G. Gmel. ex C.A. Mey., $2n = 14$; Russia, Republic of Buryatia, *SK & Prelovskaya 11826*.

ERICACEAE

Rhododendron parvifolium Adams, $2n = 26$; Russia, Republic of Buryatia, SK 11853.

FABACEAE

Amphicarpa japonica B. Fedtsch., $2n = 20$; Russia, Primorskii Krai, VN 11040.

Astragalus membranaceus Moench, $2n = 16$; Russia, Primorskii Krai, Nesterova 7773.

Glycine soja Siebold & Zucc., $2n = 40$; Russia, Primorskii Krai, Pavlova 7685.

Gueldenstaedtia verna (Georgi) Boriss., $2n = 16$; Russia, Republic of Buryatia, Verkhozina & SK 11598.

Lathyrus humilis (Ser.) Fisch. ex Spreng., $2n = 14+0-2B$; Russia, Zabaikal'skii Krai, SK 11814.

Lеспедежа juncea (L. f.) Pers., $2n = 20+0-2B$; Russia, Republic of Buryatia, NP & VS 9667.

Lotus corniculatus L., $2n = 24$; Russia, Primorskii Krai, VL 11445.

Lupinaster pacificus (Bohr.) Latsch., $2n = 32$; Russia, Primorskii Krai, VN 11353.

Medicago lupulina L., $2n = 16$; Russia, Primorskii Krai, VL 11446.

Oxytropis evenorum Jurtzev & A.P. Khokhr., $2n = 32$; Russia, Republic of Sakha-Yakutia, Yakubov 11766.

Oxytropis intermedia Bunge, $2n = 16+0-3B$; Russia, Republic of Tyva, Yakubov 11764.

Oxytropis lanata DC., $2n = 16$; Russia, Republic of Buryatia, Nakonechnaya 11765.

Oxytropis manshurica Bunge, $2n = 16$; Russia, Primorskii Krai, Pimenova 11762.

Oxytropis strobilacea Bunge, $2n = 16$; Russia, Republic of Tyva, Yakubov 11763.

Vicia hirsuta (L.) Gray, $2n = 14$; Russia, Khabarovskii Krai, NP & VS 8011.

Vicia segetalis Thuill., $2n = 12$; Russia, Amurskaya Oblast', Kudrin 9674; Russia, Khabarovskii Krai, NP & VS 8010.

Vicia tetrasperma (L.) Schreb., $2n = 14$; Russia, Primorskii Krai, VL 11450.

GENTIANACEAE

Gentiana macrophylla Pall., $2n = 26$; Russia, Republic of Buryatia, SK & Kossachev 11817.

Gentianella acuta (Michx.) Hiitonen, $2n = 18$; Russia, Republic of Buryatia, SK 11822; Russia, Irkutskaya Oblast', Krivenko 11812.

GROSSULARIACEAE

Ribes diacantha Pall., $2n = 16$; Russia, Zabaikal'skii Krai, Chepinoga & Rosbakh 11878.

HIPPURIDACEAE

Hippuris vulgaris L., $2n = 32$; Russia, Primorskii Krai, Nesterova 9720.

HYDROCHARITACEAE

Hydrocharis dubia (Blume) Backer, $2n = 14$; Russia, Primorskii Krai, VB 9290.

HYPERICACEAE

Hypericum attenuatum Choisy, $2n = 16$; Russia, Primorskii Krai, VL 11052.

Hypericum maculatum Crantz, $2n = 16$; Russia, Irkutskaya Oblast', SK & Pochinchik 11947.

JUNCAGINACEAE

Triglochin palustre L., $2n = 24$; Russia, Primorskii Krai, Burkovskaya 9742.

LAMIACEAE

Dracocephalum grandiflorum L., $2n = 14$; Russia, Republic of Buryatia, SK 11860.

Elsholtzia ciliata (Thunb.) Hylander, $2n = 16$; Russia, Irkutskaya Oblast', NP & VS 11630.

Leonurus japonicus Houtt., $2n = 20$; Russia, Khabarovskii Krai, NP & VS 7176.

Lycopus lucidus Turcz. ex Benth., $2n = 22$; Russia, Primorskii Krai, VN 11738.

Nepeta cataria L., $2n = 34$; Russia, Primorskii Krai, VL 11649.

LILIACEAE

Lilium distichum Nakai, $2n = 24$; Russia, Amurskaya Oblast', Kapustina 8114; Russia, Primorskii Krai, Beskorovaynaya 11595.

Lilium pensylvanicum Ker Gawl., $2n = 24+0-2B$; Russia, Amurskaya Oblast', Kapustina 8580.

Lilium pilosiusculum (Freyn) Misch., $2n = 24$; Russia, Republic of Buryatia, SK 11859.

Lilium pumilum Delile, $2n = 24$; Russia, Republic of Buryatia, SK 11837.

LOBELIACEAE

Lobelia sessilifolia Lamb., $2n = 28$; Russia, Primorskii Krai, Lapenko 11683.

MELANTHIACEAE

Zigadenus sibiricus A. Gray, $2n = 32$; Russia, Republic of Buryatia, SK 11852.

NELUMBONACEAE

Nelumbo komarovii Grossh., $2n = 16$; Russia, Amurskaya Oblast', Kudrin 8091.

ONAGRACEAE

Chamaenerion latifolium Sweet, $2n = 36$; Russia, Republic of Buryatia, SK 11835.

PAPAVERACEAE

Chelidonium asiaticum (Hara) Krahulc., $2n = 10$; Russia, Khabarovskii Krai, NP & VS 7077, Tolmacheva 8927.

PHRYMACEAE

Phryma asiatica (Hara) O. Deg. & I. Deg., $2n = 28$; Russia, Khabarovskii Krai, NP & VS 7265.

PLANTAGINACEAE

Plantago camtschatica Link, $2n = 12$; Russia, Primorskii Krai, VN 11393.

Plantago depressa Willd., $2n = 12$; Russia, Zabaikal'skii Krai, SK 11848.

POACEAE

Agrostis clavata Trin., $2n = 42$; Russia, Irkutskaya Oblast', NP & VS 10786, 10780; Russia, Primorskii Krai, Tolmacheva 11448, VN 11566.

Alopecurus aequalis Sobol., $2n = 14$; Russia, Sverdlovskaya Oblast', Tolkach 11506.

Alopecurus arundinaceus Poir., $2n = 28$; Russia, Khabarovskii Krai, Barkalov 11514.

Avenula schelliana (Hack.) W. Sauer & Chmel., $2n = 14$; Russia, Primorskii Krai, Pavlova 9773.

Beckmannia syzigachne (Steud.) Fernald, $2n = 14$; Russia, Amurskaya Oblast', Denissenko 9166, NP & VS 9471; Russia, Primorskii Krai, VB 7511, Shatalova 7484.

Bromopsis inermis (Leyss.) Holub, $2n = 56$; Russia, Primorskii Krai, Volynets 11402.

- Calamagrostis brachytricha* Steud., $2n = 56$; Russia, Khabarovskii Krai, NP & VS 7078.
- Calamagrostis extremiorientalis* (Tzvelev) Prob., $2n = 28$; Russia, Khabarovskii Krai, NP & VS 7101.
- Echinochloa crusgalli* (L.) P. Beauv., $2n = 54$; Russia, Irkutskaya Oblast', Prelovskaya 11840.
- Echinochloa oryzoides* (Ard.) Fritsch, $2n = 36$; Russia, Primorskii Krai, Kostyuk 9107.
- Elymus sajanensis* (Nevski) Tzvelev, $2n = 28$; Russia, Republic of Buryatia, SK 11846.
- Elymus sibiricus* L., $2n = 28$; Russia, Republic of Buryatia, SK 11857.
- Festuca rubra* L., $2n = 42$; Russia, Primorskii Krai, VN 10121.
- Glyceria spiculosa* Roshev. ex B. Fedtsch., $2n = 40$; Russia, Khabarovskii Krai, NP & VS 7085.
- Hierochloë glabra* Trin., $2n = 28$; Russia, Primorskii Krai, VN 11563, VN 11039, VN 11350, VL 11024.
- Hordeum brevisubulatum* Link, $2n = 28$; Russia, Zabaikal'skii Krai, Chepinoga & Rosbakh 11866.
- Leymus mollis* (Trin.) Pilg., $2n = 28$; Russia, Primorskii Krai, VN 11060.
- Milium effusum* L., $2n = 28$; Russia, Amurskaya Oblast', Starchenko & Darman 9668.
- Ochlopa annua* (L.) H. Scholz, $2n = 28$; Russia, Sverdlovskaya Oblast, Tolkach 11504.
- Phalaroides arundinacea* (L.) Rauschert, $2n = 28$; Russia, Primorskii Krai, VN 11637.
- Ptilagrostis mongholica* Griseb., $2n = 22$; Russia, Republic of Buryatia, SK 11831.
- Puccinellia kurilensis* (Takeda) Honda, $2n = 42$; Russia, Primorskii Krai, Nesterova 9665.
- Puccinellia tenuiflora* Scribn. & Merr., $2n = 14$; Russia, Zabaikal'skii Krai, Konovalov & Isaykina 11858, Rosbakh 11865, Chepinoga & Rosbakh 11867.
- Schedonorus pratensis* (Huds.) P. Beauv., $2n = 14$; Russia, Primorskii Krai, VL 11257.
- Setaria viridis* (L.) P. Beauv., $2n = 18$; Russia, Khabarovskii Krai, NP & VS 7148; Russia, Primorskii Krai, VN 11686, 11884.
- Spodiopogon sibiricus* Trin., $2n = 40$; Russia, Primorskii Krai, SK 11378.
- Stipa capillata* L., $2n = 44$; Russia, Irkutskaya Oblast', Krivenko 11829.
- Tripogon chinensis* Hack., $2n = 20$; Russia, Zabaikal'skii Krai, Chepinoga & al. 11868.
- Trisetum sibiricum* Rupr., $2n = 14$; Russia, Primorskii Krai, VL 11231.
- Trisetum umbratile* (Kitag.) Kitag., $2n = 14$; Russia, Primorskii Krai, NP & VS 9605.

POLEMONIACEAE

- Polemonium boreale* Adams, $2n = 18$; Russia, Kamchatskii Krai, Kamchatka Peninsula, VB 11554.

POLYGONACEAE

- Persicaria maculosa* Gray, $2n = 40$; Russia, Irkutskaya Oblast', Prudnikova 10512; Russia, Evreiskaya Avtonomnaya Oblast', NP & VS 11092.
- Rheum compactum* L., $2n = 22$; Russia, Zabaikal'skii Krai, SK 11834.
- Rumex stenophyllus* Ledeb., $2n = 60$; Russia, Primorskii Krai, Burkovskaya 9798.

POTAMOGETONACEAE

- Potamogeton maackianus* A. Benn., $2n = 26$; Russia, Primorskii Krai, Shatalova 7681.

PRIMULACEAE

- Primula farinosa* L., $2n = 18$; Russia, Primorskii Krai, VB 11664.
- Primula nivalis* Pall., $2n = 22$; Russia, Republic of Buryatia, SK 11862.

RANUNCULACEAE

- Aconitum kusnezoffii* Rechb., $2n = 16$; Russia, Amurskaya Oblast', Kudrin 8418.
- Aquilegia oxysepala* Trautv. & Mey., $2n = 16$; Russia, Amurskaya Oblast', Kudrin 8416.
- Arsenjevia glabrata* (Maxim.) Starod., $2n = 21$; Russia, Primorskii Krai, Pavlova 10200.
- Delphinium crassifolium* Schrad. ex Spreng., $2n = 16$; Russia, Republic of Buryatia, SK 11844.
- Halerpestes sarmentosa* (Adams) Komarov, $2n = 16$; Russia, Primorskii Krai, Voronkova 9968.
- Paraquilegia microphylla* J. R. Drum. & Hutch., $2n = 14$; Russia, Republic of Buryatia, SK 11783.
- Ranunculus acris* L. s.l., $2n = 28$; Russia, Khabarovskii Krai, VB 9894.
- Ranunculus grandis* Honda, $2n = 28$; Russia, Primorskii Krai, VB 9838.
- Ranunculus* cf. *sceleratus* L., $2n = 56$; Russia, Primorskii Krai, VB 8795.
- Thacla natans* (Pall. ex Georgi) Deyl & Soják, $2n = 32$; Russia, Primorskii Krai, Nesterova 11701, VB 7686.
- Thalictrum petaloideum* L., $2n = 14$; Russia, Zabaikal'skii Krai, SK 11828.

ROSACEAE

- Aruncus asiaticus* Pojark., $2n = 18$; Russia, Primorskii Krai, SK 11373.
- Potentilla centigrana* Maxim., $2n = 14$; Russia, Primorskii Krai, VB 7682.
- Potentilla chinensis* Ser., $2n = 14$; Russia, Primorskii Krai, VN 9812, 9283.
- Potentilla fragarioides* L., $2n = 14$; Russia, Primorskii Krai, VS 9983, VN 10565, VN 11007, SK 11374.
- Potentilla norvegica* L., $2n = 56$; Russia, Khabarovskii Krai, VB 11516.
- Potentilla supina* L., $2n = 28$; Russia, Republic of Buryatia, SK & Verkhozina 11655; Russia, Amurskaya Oblast', NP & VS 9372; Russia, Primorskii Krai, VB 8858, 9659, VN 10478.
- Potentilla tergemina* Soják, $2n = 28$; Russia, Republic of Buryatia, SK & Verkhozina 11751.
- Potentilla tranzschelii* Juz., $2n = 14$; Russia, Primorskii Krai, Yakubov 11592, VB 11650, VN 10662.

RUBIACEAE

- Galium maximowiczii* (Kom.) Pobed., $2n = 22$; Russia, Primorskii Krai, SK 11384.

SALICACEAE

- Salix abscondita* Laksch., $2n = 38$; Russia, Primorskii Krai, VB 11795.
- Salix integra* Thunb., $2n = 38$; Russia, Primorskii Krai, VB 11800.
- Salix nipponica* Franch. & Sav., $2n = 38$; Russia, Primorskii Krai, VB 11787.
- Salix pierotii* Miq., $2n = 38$; Russia, Primorskii Krai, VB 11799.
- Salix rorida* Laksch., $2n = 38$; Russia, Primorskii Krai, VB 11788.
- Salix schwerinii* E.L. Wolf, $2n = 38$; Russia, Primorskii Krai, VB 11777, VB 11786.
- Salix siuzevii* Seemen, $2n = 38$; Russia, Primorskii Krai, VB 11794, VB 11785.
- Salix taraikensis* Kimura, $2n = 38$; Russia, Primorskii Krai, VB 11797.

SAXIFRAGACEAE

- Saxifraga calycina* Sternb., $2n = 24$; Russia, Kamchatskii Krai, Kamchatka Peninsula, Yakubov 8423.
- Saxifraga cherlerioides* D. Don, $2n = 26$; Russia, Kamchatskii Krai, Kamchatka Peninsula, Yakubov 8430.

Saxifraga nelsoniana D. Don, $2n = 60$; Russia, Kamchatskii Krai, Kamchatka Peninsula, Yakubov 8424.

SCROPHULARIACEAE

Chaenorhinum minus (L.) Lange, $2n = 14$; Russia, Republic of Buryatia, SK 11757.

Linaria japonica Miq., $2n = 12$; Russia, Khabarovskii Krai, Yermoshkin 10497.

Linaria vulgaris Mill., $2n = 12$; Russia, Primorskii Krai, VL 10660.

Pedicularis oederi Vahl, $2n = 16$; Russia, Republic of Buryatia, SK 11838.

Pedicularis resupinata L., $2n = 16$; Russia, Irkutskaya Oblast', Pochinchik 11698.

Pedicularis rubens Stephan ex Willd., $2n = 16$; Russia, Republic of Buryatia, SK & Prelovskaya 11827.

Pedicularis striata Pall., $2n = 16$; Russia, Republic of Buryatia, SK 11850.

Pedicularis tristis L., $2n = 16$; Russia, Republic of Buryatia, SK 11851.

VACCINIACEAE

Vaccinium uliginosum L., $2n = 24$; Russia, Republic of Buryatia, SK 11855.

VALERIANACEAE

Valeriana transjensis Kreyer, $2n = 42$; Russia, Zabaikal'skii Krai, SK 11810.

VIOLACEAE

Viola acuminata Ledeb., $2n = 20$; Russia, Primorskii Krai, SK 11372.

Viola alisoviana Kiss, $2n = 48$; Russia, Primorskii Krai, VB 9285.

Viola arenaria DC., $2n = 20$; Russia, Irkutskaya Oblast', SK 11836.

Viola collina Besser, $2n = 20$; Russia, Primorskii Krai, VN 10115, Kapustina 10528.

Viola epipsiloides A. Löve & D. Löve, $2n = 24$; Russia, Khabarovskii Krai, VB 9898.

Viola variegata Fisch. ex Link, $2n = 24$; Russia, Primorskii Krai, VB 9185, VN 11413.

Viola xanthopetala Nakai, $2n = 12$; Russia, Primorskii Krai, VN 10112.

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APIACEAE

Chaerophyllum capnoides Benth. & Hook. f., $n = 11$; SR 25002.

Heracleum brunonis Benth. ex C.B. Clarke, $n = 11$; SR 27760.

BALSAMINACEAE

Impatiens arguta Hook. f. & Thomson, $n = 7$; SR 24893.

Impatiens brachycentra Kar. & Kir., $n = 8$; SR 24888.

Impatiens glandulifera Royle, $n = 6$; SR 24890.

Impatiens reidii Hook. f., $n = 7$; SR 24891.

Impatiens scabrida DC., $n = 6$; SR 24894.

BERBERIDACEAE

Berberis ceratophylla G. Don, $n = 14$; SR 27844.

BRASSICACEAE

Barbarea vulgaris W.T. Aiton, $n = 8$; SR 25035.

Capsella bursa-pastoris (L.) Medik., $n = 8$; SR 25007.

Thlaspi alpestre L., $n = 7$; SR 25031.

CARYOPHYLLACEAE

Silene conoidea L., $n = 20$; SR 26971.

CRASSULACEAE

Sedum trifidum Wall., $n = 18$; SR 27830.

FABACEAE

Astragalus hamosus L., $n = 8$; SR 25026.

Astragalus ladakensis N.P. Balakr., $n = 8$; SR 24700.

Caragana pygmaea (L.) DC., $n = 8$; SR 27817.

Desmodium retusum G. Don, $n = 11$; SR 27823.

Indigofera hamiltonii Graham, $n = 8$; SR 27842.

Lespedeza cuneata G. Don, $n = 10$; SR 27816.

FUMARIACEAE

Corydalis meifolia Wall., $n = 8$; SR 27836.

Corydalis thyrsoiflora Prain, $n = 8$; SR 27835.

GERANIACEAE

Geranium pratense L., $n = 13$; SR 27858.

Geranium wallichianum D. Don, $n = 28$; SR 25021.

Pelargonium hortorum L.H. Bailey, $n = 18$; SR 25028.

HYPERICACEAE

Hypericum dyeri Rehder, $n = 9$; SR 26709.

OXALIDACEAE

Oxalis corymbosa DC., $n = 7$; SR 25027.

PAPAVERACEAE

Argemone mexicana L., $n = 7$; SR 25032.

RANUNCULACEAE

Anemone obtusiloba D. Don, $n = 7+4B$; SR 26744.

Aquilegia pubiflora Wall., $n = 7$; SR 26738.

Clematis grata Wall., $n = 8+1B$; SR 24687.

Ranunculus diffusus DC., $n = 14+1B$; SR 24677.

Ranunculus hyperboreus Rottb., $n = 14$; SR 25700.

Thalictrum foetidum L., $n = 8$; SR 24684.

Thalictrum foliolosum DC. $n = 14$; SR 26770.

ROSACEAE

Potentilla desertorum Bunge, $n = 14$; SR 26710; $n = 7$; SR 27716.

Potentilla thomsonii Hand.-Mazz., $n = 7$; SR 27707.

Sibbaldia parviflora Willd., $n = 7$; SR 27739.

SAXIFRAGACEAE

Saxifraga diversifolia Wall. & Ser., $n = 16$; SR 27850.

Saxifraga filicaulis Wall. & Ser., $n = 8$; SR 27846.

Saxifraga flagellaris Willd. ex Sternb., $n = 8$; SR 27847.

VIOLACEAE

Viola betonicifolia Sm., $n = 7$; SR 27843.

Viola canescens Wall., $n = 6$; SR 26712.

Viola sempervirens Greene, $n = 6$; SR 27860.

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PLANTAGINACEAE

- Veronica acinifolia* L., $2n = 14$; LD, MMO & JA (SALA 108481), LD, MMO, ER & JA (SALA 109220), JA (SALA 109241). $2n = 28$; JA (SALA 109241).
- Veronica agrestis* L., $n = 14$; LD, MMO & JA (SALA 109218). $2n = 28$; ER, LD, MMO & JA (SALA 109217), LD, MMO, ER & JA (SALA 109218), LD & JA (SALA 100144).
- Veronica anagallis-aquatica* L. subsp. *anagallis-aquatica*, $2n = 27$; LD & JA (SALA 109329). $2n = 36$; MMO & JA (SALA 109357), LD & JA (SALA 109331), LD, MMO, ER & JA (SALA 109343), LD & JA (SALA 109329).
- Veronica anagalloides* Guss. subsp. *anagalloides*, $2n = 36$; JA (SALA 109373), LD (SALA 109398), JA (SALA 109375).
- Veronica arvensis* L., $n = 8$; LD, MMO, ER & JA (SALA 109254). $2n = 16$; ER, FJ & MV (SALA 109250), LD, MMO, ER & JA (SALA 109352), LD, MMO, ER & JA (SALA 109257).
- Veronica beccabunga* L. subsp. *beccabunga*, $2n = 18$; LD, MMO & JA (SALA 109345), LD & JA (SALA 109334), JA (SALA 109316).
- Veronica catenata* Pennell, $2n = 36$; AGT & JA (SALA 109393).
- Veronica chamaepithyoides* Lam., $2n = 24$; LD, MMO, ER & JA (SALA 96420), LD, ER & JA (SALA 109399).
- Veronica cymbalaria* Bodard, $n = 18$; LD, PF & JA (SALA 109383). $n = 27$; LD, MMO & JA (SALA 109203). $2n = 36$; LD, PF & JA (SALA 109382). $2n = 54$; LD, MMO & JA (SALA 109243), ER (SALA 109296), LD, MMO & JA (SALA 109202), LD, MMO & JA (SALA 109204), LD, PF & JA (SALA 109385).
- Veronica dillenii* Crantz, $2n = 16$; LD, MMO, ER & JA (SALA 110142).
- Veronica hederifolia* L., $n = 27$; LD, MMO & JA (SALA 109276), LD, MMO, ER & JA (SALA 109300), LD & JA (SALA 109278). $2n = 36$; LD, MMO & JA (SALA 109255). $2n = 54$; LD, MMO & JA (SALA 109307), LD, MMO & JA (SALA 109264), LD & JA (SALA 109411), LD & JA (SALA 109298).
- Veronica panormitana* Tineo subsp. *panormitana*, $2n = 18$; LD, PF & JA (SALA 105882), LD, PF & JA (SALA 105880).
- Veronica peregrina* L. subsp. *peregrina*, $n = 26$, $2n = 52$; ER (SALA 109319).
- Veronica persica* Poir., $2n = 28$; LD, MMO, ER & JA (SALA 109355), LD, MMO, ER & JA (SALA 109322).
- Veronica polita* Fr., $2n = 14$; JA (SALA 100145), LD, MMO, ER & JA (SALA 109206), LD & JA (SALA 109216), JA (SALA 109210).
- Veronica praecox* All., $2n = 18$; LD, MMO, ER & JA (SALA 109238), JA (SALA 109323), LD, MMO, ER & JA (SALA 109289).
- Veronica sibthorpioides* Debeaux, Degen & Hervier, $n = 14$; LD,

MMO & JA (SALA 109271). $n = 15$; LD, MMO & JA (SALA 109304), LD, MMO, ER & JA (SALA 109259), LD, MMO & JA (SALA 109273). $2n = 28$; LD, MMO & JA (SALA 109274), ER & XG (SALA 109303). $2n = 30$; LD, MMO, ER & JA (SALA 109313), MMO & JA (SALA 109358), LD, MMO & JA (SALA 109361), LD, MMO & JA (SALA 109362).

Veronica spicata L. subsp. *spicata*, $2n = 34$; LD & IS (SALA 105779).
Veronica trichadena Jord. & Fourr., $2n = 18$; LD, PF & JA (SALA 108483).

Veronica triloba (Opiz) Opiz, $n = 9$; LD, MMO & JA (SALA 109275). $2n = 18$; LD, MMO & JA (SALA 109275), LD, MMO & JA (SALA 109265), JA & LD (SALA 109262), LD, MMO & JA (SALA 109270).

Veronica triphyllos L., $n = 7$; LD, MMO, ER & JA (SALA 109236). $2n = 14$; LD, MMO, ER & JA (SALA 109236), LD, MMO, ER & JA (SALA 109239), LD, MMO, ER & JA (SALA 109237).

Veronica verna L., $n = 8$; ER & XG (SALA 109227). $2n = 16$; ER, FJ & MV (SALA 109224), LD & JA (SALA 109225).

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All material CHN; vouchers in SOM.

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ASTERACEAE

Antennaria dioica (L.) Gaertn., $2n = 28$; Bulgaria, V. Vladimirov & D. Ivanova V-No-47, D. Ivanova D-5(6) & R. Gorgorov, D. Ivanova D-5(10) & R. Gorgorov, S. Bancheva V-No-2, V. Vladimirov & S. Bancheva N-A-09-116(2); Norway, S. Bancheva & D. Ivanova H 53, S. Bancheva & D. Ivanova H 55, S. Bancheva & D. Ivanova H 58, S. Bancheva & D. Ivanova H 113, S. Bancheva & D. Ivanova H 117, S. Bancheva & D. Ivanova H 118, S. Bancheva & D. Ivanova H 119.

Omalotheca supina (L.) DC., $2n = 28$; Bulgaria, D. Ivanova D-11(2) & R. Gorgorov, D. Ivanova D-11(6) & R. Gorgorov, D. Ivanova D-11(8) & R. Gorgorov, D. Ivanova D-11(10) & R. Gorgorov; Norway, S. Bancheva & D. Ivanova H 81, S. Bancheva & D. Ivanova H 82, S. Bancheva & D. Ivanova H 83, S. Bancheva & D. Ivanova H 88, S. Bancheva & D. Ivanova H 90.

ERICACEAE

Empetrum nigrum subsp. *hermaphroditum* (Hagerup) Böcher, $2n = 52$; Bulgaria, D. Ivanova D-12(3) & R. Gorgorov, D. Ivanova D-12(5) & R. Gorgorov.

PLANTAGINACEAE

Plantago gentianoides Sibth. & Sm., $2n = 12$; Bulgaria, D. Ivanova & R. Gorgorov s.n., 31 Aug 2009.

POACEAE

Alopecurus gerardii Vill., $2n = 14$; Bulgaria, V. Vladimirov & al. V 10-216, V. Vladimirov & al. V 10-230.

Phleum alpinum L., $2n = 28$; Norway, S. Bancheva & D. Ivanova H 32, S. Bancheva & D. Ivanova H 33, S. Bancheva & D. Ivanova H 37, S. Bancheva & D. Ivanova H 93, S. Bancheva & D. Ivanova

H 95, S. Bancheva & D. Ivanova H 100, S. Bancheva & D. Ivanova H 191, S. Bancheva & D. Ivanova H 194, S. Bancheva & D. Ivanova H 196.

Phleum rhaeticum (Humphries) Rauschert, $2n = 14$; Bulgaria, Osogovo Mts, *V. Vladimirov & al. VV-N 10-11, V. Vladimirov & al. VV-N 10-14.*

PRIMULACEAE

Primula minima L., $2n = 66$; Bulgaria, *D. Ivanova D-3(3) & R. Gorgorov, D. Ivanova D-3(7) & R. Gorgorov, D. Ivanova D-3(9) & R. Gorgorov.*

ROSACEAE

Dryas octopetala L., $2n = 18$; Bulgaria, *D. Ivanova D-15(8) & R. Gorgorov*; Norway, *S. Bancheva & D. Ivanova H 67, S. Bancheva & D. Ivanova H 70.*

Geum montanum L., $2n = 42$; Bulgaria, *V. Vladimirov & al. V 10-159.*

SAXIFRAGACEAE

Saxifraga paniculata Mill., $2n = 28$; Bulgaria, *D. Ivanova RL 01-09-09 & R. Gorgorov, V. Vladimirov V-No-72 & D. Ivanova, S. Bancheva D-17(2).*

IOPB COLUMN

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Methods are described in Aguilera & al. (2011). Karyotype asymmetry indices: A_1 and A_2 (Romero Zarco, 1986); AI (Paszko, 2006); $r > 2$ and R (Stebbins, 1971). Abbreviations: PMC, pollen mother cell; *m*, metacentric; *sm*, submetacentric; *i*, centromeric mean.

ASTERACEAE

Viguiera anchusaefolia var. *immarginata* (DC.) Blake

$n = 11$, $2n = 22$, $22+1B$, $22+2B$, CHN. Argentina, Misiones Province, Leandro N. Alem Department, along the road between the villages of Cerro Azul and Villa Venecia, 23 km SE of Paraná river, in open field, 27°36'S, 55°34'W, 29 Dec 2006, P.M. Aguilera 18 (MNES) (Fig. 1A–D).

Viguiera anchusaefolia (DC.) Baker naturally occurs in Argentina, in its northeast and central-east regions (Misiones, Corrientes, Entre Ríos and Buenos Aires Provinces), Brazil, and Uruguay (Sáenz, 2008). This species has a considerable morphological variability and two varieties can be distinguished, var. *anchusaefolia* and var. *immarginata* (Sáenz, 1979). *Viguiera anchusaefolia* var. *immarginata* exhibited $n = 11$ bivalents in PMC at diakinesis and metaphase I and chromosomes behaved regularly at meiosis. Our results differ from previous chromosome counts which reported $n = 28$, ca. 34, ca. 16–17 II (Turner & al., 1979; Rozenblum & al., 1985; Wulff & al., 1996) in *V. anchusaefolia*. Our plant material is diploid with $2n = 2x = 22$ chromosomes. Unexpectedly, in some individuals from this natural population we noticed $2n = 23$ or 24 chromosomes, and also mitotic instability, that means, on the same slide, different cells from the same root tip bore $2n = 23$ and 24 chromosomes. Therefore, a more exhaustive karyotype analysis was carried out and four cytotypes were recognized. The typical cytotype $2n = 22$ possess a karyotype formula of $18m + 4sm$ chromosomes and this is the standard karyotype. Other three cytotypes possess additional chromosomes, namely B_1 and B_{II} , in combinations $2n = 22 + B_1$, $2n = 22 + B_{II}$, or $2n = 22 + B_1 + B_{II}$. Chromosomes B_1 and B_{II} are *m* and B_1 is slightly larger than B_{II} . Figure

1E summarizes the standard karyotype, together with extra chromosomes. The smallest chromosome has $1.50 \pm 0.07 \mu\text{m}$ (*m*) and the largest $2.37 \pm 0.00 \mu\text{m}$ (*m*) with a mean chromosome length of $1.90 \pm 0.02 \mu\text{m}$. All karyotypes are unimodal ($A_2 = 0.14 \pm 0.01$; $R = 1.58 \pm 0.08$) and symmetrical ($A_1 = 0.22 \pm 0.01$; $r > 2 = 0.00$; $i = 43.42 \pm 0.20$; $AI = 1.52 \pm 0.06$) (category 1A of karyotype asymmetry, Stebbins 1971). The haploid genome has $22.87 \pm 1.23 \mu\text{m}$. The occasional lack of a counterpart chromosome, observed mitotic instability and an earlier condensation along with heteropicnotic behavior throughout the cell cycle (Fig. 1B–C) led us to propose that these extra chromosomes are B ones, which could help to explain the number diversity previously reported for this species.

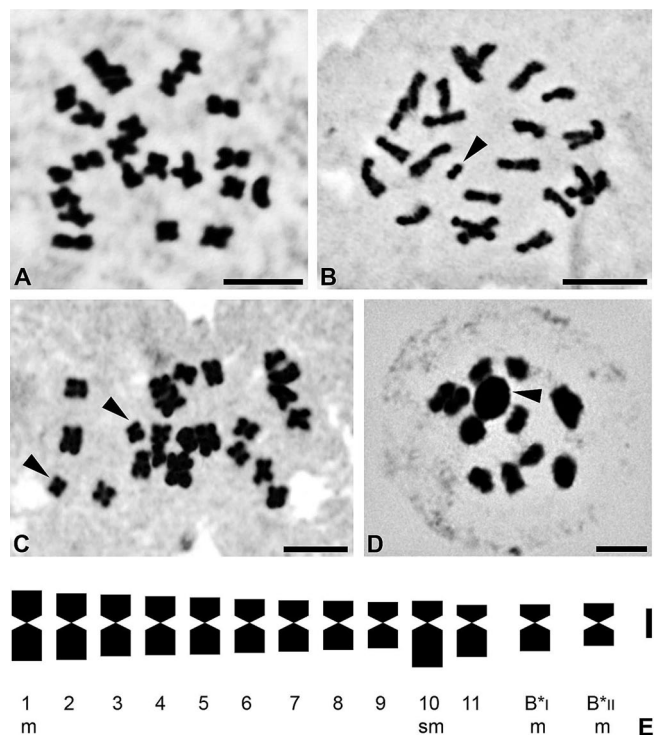


Fig. 1. *Viguiera anchusaefolia* var. *immarginata*. **A–C**, Mitotic metaphases: **A**, $2n = 22$; **B**, $2n = 22 + 1B$; **C**, $2n = 22 + 2B$. **D**, PMC at diakinesis with 11 II. **E**, Standard idiogram and additional B_1 and B_{II} chromosomes. Arrowheads point out additional chromosomes in B and C and nucleolus in D. Scale bar is $5 \mu\text{m}$ for the mitotic metaphases and $1 \mu\text{m}$ for the idiogram.

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 appended to this article. 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.

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- * First chromosome count for the species.
- ** New chromosome number (cytotype) for the species.
- ▼ First chromosome count from an Indian accession.

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ACANTHACEAE*Adhatoda vasica* Nees

$n = 17$, CHN. India, Himachal Pradesh, Kangra, Bankhandi, 31°59'N, 76°12'E, 557 m, along roadsides, 28 Dec 2007, *Santosh Bala SB 21977* (PUN 53050); India, Himachal Pradesh, Kangra, Shahpur, 32°13'N, 76°10'E, 780 m, along roadsides, 11 Oct 2008, *Santosh Bala SB 21978* (PUN 53051); India, Himachal Pradesh, Kangra, Trilokpur, 32°13'N, 76°04'E, 615 m, along roadsides, 7 Mar 2009, *Santosh Bala SB 21979* (PUN 53052) [Fig. 2A].

Asteracantha longifolia (L.) Nees

$n = 16$, CHN. India, Himachal Pradesh, Kangra, Shahpur, 32°13'N, 76°10'E, 780 m, banks of stagnant water, 11 Oct 2008, *Santosh Bala SB 21960* (PUN 53034) [Fig. 2B].

Dicliptera bupleroides Nees

$n = 13$, CHN. India, Himachal Pradesh, Kangra, Shahpur, 32°13'N, 76°10'E, 780 m, grass fields, 2 Apr 2009, *Santosh Bala SB 21959* (PUN 53214) [Fig. 2C].

Eranthemum nervosum (Vahl) R. Br. ex Roem. & Schult.

** $n = 11$, CHN. India, Himachal Pradesh, Kangra, Jarpali, 32°12'N, 76°02'E, 501 m, 7 Mar 2009, *Santosh Bala SB 21968* (PUN 53042) [Fig. 2D].

The present chromosome count is the first record of a diploid cytotype for this species. Otherwise, the species is known as tetraploid with the chromosome number $2n = 44$, as reported by Saggoo (1983).

Hemigraphis latebrosa (Roth) Nees

** $n = 12$, CHN. India, Himachal Pradesh, Kangra, Galua, 32°03'N, 76°06'E, 595 m, along roadsides, 2 Mar 2008, *Santosh Bala SB 21975* (PUN 53049) [Fig. 2E].

$n = 12 + 0 - 2B$, CHN. India, Himachal Pradesh, Kangra, Jarpali, 32°12'N, 76°02'E, 501 m, along roadsides, 8 Mar 2009, *Santosh Bala SB 21976* (PUN 53074) [Fig. 2F].

Earlier reports for this species comprise $2n = 14$ (Vasudevan, 1976), $2n = 26$ (Kaur, 1965), and $2n = 28$ (Saggoo, 1983).

Justicia diffusa Willd.

** $n = 16$, CHN. India, Himachal Pradesh, Kangra, Dharamkot, 32°14'N, 76°19.55'E, 2200 m, along roadsides, 17 Aug 2008, *Santosh Bala SB 21972* (PUN 53046); India, Himachal Pradesh, Kangra, Shahpur, 32°13'N, 76°10'E, 780 m, along roadsides, 13 Oct 2008, *Santosh Bala SB 21973* (PUN 53047) [Fig. 2G].

The present chromosome count differs from the earlier reports of $2n = 36$ by Krishnappa & Basavaraj (1982) and Valsala Deri & Mathew (1982).

Lepidagathis cuspidata Nees

$n = 11$, CHN. India, Himachal Pradesh, Kangra, Salli, 32°14'N, 76°14'E, 1500 m, rocky slopes, 11 Oct 2008, *Santosh Bala SB 21967* (PUN 53041) [Fig. 2H].

Lepidagathis hyalina Nees

** $n = 30$, CHN. India, Himachal Pradesh, Kangra, Galua, 32°03'N, 76°06'E, 595 m, moist areas, 2 Mar 2008, *Santosh Bala SB 21969* (PUN 53043) [Fig. 2I].

The current hexaploid chromosome count differs from the previously reported diploid cytotype of $2n = 20$ by Saggoo (1983) from India.

Peristrophe bicalyculata (Retz.) Nees

$n = 15$, CHN. India, Himachal Pradesh, Kangra, Nagrota Surian, 32°03'N, 76°05'E, 530 m, common in waste places, 3 Nov 2007, *Santosh Bala SB 21974* (PUN 53048) [Fig. 2J].

Strobilanthes alatus Nees

$n = 16$, CHN. India, Himachal Pradesh, Kangra, Multhan; Chhota Banghal, 32°01'N, 76°50'E, 2000 m, in forest undergrowth, 27 Jun 2009, *Santosh Bala SB 21963* (PUN 53037); India, Himachal Pradesh, Kangra, Swar; Chhota Banghal, 32°05'N, 76°51'E, 2500 m, in forest undergrowth, 28 Oct 2009, *Santosh Bala SB 21964* (PUN 53038) [Fig. 2K].

APOCYNACEAE*Catharanthus roseus* (L.) G. Don

$n = 8$, CHN. India, Himachal Pradesh, Kangra, Sakri-Bilaspur, 32°02'N, 76°05'E, 527 m, in orchard, 27 Dec 2007, *Santosh Bala SB 26124* (PUN 53331) [Fig. 2L].

ASTERACEAE**Tribe Anthemideae***Achillea millefolium* L.

$n = 9$, CHN. India, Himachal Pradesh, Kangra, Badagaon; Chhota Banghal, 32°05'N, 76°46'E, 3000 m, near cultivated areas, 29 Jun 2009, *Santosh Bala SB 24999* (PUN 53457) [Fig. 2M].

Artemisia roxburghiana Wall.

$n = 9$, CHN. India, Himachal Pradesh, Kangra, Polling; Chhota Banghal, 32°05'N, 76°51'E, 2200 m, open slopes, 25 Sep 2009, *Santosh Bala SB 24904* (PUN 53365) [Fig. 2N].

Artemisia vestita Wall. ex Besser

** $n = 27$, CHN. India, Himachal Pradesh, Kangra, Loharadi; Chhota Banghal, 32°04'N, 76°51'E, 2200 m, dry slopes, 25 Sep 2009, *Santosh Bala SB 20864* (PUN 49261) [Fig. 2O].

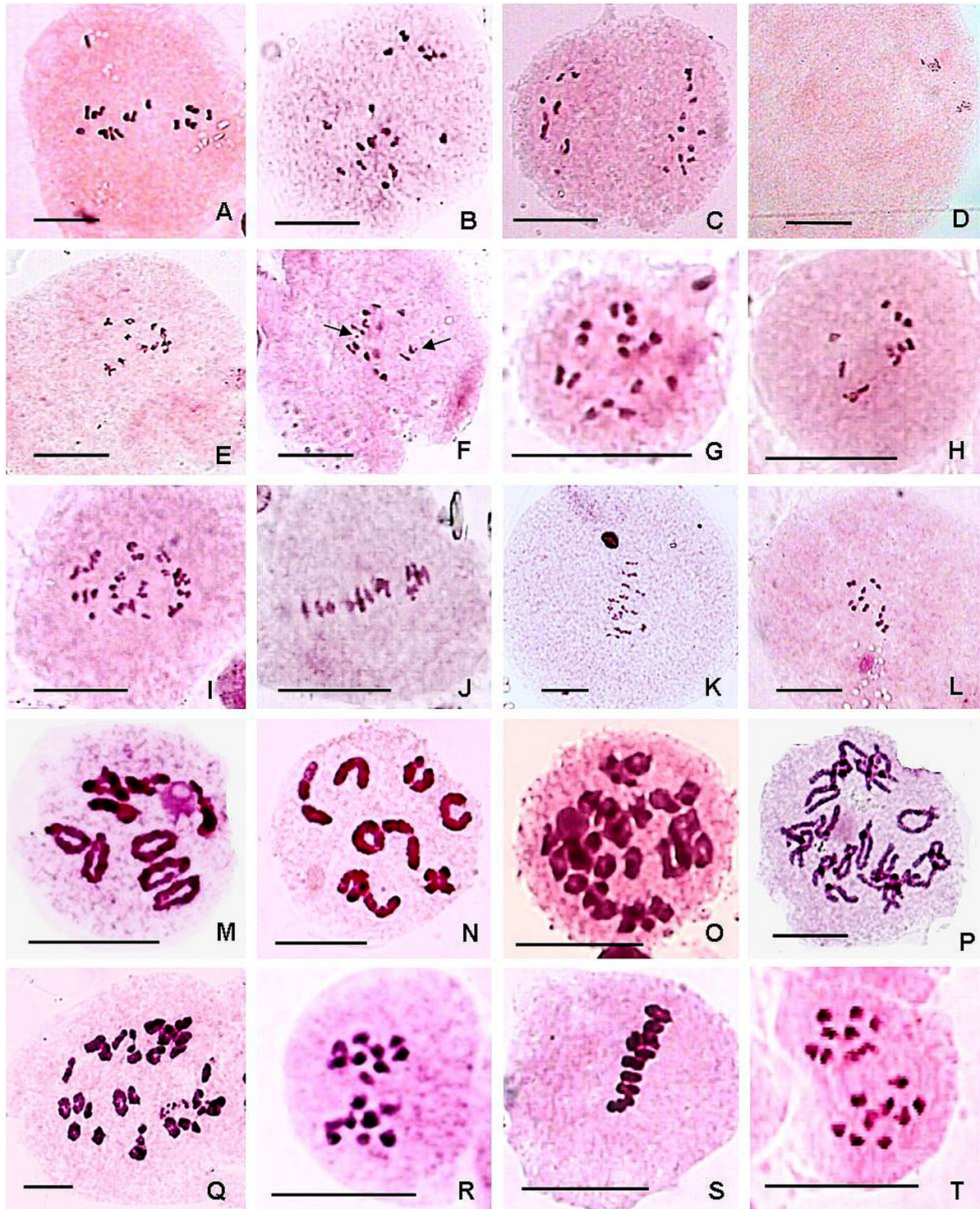


Fig. 2. **A**, *Adhatoda vasica*, meiotic metaphase I, $n = 17$ (PUN 53051); **B**, *Asteracantha longifolia*, meiotic metaphase I, $n = 16$ (PUN 53034); **C**, *Dicliptera bupleroides*, meiotic anaphase I, $n = 13$ (PUN 53214); **D**, *Eranthemum nervosum*, meiotic anaphase I, $n = 11$ (PUN 53042); **E–F**, *Hemigraphis latebrosa*: **E**, meiotic metaphase I, $n = 12$ (PUN 53049), **F**, meiotic metaphase I, $n = 12+2B$ (PUN 53050); **G**, *Justicia diffusa*, meiotic metaphase I, $n = 16$ (PUN 53046); **H**, *Lepidagathis cuspidata*, meiotic metaphase I, $n = 11$ (PUN 53041); **I**, *Lepidagathis hyalina*, meiotic metaphase I, $n = 30$ (PUN 53043); **J**, *Peristrophe bicalyculata*, meiotic metaphase I, $n = 15$ (PUN 53048); **K**, *Strobilanthes alatus*, meiotic metaphase I, $n = 16$ (PUN 53037); **L**, *Catharanthus roseus*, meiotic metaphase I, $n = 8$ (PUN 53331); **M**, *Achillea millefolium*, meiotic diakinesis, $n = 9$ (PUN 53457); **N**, *Artemisia roxburghiana*, meiotic metaphase I, $n = 9$ (PUN 53365); **O**, *Artemisia vestita*, meiotic diakinesis, $n = 27$ (PUN 49261); **P**, *Chrysanthemum leucanthemum*, meiotic diakinesis, $n = 18$ (PUN 53352). **Q**, *Aster peduncularis*, meiotic metaphase I, $n = 27$ (PUN 53458); **R**, *Conyza canadensis*, meiotic anaphase I, $n = 9$ (PUN 53384); **S**, *Conyza japonica*, meiotic metaphase I, $n = 9$ (PUN 53416); **T**, *Conyza stricta* var. *pinnatifida*, meiotic anaphase I, $n = 9$ (PUN 53418). Scale bar = 10 μm

Previously, diploid cytotype of $2n = 18$ was reported for this species by Kaul & Bakshi (1984).

Chrysanthemum leucanthemum L.

$n = 18$, CHN. India, Himachal Pradesh, Kangra, Multhan; Chhota Banghal, 32°01'N, 76°50'E, 2000 m, waste places, 27 Jun 2009, *Santosh Bala SB 26145* (PUN 53352) [Fig. 2P].

Tribe Astereae

Aster peduncularis Wall. ex Nees

$n = 27$, CHN. India, Himachal Pradesh, Kangra, Swar; Chhota Banghal, 32°05'N, 76°51'E, 2500 m, rocky slopes and shady moist places, 25 Sep 2009, *Santosh Bala SB 25000* (PUN 53458) [Fig. 2Q].

Conyza canadensis (L.) Cronq.

$n = 9$, CHN. India, Himachal Pradesh, Kangra, Loharadi; Chhota Banghal, 32°04'N, 76°51'E, 2200 m, along roadsides and on waste places, 25 Jun 2009, *Santosh Bala SB 24924* (PUN 53384) [Fig. 2R].

Conyza japonica Less.

$n = 9$, CHN. India, Himachal Pradesh, Kangra, Dharamshala, 32°13'N, 76°18'E, 1500 m, in forests and along roadsides, 13 Oct 2008, *Santosh Bala SB 24957* (PUN 53416); India, Himachal Pradesh, Kangra, Palampur, 32°05'N, 76°32'E, 1219 m, in forests and along roadsides, 1 Apr 2009, *Santosh Bala SB 24958* (PUN 53417) [Fig. 2S].

Conyza stricta var. *pinnatifida* Kitam.

$n = 9$, CHN. India, Himachal Pradesh, Kangra, Loharadi; Chhota Banghal, 32°04'N, 76°51'E, 2200 m, 25 Sep 2009, *Santosh Bala SB 24959* (PUN 53418); India, Himachal Pradesh, Kangra, Bir, 32°02'N, 76°43'E, 1300 m, 9 Apr 2008, *Santosh Bala SB 24960* (PUN 53419) [Fig. 2T].

Conyza stricta Willd. var. *stricta*

* $n = 9$, CHN. India, Himachal Pradesh, Kangra, Pargor, 32°10'N, 76°03'E, 780 m, exposed grassy hill slopes, 8 Mar 2009, *Santosh Bala SB 24961* (PUN 53420) [Fig. 3A].

Cyathocline lyrata Cass.

$n = 9$, CHN. India, Himachal Pradesh, Kangra, Bassa, 32°03'N, 76°04'E, 490 m, 28 Feb 2008, marshy and swampy places, *Santosh Bala SB 26151* (PUN 53358) [Fig. 3B].

Dicrocephala chrysanthemifolia (Blume) DC.

$n = 9$, CHN. India, Himachal Pradesh, Kangra, Dyot; Chhota Banghal, 32°01'N, 76°50'E, 2037 m, along roadsides and waste places, 28 Jun 2009, *Santosh Bala SB 24915* (PUN 53376); India, Himachal Pradesh, Kangra, Loharadi; Chhota Banghal, 32°04'N, 76°51'E, 2200 m, along roadsides and waste places, 28 Jun 2009, *Santosh Bala SB 24916* (PUN 53377) [Fig. 3C].

Dicrocephala integrifolia (L. f.) Kuntze

$n = 9$, CHN. India, Himachal Pradesh, Kangra, Banuri, 32°04'N, 76°34'E, 1300 m, in rock crevices, 7 Apr 2008, *Santosh Bala SB 24911* (PUN 53372); India, Himachal Pradesh, Kangra, Shahpur, 32°13'N, 76°10'E, 780 m, in rock crevices, 11 Oct 2008, *Santosh Bala SB 24912* (PUN 53373); India, Himachal Pradesh, Kangra, Dharamshala, 32°13'N, 76°18'E, 1500 m, in rock crevices, 12 Oct 2008, *Santosh Bala SB 24913* (PUN 53374) [Fig. 3D].

Erigeron annuus (L.) Pers.

$2n = 27$, CHN. India, Himachal Pradesh, Kangra, Multhan; Chhota Banghal, 32°01'N, 76°50'E, 2000 m, moist and shady places, 27 Jun 2009, *Santosh Bala SB 24920* (PUN 53380); India, Himachal Pradesh, Kangra, Badagaon; Chhota Banghal, 32°05'N, 76°46'E, 3000 m, moist and shady places, 26 Jun 2009, *Santosh Bala SB*

24921 (PUN 53381); India, Himachal Pradesh, Kangra, Dyot; Chhota Banghal, 32°01'N, 76°50'E, 2037 m, moist and shady places, 26 Sep 2009, *Santosh Bala SB 24922* (PUN 53382); India, Himachal Pradesh, Kangra, Banuri, 32°04'N, 76°34'E, 1300 m, found in moist and shady places, 7 Apr 2008, *Santosh Bala SB 24925* (PUN 53385) [Fig. 3E].

Erigeron bonariensis L.

$n = 27$, CHN. India, Himachal Pradesh, Kangra, Swar; Chhota Banghal, 32°05'N, 76°51'E, 2500 m, waste places, 26 Sep 2009, *Santosh Bala SB 24923* (PUN 53383); India, Himachal Pradesh, Kangra, Sakri-Bilaspur, 32°02'N, 76°05'E, 527 m, waste places, 20 May 2009, *Santosh Bala SB 24949* (PUN 53409); India, Himachal Pradesh, Kangra, Polling; Chhota Banghal, 32°05'N 76°51'E, 2200 m, waste places, 25 Sep 2009, *Santosh Bala SB 24951* (PUN 53410); India, Himachal Pradesh, Kangra, Dyot; Chhota Banghal, 32°01'N, 76°50'E, 2037 m, waste places, 26 Sep 2009, *Santosh Bala SB 24952* (PUN 53411) [Fig. 3F].

Myriactis nepalensis Less.

$n = 18$, CHN. India, Himachal Pradesh, Kangra, Loharadi; Chhota Banghal, 32°04'N, 76°51'E, 2200 m, waste places, orchards and forests, 26 Jun 2009, *Santosh Bala SB 24901* (PUN 53362); India, Himachal Pradesh, Kangra, Polling; Chhota Banghal, 32°05'N, 76°51'E, 2200 m, waste places, orchards and forests, 26 Jun 2009, *Santosh Bala SB 24902* (PUN 53363) [Fig. 3G].

Solidago canadensis L.

$n = 27$, CHN. India, Himachal Pradesh, Kangra, Gaggal, 32°11'N, 76°16'E, 770 m, hill slopes, 3 Nov 2007, *Santosh Bala SB 24986* (PUN 53444) [Fig. 3H].

Solidago virgaurea L.

$n = 9$, CHN. India, Himachal Pradesh, Kangra, Loharadi; Chhota Banghal, 32°04'N, 76°51'E, 2200 m, open slopes, 25 Sep 2009, *Santosh Bala SB 24989* (PUN 53447); India, Himachal Pradesh, Kangra, Badagaon; Chhota Banghal, 32°05'N, 76°46'E, 3000 m, open slopes, 26 Sep 2009, *Santosh Bala SB 24990* (PUN 53448) [Fig. 3I].

Tribe Cardueae

Arctium lappa L.

$n = 16$, CHN. India, Himachal Pradesh, Kangra, Loharadi; Chhota Banghal, 32°04'N, 76°51'E, 2200 m, open slopes, 25 Sep 2009, *Santosh Bala SB 26146* (PUN 53353) [Fig. 3J].

Cirsium wallichii DC.

$n = 17$, CHN. India, Himachal Pradesh, Kangra, Loharadi; Chhota Banghal, 32°04'N, 76°51'E, 2200 m, waste places, 25 Sep 2009, *Santosh Bala SB 26148* (PUN 53355) [Fig. 3K].

Saussurea candicans (DC.) Sch.-Bip.

$n = 16$, CHN. India, Himachal Pradesh, Kangra, Galua, 32°03'N, 76°06'E, 595 m, dry slopes, 1 Mar 2008, *Santosh Bala SB 24953* (PUN 53412); India, Himachal Pradesh, Kangra, Solda, 32°14'N, 76°04'E, 621 m, dry slopes, 7 Mar 2009, *Santosh Bala SB 24954* (PUN 53413) [Fig. 3L].

Tricholepis elongata DC.

$n = 16$, CHN. India, Himachal Pradesh, Kangra, Loharadi; Chhota Banghal, 32°04'N, 76°51'E, 2200 m, sloppy waste places, 25 Sep 2009, *Santosh Bala SB 24972* (PUN 53430) [Fig. 3M].

Tribe Cichorieae

Crepis japonica (L.) Benth.

$n = 8$, CHN. India, Himachal Pradesh, Kangra, Sakri-Bilaspur, 32°02'N, 76°05'E, 527 m, shady places, 2 Nov 2008, *Santosh Bala SB 24962* (PUN 53421); India, Himachal Pradesh, Kangra, Shahpur,

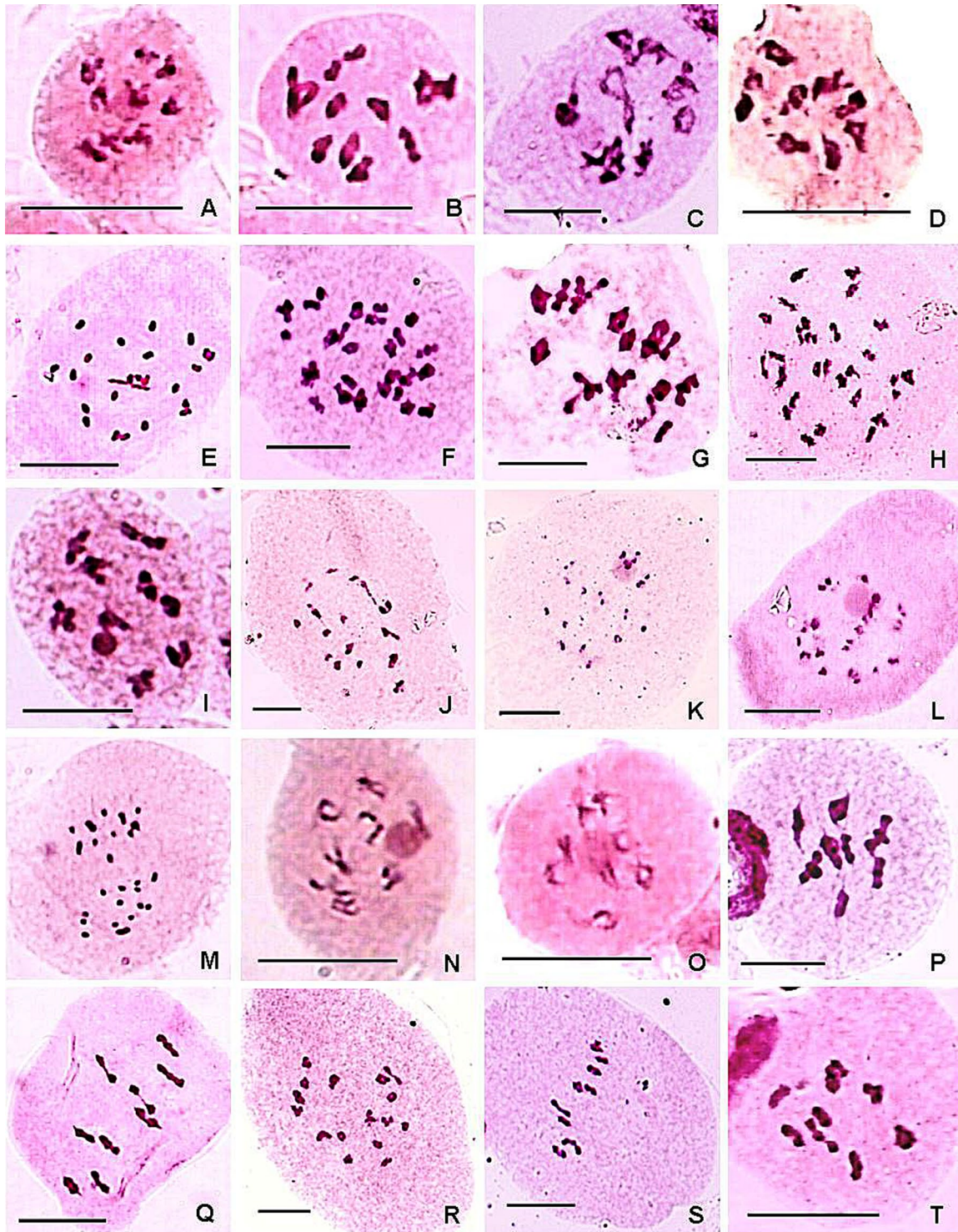


Fig. 3. **A**, *Conyza stricta* var. *stricta*, meiotic diakinesis, $n = 9$ (PUN 53420); **B**, *Cyathocline lyrata*, meiotic metaphase I, $n = 9$ (PUN 53358); **C**, *Dicrocephala chrysanthemifolia*, meiotic diakinesis, $n = 9$ (PUN 53376); **D**, *Dicrocephala intergrifolia*, meiotic metaphase I, $n = 9$ (PUN 53372); **E**, *Erigeron annuus*, meiotic metaphase I, $2n = 27$ (PUN 53380); **F**, *Erigeron bonariensis*, meiotic metaphase I, $n = 27$ (PUN 53383); **G**, *Myriactis nepalensis*, meiotic metaphase I, $n = 18$ (PUN 53362); **H**, *Solidago canadensis*, meiotic metaphase I, $n = 27$ (PUN 53444); **I**, *Solidago virgaurea*, meiotic metaphase I, $n = 9$ (PUN 53447); **J**, *Arctium lappa*, meiotic metaphase I, $n = 16$ (PUN 53353); **K**, *Cirsium wallichii*, meiotic diakinesis, $n = 17$ (PUN 53355); **L**, *Saussurea candicans*, meiotic diakinesis, $n = 16$ (PUN 53413); **M**, *Tricholepis elongata*, meiotic anaphase I, $n = 16$ (PUN 53430); **N**, *Crepis japonica*, meiotic diakinesis, $n = 8$ (PUN 53421); **O**, *Lactuca dissecta*, meiotic diakinesis, $n = 8$ (PUN 53350); **P**, *Lactuca dolichophylla*, meiotic metaphase I, $n = 8$ (PUN 54283); **Q**, *Launaea procumbens*, meiotic metaphase I, $n = 9$ (PUN 53349); **R**, *Sonchus asper*, meiotic metaphase I, $n = 9$ (PUN 53399); **S**, *Sonchus brachyotus*, meiotic metaphase I, $n = 9$ (PUN 53391); **T**, *Sonchus oleraceus*, meiotic metaphase I, $n = 16$ (PUN 53392). Scale bar = 10 μm .

32°13'N, 76°10'E, 780 m, shady places, 11 Oct 2008, *Santosh Bala SB 24963* (PUN 53422); India, Himachal Pradesh, Kangra, Dharamshala, 32°13'N, 76°18'E, 1500 m, shady places, 12 Oct 2008, *Santosh Bala SB 24964* (PUN 53423); India, Himachal Pradesh, Kangra, Loharadi; Chhota Banghal, 32°04'N, 76°51'E, 2200 m, shady places, 28 Jun 2009, *Santosh Bala SB 24965* (PUN 53424) [Fig. 3N].

Lactuca dissecta D. Don

n = 8, CHN. India, Himachal Pradesh, Kangra, Bir, 32°02'N, 76°43'E, 1300 m, waste places, 8 Apr 2008, *Santosh Bala SB 26143* (PUN 53350); India, Himachal Pradesh, Kangra, Loharadi; Chhota Banghal, 32°04'N, 76°51'E, 2200 m, waste places, 28 Jun 2009, *Santosh Bala SB 26144* (PUN 53351) [Fig. 3O].

Lactuca dolichophylla Kitam.

n = 8, CHN. India, Himachal Pradesh, Kangra, Badagaon; Chhota Banghal, 32°05'N, 76°46'E, 3000 m, slopes, 29 Jun 2009, *Santosh Bala SB 26155* (PUN 54283) [Fig. 3P].

Launaea procumbens (Roxb.) Ramayya & Rajagopal

n = 9, CHN. India, Himachal Pradesh, Kangra, Sakri-Bilaspur, 32°02'N, 76°05'E, 527 m, fields, 2 Nov 2008, *Santosh Bala SB 26142* (PUN 53349) [Fig. 3Q].

Sonchus asper (L.) Hill

n = 9, CHN. India, Himachal Pradesh, Kangra, Bir, 32°02'N, 76°43'E, 1300 m, moist waste places, 8 Apr 2008, *Santosh Bala SB 24939* (PUN 53399); India, Himachal Pradesh, Kangra, Multhan; Chhota Banghal, 32°01'N, 76°50'E, 2000 m, moist waste places, 27 Jun 2009, *Santosh Bala SB 24940* (PUN 53400); India, Himachal Pradesh, Kangra, Loharadi; Chhota Banghal, 32°04'N, 76°51'E, 2200 m, moist waste places, 28 Jun 2009, *Santosh Bala SB 24941* (PUN 53401) [Fig. 3R].

Sonchus brachyotus DC.

n = 9, CHN. India, Himachal Pradesh, Kangra, Dharamshala, 32°13'N, 76°18'E, 1500 m, shady places, 12 Oct 2008, *Santosh Bala SB 24931* (PUN 53391); India, Himachal Pradesh, Kangra, Shahpur, 32°13'N, 76°10'E, 780 m, shady places, 11 Oct 2008, *Santosh Bala SB 24933* (PUN 53393); India, Himachal Pradesh, Kangra, Solda, 32°14'N, 76°04'E, 621 m, shady places, 7 Mar 2009, *Santosh Bala SB 24934* (PUN 53394) [Fig. 3S].

Sonchus oleraceus L.

n = 16, CHN. India, Himachal Pradesh, Kangra, Dharamshala, 32°13'N, 76°18'E, 1500 m, weed of cultivated and waste places, 12 Oct 2008, *Santosh Bala SB 24932* (PUN 53392); India, Himachal Pradesh, Kangra, Trilokpur, 32°13'N, 76°04'E, 615 m, weed of cultivated and waste places, 7 Mar 2009, *Santosh Bala SB 24935* (PUN 53395); India, Himachal Pradesh, Kangra, Nagrota Surian, 32°03'N, 76°05'E, 530 m, weed of cultivated and waste places, 2 Nov 2008, *Santosh Bala SB 24937* (PUN 53397); India, Himachal Pradesh, Kangra, Dyot; Chhota Banghal, 32°01'N, 76°50'E, 2037 m, weed of cultivated and waste places, 26 Sep 2009, *Santosh Bala SB 24938* (PUN 53398); India, Himachal Pradesh, Kangra, Shahpur, 32°13'N, 76°10'E, 780 m, weed of cultivated and waste places, 11 Oct 2008, *Santosh Bala SB 24942* (PUN 53402); India, Himachal Pradesh, Kangra, Sakri-Bilaspur, 32°02'N, 76°05'E, 527 m, weed of cultivated and waste places, 3 Nov 2007, *Santosh Bala SB 24944* (PUN 53404); India, Himachal Pradesh, Kangra, Bir, 32°02'N, 76°43'E, 1300 m, weed of cultivated and waste places, 8 Apr 2008, *Santosh Bala SB 24945* (PUN 53405) [Fig. 3T].

Taraxacum officinale Wigg.

n = 8, CHN. India, Himachal Pradesh, Kangra, Sakri-Bilaspur, 32°02'N, 76°05'E, 527 m, open grass fields, 2 Feb 2008, *Santosh*

Bala SB 24982 (PUN 53440); India, Himachal Pradesh, Kangra, Bir, 32°02'N, 76°43'E, 1300 m, open grass fields, 8 Apr 2008, *Santosh Bala SB 24983* (PUN 53441); India, Himachal Pradesh, Kangra, Solda, 32°14'N, 76°04'E, 621 m, open grass fields, 7 Mar 2009, *Santosh Bala SB 24984* (PUN 53442); India, Himachal Pradesh, Kangra, Loharadi; Chhota Banghal, 32°04'N, 76°51'E, 2200 m, open grass fields, 28 Jun 2009, *Santosh Bala SB 24985* (PUN 53443) [Fig. 4A].

Tribe Eupatorieae

Ageratum conyzoides L.

n = 10, CHN. India, Himachal Pradesh, Kangra, Nagrota Surian, 32°03'N, 76°05'E, 530 m, moist places and field edges, 2 Nov 2006, *Santosh Bala SB 20878* (PUN 49282); India, Himachal Pradesh, Kangra, Shahpur, 32°13'N, 76°10'E, 780 m, moist places and field edges, 13 Oct 2008, *Santosh Bala SB 24948* (PUN 53408) [Fig. 4B].

n = 20, CHN. India, Himachal Pradesh, Kangra, Gaggal, 32°11'N, 76°16'E, 770 m, moist places and field edges, 4 Nov 2007, *Santosh Bala SB 24946* (PUN 53406); India, Himachal Pradesh, Kangra, Dharamkot, 32°14'N, 76°19.55'E, 2200 m, moist places and field edges, 28 Jul 2008, *Santosh Bala SB 24947* (PUN 53407) [Fig. 4C].

Eupatorium adenophorum Spreng.

n = 51, CHN. India, Himachal Pradesh, Kangra, Harchhakian, 32°08'N, 76°07'E, 600 m, waste places, 7 Mar 2009, *Santosh Bala SB 24966* (PUN 53425); India, Himachal Pradesh, Kangra, Bassa, 32°03'N, 76°04'E, 490 m, 2 Mar 2008, waste places, *Santosh Bala SB 24967* (PUN 53426); India, Himachal Pradesh, Kangra, Mecleodganj, 32°15'N, 76°17'E, 1780 m, waste places, 28 Feb 2008, *Santosh Bala SB 24968* (PUN 53427); India, Himachal Pradesh, Kangra, Palampur, 32°05'N, 76°32'E, 1219 m, waste places, 1 Apr 2009, *Santosh Bala SB 24969* (PUN 53428) [Fig. 4D].

Tribe Heliantheae

Bidens biternata (Lour.) Merr. & Sherff

n = 36, CHN. India, Himachal Pradesh, Kangra, Dharamshala, 32°13'N, 76°18'E, 1500 m, waste places, 12 Oct 2008, *Santosh Bala SB 24917* (PUN 53378); India, Himachal Pradesh, Kangra, Nagrota Surian, 32°03'N, 76°05'E, 530 m, waste places, 14 Nov 2009, *Santosh Bala SB 24918* (PUN 53379); India, Himachal Pradesh, Kangra, Multhan; Chhota Banghal, 32°01'N, 76°50'E, 2000 m, waste places, 27 Jun 2009, *Santosh Bala SB 24919* (PUN 53459) [Fig. 4E].

Bidens pilosa L.

n = 36, CHN. India, Himachal Pradesh, Kangra, Galua, 32°03'N, 76°06'E, 595 m, orchards, 28 Feb 2008, *Santosh Bala SB 26150* (PUN 53357) [Fig. 4F].

Bidens tripartita L.

n = 36, CHN. India, Himachal Pradesh, Kangra, Shahpur, 32°13'N, 76°10'E, 780 m, along water channels, 13 Oct 2008, *Santosh Bala SB 26149* (PUN 53356) [Fig. 4G].

Cosmos bipinnatus Cav.

n = 12, CHN. India, Himachal Pradesh, Kangra, Dyot; Chhota Banghal, 32°01'N, 76°50'E, 2037 m, near cultivated area, 25 Sep 2009, *Santosh Bala SB 26139* (PUN 53346); India, Himachal Pradesh, Kangra, Swar; Chhota Banghal, 32°05'N, 76°51'E, 2500 m, near cultivated area, 25 Sep 2009, *Santosh Bala SB 26140* (PUN 53347) [Fig. 4H].

Cosmos sulphureus Cav.

n = 12+0–1B, CHN. India, Himachal Pradesh, Kangra, Gaggal, 32°11'N, 76°16'E, 770 m, grows near cultivated area, 5 Apr 2007, *Santosh Bala SB 26141* (PUN 53348) [Fig. 4I].

Eclipta alba (L.) Hassk.

n = 11, CHN. India, Himachal Pradesh, Kangra, Mecleodganj,

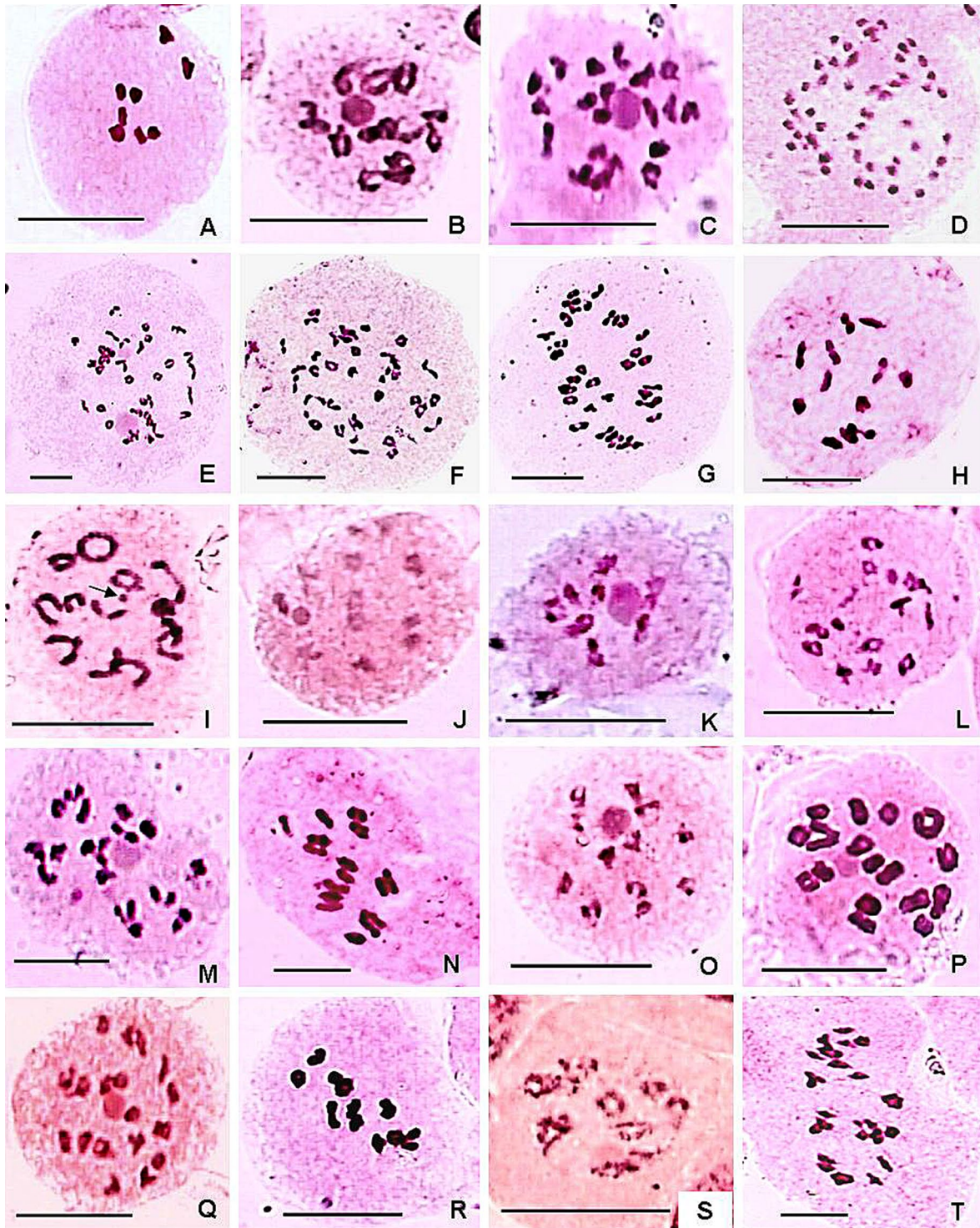


Fig. 4. **A**, *Taraxacum officinale*, meiotic metaphase I, $n = 8$ (PUN 53440); **B–C**, *Ageratum conyzoides*: **B**, meiotic diakinesis, $n = 10$ (PUN 53408), **C**, meiotic diakinesis, $n = 20$ (PUN 53406); **D**, *Eupatorium adenophorum*, meiotic diakinesis, $n = 51$ (PUN 53425); **E**, *Bidens biternata*, meiotic diakinesis, $n = 36$ (PUN 53378); **F**, *Bidens pilosa*, meiotic metaphase I, $n = 36$ (PUN 53357); **G**, *Bidens tripartita*, meiotic metaphase I, $n = 36$ (PUN 53356); **H**, *Cosmos bipinnatus*, meiotic metaphase I, $n = 12$ (PUN 53346); **I**, *Cosmos sulphureus*, meiotic diakinesis, $n = 12 + 0-1B$ (PUN 53348); **J**, *Eclipta alba*, meiotic diakinesis, $n = 11$ (PUN 53368); **K–L**, *Galinsoga parviflora*: **K**, meiotic diakinesis, $n = 8$ (PUN 52610), **L**, meiotic metaphase I, $n = 16$ (PUN 52609); **M**, *Parthenium hysterophorus*, meiotic diakinesis, $n = 17$ (PUN 53445); **N**, *Sigesbeckia orientalis*, meiotic metaphase I, $n = 15$ (PUN 53449); **O**, *Synedrella vialis*, meiotic diakinesis, $n = 12$ (PUN 53431); **P**, *Tridax procumbens*, meiotic diakinesis, $n = 18$ (PUN 53438); **Q**, *Xanthium strumarium*, meiotic metaphase I, $n = 18$ (PUN 53436); **R**, *Blumea laciniata*, meiotic metaphase I, $n = 9$ (PUN 53415); **S**, *Blumea mollis*, meiotic diakinesis, $n = 9$ (PUN 53414); **T**, *Carpesium abrotanoides*, meiotic metaphase I, $n = 18$ (PUN 49301). Scale bar = 10 μm .

32°15'N, 76°17'E, 1780 m, moist places, 27 Aug 2008, *Santosh Bala SB 24907* (PUN 53368); India, Himachal Pradesh, Kangra, Nagrota Surian, 32°03'N, 76°05'E, 530 m, moist places, 12 Jul 2009, *Santosh Bala SB 24908* (PUN 53369); India, Himachal Pradesh, Kangra, Dharamshala, 32°13'N, 76°18'E, 1500 m, moist places, 12 Oct 2008, *Santosh Bala SB 24909* (PUN 53370); India, Himachal Pradesh, Kangra, Shahpur, 32°13'N, 76°10'E, 780 m, moist places, 13 Oct 2008, *Santosh Bala SB 24910* (PUN 53371) [Fig. 4J].

Galinsoga parviflora Cav.

$n = 8$, CHN. India, Himachal Pradesh, Kangra, Palampur, 32°05'N, 76°32'E, 1219 m, dry rocks, 7 Apr 2008, *Santosh Bala SB 21820* (PUN 52610); India, Himachal Pradesh, Kangra, Badagaon; Chhota Banghal, 32°05'N, 76°46'E, 3300 m, dry rocks, 25 Sep 2009, *Santosh Bala SB 21822* (PUN 52612) [Fig. 4K].

$n = 16$, CHN. India, Himachal Pradesh, Kangra, Mecleodganj, 32°15'N, 76°17'E, 1780 m, cultivated areas, 27 Aug 2008, *Santosh Bala SB 21819* (PUN 52609); India, Himachal Pradesh, Kangra, Dharamshala, 32°13'N, 76°18'E, 1500 m, cultivated areas, 12 Oct 2008, *Santosh Bala SB 21821* (PUN 52611) [Fig. 4L].

Parthenium hysterophorus L.

$n = 17$, CHN. India, Himachal Pradesh, Kangra, Dharamshala, 32°13'N, 76°18'E, 1500 m, waste places, 12 Oct 2008, *Santosh Bala SB 24987* (PUN 53445) [Fig. 4M].

Sigesbeckia orientalis L.

$n = 15$, CHN. India, Himachal Pradesh, Kangra, Sakri-Bilaspur, 32°02'N, 76°05'E, 527 m, waste places, 14 Nov 2009, *Santosh Bala SB 24991* (PUN 53449); India, Himachal Pradesh, Kangra, Dyot; Chhota Banghal, 32°01'N, 76°50'E, 2037 m, waste places, 27 Jun 2009, *Santosh Bala SB 24992* (PUN 53450); India, Himachal Pradesh, Kangra, Loharadi; Chhota Banghal, 32°04'N, 76°51'E, 2200 m, waste places, 26 Jun 2009, *Santosh Bala SB 24993* (PUN 53451); India, Himachal Pradesh, Kangra, Shahpur, 32°13'N, 76°10'E, 780 m, waste places, 13 Sep 2008, *Santosh Bala SB 24994* (PUN 53452) [Fig. 4N].

Synedrella vialis A. Gray

* $n = 12$, CHN. India, Himachal Pradesh, Kangra, Dharamshala, 32°13'N, 76°18'E, 1500 m, moist places, 12 Oct 2008, *Santosh Bala SB 24973* (PUN 53431) [Fig. 4O].

Tridax procumbens L.

$n = 18$, CHN. India, Himachal Pradesh, Kangra, Pargor, 32°10'N, 76°03'E, 780 m, as a weed, 2 Nov 2008, *Santosh Bala SB 24980* (PUN 53438); India, Himachal Pradesh, Kangra, Sakri-Bilaspur, 32°02'N, 76°05'E, 527 m, as a weed, 7 Mar 2009, *Santosh Bala SB 24981* (PUN 53439) [Fig. 4P].

Xanthium strumarium L.

$n = 18$, CHN. India, Himachal Pradesh, Kangra, Shahpur, 32°13'N, 76°10'E, 780 m, a weed of roadsides, 11 Oct 2008, *Santosh Bala SB 24978* (PUN 53436); India, Himachal Pradesh, Kangra, Dharamshala, 32°13'N, 76°18'E, 1500 m, a weed of roadsides, 12 Oct 2008, *Santosh Bala SB 24979* (PUN 53437) [Fig. 4Q].

Tribe Inuleae

Blumea laciniata (Roxb.) DC.

$n = 9$, CHN. India, Himachal Pradesh, Kangra, Sakri-Bilaspur, 32°02'N, 76°05'E, 527 m, waste places, 2 Feb 2009, *Santosh Bala SB 24956* (PUN 53415) [Fig. 4R].

Blumea mollis (D. Don) Merr.

$n = 9$, CHN. India, Himachal Pradesh, Kangra, Trilokpur, 32°13'N, 76°04'E, 615 m, along roadsides, 7 Mar 2009, *Santosh Bala SB 24955* (PUN 53414) [Fig. 4S].

Carpesium abrotanoides L.

▼ $n = 18$, CHN. India, Himachal Pradesh, Kangra, Lohardi; Chhota Banghal, 32°04'N, 76°51'E, 2200 m, along roadsides, 26 Jun 2009, *Santosh Bala SB 20888* (PUN 49301) [Fig. 4T].

Current report agrees with the earlier report given by Nishikawa (1984).

Gnaphalium coarctatum Willd.

* $n = 14$, CHN. India, Himachal Pradesh, Kangra, Baijnath, 32°15'N, 76°20'E, 1300 m, rocky grounds in waste places, 3 Nov 2007, *Santosh Bala SB 24928* (PUN 53388); India, Himachal Pradesh, Kangra, Palampur, 32°05'N, 76°32'E, 1219 m, rocky grounds in waste places, 2 Apr 2009, *Santosh Bala SB 24929* (PUN 53389); India, Himachal Pradesh, Kangra, Multhan; Chhota Banghal, 32°01'N, 76°50'E, 2000 m, rocky grounds in waste places, 27 Jun 2009, *Santosh Bala SB 24930* (PUN 53390) [Fig. 5A].

Gnaphalium hypoleucum DC.

$n = 7$, CHN. India, Himachal Pradesh, Kangra, Palampur, 32°05'N, 76°32'E, 1219 m, slopes and pastures, 6 Mar 2008, *Santosh Bala SB 20889* (PUN 49302) [Fig. 5B].

Gnaphalium pensylvanicum Willd.

** $n = 9$, CHN. India, Himachal Pradesh, Kangra, Sakri-Bilaspur, 32°02'N, 76°05'E, 527 m, cultivated areas, 28 Jun 2008, *Santosh Bala SB 20890* (PUN 49304) [Fig. 5C].

The present chromosome count differs from the only earlier report of $2n = 28$ for this species by Gupta & Gill (1989).

Vicoa indica (L.) DC.

$n = 9$, CHN. India, Himachal Pradesh, Kangra, Bhagsunaag, 32°15'N, 76°20'E, 1800 m, slopes, 3 Feb 2007, *Santosh Bala SB 24975* (PUN 53433); India, Himachal Pradesh, Kangra, Jarpali, 32°12'N, 76°02'E, 501 m, slopes, 7 Mar 2009, *Santosh Bala SB 24976* (PUN 53434); India, Himachal Pradesh, Kangra, 32 Meel, 32°12'N, 76°02'E, 620 m, slopes, 7 Mar 2009, *Santosh Bala SB 24977* (PUN 53435) [Fig. 5D].

Vicoa vestita (Wall. ex DC.) Benth.

$n = 9$, CHN. India, Himachal Pradesh, Kangra, Harchhakian, 32°08'N, 76°07'E, 600 m, waste places, 7 Mar 2009, *Santosh Bala SB 24974* (PUN 53432) [Fig. 5E].

Tribe Mutisieae

Gerbera gossypina (Royle) Beauverd

* $n = 9$, CHN. India, Himachal Pradesh, Kangra, Boh, 32°17'N, 76°10'E, 1670 m, shrubberies, 12 Apr 2010, *Santosh Bala SB 26154* (PUN 54284) [Fig. 5F].

Tribe Senecioneae

Emilia sonchifolia (L.) DC.

$n = 5$, CHN. India, Himachal Pradesh, Kangra, Sakri-Bilaspur, 32°02'N, 76°05'E, 527 m, shady places, 25 Jun 2009, *Santosh Bala SB 21955* (PUN 52813) [Fig. 5G].

Gynura nepalensis DC.

** $n = 20$, CHN. India, Himachal Pradesh, Kangra, Palampur, 32°05'N, 76°32'E, 1219 m, along roadsides, 2 Apr 2009, *Santosh Bala SB 21954* (PUN 52812) [Fig. 5H].

Previously, diploid cytotype of $2n = 20$ was reported for this species by Mehra & al. (1965).

Senecio graciliflorus (Wall.) DC.

$n = 20$, CHN. India, Himachal Pradesh, Kangra, Loharadi; Chhota Banghal, 32°04'N, 76°51'E, 2200 m, open slopes and shrubberies, 26 Jun 2009, *Santosh Bala SB 21816* (PUN 52606) [Fig. 5I].

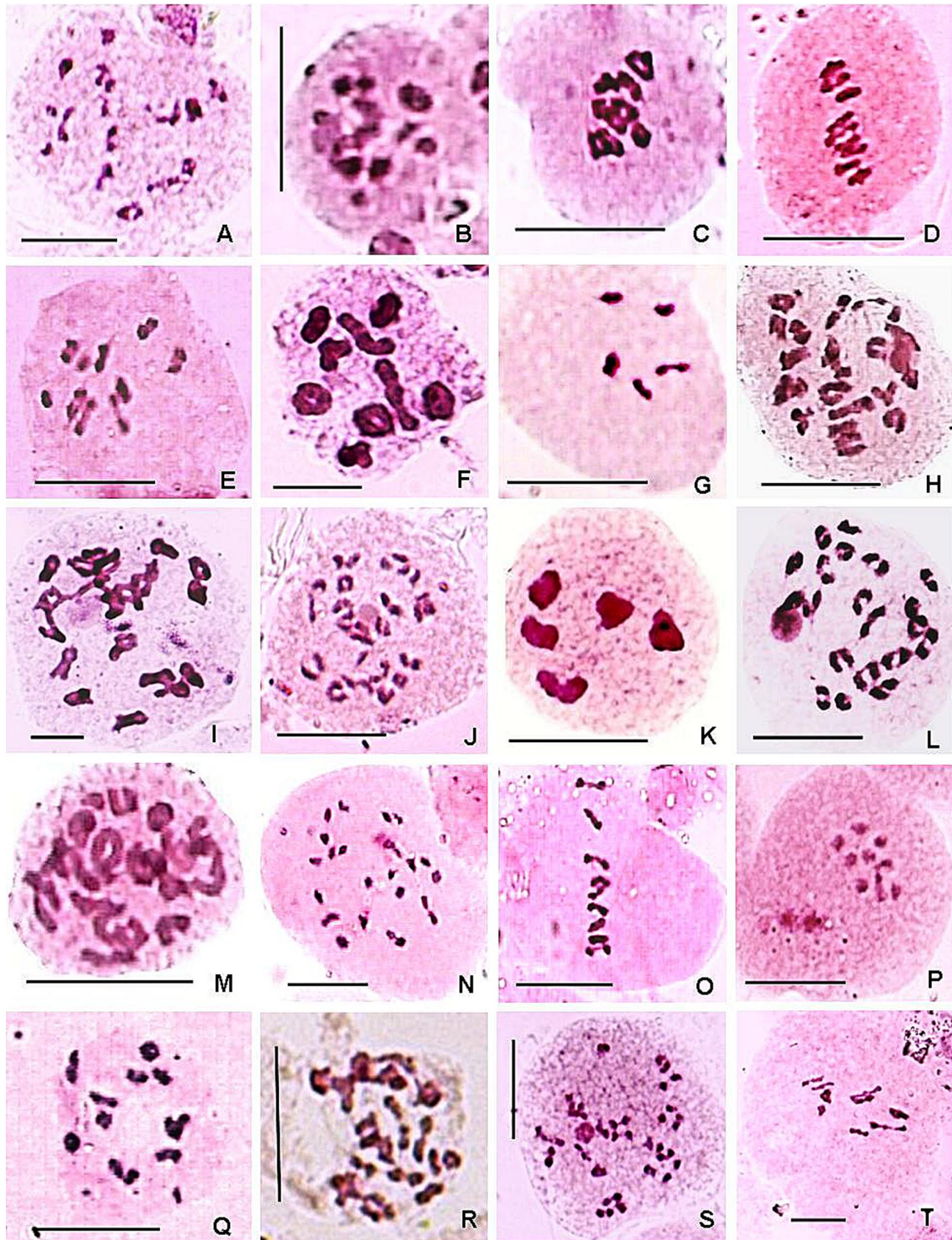


Fig. 5. **A**, *Gnaphalium coarctatum*, meiotic metaphase I, $n = 14$ (PUN 53388); **B**, *Gnaphalium hypoleucum*, meiotic diakinesis, $n = 7$ (PUN 49302); **C**, *Gnaphalium pensylvanicum*, meiotic metaphase I, $n = 9$ (PUN 49304); **D**, *Vicoa indica*, meiotic metaphase I, $n = 9$ (PUN 53433); **E**, *Vicoa vestita*, meiotic metaphase I, $n = 9$ (PUN 53432); **F**, *Gerbera gossypina*, meiotic diakinesis, $n = 9$ (PUN 54284); **G**, *Emilia sonchifolia*, meiotic metaphase I, $n = 5$ (PUN 52813); **H**, *Gynura nepalensis*, meiotic diakinesis, $n = 20$ (PUN 52812); **I**, *Senecio graciliflorus*, meiotic diakinesis, $n = 20$ (PUN 52606); **J**, *Senecio laetus*, meiotic diakinesis, $n = 20$ (PUN 52605); **K–L**, *Senecio nudicaulis*: **K**, meiotic metaphase I, $n = 5$ (PUN 52809), **L**, meiotic diakinesis, $n = 20$ (PUN 52607); **M**, *Senecio rufinervis*, meiotic diakinesis, $n = 20$ (PUN 52608); **N**, *Tagetes minuta*, meiotic metaphase I, $n = 24$ (PUN 53453); **O**, *Vernonia cinerea*, meiotic metaphase I, $n = 9$ (PUN 49311); **P**, *Anchusa ovata*, meiotic anaphase I, $n = 9$ (PUN 53328); **Q**, *Cynoglossum furcatum*, meiotic metaphase I, $n = 12$ (PUN 53320); **R**, *Myosotis sylvatica*, meiotic metaphase I, $n = 18$ (PUN 53327); **S**, *Trichodesma indicum*, meiotic diakinesis, $n = 22$ (PUN 53325); **T**, *Leycesteria farmosa*, meiotic metaphase I, $n = 9$ (PUN 53330). Scale bar = 10 μm .

Senecio laetus Edgew.

$n = 20$, CHN. India, Himachal Pradesh, Kangra, Loharadi; Chhota Banghal, 32°04'N, 76°51'E, 2200 m, moist waste places, 26 Jun 2009, *Santosh Bala SB 21814* (PUN 52604); India, Himachal Pradesh, Kangra, Polling; Chhota Banghal, 32°05'N, 76°51'E, 2200 m, moist waste places, 25 Sep 2009, *Santosh Bala SB 21815* (PUN 52605) [Fig. 5J].

Senecio nudicaulis Buch.-Ham. ex D. Don

** $n = 5$, CHN. India, Himachal Pradesh, Kangra, Badagaon; Chhota Banghal, 32°05'N, 76°46'E, 3000 m, forest edges, 28 Jun 2009, *Santosh Bala SB 21951* (PUN 52809) [Fig. 5K].

$n = 20$, CHN. India, Himachal Pradesh, Kangra, Palampur, 32°05'N 76°32'E, 1219 m, occasionally found in waste places, 1 Apr 2009, *Santosh Bala SB 21817* (PUN 52607) [Fig. 5L].

Previously, only tetraploid cytotype of $2n = 40$ (based on $x = 10$) was reported by Mehra & al. (1965) for this species.

Senecio rufinervis DC.

$n = 20$, CHN. India, Himachal Pradesh, Kangra, Loharadi; Chhota Banghal, 32°04'N, 76°51'E, 2200 m, forests and shrubberies, 26 Jun 2009, *Santosh Bala SB 21818* (PUN 52608) [Fig. 5M].

Tribe Tageteae*Tagetes minuta* L.

$n = 24$, CHN. India, Himachal Pradesh, Kangra, Dyot; Chhota Banghal, 32°01'N, 76°50'E, 2037 m, open dry slopes, 26 Sep 2009, *Santosh Bala SB 24995* (PUN 53453); India, Himachal Pradesh, Kangra, Mecleodganj, 32°15'N, 76°17'E, 1780 m, along roadsides, 2 Nov 2007, *Santosh Bala SB 24996* (PUN 53454); India, Himachal Pradesh, Kangra, Shahpur, 32°13'N, 76°10'E, 780 m, along roadsides, 11 Oct 2008, *Santosh Bala SB 24997* (PUN 53455); India, Himachal Pradesh, Kangra, Dharamshala, 32°13'N, 76°18'E, 1500 m, open dry slopes, 12 Oct 2008, *Santosh Bala SB 24998* (PUN 53456) [Fig. 5N].

Tribe Vernoniaeae*Vernonia cinerea* (L.) Less.

$n = 9$, CHN. India, Himachal Pradesh, Kangra, Sakri-Bilaspur, 32°02'N, 76°05'E, 527 m, cultivated areas, 2 Nov 2008, *Santosh Bala SB 20895* (PUN 49311) [Fig. 5O].

BORAGINACEAE*Anchusa ovata* Lehm.

** $n = 9$, CHN. India, Himachal Pradesh, Kangra, Multhan; Chhota Banghal, 32°01'N, 76°50'E, 2000 m, dry sandy places, 27 Jun 2009, *Santosh Bala SB 26121* (PUN 53328) [Fig. 5P].

The present chromosome count differs from the earlier report of $2n = 16$ for this species by Vasudevan (1975).

Cynoglossum furcatum Wall.

$n = 12$, CHN. India, Himachal Pradesh, Kangra, Mecleodganj, 32°15'N 76°17'E, 1780 m, grows in dry rocks, 28 Feb 2008, *Santosh Bala SB 26113* (PUN 53320); India, Himachal Pradesh, Kangra, Sakri-Bilaspur, 32°02'N 76°05'E, 527 m, grows in dry rocks, 28 Jun 2008, *Santosh Bala SB 26114* (PUN 53321); India, Himachal Pradesh, Kangra, Dharamkot, 32°14'N 76°19.55'E 2200 m, grows in dry rocks, 15 Jul 2008, *Santosh Bala SB 26115* (PUN 53322); India, Himachal Pradesh, Kangra, Palampur, 32°05'N 76°32'E, 1219 m, grows in dry rocks, 7 Apr 2008, *Santosh Bala SB 26116* (PUN 53323) [Fig. 5Q].

Myosotis sylvatica Ehrh. ex Hoffm.

** $n = 18$, CHN. India, Himachal Pradesh, Kangra, Badagaon; Chhota Banghal, 32°05'N, 76°46'E, 3300 m, meadows, 29 Jun 2009, *Santosh Bala SB 26120* (PUN 53327) [Fig. 5R].

The present chromosome count is the first report of a tetraploid

cytotype for the species, for which diploid cytotype, $2n = 18$ is known from outside of India (Gregor & Hand, 2007).

Trichodesma indicum (L.) Lehm.

$n = 22$, CHN. India, Himachal Pradesh, Kangra, Masroor, 32°04'N, 76°08'E, 617 m, dry sandy places and rocks, 12 Aug 2009, *Santosh Bala SB 26118* (PUN 53325) [Fig. 5S].

CAPRIFOLIACEAE*Leycesteria farmosa* Wall.

$n = 9$, CHN. India, Himachal Pradesh, Kangra, Multhan; Chhota Banghal, 32°01'N, 76°50'E, 2000 m, moist slopes, 27 Jun 2009, *Santosh Bala SB 26123* (PUN 53330) [Fig. 5T].

GENTIANACEAE*Canscora diffusa* (Vahl) R. Br. ex Roem. & Schult.

$n = 30$, CHN. India, Himachal Pradesh, Kangra, Shahpur, 32°13'N, 76°10'E, 780 m, grassy fields, 13 Oct 2008, *Santosh Bala SB 21896* (PUN 53206) [Fig. 6A].

Gentiana aprica Decne.

* $n = 10$, CHN. India, Himachal Pradesh, Kangra, Mecleodganj, 32°15'N, 76°17'E, 1780 m, grassy fields, 29 Mar 2008, *Santosh Bala SB 21899* (PUN 53209); India, Himachal Pradesh, Kangra, Galua, 32°03'N, 76°06'E 595 m, grassy fields, 9 Feb 2009, *Santosh Bala SB 21900* (PUN 53210) [Fig. 6B].

Gentiana argentea var. *albescens* Franch.

* $n = 10$, CHN. India, Himachal Pradesh, Kangra, Bir, 32°02'N, 76°43'E, 1300 m, grassy fields, 8 Apr 2008, *Santosh Bala SB 21898* (PUN 53208) [Fig. 6C].

Gentiana pedicellata (Wall. ex D. Don) Griseb. var. *pedicellata*

* $n = 9$, CHN. India, Himachal Pradesh, Kangra, Palampur, 32°05'N, 76°32'E, 1219 m, grassy fields, 1 Apr 2009, *Santosh Bala SB 21897* (PUN 53207) [Fig. 6D].

LAMIACEAE*Ajuga bracteosa* Wall. ex Benth.

$n = 32 + 0 - 2B$, CHN. India, Himachal Pradesh, Kangra, Dehra Gopipur, 31°52'N, 76°12'E, 490 m, slopes, 9 Apr 2008, *Santosh Bala SB 21853* (PUN 53014); India, Himachal Pradesh, Kangra, Masroor, 32°04'N, 76°08'E, 617 m, slopes, 12 Sep 2008, *Santosh Bala SB 21854* (PUN 53015); India, Himachal Pradesh, Kangra, Nagrota Surian, 32°03'N, 76°05'E, 530 m, slopes, 12 Sep 2009, *Santosh Bala SB 21855* (PUN 53016) [Fig. 6E].

Ajuga macrosperma Wall. ex Benth.

$n = 16$, CHN. India, Himachal Pradesh, Kangra, Masroor, 32°04'N, 76°08'E, 617 m, along roadsides, 7 Mar 2009, *Santosh Bala SB 21850* (PUN 53011) [Fig. 6F].

Ajuga parviflora Benth.

$n = 16$, CHN. India, Himachal Pradesh, Kangra, Palampur, 32°05'N, 76°32'E, 1219 m, along roadsides, 1 Apr 2009, *Santosh Bala SB 21851* (PUN 53012); India, Himachal Pradesh, Kangra, Bir, 32°02'N, 76°43'E, 1300 m, along roadsides, 7 Apr 2008, *Santosh Bala SB 21852* (PUN 53013) [Fig. 6G].

Anisomeles indica (L.) O. Kuntze

$n = 17$, CHN. India, Himachal Pradesh, Kangra, Shahpur, 32°13'N, 76°10'E, 780 m, slopes, 11 Oct 2008, *Santosh Bala SB 21824* (PUN 52988) [Fig. 6H].

Calamintha clinopodium Benth.

** $n = 18 + 0 - 1B$, CHN. India, Himachal Pradesh, Kangra, Bir,

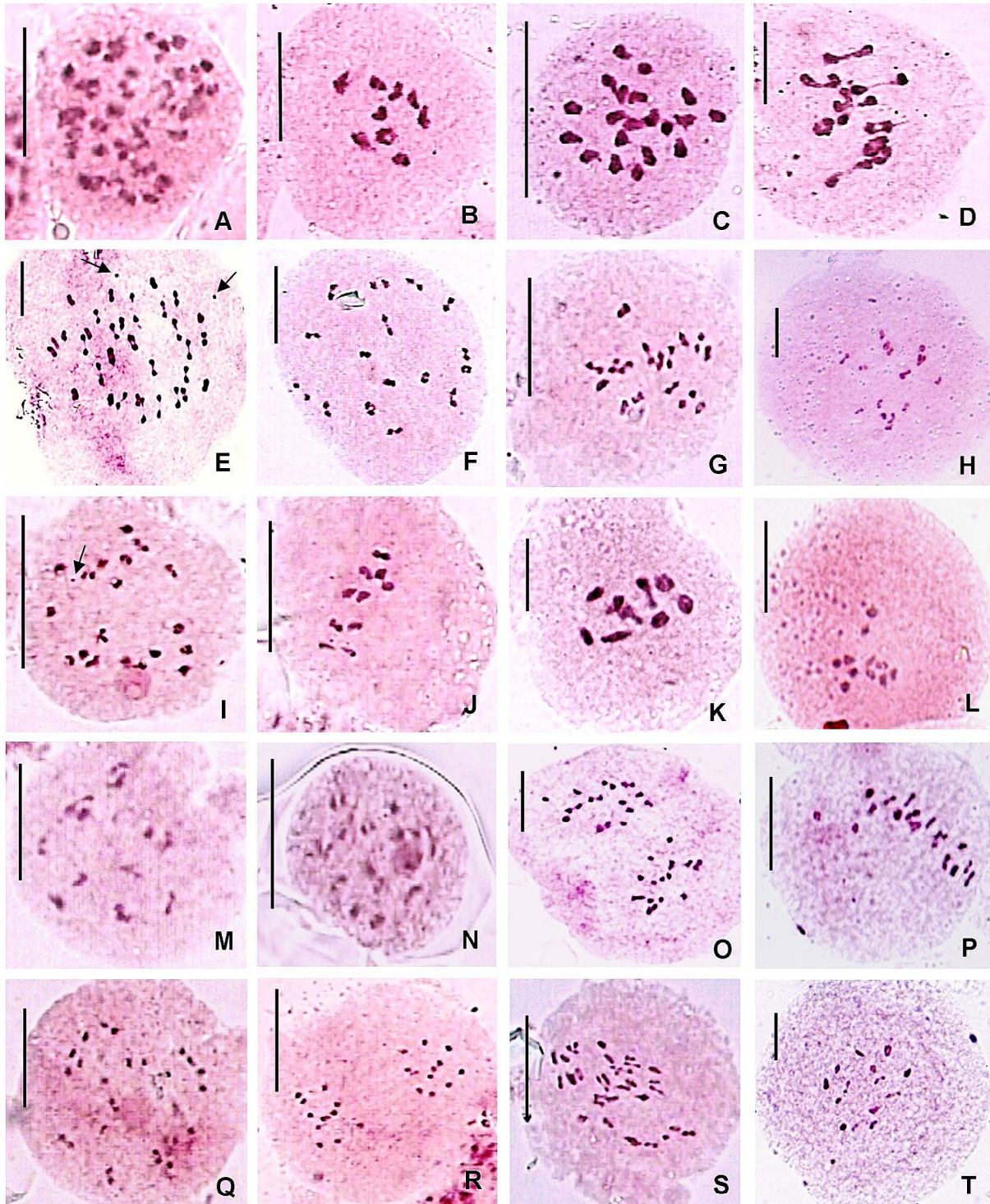


Fig. 6. **A**, *Canscora diffusa*, meiotic diakinesis, $n = 30$ (PUN 53206); **B**, *Gentiana aprica*, meiotic metaphase I, $n = 10$ (PUN 53209); **C**, *Gentiana argentea* var. *albescens*, meiotic metaphase II, $n = 10$ (PUN 53208); **D**, *Gentiana pedicellata* var. *pedicallata*, meiotic metaphase I, $n = 9$ (PUN 53207); **E**, *Ajuga bracteosa*, meiotic metaphase I, $n = 32 + 2B$ (PUN 53015); **F**, *Ajuga macrosperma*, meiotic metaphase I, $n = 16$ (PUN 53011); **G**, *Ajuga parviflora*, meiotic metaphase I, $n = 16$ (PUN 53012); **H**, *Anisomeles indica*, meiotic metaphase I, $n = 17$ (PUN 52988); **I**, *Calamintha clinopodium*, meiotic diakinesis, $n = 18 + 1B$ (PUN 53017); **J**, *Lamium amplexicaule*, meiotic metaphase I, $n = 9$ (PUN 53000); **K**, *Leonurus cardiaca*, meiotic metaphase I, $n = 9$ (PUN 53024); **L**, *Leucas cephalotes*, meiotic metaphase I, $n = 11$ (PUN 53020); **M**, *Leucas lanata*, meiotic metaphase I, $n = 14$ (PUN 52998); **N**, *Micromeria biflora*, meiotic diakinesis, $n = 15$ (PUN 53026); **O**, *Nepeta hindostana*, meiotic anaphase I, $n = 18$ (PUN 53001); **P**, *Nepeta leucophylla*, meiotic metaphase I, $n = 18$ (PUN 53361); **Q**, *Plectranthus rugosus*, meiotic diakinesis, $n = 12$ (PUN 53022); **R**, *Plectranthus striatus*, meiotic anaphase I, $n = 12$ (PUN 53021); **S**, *Pogostemon benghalensis*, meiotic metaphase I, $n = 32$ (PUN 53030); **T**, *Prunella vulgaris*, meiotic metaphase I, $n = 14$ (PUN 53023). Scale bar = 10 μm .

32°02'N, 76°43'E, 1300 m, slopes and open fields, 8 Apr 2008, *Santosh Bala SB 21856* (PUN 53017); India, Himachal Pradesh, Kangra, Palampur, 32°05'N, 76°32'E, 1219 m, slopes and open fields, 2 Apr 2009, *Santosh Bala SB 21857* (PUN 53018) [Fig. 6I].

The present chromosome count differs from the earlier report of $2n = 20$ by Gill (1984).

Lamium amplexicaule L.

$n = 9$, CHN. India, Himachal Pradesh, Kangra, Nagrota Surian, 32°03'N, 76°05'E, 530 m, moist waste places, 9 Feb 2009, *Santosh Bala SB 21839* (PUN 53000) [Fig. 6J].

Leonurus cardiaca L.

$n = 9$, CHN. India, Himachal Pradesh, Kangra, Loharadi; Chhota Banghal, 32°04'N, 76°51'E, 2200 m, forests, 26 Jun 2009, *Santosh Bala SB 21864* (PUN 53024) [Fig. 6K].

Leucas cephalotes (Roth) Spreng.

$n = 11$, CHN. India, Himachal Pradesh, Kangra, Nagrota Surian, 32°03'N, 76°05'E, 530 m, weed in fields, 15 Jul 2008, *Santosh Bala SB 21859* (PUN 53020) [Fig. 6L].

Leucas lanata Benth.

$n = 14$, CHN. India, Himachal Pradesh, Kangra, Banuri, 32°04'N, 76°34'E, 1300 m, slopes, 8 Apr 2008, *Santosh Bala SB 21837* (PUN 52998); India, Himachal Pradesh, Kangra, Shahpur, 32°13'N, 76°10'E, 780 m, slopes, 11 Oct 2008, *Santosh Bala SB 21838* (PUN 52999) [Fig. 6M].

Micromeria biflora (Buch.-Ham. ex D. Don) Benth.

$n = 15$, CHN. India, Himachal Pradesh, Kangra, Banuri, 32°04'N, 76°34'E, 1300 m, open grassy land, 7 Apr 2008, *Santosh Bala SB 21866* (PUN 53026); India, Himachal Pradesh, Kangra, Nagrota Surian, 32°03'N, 76°05'E, 530 m, open grassy land, 9 Apr 2008, *Santosh Bala SB 21868* (PUN 53028) [Fig. 6N].

Nepeta hindostana (Roth) Haines

$n = 18$, CHN. India, Himachal Pradesh, Kangra, Tiara, 32°07'N, 76°14'E, 810 m, moist areas, 28 Dec 2007, *Santosh Bala SB 21840* (PUN 53001); India, Himachal Pradesh, Kangra, Sakri-Bilaspur, 32°02'N, 76°05'E, 527 m, moist areas, 2 Nov 2008, *Santosh Bala SB 21842* (PUN 53003); India, Himachal Pradesh, Kangra, Dyot; Chhota Banghal, 32°01'N, 76°50'E, 2037 m, moist areas, 26 Sep 2009, *Santosh Bala SB 21843* (PUN 53004) [Fig. 6O].

Nepeta leucophylla Benth.

$n = 18$, CHN. India, Himachal Pradesh, Kangra, Multhan; Chhota Banghal, 32°01'N, 76°50'E, 2000 m, open dry areas, 28 Jun 2009, *Santosh Bala SB 21962* (PUN 53361) [Fig. 6P].

Plectranthus rugosus Wall. ex Benth.

$n = 12$, CHN. India, Himachal Pradesh, Kangra, Salli, 32°14'N, 76°14'E, 1500 m, dry slopes, 11 Oct 2009, *Santosh Bala SB 21861* (PUN 53022) [Fig. 6Q].

Plectranthus striatus Benth.

$n = 12$, CHN. India, Himachal Pradesh, Kangra, Salli, 32°14'N, 76°14'E, 1500 m, near cultivated fields, 11 Oct 2009, *Santosh Bala SB 21860* (PUN 53021) [Fig. 6R].

Pogostemon benghalensis (Burm. f.) Kuntze

$n = 32$, CHN. India, Himachal Pradesh, Kangra, Bankhandi, 32°59'N, 76°12'E, 557 m, roadside waste places, 28 Dec 2007, *Santosh Bala SB 21869* (PUN 53030) [Fig. 6S].

Prunella vulgaris L.

$n = 14$, CHN. India, Himachal Pradesh, Kangra, Multhan;

Chhota Banghal, 32°01'N, 76°50'E, 2000 m, open slopes, 28 Jun 2009, *Santosh Bala SB 21863* (PUN 53023) [Fig. 6T].

Salvia coccinia Juss. ex Murray

$n = 11$, CHN. India, Himachal Pradesh, Kangra, Gaggal, 32°11'N, 76°16'E, 770 m, grows near cultivated areas, 4 Nov 2007, *Santosh Bala SB 21827* (PUN 52991); India, Himachal Pradesh, Kangra, Masroor, 32°04'N, 76°08'E, 617 m, grows near cultivated areas, 7 Jun 2009, *Santosh Bala SB 21828* (PUN 52992) [Fig. 7A].

Salvia plebeia R. Br.

$n = 8$, CHN. India, Himachal Pradesh, Kangra, Dehra Gopipur, 31°52'N, 76°12'E, 490 m, near cultivated fields, 9 Feb 2009, *Santosh Bala SB 21830* (PUN 52994); India, Himachal Pradesh, Kangra, Nagrota Surian, 32°03'N, 76°05'E, 527 m, near cultivated fields, 8 Apr 2008, *Santosh Bala SB 21834* (PUN 52995) [Fig. 7B].

Scutellaria repens Buch.-Ham. ex D. Don

$n = 10$, CHN. India, Himachal Pradesh, Kangra, Tiara, 32°07'N, 76°14'E, 810 m, dry slopes, 3 Nov 2007, *Santosh Bala SB-21999* (PUN 53072) [Fig. 7C].

Stachys sericea Wall. ex Benth.

$n = 15$, CHN. India, Himachal Pradesh, Kangra, Loharadi; Chhota Banghal, 32°04'N, 76°51'E, 2200 m, moist slopes, 26 Jun 2009, *Santosh Bala SB 21846* (PUN 53007); India, Himachal Pradesh, Kangra, Badagaon; Chhota Banghal, 32°05'N, 76°46'E, 3000 m, moist slopes, 28 Jun 2009, *Santosh Bala SB 21848* (PUN 53009) [Fig. 7D].

PHRYMATACEAE

▼ *Phryma leptostachya* L.

$n = 14$, CHN. India, Himachal Pradesh, Kangra, Loharadi; Chhota Banghal, 32°04'N, 76°51'E, 2200 m, near forest, 28 Jun 2009, *Santosh Bala SB 26112* (PUN 53184) [Fig. 7E].

PLANTAGINACEAE

Plantago depressa Willd.

▼ $n = 12$, CHN. India, Himachal Pradesh, Kangra, Bir, 32°02'N, 76°43'E, 1300 m, grows in waterside meadows, 5 Mar 2008, *Santosh Bala SB 21802* (PUN 52449) [Fig. 7F].

$n = 12 + 0-1B$, CHN. India, Himachal Pradesh, Kangra, Palampur, 32°05'N, 76°32'E, 1219 m, grows in waterside meadows, 6 Mar 2008, *Santosh Bala SB 21803* (PUN 52450) [Fig. 7G].

** $n = 18$, CHN. India, Himachal Pradesh, Kangra, Dharamshala, 32°13'N, 76°18'E, 1500 m, grows as weed near roads, 15 Sep 2008, *Santosh Bala SB 21801* (PUN 52448) [Fig. 7H].

From earlier reports the species is known to have diploid cytotype with $2n = 12$ (McCullagh, 1934) and tetraploid cytotype with $2n = 24$ (Ekstrand, 1918) from outside India.

Plantago lanceolata L.

$n = 6$, CHN. India, Himachal Pradesh, Kangra, Mecleodganj, 32°15'N, 76°17'E, 1780 m, weed of cultivated areas, 2 Nov 2007, *Santosh Bala SB 21809* (PUN 52454); India, Himachal Pradesh, Kangra, Palampur, 32°05'N, 76°32'E, 1219 m, weed of roadsides, 4 Mar 2008, *Santosh Bala SB 21810* (PUN 52455); India, Himachal Pradesh, Kangra, Multhan; Chhota Banghal, 32°01'N, 76°50'E, 2000 m, weed of roadsides, 25 Jun 2009, *Santosh Bala SB 21811* (PUN 52456); India, Himachal Pradesh, Kangra, Badagaon; Chhota Banghal, 32°05'N, 76°46'E, 3300 m, weed of cultivated areas, 26 Jun 2009, *Santosh Bala SB 21812* (PUN 52457) [Fig. 7I].

Plantago major L.

$n = 6$, CHN. India, Himachal Pradesh, Kangra, Shahpur, 32°13'N, 76°10'E, 780 m, grasslands, 13 Sep 2008, *Santosh Bala SB 21804* (PUN 52451); India, Himachal Pradesh, Kangra, Badagaon;

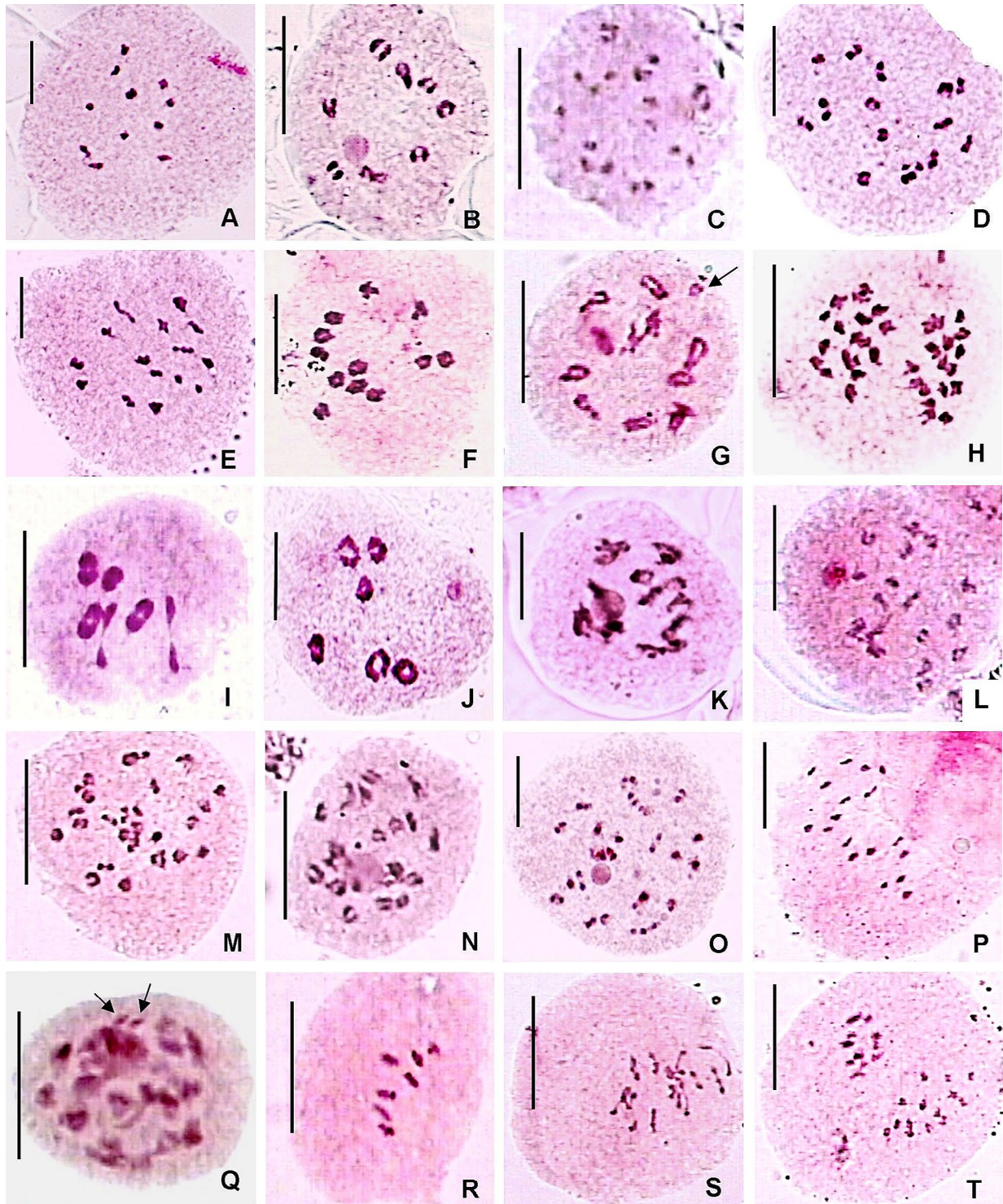


Fig. 7. **A**, *Salvia coccinea*, meiotic metaphase I, $n = 11$ (PUN 52991); **B**, *Salvia plebeia*, meiotic diakinesis, $n = 8$ (PUN 52995); **C**, *Scutellaria repens*, meiotic diakinesis, $n = 10$ (PUN 53072); **D**, *Stachys sericea*, meiotic metaphase I, $n = 15$ (PUN 53007); **E**, *Phryma leptostachya*, meiotic metaphase I, $n = 14$ (PUN 53184); **F–H**, *Plantago depressa*: **F**, meiotic diakinesis, $n = 12$ (PUN 52449), **G**, meiotic diakinesis, $n = 12 + 1B$ (PUN 52450), **H**, meiotic anaphase I, $n = 18$ (PUN 52448); **I**, *Plantago lanceolata*, meiotic metaphase I, $n = 6$ (PUN 52457); **J–K**, *Plantago major*: **J**, meiotic metaphase I, $n = 6$ (PUN 52452), **K**, meiotic diakinesis, $n = 12$ (PUN 52430); **L**, *Anagallis arvensis*, meiotic diakinesis, $n = 20$ (PUN 53329); **M**, *Lindenbergia indica*, meiotic metaphase I, $n = 25$ (PUN 53067); **N**, *Mazus japonicus*, meiotic diakinesis, $n = 20$ (PUN 53056); **O**, *Scrophularia himalensis*, meiotic metaphase I, $n = 24$ (PUN 53060); **P**, *Verbascum thapsus*, meiotic metaphase I, $n = 18$ (PUN 53064); **Q**, *Veronica anagallis-aquatica*, meiotic diakinesis, $n = 18 + 2B$ (PUN 53059); **R**, *Veronica persica*, meiotic metaphase I, $n = 7$ (PUN 53054); **S–T**, *Veronica persica*: **S**, meiotic metaphase I, $n = 14$ (PUN 53055), **T**, meiotic anaphase I, $n = 14$ (PUN 53055). Scale bar = 10 μ m.

Chhota Banghal, 32°05'N, 76°46'E, 3300 m, weed of roadsides, 26 Sep 2009, *Santosh Bala SB 21805* (PUN 52452); India, Himachal Pradesh, Kangra, Multhan; Chhota Banghal, 32°01'N, 76°50'E, 2000 m, grows as weed in crops, 25 Jun 2009, *Santosh Bala SB 21806* (PUN 52453) [Fig. 7J].

$n = 12$, CHN. India, Himachal Pradesh, Kangra, Palampur, 32°05'N, 76°32'E, 1219 m, grasslands, 15 Mar 2010, *Santosh Bala SB 21807* (PUN 52430) [Fig. 7K].

PRIMULACEAE

Anagallis arvensis L.

$n = 20$, CHN. India, Himachal Pradesh, Kangra, Nagrota Surian, 32°03'N, 76°05'E, 530 m, weed of wheat fields and waste places, 9 Feb 2009, *Santosh Bala SB 26122* (PUN 53329) [Fig. 7L].

SCROPHULARIACEAE

Lindenbergia indica Vatke

** $n = 25$, CHN. India, Himachal Pradesh, Kangra, Tiara, 32°07'N, 76°14'E, 810 m, slopes, 3 Nov 2007, *Santosh Bala SB 21994* (PUN 53067); India, Himachal Pradesh, Kangra, Dharamshala, 32°13'N, 76°18'E, 1500 m, slopes, 12 Oct 2008, *Santosh Bala SB 21995* (PUN 53068); India, Himachal Pradesh, Kangra, Dyot; Chhota Banghal, 32°01'N, 76°50'E, 2037 m, slopes, 26 Sep 2009, *Santosh Bala SB 21997* (PUN 53070); India, Himachal Pradesh, Kangra, Nagrota Surian, 32°03'N, 76°05'E, 530 m, slopes, 10 Oct 2008, *Santosh Bala SB 21998* (PUN 53071) [Fig. 7M].

The present chromosome count differs from the earlier report of $2n = 30$ for this species by Trivedi (1984).

Mazus japonicus (Thunb.) Kuntze

$n = 20$, CHN. India, Himachal Pradesh, Kangra, Nagrota Surian, 32°03'N, 76°05'E, 530 m, marshy and swampy places, 1 Mar 2008, *Santosh Bala SB 21983* (PUN 53056); India, Himachal Pradesh, Kangra, Bassa, 32°03'N, 76°04'E, 490 m, 2 Mar 2008, marshy and swampy places, *Santosh Bala SB 21984* (PUN 53057); India, Himachal Pradesh, Kangra, Galua, 32°03'N, 76°06'E, 595 m, 2 Mar 2008, marshy and swampy places, *Santosh Bala SB 21985* (PUN 53058) [Fig. 7N].

Scrophularia himalensis Royle

$n = 24$, CHN. India, Himachal Pradesh, Kangra, Loharadi; Chhota Banghal, 32°04'N, 76°51'E, 2200 m, open slopes, 26 Jun 2009, *Santosh Bala SB 21987* (PUN 53060) [Fig. 7O].

Verbascum thapsus L.

$n = 18$, CHN. India, Himachal Pradesh, Kangra, Harchhakian, 32°08'N, 76°07'E, 600 m, waste places, 7 Mar 2009, *Santosh Bala SB 21988* (PUN 53061); India, Himachal Pradesh, Kangra, Bir, 32°02'N, 76°43'E, 1300 m, along roadsides, 8 Apr 2008, *Santosh Bala SB 21989* (PUN 53062); India, Himachal Pradesh, Kangra, Palampur, 32°05'N, 76°32'E, 1219 m, waste places, 2 Apr 2009, *Santosh Bala SB 21991* (PUN 53064); India, Himachal Pradesh, Kangra, Dyot; Chhota Banghal, 32°01'N, 76°50'E, 2037 m, waste places, 27 Jun 2009, *Santosh Bala SB 21992* (PUN 53065); India, Himachal Pradesh, Kangra, Badagaon; Chhota Banghal, 32°05'N, 76°46'E, 3300 m, waste places, 28 Jun 2009, *Santosh Bala SB 21993* (PUN 53066) [Fig. 7P].

Veronica anagallis-aquatica L.

▼ $n = 18 + 2B$, CHN. India, Himachal Pradesh, Kangra, Nagrota Surian, 32°03'N, 76°05'E, 530 m, near stream banks, 8 Apr 2008, *Santosh Bala SB 21986* (PUN 53059) [Fig. 7Q].

Veronica persica Poir.

** $n = 7$, CHN. India, Himachal Pradesh, Kangra, Nagrota Surian, 32°03'N, 76°05'E, 530 m, moist and shady places, 2 Feb 2008, *Santosh Bala SB 21981* (PUN 53054) [Fig. 7R].

The present chromosome count is the first record of diploid cytotype for this species, which is otherwise known as tetraploid from outside of India (Saedi Mehrvarz & Kharabian, 2005).

$n = 14$, CHN. India, Himachal Pradesh, Kangra, Palampur, 32°05'N 76°32'E, 1219 m, grows in moist and shady places, 8 Mar 2009, *Santosh Bala SB 21982* (PUN 53055) [Fig. 7S–T].

SOLANACEAE

Nicotiana tabacum L.

$n = 24$, CHN. India, Himachal Pradesh, Kangra, Dyot; Chhota Banghal, 32°01'N, 76°50'E, 2037 m, on heaps, 27 Jun 2009, *Santosh Bala SB 21890* (PUN 53201) [Fig. 8A].

Physalis angulata L.

$n = 24$, CHN. India, Himachal Pradesh, Kangra, Nagrota Surian, 32°03'N, 76°05'E, 530 m, waste places, 15 Jul 2008, *Santosh Bala SB 21892* (PUN 53202); India, Himachal Pradesh, Kangra, Masroor, 32°04'N, 76°08'E, 617 m, waste places, 12 Sep 2009, *Santosh Bala SB 21893* (PUN 53203) [Fig. 8B].

Physalis peruviana L.

$n = 24$, CHN. India, Himachal Pradesh, Kangra, Palampur, 32°05'N, 76°32'E, 1219 m, cultivated land, 1 Apr 2008, *Santosh Bala SB 21813* (PUN 52460) [Fig. 8C].

Solanum indicum L.

$n = 12$, CHN. India, Himachal Pradesh, Kangra, Dharamshala, 32°13'N, 76°18'E, 1500 m, waste places, 12 Oct 2008, *Santosh Bala SB 21881* (PUN 53192) [Fig. 8D].

Solanum nigrum L.

$n = 12$, CHN. India, Himachal Pradesh, Kangra, Dharamshala, 32°13'N, 76°18'E, 1500 m, waste places, 17 Aug 2008, *Santosh Bala SB 21877* (PUN 53188) [Fig. 8E].

$n = 24$, CHN. India, Himachal Pradesh, Kangra, Palampur, 32°05'N, 76°32'E, 1219 m, roadsides, 2 Apr 2009, *Santosh Bala SB 21878* (PUN 53189) [Fig. 8F].

Solanum surattense Burm. f.

$n = 12$, CHN. India, Himachal Pradesh, Kangra, Masroor, 32°04'N, 76°08'E, 617 m, slopes, waste places, 7 Mar 2009, *Santosh Bala SB 21882* (PUN 53193); India, Himachal Pradesh, Kangra, Pargor, 32°10'N, 76°03'E, 780 m, waste places, 8 Mar 2009, *Santosh Bala SB 21883* (PUN 53194) [Fig. 8G].

Solanum viarum Dunal

$n = 12$, CHN. India, Himachal Pradesh, Kangra, Nagrota Surian, 32°03'N, 76°05'E, 530 m, waste places, 7 Mar 2009, *Santosh Bala SB 21884* (PUN 53195); India, Himachal Pradesh, Kangra, Dharamshala, 32°13'N, 76°18'E, 1500 m, waste places, 12 Oct 2008, *Santosh Bala SB 21885* (PUN 53196) [Fig. 8H].

VERBENACEAE

Lantana camara L.

$n = 22$, CHN. India, Himachal Pradesh, Kangra, Sakri-Bilaspur, 32°02'N, 76°05'E, 527 m, as a weed along roadsides, 3 Nov 2007, *Santosh Bala SB 26108* (PUN 53181); India, Himachal Pradesh, Kangra, Dharamshala, 32°13'N, 76°18'E, 1500 m, as a weed along roadsides, 12 Oct 2008, *Santosh Bala SB 26109* (PUN 53215) [Fig. 8I].

Verbena bonariensis L.

** $n = 21$, CHN. India, Himachal Pradesh, Kangra, Dharamshala, 32°13'N, 76°18'E, 1500 m, roadsides & fields, 12 Oct 2008, *Santosh Bala SB 26103* (PUN 53177) [Fig. 8J].

** $n = 28$, CHN. India, Himachal Pradesh, Kangra, Palampur,

32°05'N 76°32'E, 1219 m, common on roadsides and fields, 2 Apr 2009, *Santosh Bala SB 26104* (PUN 53178) [Fig. 87K].

The present chromosome counts represent the first records of hexa- and octoploid cytotypes for this species. Otherwise the species is known as diploid ($2n = 12, 14$) by Kumar & Dutt (1989) from India and tetraploid ($2n = 28$) by Chaw & al. (1986) from outside of India.

Verbena officinalis L.

▼ $n = 6$, CHN. India, Himachal Pradesh, Kangra, Dharamshala, 32°13'N 76°18'E, 1500 m, roadsides, 12 Oct 2008, *Santosh Bala SB 26105* (PUN 53179) [Fig. 8L].

▼ $n = 7$, CHN. India, Himachal Pradesh, Kangra, Nagrota Surian, 32°03'N 76°05'E, 530 m, roadsides, 28 Jun 2008, *Santosh Bala SB 26106* (PUN 53180) [Fig. 8M].

Both the chromosome numbers of $2n = 12$ and 14 are previously known from outside India by Patermann (1935) and Montgomery & al. (1997) respectively.

Vitex negundo L.

$n = 16 + 2B$, CHN. India, Himachal Pradesh, Kangra, Masroor, 32°04'N, 76°08'E, 617 m, near cultivated fields, 12 Sep 2009, *Santosh Bala SB 26111* (PUN 53183) [Fig. 8N].

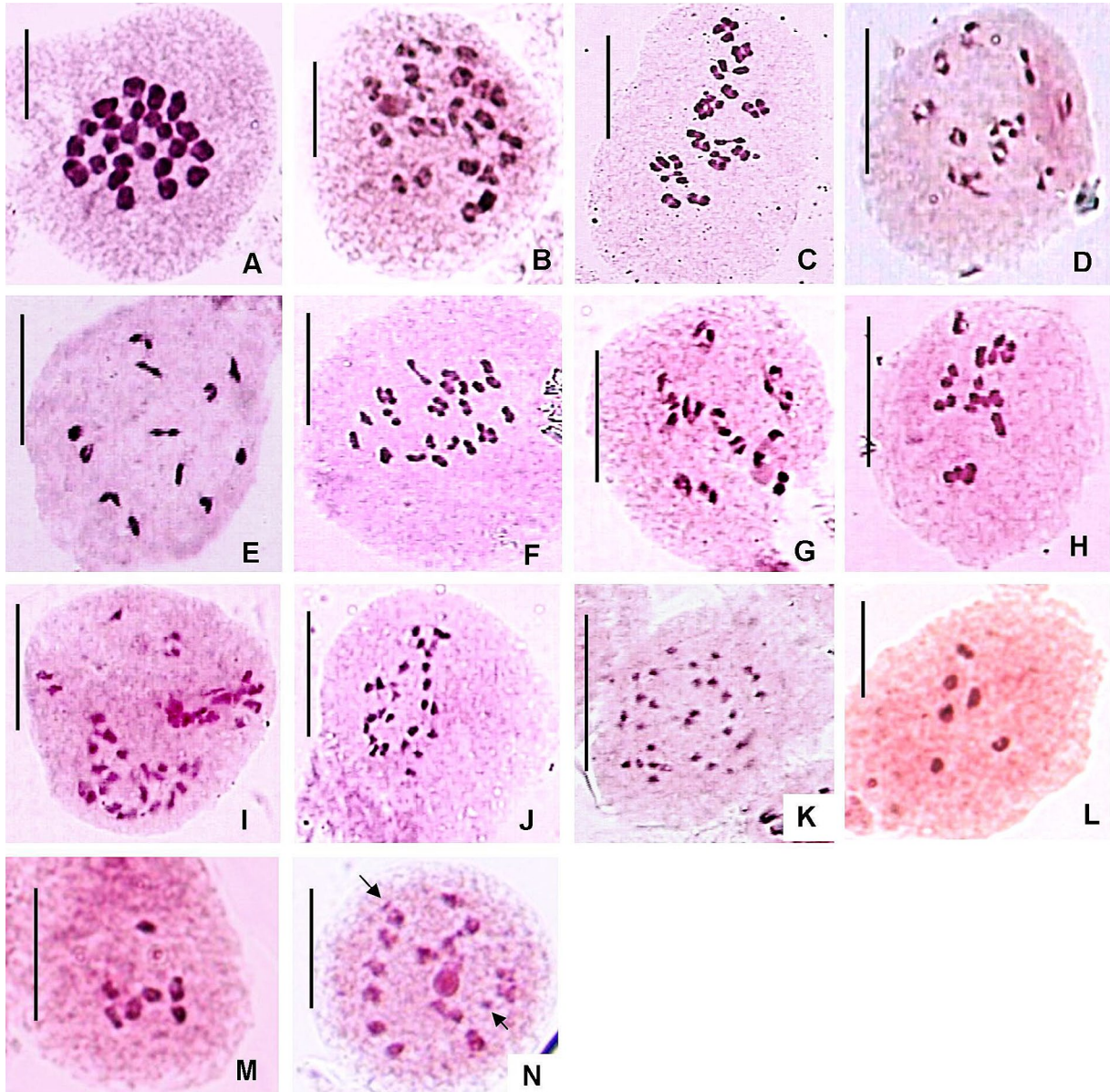


Fig. 8. A, *Nicotiana tabacum*, meiotic metaphase I, $n = 24$ (PUN 53201); B, *Physalis angulata*, meiotic diakinesis, $n = 24$ (PUN 53203); C, *Physalis peruviana*, meiotic metaphase I, $n = 24$ (PUN 52460); D, *Solanum indicum*, meiotic diakinesis, $n = 12$ (PUN 53192); E–F, *Solanum nigrum*: E, meiotic metaphase I, $n = 12$ (PUN 53188), F, meiotic metaphase I, $n = 24$ (PUN 53189); G, *Solanum surattense*, meiotic diakinesis, $n = 12$ (PUN 53193); H, *Solanum viarum*, meiotic metaphase I, $n = 12$ (PUN 53195); I, *Lantana camara*, meiotic anaphase I, $n = 22$ (PUN 53215); J–K, *Verbena bonariensis*: J, meiotic metaphase I, $n = 21$ (PUN 53177), K, meiotic metaphase I, $n = 28$ (PUN 52178); L–M, *Verbena officinalis*: L, meiotic metaphase I, $n = 6$ (PUN 53179), M, meiotic metaphase I, $n = 7$ (PUN 53180); N, *Vitex negundo*, meiotic diakinesis, $n = 16 + 2B$ (PUN 53183). Scale bar = 10 μ m.

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- * First chromosome count for the species.
 ▼ First chromosome count from a South American accession.
 ▼▼ First chromosome count from Argentinian accession.

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RUBIACEAE

Borreria multiflora (DC.) Bacigalupo & E.L. Cabral
 * $2n = 2x = 28$, CHN. Bolivia, Santa Cruz, Velasco 15°52'46.2" S 61°26'45.3" W, José D. Soto, Roberto M. Salas, Domingos Cardoso & Walter Medina 1059 (CTES, LPB, USZ).

Diodia kuntzei K. Schum.
 * $2n = 2x = 28$, CHN. Argentina, Corrientes, Depto. Concepción 28°16'48.80" S 57°55'01.53" W, Roberto M. Salas & Andrea A. Cabaña Fader 322 (CTES).

Diodella radula (Willd. ex Roem. & Schult.) Delprete
 * $n = 2x = 14$, CHN. Brazil, Rio Grande do Sul, São Leopoldo, Pevi Zefa 638 (CTES).

Galianthe brasiliensis (Spreng.) E.L. Cabral & Bacigalupo
 * $2n = 2x = 24$, CHN. Argentina, Misiones, depto. San Ignacio, Reserva Teyú Cuaré 27°16'35.72" S, 55°34'18.85" W, Elsa L. Cabral, Andrea A. Cabaña Fader, Sandra Sobrado & Roberto M. Salas 758 (CTES).

Richardia brasiliensis Gomes
 ▼▼ $2n = 2x = 28$, CHN. Argentina, Corrientes Riachuelo 27°33'47.55" S, 58°44'43" W, Andrea A. Cabaña Fader & Roberto M. Salas 10 (CTES).

Richardia grandiflora (Cham. & Schltdl.) Steud.
 * $n = 2x = 14$, CHN. Argentina, Misiones, Depto. San Ignacio, Reserva Teyú Cuaré. 27°16'41.81" S, 55°33'24.92" W, Elsa L. Cabral, Andrea A. Cabaña Fader, Sandra Sobrado & Roberto M. Salas 753 (CTES).

Spermacoce glabra Michx.
 ▼ $n = 2x = 14$, CHN. Argentina, Misiones, Depto. San Ignacio, Reserva Teyú Cuaré. 27°16'35.17" S, 55°55'34.20" W, Elsa L. Cabral, Andrea A. Cabaña Fader, Sandra Sobrado & Roberto M. Salas 757 (CTES); Argentina, Corrientes Riachuelo 27°33'13.03" S, 58°45'03.01" W, Roberto M. Salas 173 (CTES).

Spermacoce paganuccii E.L. Cabral & Bacigalupo
 * $2n = 2x = 28$, CHN. Brazil, Bahia, Itaberaba, Serra do Orobó. Faz. Leão dos Brejos 12°25'04.6" S, 40°31'17.5" W, 438 m, Luciano Paganucci Queiroz, Raymond M. Harley, Andrea A. Cabaña Fader, Roberto M. Salas & Domingos Cardoso 14609 (CTES, HUEFS, SI).

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* First chromosome count for the species.

** New chromosome number (cytotype) for the species.

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POACEAE**Subfamily Panicoideae****Tribe Andropogoneae**

Apluda mutica L.

n = 10, CHN. India, Maharashtra, Kolhapur district, Karveer, Shivaji University campus, on the way from Botany Department to Bha-shabhavan, 560 m, 20 Sep 2006, *K.V.C. Gosavi 2684* (SUK) [Fig. 9F].

Arthraxon hispidus (Thunb.) Makino var. *hispidus*

n = 9, CHN. India, Maharashtra, Sindhudurg district, Amboli, Amboli Ghat, 717 m, 27 Nov 2006, *K.V.C. Gosavi 2747* (SUK) [Fig. 9G].

Arthraxon hispidus var. *santapau* (Bor) Welzen

* *n* = 9, CHN. India, Maharashtra, Kolhapur district, Karveer, Shivaji University campus, Botany Department garden, 606 m, 10 Nov 2006, *K.V.C. Gosavi 2730* (SUK) [Fig. 9H].

Arthraxon jubatus Hack.

* *n* = 9, CHN. India, Maharashtra, Sindhudurg district, Amboli, Amboli Ghat, 717 m, 27 Nov 2006, *K.V.C. Gosavi 2706* (SUK) [Fig. 9I].

Arthraxon lanceolatus (Roxb.) Hochst. var. *lanceolatus*

** *n* = 9, CHN. India, Maharashtra, Kolhapur district, Karveer, Shivaji University campus, Computer Department, 606 m, 10 Sep 2006, *K.V.C. Gosavi 2682* (SUK) [Fig. 9J]; India, Maharashtra, Satara district, Mahabaleshwar, 1322 m, 12 Jul 2007, *K.V.C. Gosavi 2867* (SUK) [Fig. 9K].

** *n* = 13, CHN. India, Maharashtra, Kolhapur district, Karveer, Shivaji University campus, Rajaram lake, 605 m, 10 Nov 2006, *K.V.C. Gosavi 2725* (SUK) [Fig. 9L].

Arthraxon lanceolatus var. *meeboldii* (Stapf) Welzen

n = 9, CHN. India, Maharashtra, Kolhapur district, Shahuwadi, Amba Ghat, 617 m, 11 Jun 2008, *K.V.C. Gosavi 2864* (SUK) [Fig. 9M].

Arthraxon lanceolatus var. *raizadae* (Jain, Hemadri & Deshpande) Welzen

* *n* = 9, CHN. India, Maharashtra, Kolhapur district, Shahuwadi, Vishal gad way, Bhattali, Pandharpani, 803 m, 26 Sep 2008, *K.V.C. Gosavi 2912* (SUK) [Fig. 9N].

Arthraxon lanceolatus var. *villosus* (C.E.C. Fisch.) Welzen

* *n* = 9, CHN. India, Maharashtra, Satara district, Jawali, Mahabaleshwar, 1325 m, 11 Jun 2007, *K.V.C. Gosavi 2865* (SUK) [Fig. 9O].

Arthraxon lancifolius Hochst.

n = 9, CHN. India, Maharashtra, Kolhapur district, Karveer, Shivaji University Campus, Botany Department garden, 606 m, 10 Nov 2006, *K.V.C. Gosavi 2716A* (SUK) [Fig. 9P].

Bhidea burnsiiana Bor

* *n* = 10, CHN. India, Maharashtra, Kolhapur district, Gaganbawada, Borbet plateau, 969 m, 26 Sep 2009, *K.V.C. Gosavi 2969* (SUK) [Fig. 9Q].

Chrysopogon aciculatus (Retz.) Trin.

** *n* = 8, CHN. India, Maharashtra, Ratnagiri district, Devgad, 80 m, 19 Jul 2008, *K.V.C. Gosavi 2872* (SUK) [Fig. 9R].

Chrysopogon castaneus Veldkamp & Salunkhe

* *n* = 10, CHN. India, Maharashtra, Kolhapur district, Gargoti, Kondushi plateau, 987 m, 17 Oct 2007, *K.V.C. Gosavi 2803* (SUK) [Fig. 9S].

Chrysopogon velutinus (Hook. f.) Bor

** *n* = 9, CHN. India, Karnataka state, Bagalkot district, Badami, Badami plateau, 662 m, 18 Nov 2010, *K.V.C. Gosavi 3000* (SUK) [Fig. 9T].

Cymbopogon martini (Roxb.) Will. Watson

n = 20, CHN. India, Maharashtra, Kolhapur district, Karveer, Shivaji University Campus, boys hostel, 598 m, 10 Sep 2006, *K.V.C. Gosavi 2683* (SUK) [Fig. 9U].

Dichanthium annulatum Stapf

** *n* = 20, CHN. India, Maharashtra, Kolhapur district, Shivaji University campus, Botany Department garden, 606 m, 11 Jun 2009, *K.V.C. Gosavi 3867* (SUK) [Fig. 9V].

Dichanthium armatum Blatt. & McCann

* *n* = 20, CHN. India, Maharashtra, Nasik district, Trimbkeshwar, Bramhagiri, 888 m, 16 Oct 2009, *K.V.C. Gosavi 2975* (SUK) [Fig. 9W].

Dichanthium assimile (Steud.) Deshp.

** *n* = 20, CHN. India, Maharashtra, Sindhudurg district, Amboli, Amboli Ghat, 721 m, 30 Nov 2007, *K.V.C. Gosavi 2861* (SUK) [Fig. 9X].

Dichanthium caricosum A. Camus

** *n* = 15, CHN. India, Maharashtra, Kolhapur district, Karveer, Shivaji University campus, Botany Department garden, 606 m, 11 Jun 2009, *K.V.C. Gosavi 3865* (SUK) [Fig. 9Y].

Dichanthium jainii (Deshp. & Hemadri) Deshp.

** *n* = 10, CHN. India, Maharashtra, Satara district, Thoseghar, water fall point, 995 m, 18 Nov 2007, *K.V.C. Gosavi 2852* (SUK) [Fig. 10A].

Dichanthium odoratum (Lisboa) S.K. Jain & Deshp.

** *n* = 10, CHN. India, Maharashtra, Nasik district, Trimbkeshwar, 716 m, 16 Oct 2009, *K.V.C. Gosavi 2976* (SUK) [Fig. 10B].

Dichanthium oliganthum (Hochst. ex Steud.) Cope

* *n* = 10, CHN. India, Maharashtra, Kolhapur district, Gaganbawada, Borbet plateau, 969 m, 07 Oct 2007, *K.V.C. Gosavi 2783* (SUK) [Fig. 10C].

Dichanthium panchganiense Blatt. & McCann

n = 10, CHN. India, Maharashtra, Satara district, Pachgani, Pachgani plateau, 1330 m, 05 Aug 2010, *K.V.C. Gosavi 2989* (SUK) [Fig. 10D].

Dichanthium tuberculatum (Hack.) Cope

* *n* = 10, CHN. India, Maharashtra, Dhule district, Laling Ghat, 370 m, 03 Aug 2008, *K.V.C. Gosavi 2883* (SUK) [Fig. 10E].

Dimeria blatteri Bor

* *n* = 6, CHN. India, Maharashtra, Kolhapur district, Chandgad, Tillari, Tillari plateau, 747 m, 4 Oct 2009, *K.V.C. Gosavi 2972* (SUK) [Fig. 10F].

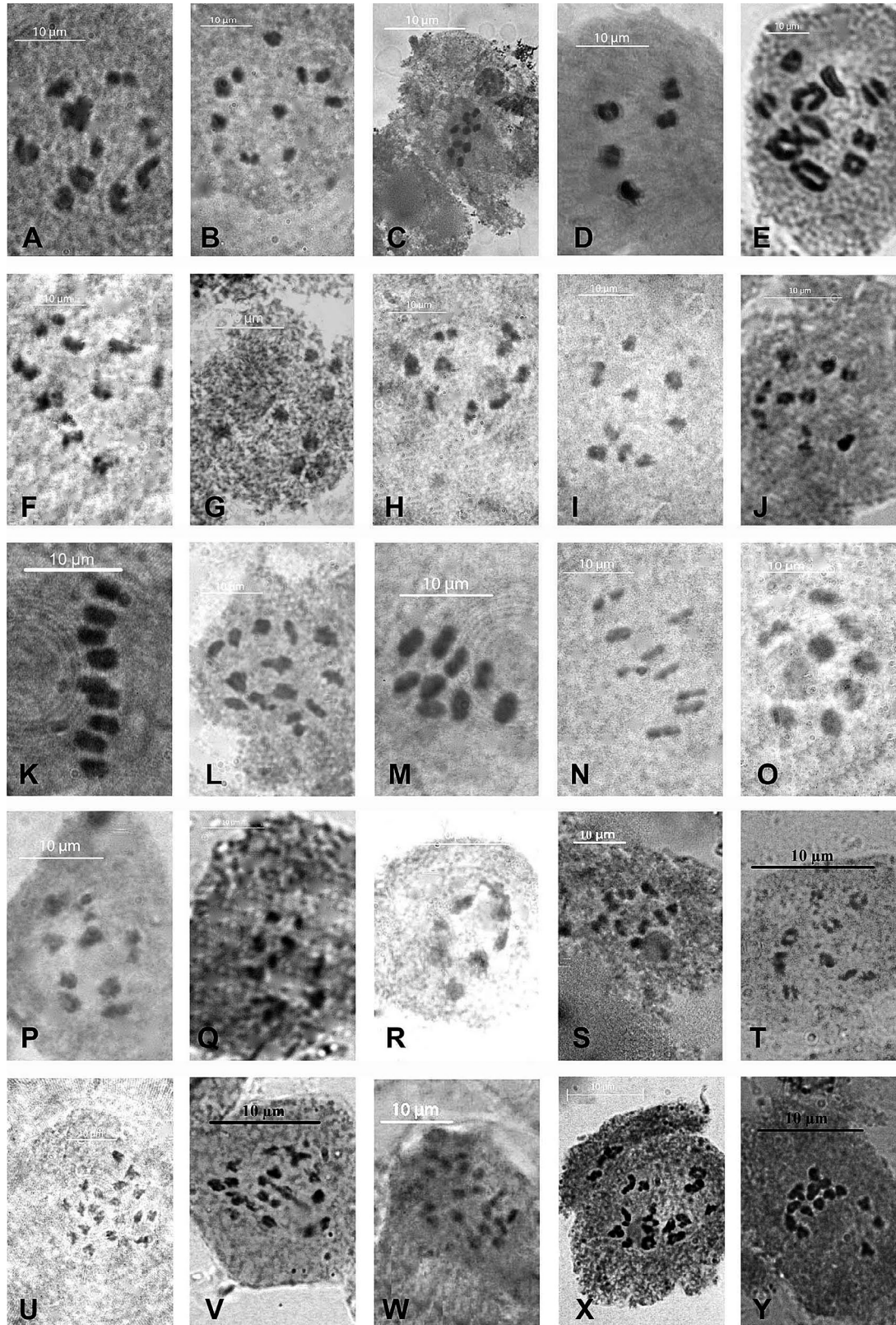


Fig. 9. Meiocytes of grasses. **A**, *Chionachne koenigii*; **B–C**, *Coix gigantea*; **D**, *Coix lacryma-jobi*; **E**, *Trilobachne cookei*; **F**, *Apluda mutica*; **G**, *Arthraxon hispidus* var. *hispidus*; **H**, *Arthraxon hispidus* var. *santapau*; **I**, *Arthraxon jubatus*; **J–L**, *Arthraxon lanceolatus* var. *lanceolatus*; **M**, *Arthraxon lanceolatus* var. *meeboldii*; **N**, *Arthraxon lanceolatus* var. *raizadae*; **O**, *Arthraxon lanceolatus* var. *villosus*; **P**, *Arthraxon lancifolius*; **Q**, *Bhidea burnsiiana*; **R**, *Chrysopogon aciculatus*; **S**, *Chrysopogon castaneus*; **T**, *Chrysopogon velutinous*; **U**, *Cymbopogon martini*; **V**, *Dichanthium annulatum*; **W**, *Dichanthium armatum*; **X**, *Dichanthium assimile*; **Y**, *Dichanthium caricosum*.

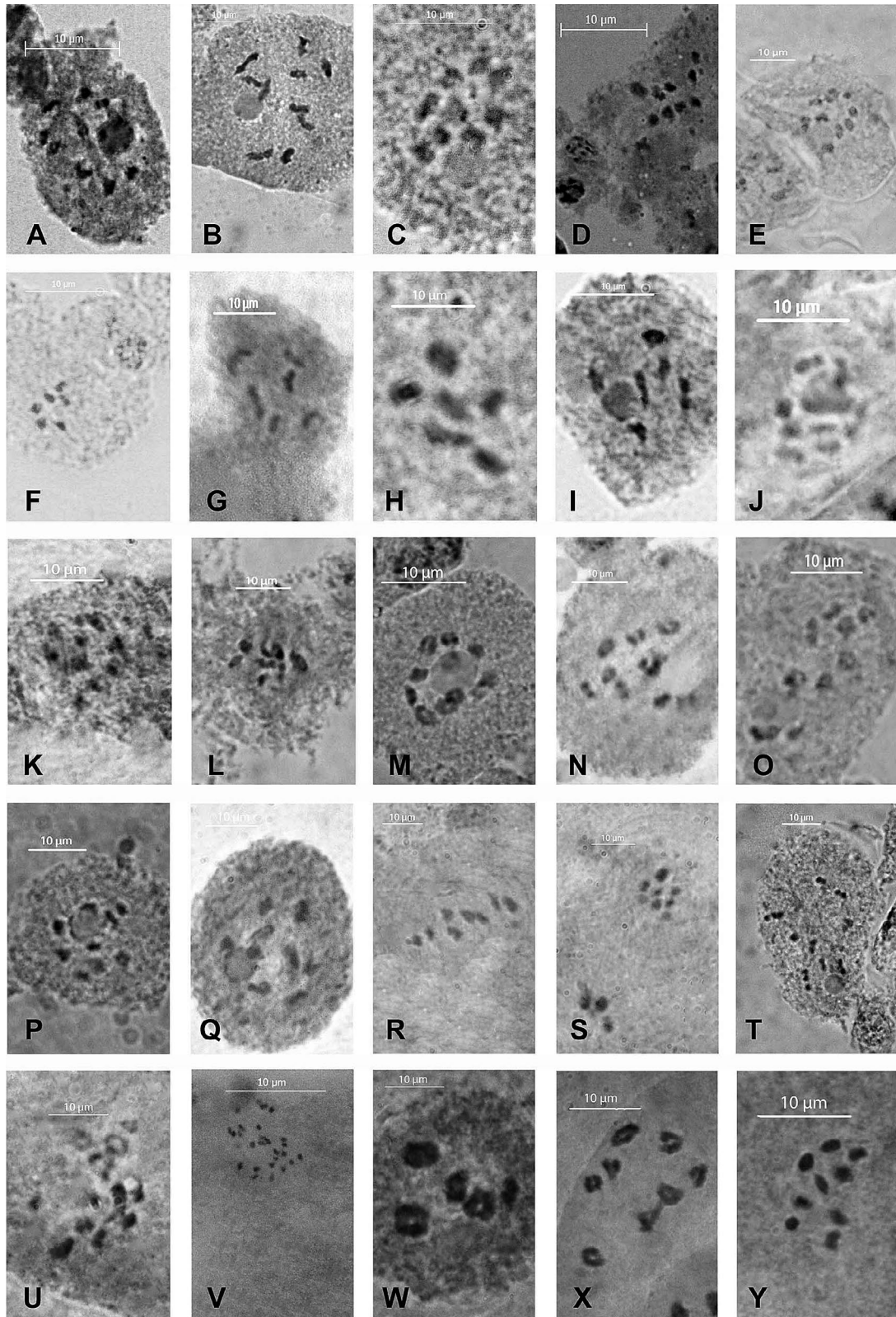


Fig. 10. Meicytes of grasses. **A**, *Dichanthium jainii*; **B**, *Dichanthium odoratum*; **C**, *Dichanthium oliganthum*; **D**, *Dichanthium panchganiense*; **E**, *Dichanthium tuberculatum*; **F**, *Dimeria blatteri*; **G**, *Dimeria santapau*; **H**, *Dimeria stapfiana*; **I**, *Dimeria woodrowii*; **J**, *Eulalia shrirangii*; **K**, *Ischaemum dalzellii*; **L**, *Ischaemum diplopogon*; **M–N**, *Ischaemum impressum*; **O**, *Ischaemum kingii*; **P**, *Ischaemum raizadae*; **Q**, *Ischaemum ritchei*; **R**, *Ischaemum santapau*; **S**, *Ischaemum semisagittatum*; **T**, *Ischaemum travancorense*; **U**, *Iseilema anthephoroides*; **V**, *Lakshmia venusta*; **W**, *Lophopogon tridentatus*; **X**, *Mnesithea clarkei*; **Y**, *Mnesithea veldkampii*.

Dimeria santapau M.R. Almeida
* *n* = 6, CHN. India, Maharashtra, Ratnagiri district, Ratnagiri, 112 m, 28 Oct 2007, *K.V.C. Gosavi 2830* (SUK) [Fig. 10G].

Dimeria stapfiana C.E. Hubb. ex Pilg.
* *n* = 6, CHN. India, Maharashtra, Ratnagiri district, Pali, 203 m, 19 Jul 2009, *K.V.C. Gosavi 2957* (SUK) [Fig. 10H].

Dimeria woodrowii Stapf
* *n* = 6, CHN. India, Maharashtra, Ratnagiri district, Pali, 203 m, 28 Oct 2007, *K.V.C. Gosavi 2827* (SUK) [Fig. 10I].

Eulalia shrirangii Salunkhe & Potdar
* *n* = 8, CHN. India, Maharashtra, Satara district, Kas, Kas plateau, 1182 m, 06 Oct 2008, *K.V.C. Gosavi 2920* (SUK) [Fig. 10J].

Ischaemum dalzellii Stapf ex Bor
* *n* = 10, CHN. India, Maharashtra, Kolhapur district, Chandgad, Tillari, Tillari Ghat, 663 m, 17 Nov 2006, *K.V.C. Gosavi 2733* (SUK) [Fig. 10K].

Ischaemum diplopogon Hook. f.
n = 8, CHN. India, Maharashtra, Satara district, Mahabaleshwar, Ambenali Ghat, 1182 m, 08 Nov 2008, *K.V.C. Gosavi 2934* (SUK) [Fig. 10L].

Ischaemum impressum Hack.
n = 10, CHN. India, Maharashtra, Kolhapur district, Gargoti, Kondushi, Kondushi plateau, 987 m, 17 Oct 2007, *K.V.C. Gosavi 2799* (SUK); India, Maharashtra, Kolhapur district, Shelap, 830 m, 18 Oct 2007, *K.V.C. Gosavi 2808* (SUK) [Fig. 10M–N].

Ischaemum kingii Hook. f.
n = 10, CHN. India, Maharashtra, Sindhudurg district, Amboli, Amboli Ghat, 728 m, 26 Oct 2007, *K.V.C. Gosavi 2816* (SUK) [Fig. 10O].

Ischaemum raizadae Hemadri & Billore
* *n* = 10, CHN. India, Maharashtra, Sindhudurg district, Amboli, Amboli Ghat, 728 m, 28 Oct 2006, *K.V.C. Gosavi 2705* (SUK) [Fig. 10P].

Ischaemum ritchiei Stapf ex Bor
* *n* = 9, CHN. India, Maharashtra, Kolhapur district, Chandgad, Tillari, Tillari Ghat, 663 m, 14 Nov 2007, *K.V.C. Gosavi 2848* (SUK) [Fig. 10Q].

Ischaemum santapau Bor
** *n* = 8, CHN. India, Maharashtra, Sindhudurg district, Sawantwadi, 80 m, 16 Nov 2008, *K.V.C. Gosavi 2936* (SUK) [Fig. 10R].

Ischaemum semisagittatum Roxb.
* *n* = 8, CHN. India, Maharashtra, Kolhapur district, Chandgad, Tillari, Tillari Ghat, 663 m, 14 Nov 2007, *K.V.C. Gosavi 2849* (SUK) [Fig. 10S].

Ischaemum travancorense Stapf ex C.E.C. Fischer
* *n* = 10, CHN. India, Maharashtra, Nasik district, Igatpuri, 588 m, 17 Oct 2009, *K.V.C. Gosavi 2977* (SUK) [Fig. 10T].

Isilema antheboroides Hack.
** *n* = 12, CHN. India, Maharashtra, Kolhapur district, Karveer, Shivaji University campus, Rajaram lake, 697 m, 18 Sep 2006, *K.V.C. Gosavi 2692* (SUK) [Fig. 10U].

Lakshmia venusta (Thwaites) Veldkamp
* *n* = 24, CHN. India, Maharashtra, Sindhudurg district, Amboli,

Amboli water fall, 726 m, 25 Dec 2008, *K.V.C. Gosavi 2953* (SUK) [Fig. 10V].

Lophopogon tridentatus Hack.
n = 5, CHN. India, Maharashtra, Kolhapur district, Karveer, Shivaji University campus, Vidyarthi bhavan, 595 m, 28 Nov 2006, *K.V.C. Gosavi 2752* (SUK) [Fig. 10W].

Mnesithea clarkei (Hack.) de Koning & Sosef
* *n* = 8, CHN. India, Maharashtra, Kolhapur district, Radhanagari, Shelap plateau, 830 m, 10 Oct 2006, *K.V.C. Gosavi 2697* (SUK) [Fig. 10X].

Mnesithea veldkampii Potdar, S.P. Gaikwad, Salunkhe & S.R. Yadav
* *n* = 9, CHN. India, Maharashtra, Kolhapur district, Panhala, Masai plateau, 969 m, 31 Dec 2006, *K.V.C. Gosavi 2757* (SUK) [Fig. 10Y].

Ophiuros exaltatus (L.) Kuntze
* *n* = 7, CHN. India, Maharashtra, Kolhapur district, Kagal, Kagal lake, 554 m, 15 Aug 2008, *K.V.C. Gosavi 2888* (SUK) [Fig. 11A].

Pogonachne racemosa Bor
* *n* = 10, CHN. India, Maharashtra, Sindhudurg district, Amboli, Amboli Ghat, 707 m, 26 Oct 2007, *K.V.C. Gosavi 2818* (SUK) [Fig. 11B].

Pseudodichanthium serrafalcoides (Cooke & Stapf) Bor
* *n* = 10, CHN. India, Maharashtra, Sindhudurg district, Amboli, Amboli Ghat, 719 m, 26 Oct 2007, *K.V.C. Gosavi 2819* (SUK) [Fig. 11C].

Rottboellia cochinchinensis (Lour.) Clayton
n = 10, CHN. India, Maharashtra, Satara district, Satara, 748 m, 11 Jan 2009, *K.V.C. Gosavi 2959* (SUK) [Fig. 11D].

Sorghum deccanense Stapf ex Raizada
n = 5, CHN. India, Maharashtra, Kolhapur district, Karveer, Ujlaiwadi, 643 m, 18 Sep 2006, *K.V.C. Gosavi 2691* (SUK) [Fig. 11E].

Sorghum halepense (L.) Pers.
n = 20, CHN. India, Maharashtra, Kolhapur district, Karveer, Shivaji University campus, Statistic department, 598 m, 5 Sep 2006, *K.V.C. Gosavi 2687* (SUK) [Fig. 11F].

Spodiopogon rhizophorus (Steud.) Pilg.
n = 10, CHN. India, Maharashtra, Sindhudurg district, Amboli, Amboli Ghat, 719 m, 26 Oct 2007, *K.V.C. Gosavi 2817* (SUK) [Fig. 11G].

Thelepogon elegans Roth ex Roem. & Schult.
n = 5, CHN. India, Maharashtra, Kolhapur district, Karveer, Shivaji University campus, Bhashabhavan Kolhapur, 595 m, 5 Sep 2006, *K.V.C. Gosavi 2686* (SUK) [Fig. 11H].

Triplopogon ramosissimus (Hack.) Bor
* *n* = 10, CHN. India, Maharashtra, Satara district, Thoshegar, 990 m, 6 Oct 2008, *K.V.C. Gosavi 2918* (SUK) [Fig. 11I].

Tribe Maydeae

Chionachne koenigii (Spreng.) Thwaites & Hook. f.
n = 10, CHN. India, Maharashtra, Kolhapur district, Karveer, Shivaji University campus, on the way from Botany Department to Bhashabhavan, 607 m, 18 Sep 2006, *K.V.C. Gosavi 2690* (SUK) [Fig. 9A].

Coix gigantea J. Koenig
n = 10, CHN. India, Maharashtra, Kolhapur district, Karveer,

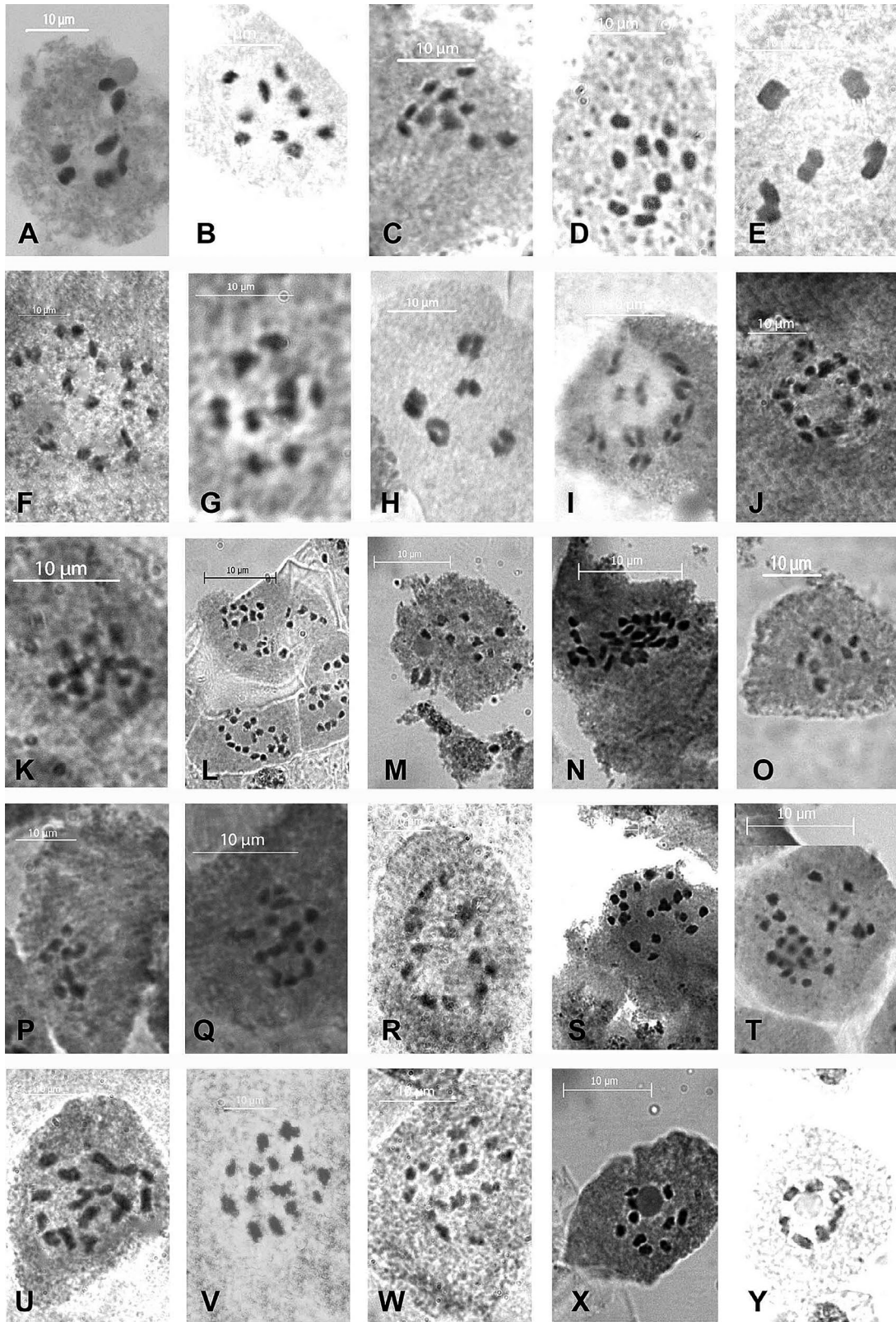


Fig. 11. Meiocytes of grasses. **A**, *Ophiuros exaltatus*; **B**, *Pogonachne racemosa*; **C**, *Pseudodichanthium serrafalcoides*; **D**, *Rottboellia cochinchinensis*; **E**, *Sorghum deccanense*; **F**, *Sorghum halepense*; **G**, *Spodiopogon rhizophorus*; **H**, *Thelepogon elegans*; **I**, *Triplopogon ramosissimus*; **J–K**, *Alloteropsis cimicina*. **L**, *Chloris barbata*; **M**, *Chloris virgata*; **N**, *Echinochloa colona*; **O**, *Paspalum canarae* var. *canarae*; **P**, *Paspalum canarae* var. *fimbriatum*; **Q**, *Panicum maximum*; **R**, *Panicum psilopodium*; **S**, *Pennisetum alopecuroides*; **T**, *Pennisetum pedicellatum*; **U**, *Pennisetum purpureum*; **V**, *Pseudoraphis spinescens*; **W**, *Rhynchelytrum repens*; **X**, *Arundinella ciliata*; **Y**, *Arundinella leptochloa*.

Shivaji University Campus, Chemistry Department, 601 m, 17 Sep 2006, *K.V.C. Gosavi 2685* (SUK) [Fig. 9B].

n = 9, CHN. India, Maharashtra, Nasik district, Igatpuri, along national highway, 17 Oct 2009, 574 m, *K.V.C. Gosavi 2978* (SUK) [Fig. 9C].

Coix lacryma-jobi L.

n = 5, CHN. Kolhapur district, Shahuwadi, Amba Ghat, 650 m, 17 Sep 2006, *K.V.C. Gosavi 2689* (SUK) [Fig. 9D].

Trilobachne cookei (Stapf) M. Schenck ex Henrard

n = 10, CHN. India, Maharashtra, Kolhapur district, Shahuwadi, Amba Ghat, 663 m, 19 Jul 2009, *K.V.C. Gosavi 2958* (SUK) [Fig. 9E].

Tribe Paniceae

Alloteropsis cimicina (L.) Stapf

n = 18, CHN. India, Maharashtra, Kolhapur district, Karveer, Rajaram lake, 581 m, 10 Nov 2006, *K.V.C. Gosavi 2720* (SUK) [Fig. 11J]; India, Maharashtra, Ratnagiri district, Ratnagiri, 112 m, 06 Jul 2008, *K.V.C. Gosavi 2866* (SUK) [Fig. 11K].

Chloris barbata Sw.

n = 20, CHN. India, Maharashtra, Kolhapur district, Karveer, Shivaji University campus, Botany Department garden, 603 m, 11 Jun 2009, *K.V.C. Gosavi 3866* (SUK) [Fig. 11L].

Chloris virgata Sw.

n = 10, CHN. India, Maharashtra, Kolhapur district, Karveer, Shivaji University campus, Botany Department garden, 603 m, 10 Nov 2007, *K.V.C. Gosavi 3851* (SUK) [Fig. 11M].

Echinochloa colona (L.) Link

n = 24, CHN. India, Maharashtra, Kolhapur district, Karveer, Shivaji University campus, Botany Department garden, 603 m, 10 Jun 2009, *K.V.C. Gosavi 3868* (SUK) [Fig. 11N].

Panicum maximum Jacq.

***n* = 14, CHN. India, Maharashtra, North Goa, Goa University campus, 123 m, 28 Nov 2008, *K.V.C. Gosavi 2992* (SUK) [Fig. 11Q].

Panicum psilopodium Trin.

***n* = 14, CHN. India, Maharashtra, Kolhapur district, Karveer, Shivaji University campus, gate number 2606 m, 25 Nov 2008, *K.V.C. Gosavi 2991* (SUK) [Fig. 11R].

Paspalum canarae var. *canarae* (Steud.) Veldkamp

***n* = 8, CHN. India, Maharashtra, Kolhapur district, Shahuwadi, Pavan khind, 786 m, 25 Sep 2008, *K.V.C. Gosavi 2909* (SUK) [Fig. 11O].

Paspalum canarae var. *fimbriatum* (Bor) Veldkamp

**n* = 8, CHN. India, Maharashtra, Sindhudurg district, Amboli, Chaukul, 746 m, 28 Oct 2006, *K.V.C. Gosavi 2702* (SUK) [Fig. 11P].

Pennisetum alopecuroides (L.) Spreng.

***n* = 18, CHN. India, Maharashtra, Satara district, Pachgani, Pachgani plateau, 1330 m, 08 Nov 2008, *K.V.C. Gosavi 2930* (SUK) [Fig. 11S].

Pennisetum pedicellatum Trin.

***n* = 25, CHN. India, Maharashtra, Kolhapur district, Karveer, Shivaji University campus, Bhashabhavan, 606 m, 6 Oct 2009, *K.V.C. Gosavi 2973* (SUK) [Fig. 11T].

Pennisetum purpureum Schumach.

***n* = 16, CHN. India, Maharashtra, Kolhapur district, Karveer,

Shivaji University campus, 603 m, 2 May 2008, *K.V.C. Gosavi 2863* (SUK) [Fig. 11U].

Pseudoraphis spinescens (R. Br.) Vickery

***n* = 14, CHN. India, Maharashtra, Raigad district, Pali, 30 m, 15 Dec 2007, *K.V.C. Gosavi 2862* (SUK) [Fig. 11V].

Rhynchelytrum repens (Willd.) C.E. Hubb.

***n* = 20, CHN. India, Maharashtra, Kolhapur district, Kagal, 554 m, 30 Oct 2006, *K.V.C. Gosavi 2700* (SUK) [Fig. 11W].

Subfamily Pooideae

Arundinella ciliata Nees ex Miq.

n = 10, CHN. India, Maharashtra, Kolhapur district, Karveer, Shivaji University Campus, Botany Department garden, 603 m, 11 Aug 2009 *K.V.C. Gosavi 3869* (SUK) [Fig. 11X].

Arundinella leptochloa Hook. f.,

***n* = 8, CHN. India, Maharashtra, Sindhudurg district, Amboli, Amboli Ghat, 722 m, 26 Oct 2007, *K.V.C. Gosavi 2823* (SUK) [Fig. 11Y].

Arundinella nepalensis Trin.

***n* = 9, CHN. India, Maharashtra, Kolhapur district, Gaganbawada, Borbet, 895 m, 18 Nov 2008, *K.V.C. Gosavi 2943* (SUK) [Fig. 12A].

Arundinella nervosa Nees ex Hook. & Arn.

**n* = 8, CHN. India, Maharashtra, Ratnagiri district, Ganapatipule, 40 m, 14 Sep 2008, *K.V.C. Gosavi 2902* (SUK) [Fig. 12B].

Arundinella tuberculata Munro ex Lisboa

**n* = 10, CHN. India, Maharashtra, Satara district, Wai, Pasarani Ghat, 837 m, 8 Nov 2008, *K.V.C. Gosavi 2927* (SUK) [Fig. 12C].

Coelachne minuta Bor

**n* = 25, CHN. India, Maharashtra, Kolhapur district, Radhanagari, Shelap plateau, 824 m, 17 Oct 2007, *K.V.C. Gosavi 2809* (SUK) [Fig. 12D].

Danthonidium gammiei (Bhide) C.E. Hubb.

**n* = 10, CHN. India, Maharashtra, Sindhudurg district, Vaibhavwadi, 68 m, 11 Sep 2007, *K.V.C. Gosavi 2777* (SUK) [Fig. 12E].

Garnotia arborum Stapf ex Woodrow

**n* = 10, CHN. India, Maharashtra, Kolhapur district, Radhanagari, 569 m, 6 Dec 2008, *K.V.C. Gosavi 2951* (SUK) [Fig. 12F].

Garnotia tenella Janowski

***n* = 16, CHN. India, Maharashtra, Kolhapur district, Shahuwadi, Pavan khind, 786 m, 25 Sep 2008, *K.V.C. Gosavi 2681* (SUK) [Fig. 12G].

Hubbardia diandra Chandore, Gosavi & S.R. Yadav

**n* = 10, CHN. India, Maharashtra, Kolhapur district, Chandgad, Tillari, Tillari Ghat, 663 m, 17 Nov 2006, *K.V.C. Gosavi 2731* (SUK) [Fig. 12H].

**Indopoa paupercula* (Stapf) Bor

n = 10, CHN. India, Maharashtra, Kolhapur district, Gaganbawada, Borbet, Borbet plateau, 970 m, 26 Sep 2009, *K.V.C. Gosavi 2971* (SUK) [Fig. 12I].

Isachne albens Trin.

***n* = 10, CHN. India, Maharashtra, Kolhapur district,

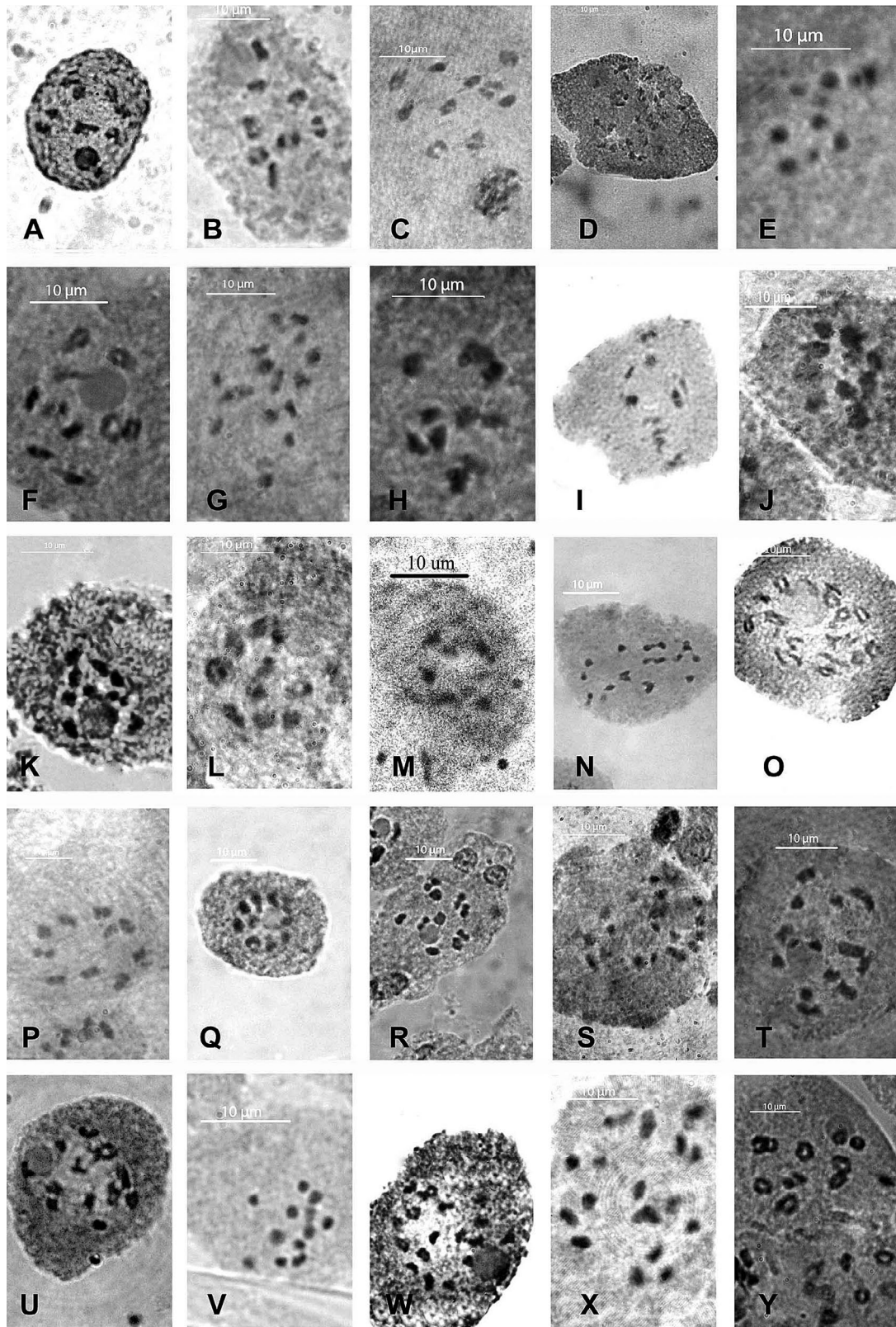


Fig. 12. Meiocytes of grasses. **A**, *Arundinella nepalensis*; **B**, *Arundinella nervosa*; **C**, *Arundinella tuberculata*; **D**, *Coelachne minuta*; **E**, *Danthonidium gammiei*; **F**, *Garnotia arborum*; **G**, *Garnotia tenella*; **H**, *Hubbardia diandra*; **I**, *Indopoa paupercula*; **J**, *Isachne albens*; **K**, *Isachne bicolor*; **L**, *Isachne borii*; **M**, *Isachne elegans*; **N**, *Isachne globosa*; **O**, *Isachne lisboae*; **P**, *Isachne pulchella*; **Q**, *Isachne swaminathanii*; **R**, *Jansenella griffithiana*; **S**, *Jansenella neglecta*; **T**, *Melanocenchris jacquemontii*; **U**, *Oryza rufipogon*; **V**, *Oryza granulata*; **W**, *Tripogon capillatus*; **X**, *Tripogon lisboae*; **Y**, *Zenkeria elegans*.

Gaganbawada, Bhuibawada Ghat, 619 m, 07 Oct 2007, *K.V.C. Gosavi 2796* (SUK) [Fig. 12J].

Isachne bicolor Naik & Patunkar

* $n = 10$, CHN. India, Maharashtra, Satara district, Kas, Kas plateau, 1180 m, 19 Sep 2009, *K.V.C. Gosavi 2963* (SUK) [Fig. 12K].

Isachne borii Hemadri

* $n = 10$, CHN. India, Maharashtra, Sindhudurg district, Amboli, Chaukul, 720 m, 13 Sep 2008, *K.V.C. Gosavi 2893* (SUK) [Fig. 12L].

Isachne elegans Dalzell

$n = 10$, CHN. India, Maharashtra, Kolhapur district, Ajara, 667 m, 13 Sep 2007, *K.V.C. Gosavi 2892* (SUK) [Fig. 12M].

Isachne globosa (Thunb.) Kuntze

** $n = 10$, CHN. India, Maharashtra, Nasik district, Igatpuri, 588 m, 17 Oct 2009, *K.V.C. Gosavi 2979* (SUK) [Fig. 12N].

Isachne lisboae Hook. f.

* $n = 18$, CHN. India, Maharashtra, Kolhapur district, Radhanagari, Shelap, 824 m, 18 Oct 2007, *K.V.C. Gosavi 2805* (SUK) [Fig. 12O].

Isachne pulchella Roth ex Roem. & Schult.

* $n = 10$, CHN. India, Maharashtra, Sindhudurg district, Vaibhawadi, 68 m, 28 Aug 2008, *K.V.C. Gosavi 2889* (SUK) [Fig. 12P].

Isachne swaminathanii V. Prakash & S.K. Jain

* $n = 10$, CHN. India, Maharashtra, Satara district, Mahabaleshwar, 1322 m, 27 Sep 2009, *K.V.C. Gosavi 2982* (SUK) [Fig. 12Q].

Jansenella griffithiana (Müll.Hal.) Bor

$n = 10$, CHN. India, Maharashtra, Sindhudurg district, Amboli, Chaukul, 720 m, 28 Oct 2006, *K.V.C. Gosavi 2703* (SUK) [Fig. 12R].

Jansenella neglecta S.R. Yadav, Chivalkar & Gosavi.

* $n = 20$, CHN. India, Maharashtra, Kolhapur district, Shahuwadi, Pandharpani, Vishal gad way, 792 m, 26 Sep 2008, *K.V.C. Gosavi 2913* (SUK) [Fig. 12S].

Melanocenchris jacquemontii Jaub. & Spach

** $n = 14$, CHN. India, Maharashtra, Kolhapur district, Karveer, Shivaji University campus, Rajaram lake, 604 m, 10 Nov 2006, *K.V.C. Gosavi 2719* (SUK) [Fig. 12T].

Oryza granulata Ness

$n = 12$, CHN. India, Karnataka state, Chikmangalur, Bhadra wildlife sanctuary, 656 m, s.d., *S.R. Yadav 3884* (SUK) [Fig. 12V].

Oryza rufipogon Griff.

$n = 12$, CHN. India, Maharashtra, Sindhudurg district, Vaibhawadi, 68 m, 11 Sep 2007, *K.V.C. Gosavi 2775* (SUK) [Fig. 12U].

Tripogon capillatus Jaub. & Spach

* $n = 18$, CHN. India, Maharashtra, Sindhudurg district, Amboli, Amboli Ghat, 708 m, 13 Sep 2008, *K.V.C. Gosavi 2895* (SUK) [Fig. 12W].

Tripogon lisboae Stapf

* $n = 18$, CHN. India, Maharashtra, Kolhapur district, Shahuwadi, Amba Ghat, 625 m, 28 Oct 2007, *K.V.C. Gosavi 2840* (SUK) [Fig. 12X].

Zenkeria elegans Trin.

* $n = 10$, CHN. India, Tamil Nadu state, Tirunanveli, 45 m, s.d., *S.R. Yadav 3885* (SUK) [Fig. 12Y].

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Methods are described in Grabile & al. (2010). RI, recombination index (Darlington, 1939); EC, excess chiasmata frequency (Burt & Bell, 1987). Abbreviation: PMC, pollen mother cells.

This contribution belongs to the series “Chromosome studies in Orchidaceae from Argentina, III”. For all taxa, these are the first reports on their gametic chromosome number and the meiotic behaviour, at the species (*) or genus (**) levels.

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ORCHIDACEAE

Aspidogyne kuczynskii (Porsh) Garay

** $n = 21$, CHN (Fig. 13G). Argentina, Corrientes Province, Ituzaingó Department, Garapé, at the coast of Paraná river, in forest shade, 27°36' S, 56°22' W, 01 Oct 2002, *Almada 151* (MNES).

This terrestrial species occurs in Argentina, being restricted to the forests of Chaco, Corrientes, and Misiones Provinces, SE Brazil and Paraguay (Correa, 1996; Johnson, 2001). Only two chromosome counts were reported for this genus, by Daviña & al. (2009) who established $2n = 42$ in this accession of *A. kuczynskii* and Grabile & al. (2004) who found the same number in *Aspidogyne* sp. from Misiones.

The meiotic behaviour of *A. kuczynskii* is regular. In PMC at diakinesis and metaphase I the chromosomes exclusively associate as 21 bivalents, mostly rings (90.0%) with distal chiasmata (90.1%) averaging 1.95 chiasmata per bivalent and 40.95 total chiasmata per cell. The RI and the EC values are high (61.95 and 19.95, respectively). This species is included in Appendix II of CITES.

Brassavola tuberculata Hook.

** $n = 20$, CHN (Fig. 13M). Argentina, Misiones Province, Capital Department, Posadas, in forest, 50 m W of Zaimán stream and 2.3 km W of Paraná river, 27°24' S, 55°53' W, 13 Feb 2002, *Hojsgaard 228* (MNES); Argentina, Misiones Province, San Ignacio Department, San Ignacio, Teyú Cuaré, at the coast of Paraná river, in forest, 27°17' S, 55°35' W, 28 Oct 1993, *Seijo, Daviña & Rodríguez 706* (BAB, CTES, MNES).

This epiphytic taxon occurs in Argentina, in its northeast and central-east regions, NE Brazil, Bolivia and Paraguay (Correa, 1996; Johnson, 2001), constantly showing $2n = 40$ (Afzelius, 1943; Blumenstein, 1960; Daviña & al., 2009).

The meiotic behaviour of *B. tuberculata* is regular. In PMC at diakinesis and metaphase I the chromosomes exclusively associate as 20 bivalents, mostly rings (85.0%) with distal chiasmata (89.7%) averaging 1.90 chiasmata per bivalent and 38.00 total chiasmata per cell. The RI and the EC values are high (58.00 and 18.00, respectively). This species is included in Appendix II of CITES.

Campylocentrum neglectum (Rehb. f. & Warm.) Cogn.

** $n = 19$, CHN (Fig. 13L). Argentina, Chaco Province, San Fernando Department, in road between Resistencia and Colonia Benitez, in forest, 500 m W of Tragadero river, 27°20' S, 58°58' W, 10 Aug 2002, *Insaurrealde 676* (MNES).

This epiphytic species occurs in NE Argentina, Brazil, Bolivia

and Paraguay (Correa, 1996) and only two chromosome counts were reported revealing $2n = 38$, in this accession of *C. neglectum* from Argentina (Daviña & al., 2009) and other from Paraguay (Dematteis & Daviña, 1999).

The meiotic behaviour of *C. neglectum* is regular. In PMC at diakinesis and metaphase I the chromosomes associate as 19 bivalents exclusively, mostly rings (84.2%) with distal chiasmata (91.4%) averaging 1.84 chiasmata per bivalent and 34.96 total chiasmata per cell. The RI and the EC values are high (53.96 and 15.96, respectively). This species is included in Appendix II of CITES.

Capanemia micromera Barb. Rodr.

** $n = 12$, CHN (Fig. 13K). Argentina, Misiones Province, Capital Department, Garupá, in forest, 200 m W of Garupá stream, 27°27'S, 55°49'W, 03 Aug 2001, *Cerutti 13* (MNES); Argentina, Misiones Province, Capital Department, Posadas, in forest at the coast of Itaembé stream, 2 km SW of Paraná river, 27°21'S, 56°02'W, 28 Aug 1993, *Guillen, Dematteis & Seijo 232* (MNES); Argentina, Misiones Province, Capital Department, Garupá, in forest, 2 km W of Garupá stream, 27°28'S, 55°50'W, 07 Jul 2004, *Cerutti 70* (MNES).

This epiphytic taxon is present at NE Argentina, Brazil, Bolivia, and Paraguay (Tropicos.org, 2011), and its gametic number constitute the former chromosome count in *Capanemia* Barb. Rodr.

The meiotic behaviour of *C. micromera* is regular. In PMC at diakinesis and metaphase I the chromosomes associate as 12 bivalents exclusively, mostly rings (83.3%) with distal chiasmata (86.4%) averaging 1.83 chiasmata per bivalent and 21.96 total chiasmata per cell. The RI and the EC values are low (33.96 and 9.96, respectively). We propose $x = 12$ as the basic chromosome number for the genus. This species is included in Appendix II of CITES.

Cyclopogon calophyllus (Barb. Rodr.) Barb. Rodr.

* $n = 14$, CHN (Fig. 13D). Argentina, Misiones Province, Capital Department, Posadas, at the coast of Paraná river, in forest shade, 27°21'S, 56°00'W, 07 Jul 2004, *Cerutti 74* (MNES); Argentina, Corrientes Province, Ituzaingó Department, Garapé, at the coast of Paraná river, in forest shade, 27°36'S, 56°22'W, 10 Feb 2002, *Cerutti 28* (MNES).

This terrestrial species occurs in Argentina, restricted to Jujuy, Misiones and Corrientes Provinces, SE Brazil and Bolivia (Correa, 1996; Johnson, 2001; Insaurralde & Radins, 2007). In agreement with this record, Daviña & al. (2009) reported $2n = 28$ for this accession of *C. calophyllus*.

The meiotic behaviour of *C. calophyllus* is regular. In PMC at diakinesis and metaphase I the chromosomes associate as 14 bivalents exclusively, mostly rings (78.6%) with distal chiasmata (88.4%) averaging 1.86 chiasmata per bivalent and 26.04 total chiasmata per cell. The RI and the EC values are low (40.04 and 12.04, respectively). Previous reports in other taxa of *Cyclopogon* Presl. found $n = 14$ bivalents (*C. elatus* (Sw.) Schltr.: Martínez, 1981; Cerutti & al., 2004; *C. multiflorus* Schltr.: Felix & Guerra, 2005) or 16 bivalents (*C. congestus* (Vell.) Hoehne: Martínez, 1981). This species is included in Appendix II of CITES.

Cyclopogon oliganthus (Hoehne) Hoehne & Schltr.

* $n = 32$, CHN (Fig. 13E). Argentina, Misiones Province, Apóstoles Department, Apóstoles, at the coast of Chimiray stream, in forest shade, 27°54'S, 55°49'W, 03 Aug 2004, *Hojsgaard, Cerutti & Grabielle 339* (MNES); Argentina, Misiones Province, Capital Department, Miguel Lanús, in forest shade, close to swamp of Zaimán stream, 27°26'S, 55°53'W, 03 Aug 2004, *Cerutti, Grabielle & Hojsgaard 71* (CTES, MNES).

This terrestrial orchid occurs in Argentina, limited to the forests of Salta, Corrientes, and Misiones Provinces, and Brazil (Correa, 1996; ww.tropicos.org, 2011). In accordance, Daviña & al. (2009) found $2n = 64$ in this accession of *C. oliganthus*.

The meiotic behaviour of *C. oliganthus* is regular. In PMC at diakinesis and metaphase I the chromosomes associate as 32 bivalents exclusively, mostly rings (82.5%) with distal chiasmata (85.2%) averaging 1.91 chiasmata per bivalent and 61.12 total chiasmata per cell. The RI and the EC values are high (93.12 and 29.12, respectively). This species is included in Appendix II of CITES.

Cyrtopodium hatschbachii Pabst

* $n = 23$, CHN (Fig. 13J). Argentina, Misiones Province, Capital Department, Miguel Lanús, in swamp of Zaimán stream, 27°26'S, 55°53'W, 26 Aug 2002, *Almada, Cerutti & Grabielle 153* (MNES), 23 Jan 1995, *Guillen, Dematteis & Insaurralde 406* (CTES, MNES), 09 Aug 2001, *Hojsgaard 185* (MNES), 24 Nov 1994, *Insaurralde, Cardozo, Honfi & Guillén 600* (CTES, MNES, SI), 02 Jul 1995, *Insaurralde, Galaverna & Guillén 626* (CTES, MNES).

This is a terrestrial orchid occurring in Argentina, Brazil, Bolivia, and Paraguay (Correa, 1996; Tropicos.org, 2011). In agreement with this record, Daviña & al. (2009) reported $2n = 46$ for this accession of *C. hatschbachii*.

The meiotic behaviour of *C. hatschbachii* is regular. In PMC at diakinesis and metaphase I the chromosomes associate as 23 bivalents

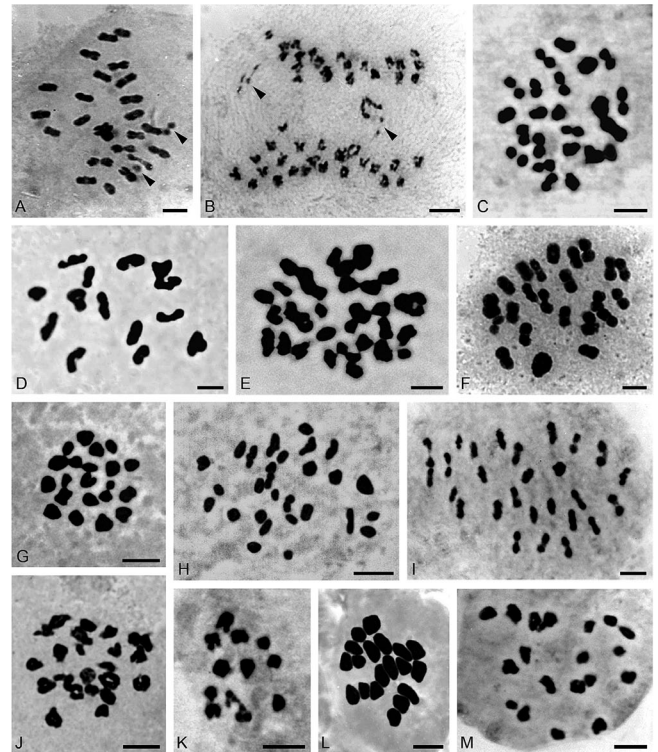


Fig. 13. Pollen mother cells (PMCs) with meiotic chromosomes. **A**, *Sarcoglottis fasciculata*, metaphase I with 23II+3B; **B**, *S. fasciculata*, anaphase I with 23II+3B; while A chromosomes separate in homologues, the Bs separate in sister chromatids; **C**, *Mesadenella cuspidata*, metaphase I with 23 II; **D**, *Cyclopogon calophyllus*, metaphase I with 14 II; **E**, *C. oliganthus*, metaphase I with 32 II; **F**, *Pelexia bonariensis*, metaphase I with 23 II; **G**, *Aspidogyne kuczynskii*, metaphase I with 21 II; **H**, *Oeceoclades maculata*, metaphase I with 28 II; **I**, *Galeandra beyrichii*, metaphase I with 27 II; **J**, *Cyrtopodium hatschbachii*, metaphase I with 23 II; **K**, *Capanemia micromera*, metaphase I with 12 II; **L**, *Campylocentrum neglectum*, metaphase I with 19 II; **M**, *Brassavola tuberculata*, metaphase I with 20 II. Arrowheads in A and B point out B chromosomes. Scale bar = 5 µm.

exclusively, mostly rings (78.2%) with distal chiasmata (88.4%) averaging 1.87 chiasmata per bivalent and 43.01 total chiasmata per cell. The RI and the EC values are high (66.01 and 20.01, respectively). Previous reports in other taxa of *Cyrtopodium* R. Br. found $n = 22$ bivalents (*C. eugenii* Rchb. f.) and $n = 23$ (*C. intermedium* Brade) (Felix & Guerra, 2000). This species is included in Appendix II of CITES.

Galeandra beyrichii Rchb. f.

** $n = 27$, CHN (Fig. 13I). Argentina, Misiones Province, Capital Department, Garupá, in open wet forest, 2 km W of Garupá stream, 27°28'S, 55°50'W, 20 Jan 2003, *Insaurralde & Radins 705* (MNES).

This terrestrial orchid is widely distributed in America extending to the northern regions of Argentina, at Jujuy, Salta and Misiones Provinces (Correa, 1996; Insaurralde & Radins, 2007; Tropic.org, 2011). In accordance with this record, Daviña & al. (2009) found $2n = 54$ in this accession of *G. beyrichii*.

The meiotic behaviour of *G. beyrichii* is regular. In PMC at diakinesis and metaphase I the chromosomes associate as 27 bivalents exclusively, mostly rings (81.5%) with distal chiasmata (91.8%) averaging 1.81 chiasmata per bivalent and 48.87 total chiasmata per cell. The RI and the EC values are high (75.87 and 21.87, respectively). This species is included in Appendix II of CITES.

Mesadenella cuspidata (Lindl.) Garay

** $n = 23$, CHN (Fig. 13C). Argentina, Misiones Province, Capital Department, Garupá, 2 km W of Garupá stream, in forest shade, 27°28'S, 55°50'W, 4 Jul 2004, *Hojsgaard, Grabile & Cerutti 349* (MNES); Argentina, Corrientes Province, Ituzingó Department, Garapé, at the coast of Paraná river, in forest shade, 27°36'S, 56°22'W, 20 May 2001, *Cerutti 68* (CTES, MNES), 25 Aug 1993, *Perez, Guillen, Insaurralde & Seijo 114B* (MNES).

This terrestrial species inhabits Argentina, at Misiones and Corrientes Provinces, Brazil and Paraguay (Correa, 1996; Johnson, 2001) with only $2n = 46$ being reported (Martinez, 1985; Daviña & al., 2009; Grabile & al., 2011).

The meiotic behaviour of *M. cuspidata* is regular. In PMC at diakinesis and metaphase I the chromosomes associate as 23 bivalents exclusively, mostly rings (81.9%) with distal chiasmata (92.7%) averaging 1.87 chiasmata per bivalent and 43.01 total chiasmata per cell. The RI and the EC values are high (66.01 and 20.01, respectively). This species is included in Appendix II of CITES.

Oeceoclades maculata (Lindl.) Lindl.

** $n = 28$, CHN (Fig. 13H). Argentina, Misiones Province, San Ignacio Department, San Ignacio, Teyú Cuaré, at the coast of Paraná river, in forest shade, 27°17'S, 55°35'W, 04 May 1995, *Dematteis & Daviña 486* (MNES); Argentina, Misiones Province, Capital Department, Posadas, in forest shade, 50 m W of Zaimán stream and 2.3 km W of Paraná river, 27°24'S, 55°53'W, 02 Nov 2006, *Daviña 613* (MNES).

This cosmopolitan terrestrial species represents *Oeceoclades* Lindl. in Argentina, living at the northern regions' forests (Correa, 1996; Johnson, 2001; Tropic.org, 2011). In agreement with the present record, the Argentinean accessions of this taxon constantly display $2n = 56$ (Dematteis & Daviña, 1999; Daviña & al., 2009) unlike that of Brazil ($2n = 48$, ca. 52, 54, 58; Guerra, 1986; Felix & Guerra, 2000).

The meiotic behaviour of *O. maculata* is regular. In PMC at diakinesis and metaphase I the chromosomes associate as 28 bivalents exclusively, mostly rings (84.2%) with distal chiasmata (84.3%) averaging 1.89 chiasmata per bivalent and 52.92 total chiasmata per cell. The RI and the EC values are high (80.92 and 24.92, respectively). This species is included in Appendix II of CITES.

Pelexia bonariensis (Lindl.) Schltr.

* $n = 23$, CHN (Fig. 13F). Argentina, Misiones Province, Capital Department, Posadas, at the coast of Paraná river, in open field,

27°21'S, 56°00'W, 10 Jun 2002, *Cerutti 29* (MNES); Argentina, Misiones Province, Candelaria Department, Parque Provincial Cañadon de Profundidad, 2 km W of Garupá stream, in open field, 27°33'S, 55°42'W, 29 May 2003, *Hojsgaard 289* (CTES, MNES, SI).

This is a southern South American terrestrial orchid that extends as far as to the northern and central regions of Argentina (Correa, 1996), constantly showing $2n = 46$ (Martinez, 1985; Dematteis & Daviña, 1999; Felix & Guerra, 2005; Daviña & al., 2009; Grabile & al., 2011).

The meiotic behaviour of *P. bonariensis* is regular. In PMC at diakinesis and metaphase I the chromosomes associate as 23 bivalents exclusively, mostly rings (86.3%) with distal chiasmata (90.5%) averaging 1.96 chiasmata per bivalent and 45.08 total chiasmata per cell. The RI and the EC values are high (68.08 and 22.08, respectively). A previous report in another taxon of *Pelexia* (Poi) Lindl. also revealed $n = 23$ (*P. longifolia* (Cogn.) Hoehne: Felix & Guerra, 2005). This species is included in Appendix II of CITES.

Sarcoglottis fasciculata (Vell.) Schltr.

* $n = 23 + 3B$, CHN (Fig. 13A–B). Argentina, Misiones Province, Capital Department, Posadas, at the coast of Paraná river, in forest shade, 27°21'S, 56°00'W, 10 Apr 2003, *Hojsgaard 291B* (CTES, MNES, SI).

This terrestrial species occurs in Argentina, being restricted to Misiones Province, Brazil, and Paraguay (Correa, 1996). The somatic number $2n = 46$ is common for this species (Martinez, 1985; Felix & Guerra, 2005; Daviña & al., 2009; Grabile & al., 2011) but the presence of putative B chromosomes with mitotic instability is also recorded in this particular accession ($2n = 46, 47, 49$; Daviña & al., 2009).

The meiotic behaviour of *S. fasciculata* is regular throughout the cycle except for the presence of the accessory chromosomes that separate mitotically in sister chromatids during anaphase I, unlike the As that regularly do in homologues. Regarding to the A set of chromosomes, in PMC at diakinesis and metaphase I they associate as 23 bivalents exclusively, mostly rings (86.2%) with distal chiasmata (92.8%) averaging 1.95 chiasmata per bivalent and 44.85 total chiasmata per cell. The RI and the EC values are high (67.85 and 21.85, respectively). Additionally, Felix & Guerra (2005) reported $n = 23$ bivalents in Brazilian accessions of *S. fasciculata* in agreement with results in other taxa of *Sarcoglottis* Presl. from Argentina (*S. acaulis* (Sm.) Schltr.: Martinez, 1985; *S. grandiflora* (Lindl.) Klotzsch: Cerutti & al., 2004). This species is included in Appendix II of CITES.

Orchidaceae comprise ca. 20,000 species nevertheless the somatic chromosome number is known for a 10% to 13% of them (Daviña & al., 2009 and references therein). On the other hand, gametic chromosome counts and meiotic behaviour analysis are unusual in the family (Cerutti & al., 2004; Grabile & al. 2010; this work).

All the orchids analyzed here share main traits related to meiosis. In all the cases, the chromosomes associate as bivalents exclusively, typically rings (83.5%) with distal chiasmata (89.3%) averaging a high number of chiasmata per bivalent (1.89). In general the RI and EC values are high, and there is a positive correlation between the gametic number and the total chiasmata per cell, pieces of evidence which add to the high amount of chiasmata per bivalent suggest an elevated intra and interchromosomal meiotic recombination for each taxon, a major fact taken into account the widespread sexual reproduction in the family. On the other hand, the gametic number alone confines the total meiotic recombination in those taxa with low RI and EC values, i.e., *C. micromera* and *C. calophyllus*. Additionally to the regular and diploidized meiotic behaviour, the pollen grain viability of all the analyzed taxa is high, suggesting reduced, balanced and fertile gametes.

Furthermore, even though the phylogenetic distance between the studied taxa (Cameron & al., 1999; Cameron, 2004; Van den Berg, 2005), a diploidized meiotic behaviour and a high gametic number are common features to all of them, suggesting derived basic numbers and in turns the status of ancient polyploid orchids.

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- * First chromosome count for the species.
- ** New chromosome number (cytotype) for the species.
- ▼ First chromosome count from an Indian accession.

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APIACEAE

Pleurospermum densiflorum Benth. ex C.B. Clarke

* $n = 11$, CHN. India, Kashmir, Srinagar, Mahadev, 2900 m, on the slopes under *Cedrus* plants, 34°10'N, 75°00'E, 20 Jul 2009, Syed Mudassir Jeelani SMJ 26466 (PUN 54246) [Fig. 14A].

BALSAMINACEAE

Impatiens bicornuta Wall.

▼ $n = 9$, CHN. India, Kashmir, Shopian, Keller, 2000 m, in between rocks near water, 33°47'N, 74°45'E, 4 Jun 2010, Syed Mudassir Jeelani SMJ 27795 (PUN 54846) [Fig. 14B].

The present chromosome count of $n = 9$ is in agreement with the earlier reports of $2n = 18$ (Akiyama & al., 1992; Wakabayashi, 1992) from outside of India.

Impatiens scabrida DC.

** $n = 6$, CHN. India, Kashmir, Kulgam, Aharbal, 2250 m, along the slopes and roadsides, 33°38'N, 74°47'E, 30 Jul 2009, Syed Mudassir Jeelani SMJ 24770 (PUN 52507) [Fig. 14C].

Earlier reports on this species comprise $2n = 14$ (Akiyama & al., 1992) from outside of India, and $2n = 14$ (Khoshoo, 1966), $2n = 16$ (Sharma & Gosh, 1976), $2n = 18$ (Chatterjee & Sharma, 1970), and $2n = 20$ (Khoshoo, 1955) from India.

Impatiens sulcata Wall.

** $n = 8$, CHN. India, Kashmir, Kulgam, Aharbal, 2200 m, on the slopes under *Cedrus* trees, 33°38'N, 74°47'E, 30 Jul 2009, Syed Mudassir Jeelani SMJ 24772 (PUN 54246) [Fig. 14D].

Previous reports on this species include $2n = 18$ (Akiyama & al., 1992) from outside of India and $2n = 20$ (Khushoo, 1955, 1966) from India.

BRASSICACEAE

Barbarea intermedia Boreau

▼ $n = 8$, CHN. India, Kashmir, Baramullah, Ferozpur Nallah, 2400 m, near the small water channels, in open fields and along road sides, 34°03'N, 74°26'E, 20 May 2009, Syed Mudassir Jeelani SMJ 24509 (PUN 54270) [Fig. 14E].

The chromosome number for this species is in agreement with the previous report of $2n = 16$ (Mizianty & al., 1983) from outside of India.

Cardamine loxostemonoides O.E. Schulz

** $n = 8$, CHN. India, Kashmir, Pulwama, Ratnipora, 1750 m, along the roadsides and in open fields, 33°54'N, 74°56'E, 29 May 2009, Syed Mudassir Jeelani SMJ 24792 (PUN 52473) [Fig. 14F].

Earlier report on this species was tetraploid, with $2n = 32$ (Rashid & Ohba, 1993).

Descurainia sophia (L.) Webb ex Prantl

▼ $n = 10$, CHN. India, Kashmir, Budgam, Yusmarg, 2600 m, on the open slopes, 33°47'N, 74°39'E, 22 May 2009, Syed Mudassir Jeelani SMJ 26437 (PUN 54202) [Fig. 14G].

The record is in agreement with the earlier reports of $2n = 20$ (Baez-Major, 1934; Tischler, 1938) from other parts of the world.

Rorippa islandica (Oeder) Borbás

▼ $n = 8$, CHN. India, Kashmir, Shopian, Keller, 33°47'N, 74°45'E, 2000 m, commonly found on open grounds, 4 Jun 2009, *Syed Mudassir Jeelani SMJ 27775* (PUN 54827) [Fig. 14H].

Chromosome number reported here agrees with previous reports of $2n = 16$ (Taylor & Mulligan, 1968; Tomšovic, 1974) from outside of India.

Sisymbrium orientale L.

** $n = 14$, CHN. India, Kashmir, Ganderbal, Sonmarg, 2800 m, 34°17'N, 75°17'E, 7 Jun 2009, *Syed Mudassir Jeelani SMJ 26473* (PUN 54223) [Fig. 14I].

Previous reports for this species represented diploid level only, namely $2n = 14$ (Diers, 1961; Carrique & Martinez, 1984; Runemark, 2000).

Sisymbrium strictum Hook. f. & Thomson

▼ $n = 7$, CHN. India, Kashmir, Pulwama, Batnoor Tral, 2300 m, on the slopes along cultivated fields, 33°57'N, 75°08'E, 30 May 2009, *Syed Mudassir Jeelani SMJ 24790* (PUN 52475) [Fig. 14J].

The report is in agreement with the earlier one of $2n = 14$ (Jaretsky, 1932) from outside of India.

CARYOPHYLLACEAE

Arenaria kashmirica Edgew.

** $n = 20$, CHN. India, Kashmir, Ganderbal, Thajwas, 3000 m, along slopes in between the rock crevices, 34°17'N, 75°17'E, 17 Aug 2010, *Syed Mudassir Jeelani SMJ 26907* (PUN 54387) [Fig. 14K].

Earlier, $2n = 26$ was reported for this species (Podlech & Dieterle, 1969).

Silene edgeworthii Bocquet

** $n = 24$, CHN. India, Kashmir, Shopian, Keller, 2300 m, along the roadsides on slopes, 33°47'N, 74°45'E, 24 Jun 2010, *Syed Mudassir Jeelani, SMJ 26970* (PUN 54449) [Fig. 14L].

Earlier, $2n = 24$ was reported for this species (Kaur & Singhal, 2010).

Silene moorcroftiana Wall.

* $n = 24$, CHN. India, Kashmir, Kulgam, Aharbal, 2450 m, along the slopes, 33°38'N, 74°47'E, 28 Jul 2009, *Syed Mudassir Jeelani SMJ 24780* (PUN 52491) [Fig. 14M].

Silene nepalensis Majumdar

* $n = 12$, CHN. India, Kashmir, Pulwama, Tral, 2000 m, in the cultivated fields under moist conditions, 33°55'N, 75°06'E, 21 Jun 2010, *Syed Mudassir Jeelani SMJ 26976* (PUN 54455) [Fig. 14N].

Stellaria media (L.) Vill.

** $n = 13$, CHN. India, Kashmir, Kulgam, Aharbal, 2300 m, on open slopes, 33°38'N, 74°47'E, 24 Jul 2010, *Syed Mudassir Jeelani SMJ 26492* (PUN 54421) [Fig. 14O].

Previous records for this species comprise $2n = 18$ (Krasnikov & Schaulo, 1990), $2n = 28$ (Pal, 1952), $2n = 36–42$ (Heitz, 1926), $2n = 40$ (Morton 1993; Albers & Pröbsting, 1998; Javůrková-Jarolímová, 1992), $2n = 42$ (Probatova & al., 1996), $2n = 44$ (Sidhu & Bir, 1983), and $2n = 40–44$ (Tischler, 1937).

Stellaria monosperma Buch.-Ham. ex D. Don

** $n = 13$, CHN. India, Kashmir, Anantnag, Pehalgam, 2300 m, on open slopes, 34°03'N, 75°17'E, 27 Aug 2010, *Syed Mudassir Jeelani SMJ 26929* (PUN 54408) [Fig. 14P].

Earlier, $2n = 52$ was reported for this species (Chatterjee, 1975).

Stellaria semivestita Edgew.

* $n = 13$, CHN. India, Kashmir, Ganderbal, Sonmarg, 2800 m, in between rocks near water, 34°17'N, 75°17'E, 25 Jul 2010, *Syed Mudassir Jeelani SMJ 26495* (PUN 54424) [Fig. 14Q].

CRASSULACEAE

Sedum ewersii Ledeb.

** $n = 36$, CHN. India, Kashmir, Anantnag, Chumnai, 3500 m, on rocks, 34°04'N, 75°19'E, 21 Jul 2010, *Syed Mudassir Jeelani SMJ 27778* (PUN 54830) [Fig. 14R].

Other published reports for this species are $2n = 20$ (Malik & Ahmad, 1963) and $2n = 22$ (Baldwin, 1937; Löve & Löve, 1961).

Sedum wallichianum Hook.

* $n = 36$, CHN. India, Kashmir, Ganderbal, Thajwas, 3100 m, 34°17'N, 75°17'E, 25 Jul 2010, *Syed Mudassir Jeelani SMJ 27781* (PUN 54833) [Fig. 14S].

FABACEAE

Astragalus strobiliferus Royle

* $n = 8$, CHN. India, Kashmir, Srinagar, Mahadev, 2400 m, on the slopes in cultivated fields, 34°08'N, 75°01'E, 2 Aug 2009, *Syed Mudassir Jeelani SMJ 26453* (PUN 54216) [Fig. 14T].

Hedysarum cachemirianum Benth. ex Baker

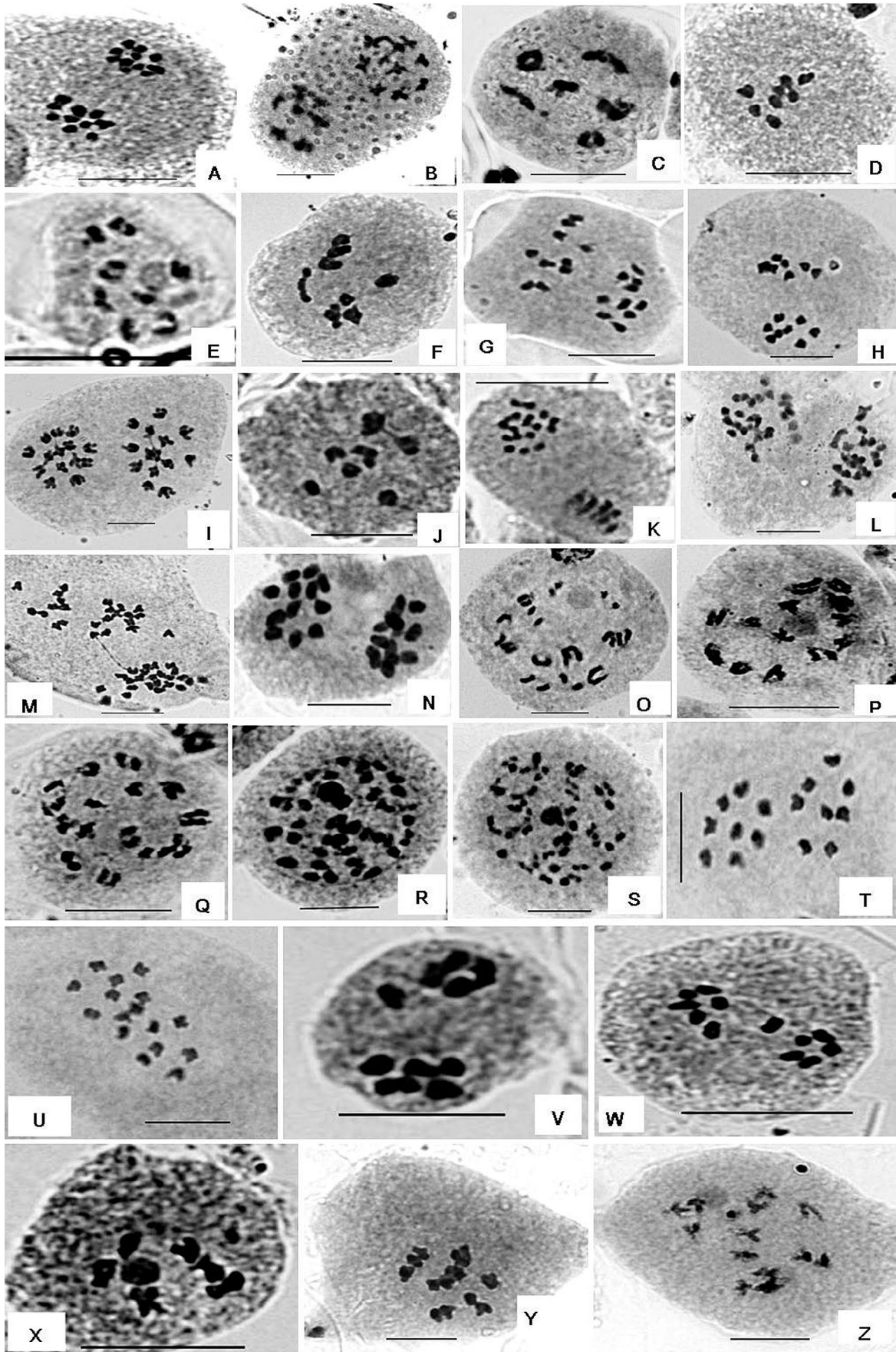
* $n = 8$, CHN. India, Kashmir, Anantnag, Chumnai, 3500 m, 34°04'N, 75°19'E, 21 Aug 2010, *Syed Mudassir Jeelani SMJ 27792* (PUN 54843) [Fig. 14U].

Lotus corniculatus L. var. *corniculatus*

▼ $n = 6$, CHN. India, Kashmir, Pulwama, Rajpora, 32°02'N, 76°50'E, 1900 m, in the cultivated fields of apple, 12 Apr 2009, *Syed Mudassir Jeelani SMJ 24799* (PUN 52461) [Fig. 14V].

The current report for this variety agrees with the previous one of $2n = 12$ (Al-Mayah & Al-Shehbaz, 1977) from outside of India.

Fig. 14. A. *Pleurospermum densiflorum*, PMC at anaphase I, $n = 11$ (PUN 54246); **B.** *Impatiens bicornuta*, PMC at metaphase II, $n = 9$ (PUN 54846); **C.** *Impatiens scabrifera*, PMC at metaphase I, $n = 6$ (PUN 52507); **D.** *Impatiens sulcata*, PMC at metaphase I, $n = 8$ (PUN 54246); **E.** *Barbarea intermedia*, PMC at diakinesis, $n = 8$ (PUN 54270); **F.** *Cardamine loxostemonoides*, PMC at metaphase I, $n = 8$ (PUN 52473); **G.** *Descurainia sophia*, PMC at anaphase I, $n = 10$ (PUN 54202); **H.** *Rorippa islandica*, PMC at anaphase I, $n = 8$ (PUN 54827); **I.** *Sisymbrium orientale*, PMC at metaphase II, $n = 14$ (PUN 54223); **J.** *Sisymbrium strictum*, PMC at metaphase I, $n = 7$ (PUN 52475); **K.** *Arenaria kashmirica*, PMC at anaphase I, $n = 20$ (PUN 54387); **L.** *Silene edgeworthii*, PMC at anaphase I, $n = 24$ (PUN 54449); **M.** *Silene moorcroftiana*, PMC at anaphase I, $n = 24$ (PUN 52491); **N.** *Silene nepalensis*, PMC at anaphase I, $n = 12$ (PUN 54455); **O.** *Stellaria media*, PMC at diakinesis, $n = 13$ (PUN 54421); **P.** *Stellaria monosperma*, PMC at diakinesis, $n = 13$ (PUN 54408); **Q.** *Stellaria semivestita*, PMC at metaphase I, $n = 13$ (PUN 54424); **R.** *Sedum ewersii*, PMC at diakinesis, $n = 36$ (PUN 54830); **S.** *Sedum wallichianum*, PMC at diakinesis, $n = 36$ (PUN 54833); **T.** *Astragalus strobiliferus*, PMC at anaphase I, $n = 8$ (PUN 54216); **U.** *Hedysarum cachemirianum*, PMC at anaphase I, $n = 8$ (PUN 54843); **V.** *Lotus corniculatus* var. *corniculatus*, PMC at anaphase I, $n = 6$ (PUN 52461); **W.** *Lotus corniculatus* var. *japonicus*, PMC at anaphase I, $n = 6$ (PUN 54855); **X.** *Lotus corniculatus* var. *minor*, PMC at diakinesis, $n = 6$ (PUN 52498); **Y.** *Lotus corniculatus* var. *minor*, PMC at metaphase I, $n = 12$ (PUN 52499); **Z.** *Lotus corniculatus* var. *tenuifolius*, PMC at diakinesis, $n = 12$ (PUN 52494); Scale = 10 μ m.



Lotus corniculatus var. *japonicus* Regel

▼ $n = 6$, CHN. India, Kashmir, Baramullah, Tangmarg, 2600 m, on the open ground and in cultivated fields, 34°03'N, 74°26'E, 27 Jun 2010, *Syed Mudassir Jeelani SMJ 27696* (PUN 54855) [Fig. 14W].

The current report for this variety agrees with the previous one of $2n = 12$ (Yeh & al., 1986) from outside of India.

Lotus corniculatus var. *minor* Baker

▼ $n = 6$, CHN. India, Kashmir, Anantnag, Campus Govt. Degree College Khanbal, 1700 m, on the open ground and waste land, 33°44'N, 75°09'E, 6 Aug 2009, *Syed Mudassir Jeelani SMJ 24475* (PUN 52498) [Fig. 14X].

** $n = 12$, CHN. India, Kashmir, Budgam, Yusmarg, 33°47'N, 74°39'E, 2300 m, along the way to Doodh-Ganga, 6 Aug 2009, *Syed Mudassir Jeelani SMJ 24776* (PUN 52499) [Fig. 14Y].

The current report of $n = 6$ for this variety agrees with the previous one of $2n = 12$ (Someroo & Grant, 1971) from outside of India.

Lotus corniculatus var. *tenuifolius* L.

** $n = 12$, CHN. India, Pulwama, Batnoor Tral, 2300 m, on the slopes in the cultivated fields, 33°57'N, 75°08'E, 6 Aug 2009, *Syed Mudassir Jeelani SMJ 24777* (PUN 52494) [Fig. 14Z].

Earlier report for this variety is $2n = 12$ (Guinochet, 1945).

Lupinus polyphyllus Lindl.

▼ $n = 24$, CHN. India, Kashmir, Baramullah, Gulmarg, 2600 m, found everywhere like a weed at this particular locality, 34°03'N, 74°23'E, 25 Jul 2009, *Syed Mudassir Jeelani SMJ 27774* (PUN 54826) [Fig. 15A].

Current report for this species agrees with the previous one of $2n = 48$ (Pogan & al., 1990) from outside of India.

FUMARIACEAE*Corydalis cashmeriana* Royle

** $n = 8$, CHN. India, Kashmir, Anantnag, Chumnai, 3500 m, in between rock crevices, 34°04'N, 75°19'E, 21 Aug 2010, *Syed Mudassir Jeelani SMJ 27789* (PUN 54852) [Fig. 15B].

Earlier report for this species is $2n = 32$ (Liden, 1986).

Fumaria indica (Hausskn.) Pugsley

** $n = 6$, CHN. India, Kashmir, Pulwama, 33°53'N, 74°56'E, 1750 m, on the walls under shady and moist places, 25 Jul 2010, *Syed Mudassir Jeelani SMJ 27784* (PUN 54836) [Fig. 15C].

Previous reports for this species include $2n = 22$ (Rai, 1939) and $2n = 48$ (Sidhu & Bir, 1983; Lidén, 1986).

GERANIACEAE*Geranium lucidum* L.

$n = 14$, CHN. India, Kashmir, Pulwama, Pahoo, 1700 m, on open ground, 33°52'N, 74°50'E, 20 Apr 2009, *Syed Mudassir Jeelani SMJ 26449* (PUN 54212) [Fig. 15D].

Geranium ocellatum Jacquem.

** $n = 14$, CHN. India, Kashmir, Pulwama, Karmul Tral, 2300 m, under the shady places, 33°53'N, 75°03'E, 15 Apr 2009, *Syed Mudassir Jeelani SMJ 26428* (PUN 53490) [Fig. 15E].

Earlier, $2n = 56$ was reported for this species (Hedberg & Hedberg, 1977; Morton, 1993).

Geranium sibiricum L.

▼ $n = 14$, CHN. India, Kashmir, Kulgam, Aharbal, 2500 m, on the slopes and in between the grasses, 33°38'N, 74°47'E, 17 Jul 2010, *Syed Mudassir Jeelani SMJ 27799* (PUN 54850) [Fig. 15F].

Current report for this species agrees with the previous ones of $2n = 28$ (Dvořák & Dadáková, 1984; Probatova & al., 1996; Albers & Pröbsting, 1998) from outside of India.

HYPERICACEAE*Hypericum perforatum* L.

▼ $n = 16$, CHN. India, Kashmir, Baramullah, Gulmarg, above Gundola, 2600 m, 34°03'N, 74°23'E, 9 Jul 2009, *Syed Mudassir Jeelani SMJ 26488* (PUN 54248) [Fig. 15G].

The current report for this species agrees with all previous ones of $2n = 32$ (Hollingsworth & al., 1992; Probatova & al., 1996; Dobeš & al., 1997; Albers & Pröbsting, 1998) from outside of India.

ONAGRACEAE*Epilobium alpinum* L.

▼ $n = 9$, CHN. India, Kashmir, Anantnag, Chumnai, 3500 m, 34°04'N, 75°19'E, 21 Jul 2010, *Syed Mudassir Jeelani SMJ 27786* (PUN 54838) [Fig. 15H].

The current report for this species agrees with the previous one of $2n = 18$ (Seavey & Raven, 1977) from outside of India.

Epilobium angustifolium L.

▼ $n = 18$, CHN. India, Kashmir, Kulgam, Aharbal, 2500 m, 33°38'N, 74°47'E, 20 Jul 2009, *Syed Mudassir Jeelani SMJ 24780* (PUN 52489) [Fig. 15I].

The current report for this species agrees with the previous ones of $2n = 36$ (Chen & al., 1988; Khatoon, 1991; Dobeš & al., 1997; Lövkvist & Hultgård, 1999) from outside of India.

▼ $n = 36$, CHN. India, Kashmir, Kulgam, Aharbal, 2500 m, 33°38'N, 74°47'E, 20 Jul 2009, *Syed Mudassir Jeelani SMJ 24781* (PUN 52490) [Fig. 15J].

The current report for this species agrees with the previous ones of $2n = 72$ (Mulligan, 1957; Mosquin, 1963) from outside of India.

Epilobium cylindricum D. Don

▼ $n = 18$, CHN. India, Kashmir, Pulwama, Batnoor Tral, 2300 m, in cultivated fields, 33°57'N, 75°08'E, 20 Jul 2009, *Syed Mudassir Jeelani, SMJ 26503* (PUN 54264) [Fig. 15K].

The current report for this species agrees with the previous one of $2n = 36$ (Chen & al., 1992) from outside of India.

Epilobium hirsutum L.

▼ $n = 18$, CHN. India, Kashmir, Shopian, Keller, 2100 m, along the roadsides, 33°47'N, 74°45'E, 31 Jul 2009, *Syed Mudassir Jeelani SMJ 24789* (PUN 52476) [Fig. 15L].

The current report for this species agrees with the previous ones of $2n = 36$ (Van Loon & Kieft, 1980; Probatova & al., 1991; Lövkvist & Hultgård, 1999) from outside of India.

Epilobium palustre L.

** $n = 9$, CHN. India, Kashmir, Srinagar, SKUAST Campus, 34°09'N, 74°45'E, 1750 m, on open field, 23 Apr 2009, *Syed Mudassir Jeelani SMJ 24793* (PUN 52469) [Fig. 15M].

Chromosome number $2n = 36$ was published for this species by other authors (Semerenko, 1990; Krasnikov & Schaulo, 1990; Javůrková-Jarolímová, 1992; Stepanov, 1994).

Oenothera drummondii Hook.

▼ $n = 7$, CHN. India, Kashmir, Pulwama, Ratnipora, 1750 m, on waste lands, 33°54'N, 74°56'E, 2 Jul 2009, *Syed Mudassir Jeelani SMJ 24785* (PUN 52482) [Fig. 15N].

The current report for this species agrees with the previous one of $2n = 14$ (Brittingham & Shull, 1936) from outside of India.

RANUNCULACEAE*Delphinium roylei* Munz

* $n = 8$, CHN. India, Kashmir, Anantnag, Chumnai, 3500 m, along the slopes, 34°04'N, 75°19'E, 24 Jul 2010, *Syed Mudassir Jeelani SMJ 26752* (PUN 54480) [Fig. 15O].

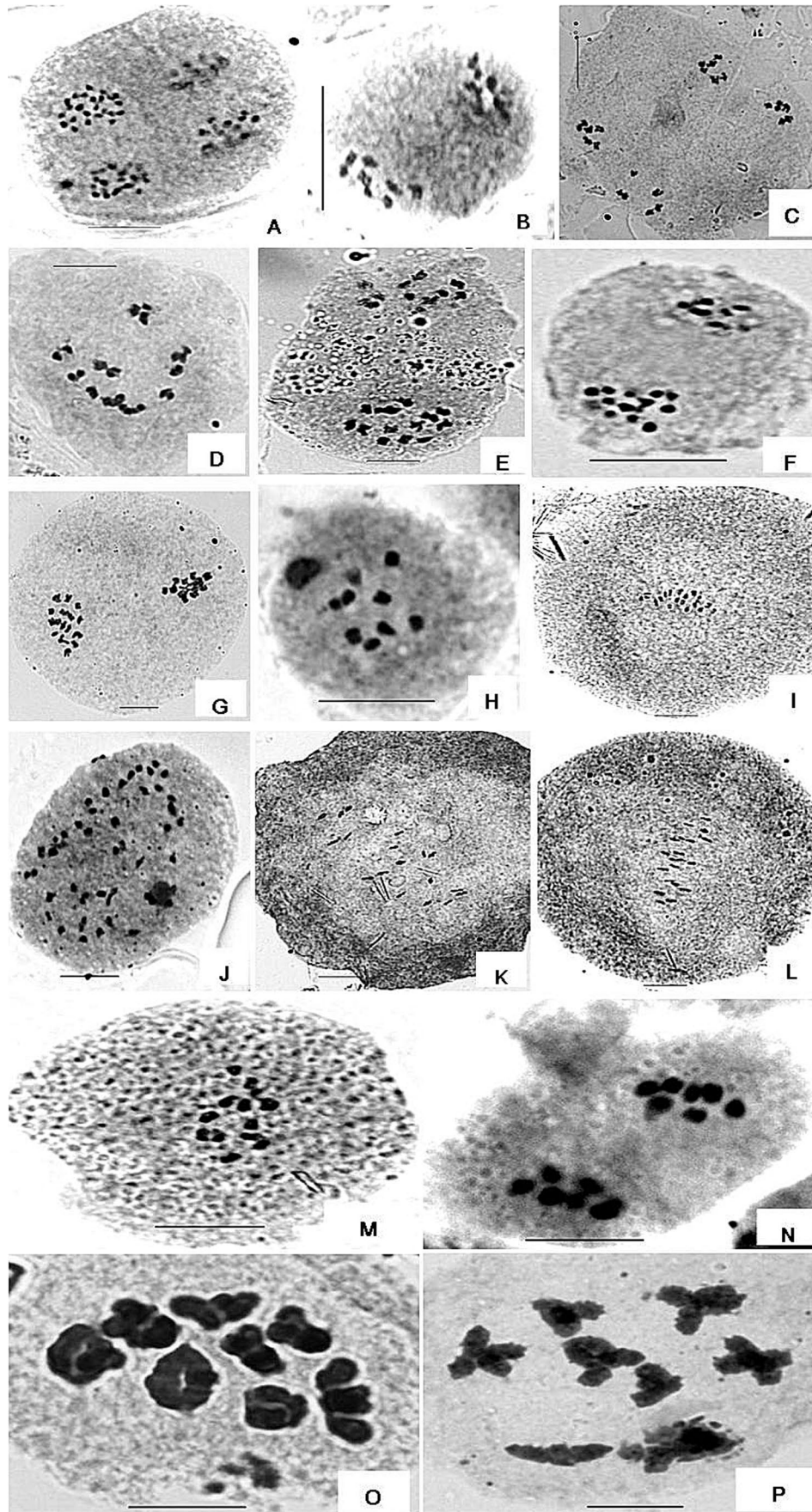


Fig. 15. **A**, *Lupinus polyphyllus*, PMC at anaphase II, $n = 24$ (PUN 54826); **B**, *Corydalis cashmeriana*, PMC at anaphase I, $n = 8$ (PUN 54852); **C**, *Fumaria indica*, PMC at anaphase II, $n = 6$ (PUN 54836); **D**, *Geranium lucidum*, PMC at metaphase I, $n = 14$ (PUN 54212); **E**, *Geranium ocellatum* PMC at anaphase I, $n = 14$ (PUN 53490); **F**, *Geranium sibiricum*, PMC at anaphase I, $n = 14$ (PUN 54850); **G**, *Hypericum perforatum* L, PMC at anaphase I, $n = 16$ (PUN 54248); **H**, *Epilobium alpinum*, PMC at metaphase I, $n = 9$ (PUN 54838); **I**, *Epilobium angustifolium*, PMC at metaphase I, $n = 18$ (PUN 52489); **J**, *Epilobium angustifolium*, PMC at diakinesis, $n = 36$ (PUN 52490); **K**, *Epilobium cylindricum*, PMC at metaphase I, $n = 18$ (PUN 54264); **L**, *Epilobium hirsutum*, PMC at metaphase I, $n = 18$ (PUN 52476); **M**, *Epilobium palustre*, PMC at metaphase I, $n = 9$ (PUN 52469); **N**, *Oenothera drummondii*, PMC at anaphase I, $n = 7$ (PUN 52482); **O**, *Delphinium roylei*, PMC at metaphase I, $n = 8$ (PUN 54480); **P**, *Delphinium uncinatum*, PMC at metaphase I, $n = 8$ (PUN 54484). Scale = 10 μ m.

Delphinium uncinatum Hook. f. & Thomson

* $n = 8$, CHN. India, Kashmir, Anantnag, Lower-Munda, 2300 m, on the slopes, 33°55'N, 75°20'E, 28 Jul 2010, *Syed Mudassir Jeelani SMJ 26756* (PUN 54484) [Fig. 15P].

Thalictrum minus L.

▼ $n = 7$, CHN. India, Kashmir, Baramullah, Gulmarg, 2600 m, on open slopes, 34°03'N, 74°23'E, 20 Jul 2010, *Syed Mudassir Jeelani, SMJ 26760* (PUN 54488) [Fig. 16A].

The current report for this species agrees with the previous ones of $2n = 14$ (Kurita, 1957; Magulaev, 1984) from outside of India.

ROSACEAE*Argemone eupatoria* L.

** $n = 42$, CHN. India, Kashmir, Kulgam, Aharbal, 2450 m, on open grassland, 33°38'N, 74°47'E, 31 Jul 2009, *Syed Mudassir Jeelani SMJ 24786* (PUN 52488) [Fig. 16B].

Earlier chromosome number reports for this species comprise $2n = 28$ (Sharma & Sarkar, 1967–1968) and $2n = 56$ (Mehra & Dhawan, 1966).

Filipendula vestita Maxim.

** $n = 7$, CHN. India, Kashmir, Kulgam, Aharbal, 33°38'N, 74°47'E, 2450 m, on the rocky slopes near water, 30 Jul 2009, *Syed Mudassir Jeelani SMJ 24768* (PUN 52510) [Fig. 16C].

Previously, the species is known to have $2n = 18$ for its synonym *Spiraea vestita* Wall. (Mehra & Dhawan, 1971).

Potentilla argyrophylla Wall.

** $n = 14$, CHN. India, Kashmir, Ganderbal, Thajwas, 3000 m, in between the rock crevices, 34°17'N, 75°17'E, 17 Jul 2009, *Syed Mudassir Jeelani SMJ 26507* (PUN 54268) [Fig. 16D].

Earlier chromosome number reports for this species comprise $2n = 42$ (Zhukova, 1967), $2n = 56$ (Zhukova, 1967; Gentscheff, 1938; Gustafsson, 1947), and $2n = 63$ (Gentscheff, 1938; Gustafsson, 1947).

Potentilla atosanguinea Lodd.

** $n = 7$, CHN. India, Kashmir, Shopian, Keller, 2000 m, 33°47'N, 74°45'E, 6 Jun 2010, *Syed Mudassir Jeelani SMJ 27725* (PUN 54903) [Fig. 16E].

Earlier chromosome number reports for this species comprise $2n = 56$ (Goswami & Metfield, 1978), $2n = 63$ (Zhukova, 1967), and $2n = 74, 84$ (Goswami & Metfield, 1978).

Potentilla gelida C.A. Mey.

▼ $n = 7$, CHN. India, Kashmir, Ganderbal, Thajwas, 34°17'N, 75°17'E, 3100 m, on the slopes in rock crevices, 6 Jul 2010, *Syed Mudassir Jeelani SMJ 26446* (PUN 54227) [Fig. 16F].

The current report for this species agrees with the previous one of $2n = 14$ (Guinochet, 1968) from outside of India.

Potentilla nepalensis Hook.

** $n = 14$, CHN. India, Kashmir, Shopian, Keller, 2000 m, near the stream, 33°47'N, 74°45'E, 15 Jul 2010, *Syed Mudassir Jeelani SMJ 27723* (PUN 54901) [Fig. 16G].

Earlier chromosome number reports for this species comprise $2n = 14$ (Popoff, 1939) and $2n = 42$ (Mehra & Dhawan, 1966; Zhukova, 1967).

Rosa macrophylla var. *minor* Lindl.

* $n = 7$, CHN. India, Kashmir, Shopian, Keller, 2100 m, on the edges of cultivated fields, 33°47'N, 74°45'E, 28 Jun 2009, *Syed Mudassir Jeelani SMJ 26447* (PUN 54237) [Fig. 16H].

Rosa pendulina L.

** $n = 7$, CHN. India, Kashmir, Srinagar, Zabarwan, 34°06'N

74°52'E, 1800 m on the slopes, 23 May 2009, *Syed Mudassir Jeelani SMJ 26445* (PUN 54217) [Fig. 16I].

$2n = 28$ was previously reported for this species (Tackholm, 1922).

Rubus caesius L.

* $n = 7$, CHN. India, Kashmir, Pulwama, Bandzoo, 1800 m, close to cultivated fields, 33°54'N, 74°56'E, 28 Jul 2009, *Syed Mudassir Jeelani SMJ 26511* (PUN 54249) [Fig. 16J].

Rubus idaeus L.

▼ $n = 7$, CHN. India, Kashmir, Srinagar, Dachigam, 1800 m, 34°08'N, 74°53'E, 20 Jul 2009, *Syed Mudassir Jeelani SMJ 26469* (PUN 54230) [Fig. 16K].

The current report for this species agrees with the previous ones of $2n = 14$ (Chen, 1993; Li & al., 1993; Krahulcová & Holub, 1997; Lövkvist & Hultgård, 1999) from outside of India.

Rubus saxatilis L.

▼ $n = 14$, CHN. India, Kashmir, Shopian, Haripora, 2450 m, 33°47'N, 74°45'E, 10 Jul 2010, *Syed Mudassir Jeelani SMJ 27776* (PUN 54828) [Fig. 16L].

The current report for this species agrees with the previous ones of $2n = 28$ (Semerenko, 1990; Druskovic & Lovka, 1995; Krahulcová & Holub, 1998; Boratyńska, 1997) from outside of India.

SAXIFRAGACEAE*Saxifraga sibirica* L.

** $n = 16$, CHN. India, Kashmir, Ganderbal, Thajwas, 3,100 m, in between the rock crevices, 34°17'N, 75°17'E, 17 Aug 2010, *Syed Mudassir Jeelani SMJ 27773* (PUN 54825) [Fig. 16M].

Earlier chromosome number reports for this species comprise $2n = 16$ (Murin & al., 1984), $2n = 20$ (Gagnidze & al., 1997), $2n = 26$ (Zhukova & Petrovsky, 1987) and $2n = 28$ (Funamoto & al., 1998).

TAMARICACEAE*Myricaria germanica* Desv.

▼ $n = 12$, CHN. India, Kashmir, Shopian, Haripora, 2450 m, in between the rocks in the stream, 33°47'N, 74°45'E, 10 Jul 2010, *Syed Mudassir Jeelani SMJ 27770* (PUN 54822) [Fig. 16N].

The current report for this species agrees with the previous one of $2n = 24$ (Váchová & Májovský, 1980) from outside of India.

VITACEAE*Parthenocissus semicordata* Planch.

* $n = 24$, CHN. India, Kashmir, Srinagar, Cheshmashahi, 1900 m, on the slopes, 34°05'N, 74°53'E, 20 Aug 2009, *Syed Mudassir Jeelani SMJ 25041* (PUN 52532) [Fig. 16O].

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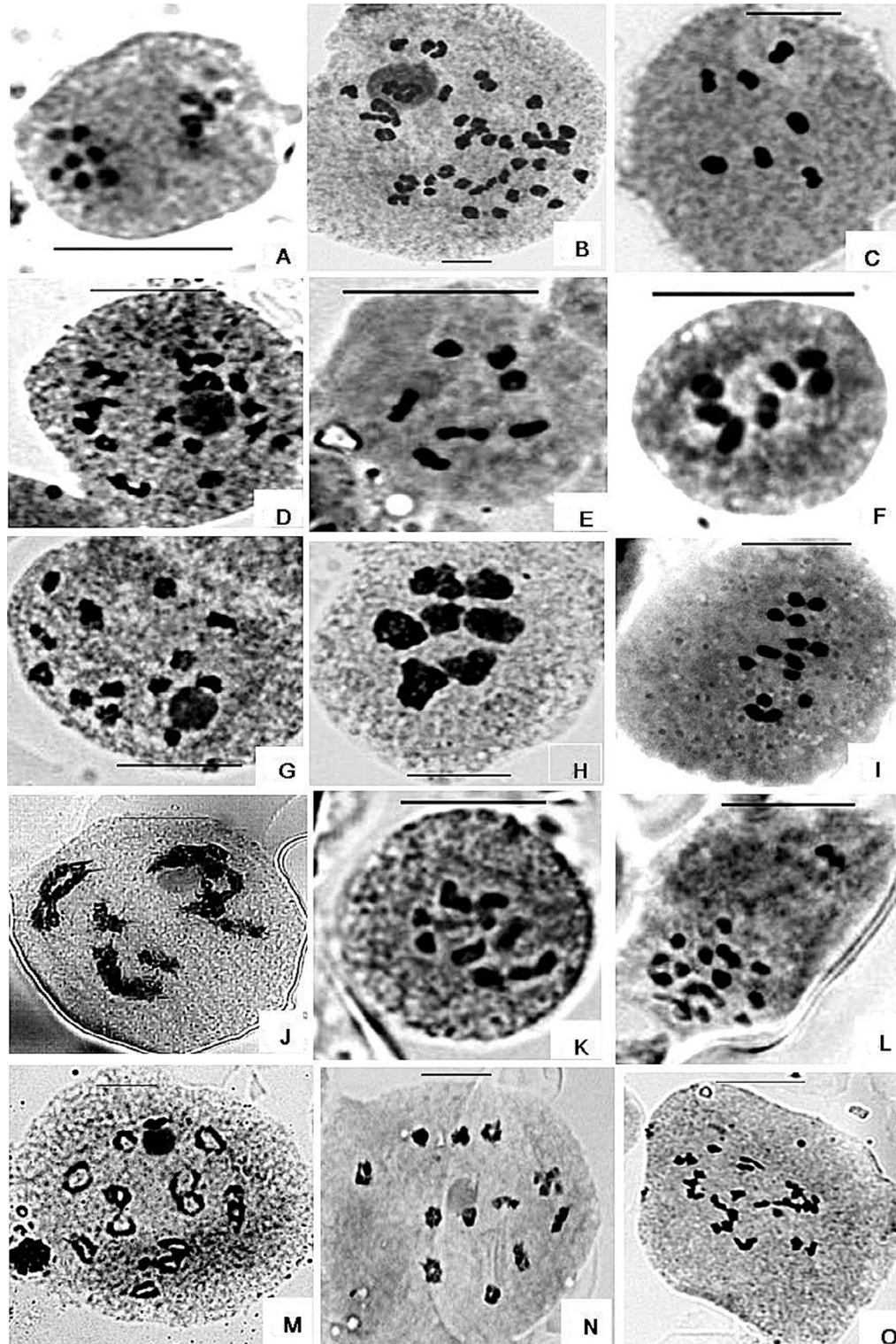


Fig. 16. **A**, *Thalictrum minus*, PMC at anaphase I, $n = 7$ (PUN 54484); **B**, *Argimonia eupatoria*, PMC at diakinesis, $n = 42$ (PUN 52488); **C**, *Filipendula vestita*, PMC at metaphase I, $n = 7$ (PUN 52510); **D**, *Potentilla argrophylla*, PMC at diakinesis, $n = 14$ (PUN 54268); **E**, *Potentilla atrosanguinea*, PMC at diakinesis, $n = 7$ (PUN 54903); **F**, *Potentilla gelida*, PMC at metaphase I, $n = 7$ (PUN 54227); **G**, *Potentilla nepalensis*, PMC at diakinesis, $n = 14$ (PUN 54901); **H**, *Rosa macrophylla* var. *minor*, PMC at metaphase I, $n = 7$ (PUN 54237); **I**, *Rosa pendulina*, PMC at metaphase I, $n = 7$ (PUN 54217); **J**, *Rubus caesius*, PMC at diakinesis, $n = 7$ (PUN 54249); **K**, *Rubus idaeus*, PMC at metaphase I, $n = 7$ (PUN 54230); **L**, *Rubus saxatilis*, PMC at anaphase I, $n = 14$ (PUN 54828); **M**, *Saxifraga sibirica*, PMC at diakinesis, $n = 16$ (PUN 54825); **N**, *Myricaria germanica*, PMC at diakinesis, $n = 12$ (PUN 54822); **O**, *Parthenocissus semicordata*, PMC at metaphase I, $n = 24$ (52532). Scale = 10 μm .

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- * First chromosome count for the species.
- ** New chromosome number (cytotype) for the species.
- ▼ First chromosome count from an Indian accession.

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POACEAE

Acrachne racemosa (B. Heyne ex Roth) Ohwi

* $n = 6$, CHN. India, Himachal Pradesh, Kangra, Dharamsala, 32°13'N, 76°19'E, 1345 m, shady moist places along roadsides, 28 Feb 2009, *Harpreet Kaur*, HK 27020 (PUN 54750) [Fig. 17A].

The haploid chromosome number has been counted at diakinesis of meiosis in pollen mother cells.

Agrostis debilis (Hook. f.) Bor

* $n = 14$, CHN. India, Himachal Pradesh, Kangra, Bhagsunaag, 32°14'N, 76°21'E, 1456 m, along water spring, 14 Aug 2009, *Harpreet Kaur*, HK 25046 (PUN 52593) [Fig. 17B].

The haploid chromosome number has been counted at metaphase I of meiosis in pollen mother cells.

Agrostis pilosula var. *royleana* (Trin.) Bor

$n = 21$, CHN. India, Himachal Pradesh, Kangra, Swad, 32°00'N, 76°16'E, 1204 m, waste places along roadsides, 25 Sep 2009, *Harpreet Kaur*, HK 24868 (PUN 53549) [Fig. 17C].

Alopecurus nepalensis Trin. ex Steud.

$n = 14$, CHN. India, Himachal Pradesh, Kangra, Rehlu, 32°13'N, 76°10'E, 850 m, along agricultural fields, 26 Feb 2009, *Harpreet Kaur*, HK 24872 (PUN 53551) [Fig. 17].

Andropogon munroi C.B. Clarke

* $n = 10$, CHN. India, Himachal Pradesh, Kangra, Dyot, 32°11'N, 76°34'E, 1420 m, along roadsides, 28 Jun 2009, *Harpreet Kaur*, HK 24857 (PUN 53542) [Fig. 17E].

The haploid chromosome number has been counted at diakinesis of meiosis in pollen mother cells.

Avena fatua var. *fatua* L.

** $n = 21 + 1B$, CHN. India, Himachal Pradesh, Kangra, Bandla, 32°06'N, 76°32'E, 1266 m, along cultivated fields, 30 Mar 2009, *Harpreet Kaur*, HK 24828 (PUN 53530) [Fig. 17F].

This is the first record of presence of B chromosomes in this species. During meiosis, haploid chromosome number has been counted at diakinesis in pollen mother cells.

Bothriochloa pertusa (L.) A. Camus

$n = 20$, CHN. India, Himachal Pradesh, Kangra, Chhota Bhangal, 32°02'N, 76°50'E, 1489 m, near water, 27 Jun 2009, *Harpreet Kaur*, HK 24819 (PUN 52619) [Fig. 17G].

Brachiaria remota Haines

* $n = 16$, CHN. India, Himachal Pradesh, Kangra, Sakri, 32°14'N, 76°04'E, 625 m, along open fields, 28 Feb 2009, *Harpreet Kaur*, HK 25622 (PUN 53576) [Fig. 17H].

This is the first record of a tetraploid cytotype for this species. Earlier record of $2n = 64$ by Basappa & al. (1987) was reported from outside of India. The haploid chromosome number has been counted at metaphase I in pollen mother cells.

Briza minor L.

▼ $n = 5$, CHN. India, Himachal Pradesh, Kangra, Palampur, 32°07'N, 76°31'E, 1235 m, along agricultural fields, 29 Mar 2009, *Harpreet Kaur*, HK 27019 (PUN 54749) [Fig. 17I].

This record is in accordance with earlier reports of $2n = 10$ by Parodi (1946); Heiser & Whitaker (1948); Tateoka (1953, 1954); Hubbard (1954); Larsen (1960); Fernandes & Queiros (1969); Dahlgren & al. (1971); Pohl & Davidse (1971); Gould & Soderstrom (1974); Murray (1975); Humphries & al. (1978); Devesa & Romero (1981); Pavone & al. (1981); Schifino & Winge (1983); Devesa & Luque (1988); Devesa & al. (1990), and Spies & al. (1997) from outside of India. The haploid chromosome number has been counted at diakinesis in pollen mother cells.

Bromus catharticus Vahl

▼ $n = 21$, CHN. India, Himachal Pradesh, Kangra, Andretta, 32°04'N 76°36'E, 1035 m, along cultivated fields, 20 Mar 2010, *Harpreet Kaur*, HK 27003 (PUN 54742); India, Himachal Pradesh, Kangra, Palampur, 32°07'N 76°31'E, 1235 m, along roadsides, 21 Mar 2010, *Harpreet Kaur*, HK 27096 (PUN 54767) [Fig. 17J].

This record is in accordance with earlier reports of $2n = 42$ by Stebbins & Tobgy (1944); Yan & al. (1989), and Spies & al. (1999) from outside of India. The haploid chromosome number has been counted at diakinesis in pollen mother cells.

Capillipedium assimile A. Camus

$n = 10$, CHN. India, Himachal Pradesh, Kangra, Dyot, 32°11'N,

76°34'E, 1310 m, between dry rock crevices, 28 Jun 2009, *Harpreet Kaur*, HK 24801 (PUN 53517) [Fig. 17K].

Cymbopogon distans Duthie

** $n = 20 + 2B$, CHN. India, Himachal Pradesh, Kangra, Bhagsunaag, 32°14'N, 76°21'E, 1456 m, on the foot of rocks along roadsides, 14 Aug 2009, *Harpreet Kaur*, HK 24863 (PUN 53545) [Fig. 17].

This is the first record of B-chromosomes for this species, it has been counted at metaphase I in pollen mother cells.

Dactylis glomerata L.

$n = 7$, CHN. India, Himachal Pradesh, Kangra, Bada Gran, 32°14'N, 76°20'E, 1810 m, waste places along roadsides, 25 Jun 2010, *Harpreet Kaur*, HK 27072 (PUN 54780) [Fig. 17M].

Dichanthium annulatum Stapf

$n = 20$, CHN. India, Himachal Pradesh, Kangra, Bandla, 32°06'N, 76°32'E, 1266 m, in open fields, 20 Mar 2009, *Harpreet Kaur*, HK 24809 (PUN 52617) [Fig. 17N].

Digitaria adscendens Henrard

$n = 27$, CHN. India, Himachal Pradesh, Kangra, Dehra, 31°52'N, 76°12'E, 430 m, waste places along roadsides, 29 Sep 2008, *Harpreet Kaur*, HK 24805 (PUN 52615) [Fig. 17O].

Digitaria longiflora Pers.

$n = 9$, CHN. India, Himachal Pradesh, Kangra, Bhagsunaag, 32°14'N, 76°21'E, 1456 m, shady moist places along roadsides, 14 Aug 2009, *Harpreet Kaur*, HK 24841 (PUN 52628) [Fig. 17P].

Digitaria setigera Roth

$n = 36$, CHN. India, Himachal Pradesh, Kangra, Loharari, 32°01'N, 76°60'E, 1420 m, along roadsides, 26 Oct 2009, *Harpreet Kaur*, HK 24844 (PUN 52629) [Fig. 17Q].

Echinochloa frumentacea Link

$n = 27$, CHN. India, Himachal Pradesh, Kangra, Bada Gran, 32°14'N, 76°20'E, 1810 m, near water, 25 Sep 2009, *Harpreet Kaur*, HK 24853 (PUN 52634) [Fig. 17R].

Eleusine indica (L.) Gaertn.

** $n = 14$, CHN. India, Himachal Pradesh, Kangra, Dehra, 31°52'N, 76°12'E, 430 m, between dry rock crevices, 20 Sep 2008, *Harpreet Kaur*, HK 24834 (PUN 52581) [Fig. 17S].

The present chromosome count represents an aneuploid cytotype. Previous reports for this species are these of $2n = 18$ by Bhattacharya (1973); Sharma & al. (1978); Dujardin (1979); Hiremath & Chennaveeraiah (1982); Mehra (1982); Bir & Sahni (1986); Faruqi & al. (1987); Koul & Gohil (1988); Bir & Chauhan (1990); Sinha & al. (1990); Hiremath & Salimath (1991); Moinuddin & al. (1994); Salimath & al. (1995); Mysore & Baird (1997); Yang (1998); Bisht & Mukai (2000,

2001); Devarumath & al. (2005); and Mallikharjun (2005), and $2n = 36$ by Moffett & Hurcombe (1949); Wet (1954); Gould & Soderstrom (1967); and Subramanyam & Kamble (1967). The haploid chromosome number has been counted at metaphase I in pollen mother cells.

Isachne albens Trin.

* $n = 5$, CHN. India, Himachal Pradesh, Kangra, Andretta, 32°04'N, 76°36'E, 1035 m, open moist places, 20 Mar 2010, *Harpreet Kaur*, HK 27001 (PUN 54740) [Fig. 17T].

The haploid chromosome number has been counted at metaphase II of meiosis in pollen mother cells (Fig. 17T).

Ischaemum thomsonianum Stapf ex C.E.C. Fisch.

$n = 10$, CHN. India, Himachal Pradesh, Kangra, Dharamsala, 32°13'N, 76°19'E, 1345 m, moist places, 12 Oct 2008, *Harpreet Kaur*, HK 25047 (PUN 52594) [Fig. 17].

Lolium remotum var. *aristatum* (Döll) Asch.

$n = 7$, CHN. India, Himachal Pradesh, Kangra, Bada Gran, 32°14'N, 76°20'E, 1810 m, along cultivated fields, 28 Jun 2009, *Harpreet Kaur*, HK 24876 (PUN 53554) [Fig. 17V].

Miscanthus nepalensis Hack.

$n = 20$, CHN. India, Himachal Pradesh, Kangra, Chhota Bhagal, 32°02'N, 76°50'E, 1489 m, on rocks along roadsides, 25 Sep 2009, *Harpreet Kaur*, HK 24866 (PUN 53547) [Fig. 17W].

Mnesithea laevis Kunth

$n = 9$, CHN. India, Himachal Pradesh, Kangra, Bhanala, 32°13'N, 76°10'E, 800 m, along roadsides, 23 Aug 2010, *Harpreet Kaur*, HK 27067 (PUN 54779) [Fig. 17X].

Muhlenbergia himalayensis Hack. ex Hook. f.

$n = 20$, CHN. India, Himachal Pradesh, Kangra, Loharari, 32°02'N, 76°50'E, 1420 m, shady moist places, 25 Sep 2009, *Harpreet Kaur*, HK 25618 (PUN 53572) [Fig. 18A].

Oplismenus burmannii (Retz.) P. Beauv.

$n = 9$, CHN. India, Himachal Pradesh, Kangra, Ranekar, 32°13'N, 76°10'E, 796 m, open moist places, 13 Oct 2008, *Harpreet Kaur*, HK 24832 (PUN 52625) [Fig. 18B].

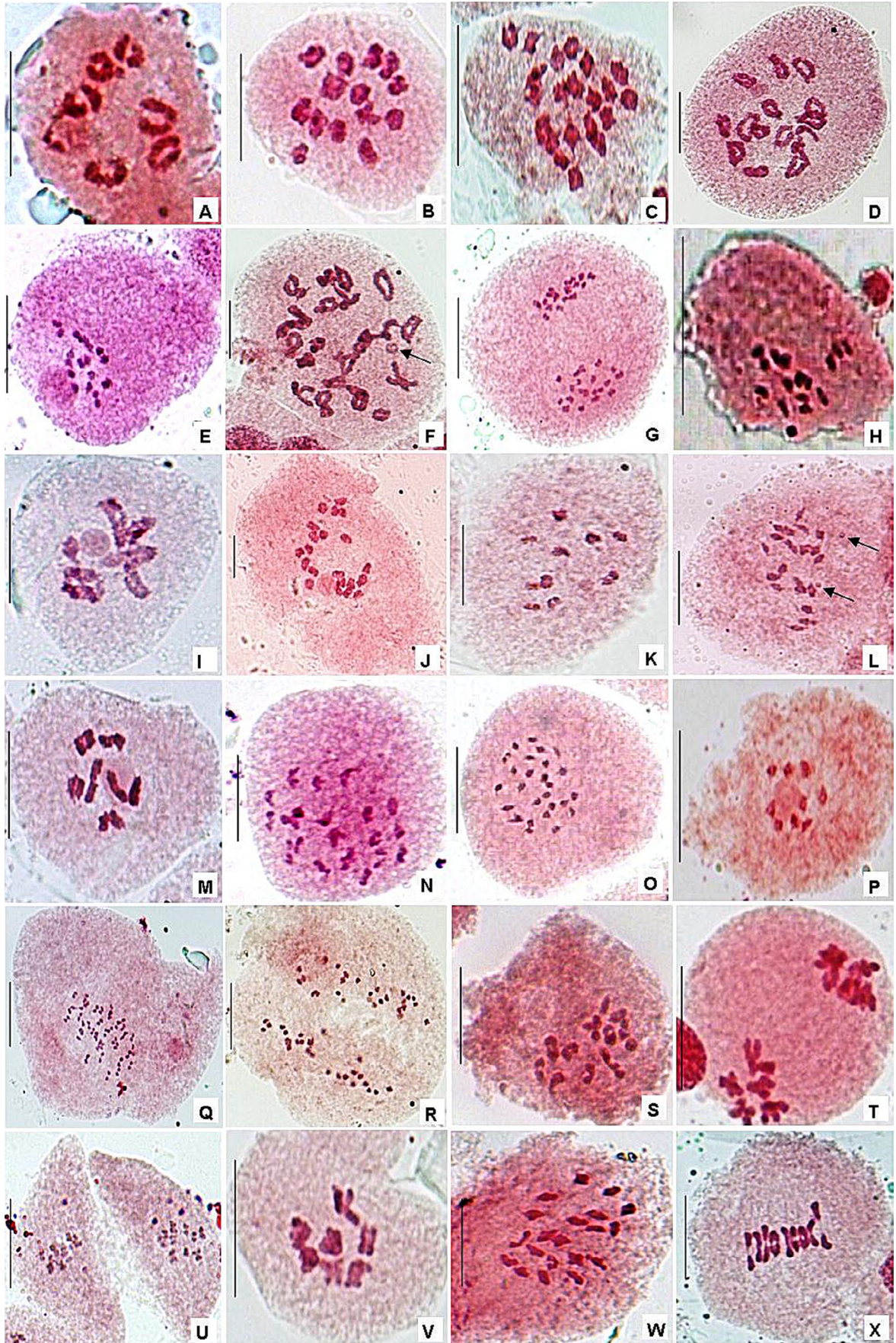
Oplismenus compositus (L.) P. Beauv.

$n = 36$, CHN. India, Himachal Pradesh, Kangra, Dharamsala, 32°13'N, 76°19'E, 1345 m, on the foot of rocks along roadsides, 12 Oct 2008, *Harpreet Kaur*, HK 24827 (PUN 52623) [Fig. 18C].

Paspalum distichum L.

$n = 30$, CHN. India, Himachal Pradesh, Kangra, Bhagsunaag, 32°14'N, 76°21'E, 1456 m, shady moist places along roadsides, 14 Aug 2009, *Harpreet Kaur*, HK 24821 (PUN 52630) [Fig. 18D].

Fig. 17. A, *Acrachne racemosa*, meiotic diakinesis, $n = 6$ (PUN 54750); **B**, *Agrostis debilis*, meiotic metaphase I, $n = 14$ (PUN 52593); **C**, *Agrostis pilosula* var. *royleana*, meiotic metaphase I, $n = 21$ (PUN 53549); **D**, *Alopecurus nepalensis*, meiotic diakinesis, $n = 14$ (PUN 53551); **E**, *Andropogon munroi*, meiotic diakinesis, $n = 10$ (PUN 53542); **F**, *Avena fatua* var. *fatua*, meiotic diakinesis, $n = 21 + 1B$ (PUN 53530) (arrow shows B-chromosome); **G**, *Bothriochloa pertusa*, meiotic anaphase I, $n = 20$ (PUN 52619); **H**, *Brachiaria remota*, meiotic metaphase I, $n = 16$ (PUN 53576); **I**, *Briza minor*, meiotic diakinesis, $n = 5$ (PUN 54749); **J**, *Bromus catharticus*, meiotic diakinesis, $n = 21$ (PUN 54767); **K**, *Capillipedium assimile*, meiotic diakinesis, $n = 10$ (PUN 53517); **L**, *Cymbopogon distans*, meiotic metaphase I, $n = 20 + 2B$ (PUN 53545) (arrows show B-chromosomes); **M**, *Dactylis glomerata*, meiotic diakinesis, $n = 7$ (PUN 54780); **N**, *Dichanthium annulatum*, meiotic metaphase I, $n = 20$ (PUN 52617); **O**, *Digitaria adscendens*, meiotic metaphase I, $n = 27$ (PUN 52615); **P**, *Digitaria longiflora*, meiotic diakinesis, $n = 9$ (PUN 52628); **Q**, *Digitaria setigera*, meiotic metaphase I, $n = 36$ (PUN 52629); **R**, *Echinochloa frumentacea*, meiotic anaphase I, $n = 27$ (PUN 52634); **S**, *Eleusine indica*, meiotic metaphase I, $n = 14$ (PUN 52581); **T**, *Isachne albens*, meiotic metaphase II, $n = 5$ (PUN 54740); **U**, *Ischaemum thomsonianum*, meiotic metaphase II, $n = 10$ (PUN 52594); **V**, *Lolium remotum* var. *aristatum*, meiotic metaphase I, $n = 7$ (PUN 53554); **W**, *Miscanthus nepalensis*, meiotic metaphase I, $n = 20$ (PUN 53547); **X**, *Mnesithea laevis*, meiotic metaphase I, $n = 9$ (PUN 54779). Scale = 10 μ m.



Phlaris minor var. *nepalensis* (Trin.) Bor

$n = 14$, CHN. India, Himachal Pradesh, Kangra, Tal-mata, 32°14'N, 76°12'E, 1103 m, near water, 26 Feb 2009, *Harpreet Kaur*, HK 24825 (PUN 52622) [Fig. 18E].

Piptatherum microcarpum (Pilg.) Tzvelev

▼ $n = 12$, CHN. India, Himachal Pradesh, Kangra, Chhota Bhangal, 32°02'N, 76°50'E, 1489 m, shady and moist places, 26 Sep 2009, *Harpreet Kaur*, HK 25082 (PUN 52644) [Fig. 18F].

The current chromosome count agrees with the previous report of $2n = 24$ by Podlech & Dieterle (1969) from outside of India. The haploid chromosome number has been counted at diakinesis in pollen mother cells.

Poa annua L.

$n = 14 + 0-3B$, CHN. India, Himachal Pradesh, Kangra, Chhota Bhangal, 32°02'N, 76°50'E, 1489 m, near water, 28 Jun 2009, *Harpreet Kaur*, HK 24881 (PUN 52588); India, Himachal Pradesh, Kangra, Bandla, 32°06'N, 76°32'E, 1266 m, edges of cultivated fields, 29 Mar 2009, *Harpreet Kaur*, HK 24879 (PUN 52586) [Fig. 18G–H].

Earlier records for this species from India represent $2n = 28$ with the presence 0–1 B-chromosome per PMC as reported by Mehra & Kohli (1966) and Mehra & al. (1968).

The haploid chromosome number has been counted at diakinesis and metaphase I in pollen mother cells (Fig. 18G–H).

Poa nepalensis (Wall. ex Griseb.) Duthie

** $n = 14$, CHN. India, Himachal Pradesh, Kangra, Patti, 32°13'N, 76°10'E, 800 m, waste places along roadsides, 26 Feb 2009, *Harpreet Kaur*, HK 24882 (PUN 52589); India, Himachal Pradesh, Kangra, Bandla, 32°06'N, 76°32'E, 1266 m, along cultivated fields, 29 Mar 2009, *Harpreet Kaur*, HK 24883 (PUN 52590) [Fig. 18I].

The haploid chromosome number has been counted at metaphase I in pollen mother cells. Earlier the species was reported to have diploid chromosome number, $2n = 14$ by Mehra & Sunder (1969) from India.

Poa setulosa Bor

* $n = 14$, CHN. India, Himachal Pradesh, Kangra, Bhagsunaag, 32°14'N, 76°21'E, 1456 m, shady moist places along the roadsides, 14 Aug 2009, *Harpreet Kaur*, HK 24884 (PUN 52591) [Fig. 18J].

The haploid chromosome number has been counted at diakinesis of meiosis in pollen mother cells.

Polypogon fugax Steud.

$n = 21$, CHN. India, Himachal Pradesh, Kangra, Ranehar, 32°13'N, 76°10'E, 796 m, near water, 26 Feb 2009, *Harpreet Kaur*, HK 24822 (PUN 52620) [Fig. 18K].

Rottboellia exaltata L. f.

▼ $n = 30$, CHN. India, Himachal Pradesh, Kangra, Bada Gran, 32°14'N, 76°20'E, 1810 m, along open fields, 28 Jun 2009, *Harpreet Kaur*, HK 24871 (PUN 52582) [Fig. 18L].

The present count agrees with earlier report by Chen & Hsu (1962) from outside of India. The haploid chromosome number has been counted at late anaphase I in pollen mother cells (Fig. 18L).

Saccharum bengalense Retz.

$n = 10$, CHN. India, Himachal Pradesh, Kangra, Chhota Bhangal, 32°02'N, 76°50'E, 1489 m, along roadsides, 30 Mar 2009, *Harpreet Kaur*, HK 24855 (PUN 52636) [Fig. 18M].

Setaria barbata (Lam.) Kunth

▼ $n = 18$, CHN. India, Himachal Pradesh, Kangra, Dehra, 31°52'N, 76°12'E, 430 m, waste places and along cultivated fields, 21 Oct 2008, *Harpreet Kaur*, HK 25051 (PUN 52598) [Fig. 18N].

The present count agrees with earlier report of $2n = 36$ by Olorode (1975) from outside of India. The haploid chromosome number has been counted at metaphase I in pollen mother cells.

Setaria glauca (L.) P. Beauv.

$n = 36$, CHN. India, Himachal Pradesh, Kangra, Bhagsunaag, 32°14'N, 76°21'E, 1456 m, near water fall, 14 Aug 2009, *Harpreet Kaur*, HK 24837 (PUN 52627) [Fig. 18O].

Setaria megaphylla T. Durand & Schinz

▼ $n = 18$, CHN. India, Himachal Pradesh, Kangra, Bhagsunaag, 32°14'N, 76°21'E, 1456 m, waste places, 14 Aug 2009, *Harpreet Kaur*, HK 25052 (PUN 52599) [Fig. 18P].

The present count agrees with earlier report of $2n = 36$ by Kam-macher & al. (1973), Olorode (1975), and Dujardin (1978) from outside of India. The haploid chromosome number has been counted at metaphase I in pollen mother cells (Fig. 18P).

Setaria tomentosa Kunth

$n = 18$, CHN. India, Himachal Pradesh, Kangra, Suliali, 32°12'N, 76°03'E, 553 m, shady moist places, 17 Jul 2010, *Harpreet Kaur*, HK 27049 (PUN 54759) [Fig. 18Q].

Urochloa panicoides P. Beauv var. *pubescence* (Kunth) Bor

$n = 24$, CHN. India, Himachal Pradesh, Kangra, Dehra, 31°52'N, 76°12'E, 430 m, waste places, 16 Aug 2009, *Harpreet Kaur*, HK 24850 (PUN 52632) [Fig. 18R].

Vetiveria zizanioides Nash

$n = 10$, CHN. India, Himachal Pradesh, Kangra, Dharamsala, 32°13'N, 76°19'E, 1345 m, along roadsides, 12 Oct 2008, *Harpreet Kaur*, HK 24815 (PUN 52618) [Fig. 18S].

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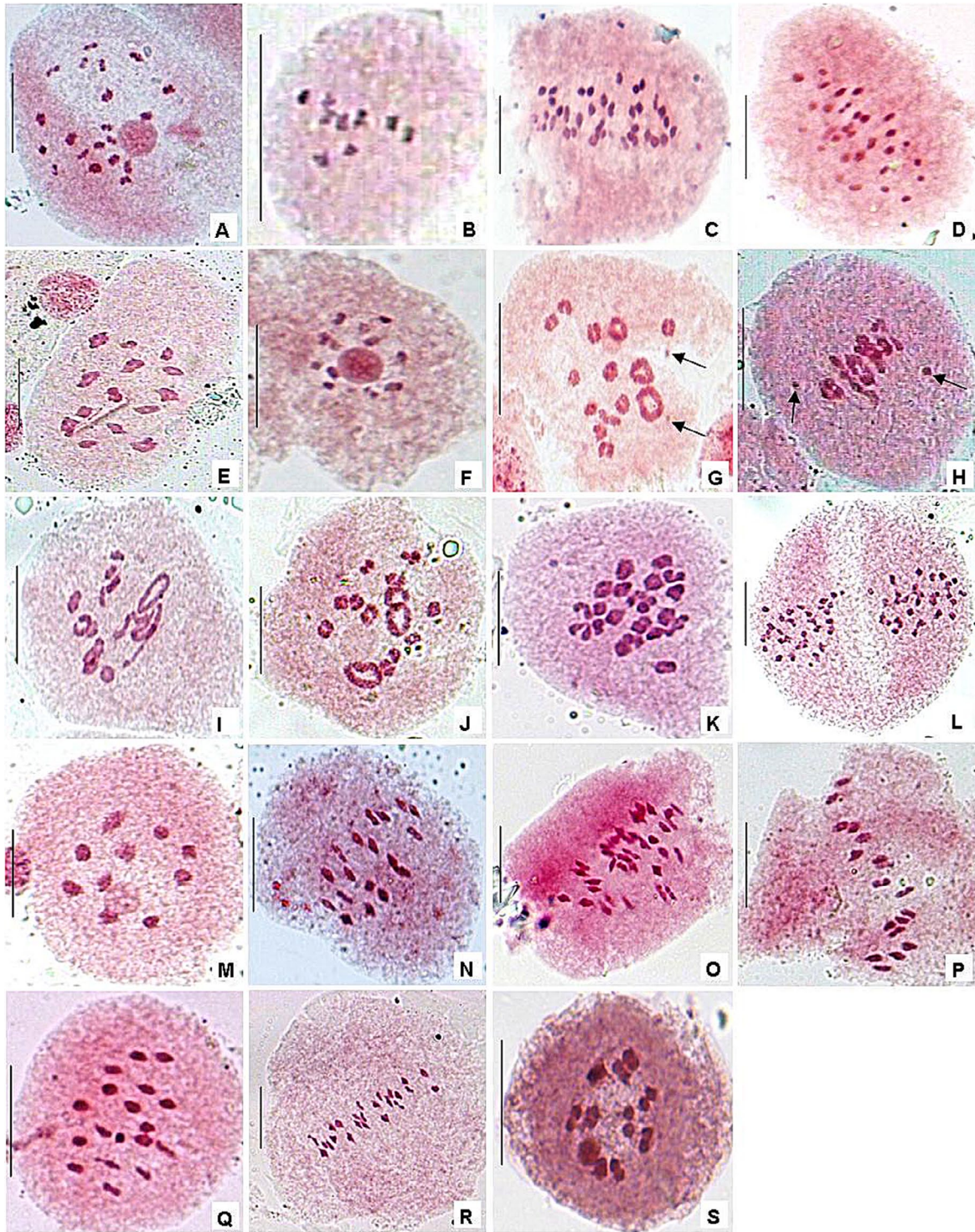


Fig. 18. **A**, *Muhlenbergia himalayensis*, meiotic diakinesis, $n = 20$ (PUN 53572); **B**, *Oplismenus burmannii*, meiotic metaphase I, $n = 9$ (PUN 52625); **C**, *Oplismenus compositus*, meiotic metaphase I, $n = 36$ (PUN 52623); **D**, *Paspalum distichum*, meiotic metaphase I, $n = 30$ (PUN 52630); **E**, *Phlaris minor* var. *nepalensis*, meiotic metaphase I, $n = 14$ (PUN 52622); **F**, *Piptatherum microcarpum*, meiotic diakinesis, $n = 12$ (PUN 52644); **G**, *Poa annua*, meiotic diakinesis, $n = 14+2B$ (PUN 52586) (arrows show B-chromosomes); **H**, *Poa annua*, meiotic metaphase I, $n = 14-10II+1IV+2B$ (PUN 52586) (arrows show B-chromosomes); **I**, *Poa nepalensis*, meiotic metaphase I, $n = 14$ (PUN 52590); **J**, *Poa setulosa*, meiotic diakinesis, $n = 14$ (PUN 52591); **K**, *Polypogon fugax*, meiotic metaphase I, $n = 21$ (PUN 52620); **L**, *Rottboellia exaltata*, meiotic late anaphase I, $n = 30$ (PUN 52582); **M**, *Saccharum bengalense*, meiotic diakinesis, $n = 10$ (PUN 52636); **N**, *Setaria barbata*, meiotic metaphase I, $n = 18$ (PUN 52598); **O**, *Setaria glauca*, meiotic metaphase I, $n = 36$ (PUN 52627); **P**, *Setaria megaphylla*, meiotic metaphase I, $n = 18$ (PUN 52599); **Q**, *Setaria tomentosa*, meiotic metaphase I, $n = 18$ (PUN 54759); **R**, *Urochloa panicoides*, meiotic metaphase I, $n = 24$ (PUN 52632); **S**, *Vetiveria zizantoides*, meiotic diakinesis, $n = 10$ (PUN 52618). Scale = 10 μm .

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** New chromosome number (cytotype) for the species.

▼ First chromosome count from an Indian accession.

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APIACEAE

Chaerophyllum acuminatum Lindl.

$n = 11$, CHN. India, Himachal Pradesh, Sirmaur, Shillai, 30°40'N, 77°42'E, 2000 m, moist places, 06 Aug 2010, Sanjeev Kumar SK 27463 (PUN 55247) [Fig. 19A].

Chaerophyllum aromaticum L.

▼ $n = 11$, CHN. India, Himachal Pradesh, Sirmaur, Rajgarh, 30°51'N, 77°18'E, 1650 m, moist places, 04 Aug 2010, Sanjeev Kumar SK 27462 (PUN 55246) [Fig. 19B].

The species was previously reported to have $2n = 22$ (Skalinska, 1974; Pashuk, 1987; Albers & Pröbsting, 1998) from outside of India.

Pimpinella acuminata C.B. Clarke

***n* = 9, CHN. India, Himachal Pradesh, Sirmaur, Rajgarh, 30°51'N, 77°18'E, 1650 m, moist places, 24 Jul 2010, *Sanjeev Kumar SK 27467* (PUN 55248) [Fig. 19C].

The species was previously reported to have *2n* = 20 (Mehra & Dhawan, 1971; Cauwet-Marc, 1982).

Pimpinella diversifolia DC.

n = 9, CHN. India, Himachal Pradesh, Sirmaur, Rajgarh, 30°51'N, 77°18'E, 1650 m, moist places, 10 Sep 2009, *Sanjeev Kumar SK 25074* (PUN 52662) [Fig. 19D].

BALSAMINACEAE*Impatiens arguta* Hook. f. & Thomson

n = 7, CHN. India, Himachal Pradesh, Sirmaur, Naurdhar, 30°46'N, N 77°31'E, 1800 m, moist places, 13 Sep 2009, *Sanjeev Kumar SK 24662* (PUN 52534) [Fig. 19E].

Impatiens balsamina L.

n = 7, CHN. India, Himachal Pradesh, Sirmaur, Ganduri, 30°54'N, 77°40'E, 2000 m, grassy field, 04 Mar 2010, *Sanjeev Kumar SK 24663* (PUN 52535) [Fig. 19F].

Impatiens bicornuta Wall.

n = 7, CHN. India, Himachal Pradesh, Sirmaur, Haripurdhar, 30°46'N, 77°32'E 2600 m, along road sides, 08 Aug 2009, *Sanjeev Kumar SK 24669* (PUN 52542) [Fig. 19G].

Impatiens laxiflora Edgew.

***n* = 7, CHN. India, Himachal Pradesh, Sirmaur, Ganduri, 30°54'N, 77°40'E, 2000 m, along water spring, 16 Jul 2009 *Sanjeev Kumar SK 24664* (PUN 52536) [Fig. 19H].

***n* = 8, CHN. India, Himachal Pradesh, Sirmaur, Rajgarh 30°51'N, 77°18'E, 1650 m, along road sides, 04 Aug 2009, *Sanjeev Kumar SK 24665* (PUN 52537) [Fig. 19I].

Kaur & al. (2010) reported this species to have *2n* = 12.

Impatiens scabrida DC.

n = 7, CHN. India, Himachal Pradesh, Sirmaur, Haripurdhar, 30°46'N, 77°32'E, 2600 m, moist places, 08 Aug 2009, *Sanjeev Kumar SK 24668* (PUN 52543) [Fig. 19J].

BRASSICACEAE*Capsella bursa-pastoris* (L.) Medik.

n = 16, CHN. India, Himachal Pradesh, Sirmaur, Shillai, 30°40'N 77°42'E, 2000 m, grassy fields, 04 Mar 2010, *Sanjeev Kumar SK 25063* (PUN 52653) [Fig. 19K].

Nasturtium officinale R. Br.

***n* = 8, CHN. India, Himachal Pradesh, Sirmaur, Nahan, 30°33'N, 77°17'E, 900 m, moist places, 18 Apr 2010, *Sanjeev Kumar SK 27415* (PUN 55242) [Fig. 19L].

The species was previously reported to have *2n* = 32 (Javůrková-Jarolímová, 1992; Krahulcová, 1992; Diosdado & al., 1993; Khatoun & Ali, 1993; Valdés & Parra, 1997).

Sisymbrium irio L.

n = 14, CHN. India, Himachal Pradesh, Sirmaur, Renukaji, 30°35'N, 77°17'E, 640 m, moist places, 04 Mar 2010, *Sanjeev Kumar SK 27414* (PUN 55241) [Fig. 19M].

CASEALPINIACEAE*Caesalpinia decapetala* (Roth) Alston

n = 12, CHN. India, Himachal Pradesh, Sirmaur, Nahan, 30°33'N, 77°17'E, 900 m, 24 Feb 2010, *Sanjeev Kumar SK 25072* (PUN 52660) [Fig. 19N].

CARYOPHYLLACEAE*Silene vulgaris* (Moench) Garcke

▼ *n* = 24, CHN. India, Himachal Pradesh, Sirmaur, Shillai, 30°40'N, 77°42'E, 2000 m, grassy areas, 04 May 2010, *Sanjeev Kumar SK 26955* (PUN 54434) [Fig. 19O].

The species was previously reported to have *2n* = 48 (Horovitz & Dolberger, 1983; Baltisberger & Baltisberger, 1995) from outside of India.

CRASSULACEAE*Sedum multicaule* Wall ex Lindl.

***n* = 14, CHN. India, Himachal Pradesh, Sirmaur, Churpeak, 30°52'N, 77°20'E, 3250 m, in rock crevices, 04 Jul 2010, *Sanjeev Kumar SK 27368* (PUN 55239) [Fig. 19P].

The species was previously reported to have *2n* = 24 and 84 (Wakabayashi & Ohba, 1999).

FABACEAE*Lathyrus aphaca* L.

n = 7, CHN. India, Himachal Pradesh, Sirmaur, Shillai, 30°40'N, 77°42'E, 2000 m, moist grassy area, 04 Feb 2010, *Sanjeev Kumar SK 25057* (PUN 52686) [Fig. 19Q].

n = 14, CHN. India, Himachal Pradesh, Sirmaur, Poanta-Sahib, 30°26'N 77°37'E, 350 m, along water springs, 08 Feb 2009, *Sanjeev Kumar SK 25045* (PUN 52533) [Fig. 19R].

Medicago polymorpha L.

n = 7, CHN. India, Himachal Pradesh, Sirmaur, Sataun, 30°28'N, 77°37'E, 800 m, moist places, 04 Mar 2010, *Sanjeev Kumar SK 25061* (PUN 52651) [Fig. 19S].

Melilotus indica (L.) All.

n = 8, CHN. India, Himachal Pradesh, Sirmaur, Poanta-Sahib 30°26'N 77°37'E, 350 m, weed in agricultural fields, 08 Feb 2010, *Sanjeev Kumar SK 25062* (PUN 52652) [Fig. 19T].

Trifolium repens L.

▼ *n* = 8, CHN. India, Himachal Pradesh, Sirmaur, Haripurdhar, 30°46'N, 77°32'E, 2600 m, on edges of cultivated fields, 15 Jul 2009, *Sanjeev Kumar SK 25056* (PUN 52685) [Fig. 19U].

The species was previously reported to have *2n* = 32 (Yang & Zhou, 1999; Probatova & al., 2000; Yang & al., 2003; Chen & al., 2003).

n = 16, CHN. India, Himachal Pradesh, Sirmaur, Shillai, 30°40'N, 77°42'E, 2000 m, on edges of cultivated fields, 08 Jul 2009, *Sanjeev Kumar SK 25084* (PUN 52684) [Fig. 19V].

Vicia hirsuta (L.) Gray

n = 6, CHN. India, Himachal Pradesh, Sirmaur, Kala-amb, 30°30'N, 77°12'E, 400 m, moist grassy area, 04 Mar 2010, *Sanjeev Kumar SK 27473* (PUN 55250) [Fig. 19W].

Vicia sativa L.

n = 6, CHN. India, Himachal Pradesh, Sirmaur, Sataun, 30°28'N, 77°37'E, 800 m, weed in cultivated fields, 04 Feb 2010, *Sanjeev Kumar SK 25067* (PUN 52656) [Fig. 19X].

Vicia tetrasperma (L.) Schreb.

n = 7, CHN. India, Himachal Pradesh, Sirmaur, Sataun, 30°28'N, 77°37'E, 800 m, moist grassy area, 04 Feb 2010, *Sanjeev Kumar SK 25068* (PUN 52657) [Fig. 20A].

GERANIACEAE*Geranium nepalense* Sweet

n = 14, CHN. India, Himachal Pradesh, Sirmaur, Rajgarh, 30°51'N, 77°18'E, 1650 m, along road sides, 08 Aug 2009, *Sanjeev Kumar SK 25059* (PUN 52649) [Fig. 20B].

Geranium ocellatum Jacquem.

▼ $n = 28$, CHN. India, Himachal Pradesh, Sirmaur, Rajgarh, 30°51'N, 77°18'E, 1650 m, grassy fields, 04 Mar 2010, *Sanjeev Kumar SK 27421* (PUN 55243) [Fig. 20C].

The species was previously reported to have $2n = 56$ (Hedberg & Hedberg, 1977; Morton, 1993) from outside of India.

Geranium wallichianum D. Don

$n = 13$, CHN. India, Himachal Pradesh, Sirmaur, Haripurdhar, 30°46'N, 77°32'E, 2600 m, along road sides, 08 Aug 2009, *Sanjeev Kumar SK 25058* (PUN 52648) [Fig. 20D].

MALVACEAE

Sida cordata (Burm. f.) Borss.Waalk.

** $n = 8$, CHN. India, Himachal Pradesh, Sirmaur, Shillai, 30°40'N, 77°42'E, 2000 m, along road sides, 10 Jun 2010, *Sanjeev Kumar SK 27449* (PUN 55244) [Fig. 20E].

The species was previously reported to have $2n = 32$ (Krishnappa & Munirajappa, 1980; Sidhu & al., 1990; Noor & al., 2003).

Sida cordifolia L.

** $n = 8$, CHN. India, Himachal Pradesh, Sirmaur, Rajgarh, 30°51'N, 77°18'E, 1650 m, along road sides, 04 Jun 2010, *Sanjeev Kumar SK 27450* (PUN 55245) [Fig. 20F].

The species was previously reported to have $2n = 28$ (Ugborogho, 1982; Sidhu & al., 1990; Cheng & Tsai, 1999).

ONAGRACEAE

Epilobium palustre L.

▼ $n = 18$, CHN. India, Himachal Pradesh, Sirmaur, Bhangyanimata, 30°46'N, 77°33'E, 2800 m, open fields, 08 Aug 2010, *Sanjeev Kumar SK 27372* (PUN 55240) [Fig. 20G].

The species was previously reported to have $2n = 36$ (Krasnikov & Schaulo, 1990; Semerenko, 1990; Javůrková-Jarolímová, 1992) from outside of India.

Oenothera drummondii (Spach) Walp.

$n = 7$, CHN. India, Himachal Pradesh, Sirmaur, Shillai, 30°40'N, 77°42'E, 2000 m, grassy areas, 10 Sep 2009, *Sanjeev Kumar SK 25073* (PUN 52661); India, Himachal Pradesh, Sirmaur, Nauradhar, 30°46'N, 77°31'E, 1800 m, grassy area, 10 Sep 2009, *Sanjeev Kumar SK 25083* (PUN 52683) [Fig. 20H].

Oenothera rosea Aiton

$n = 7$, CHN. India, Himachal Pradesh, Sirmaur, Sarahan, 30°54'N, 77°30'E, 2200 m, open fields, 04 May 2010, *Sanjeev Kumar SK 27403* (PUN 52663) [Fig. 20I].

RANUNCULACEAE

Anemone obtusiloba D. Don

$n = 7$, CHN. India, Himachal Pradesh, Sirmaur, Churdhar, 30°52'N, 77°24'E, 3630 m, hill slopes, 04 Jun 2010, *Sanjeev Kumar SK 26986* (PUN 54524) [Fig. 20J].

Anemone rivularis Buch.-Ham. ex DC.

$n = 7$, CHN. India, Himachal Pradesh, Sirmaur, Churdhar, 30°52'N, 77°24'E, 3630 m, hill slopes, 06 Jun 2010, *Sanjeev Kumar SK 26989* (PUN 54527) [Fig. 20K].

Anemone vitifolia Buch.-Ham. ex DC.

$n = 7$, CHN. India, Himachal Pradesh, Sirmaur, Churdhar, 30°52'N, 77°24'E, 3630 m, hill slopes, 02 Jun 2010, *Sanjeev Kumar SK 26992* (PUN 54530) [Fig. 20L].

Clematis orientalis L.

** $n = 8 + 0 - 1B$, CHN. India, Himachal Pradesh, Sirmaur, Rajgarh, 30°51'N, 77°18'E, 1650 m, climber on tree, 04 Aug 2010, *Sanjeev Kumar SK 26985* (PUN 54512) [Fig. 20M].

The species was previously reported to have $2n = 16$ (Serov, 1986, 1989; Khatoun & Ali, 1993).

Ranunculus hyberboreus Rottb.

$n = 16$, CHN. India, Himachal Pradesh, Sirmaur, Shillai, 30°40'N, 77°42'E, 2000 m, moist places, 04 Mar 2010, *Sanjeev Kumar SK 25071* (PUN 53596) [Fig. 20N].

Ranunculus laetus Wall.

$n = 14$, CHN. India, Himachal Pradesh, Sirmaur, Ganduri, 30°54'N, 77°40'E, 2000 m, along water spring, 14 May 2009, *Sanjeev Kumar SK 25064* (PUN 52670) [Fig. 20O].

Ranunculus muricatus L.

$n = 16$, CHN. India, Himachal Pradesh, Sirmaur, Shillai, 30°40'N, 77°42'E, 2000 m, moist places, 08 Mar 2010, *Sanjeev Kumar SK 27475* (PUN 55249) [Fig. 20P].

ROSACEAE

Agrimonia eupatoria L.

$n = 14$, CHN. India, Himachal Pradesh, Sirmaur, Haripurdhar, 30°46'N, 77°32'E, 2600 m, open grassland, 04 Aug 2010, *Sanjeev Kumar SK 25675* (PUN 53491) [Fig. 20Q].

$n = 28$, CHN. India, Himachal Pradesh, Sirmaur, Bhangyanimata, 30°46'N, 77°33'E, 2800 m, grassy fields, 06 Aug 2010, *Sanjeev Kumar SK 25676* (PUN 53492) [Fig. 20R].

Duchesnea indica (Andrews) Focke

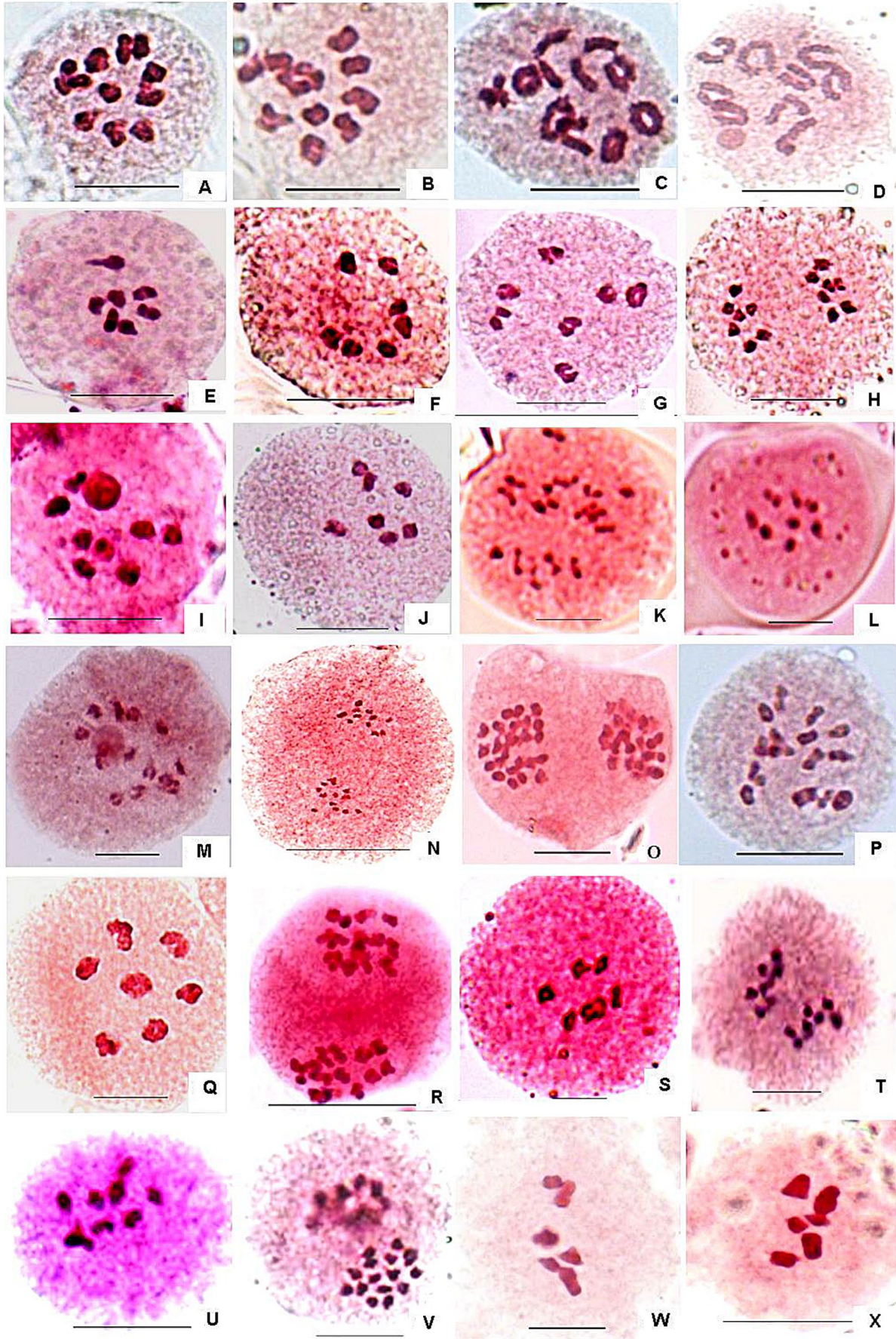
** $n = 14$, CHN. India, Himachal Pradesh, Sirmaur, Haripurdhar, 30°46'N, 77°32'E, 2600 m, grassy fields, 20 Apr 2010, *Sanjeev Kumar SK 27311* (PUN 54860) [Fig. 20S].

The species was previously reported to have $2n = 84$ (Naruhashi & al., 1986; Naruhashi & Takano, 1987; Hill, 1989; Zhao & al., 1990; Naruhashi & Iwatsubo, 1991; Xu & al., 1992; Naruhashi & al., 2005).

Potentilla argyrophylla Wall. ex Lehm.

▼ $n = 28$, CHN. India, Himachal Pradesh, Sirmaur, Rohanat, 30°45'N, 77°40'E, 1450 m, open grassland, 04 Jun 2010, *Sanjeev Kumar SK 27360* (PUN 54875) [Fig. 20T].

Fig. 19. A, *Chaerophyllum acuminatum*, meiotic metaphase I, $n = 11$ (PUN 55247); **B**, *Chaerophyllum aromaticum*, meiotic metaphase I, $n = 11$ (PUN 55246); **C**, *Pimpinella acuminata*, meiotic metaphase I, $n = 9$ (PUN 55248); **D**, *Pimpinella diversifolia*, meiotic diakinesis, $n = 9$ (PUN 52662); **E**, *Impatiens arguta*, meiotic metaphase I, $n = 7$ (PUN 52534); **F**, *I. balsamina*, meiotic metaphase I, $n = 7$ (PUN 52535); **G**, *I. bicornuta*, meiotic metaphase I, $n = 7$ (PUN 52542); **H**, *I. laxiflora*, meiotic anaphase I, $n = 7$ (PUN 52536); **I**, *I. laxiflora*, meiotic diakinesis, $n = 8$ (PUN 52537); **J**, *I. scabrida*, meiotic metaphase I, $n = 7$ (PUN 52543); **K**, *Capsella bursa-pastoris*, meiotic metaphase I, $n = 16$ (PUN 52653); **L**, *Nasturtium officinale*, meiotic metaphase I, $n = 8$ (PUN 52542); **M**, *Sysimbrium irio*, meiotic diakinesis, $n = 14$ (PUN 55241); **N**, *Caesalpinia decapetala*, meiotic anaphase I, $n = 12$ (PUN 52660); **O**, *Silene vulgaris*, meiotic anaphase I, $n = 24$ (PUN 54434); **P**, *Sedum multicaule*, meiotic metaphase I, $n = 14$ (PUN 55239); **Q**, *Lathyrus aphaca*, meiotic metaphase I, $n = 7$ (PUN 52686); **R**, *Lathyrus aphaca*, meiotic metaphase II, $n = 14$ (PUN 52533); **S**, *Medicago polymorpha*, meiotic metaphase I, $n = 7$ (PUN 52651); **T**, *Melilotus indica*, meiotic anaphase I, $n = 8$ (PUN 52652); **U**, *Trifolium repens*, meiotic metaphase I, $n = 8$ (PUN 52685); **V**, *Trifolium repens*, meiotic anaphase I, $n = 16$ (PUN 52684); **W**, *Vicia hirsuta*, meiotic metaphase I, $n = 6$ (PUN 52650); **X**, *Vicia sativa*, meiotic metaphase I, $n = 6$ (PUN 52656). Scale = 10 μ m.



The species was previously reported to have $2n = 56$ (Shimotomai, 1930a, b; Zhukova 1967).

Potentilla atosanguinea Lodd. ex D. Don

** $n = 14$, CHN. India, Himachal Pradesh, Sirmaur, Sainj, 30°04'N, 77°23'E, 1400 m, grassy fields, 04 Jul 2010, *Sanjeev Kumar SK 27332* (PUN 54867) [Fig. 20U].

The species was previously reported to have $2n = 56$, 74, 84 (Goswami & Matfield, 1978) and $2n = 63$ (Zhukova, 1967).

Potentilla fructicosa Gray

▼ $n = 14$, CHN. India, Himachal Pradesh, Sirmaur, Shillai, 30°40'N, 77°42'E, 2000 m, grassy fields, 04 Jul 2010, *Sanjeev Kumar SK 27301* (PUN 52668) [Fig. 20V].

The species was previously reported to have $2n = 14$ (Leht, 1999).

Potentilla fulgens Wall. ex Hook.

▼ $n = 7$, CHN. India, Himachal Pradesh, Sirmaur, Naurdhar, 30°46'N, 77°31'E, 1800 m, in rock crevices, 12 Jul 2010, *Sanjeev Kumar SK 27336* (PUN 54869) [Fig. 20W].

The species was previously reported to have $2n = 14$ (Ikeda, 1989) from outside of India.

Potentilla nepalensis Hook.

$n = 7$, CHN. India, Himachal Pradesh, Sirmaur, Haripurdhar, 30°46'N, 77°32'E, 2600 m, in rock crevices, 08 Jul 2010, *Sanjeev Kumar SK 27316* (PUN 54864) [Fig. 20X].

** $n = 14$, CHN. India, Himachal Pradesh, Sirmaur, Shillai, 30°40'N, 77°42'E, 2000 m, in rock crevices, 07 Jul 2010, *Sanjeev Kumar SK 27317* (PUN 54865) [Fig. 21A].

The species was previously reported to have $2n = 42$ (Mehra & Dhawan, 1966; Zhukova, 1967).

Prinsepia utilis Royle

$n = 16$, CHN. India, Himachal Pradesh, Sirmaur, Shillai, 30°40'N, 77°42'E, 2000 m, along road sides, 04 Jan 2010, *Sanjeev Kumar SK 25066* (PUN 52655) [Fig. 21B].

Rubus ellipticus Sm.

$n = 7$, CHN. India, Himachal Pradesh, Sirmaur, Shillai, 30°40'N, 77°42'E, 2000 m, along road sides, 01 Jan 2010, *Sanjeev Kumar SK 25065* (PUN 52654) [Fig. 21C].

Sibbaldia micropetala (D. Don) Hand.-Mazz.

** $n = 7$, CHN. India, Himachal Pradesh, Sirmaur, Churdhar, 30°52'N, 77°24'E, 3630 m, grassy fields, 04 Aug 2010, *Sanjeev Kumar SK 27334* (PUN 54913) [Fig. 21D].

** $n = 14$, CHN. India, Himachal Pradesh, Sirmaur, Churdhar, 30°52'N, 77°24'E, 3630 m, open grassland, 06 Aug 2010, *Sanjeev Kumar SK 27335* (PUN 54914) [Fig. 21E].

The species was previously reported to have $2n = 56$ (Mehra & Dhawan, 1966).

Sibbaldia parviflora Willd.

** $n = 14$, CHN. India, Himachal Pradesh, Sirmaur, Shillai, 30°40'N, 77°42'E, 2000 m, grassy fields, 04 Jul 2010, *Sanjeev Kumar SK 27343* (PUN 55067) [Fig. 21F].

The species was previously reported to have $2n = 14$ (Guinochet & Lefranc, 1981).

SAXIFRAGACEAE

Bergenia ciliata (Haw.) Sternb.

▼ $n = 17$, CHN. India, Himachal Pradesh, Sirmaur, Shillai, 30°40'N, 77°42'E, 2000 m, open hills, 04 Mar 2010, *Sanjeev Kumar SK 27347* (PUN 55066) [Fig. 21G].

The species was previously reported to have $2n = 34$ (Hamel, 1948) from outside of India.

Saxifraga diversifolia Wall. & Ser.

** $n = 8$, CHN. India, Himachal Pradesh, Sirmaur, Churpaek, 30°52'N, 77°20'E, 3250 m, in rock crevices, 11 Aug 2010, *Sanjeev Kumar SK 27441* (PUN 55070) [Fig. 21H].

The species was previously reported to have $2n = 20$ (Mehra & Dhawan, 1971; Malla & al., 1984).

Saxifraga sibirica L.

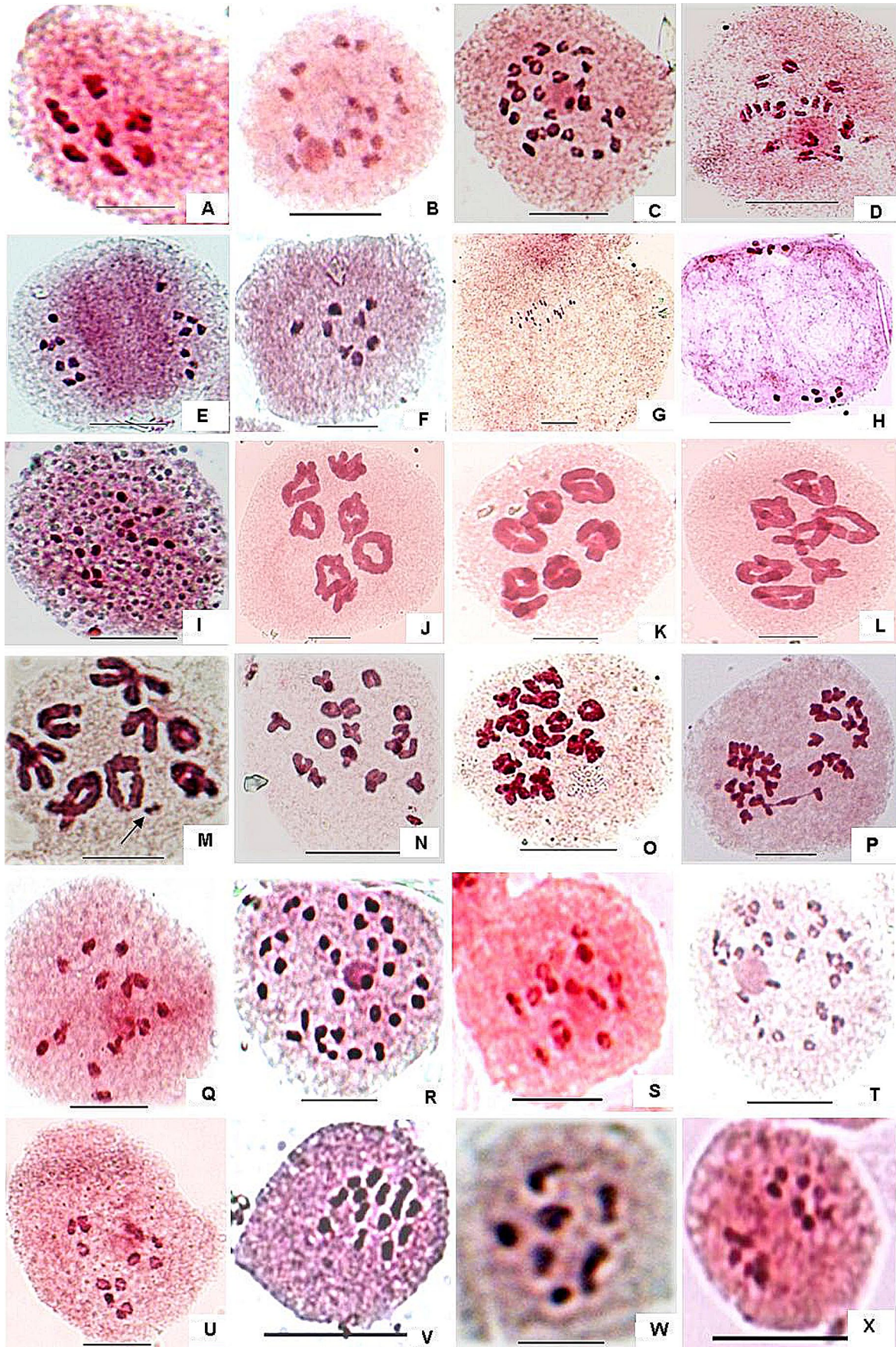
▼ $n = 8$, CHN. India, Himachal Pradesh, Sirmaur, Haripurdhar, 30°46'N, 77°32'E, 2600 m, in rock crevices, 04 Aug 2010, *Sanjeev Kumar SK 27402* (PUN 55076) [Fig. 21I].

The species was previously reported to have $2n = 16$ (Funamoto & al., 1998; Kutlunina & al., 2006) from outside of India.

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Fig. 20. A, *Vicia tetrasperma*, meiotic metaphase I, $n = 7$ (PUN 52657); **B**, *Geranium nepalense*, meiotic diakinesis, $n = 14$ (PUN 52649); **C**, *Geranium ocellatum*, meiotic diakinesis $n = 28$ (PUN 55243); **D**, *Geranium wallichianum*, meiotic diakinesis, $n = 13$ (PUN 52648); **E**, *Sida cordata*, meiotic anaphase I, $n = 8$ (PUN 55244); **F**, *Sida cordifolia*, meiotic metaphase I, $n = 8$ (PUN 55245); **G**, *Epilobium palustre*, meiotic metaphase I, $n = 18$ (PUN 55240); **H**, *Oenothera drummondii*, meiotic anaphase I, $n = 7$ (PUN 52661, 52683); **I**, *Oenothera rosea*, meiotic anaphase I, $n = 7$ (PUN 52663); **J**, *Anemone obtusiloba*, meiotic metaphase I, $n = 7$ (PUN 54524); **K**, *A. rivularis*, meiotic metaphase I, $n = 7$ (PUN 54527); **L**, *A. vitifolia*, meiotic metaphase I, $n = 7$ (PUN 54530); **M**, *Clematis orientalis*, meiotic metaphase I, $n = 8 + 1B$ (arrow shows B chromosome) (PUN 54512); **N**, *Ranunculus hyberboreus*, meiotic metaphase I, $n = 16$ (PUN 53596); **O**, *R. lateus*, meiotic metaphase I, $n = 14$ (PUN 52670); **P**, *R. muricatus*, meiotic metaphase II, $n = 16$ (PUN 55249); **Q**, *Agrimonia eupatoria*, meiotic diakinesis, $n = 14$ (PUN 53491); **R**, *Agrimonia eupatoria*, meiotic diakinesis, $n = 28$ (PUN 53492); **S**, *Duchesnia indica*, meiotic metaphase I, $n = 14$ (PUN 54860); **T**, *Potentilla argrophylla*, meiotic diakinesis $n = 28$ (PUN 54875); **U**, *P. atosanguinea*, meiotic metaphase I, $n = 14$ (PUN 54867); **V**, *P. fructicosa*, meiotic metaphase I, $n = 14$ (PUN 52668); **W**, *P. fulgens*, meiotic metaphase I, $n = 7$ (PUN 54869); **X**, *P. nepalensis*, meiotic anaphase I, $n = 7$ (PUN 54864). Scale = 10 μ m.



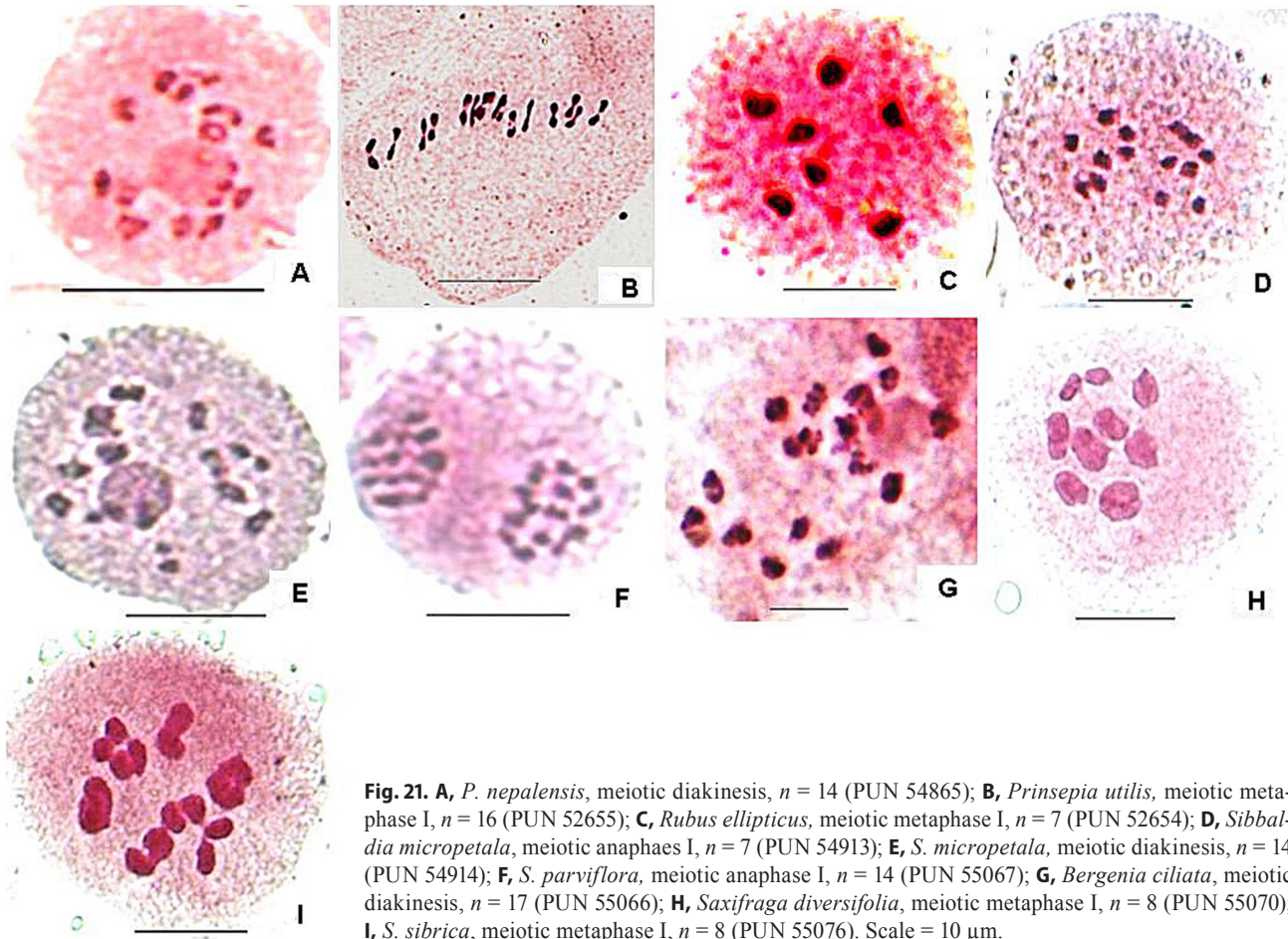


Fig. 21. **A**, *P. nepalensis*, meiotic diakinesis, $n = 14$ (PUN 54865); **B**, *Prinsepia utilis*, meiotic metaphase I, $n = 16$ (PUN 52655); **C**, *Rubus ellipticus*, meiotic metaphase I, $n = 7$ (PUN 52654); **D**, *Sibbaldia micropetala*, meiotic anaphase I, $n = 7$ (PUN 54913); **E**, *S. micropetala*, meiotic diakinesis, $n = 14$ (PUN 54914); **F**, *S. parviflora*, meiotic anaphase I, $n = 14$ (PUN 55067); **G**, *Bergenia ciliata*, meiotic diakinesis, $n = 17$ (PUN 55066); **H**, *Saxifraga diversifolia*, meiotic metaphase I, $n = 8$ (PUN 55070); **I**, *S. sibirica*, meiotic metaphase I, $n = 8$ (PUN 55076). Scale = 10 μm .

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* First chromosome count for the species.

** New chromosome number (cytotype) for the species.

▼ First chromosome count from an Indian accession.

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ASTERACEAE

Carduus edelbergii Rech. f.

** $n = 20$, CHN. India, Kashmir, Pulwama, Galandar (Pampore), 1700 m, near saffron fields, 34°03'N, 74°54'E, 25 Apr 2009, Reyaz Ahmad Malik RAM 28690 (PUN 56385) [Fig. 22A]

The sporophytic chromosome number $2n = 16$ was previously published for *Carduus edelbergii* subsp. *edelbergii* (Podlech & Dieterle, 1969).

Saussurea kingii C.E.C. Fisch.

▼ $n = 17$, CHN, India, Kashmir, Baramulla, Mount Agharwat (Gulmarg), 4000 m, near rocks on exposed soil surfaces, 34°00'N, 74°21'E, 1 Aug 2011, Reyaz Ahmad Malik RAM 28691 (PUN 56386) [Fig. 22B].

The chromosome count agrees with the earlier report of $2n = 34$ (Fujikawa & al., 2004) for this species from outside of India.

Senecio krascheninnikovi Schischk.

▼ $n = 10$, CHN. India, Kashmir, Kulgam, Aharbal, 2250 m, in dried, sandy/stony area along stream, 33°38'N, 74°47'E, 2 Aug 2009, Reyaz Ahmad Malik RAM 21952 (PUN 52810) [Fig. 22C].

The chromosome count agrees with the earlier report of $n = 10$ (Razaq & al., 1994) for this species from outside of India.

Senecio vulgaris L.

▼ $n = 20$, CHN. India, Kashmir, Pulwama, Govt. Degree College Pulwama, 1750 m, near very small water channel, 33°52'N, 74°55'E, 15 May 2009, Reyaz Ahmad Malik RAM 21953 (PUN 52811) [Fig. 22D].

The chromosome count agrees with the earlier report of $n = 20$ (Lövkvist & Hultgård, 1999) for this species from outside India.

BORAGINACEAE

Mertensia echioides (Benth.) Benth. & Hook. (= *Lithospermum echioides* Benth.)

* $n = 12$, CHN. India, Kashmir, Bandipora, Razdan Pass, 3600 m, on road side rocky slope with other herbs, 34°34'N, 75°43'E, 20 Jul 2011, Reyaz Ahmad Malik RAM 28692 (PUN 56387) [Fig. 22E].

GENTIANACEAE

Swertia ciliata (D. Don ex G. Don) B.L. Burtt.

** $n = 13$, CHN. India, Kashmir, Kulgam, Aharbal, 2250 m, on soil of rocky slopes, 33°38'N, 74°47'E, 2 Aug 2009, Reyaz Ahmad Malik RAM 25110 (PUN 54357) [Fig. 22F].

A haploid chromosome number of $n = 12$ (Mehra & Gill, 1968) was previously reported for this species from India.

LAMIACEAE

Coleus blumei Benth.

** $n = 21$, CHN. India, Kashmir, Pulwama, Gangoo, 1750 m, along cultivated fields, 33°52'N, 74°55'E, 13 Aug 2010, Reyaz Ahmad Malik RAM 25168 (PUN 55182) [Fig. 22G].

Chromosome numbers $n = 24$ (Bir & Saggoo, 1985) and $2n = 49$ (Reddy, 1952) from India, and $2n = 24$ (Furusato, 1940), $2n = 72$ (Morton, 1962), and $2n = 48$ (Chen & al., 2003) from outside India were previously reported for this species. Base numbers $x = 6, 7$ and 8 were given for the genus *Coleus* (Darlington & Wylie, 1955).

Elsholtzia ciliata (Thunb.) Hyl.

▼ $n = 16$, CHN. India, Kashmir, Ganderbal, Thajwas, 3100 m, 34°17'N, 75°17'E, 17 Aug 2010, Reyaz Ahmad Malik RAM 25183 (PUN 55193) [Fig. 22H].

A haploid chromosome number of $n = 8$ (Gill, 1984) was previously reported for this species from India and the tetraploid number $2n = 32$ (Nishikawa, 1985) was reported from outside of India.

Thymus linearis L.

** $n = 13$, CHN. India, Kashmir, Pulwama, Galandar (Pampore), 1700 m, on dry brown soil, road sides near saffron fields, 34°03'N, 74°54'E, 25 Apr 2009, Reyaz Ahmad Malik RAM 25184 (PUN 55194) [Fig. 22I].

There is an earlier report on $2n = 24$ (Khatoun & Ali, 1993) for *Thymus linearis* subsp. *linearis* from outside of India.

SCROPHULARIACEAE

Digitalis grandiflora Mill.

▼ $n = 28$, CHN. India, Kashmir, Baramulla, Gulmarg, 2600 m, on open green lawns, 34°03'N, 74°23'E, 25 Jul 2010, *Reyaz Ahmad Malik RAM 25138* (PUN 54378) [Fig. 22J].

The present chromosome number is in accordance with the earlier reports of $n = 28$ (Dobea & Hahn, 1997) from outside of India.

Scrophularia incisa Weinm.

▼ $n = 25$, CHN. India, Kashmir, Bandipora, Razdan Pass, 3600 m, on dry soil near road side, 34°34'N, 75°43'E, 20 Jul 2011, *Reyaz Ahmad Malik RAM 28693* (PUN 56388) [Fig. 22K].

The previous chromosome reports for this species are $2n = 24$ (Rostovtseva & al., 1981) and $2n = 50$ (Měsíček & Soják, 1992) from outside of India.

Scrophularia scopolii Hoppe

▼ $n = 13$, CHN. India, Kashmir, Kulgam, Aharbal, 2300 m, on

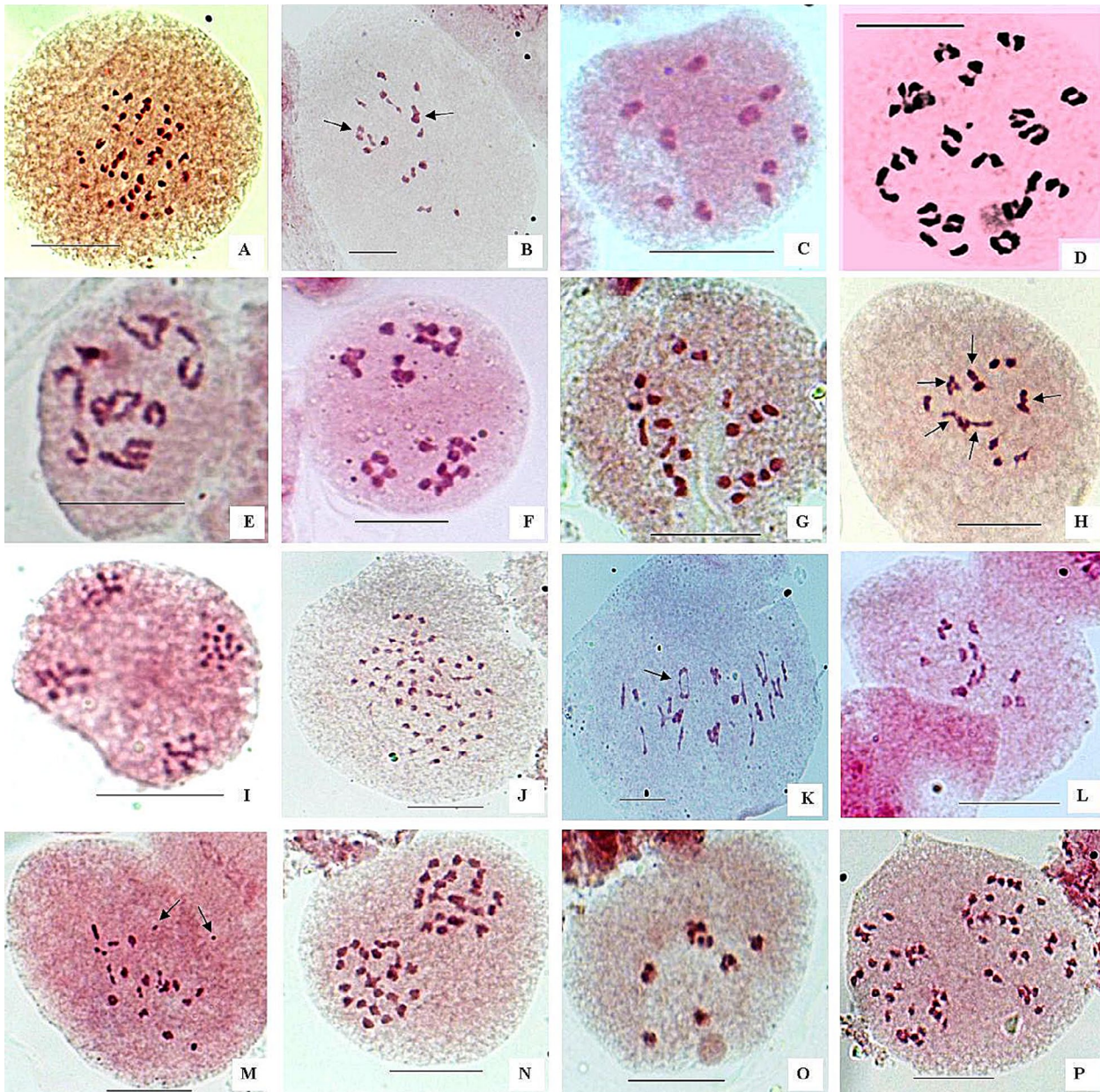


Fig. 22. **A**, *Carduus edelbergii*, meiotic anaphase I, $n = 20$; **B**, *Saussurea kingii*, meiotic metaphase I, arrows pointing to quadrivalents, $n = 17$; **C**, *Senecio krascheninnikovi*, meiotic metaphase I, $n = 10$; **D**, *S. vulgaris*, diakinesis, $n = 20$; **E**, *Mertensia echinoides*, diakinesis, $n = 12$; **F**, *Swertia ciliata*, meiotic anaphase I, $n = 13$; **G**, *Coleus blumei*, meiotic metaphase I, $n = 21$; **H**, *Elsholtzia ciliata*, meiotic metaphase I, arrows pointing to quadrivalents, $n = 16$; **I**, *Thymus linearis*, meiotic anaphase II, $n = 13$; **J**, *Digitalis grandiflora*, meiotic anaphase I, $n = 28$; **K**, *Scrophularia incisa*, meiotic metaphase I, arrow pointing to quadrivalent, $n = 25$; **L**, *S. scopolii*, meiotic metaphase I, $n = 13$; **M**, *Verbascum thapsus*, meiotic metaphase I, arrows pointing to B-chromosomes, $n = 17$; **N**, *Veronica cana*, meiotic anaphase I, $n = 23$; **O**, *V. persica*, diakinesis, $n = 7$; **P**, *Valeriana hardwickii*, meiotic anaphase I, $n = 30$. Scale = 10 μ m.

the sides of the path in between hills, 33°38'N, 74°47'E, 8 Aug 2009, *Reyaz Ahmad Malik RAM 25182* (PUN 55192) [Fig. 22L].

This chromosome report is in agreement with earlier reports of $n = 13$ (Daniela, 1997) from outside of India.

Verbascum thapsus L.

** $n = 17+0-2B$, CHN. India, Kashmir, Anantnag, Pahalgam, 2300 m, on the open bank of road, 34°03'N, 75°17'E, 27 Aug 2009, *Reyaz Ahmad Malik RAM 25126* (PUN 54367) [Fig. 22M].

A haploid chromosome number of $n = 17$ (Subramanian & Pondmudi, 1987) was already reported for this species; nevertheless, B-chromosomes are reported here for the first time.

Veronica cana Wall. ex Benth.

** $n = 23$, CHN. India, Kashmir, Kulgam, Aharbal, 2250 m, 33°38'N, 74°47'E, 13 Jun 2010, *Reyaz Ahmad Malik RAM 25158* (PUN 55172) [Fig. 22N].

Previous reports for this species from India indicated $n = 26$ (Vasudevan, 1975) and $2n = 50$ (Mehra & Vasudevan, 1972).

Veronica persica Poir.

** $n = 7$, CHN. India, Kashmir, Pulwama, Gangoo, 1750 m, on uncultivated and somewhat moist sites, 33°52'N, 74°55'E, 3 Jun 2009, *Reyaz Ahmad Malik RAM 25192* (PUN 55463) [Fig. 22O].

Current chromosome count of $n = 7$ represents the first diploid report for this species. Previous report of $n = 14$ (Vasudevan, 1975) corresponds to the tetraploid level, taking into account the base number of $x = 7$ (Darlington & Wylie, 1955).

VALERIANACEAE

Valeriana hardwickii Wall.

** $n = 30$, CHN. India, Kashmir, Kulgam, Aharbal, 2300 m, 33°38'N, 74°47'E, 13 Jun 2010, *Reyaz Ahmad Malik RAM 25174* (PUN 55185) [Fig. 22P].

The previous chromosome reports for this species are $n = 8$ (Hong & Zhang, 1990) and $2n = 28$ (Engel, 1976).

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* First chromosome count for the species marked.

** New chromosome number (cytotype) for the species.

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ALISMATACEAE

Alisma orientale (Sam.) Juz.

$2n = 14$, CHN. Russia, Far East, Primorskii Krai, Khorol'skii Raion, 8 km S of Khorol' settlement, near Blagodatnoe village, at the lake, 17 Jul 1979, *Rudyka 5446* (VLA); Russia, Far East, Primorskii Krai, Mikhailovskii Raion, vicinity of Mikhailovka village, the river-side of Rep'ovka River (tributary of Rakovka River, the Suifun River basin), 5 Jul 1998, *Shatalova 7679* (VLA); Russia, Far East, Primorskii Krai, Shkotovskii Raion, near Romanovka village, a pond at the way to "Pristan", 19 Oct 1997, *Shatalova 7500* (VLA).

ALLIACEAE

Allium anisopodium Ledeb.

$2n = 16$, CHN. Russia, Far East, Primorskii Krai, Khankaiskii Raion, Khanka Lake, nature reserve "Khankaiskii", sector Sosnovyi,

Przheval'skogo Peninsula, meadow, 21 Jun 2002, *Barkalov 8833* (VLA); Russia, Far East, Primorskii Krai, Khassanskii Raion, near Gvozdevo settlement, maritime slope, 25 Jul 2008, *Nechaev 11086* (VLA).

Allium condensatum Turcz.

$2n = 16$, CHN. Russia, Far East, Khabarovskii Krai, nature reserve "Bol'shekhkhtsirskii", right riverside of the Ussuri River, Bashmachkovaya Hill, rocky slope, 31 Aug 1993, *Probatova & Seledets 7072* (VLA); Russia, Far East, Primorskii Krai, Khassanskii Raion, Krabbe Peninsula, sea coast, sandy spit, 16 May 2009, *Nechaev 11349* (VLA).

Allium komarovianum Vved.

$2n = 16$, CHN. Russia, Far East, Primorskii Krai, Ussuriiskii Raion, 5 km of Krounovka village, steep slope of the river valley, sparse oak forest, on the rocks, 20 May 2006, *Nechaev 10438* (VLA).

Allium macrostemon Bunge

$2n = 32$, CHN. Russia, Far East, Primorskii Krai, Terneiskii Raion, Sikhote-Alinskii biosphere reserve, Blagodatnoe area, 2007, *Nesterova 10745* (VLA); Russia, Far East, Primorskii Krai, Mikhailovskii Raion, 1 km S of Otradnoe village, along the route, 14 Jun 2003, *Lelikov & Lopenko 9019* (VLA).

Allium maximowiczii Regel

$2n = 16$, CHN. Russia, Far East, Primorskii Krai, Shkotovskii Raion, near Bol'shoi Kamen' settlement, meadow by sea coast, 1 Jul 2007, *Nechaev 10755* (VLA).

Allium ramosum L.

$2n = 32$, CHN. Russia, Far East, Primorskii Krai, Khassanskii Raion, near Lotos (Doritseni) Lake, sparse oak forest (*Quercus dentata*), 11 May 2008, *Nechaev 11044* (VLA).

Allium sacculiferum Maxim.

$2n = 32$, CHN. Russia, Far East, Primorskii Krai, Khassanskii Raion, near Tal'my Lake, stony islet in the middle of the *Carex* and *Phragmites* meadow bog, on the slope with *Arundinella*, 23 Sep 2010, *Nechaev 11666* (VLA).

Allium schoenoprasum L.

$2n = 16$, CHN. Russia, Far East, Kamchatskii Krai, central part of Kamchatka Peninsula, Sredinnyi Kamchatskii mountain ridge, near Alnei Mt., Kireunskye hot springs, wet meadow, 29 Jul 2009, *Barkalov 11461* (VLA).

Allium senescens L.

$2n = 16$, CHN. Russia, Far East, Khabarovskii Krai, nature reserve "Bol'shekhkhtsirskii", right riverside of Ussuri River, Bashmachkovaya Hill, rocky slope, 31 Aug 1993, *Probatova & Seledets 7071* (VLA); Russia, Far East, Primorskii Krai, Khankaiskii Raion, Sinyi mountain ridge, near Sin'aya Mt., rocky outcrops, 3 Apr 2011, *Barkalov 11804* (VLA); Russia, Far East, Primorskii Krai, Muravëv-Amurskii Peninsula, Okeanskii mountain ridge, 5 km NW of Lazurny settlement, 312 m, stony SE slope with steppe-like vegetation, 21 Oct 2004, *Probatova & Seledets 9538* (VLA); Russia, Far East, Primorskii Krai, Khassanskii Raion, near Gvozdevo, maritime slope, 25 Jul 2008, *Nechaev 11087* (VLA).

$2n = 32$, CHN. Russia, Far East, Primorskii Krai, Ussuriiskii Raion, near Korfovka village, slightly wet meadow, 11 Jun 2000, *Pavlova 8155* (VLA), and on the dry slope, 5 Sep 2000, *Pavlova 8360* (VLA); Russia, Far East, Primorskii Krai, Shkotovskii Raion, in vicinity of Fokino town, the Bol'shoi Iossif Mt., 440–500 m, 9 May 2007, *Nechaev 10556* (VLA).

Allium spirale Willd.

$2n = 32$, CHN. Russia, Far East, Primorskii Krai, Dal'negorskii Raion, near Rudnaya Pristan', the nature monument "Vulkan Brinera", abrupt stony W slope, 24 Sep 2005, *Seledets 9991* (VLA).

APIACEAE

Anthriscus sylvestris (L.) Hoffm.

$2n = 16$, CHN. Russia, Far East, Primorskii Krai, Nadezhdinskii Raion, 10 km of Vol'no-Nadezhdinskoe settlement, near Yasnoe village, moist clearing in the forest, 5 Jul 1998, *Barkalov 7759* (VLA).

ARACEAE

Arisaema amurense Maxim.

$2n = 56$, CHN. Russia, Far East, Primorskii Krai, Muravëv-Amurskii Peninsula, in vicinity of Okeanskaya railway station, forest zone of the Botanical Garden-Institute of the Far East Branch of the Russian Academy of Sciences, 30 May 2010, *Semeykin 11582* (VLA); Russia, Far East, Primorskii Krai, Vladivostok, Muravëv-Amurskii Peninsula, forest slope near Akademgorodok, 1 Jun 2009, *Volynets 11361* (VLA).

ASCLEPIADACEAE

Metaplexis japonica Makino

$2n = 24$, CHN. Russia, Far East, Primorskii Krai, Nadezhdinskii Raion, 7 km of the railway station Kiparissovo and 4 km of Tazhnoye settlement, country area, in shrub community, 4 Oct 2006, *Rudyka 11110* (VLA).

Vincetoxicum acuminatum C. Morr. & Decne.

$2n = 22$, CHN. Russia, Far East, Primorskii Krai, in vicinity of Nakhodka city, near Wrangel settlement, oak forest with *Lespedeza bicolor*, 16 Jun 2009, *Kazanovsky 11370* (VLA).

ASTERACEAE

Artemisia keiskeana Miq.

$2n = 18$, CHN. Russia, Far East, Primorskii Krai, Khassanskii Raion, near Tal'mi Lake, in forest, 22 Sep 2010, *Nechaev 11807* (VLA).

Artemisia laciniata Willd.

$2n = 18$, CHN. Russia, Far East, Primorskii Krai, Khassanskii Raion, near Lebedinoe village, dry SE slope, 27 May 1998, *Pavlova 7638* (VLA).

Artemisia selengensis Turcz. ex Besser

$2n = 36$, CHN. Russia, Far East, Primorskii Krai, Nadezhdinskii Raion, 10 km of Vol'no-Nadezhdinskoye settlement, near Yasnoye village, 5 Jul 1998, *Barkalov 7818* (VLA).

Artemisia sieversiana Ehrh. ex Willd.

$2n = 18$, CHN. Russia, Far East, Evreiskaya Avtonomnaya Oblast', nature reserve "Bastak", 21 Oct 2005, *Seledets 10059* (VLA).

Artemisia sylvatica Maxim.

$2n = 16$, CHN. Russia, Far East, Khabarovskii Krai, nature reserve "Bol'shekhkhtsirskii", right riverside of Ussuri River, 5th km of the road Bychikha–Kazakevichevo, in forest, 30 Aug 1993, *Probatova & Seledets 7084* (VLA).

Aster alpinus L.

$2n = 18$, CHN. Russia, East Siberia, Republic of Buryatia, Tunkinskii Raion, near Tunka village, 729 m, pine forest, 2 Aug 2010, *Kazanovsky 11693* (VLA).

Aster amellus L. s.l.

$2n = 18$, CHN. U.S.A., Texas, Addison town (near Dallas city), as a weed, Apr 2009, *Rudyka 11414* (VLA).

- Chrysanthemum sichotense* (Tzvelev) Vorosch.
 $2n = 36$, CHN. Russia, Far East, Primorskii Krai, Partizanskii Raion, Alexeevskii mountain ridge, Ol'khovaya Mt., on the spots of melkozem, 1600 m, 10 Sep 2010, *Barkalov 11662* (VLA).
- Cichorium intybus* L.
 $2n = 18$, CHN. Russia, Far East, Primorskii Krai, Oktyabr'skii Raion, near Novo-Georgievka village, meadow along the road, 26 Jul 2009, *Nechaev 11434* (VLA).
- Cirsium kamschaticum* Ledeb. ex DC.
 ** $2n = ca. 34$, CHN. Russia, Far East, Kamchatskii Krai, Kamchatka Peninsula, Elizovskii Raion, outskirts of Petropavlovsk-Kamchatskii city, border of the valley forest, 29 Aug 2003, *Yakubov 9250* (VLA).
- Cirsium setosum* M. Bieb.
 $2n = 34$, CHN. Russia, East Siberia, Irkutskaya Oblast', Irkutsk city, Akademgorodok, on the waste ground near abandoned building site, 9 Nov 2010, *Kazanovsky 11839* (VLA).
- Crepidiastrum denticulatum* (Houtt.) Pak & Kawano
 $2n = 10$, CHN. Russia, Far East, Primorskii Krai, Oktyabr'skii Raion, near Novo-Georgievka village, oak forest, on dry rocks, 15 Sep 1997, *Barkalov 7538* (VLA).
- Crepis nana* Richardson
 $2n = 14$, CHN. Russia, East Siberia, Republic of Buryatia, East Sayan Mts., Okinskii Raion, the route Mondy–Orlik, upper course of the Irkut River, right riverside, 1619 m, 28 Aug 2010, *Kazanovsky 11755* (VLA).
- Crepis runcinata* (E. James) Torr. & A. Gray
 $2n = 22$, CHN. U.S.A., Texas, Addison town (near Dallas city), as a weed on the lawn, 6 Apr 2005, *Rudyka 9725* (VLA).
- Erigeron lonchophyllus* Hook.
 $2n = 18$, CHN. Russia, East Siberia, Irkutskaya Oblast', Ol'khonskii Raion, Tazheranskaya steppe, salt lake Gyzghi-Nur, 597 m, saline land, 31 Jul 2010, *Kazanovsky & Krivenko 11685* (VLA).
- Galatella dahurica* DC.
 $2n = 18$, CHN. Russia, Far East, Primorskii Krai, Nadezhdinskii Raion, in vicinity of the railway station Baranovskii, meadow on the slope, 30 Sep 2010, *Nechaev 11782* (VLA).
- Heteropappus hispidus* Less.
 $2n = 18$, CHN. Russia, Far East, Primorskii Krai, Nadezhdinskii Raion, near the railway station Baranovskii, rocky slope, 30 Sep 2010, *Nechaev 11771* (VLA).
- Ixeris chinensis* (Thunb.) Kitag.
 $2n = 16$, CHN. Russia, East Siberia, Zabaikal'skii Krai, Mogoituiskii Raion, near Ara-Ilya village, the national park "Alkhanai", Dybyksa locality, meadow, roadside, 21 Jul 2010, *Kazanovsky 11774* (VLA).
- Lagedium sibiricum* (L.) Soják
 $2n = 18$, CHN. Russia, Far East, Primorskii Krai, Khankaiskii Raion, Khanka Lake, nature reserve "Khankaiskii", sector Sosnovyi, Przheval'skogo Peninsula, wet meadow, 19 Jun 2004, *Barkalov 9292* (VLA).
- Leontodon autumnalis* L.
 $2n = 12$, CHN. Russia, East Siberia, Irkutskaya Oblast',

Sliudyanskii Raion, lower course of Snezhnaya River, 704 m, meadow along the road, 4 Aug 2010, *Kazanovsky 11656* (VLA).

Leontopodium leontopodioides Beauverd
 $2n = 26$, CHN. Russia, Far East, Primorskii Krai, Khassanskii Raion, S of Zarubino settlement, maritime stony slope, 10 Jun 2008, *Nechaev 10994* (VLA).

Ligularia sibirica Cass.
 $2n = 60$, CHN. Russia, East Siberia, Republic of Buryatia, Okinskii Raion, East Sayan Mts., Kitoiskii mountain ridge, in vicinity of Samarta settlement, the upper course of Kitoi River, 1889 m, shrub community, 28 Aug 2010, *Kazanovsky 11825* (VLA).

Picris davurica Fisch. ex Hornem.
 $2n = 10$, CHN. Russia, East Siberia, Irkutskaya Oblast', Irkutsk city, Akademgorodok, on the waste ground near the abandoned building site, 9 Nov 2010, *Kazanovsky 11841* (VLA).

Picris japonica Thunb.
 $2n = 10$, CHN. Russia, Far East, Khabarovskii Krai, nature reserve "Bol'shekhokhtskii", Bashmachkovaya Hill, along the path, 31 Aug 1993, *Probatova & Seledets 7118* (VLA).

Rhaponticum uniflorum DC.
 $2n = 26$, CHN. Russia, East Siberia, Zabaikal'skii Krai, Aghinskii Buryatskii Nationalnyi Okrug, Dul'durghinskii Raion, near Ara-Ilya village, the national park "Alkhanai", right riverside of the Ilya River, 895 m, steppe slope, 20 Jul 2010, *Kazanovsky 11830* (VLA).

Saussurea amara (L.) DC.
 $2n = 26$, CHN. Russia, East Siberia, Republic of Buryatia, Tunkinskii Raion, Mondy settlement, steppe, on roadside, 28 Aug 2010, *Kazanovsky 11768* (VLA).

Saussurea baicalensis B.L. Rob.
 $2n = 36$, CHN. Russia, East Siberia, Republic of Buryatia, Zakamenskii Raion, near Bayankol village, right riverside of the Sangina River, 1147 m, meadow bog, 17 Jul 2009, *Verkhovina 11699* (VLA).

Saussurea grandifolia Maxim.
 $2n = 26$, CHN. Russia, Far East, Primorskii Krai, in vicinity of Nakhodka city, near Wrangel settlement, oak forest, 16 Jun 2009, *Kazanovsky 11381* (VLA).

Saussurea schanginiana Fisch. ex Herder
 $2n = 36$, CHN. Russia, East Siberia, Irkutskaya Oblast', Ol'khonskii Raion, Malomorskoe lakeside of Baikal Lake, left riverside of Sarma River, 603 m, rocky slope, stony steppe, 30 Jul 2010, *Kazanovsky 11671* (VLA).

Scorzonera albicaulis Bunge
 $2n = 14$, CHN. Russia, Far East, Primorskii Krai, Nadezhdinskii Raion, nearby the railway station Nadezhdinskaya, oak forest edge, 12 Sep 2006, *Nechaev 11124* (VLA).

Scorzonera austriaca Willd.
 $2n = 14$, CHN. Russia, East Siberia, Irkutskaya Oblast', Ust'-Ordynskii Buryatskii Okrug, Ossinskii Raion, Bratskoe reservoir, Obussa Bay, near Kutanka village, 451 m, W slope, grassland steppe, 26 Jun 2010, *Kazanovsky 11695* (VLA).

Senecio erucifolius L.
 $2n = 40$, CHN. Russia, East Siberia, Irkutskaya Oblast', Irkutsk city, on the lawn near the motor-coach terminal, 7 Oct 2010, *Kazanovsky 11820* (VLA).

Senecio viscosus L.

$2n = 40$, CHN. Russia, East Siberia, Irkutskaya Oblast', Irkutsk city, as a weed on the lawn near the motor-coach terminal, 7 Oct 2010, *Kazanovsky 11815* (VLA).

Syneilesis aconitifolia Maxim.

** $2n = 60$, CHN. Russia, Far East, Primorskii Krai, in vicinity of Nakhodka city, near Wrangel settlement, oak forest, 16 Jun 2009, *Kazanovsky 11377* (VLA).

Tephrosia subscaposa (Kom.) Czerep.

* $2n = 48$, CHN. Russia, Far East, Primorskii Krai, Shkotovskii Raion, near Bol'shoi Kamen' settlement, stony slope, sparse oak forest, 24 May 2009, *Nechaev 11330* (VLA).

Tragopogon orientalis L.

$2n = 12$, CHN. Russia, East Siberia, Irkutskaya Oblast', Irkutsk city, Akademgorodok, right riverside of Angara River, roadside, 12 Jul 2010, *Kazanovsky 11742* (VLA).

** $2n = 12 + 0 - 2B$, CHN. Russia, Far East, Primorskii Krai, Mikhailovskii Raion, Novo-Shakhtinsk settlement, the railway station Ozernaya Pad', on the railway road, 2 Sep 2008, *Lapenko 11105* (VLA).

Youngia tenuifolia (Willd.) Bab. & Stebbins

$2n = 10$, CHN. Russia, East Siberia, Irkutskaya Oblast', Ol'khonskii Raion, Malomorskoe lakeside of Baikal Lake, Cape Uyuga, rocky slope, 4 Sep 2010, *Krivenko 11811* (VLA).

BORAGINACEAE

Lappula consanguinea Gürke

* $2n = 24$, CHN. Russia, East Siberia, Republic of Buryatia, Tunkinskii Raion, E outskirts of Tunka village, 738 m, steppe, 2 Aug 2010, *Kazanovsky 11816* (VLA).

Lappula redowskii (Hornem.) Greene

* $2n = 24$, CHN. Russia, East Siberia, Republic of Buryatia, Tunkinskii Raion, E outskirts of Tunka village, 738 m, steppe, 2 Aug 2010, *Kazanovsky 11818* (VLA).

BRASSICACEAE

Arabis pendula L.

$2n = 16$, CHN. Russia, East Siberia, Irkutskaya Oblast', Irkutsk city, Akademgorodok, on the waste ground near the abandoned building site, 2 Nov 2010, *Kazanovsky 11770* (VLA).

Draba lonchocarpa Rydb.

$2n = 16$, CHN. Russia, Far East, Kamchatskii Krai, Kamchatka Peninsula, Ust'-Kamchatskii Raion, Ploskii Tolbachik Volcano, on the slope covered with volcanic lava, 3 Aug 2009, *Barkalov 11553* (VLA).

Isatis oblongata DC.

$2n = 28$, CHN. Russia, East Siberia, Irkutskaya Oblast', Ol'khonskii Raion, Malomorskoe lakeside of Baikal Lake, Cape Uyuga, the spit, on pebbles, 4 Sep 2010, *Krivenko 11809* (VLA); Russia, East Siberia, Irkutskaya Oblast', Ol'khonskii Raion, NW lakeside of Baikal Lake, Baikalo-Lenskii nature reserve, Cape Pokoiniki, sandy beach of the bay, 1 Aug 2006, *Stepantsova 11873* (VLA).

Smelowskia alba B. Fedtsch.

$2n = 12$, CHN. Russia, East Siberia, Irkutskaya Oblast', Ol'khonskii Raion, Malomorskoe lakeside of Baikal Lake, Mukhor Bay, at the base of Ulan-Khada Peninsula, 569 m, stony steppe with sparse *Larix* trees, 30 Jul 2010, *Kazanovsky 11672* (VLA).

CALLITRICHACEAE

Callitriche palustris L.

$2n = 20$, CHN. Russia, Far East, Primorskii Krai, Khankaiskii Raion, Khanka Lake, nature reserve "Khankaiskii", sector Sosnovyi, Arsen'eva spit, by the small lake, 20 Jun 2004, *Barkalov 9297* (VLA); Russia, Far East, Primorskii Krai, Terneiskii Raion, Sikhote-Alinskii biosphere reserve, Shandui locality, Tsarskoe Lake, in water, 21 Aug 2004, *Nesterova 9650* (VLA).

CAMPANULACEAE

Campanula turczaninovi Fed.

$2n = 34$, CHN. Russia, East Siberia, Republic of Buryatia, Okinskii Raion, East Sayan Mts., upper course of Oka River, right riverside, 1631 m, meadow, 29 Aug 2010, *Kazanovsky 11819* (VLA); Russia, East Siberia, Republic of Buryatia, Okinskii Raion, upper course of Kitoi River, left riverside, 1942 m, sparse *Larix* forest, at margin, 28 Aug 2010, *Kazanovsky 11861* (VLA).

Codonopsis lanceolata Benth. & Hook. f.

$2n = 16$, CHN. Russia, Far East, Primorskii Krai, Khassanskii Raion, 5 km of railway station Khassan, oak forest (*Quercus dentata*) with *Lespedeza cyrtobotrya*, 27 Aug 2008, *Nechaev 11280* (VLA).

Platycodon grandiflorus A. DC.

$2n = 18$, CHN. Russia, Far East, Primorskii Krai, Khassanskii Raion, near Tal'mi Lake, stony slope of a terrace, on the border of sparse oak forest, 22 Sep 2010, *Nechaev 11690* (VLA); Russia, Far East, Primorskii Krai, Khassanskii Raion, near Gvozdevo settlement, coastal meadow, 25 Jul 2008, *Nechaev 11081* (VLA).

CARYOPHYLLACEAE

Dianthus amurensis Hort. ex Jacques

$2n = 30$, CHN. Russia, Far East, Khabarovskii Krai, nature reserve "Bol'shekhetskii", right riverside of the Ussuri River, Bashmachkovaya Hill, on the slope to Ussuri River, 31 Aug 1993, *Probatova & Seledets 7185* (VLA).

Dianthus superbus L.

$2n = 30$, CHN. Russia, East Siberia, Republic of Buryatia, Okinskii Raion, East Sayan Mts., Kitoiskii mountain ridge, in vicinity of Samarta settlement, the upper course of Kitoi River, Vassil'evskaya Mt., 2027 m, sparse *Larix* forest, 28 Aug 2010, *Kazanovsky 11824* (VLA).

Gypsophila pacifica Komarov

$2n = 34$, CHN. Russia, Far East, Primorskii Krai, Dal'negorskii Raion, near Rudnaya Pristan', the nature monument "Vulkan Brinera", abrupt stony W slope, 24 Sep 2005, *Seledets 10486* (VLA).

Melandrium album (Mill.) Garcke

$2n = 24$, CHN. Russia, Far East, Primorskii Krai, Vladivostok, Murav'ev-Amurskii Peninsula, Akademgorodok, near the greenhouse, as a weed, 22 Aug 2000, *Pavlova 8427* (VLA).

Silene jeniseensis Willd.

$2n = 24$, CHN. Russia, East Siberia, Zabaikal'skii Krai, Borzinskii Raion, mountain-steppe massif Adun-Chelon, 1019 m, 16 Jul 2010, *Kazanovsky 11832* (VLA).

Spergula arvensis L.

$2n = 18$, CHN. Russia, East Siberia, Irkutskaya Oblast', Kazachinsko-Lenskii Raion, near Ermaki village, meadow, 6 Aug 2008, *Prelovskaya 11833* (VLA).

Spergularia salina J. Presl & C. Presl

$2n = 18$, CHN. Russia, Far East, Primorskii Krai, in vicinity

of the railway station Sovkhoznoyaya, the coast of Uglovoi Bay, near Prokhladnoe village, peat swamp, 3 Nov 2004, *Burkovskaya 9666* (VLA).

CHENOPODIACEAE

Corispermum sibiricum Iljin

$2n = 18$, CHN. Russia, East Siberia, Republic of Buryatia, Tunkinskii Raion, near Zun-Murino village, scientific station of the Siberian Institute of Plant Physiology & Biochemistry, Khyr-Gorkhon River, 704 m, sandy slope, 1 Sep 2010, *Kazanovskiy 11769* (VLA).

CONVALLARIACEAE

Disporum viridescens (Maxim.) B. Fedtsch.

** $2n = 16+0-4B$, CHN. Russia, Far East, Primorskii Krai, Khassanskii Raion, Krabbe Peninsula, seacoast, rocky slope, 16 May 2009, *Nechaev 11344* (VLA).

Polygonatum humile Fisch. ex Maxim.

$2n = 20$, CHN. Russia, Far East, Primorskii Krai, in vicinity of Nakhodka city, near Wrangel settlement, oak forest, 16 Jun 2009, *Kazanovskiy 11369* (VLA).

CONVOLVULACEAE

Calystegia inflata G. Don

$2n = 22$, CHN. Russia, Far East, Khabarovskii Krai, nature reserve “Bol’shekhokhtskii”, right riverside of the Ussuri River, nearby the mouth of Chirka River, 1 Sep 1993, *Probatova & Seledets 7178* (VLA).

CRASSULACEAE

Hylotelephium triphyllum (Haworth) Holub

$2n = 24$, CHN. Russia, Far East, Kamchatskii Krai, central part of the Kamchatka Peninsula, Bystrinskii Raion, 11 km S of Esso settlement, S slope of Gargachan Pass, white birch mountain belt, 31 Aug 2000, *Yakubov 8420* (VLA).

EPHEDRACEAE

Ephedra monosperma J.G. Gmel. ex C.A. Mey.

$2n = 14$, CHN. Russia, East Siberia, Republic of Buryatia, Tunkinskii Raion, the lower course of Belyi Irkut River, left riverside, 1554 m, *Larix* and *Populus* valley forest, 30 Aug 2010, *Kazanovskiy & Prelovskaya 11826* (VLA).

ERICACEAE

Rhododendron parvifolium Adams

$2n = 26$, CHN. Russia, East Siberia, Republic of Buryatia, Okinskii Raion, East Sayan Mts., Kitoiskii mountain ridge, in vicinity of Samarta settlement, the upper course of Kitoi River, 1889 m, shrub community (*Caragana jubata*, *Rhododendron*, etc.), 28 Aug 2010, *Kazanovskiy 11853* (VLA).

FABACEAE

Amphicarpaea japonica B. Fedtsch.

$2n = 20$, CHN. Russia, Far East, Primorskii Krai, Khassanskii Raion, near Gvozdevo railway station, the shore of Possiet Bay, oak forest, 10 May 2008, *Nechaev 11040* (VLA).

Astragalus membranaceus Moench

$2n = 16$, CHN. Russia, Far East, Primorskii Krai, Oktyabr’skii Raion, near Pokrovka settlement, nature monument “Sen’kina Shapka”, Sep 1995, *Nesterova 7773* (VLA).

Glycine soja Siebold & Zucc.

$2n = 40$, CHN. Russia, Far East, Primorskii Krai, Khassanskii Raion, near Lebedinoe village, SE slope, 27 May 1998, *Pavlova 7685* (VLA).

Gueldenstaedtia verna (Georgi) Boriss.

$2n = 16$, CHN. Russia, East Siberia, Republic of Buryatia, Dzhdinskii Raion, 10 km SW of Dyrestui village, left riverside of Dzhida River, 596 m, sandy steppe, 24 Jul 2009, *Verkhovina & Kazanovskiy 11598* (VLA).

Lathyrus humilis (Ser.) Fisch. ex Spreng.

** $2n = 14+0-2B$, CHN. Russia, East Siberia, Zabaikal’skii Krai, Mogoituiskii Raion, near Ara-Ilya village, national park “Alkhanai”, Dybyksa locality, *Larix* and *Betula* forest, 21 Jul 2010, *Kazanovskiy 11814* (VLA).

Lespedeza juncea (L. f.) Pers.

** $2n = 20+0-2B$, CHN. Russia, East Siberia, Republic of Buryatia, Selenginskii Raion, 1 km S of Novo-Selenginsk settlement, stony mountain steppe with *Amygdalus pedunculata*, 11 Sep 2004, *Probatova & Seledets 9667* (VLA).

Lotus corniculatus L.

$2n = 24$, CHN. Russia, Far East, Primorskii Krai, Nadezhdinskii Raion, 4 km W of the railway station Baranovskii, meadow near the riverside of Razdol’naya River, 17 Aug 2008, *Lapenko 11445* (VLA).

Lupinaster pacificus (Bobr.) Latsch.

$2n = 32$, CHN. Russia, Far East, Primorskii Krai, Khassanskii Raion, Krabbe Peninsula, seacoast, sandy spit, 16 May 2009, *Nechaev 11353* (VLA).

Medicago lupulina L.

$2n = 16$, CHN. Russia, Far East, Primorskii Krai, Mikhailovskii Raion, W outskirts of Novo-Shakhtinsk settlement, as a weed in vegetable garden, 22 Jul 2007, *Lapenko 11446* (VLA).

Oxytropis evenorum Jurtzev & A.P. Khokhr.

** $2n = 32$, CHN. Russia, East Siberia, Republic of Sakha-Yakutia, Sette-Daban (Skalystyi) mountain ridge, riverside, on pebbles, 28 Jul 2006, *Yakubov 11766* (VLA).

Oxytropis intermedia Bunge

** $2n = 16+0-3B$, CHN. Russia, East Siberia, Republic of Tyva, riverside of Enissei River, slope nearby the watershed, desert stony steppe, 8 Aug 2007, *Yakubov 11764* (VLA).

Oxytropis lanata DC.

$2n = 16$, CHN. Russia, East Siberia, Republic of Buryatia, Pribaikal’skii Raion, the health resort “Goryachinsk”, lakeside of Baikal Lake, 17 Sep 2010, *Nakonechnaya 11765* (VLA).

Oxytropis manshurica Bunge

$2n = 16$, CHN. Russia, Far East, Primorskii Krai, Terneiskii Raion, Sikhote-Alinskii biosphere reserve, near cordon “Blagodatonoe”, 26 Aug 2010, *Pimenova 11762* (VLA).

Oxytropis strobilacea Bunge

$2n = 16$, CHN. Russia, East Siberia, Republic of Tyva, near Sesslerik village, steppe on the slope, 9 Aug 2007, *Yakubov 11763* (VLA).

Vicia hirsuta (L.) Gray

$2n = 14$, CHN. Russia, Far East, Khabarovskii Krai, outskirts of Khabarovsk city, Severnyi-2, as a weed on waste ground, 20 Jul 1999, *Probatova & Seledets 8011* (VLA).

Vicia segetalis Thuill.

$2n = 12$, CHN. Russia, Far East, Amurskaya Oblast’, Arkharinskii Raion, as a weed in Arkhara town, 14 Aug 2003, *Kudrin 9674* (VLA); Russia, Far East, Khabarovskii Krai, outskirts of Khabarovsk

city, Severnyi-2, as a weed on waste ground, 20 Jul 1999, *Probatova & Seledets 8010* (VLA).

Vicia tetrasperma (L.) Schreb.

$2n = 14$, CHN. Russia, Far East, Primorskii Krai, Mikhailovskii Raion, W outskirts of Novo-Shakhtinsk settlement, nearby the vegetable garden, 28 Jul 2008, *Lapenko 11450* (VLA).

GENTIANACEAE

Gentiana macrophylla Pall.

$2n = 26$, CHN. Russia, East Siberia, Republic of Buryatia, Tunkinskaya valley, 4 km E of Mondy settlement, 1185 m, *Pinus* and *Larix* forest edge, 31 Aug 2010, *Kazanovsky & Kossachev 11817* (VLA).

Gentianella acuta (Michx.) Hiitonen

$2n = 18$, CHN. Russia, East Siberia, Republic of Buryatia, Tunkinskaya valley, the lower course of the Belyi Irkut River, left riverside, 1552 m, *Betula*, *Populus* and *Larix* forest, 30 Aug 2010, *Kazanovsky 11822* (VLA); Russia, East Siberia, Irkutskaya Oblast', Ol'khonskii Raion, Malomorskoe lakeside of Baikal Lake, Cape Uyuga, wet meadow, 4 Sep 2010, *Krivenko 11812* (VLA).

GROSSULARIACEAE

Ribes diacantha Pall.

* $2n = 16$, CHN. Russia, East Siberia, Zabaikal'skii Krai, Ononskii Raion, 6 km W of Nizhnii Chassuchei village, right riverside of the Onon River valley, 663 m, shrub community, 5 Aug 2008, *Chepinoga & Rosbakh 11878* (VLA).

HIPPURIDACEAE

Hippuris vulgaris L.

$2n = 32$, CHN. Russia, Far East, Primorskii Krai, Terneiskii Raion, near Ternei settlement, Yaponskoe Lake, NW lakeside, 25 Aug 2004, *Nesterova 9720* (VLA).

HYDROCHARITACEAE

Hydrocharis dubia (Blume) Backer

$2n = 14$, CHN. Russia, Far East, Primorskii Krai, Khankaiskii Raion, Khanka Lake, nature reserve "Khankaiskii", sector Sosnovyi, Arsen'eva spit, in the small lake, 20 Jun 2004, *Barkalov 9290* (VLA).

HYPERICACEAE

Hypericum attenuatum Choisy

$2n = 16$, CHN. Russia, Far East, Primorskii Krai, Mikhailovskii Raion, SW outskirts of Novo-Shakhtinsk settlement, meadow, 6 Jul 2008, *Lapenko 11052* (VLA).

Hypericum maculatum Crantz

$2n = 16$, CHN. Russia, East Siberia, Irkutskaya Oblast', Sliudyanskii Raion, Khara-Murin River, lower course, 589 m, meadow, 29 Aug 2009, *Kazanovsky & Pochinchik 11947* (VLA).

JUNCAGINACEAE

Triglochin palustre L.

$2n = 24$, CHN. Russia, Far East, Primorskii Krai, in vicinity of the railway station Sovkhoznaya, the coast of Uglovoi Bay, near Prokhladnoe village, peat swamp, 3 Nov 2004, *Burkovskaya 9742* (VLA).

LAMIACEAE

Dracocephalum grandiflorum L.

$2n = 14$, CHN. Russia, East Siberia, Republic of Buryatia, Okinskii Raion, East Sayan Mts., Kitoiskii mountain ridge, in vicinity of Samarta settlement, the upper course of Kitoi River, Vassil'evskaya Mt., 2027 m, sparse *Larix* forest, 28 Aug 2010, *Kazanovsky 11860* (VLA).

Elsholtzia ciliata (Thunb.) Hyl.

$2n = 16$, CHN. Russia, East Siberia, Irkutskaya Oblast', lakeside of Baikal Lake, 17 km NE of Listvyanka settlement, near Bol'shie Koty village, the Bol'shaya Kotovka River, on pebbles, 12 Sep 2007, *Probatova & Seledets 11630* (VLA).

Leonurus japonicus Hoult.

$2n = 20$, CHN. Russia, Far East, Khabarovskii Krai, nature reserve "Bol'shehekhtsirskii", right riverside of Chirka River, on rocks near the mouth of the river, 1 Sep 1993, *Probatova & Seledets 7176* (VLA).

Lycopus lucidus Turcz. ex Benth.

$2n = 22$, CHN. Russia, Far East, Primorskii Krai, Khassanskii Raion, near Tal'mi Lake, *Carex* and *Phragmites* meadow bog, 23 Sep 2010, *Nechaev 11738* (VLA).

Nepeta cataria L.

$2n = 34$, CHN. Russia, Far East, Primorskii Krai, Anuchinskii Raion, N outskirts of Novo-Varvarovka village, near the spring, 17 Aug 2010, *Lapenko 11649* (VLA).

LILIACEAE

Lilium distichum Nakai

$2n = 24$, CHN. Russia, Far East, Amurskaya Oblast', Arkharinskii Raion, 3 km of the railway station Otrogy, Khinganskii nature reserve, Korean pine–broadleaved forest, 13 Oct 1999, *Kapustina 8114* (VLA); Russia, Far East, Primorskii Krai, Nadezhdinskii Raion, near the gardeners' society "Albatros", forest zone, Jun 2010, *Beskorovainaya 11595* (VLA).

Lilium pensylvanicum Ker Gawl.

$2n = 24+0-2B$, CHN. Russia, Far East, Amurskaya Oblast', Arkharinskii Raion, 3 km N of Arkhara town, dry meadow, 15 Aug 2001, *Kapustina 8580* (VLA).

Lilium pilosiusculum (Freyn) Miscz.

$2n = 24$, CHN. Russia, East Siberia, Republic of Buryatia, Tunkinskaya valley, the mouth of Belyi Irkut River, left riverside, 1550 m, sparse *Larix*, *Betula* and *Populus* forest, 30 Aug 2010, *Kazanovsky 11859* (VLA).

Lilium pumilum Delile

$2n = 24$, CHN. Russia, East Siberia, Republic of Buryatia, Tunkinskii Raion, near Zun-Murino village, right riverside of Margassan River, 749 m, 25 Aug 2009, *Kazanovsky 11837* (VLA).

LOBELIACEAE

Lobelia sessilifolia Lamb.

$2n = 28$, CHN. Russia, Far East, Primorskii Krai, Mikhailovskii Raion, 1.5 km SW of Novo-Shakhtinsk settlement, boggy depression by the lake, 20 Sep 2010, *Lapenko 11683* (VLA).

MELANTHIACEAE

Zigadenus sibiricus A. Gray

$2n = 32$, CHN. Russia, East Siberia, Republic of Buryatia, Okinskii Raion, East Sayan Mts., Kitoiskii mountain ridge, in vicinity of Samarta settlement, the upper course of Kitoi River, Vassil'evskaya Mt., 2195 m, stony deposits covered with mosses and lichens, 28 Aug 2010, *Kazanovsky 11852* (VLA).

NELUMBONACEAE

Nelumbo komarovii Grossh.

$2n = 16$, CHN. Russia, Far East, Amurskaya Oblast', Arkharinskii Raion, Khinganskii nature reserve, 1999, *Kudrin 8091* (VLA).

ONAGRACEAE*Chamaenerion latifolium* Sweet

$2n = 36$, CHN. Russia, East Siberia, Republic of Buryatia, Okinskii Raion, East Sayan Mts., the upper course of Oka River, right riverside, 1631 m, on sand and pebbles, 29 Aug 2010, *Kazanovsky 11835* (VLA).

PAPAVERACEAE*Chelidonium asiaticum* (Hara) Krahulc.

$2n = 10$, CHN. Russia, Far East, Khabarovskii Krai, nature reserve “Bol’shekhkhtsirskii”, right riverside of Ussuri River, *Salix* forest, 31 Aug 1993, *Probatova & Seledets 7077* (VLA); Russia, Far East, Khabarovskii Krai, Khabarovsk city, Industrial’nyi Raion, roadside, 28 Sep 2002, *Tolmacheva 8927* (VLA).

PHRYMACEAE*Phryma asiatica* (Hara) O. Deg. & I. Deg.

$2n = 28$, CHN. Russia, Far East, Khabarovskii Krai, nature reserve “Bol’shekhkhtsirskii”, right riverside of the Ussuri River, forest on the slope, 31 Aug 1993, *Probatova & Seledets 7265* (VLA).

PLANTAGINACEAE*Plantago camtschatica* Link

$2n = 12$, CHN. Russia, Far East, Primorskii Krai, Khassanskii Raion, Krabbe Peninsula, sea coast, 18 Jun 2009, *Nechaev 11393* (VLA).

Plantago depressa Willd.

$2n = 12$, CHN. Russia, East Siberia, Zabaikal’skii Krai, Mogoituskii Raion, near Ara-Ilya village, the national park “Alkhanai”, Dybyksa locality, on roadside, 21 Jul 2010, *Kazanovsky 11848* (VLA).

POACEAE*Agrostis clavata* Trin.

$2n = 42$, CHN. Russia, East Siberia, Irkutskaya Oblast’, lakeside of Baikal Lake, 17 km NE of Listvyanka, near Bol’shie Koty village, the Bol’shaya Kotovka River, on pebbles, 12 Sep 2007, *Probatova & Seledets 10786* (VLA); Russia, East Siberia, Irkutskaya Oblast’, NE lakeside of Baikal Lake, near Bol’shie Koty village, *Pinus* and *Larix* forest on the slope, 13 Sep 2007, *Probatova & Seledets 10780* (VLA); Russia, Far East, Primorskii Krai, Kirovskii Raion, in vicinity of Kirovskii settlement, *Artemisia* community, 19 Jul 2006, *Tolmacheva 11448* (VLA); Russia, Far East, Primorskii Krai, Khassanskii Raion, Tal’mi Lake, the slope of the lakeside terrace, trees and shrubs community, 12 Jun 2010, *Nechaev 11566* (VLA).

Alopecurus aequalis Sobol.

$2n = 14$, CHN. Russia, Urals Region, Sverdlovskaya Oblast’, 130 km of Ekaterinburg city, 20 km of Nizhnie Serghi town, Bardymskii nursery forest, 7 Sep 2009, *Tolkach 11506* (VLA).

Alopecurus arundinaceus Poir.

$2n = 28$, CHN. Russia, Far East, Khabarovskii Krai, Komso-mol’skii Raion, the abandoned settlement Machtovyi, Machtovaya River (the Amur River basin), grass plot on the place of destroyed buildings, 6 Aug 2005, *Barkalov 11514* (VLA).

Avenula schelliana (Hack.) W. Sauer & Chmel.

$2n = 14$, CHN. Russia, Far East, Primorskii Krai, Ussuriyskii Raion, near Alexeye-Nikol’skoe village, steppe meadow on the top of a hill, 29 May 2005, *Pavlova 9773* (VLA).

Beckmannia syzigachne (Steud.) Fernald

$2n = 14$, CHN. Russia, Far East, Amurskaya Oblast’, Oktyabr’skii Raion, 20 km of Varvarovka village, Erkovetskii open-pit mine, a bog with *Beckmannia*, 5 Sep 2000, *Denissenko 9166* (VLA); Russia, Far East, Amurskaya Oblast’, Arkharinskii Raion, 10 km S of

Kundur settlement, outskirts of Khinganskii nature reserve, Mutnaya River valley, moist depression by the road, 17 Sep 2004, *Probatova & Seledets 9471* (VLA); Russia, Far East, Primorskii Krai, Pogranichnyi Raion, near abandoned settlement Reshetnikov, along the spring-tributary of Mramornaya River, 22 Oct 1997, *Barkalov 7511* (VLA); Russia, Far East, Primorskii Krai, near Artem town, riverside of Knevichanka River, on sands, by the water, 8 Oct 1997, *Shatalova 7484* (VLA).

Bromopsis inermis (Leys.) Holub

$2n = 56$, CHN. Russia, Far East, Primorskii Krai, Vladivostok, Murav’ev-Amurskii Peninsula, Ussuriyskii Gulf, Tikhaya Bay, rocky maritime slope, *Artemisia gmelinii* community, 6 Jul 2009, *Volynets 11402* (VLA).

Calamagrostis brachytricha Steud.

$2n = 56$, CHN. Russia, Far East, Khabarovskii Krai, nature reserve “Bol’shekhkhtsirskii”, right riverside of the Ussuri River, Bashmachkovaya Hill, 165 m, light forest, 31 Aug 1993, *Probatova & Seledets 7078* (VLA).

Calamagrostis extremiorientalis (Tzvelev) Prob.

$2n = 28$, CHN. Russia, Far East, Khabarovskii Krai, nature reserve “Bol’shekhkhtsirskii”, right riverside of the Ussuri River, Cape Cherepashii, sandy bank, 1 Sep 1993, *Probatova & Seledets 7101* (VLA).

Echinochloa crusgalli (L.) P. Beauv.

$2n = 54$, CHN. Russia, East Siberia, Irkutskaya Oblast’, Kazachinsko-Lenskii Raion, near Ermaki village, roadside, in water, 6 Aug 2008, *Prelovskaya 11840* (VLA).

Echinochloa oryzoides (Ard.) Fritsch

$2n = 36$, CHN. Russia, Far East, Primorskii Krai, Khorol’skii Raion, Lugovoe, as a weed in rice field, 24 Sep 2003, *Kostyuk 9107* (VLA).

Elymus sajanensis (Nevski) Tzvelev

$2n = 28$, CHN. Russia, East Siberia, Republic of Buryatia, Okinskii Raion, East Sayan Mts., the upper course of Oka River, right riverside, 1631 m, meadow, 29 Aug 2010, *Kazanovsky 11846* (VLA).

Elymus sibiricus L.

$2n = 28$, CHN. Russia, East Siberia, Republic of Buryatia, Okinskii Raion, the route Mondy-Orlik, 14 km NW of Mondy settlement (near waterfall), 1433 m, roadside, 28 Aug 2010, *Kazanovsky 11857* (VLA).

Festuca rubra L.

$2n = 42$, CHN. Russia, Far East, Primorskii Krai, Vostok Bay, rocky coast, *Artemisia gmelinii* community, 7 May 2006, *Nechaev 10121* (VLA).

Glyceria spiculosa Roshev. ex B. Fedtsch.

$2n = 40$, CHN. Russia, Far East, Khabarovskii Krai, nature reserve “Bol’shekhkhtsirskii”, right riverside of the Ussuri River, near Cape Cherepashii, heterotrophic *Sphagnum* bog, 1 Sep 1993, *Probatova & Seledets 7085* (VLA).

Hierochloë glabra Trin.

$2n = 28$, CHN. Russia, Far East, Primorskii Krai, Khankaiskii Raion, near Turyi Rog town, sandy beach of Khanka Lake, 17 May 2010, *Nechaev 11563* (VLA); Russia, Far East, Primorskii Krai, Khorol’skii Raion, 3 km W of Kamyshovoe village, by the bog, 13 Jun 2008, *Lapenko 11024* (VLA); Russia, Far East, Primorskii Krai, Khassanskii Raion, in vicinity of Gvozdevo, meadow, 10 May 2008,

Nechaev 11039 (VLA); Russia, Far East, Primorskii Krai, Khassanskii Raion, Krabbe Peninsula, seacoast, sandy spit, 16 May 2009, *Nechaev 11350* (VLA).

Hordeum brevisubulatum Link

$2n = 28$, CHN. Russia, East Siberia, Zabaikal'skii Krai, Borzinskii Raion, 12 km E of Solovoyovsk settlement, S lakeside of Zun-Torey Lake, 597 m, 29 Jul 2008, *Chepinoga & Rosbakh 11866* (VLA).

Leymus mollis (Trin.) Pilg.

$2n = 28$, CHN. Russia, Far East, Primorskii Krai, Shkotovskii Raion, Ussuriyskii Gulf, Murav'iynaya Bay, sandy beach, 12 Jul 2008, *Nechaev 11060* (VLA).

Milium effusum L.

$2n = 28$, CHN. Russia, Far East, Amurskaya Oblast', Bureiskii Raion, botanical reserve "Irkun", valley broadleaved forest with solitary *Picea* trees, 4 Jul 2004, *Starchenko & Darman 9668* (VLA).

Ochlopoa annua (L.) H. Scholz

$2n = 28$, CHN. Russia, Urals, Sverdlovskaya Oblast', in vicinity of Ekaterinburg city, nursery garden, 3 Sep 2009, *Tolkach 11504* (VLA).

Phalaroides arundinacea (L.) Rauschert

$2n = 28$, CHN. Russia, Far East, Primorskii Krai, Shkotovskii Raion, near Shkotovo, riverside community, 15 Aug 2009, *Nechaev 11637* (VLA).

Ptilagrostis mongholica Griseb.

$2n = 22$, CHN. Russia, East Siberia, Republic of Buryatia, Okinskii Raion, East Sayan Mts., Kitoiskii mountain ridge, in vicinity of Samarta settlement, the upper course of Kitoi River, Vassil'evskaya Mt., 2195 m, stony deposits covered with mosses and lichens, 28 Aug 2010, *Kazanovsky 11831* (VLA).

Puccinellia kurilensis (Takeda) Honda

$2n = 42$, CHN. Russia, Far East, Primorskii Krai, Terneiskii Raion, Sikhote-Alinskii biosphere reserve, Abrek locality, near Yaponskoe Lake, maritime rocks, 6 Aug 2003, *Nesterova 9665* (VLA).

Puccinellia tenuiflora Scribn. & Merr.

$2n = 14$, CHN. Russia, East Siberia, Zabaikal'skii Krai, Borzinskii Raion, 5 km S of Sherlovaya Gora settlement, N lakeside of Khara-Nor Lake, 650 m, salt meadow, 28 Jun 2008, *Konovalov & Isaykina 11858* (VLA); Russia, East Siberia, Zabaikal'skii Krai, Ononskii Raion, 10 km SE of Builessan village, salt lake Tsagan-Nor, 678 m, *Puccinellia* community on the lakeside, 24 Jul 2008, *Rosbakh 11865* (VLA); Russia, East Siberia, Zabaikal'skii Krai, Ononskii Raion, 17 km SE of Ust'-Borzya village, salt lake Ekhe-Tsagan-Nor, 649 m, transition zone between *Sueda* and *Puccinellia* communities, 10 Jul 2008, *Chepinoga & Rosbakh 11867* (VLA).

Schedonorus pratensis (Huds.) P. Beauv.

$2n = 14$, CHN. Russia, Far East, Primorskii Krai, Ussuriisk town, on the territory of the former park, 13 Jul 2008, *Lapenko 11257* (VLA).

Setaria viridis (L.) P. Beauv.

$2n = 18$, CHN. Russia, Far East, Khabarovskii Krai, nature reserve "Bol'shekhkhtskii", right riverside of Ussuri River, rocks near the mouth of Chirka River, 1 Sep 1993, *Probatova & Seledets 7148* (VLA); Russia, Far East, Primorskii Krai, Nadezhdinskii Raion, railway station Baranovskii, the valley of Razdol'naya River, on the dry hill, 30 Sep 2010, *Nechaev 11686* (VLA); Russia, Far East, Primorskii Krai, Partizanskii Raion, near Nakhodka city, Brat Mt., on rocks, 14 Jun 2011, *Nechaev 11884* (VLA).

Spodiopogon sibiricus Trin.

$2n = 40$, CHN. Russia, Far East, Primorskii Krai, in vicinity of Nakhodka city, near Wrangel settlement, oak forest, 16 Jun 2009, *Kazanovsky 11378* (VLA).

Stipa capillata L.

$2n = 44$, CHN. Russia, East Siberia, Irkutskaya Oblast', Ol'khonskii Raion, near Sakhyurte village, ferry river crossing, steppe, 27 Jul 2010, *Krivenko 11829* (VLA).

Tripogon chinensis Hack.

$2n = 20$, CHN. Russia, East Siberia, Zabaikal'skii Krai, Borzinskii Raion, 17 km W of Sherlovaya Gora settlement, central part of the mountain massif Adun-Chelon, the top of a hill nearby Tsagan-Obo Mt., 954 m, on rocks, 2 Aug 2008, *Chepinoga & al. 11868* (VLA).

Trisetum sibiricum Rupr.

$2n = 14$, CHN. Russia, Far East, Primorskii Krai, Nadezhdinskii Raion, 4 km E of Baranovskii railway station, in forest, 13 Jul 2008, *Lapenko 11231* (VLA).

Trisetum umbratile (Kitag.) Kitag.

$2n = 14$, CHN. Russia, Far East, Primorskii Krai, Murav'ev-Amurskii Peninsula, near Murav'inaya (Tavaiza) Bay, nature monument "Chernopikhtarnik", the valley of Murav'inyi spring, moist forest, 21 Oct 2004, *Probatova & Seledets 9605* (VLA).

POLEMONIACEAE

Polemonium boreale Adams

$2n = 18$, CHN. Russia, Far East, Kamchatskii Krai, Kamchatka Peninsula, Ust'-Kamchatskii Raion, Ploskii Tolbachik Volcano, on volcanic scoria field, 4 Aug 2009, *Barkalov 11554* (VLA).

POLYGONACEAE

Persicaria maculosa Gray

$2n = 40$, CHN. Russia, East Siberia, Irkutskaya Oblast', Ussol'skii Raion, middle course of Toissuk River, near Talyany settlement, along the riverside, 19 Jul 2002, *Prudnikova 10512* (VLA); Russia, Far East, Evreiskaya Avtonomnaya Oblast', Obluchenskii Raion, railway station Obluch'e, on the railway road, 21 Sep 2007, *Probatova & Seledets 11092* (VLA).

Rheum compactum L.

$2n = 22$, CHN. Russia, East Siberia, Zabaikal'skii Krai, Aghinskii Buryatskii natsional'nyi okrug, Dul'durghinskii Raion, the national park "Alkhanai", Alkhanai rivulet, 1364 m, *Larix* forest with *Calamagrostis*, on stony deposits, 22 Jul 2010, *Kazanovsky 11834* (VLA).

Rumex stenophyllus Ledeb.

$2n = 60$, CHN. Russia, Far East, Primorskii Krai, in vicinity of the railway station Sovkhoznaya, near Prokhladnoe village, the coast of Uglovoi Bay, 10 m from water's edge, 3 Nov 2004, *Burkovskaya 9798* (VLA).

POTAMOGETONACEAE

Potamogeton maackianus A. Benn.

$2n = 26$, CHN. Russia, Far East, Primorskii Krai, Mikhailovskii Raion, near Mikhailovka village, the riverside of Rep'ovka River (tributary of Rakovka River, the Suifun River basin), 5 Jul 1998, *Shatalova 7681* (VLA).

PRIMULACEAE

Primula farinosa L.

$2n = 18$, CHN. Russia, Far East, Primorskii Krai, Partizanskii Raion, Alexeevskii mountain ridge, Ol'khovaya Mt., on the spots of melkozem, 1600 m, 10 Sep 2010, *Barkalov 11664* (VLA).

Primula nivalis Pall.

$2n = 22$, CHN. Russia, East Siberia, Republic of Buryatia, Okinskii Raion, East Sayan Mts., Kitoyskii mountain ridge, in vicinity of Samarta settlement, the upper course of Kitoi River, 1889 m, shrubs community, 28 Aug 2010, *Kazanovsky 11862* (VLA).

RANUNCULACEAE*Aconitum kusnezoffii* Rechb.

$2n = 16$, CHN. Russia, Far East, Amurskaya Oblast', Arkharinskii Raion, Khinganskii nature reserve, 23 Sep 2000, *Kudrin 8418* (VLA).

Aquilegia oxysepala Trautv. & Mey.

$2n = 16$ (2 sat.), CHN. Russia, Far East, Amurskaya Oblast', Arkharinskii Raion, Khinganskii nature reserve, 23 Sep 2000, *Kudrin 8416* (VLA).

Arsenjevia glabrata (Maxim.) Starod.

** $2n = 21$, CHN. Russia, Far East, Primorskii Krai, Amurskii Bay, Cape Peschanyi (opposite Vladivostok city), valley forest, 3 Jun 2006, *Pavlova 10200* (VLA).

Delphinium crassifolium Schrad. ex Spreng.

$2n = 16$, CHN. Russia, East Siberia, Republic of Buryatia, Tunkinskaya valley, the lower course of Belyi Irkut River, left riverside, 1552 m, *Betula*, *Populus* and *Larix* forest, 30 Aug 2010, *Kazanovsky 11844* (VLA).

Halerpestes sarmentosa (Adams) Komarov

$2n = 16$, CHN. Russia, Far East, Primorskii Krai, in vicinity of the railway station Sovkhoznyaya, Uglovoi Bay, near Prokhladnoe village, salt silty beach, 30 m of water's edge, 13 Sep 2005, *Voronkova 9968* (VLA).

Paraquilegia microphylla J.R. Drumm. & Hutch.

$2n = 14$, CHN. Russia, East Siberia, Republic of Buryatia, Tunkinskaya valley, the lower course of Belyi Irkut River, right riverside, 1639 m, moss-covered shady rocks, 30 Aug 2010, *Kazanovsky 11783* (VLA).

Ranunculus acris L. sl.

$2n = 28$, CHN. Russia, Far East, Khabarovskii Krai, Ul'chskii Raion, De-Castri settlement, grass-plot by the road, 3 Aug 2005, *Barkalov 9894* (VLA).

Ranunculus grandis Honda

$2n = 28$, CHN. Russia, Far East, Primorskii Krai, Ussuriiskii Raion, Borissovka (Shufan) River, near abandoned settlement Puschino, on pebbles, 11 Jul 2005, *Barkalov 9838* (VLA).

Ranunculus cf. *scleratus* L.

$2n = 56$, CHN. Russia, Far East, Primorskii Krai, Khankaiskii Raion, Khanka Lake, nature reserve "Khankaiskii", sector Sosnovyi, Przheval'skogo Peninsula, sandy spit, moist plots, 26 May 2002, *Barkalov 8795* (VLA).

Thacla natans (Pall.) Deyl & Soják

$2n = 32$, CHN. Russia, Far East, Primorskii Krai, Terneiskii Raion, Sikhote-Alinskii biosphere reserve, NE part of Golubichnoye Lake, lakeside, 13 Oct 2010, *Nesterova 11701* (VLA); Russia, Far East, Primorskii Krai, Nadezhdinskii Raion, 10 km of Vol'no-Nadezhdinskoe settlement, near Yasnoye, 5 Jul 1998, *Barkalov 7686* (VLA).

Thalictrum petaloideum L.

$2n = 14$, CHN. Russia, East Siberia, Zabaikal'skii Krai, Borzinskii Raion, Daurinskii nature reserve, mountain-steppe massif

Adun-Chelon, 919 m, *Agropyron* steppe, 17 Jul 2010, *Kazanovsky 11828* (VLA).

ROSACEAE*Aruncus asiaticus* Pojark.

$2n = 18$, CHN. Russia, Far East, Primorskii Krai, in vicinity of Nakhodka city, near Wrangel settlement, oak forest, 16 Jun 2009, *Kazanovsky 11373* (VLA).

Potentilla centigrana Maxim.

$2n = 14$, CHN. Russia, Far East, Primorskii Krai, Nadezhdinskii Raion, 10 km of Vol'no-Nadezhdinskoe settlement, near Yasnoye village, moist clearing, 5 Jul 1998, *Barkalov 7682* (VLA).

Potentilla chinensis Ser.

$2n = 14$, CHN. Russia, Far East, Primorskii Krai, Nadezhdinskii Raion, near Razdol'noye railway station, S slope, shrub community, 2 Jul 2005, *Nechaev 9812* (VLA); Russia, Far East, Primorskii Krai, Nadezhdinskii Raion, near Tavrichanka settlement, on the coast of Amurskii Bay, 19 Jun 2004, *Nechaev 9283* (VLA).

Potentilla fragarioides L.

$2n = 14$, CHN. Russia, Far East, Primorskii Krai, Dal'negorskii Raion, near Rudnaya Pristan', nature monument "Vulkan Brinnera", stony abrupt W slope, 24 Sep 2005, *Seledets 9983* (VLA); Russia, Far East, Primorskii Krai, Partizanskii Raion, 3 km of Mel'niki village, Mel'niki River (tributary of Partizanskaya River), Kievskii Spring, abrupt slope, 20 May 2007, *Nechaev 10565* (VLA); Russia, Far East, Primorskii Krai, in vicinity of Nakhodka city, Wrangel settlement, oak forest, 16 Jun 2009, *Kazanovsky 11374* (VLA); Russia, Far East, Primorskii Krai, Shkotovskii Raion, Sukhodol Bay, near Bol'shoi Kamen' settlement, sandy coast, 21 Jun 2008, *Nechaev 11007* (VLA).

Potentilla norvegica L.

$2n = 56$, CHN. Russia, Far East, Khabarovskii Krai, Komso-mol'skii Raion, the abandoned settlement Machtovyi, Machtovaya River (the Amur River basin), along the country road, 6 Aug 2005, *Barkalov 11516* (VLA).

Potentilla supina L.

$2n = 28$, CHN. Russia, East Siberia, Republic of Buryatia, Zakamenskii Raion, near Mikhailovka village, left riverside of Dzhida River, 855 m, on pebbles, 15 Jul 2009, *Kazanovsky & Verkhovina 11655* (VLA); Russia, Far East, Amurskaya Oblast', the railway station Erofei Pavlovich, on railroad embankment, 5 Sep 2004, *Probatova & Seledets 9372* (VLA); Russia, Far East, Primorskii Krai, Khankaiskii Raion, nature reserve "Khankaiskii", Sosnovyi Isl., sandbank, 27 Jul 2002, *Barkalov 8858* (VLA); Russia, Far East, Primorskii Krai, Khankaiskii Raion, Khanka Lake, nature reserve "Khankaiskii", sector Sosnovyi, Kazachii Bay, moist sandy beach, 18 Jun 2004, *Barkalov 9659* (VLA); Russia, Far East, Primorskii Krai, Partizanskii Raion, in vicinity of Volchanets settlement, Vostok Bay, near the mouth of a rivulet, sandy beach, 26 Jul 2006, *Nechaev 10478* (VLA).

Potentilla tergemina Soják

$2n = 28$, CHN. Russia, East Siberia, Republic of Buryatia, Selenginskii Raion, 4 km of Gussinozersk town, Tabkhor River, 536 m, stony steppe, 12 Jul 2009, *Kazanovsky & Verkhovina 11751* (VLA).

Potentilla tranzschelii Juz. (*P. rugulosa* auct.)

$2n = 14$, CHN. Russia, Far East, Primorskii Krai, Anuchinskii Raion, 2 km S of Staro-Varvarovka village, on the rocks, by the road, 3 Jun 2010, *Yakubov 11592* (VLA); Russia, Far East, Primorskii Krai, Lazovskii Raion, the upper course of Elomovskii Spring, on the rocks, by waterfall, 19 Aug 2010, *Barkalov 11650* (VLA); Russia, Far East, Primorskii Krai, Murav'ev-Amurskii Peninsula, in vicinity of Sedanka

railway station, rocks on the top of a hill, 5 Aug 2007, *Nechaev 10662* (VLA).

RUBIACEAE

Galium maximowiczii (Kom.) Pobed.

$2n = 22$, CHN. Russia, Far East, Primorskii Krai, in vicinity of Nakhodka city, near Wrangel settlement, oak forest, 16 Jun 2009, *Kazanovsky 11384* (VLA).

SALICACEAE

Salix abscondita Laksch.

* $2n = 38$, CHN. Russia, Far East, Primorskii Krai, outskirts of Ussuriisk city, "Voskhod", on the slope of a hill, shrub community, 13 Mar 2011, *Barkalov 11795* (VLA).

Salix integra Thunb.

$2n = 38$, CHN. Russia, Far East, Primorskii Krai, outskirts of Ussuriisk city, "Voskhod", in a ravine, by the rivulet, 13 Mar 2011, *Barkalov 11800* (VLA).

Salix nipponica Franch. & Sav.

* $2n = 38$, CHN. Russia, Far East, Primorskii Krai, Vladivostok, Muravëv-Amurskii Peninsula, outskirts of Akademgorodok, near motor-transport depot, by the rivulet, 7 Mar 2011, *Barkalov 11787* (VLA).

Salix pierotii Miq.

* $2n = 38$, CHN. Russia, Far East, Primorskii Krai, outskirts of Ussuriisk city, "Voskhod", in a ravine, by the rivulet, 13 Mar 2011, *Barkalov 11799* (VLA).

Salix rorida Laksch.

$2n = 38$, CHN. Russia, Far East, Primorskii Krai, Vladivostok, Muravëv-Amurskii Peninsula, near "Zarya" factory, on the slope of a ravine, 7 Mar 2011, *Barkalov 11788* (VLA).

Salix schwerinii E.L. Wolf

$2n = 38$, CHN. Russia, Far East, Primorskii Krai, Vladivostok, Muravëv-Amurskii Peninsula, on the way to Akademgorodok, near motor-transport depot, the valley of a rivulet, 7 Mar 2011, *Barkalov 11777* (VLA); Russia, Far East, Primorskii Krai, Vladivostok, Muravëv-Amurskii Peninsula, near "Zarya" factory, in a ravine, by the rivulet, 7 Mar 2011, *Barkalov 11786* (VLA).

Salix siuzevii Seemen

** $2n = 38$, CHN. Russia, Far East, Primorskii Krai, outskirts of Ussuriisk city, "Voskhod", waterlogged plot at the lower part of a slope, 13 Mar 2011, *Barkalov 11794* (VLA); Russia, Far East, Primorskii Krai, Vladivostok, Muravëv-Amurskii Peninsula, Akademgorodok, near motor-transport depot, by the rivulet, 7 Mar 2011, *Barkalov 11785* (VLA).

Salix taraiensis Kimura

* $2n = 38$, CHN. Russia, Far East, Primorskii Krai, outskirts of Ussuriisk city, "Voskhod", on the slope of a hill, shrub community, 13 Mar 2011, *Barkalov 11797* (VLA).

SAXIFRAGACEAE

Saxifraga calycina Sternb.

$2n = 24$, CHN. Russia, Far East, Kamchatskii Krai, Kamchatka Peninsula, central part, Ostryi Tolbachik Volcano, S slope, 1200 m, mountain tundra, moist place, 23 Aug 2000, *Yakubov 8423* (VLA).

Saxifraga cherlerioides D. Don

$2n = 26$, CHN. Russia, Far East, Kamchatskii Krai, Kamchatka Peninsula, central part, S foothills of the Ostryi Tolbachik Volcano, near S break, *Larix* forest belt, in a small crater, on lava, 25 Aug 2000, *Yakubov 8430* (VLA).

Saxifraga nelsoniana D. Don

$2n = 60$, CHN. Russia, Far East, Kamchatskii Krai, Kamchatka Peninsula, central part, S slope of the Ostryi Tolbachik Volcano, the bank of Vodopadnyi brook, on moist lava, 26 Aug 2000, *Yakubov 8424* (VLA).

SCROPHULARIACEAE

Chaenorhinum minus (L.) Lange

$2n = 14$, CHN. Russia, East Siberia, Republic of Buryatia, Kabanskii Raion, the railway station Rechka Vydrinaya, left riverside of Vydrinaya River, near the mouth, 454 m, ruderal community under the railway bridge, 4 Aug 2010, *Kazanovsky 11757* (VLA).

Linaria japonica Miq.

$2n = 12$, CHN. Russia, Far East, Khabarovskii Krai, Ul'chskii Raion, De-Castri settlement, tuff coastal rocks, 23 Aug 2004, *Yermoshkin 10497* (VLA).

Linaria vulgaris Mill.

$2n = 12$, CHN. Russia, Far East, Primorskii Krai, Mikhailovskii Raion, W outskirts of Novo-Shakhtinsk settlement, on the railway embankment, 29 Jul 2007, *Lapenko 10660* (VLA).

Pedicularis oederi Vahl

$2n = 16$, CHN. Russia, East Siberia, Republic of Buryatia, Okinskii Raion, East Sayan Mts, the upper course of Oka River, right riverside, 1873 m, swampy meadow, 29 Aug 2010, *Kazanovsky 11838* (VLA).

Pedicularis resupinata L.

$2n = 16$, CHN. Russia, East Siberia, Irkutskaya Oblast', Sl'udyanskii Raion, near Sl'udyanka town, 538 m, lowland birch bog, 30 Aug 2009, *Pochinchik 11698* (VLA).

Pedicularis rubens Stephan ex Willd.

$2n = 16$, CHN. Russia, East Siberia, Republic of Buryatia, Tunkinskii Raion, the lower course of Belyi Irkut River, left riverside, 1554 m, *Larix* and *Populus* valley forest, 30 Aug 2010, *Kazanovsky & Prelovskaya 11827* (VLA).

Pedicularis striata Pall.

* $2n = 16$, CHN. Russia, East Siberia, Republic of Buryatia, Tunkinskii Raion, near Turan village, 906 m, light *Larix* and *Pinus* forest with *Caragana arborescens*, 28 Aug 2009, *Kazanovsky 11850* (VLA).

Pedicularis tristis L.

$2n = 16$, CHN. Russia, East Siberia, Republic of Buryatia, Okinskii Raion, East Sayan Mts., Kitoiskii mountain ridge, in vicinity of Samarta settlement, the upper course of Kitoi River, 1889 m, shrub community, 28 Aug 2010, *Kazanovsky 11851* (VLA).

VACCINIACEAE

Vaccinium uliginosum L.

$2n = 24$, CHN. Russia, East Siberia, Republic of Buryatia, Okinskii Raion, East Sayan Mts., Kitoiskii mountain ridge, in vicinity of Samarta settlement, the upper course of Kitoi River, Vassil'evskaya Mt., 2195 m, upper mountain belt, *Juniperus pseudosabina* thickets on stony places, 28 Aug 2010, *Kazanovsky 11855* (VLA).

VALERIANACEAE

Valeriana transjensis Kreyer

$2n = 42$, CHN. Russia, East Siberia, Zabaikal'skii Krai, Mo-goituyskii Raion, near Ara-Ilya village, the national park "Alkhanai", Dybyksa locality, riverside *Salix* community, 21 Jul 2010, *Kazanovsky 11810* (VLA).

VIOLACEAE*Viola acuminata* Ledeb.

$2n = 20$, CHN. Russia, Far East, Primorskii Krai, in vicinity of Nakhodka city, near Wrangel settlement, oak forest, 16 Jun 2009, *Kazanovsky 11372* (VLA).

Viola alisoviana Kiss

$2n = 48$, CHN. Russia, Far East, Primorskii Krai, Khankaikskii Raion, Khanka Lake, nature reserve “Khankaikskii”, sector Sosnovyi, Kazachii Bay, dry slope, 18 Jun 2004, *Barkalov 9285* (VLA).

Viola arenaria DC.

$2n = 20$, CHN. Russia, Russia, East Siberia, Irkutskaya Oblast', Ust'-Ordynskii Buryatskii Okrug, Ossinskii Raion, near Prokhorovka village, 507 m, grassland steppe, 25 Jun 2010, *Kazanovsky 11836* (VLA).

Viola collina Besser

$2n = 20$, CHN. Russia, Far East, Primorskii Krai, Partizanskii Raion, Vostok Bay, on the slope covered with broadleaved forest, at the edge of a clay scree, 8 May 2006, *Nechaev 10115* (VLA); Russia, Far East, Primorskii Krai, Vladivostok, Muravëv-Amurskii Peninsula, near the railway platform Chaika, on the slope, 13 Apr 2007, *Kapustina 10528* (VLA).

Viola epipsiloides Á. Löve & D. Löve

$2n = 24$, CHN. Russia, Far East, Khabarovskii Krai, SW of Lazarev settlement, Chërnaya River, *Salix* community along the riverside, 5 Aug 2005, *Barkalov 9898* (VLA).

Viola variegata Fisch. ex Link

$2n = 24$, CHN. Russia, Far East, Primorskii Krai, Ussuriyskii Raion, nature reserve “Ussuriyskii”, Zmeinaya Hill, stony slope covered with forest, 14 May 2004, *Barkalov 9185* (VLA); Russia, Far East, Primorskii Krai, Oktyabr'skii Raion, near Novo-Georgievka village, the valley of Suifun River, 8 Jul 2009, *Nechaev 11413* (VLA).

Viola xanthopetala Nakai

$2n = 12$, CHN. Russia, Far East, Primorskii Krai, Partizanskii Raion, the coast of Vostok Bay, oak forest, 7 May 2006, *Nechaev 10112* (VLA).

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* First chromosome count for the species.

** New chromosome number (cytotype) for the species.

▼ First chromosome count from an Indian accession.

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APIACEAE*Chaerophyllum capnoides* Benth. & Hook. f.

$n = 11$, CHN. India, Himachal Pradesh, Kangra, Chhota Bhangal, 32°02'N, 76°50'E, 2300 m, 05 May 2009, *Savita Rani SR 25002* (PUN 52718) [Fig. 23A].

Heraclium brunonis Benth. ex C.B. Clarke

* $n = 11$, CHN. India, Himachal Pradesh, Kangra, Patti, 32°13'N, 76°10'E, 900 m, 05 May 2009, *Savita Rani SR 27760* (PUN 55199) [Fig. 23B].

BALSAMINACEAE*Impatiens arguta* Hook. f. & Thomson

** $n = 7$, CHN. India, Himachal Pradesh, Kangra, Bara-Gran, 32°14'N, 76°20'E, 3000 m, along the slopes, 27 Jul 2009, *Savita Rani SR 24893* (PUN 52568) [Fig. 23C].

Previous reports for this species comprise $2n = 12$ (Chatterjee & Sharma, 1970), $2n = 18$ (Akiyama & al., 1996) and $2n = 20$ (Sugawara & al., 1994).

Impatiens brachycentra Kar. & Kir.

** $n = 8$, CHN. India, Himachal Pradesh, Kangra, Chhota Bhangal, 32°02'N, 76°50'E, 2022 m, near waste places, 26 Aug 2009, *Savita Rani SR 24888* (PUN 52560) [Fig. 23D].

Previously the chromosome number $2n = 14$ was reported for this species from India (Bhat & al., 1975) as well from outside of India (Khattoon, 1991).

Impatiens glandulifera Royle

** $n = 6$, CHN. India, Himachal Pradesh, Kangra, Bara-Gran, 32°14'N, 76°20'E, 2500 m, along water springs, 26 Jul 2009, *Savita Rani SR 24890* (PUN 52564) [Fig. 23E].

Previously, diploid cytotypes $2n = 18$ from outside of India (Dobeš & al., 1997) and $2n = 20$ from India (Chinappa & Gill, 1974) were reported for this species.

Impatiens reidii Hook. f.

* $n = 7$, CHN. India, Himachal Pradesh, Kangra, Chhota Bhangal, 32°02'N, 76°50'E, 2300 m, near water fall, 30 Jul 2009, *Savita Rani SR 24891* (PUN 52565) [Fig. 23F].

Impatiens scabrida DC.

** $n = 6$, CHN. India, Himachal Pradesh, Kangra, Chhota Bhangal, 32°02'N, 76°50'E, 2022 m, moist places, 29 Jul 2009, *Savita Rani SR 24894* (PUN 52571) [Fig. 23G].

Previous reports for this species include $2n = 14$ (Akiyama & al., 1992) and $2n = 18$ (Chatterjee & Sharma, 1970), and $2n = 20$ (Khoshoo, 1955).

BERBERIDACEAE*Berberis ceratophylla* G. Don

* $n = 14$, CHN. India. Himachal Pradesh, Kangra, Chhota Bhangal, 32°02'N, 76°50'E, 2300 m, along the slopes, 24 May 2010, *Savita Rani SR 27844* (PUN 55080) [Fig. 23H].

BRASSICACEAE*Barbarea vulgaris* W.T. Aiton

▼ $n = 8$, CHN. India, Himachal Pradesh, Kangra, Chhota Bhangal, 32°02'N, 76°50'E, 2300 m, on the open slopes, 06 Jun 2009, *Savita Rani SR 25035* (PUN 52796) [Fig. 23I].

The current report agrees with the previous ones of $2n = 16$ (e.g., Albers & Pröbsting, 1998) from outside of India.

Capsella bursa-pastoris (L.) Medik.

▼ $n = 8$, CHN. India, Himachal Pradesh, Kangra, Chhota Bhangal, 32°02'N, 76°50'E, 2300 m, 04 May 2010, *Savita Rani SR 25007* (PUN 52722) [Fig. 23J].

The current report is in agreement with the previous ones of $2n = 16$ (Khattoon, 1991; Neuffer & Eschner, 1995; Aksoy & al., 1999; Runemark, 2000) from outside of India.

Thlaspi alpestre L.

▼ $n = 7$, CHN. India, Himachal Pradesh, Kangra, Bara-Gran, 32°14'N, 76°20'E, 3000 m, 05 Jun 2009, *Savita Rani SR 25031* (PUN 52742) [Fig. 23K].

The current report agrees with the previous ones of $2n = 14$ (Gadella & Kliphuis, 1966; Holmgren, 1971) from outside of India.

CARYOPHYLLACEAE*Silene conoidea* L.

** $n = 20$, CHN. India, Himachal Pradesh, Kangra, Ranear, 32°13'N, 76°10'E, 800 m, along road sides, 03 Mar 2010, *Savita Rani SR 26971* (PUN 54450) [Fig. 23L].

Previous reports for this species comprise $2n = 20$ (Khoshoo, 1960) and $2n = 24$ (Blackburn, 1928).

CRASSULACEAE*Sedum trifidum* Wall.

* $n = 18$, CHN. India, Himachal Pradesh, Kangra, Triund, 32°16'N, 76°22'E, 3000 m, on the rocky slopes, 06 Aug 2010, *Savita Rani SR 27830* (PUN 55122) [Fig. 23M].

FABACEAE*Astragalus hamosus* L.

▼ $n = 8$, CHN. India, Himachal Pradesh, Kangra, Chhota Bhangal, 32°02'N, 76°50'E, 2300 m, in moist places, 07 Aug 2010, *Savita Rani SR 25026* (PUN 52737) [Fig. 23N].

The current count agrees with the previous report of $2n = 16$ (Maassoumi, 1987) from outside of India.

Astragalus ladakensis N.P. Balakr.

** $n = 8$, CHN. India, Himachal Pradesh, Kangra, Chhota Bhangal, 32°02'N, 76°50'E, 2300 m, in moist places, 07 Aug 2010, *Savita Rani SR 24700* (PUN 52710) [Fig. 23O].

The species is previously reported to have $2n = 32$ (Gu & Sun, 1996).

Caragana pygmaea (L.) DC.

▼ $n = 8$, CHN. India, Himachal Pradesh, Kangra, Triund, 32°16'N 76°22'E, 3000 m, on the rocky slopes, 06 May 2010, *Savita Rani SR 27817* (PUN 55195) [Fig. 23P].

The species is previously reported to have $2n = 16$ (Frahm-Lelivela, 1962; Měšiček & Soják, 1995) from outside of India.

Desmodium retusum G. Don

▼ $n = 11$, CHN. India, Himachal Pradesh, Kangra, Patti, 32°13'N, 76°10'E, 900 m, shady places, 19 Sep 2010, *Savita Rani SR 27823* (PUN 55201) [Fig. 23Q].

The current report agrees with the previous one of $2n = 22$ (Manandhar & Sakya, 2003) from outside of India.

Indigofera hamiltonii Graham

* $n = 8$, CHN. India, Himachal Pradesh, Kangra, Chhota Bhangal, 32°02'N, 76°50'E, 2300 m, on open slopes, 23 Jun 2010, *Savita Rani SR 27842* (PUN 55078) [Fig. 23R].

Lespedeza cuneata G. Don

▼ $n = 10$, CHN. India, Himachal Pradesh, Kangra, Patti, 32°13'N, 76°10'E, 900 m, on moist and shady places, 04 Nov 2010, *Savita Rani SR 27816* (PUN 55200) [Fig. 23S].

The current report agrees with the previous one of $2n = 20$ (Lee, 1969; Clewell, 1971; Hill, 1989) from outside of India.

FUMARIACEAE*Corydalis meifolia* Wall.

* $n = 8$, CHN. India, Himachal Pradesh, Kangra, Lohadari, 32°01'N, 76°60'E, 1600 m, on moist and shady places, 07 Aug 2010, *Savita Rani SR 27836* (PUN 55202) [Fig. 23T].

Corydalis thyrsoiflora Prain

* $n = 8$, CHN. India, Himachal Pradesh, Kangra, Lohadari, 32°01'N, 76°60'E, 1600 m, on moist and shady places, 07 Aug 2010, *Savita Rani SR 27835* (PUN 55128) [Fig. 23U].

GERANIACEAE*Geranium pratense* L.

** $n = 13$, CHN. India, Himachal Pradesh, Kangra, Chhota Bhangal, 32°02'N, 76°50'E, 2300 m, in shady and moist places, 06 Jun 2010, *Savita Rani SR 27858* (PUN 55094) [Fig. 23V].

The species is previously known to possess $2n = 24$ (Tjebbes, 1928; Tischler, 1934) and $2n = 28$ (Zhukova, 1967; Chaterjee & Sharma, 1970).

Geranium wallichianum D. Don

** $n = 28$, CHN. India, Himachal Pradesh, Kangra, Chhota Bhangal, 32°02'N, 76°50'E, 2300 m, 6 Jun 2010, *Savita Rani SR 25021* (PUN 52734) [Fig. 23W].

The species is previously known to possess $2n = 26$ (Chaterjee & Sharma, 1970; Roy & al., 1988) and $2n = 28$ (Warburg, 1938).

Pelargonium hortorum L.H. Bailey

** $n = 18$, CHN. India, Himachal Pradesh, Kangra, Chhota Bhangal, 32°02'N, 76°50'E, 2300 m, 06 Jun 2010, *Savita Rani SR 25028* (PUN 52739) [Fig. 23X].

The species is previously known to possess $2n = 18$ (Chaterjee & Sharma, 1970) and $2n = 20, 24, 30, 34$ (Chaterjee & Sharma, 1970).

HYPERICACEAE*Hypericum dyeri* Rehder

** $n = 9$, CHN. India, Himachal Pradesh, Kangra, Biching, 32°01'N, 76°55'E, 2200 m, along the slopes, 06 Jun 2010, *Savita Rani SR 26709* (PUN 54300) [Fig. 24A].

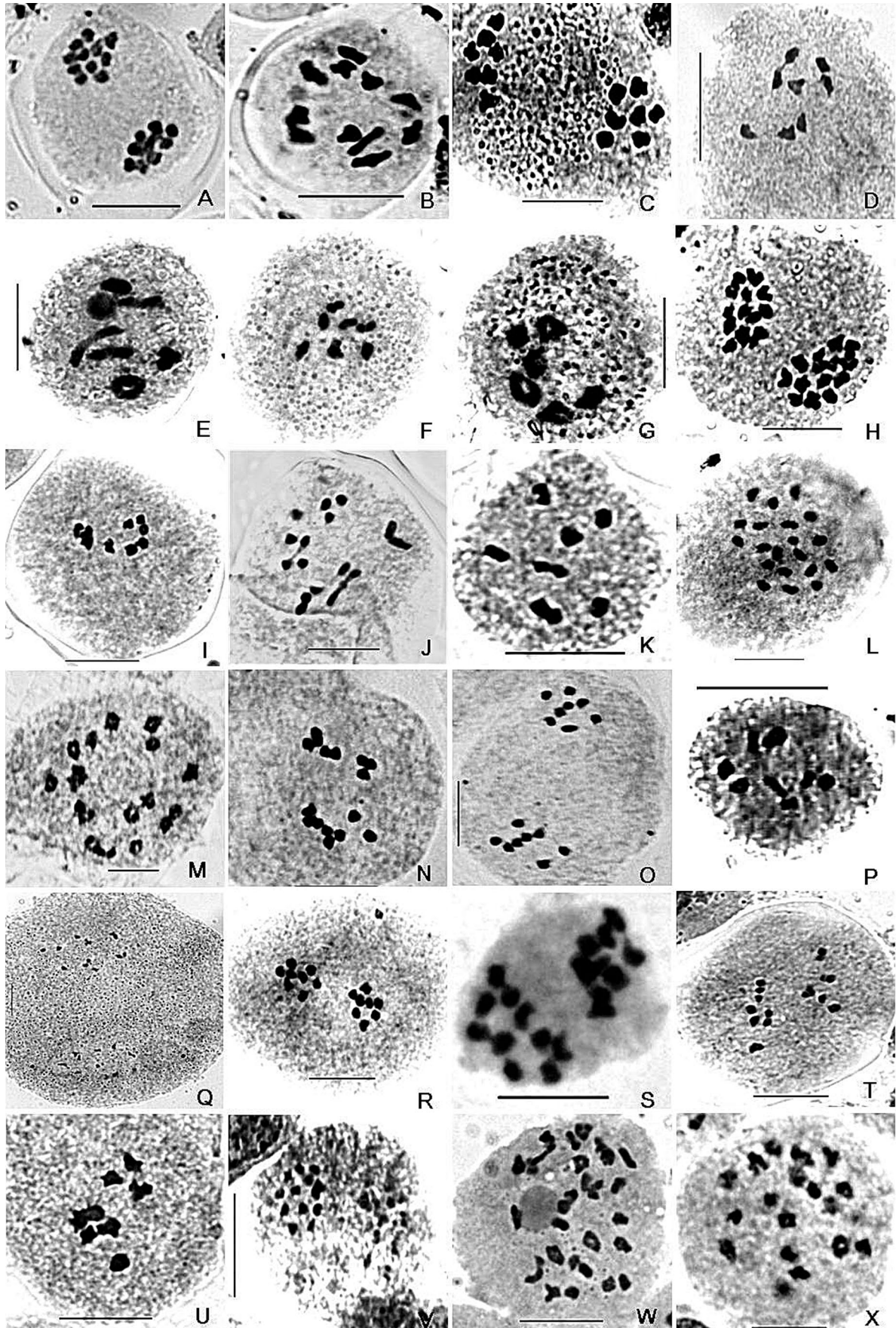
Mehra & Sareen (1969) previously reported $2n = 20$ for the species.

OXALIDACEAE*Oxalis corymbosa* DC.

▼ $n = 7$, CHN. India, Himachal Pradesh, Kangra, Tal-mata, 32°14'N, 76°12'E, 1400 m, on shady places, 06 May 2009, *Savita Rani SR 25027* (PUN 52738) [Fig. 24B].

The current chromosome number report is in agreement with the previous one of $2n = 14$ (Naranjo & al., 1982; Xu & al., 1992) from outside India.

Fig. 23. A, *Chaerophyllum capnoides*, PMC at anaphase I, $n = 11$ (PUN 52718); **B**, *Heracleum brunonis*, PMC at metaphase I, $n = 11$ (PUN 55199); **C**, *Impatiens arguta*, PMC at anaphase I, $n = 7$ (PUN 52568); **D**, *Impatiens brachycentra*, PMC at metaphase I, $n = 8$ (PUN 52560); **E**, *Impatiens glandulifera*, PMC at diakinesis, $n = 6$ (PUN 52564); **F**, *Impatiens reidii*, PMC at metaphase I, $n = 7$ (PUN 52565); **G**, *Impatiens scabrida*, PMC at metaphase I, $n = 6$ (PUN 52571); **H**, *Berberis ceratophylla*, PMC at anaphase I, $n = 14$ (PUN 55080); **I**, *Barbarea vulgaris*, PMC at metaphase I, $n = 8$ (PUN 52796); **J**, *Capsella bursa-pastoris*, PMC at metaphase I, $n = 8$ (PUN 52722); **K**, *Thlaspi alpestre*, PMC at metaphase I, $n = 7$ (PUN 52742); **L**, *Silene conoidea*, PMC at metaphase I, $n = 20$ (PUN 54450); **M**, *Sedum trifidum*, PMC at metaphase I, $n = 18$ (PUN 55122); **N**, *Astragalus hamosus*, PMC at anaphase I, $n = 8$ (PUN 52737); **O**, *Astragalus ladakensis*, PMC at anaphase I, $n = 8$ (PUN 52710); **P**, *Caragana pygmaea*, PMC at metaphase I, $n = 8$ (PUN 55195); **Q**, *Desmodium retusum*, PMC at anaphase I, $n = 11$ (PUN 55201); **R**, *Indigofera hamiltonii*, PMC at anaphase I, $n = 8$ (PUN 55078); **S**, *Lespedeza cuneata*, PMC at anaphase I, $n = 10$ (PUN 55200); **T**, *Corydalis meifolia*, PMC at anaphase I, $n = 8$ (PUN 55202); **U**, *Corydalis thyrsoiflora*, PMC at metaphase I, $n = 8$ (PUN 55128); **V**, *Geranium pratense*, PMCat anaphase I, $n = 13$ (PUN 55094); **W**, *Geranium wallichianum*, PMC at diakinesis, $n = 28$ (PUN 52734); **X**, *Pelargonium hortorum*, PMC at metaphase I, $n = 18$ (PUN 52739). Scale = 10 μm .



PAPAVERACEAE*Argemone mexicana* L.

** $n = 7$, CHN. India, Himachal Pradesh, Kangra, Dehra, 31°52'N, 76°12'E, 530 m, everywhere, 07 Jun 2009, *Savita Rani SR 25032* (PUN 52743) [Fig. 24C].

The species is previously known to possess $2n = 28$ (Safonova, 1991) and $2n = 112$ (Diers, 1961).

RANUNCULACEAE*Anemone obtusiloba* D. Don

** $n = 7 + 4B$, CHN. India, Himachal Pradesh, Kangra, Triund, 32°16'N, 76°22'E, 3000 m, on the rocky slopes, 05 Jun 2010, *Savita Rani SR 26744* (PUN 54472) [Fig. 24D].

Other reports for this species include $2n = 14$ (Bhattarai, 1989; Bhat & al., 1972), $2n = 16$ (Bhattacharjee & Sharma, 1980), and $2n = 26$ (Mehra & Remanandan, 1972).

Aquilegia pubiflora Wall.

▼ $n = 7$, CHN. India, Himachal Pradesh, Kangra, Triund, 32°16'N, 76°22'E, 3000 m, on the slopes, 05 Jun 2010, *Savita Rani SR 26738* (PUN 54466) [Fig. 24E].

The current chromosome number count agrees with the previous one of $2n = 14$ (Friesen, 1991) from outside of India.

Clematis grata Wall.

** $n = 8 + 1B$, CHN. India, Himachal Pradesh, Kangra, Bara-Gran, 32°14'N, 76°20'E, 2500 m, along road sides, 27 Jul 2009, *Savita Rani SR 24687* (PUN 52674) [Fig. 24F].

The two earlier reports from India (Bir & Thakur, 1984; Bir & al., 1987) and one from outside India (Serov, 1986) also give $2n = 16$, nevertheless, B-chromosomes are reported here for first time.

Ranunculus diffusus DC.

** $n = 14 + 0 - 1B$, CHN. India, Himachal Pradesh, Kangra, Bara-Gran, 32°14'N, 76°20'E, 2500 m, waste places, 26 Aug 2009, *Savita Rani SR 24677* (PUN 52546) [Fig. 24G].

Earlier reports for this species include $2n = 14$ (Liao & al., 1996) and $2n = 32$ (Bir & Thakur, 1984; Bir & al., 1987).

Ranunculus hyperboreus Rottb.

** $n = 14$, CHN. India, Himachal Pradesh, Kangra, Triund, 32°16'N, 76°22'E, 3000 m, on open slopes, 5 Jun 2010, *Savita Rani SR 25700* (PUN 53597) [Fig. 24H].

The species is previously known to possess $2n = 24$ (Sokolovskaya 1968), $2n = 32$ (Taylor & Mulligan, 1968; Zhukova, 1982), and $2n = 64$ (Mosquin & Hayley, 1966).

Thalictrum foetidum L.

** $n = 8$, CHN. India, Himachal Pradesh, Kangra, Chhota Bhangal, 32°02'N, 76°50'E, 2022 m, waste places, 27 Jul 2009, *Savita Rani SR 24684* (PUN 52555) [Fig. 24I].

Previously, this species is known to have $2n = 14$ (Friesen, 1991; Hand, 2000) and $2n = 32$ (Bir & Thakur, 1984; Bir & al., 1987).

Thalictrum foliolosum DC.

** $n = 14$, CHN. India, Himachal Pradesh, Kangra, Chhota Bhangal, 32°02'N, 76°50'E, 2300 m, 06 Jul 2010, *Savita Rani SR 26770* (PUN 54498) [Fig. 24J].

The previous reports for this species were $2n = 14$ (Bir & Thakur, 1984; Emura, 1972).

ROSACEAE*Potentilla desertorum* Bunge

▼ $n = 14$, CHN. India, Himachal Pradesh, Kangra, Biching, 32°01'N, 76°55'E, 2200 m, on the rocky slopes, 05 Jun 2010, *Savita Rani SR 26710* (PUN 54301) [Fig. 24K].

The current chromosome number report is in agreement with the previous one of $2n = 28$ (Měšiček & Soják, 1969; Guinochet & Lefranc, 1981) from outside of India.

** $n = 7$, CHN. India, Himachal Pradesh, Kangra, Triund, 32°16'N, 76°22'E 3000 m, on open grounds, 07 Jul 2010, *Savita Rani SR 27716* (PUN 54895) [Fig. 24L].

The species is previously reported to have $2n = 28$ (Měšiček & Soják, 1969; Guinochet & Lefranc, 1981).

Potentilla thomsonii Hand.-Mazz.

* $n = 7$, CHN. India, Himachal Pradesh, Kangra, Triund, 32°16'N, 76°22'E, 3000 m, on the slopes, 05 Jun 2010, *Savita Rani SR 27707* (PUN 54886) [Fig. 24M].

Sibbaldia parviflora Willd.

▼ $n = 7$, CHN. India, Himachal Pradesh, Kangra, Triund, 32°16'N, 76°22'E, 3000 m, on the slopes, 05 Jun 2010, *Savita Rani SR 27739* (PUN 55197) [Fig. 24N].

The current chromosome number report is in agreement with the previous one of $2n = 14$ (Guinochet & Lefranc, 1981) from outside of India.

SAXIFRAGACEAE*Saxifraga diversifolia* Wall. & Ser.

** $n = 16$, CHN. India, Himachal Pradesh, Kangra, Bara-Gran, 32°14'N, 76°20'E, 3000 m, along the slopes, 01 Aug 2010, *Savita Rani SR 27850* (PUN 55086) [Fig. 24O].

The species is previously known to possess $2n = 20$ (Mehra & Dhawan, 1971; Malla & al., 1984).

Saxifraga filicaulis Wall. & Ser.

** $n = 8$, CHN. India, Himachal Pradesh, Kangra, Bara-Gran, 32°14'N, 76°20'E, 3000 m, along the slopes, 01 Aug 2010, *Savita Rani SR 27846* (PUN 55082) [Fig. 24P].

The species is previously known to possess $2n = 24$ and 32 (Wakabayashi, 1997).

Saxifraga flagellaris Willd. ex Sternb.

▼ $n = 8$, CHN. India, Himachal Pradesh, Kangra, Chhota Bhangal, 32°02'N, 76°50'E, 2200 m, on rocky slopes, 24 Jul 2010, *Savita Rani SR 27847* (PUN 55083) [Fig. 24Q].

The current chromosome number report is in agreement with the previous one of $2n = 16$ (Packer, 1964; Mulligan & Porsild, 1969) from outside of India.

VIOLACEAE*Viola betonicifolia* Sm.

* $n = 7$, CHN. India, Himachal Pradesh, Kangra, Bara-Gran, 32°14'N, 76°20'E, 3000 m, along the slopes near moisture, 24 Jun 2010, *Savita Rani SR 27843* (PUN 55130) [Fig. 24R].

Viola canescens Wall.

* $n = 6$, CHN. India, Himachal Pradesh, Kangra, Tal-Mata, 32°14'N, 76°12'E, 1400 m, along the slopes, 06 Apr 2010, *Savita Rani SR 26712* (PUN 54303) [Fig. 24S].

Viola sempervirens Greene

* $n = 6$, CHN. India, Himachal Pradesh, Kangra, Chhota Bhangal, 32°02'N, 76°50'E, 2200 m, on rocky slopes, 06 Jun 2010, *Savita Rani SR 27860* (PUN 55096) [Fig. 24T].

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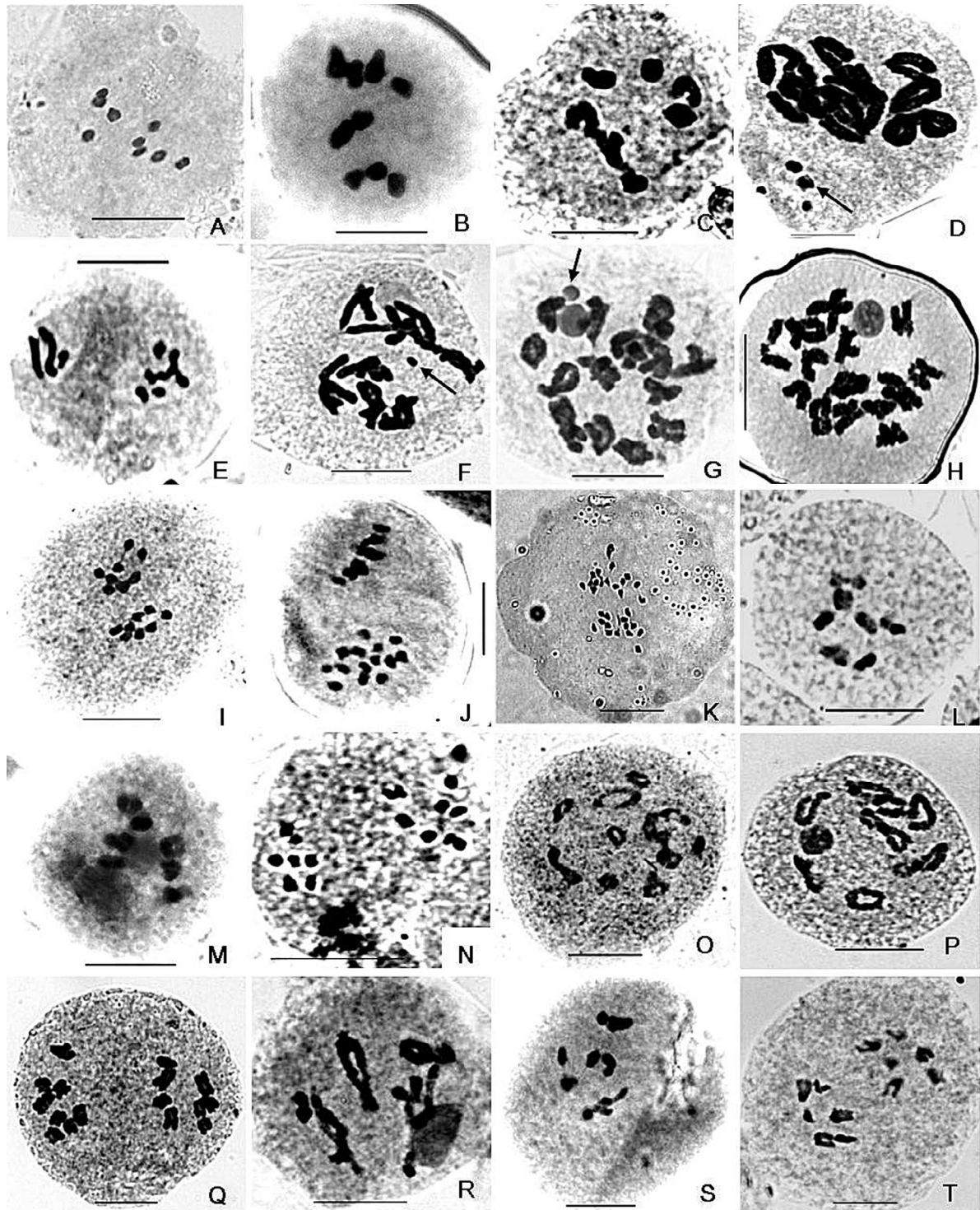


Fig. 24. **A**, *Hypericum dyeri*, PMC at metaphase I, $n = 9$ (PUN 54300); **B**, *Oxalis corymbosa*, PMC metaphase I, $n = 7$ (PUN 52738); **C**, *Argemone mexicana*, PMC at metaphase I, $n = 7$ (PUN 52743); **D**, *Anemone obtusiloba*, PMC at metaphase I, $n = 7 + 4B$ (arrowed) (PUN 54472); **E**, *Aquilegia pubiflora*, PMC at anaphase I, $n = 7$ (PUN 54466); **F**, *Clematis grata*, PMC at diakinesis, $n = 8 + 1B$ (arrowed) (PUN 52674); **G**, *Ranunculus diffusus*, PMC at diakinesis, $n = 14 + 1B$ (arrowed) (PUN 52546); **H**, *Ranunculus hyperboreus*, PMC at diakinesis, $n = 14$ (PUN 53597); **I**, *Thalictrum foetidum*, PMC at anaphase I, $n = 8$ (PUN 52555); **J**, *Thalictrum foliolosum*, PMC at anaphase I, $n = 14$ (PUN 54498); **K**, *Potentilla desertorum*, PMC at anaphase I, $n = 14$ (PUN 54301); **L**, *Potentilla desertorum*, PMC at metaphase I, $n = 7$ (PUN 54895); **M**, *Potentilla thomsonii*, PMC at diakinesis, $n = 7$ (PUN 54886); **N**, *Sibbaldia parviflora*, PMC at anaphase I, $n = 7$ (PUN 55197); **O**, *Saxifraga diversifolia*, PMC at metaphase I, $n = 16$ (PUN 55086); **P**, *Saxifraga filicaulis*, PMC at diakinesis, $n = 8$ (PUN 55082); **Q**, *Saxifraga flagellaris*, PMC at metaphase II, $n = 8$ (PUN 55083); **R**, *Viola betonicifolia*, PMC at metaphase I, $n = 7$ (PUN 55130); **S**, *Viola canescens*, PMC at diakinesis, $n = 6$ (PUN 54303); **T**, *Viola sempervirens*, PMC at anaphase I, $n = 6$ (PUN 55096). Scale = 10 μm .

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- * First chromosome count from an Iberian accession.
- ** First chromosome count from a Balearic accession.
- *** First chromosome count for the species.
- ▼ New chromosome number (cytotype) for the species.

PLANTAGINACEAE

Veronica acinifolia L.

* $2n = 14$, CHN. Spain, Badajoz, La Codosera, crossroad to San Vicente de Alcántara, 29PD5841, 300 m, in abandoned orchard, 28 Mar 1999, *L. Delgado Sánchez, M. Montserrat Martínez-Ortega & J.A. Sánchez Agudo JA28* (SALA 108481) [Fig. 25A]; Spain, Gerona, Caldes de Malavella, 1.5 km of Llagostera, 31TDG82, 150 m, moist depressions at the edge of a cereal culture, 11 May 1999, *L. Delgado Sánchez, M. Montserrat Martínez-Ortega, E. Rico & J.A. Sánchez Agudo s.n.* (SALA 109220); Spain, Salamanca, Aldea del Obispo, Fuerte de la Concepción, 29TPF0885, 740 m, meadow next to the road, near water pond, 17 Apr 1998, *J.A. Sánchez Agudo s.n.* (SALA 109241).

▼ $2n = 28$, CHN. Spain, Salamanca, Aldea del Obispo, Fuerte de la Concepción, 29TPF0885, 740 m, meadow next to the road, near water pond, 17 Apr 1998, *J.A. Sánchez Agudo s.n.* (SALA 109241).

The cytotype $2n = 28$ is here referred for this species for the first time. It was found in individuals from a population where the diploid was also represented.

Veronica agrestis L.

* $n = 14$, CHN. Spain, Jaén, Pico Almadén, 30SVG5377, 1900–2000 m, edges of the road to the peak, 8 Apr 1999, *L. Delgado Sánchez, M. Montserrat Martínez-Ortega & J.A. Sánchez Agudo s.n.* (SALA 109218).

* $2n = 28$, CHN. Spain, Jaén, Mancha Real, road to Pico Almadén, 30SVG5377, 1800 m, edges of small sinkhole on limestone and nitrified substrate, 10 May 1998, *E. Rico, L. Delgado Sánchez, M. Montserrat Martínez-Ortega & J.A. Sánchez Agudo s.n.* (SALA 109217); Spain, Jaén, Pico Almadén, 30SVG5377, 1900–2000 m, edges of the road to the peak, 8 Apr 1999, *L. Delgado Sánchez, M. Montserrat Martínez-Ortega, E. Rico & J.A. Sánchez Agudo JA33* (SALA 109218); Spain, Salamanca, Pelabravo, Las Morelas, sandy banks of the river Tormes, 30TTL8339, 780 m, 24 May 1999, *L. Delgado Sánchez & J.A. Sánchez Agudo s.n.* (SALA 100144) [Fig. 25B]

Veronica anagallis-aquatica L. subsp. *anagallis-aquatica*

$2n = 27$, CHN. Spain, Valladolid, Rábano, banks of the river

Duratón, 30TVL1198, 780 m, 22 Jul 1999, *L. Delgado Sánchez LD259 & J.A. Sánchez Agudo s.n.* (SALA 109329).

$2n = 36$, CHN. Spain, Granada, Sierra de Baza, playground La Canaleja, next to the fountain, 30SWG13, 1400–1500 m, moist soil, 8 Jun 2000, *M. Montserrat Martínez-Ortega & J.A. Sánchez Agudo JA78* (SALA 109357); Spain, Segovia, Lastras de Cuellar, stream Navacedón, next to the Church of Santa María, 30TVL0771, 880 m, 22 Jul 1999, *L. Delgado Sánchez LD255 & J.A. Sánchez Agudo* (SALA 109331) [Fig. 25C]; Spain, Valladolid, between Fuente el Sol and Ataquines, by the river Zapardiel, 30TUL4359, 750 m, wet fallows, 1 Jun 1998, *L. Delgado Sánchez, M. Montserrat Martínez-Ortega, E. Rico ER6542 & J.A. Sánchez Agudo* (SALA 109343); Spain, Valladolid, Rábano, banks of the river Duratón, 30TVM1198, 780 m, 22 Jul 1999, *L. Delgado Sánchez LD259 & J.A. Sánchez Agudo* (SALA 109329).

The triploid level was found in individuals showing a high number of sterile capsules. This character has been related to hybridization phenomena in this group (Schlenker, 1936).

Veronica anagaloides Guss. subsp. *anagaloides*

$2n = 36$, CHN. Spain, Salamanca, Espino de los Doctores, banks of the river Valmuza, 30TTL5348, 750 m, dry brookbed, 1 Aug 2000, *J.A. Sánchez Agudo s.n.* (SALA 109373); Spain, Salamanca, Ituerino de Huebra, Pozos de Hinojo, 30TQF2029, 740 m, 22 Aug 2000, *L. Delgado Sánchez LD613* (SALA 109398); Spain, Salamanca, Pelarrodríguez, river Huebra, towards Buenamadre, 30TQF3429, 770 m, wet margins of the river, with *Sparganium*, 1 Aug 2000, *J.A. Sánchez Agudo JA171* (SALA 109375) [Fig. 25D].

Only the diploid level ($2n = 2x = 18, 18+2B$) had been found before in material from the Iberian Peninsula (Björkqvist & al., 1969). The tetraploid level had already been reported by Meskova (1965) [referred to in Bolkhovskikh & al., 1969] and Vasudevan (1975) in materials collected in Ukraine and Romania, respectively.

Veronica arvensis L.

$n = 8$, CHN. Spain, Ciudad Real, Los Yébenes, Sierra del Rebollarejo, 30SVJ1871, 900 m, oak forest on quartzite scree, 9 May 1998, *L. Delgado Sánchez, M. Montserrat Martínez-Ortega, E. Rico ER6507 & J.A. Sánchez Agudo s.n.* (SALA 109254) [Fig. 25E].

$2n = 16$, CHN. Spain, Ávila, Bohoyo, Garganta de Bohoyo, Fuente de la Navezueta, 30TTK9363, 1230 m, sparse grass on sandy substrate, 20 May 1999, *E. Rico, F.J. Hernández & M. Velayos s.n.* (SALA 109250); Spain, Barcelona, Montmaneli, La Panadella, road to Sta. Coloma de Queralt, km. 1–2, 31TCG6607, 780 m, shrub and *Quercus* woodland, limestones, 8 May 1999, *L. Delgado Sánchez, M. Montserrat Martínez-Ortega, E. Rico & J.A. Sánchez Agudo s.n.* (SALA 109352); Spain, Valladolid, Aguasal, Pinar de Ordoño, 30TUL6272, 750 m, clear pine forest on sandy soil, 7 Apr 1998, *L. Delgado Sánchez, M. Montserrat Martínez-Ortega, E. Rico & J.A. Sánchez Agudo s.n.* (SALA 109257) [Fig. 25F].

Veronica beccabunga L. subsp. *beccabunga*

$2n = 18$, CHN. Spain, Segovia, Navares de las Cuevas, El Cerco, 30TVL3586, 1100 m, 29 May 1999, *L. Delgado Sánchez, M. Montserrat Martínez-Ortega & J.A. Sánchez Agudo* (SALA 109345); Spain, Valladolid, Rábano, by the river Duratón, 30TVM1198, 780 m, 22 Jul 1999, *L. Delgado Sánchez & J.A. Sánchez Agudo JA61* (SALA 109334); Spain, Zamora, San Pedro de la Nave-Almendra, El Campillo, Las Coronas, 30TTM5308, 740–750 m, brook by the wayside, 31 May 1998, *J.A. Sánchez Agudo s.n.* (SALA 109316) [Fig. 25G].

Veronica catenata Pennell

* $2n = 36$, CHN. Spain, Tarragona, Sant Carles de la Rapita, Delta de l'Ebre, 31TTL9903, 4 m, edge of rice culture, 17 May 2002, *A. González Talaván & J.A. Sánchez Agudo JA179* (SALA 109393) [Fig. 25H].

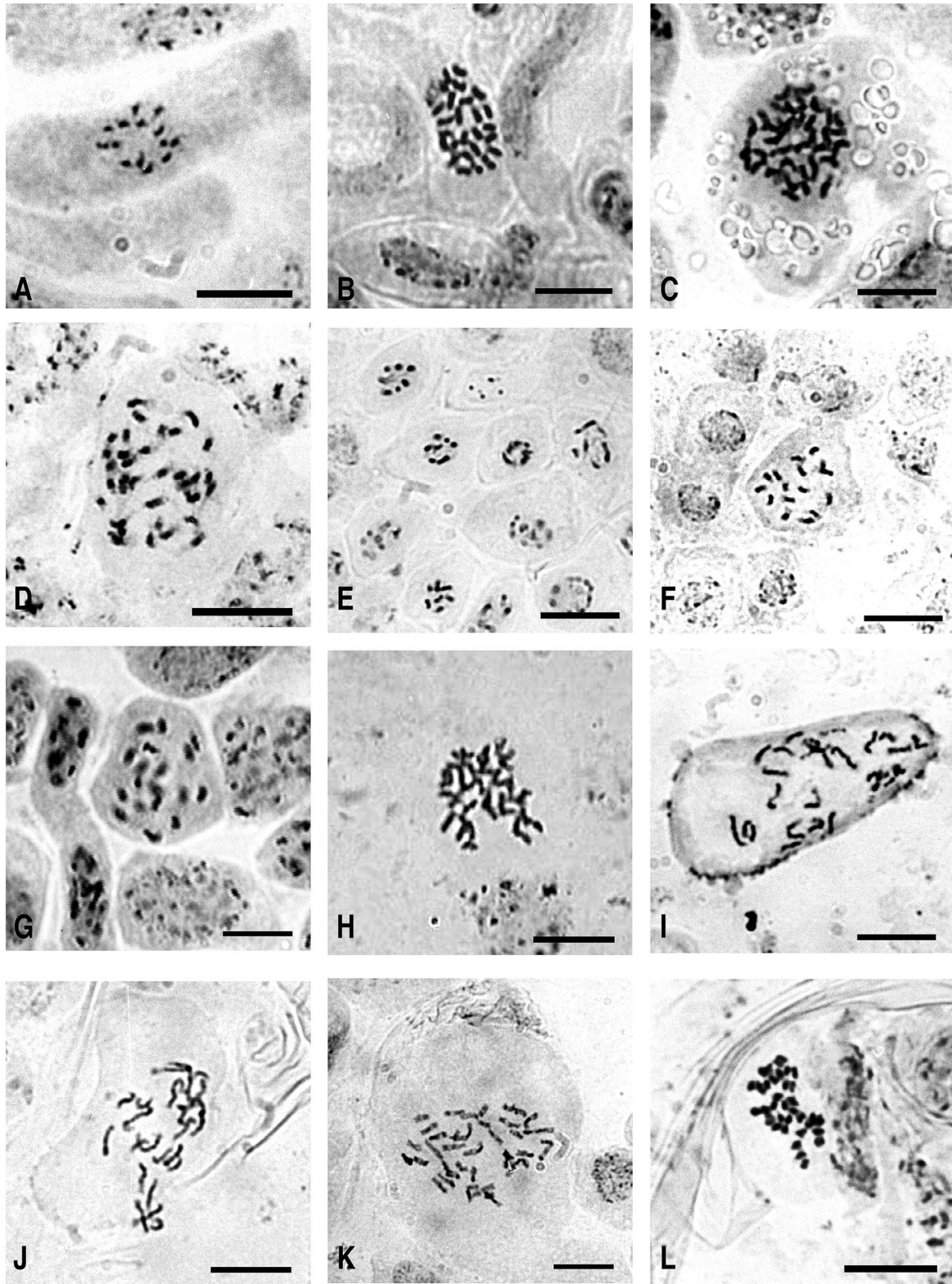


Fig. 25. **A**, *Veronica acinifolia*, mitotic metaphase, $2n = 14$ (SALA 108481); **B**, *V. agrestis*, mitotic metaphase, $2n = 28$ (SALA 100144); **C**, *V. anagallis-aquatica*, mitotic metaphase, $2n = 36$ (SALA 109331); **D**, *V. anagalloides*, mitotic metaphase, $2n = 36$ (SALA 109375); **E–F**, *V. arvensis*: **E**, meiotic metaphase I in pollen mother cell, $n = 8$ (SALA 109254), **F**, mitotic metaphase, $2n = 16$ (SALA 109257); **G**, *V. beccabunga*, mitotic metaphase (SALA 109316); **H**, *V. catenata*, mitotic metaphase, $2n = 36$ (SALA 109393); **I–K**, *V. chamaepithyoides*: **I–J**, mitotic metaphase, $2n = 24$ (SALA 96420), **K**, mitotic metaphase, $2n = 24$ (SALA 109399); **L**, *V. cymbalaria*, mitotic metaphase, $2n = 36$ (SALA 109382). Scale bar = 10 μm

Veronica chamaepithyoides Lam.

*** $2n = 24$, CHN. Spain, Segovia, San Miguel de Bernuy, 30TVL2083, 840 m, trampled chalky clay road edge, 7 Apr 1998, *L. Delgado Sánchez, M. Montserrat Martínez-Ortega, E. Rico & J.Á. Sánchez Agudo s.n.* (SALA 96420) [Fig. 25I–J]; Spain, Guadalajara, Alcolea de las Peñas, 30TVL1863, 985 m, fallow lands on limestone substrate, 13 Apr 2004, *L. Delgado Sánchez, E. Rico & J.Á. Sánchez Agudo s.n.* (SALA 109399) [Fig. 25K].

Veronica cymbalaria Bodard

/ $n = 18$, CHN. Spain, Menorca, Ferreries, Albranca Vell, Barranco de la Cova, 31SEE8723, 80–100 m, shaded areas on limestone substrate, 17 Apr 2001, *L. Delgado Sánchez LD735, P. Fraga & J.Á. Sánchez Agudo* (SALA 109383).

* $n = 27$, CHN. Spain, Málaga, Cartajima, Cancha de Armola, 30SUF0361, 1200 m, on rocky calcareous soils, 14 May 2000, *L. Delgado Sánchez, M. Montserrat Martínez-Ortega & J.Á. Sánchez Agudo JA76* (SALA 109203).

** $2n = 36$, CHN. Spain, Menorca, Es Mitjorn, Barranco de Binigaus, 31SEE8719, crevices and debris on limestone rocks, 16 Apr 2001, *L. Delgado Sánchez LD668, P. Fraga & J.Á. Sánchez Agudo* (SALA 109382) [Fig. 25L].

* $2n = 54$, CHN. Spain, Ciudad Real, Almoradiel, Venta de Cárdenas, on the way to the train station, 30SVH5352, 800–900 m, sandy slopes and loose stones, 12 May 2000, *L. Delgado Sánchez, M. Montserrat Martínez-Ortega & J.Á. Sánchez Agudo s.n.* (SALA 109243) [Fig. 26A]; Spain, Málaga, Antequera, El Torcal, 30SUF6291, 1200 m, under shrubs of *Crataegus*, 6 Apr 1999, *E. Rico ER6809* (SALA 109296); Spain, Málaga, Cartajima, streets of the village, 30SUF0261, 845 m, human altered soils, 14 May 2000, *L. Delgado Sánchez, M. Montserrat Martínez-Ortega & J.Á. Sánchez Agudo JA75* (SALA 109202) [Fig. 26B]; Spain, Málaga, Montejaque, 30TF9969, 689 m, in rocky limestone slope, shady and nitrified areas, 14 May 2000, *L. Delgado Sánchez, M. Montserrat Martínez-Ortega & J.Á. Sánchez Agudo JA77* (SALA 109204); Spain, Menorca, Ferreries, Albranca Vell, Barranco de la Cova, 31SEE8723, 80–100 m, in shaded areas on limestone, 20 Apr 2001, *L. Delgado Sánchez LD736, P. Fraga & J.Á. Sánchez Agudo* (SALA 109385).

Two different ploidy levels, tetraploid ($2n = 36$) and hexaploid ($2n = 54$) were found in materials collected in Menorca within an area of ca. 1 km². The tetraploid level had been found before in Mallorca by Fischer (1973).

Veronica dillenii Crantz

* $2n = 16$, CHN. Spain, Gerona, from Viladrau to Turó de L'Home, road to San Marçal de Montseny, 31TDG5031, 1000 m, humid granite slopes, with *Corynephorus canescens*, 10 May 1999, *L. Delgado Sánchez, M. Montserrat Martínez-Ortega, E. Rico & J.Á. Sánchez Agudo s.n.* (SALA 110142) [Fig. 26C].

Veronica hederifolia L.

$n = 27$, CHN. Spain, Madrid, on the way from the road Ocaña-Madrid to Ontigola, 30TVK4929, 550 m, crops and ditch at roadside, gypsum hills, growing together with *V. triloba*, 11 Apr 1999, *L. Delgado Sánchez, M. Montserrat Martínez-Ortega & J.Á. Sánchez Agudo JA45* (SALA 109276) [Fig. 26D]; Spain, Valladolid, San Miguel del Arroyo, road to Cogeces de Iscar, La Era, 30TUL7788, 850 m, 16 Apr 1999, *L. Delgado Sánchez, M. Montserrat Martínez-Ortega, E. Rico & J.Á. Sánchez Agudo JA56* (SALA 109300); Spain, Valladolid, Castronuño, 30TUL1189, poplar culture outside of the town, 20 Feb 1998, *L. Delgado Sánchez & J.Á. Sánchez Agudo JA16* (SALA 109278).

$2n = 36$, CHN. Spain, Jaén, Torres, on the way up to Pico Almadén, 30SVG5582, 1900 m, orchards with fruit trees, 8 Apr 1999, *L. Delgado Sánchez, M. Montserrat Martínez-Ortega & J.Á. Sánchez Agudo JA34* (SALA 109255) [Fig. 26E].

$2n = 54$, CHN. Spain, Jaén, township of Cambil-Arbuniel, road from Mata Bejid to Castillo de Mata Bejid, 30SVG5574, 900–1000 m, irrigated olive orchards, 8 Apr 1999, *L. Delgado Sánchez, M. Montserrat Martínez-Ortega & J.Á. Sánchez Agudo JA74* (SALA 109307); Spain, Jaén, Mancha Real, near a water source on the way down to Pico Almadén, 30SVG4883, 800 m, nitrified soils, 13 May 2000, *L. Delgado Sánchez, M. Montserrat Martínez-Ortega & J.Á. Sánchez Agudo JA72* (SALA 109264); Spain, Segovia, San Miguel de Bernuy, 30TVL1983, 870 m, in cultures, growing together with *V. triloba*, 9 Mar 2000, *L. Delgado Sánchez & J.Á. Sánchez Agudo s.n.* (SALA 109411); Spain, Valladolid, Castrodeza, ditch on the outskirts of the village towards Torrelobatones, 30TUM3612, 20 Feb 1998, *L. Delgado Sánchez & J.Á. Sánchez Agudo s.n.* (SALA 109298).

The number $2n = 36$ (tetraploid level) has been confirmed here for the first time on Iberian material. No morphological difference has been found between tetraploid and diploid individuals.

Veronica panormitana Tineo subsp. *panormitana*

** $2n = 18$, CHN. Spain, Menorca, Ferreries, Ferreries, Albranca Vell, Barranco de la Cova, 31SEE8723, 80–100 m, shaded areas on limestone, 20 Apr 2001, *L. Delgado Sánchez, P. Fraga & J.Á. Sánchez Agudo s.n.* (SALA 105882) [Fig. 26F]; Spain, Menorca, San Agusti Vei, talaiots, 31SEE8820, 76 m, on limestone rocks from the “talaiotic” ruins, 16 Apr 2001, *L. Delgado Sánchez, P. Fraga & J.Á. Sánchez Agudo* (SALA 105880) [Fig. 26G].

Veronica peregrina L. subsp. *peregrina*

$n = 26$; $2n = 52$, CHN. Spain, Cáceres, Valdecañas de Tajo, 30STK7506, 280 m, by the river Tajo, 15 May 1999, *E. Rico ER6861* (SALA 109319).

Veronica persica Poir.

$2n = 28$, CHN. Spain, Barcelona, Malla, between Masía de Font and Masía de Roca, 31TDG3537, 550 m, slopes in open areas of oak forest, on clay substrates, 9 May 1999, *L. Delgado Sánchez LD142, M. Montserrat Martínez-Ortega, E. Rico & J.Á. Sánchez Agudo* (SALA 109355) [Fig. 26H]; Spain, Gerona, Gerona, Parque Devesa, 31TDG8548, 80 m, flowerbeds in the park, 11 May 1999, *L. Delgado Sánchez, M. Montserrat Martínez-Ortega, E. Rico & J.Á. Sánchez Agudo s.n.* (SALA 109322).

Veronica polita Fr.

$2n = 14$, CHN. Spain, Salamanca, Ciudad Rodrigo, road to Ivanrey, 29TQE0797, 620 m, roadside, 2 May 1998, *J.Á. Sánchez Agudo s.n.* (SALA 100145) [Fig. 26I]; Spain, Segovia; San Miguel de Bernuy, 30TVL2083, 840 m, fallows, 7 Apr 1998, *L. Delgado Sánchez, M. Montserrat Martínez-Ortega, E. Rico & J.Á. Sánchez Agudo s.n.* (SALA 109206); Spain, Segovia, Valle del Tabladillo, in front of the cemetery, 30TVL3079, 900–1000 m, wasteland, 10 Mar 2000, *L. Delgado Sánchez & J.Á. Sánchez Agudo JA64* (SALA 109216); Spain, Soria, Montenegro de Cameros, on walls near the church, 30TWM2059, 1270 m, 24 Apr 1999, *J.Á. Sánchez Agudo s.n.* (SALA 109210).

Veronica praecox All.

$2n = 18$, CHN. Spain, Granada, Sierra de Baza, Calar de Santa Bárbara, 30SWG1437, 2100 m, on limestones, 10 May 1998, *L. Delgado Sánchez, M. Montserrat Martínez-Ortega, E. Rico & J.Á. Sánchez Agudo s.n.* (SALA 109238); Spain, Salamanca, Ituero de Azaba, entrance to the village from the road to Ciudad Rodrigo, 29TPE9584, 680 m, sandy slopes at the margins of the road, 18 Apr 1998, *J.Á. Sánchez Agudo s.n.* (SALA 109323); Spain, Segovia, San Miguel de Bernuy, Tentebuey, 30TVL2185, 920 m, fallows, 7 Apr 1998, *L. Delgado Sánchez, M. Montserrat Martínez-Ortega, E. Rico & J.Á. Sánchez Agudo s.n.* (SALA 109289) [Fig. 26J].

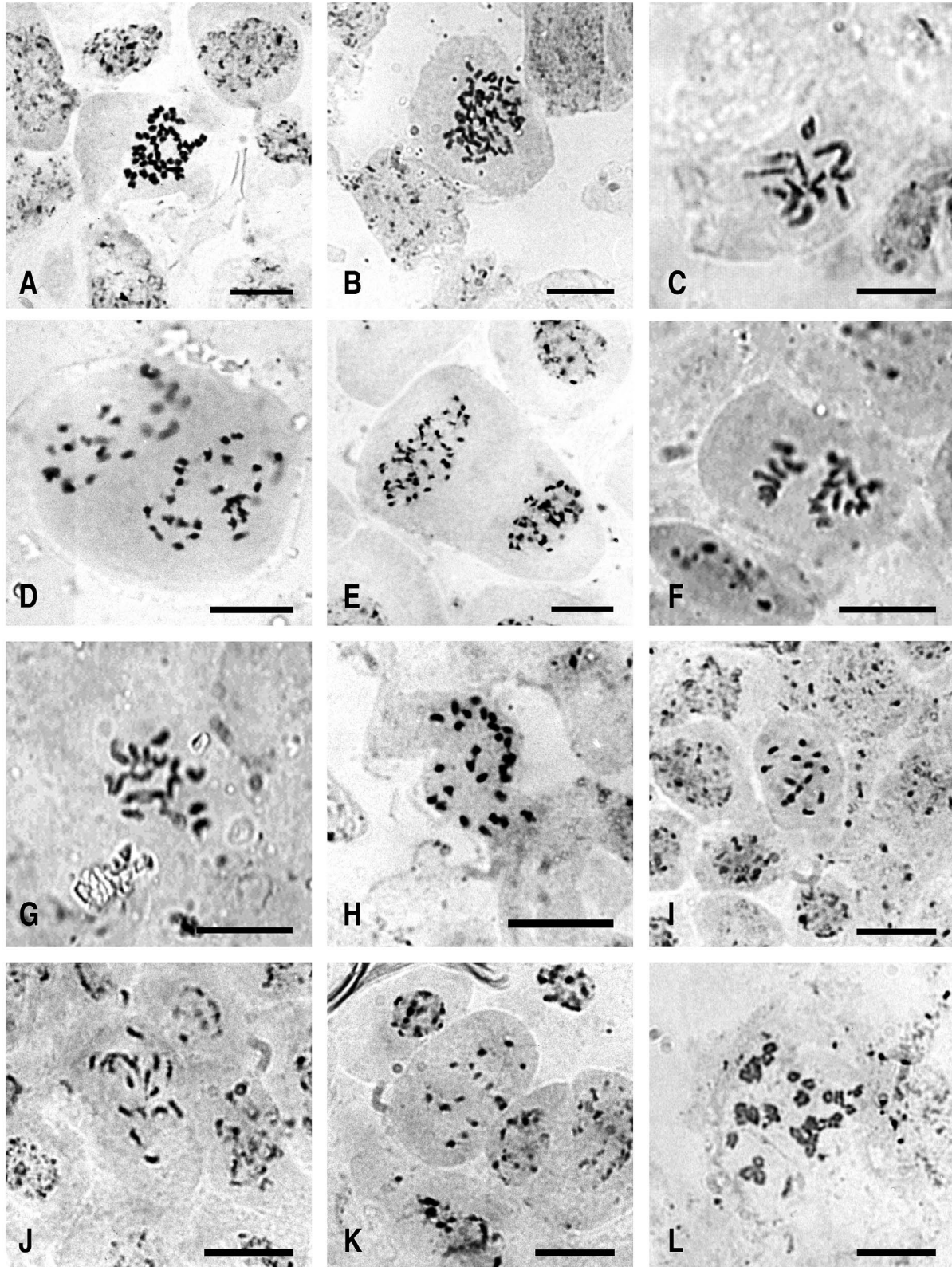


Fig. 26. **A–B**, *Veronica cymbalaria*: **A**, mitotic metaphase, $2n = 54$ (SALA 109243), **B**, mitotic metaphase, $2n = 54$ (SALA 109202); **C**, *V. dillenii*, mitotic metaphase, $2n = 16$ (SALA 110142); **D–E**, *V. hederifolia*: **D**, meiotic metaphase II in pollen mother cell, $n = 27$ (SALA 109276), **E**, mitotic metaphase, $2n = 36$ (SALA 109255); **F–G**, *V. panormitana*: **F**, mitotic metaphase, $2n = 18$ (SALA 105882), **G**, mitotic metaphase, $2n = 18$ (SALA 105880); **H**, *V. persica*, mitotic metaphase, $2n = 28$ (SALA 109355); **I**, *V. polita*, mitotic metaphase, $2n = 14$ (SALA 100145); **J**, *V. praecox*, mitotic metaphase, $2n = 18$ (SALA 109289); **K–L**, *V. sibthorpioides*, meiotic metaphase I, $n = 15$ (SALA 109304). Scale bar = 10 μm .

Veronica sibthorpioides Debeaux, Degen & Hervier

$n = 14$, CHN. Spain, Sierra de Cazorla, on the trail of the river Guadalquivir, km 27, Torcal Llano, 1660–1680 m, 10 Apr 1999, *L. Delgado Sánchez, M. Montserrat Martínez-Ortega MO539 & J.Á. Sánchez Agudo* (SALA 109271).

$n = 15$, CHN. Spain, Granada, Sierra de Baza, between Calar de Santa Bárbara and Barranco del Relumbre, 30SWG1437, 1950 m, 9 Apr 1999, *L. Delgado Sánchez LD102, M. Montserrat Martínez-Ortega & J.Á. Sánchez Agudo* (SALA 109304) [Fig. 26K–L]; Spain, Jaén, Mancha Real, Pico Almadén, 30SVG5376, 2000 m, limestone crags near the top, 10 May 1998, *L. Delgado Sánchez, M. Montserrat Martínez-Ortega, E. Rico ER6514 & J.Á. Sánchez Agudo* (SALA 109259); Spain, Jaén, Sierra de Cazorla, Sierra del Pozo, Pico Cabañas, near the forest house, 30SWG0285, 2000 m, 10 Apr 1999, *L. Delgado Sánchez, M. Montserrat Martínez-Ortega MO540 & J.Á. Sánchez Agudo* (SALA 109273).

▼ $2n = 28$, CHN. Spain, Jaén, Pico Almadén, on the way up to the peak, 30SVG5377, 1900 m, growing under shrubs (*Astragalus* and *Berberis*), limestones, 8 Apr 1999, *L. Delgado Sánchez, M. Montserrat Martínez-Ortega & J.Á. Sánchez Agudo JA32* (SALA 109274) [Fig. 27A]; Spain, Teruel, Valdelinares, El Hornillo, 30TYK0475, 1880 m, 12 Jun 1999, *E. Rico & Ximena Giráldez* (SALA 109303).

$2n = 30$, CHN. Spain, Granada, Sierra de Baza, Calar de Santa Bárbara, 30SWG1437, 2100 m, on limestones, 10 May 1998, *L. Delgado Sánchez, M. Montserrat Martínez-Ortega, E. Rico ER6523 & J.Á. Sánchez Agudo* (SALA 109313); Spain, Granada, Sierra de Baza, Calar de Sta. Bárbara, 30SWG1338, 2250 m, 8 Jun 2000, *M. Montserrat Martínez-Ortega MMO887 & J.Á. Sánchez Agudo* (SALA 109358) [Fig. 27B–C]; Spain, Jaén: Pico Almadén, 30SVG5377, 2030 m, crevices of limestone rocks, 8 Apr 1999, *L. Delgado Sánchez, M. Montserrat Martínez-Ortega & J.Á. Sánchez Agudo JA31* (SALA 109361); Spain, Jaén, Pico Almadén, 30SVG5377, 2030 m,

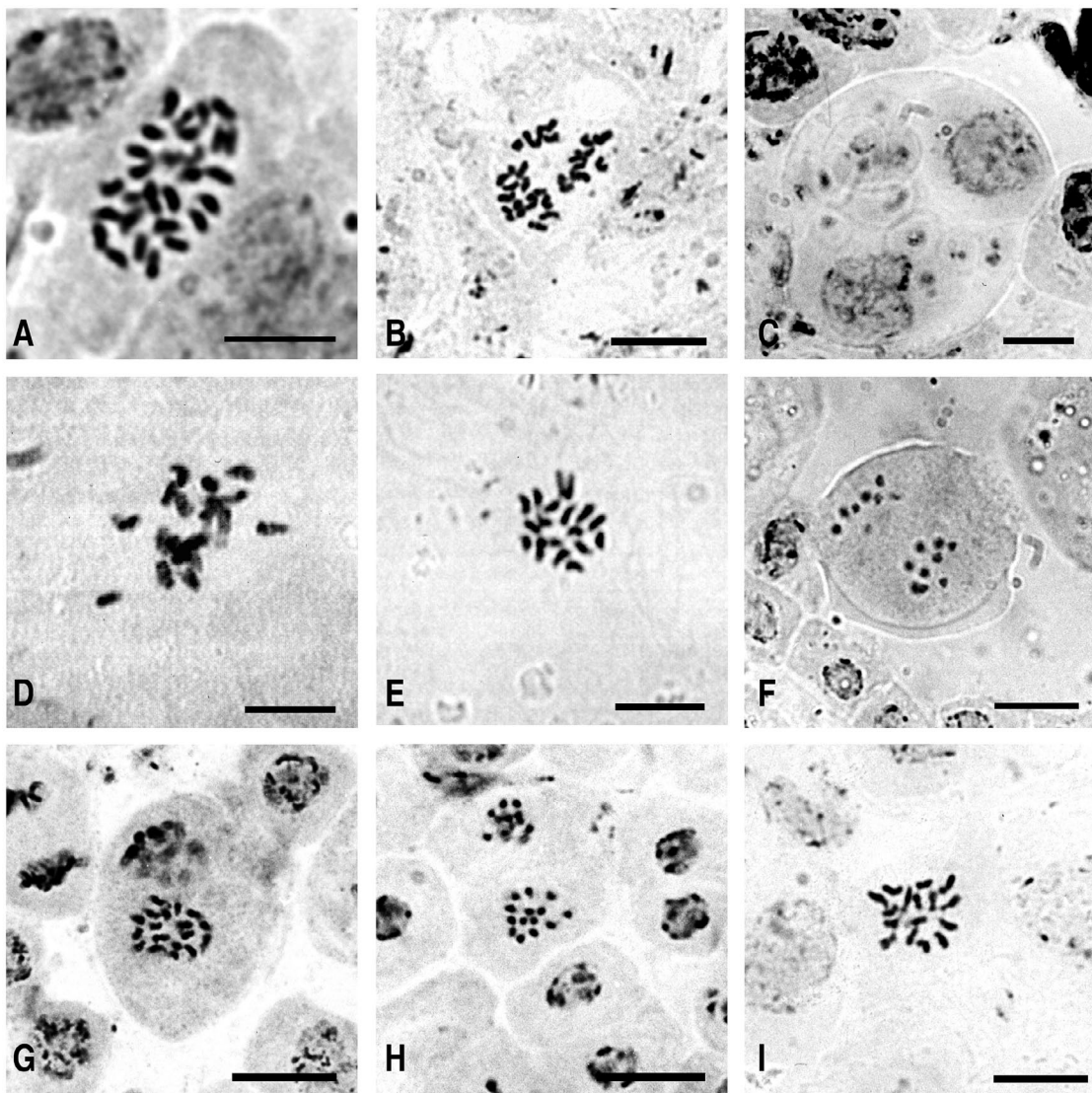


Fig. 27. A–C, *Veronica sibthorpioides*: **A**, mitotic metaphase, $2n = 28$ (SALA 109274), **B**, mitotic metaphase, $2n = 30$ (SALA 109358); **C**, irregular tetrad with ten meiospores (SALA 109358); **D–E, *V. trichadena***, mitotic metaphase, $2n = 18$ (SALA 108483); **F–G, *V. triloba***: **F**, meiotic metaphase II, $n = 9$ (SALA 109275), **G**, mitotic metaphase, $2n = 18$ (SALA 109265); **H, *V. triphyllus***, mitotic metaphase, $2n = 14$ (SALA 109237); **I, *V. verna***, mitotic metaphase, $2n = 16$ (SALA 109225). Scale bar = 10 μm .

ruderalized area at the top of the mountain, 13 May 2000, *L. Delgado Sánchez, M. Montserrat Martínez-Ortega & J.Á. Sánchez Agudo JA71* (SALA 109362).

The numbers $n = 15$ and $2n = 30$ had been found already in this Ibero-Moroccan endemic from both North African (Hofelich, 1935 [referred to in Bolkhovskikh & al., 1969]; Humphries & al., 1978; Galland, 1988) and Spanish (Löve & Kjellqvist, 1974) accessions. In our case, $2n = 28$ (Fig. 27A) was found in three of the eleven populations studied, while the remaining ones showed $2n = 30$ as a chromosome number. The haploid numbers $n = 14$ and $n = 15$ (Fig. 26K–L) were found several times in metaphase I of meiotic cycle in stem cells of pollen grains; in this cases tri- and tetravalent associations (Fig. 26L) were observed. This fact together with the presence of abnormalities in the formation of tetrads (sometimes up to ten microspores were counted) suggests irregular meiotic processes (Fig. 27C) and this could be the reason why two different somatic numbers were found.

Veronica spicata L. subsp. *spicata*

* $2n = 34$, CHN. Spain, Huesca, Ansó, sunny side of Barranco de Petrachema, 30TXN8152, 1630 m, high mountain meadows, 25 Jun 2000, *L. Delgado Sánchez & I. Soriano s.n.* (SALA 105779).

Veronica trichadena Jord. & Fourr.

$2n = 18$, CHN. Spain, Menorca, Ferreries, Santa Elena, quarry, 31SEE8423, 80 m, fringe of forest, walls and fallows, stony, calcareous soils, 17 Apr 2001, *L. Delgado Sánchez LD674, P. Fraga & J.Á. Sánchez Agudo* (SALA 108483) [Fig. 27D–E].

Veronica triloba (Opiz) Opiz

* $n = 9$, CHN. Spain, Ciudad Real, Almoradiel, Venta de Cárdenas, on the way to the train station, 30SVH5352, 800–900 m, shady slopes in oak forest on siliceous soil, 11 Apr 1999, *L. Delgado Sánchez, M. Montserrat Martínez-Ortega & J.Á. Sánchez Agudo JA42* (SALA 109275) [Fig. 27F].

* $2n = 18$, CHN. Spain, Ciudad Real, Almoradiel, Venta de Cárdenas, on the way to the train station, 30SVH5352, 800–900 m, shady slopes in oak forest on siliceous soil, 11 Apr 1999, *L. Delgado Sánchez, M. Montserrat Martínez-Ortega & J.Á. Sánchez Agudo JA42* (SALA 109275); Spain, Jaén, Cambil-Arbuniel, road from Mata Bejid to Castillo de Mata Bejid, 30SVG5574, 900–1000 m, irrigated olive orchards, 13 May 2000, *L. Delgado Sánchez, M. Montserrat Martínez-Ortega & J.Á. Sánchez Agudo JA73* (SALA 109265) [Fig. 27G]; Spain, Segovia, San Miguel de Bernuy, 30TVL1983, 840 m, chickpea crops, growing as a weed together with *V. hederifolia*, 9 Apr 2000, *J.Á. Sánchez Agudo & L. Delgado Sánchez LD129* (SALA 109262); Spain, Madrid, on the way from the road Ocaña-Madrid to Ontígola, 30TVK4929, 550 m, at the roadside, gypsum hills, growing together with *V. hederifolia*, 11 Apr 1999, *L. Delgado Sánchez, M. Montserrat Martínez-Ortega & J.Á. Sánchez Agudo JA46* (SALA 109270).

Veronica triphyllos L.

* $n = 7$, CHN. Spain, Segovia, El Robledillo, road between Fuentidueña and Sacramenia, 30TVL1890, 820 m, fallows, 8 May 1999, *L. Delgado, M. Montserrat Martínez-Ortega, E. Rico & J.Á. Sánchez Agudo JA55* (SALA 109236).

* $2n = 14$, CHN. Spain, Segovia, El Robledillo, road between Fuentidueña and Sacramenia, 30TVL1890, 820 m, fallows, 8 May 1999, *L. Delgado Sánchez, M. Montserrat Martínez-Ortega, E. Rico & J.Á. Sánchez Agudo JA55* (SALA 109236); Spain, Segovia, San Miguel de Bernuy, 30TVL1983, 840 m, 8 May 1999, *L. Delgado Sánchez LD130, M. Montserrat Martínez-Ortega, E. Rico & J.Á. Sánchez Agudo* (SALA 109239); Spain, Valladolid, Olmedo, in the access to Pinar de Ordoño, 30TUL6072, 750 m, edges of crops and fallow, 7 Apr 1998, *L. Delgado Sánchez, M. Montserrat Martínez-Ortega, E. Rico ER298 & J.Á. Sánchez Agudo* (SALA 109237) [Fig. 27H].

Veronica verna L.

* $n = 8$, CHN. Spain, Teruel, Frias de Albarracín, 500 m from the source of the river Tajo, 30TXK1165, 1600 m, cleared areas among *Thymus*, on limestone, 12 Jun 1999, *E. Rico & Ximena Giráldez s.n.* (SALA 109227).

* $2n = 16$, CHN. Spain, Ávila, Bohoyo, Garganta de Bohoyo, Fuente de la Navezuela, 30TTK9363, 1230 m, cleared pastures, on sandy soils, 20 May 1999, *E. Rico, F.J. Hernández & M. Velayos* (SALA 109224); Spain, Salamanca, Pelabravo, Las Morelas, sandy banks of the river Tormes, 30TL8339, 780 m, 29 Apr 1998, *L. Delgado Sánchez & J.Á. Sánchez Agudo s.n.* (SALA 109225) [Fig. 27I].

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ASTERACEAE

Antennaria dioica (L.) Gaertn.

$2n = 28$, CHN. Bulgaria, Pirin Mts, trail from Vihren chalet to Dzhamdzhievi skali below Vihren peak, 23 Sep 2009, *V. Vladimirov & D. Ivanova V-No-47* (Fig. 28A; SOM); Bulgaria, Rila Mts, cirque of the Seven Rila Lakes (Sedemte Rilski Ezera), Dalgia Rid above the lakes Bliznaka and Trilistnik, 42.20599°N, 23.31404°E, ca. 2310 m, 02 Sep 2009, *D. Ivanova D-5(6) & R. Gorgorov, D. Ivanova D-5(10) & R. Gorgorov* (SOM); Bulgaria, Stara Planina Mts (Central), between Kozya Stena peak and Kozya Stena hut, on silicate, 18 Jun 2009, *S. Bancheva V-No-2* (SOM); Bulgaria, Slavyanka Mt., way from Salyuva Dzhambia to Gotsev peak, 41.38678°N, 23.60666°E, 18 Aug 2009, *V. Vladimirov & S. Bancheva N-A-09-116(2)* (SOM); Norway (Southern), Sogn og Fjordane county, Aurland municipality, Låvisdalen, 60.82336°N, 07.27347°E, 1022 m, 21 Aug 2010, *S. Bancheva & D. Ivanova H 53, S. Bancheva & D. Ivanova H 55, S. Bancheva & D. Ivanova H 58* (SOM); Norway (Southern), Sogn og Fjordane

county, Lærdal municipality, Ulvehaugen, 61.02370°N, 08.12317°E, 1217 m, 22 Aug 2010, *S. Bancheva & D. Ivanova H 113*, *S. Bancheva & D. Ivanova H 117*, *S. Bancheva & D. Ivanova H 118*, *S. Bancheva & D. Ivanova H 119* (Fig. 28B; SOM).

Our data on the Bulgarian accessions agree with the reports by Kuzmanov & Kozuharov (1970, 1973) for plants from Rila Mts, Malki Ibar river.

Omalotheca supina (L.) DC.

$2n = 28$, CHN. Bulgaria, Rila Mts, cirque of the Seven Rila Lakes (Sedemte Rilski Ezera), Dalgia Rid near Babreka lake, 42.20667°N, 23.31099°E, ca. 2340 m, 01 Sep 2009, *D. Ivanova D-11(2)* & *R. Gorgorov, D. Ivanova D-11(6)* & *R. Gorgorov, D. Ivanova D-11(8)* & *R. Gorgorov, D. Ivanova D-11(10)* & *R. Gorgorov* (Fig. 28C; SOM); Norway (Southern), Sogn og Fjordane county, Lærdal municipality, Ulvehaugen, 61.02370°N, 08.12317°E, 1217 m, 22 Aug 2010, *S. Bancheva & D. Ivanova H 81*, *S. Bancheva & D. Ivanova H 82*, *S. Bancheva & D. Ivanova H 83* (Fig. 28D), *S. Bancheva & D. Ivanova H 88*, *S. Bancheva & D. Ivanova H 90* (SOM).

The chromosome number of the Bulgarian accession is congruent with the findings by Kuzmanov & al. (1986) and Baltisberger (2006, as *Gnaphalium supinum*) from other localities in this country.

ERICACEAE

Empetrum nigrum subsp. *hermaphroditum* (Hagerup) Böcher

$2n = 52$, CHN. Bulgaria, Rila Mts, cirque of the Seven Rila Lakes (Sedemte Rilski Ezera), above Babreka lake, 42.20100°N, 23.30867°E, ca. 2400 m, 01 Sep 2009, *D. Ivanova D-12(3)* & *R. Gorgorov, D. Ivanova D-12(5)* & *R. Gorgorov* (Fig. 28E; SOM).

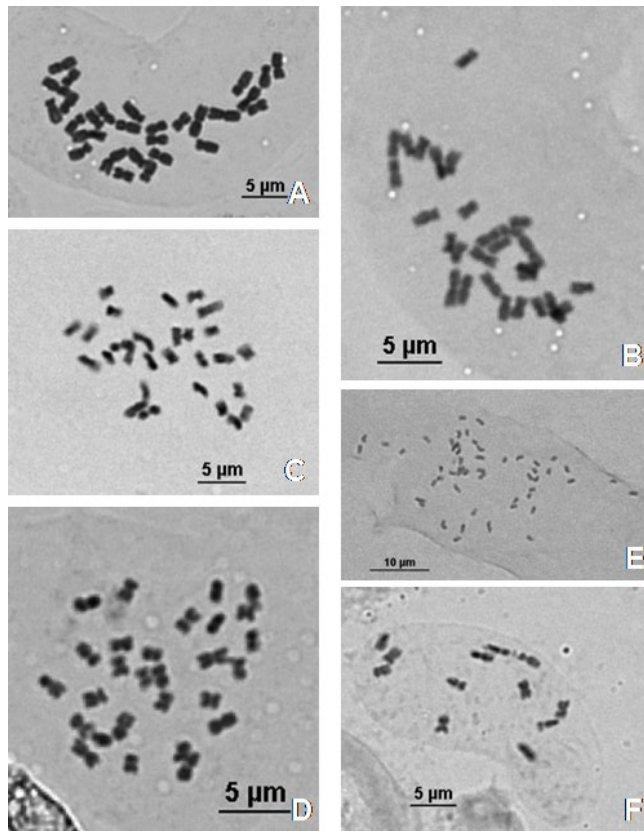


Fig. 28. Metaphase chromosome plate of: **A**, *Antennaria dioica* (V-No-47); **B**, *Antennaria dioica* (H 119); **C**, *Omalotheca supina* (D-11(10)); **D**, *Omalotheca supina* (H 83); **E**, *Empetrum nigrum* subsp. *hermaphroditum* (D-12(5)); **F**, *Plantago gentianoides*.

This represents the first chromosome count for Bulgaria and coincides with previous reports for other countries.

PLANTAGINACEAE

Plantago gentianoides Sibth. & Sm.

$2n = 12$, CHN. Bulgaria, Rila Mts, cirque of the Seven Rila Lakes (Sedemte Rilski Ezera), westwards of Dolnoto Ezero lake, by the path to Sedemte Ezera hut, 42.21206°N, 23.31870°E, ca. 2200 m, 31 Aug 2009, *D. Ivanova & R. Gorgorov s.n.* (Fig. 28F; SOM).

The report confirms the number given by Kozuharov & Petrova (1974) for plants from the Pirin Mts.

POACEAE

Alopecurus gerardii Vill.

$2n = 14$, CHN. Bulgaria, Pirin Mts, by the trail from Vihren hut to Kazanite locality below Vihren peak, 41.76638°N, 23.41105°E, 2250–2300 m, 11 Nov 2010, *V. Vladimirov & al. V 10-216* (Fig. 29B), *V. Vladimirov & al. V 10-230* (SOM).

The chromosome number is congruent with the report by Petrova & Stoyanova (1997) for plants from another locality in Pirin Mts.

Phleum alpinum L. (syn. *Ph. commutatum* Gaudin)

$2n = 28$, CHN. Norway (Southern), Sogn og Fjordane county, Aurland municipality, Låvisdalen, 60.82552°N, 07.27346°E, 978 m, 21 Aug 2010, *S. Bancheva & D. Ivanova H 32*, *S. Bancheva & D. Ivanova H 33*, *S. Bancheva & D. Ivanova H 37* (Fig. 29A; SOM); Norway (Southern), Sogn og Fjordane county, Lærdal municipality,

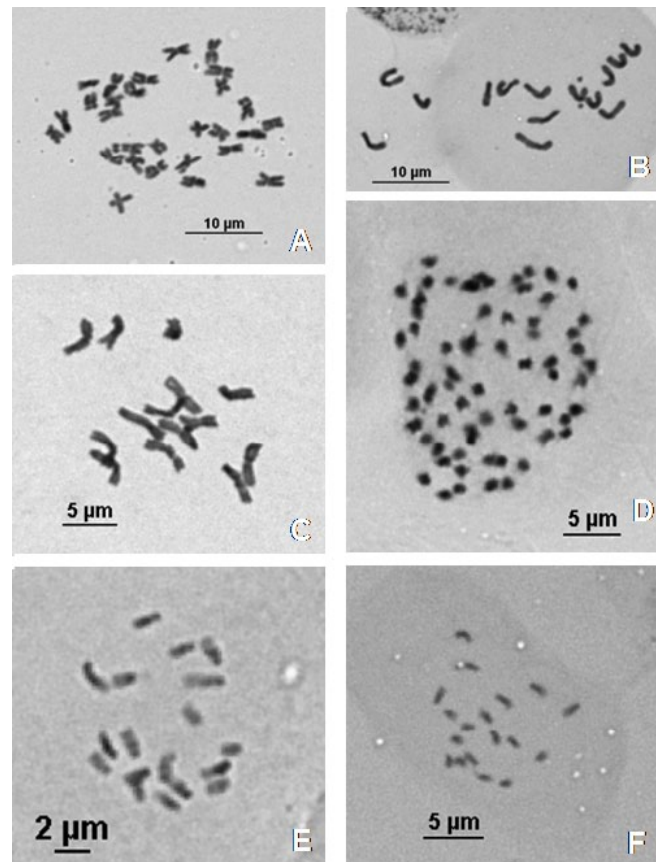


Fig. 29. Metaphase chromosome plate of: **A**, *Phleum alpinum* (H 37); **B**, *Alopecurus gerardii* (V 10-216); **C**, *Phleum rhaeticum* (VV-N 10-14); **D**, *Primula minima* (D-3(3)); **E**, *Dryas octopetala* (D-15(8)); **F**, *Dryas octopetala* (H 70).

Ulvehaugen, 61.02370°N, 08.12317°E, 1217 m, 22 Aug 2010, S. Bancheva & D. Ivanova H 93, S. Bancheva & D. Ivanova H 95, S. Bancheva & D. Ivanova H 100 (SOM); Norway (Southern), Hordaland county, Finse municipality, Jomfrunet, 60.60456°N, 07.51051°E, 1392 m, 24 Aug 2010, S. Bancheva & D. Ivanova H 191, S. Bancheva & D. Ivanova H 194, S. Bancheva & D. Ivanova H 196 (SOM).

Phleum rhaeticum (Humphries) Rauschert

$2n = 14$, CHN. Bulgaria, Osogovo Mts, near a mountain hut in Prevala locality, 42.18843°N, 22.58063°E, ca. 1860 m, 27 Jul 2010, V. Vladimirov & al. VV-N 10-II, V. Vladimirov & al. VV-N 10-14 (Fig. 29C; SOM).

Our finding is in agreement with the reports by Kozuharov & Nicolova (1975) and Kozuharov & Petrova (1991) from the Rila and Pirin Mts. Petrova & Stoyanova (1998) published $2n = 14 + 2B$ from another site in the Rila Mts.

PRIMULACEAE

Primula minima L.

$2n = 66$, CHN. Bulgaria, Rila Mts, cirque of the Seven Rila Lakes (Sedemte Rilski Ezera), above Babreka lake, 42.21172°N, 23.31588°E, ca. 2400 m, 02 Sep 2009, D. Ivanova D-3(3) & R. Gorgorov (Fig. 29D), D. Ivanova D-3(7) & R. Gorgorov, D. Ivanova D-3(9) & R. Gorgorov (SOM).

A previous report (Nikolov, 1991) shows the same chromosome number for plants from Pirin Mts.

ROSACEAE

Dryas octopetala L.

$2n = 18$, CHN. Bulgaria, Rila Mts, cirque of the Seven Rila Lakes (Sedemte Rilski Ezera), above Babreka lake, 42.20115°N, 23.30824°E, ca. 2400 m, 01 Sep 2009, D. Ivanova D-15(8) & R. Gorgorov (Fig. 29E; SOM); Norway (Southern), Sogn og Fjordane county, Aurland municipality, Låvisdalen, 60.82253°N, 07.27536°E, 1105 m, 21 Aug 2010, S. Bancheva & D. Ivanova H 67, S. Bancheva & D. Ivanova H 70 (Fig. 29F; SOM).

The same chromosome number was previously reported for accessions from the Pirin Mts (Andreev, 1982) and Central Stara Planina Mts (Popova, 1968).

Geum montanum L.

$2n = 42$, CHN. Bulgaria, Pirin Mts, near Muratovo lake, 41.74528°N, 23.40656°E, ca. 2250 m, 11 Nov 2010, V. Vladimirov & al. V 10-159 (Fig. 30A; SOM).

Our report agrees with those of Markova (1970), Andreev (1982) and Van Loon & Van Setten (1982) for specimens from other localities.

SAXIFRAGACEAE

Saxifraga paniculata Mill.

$2n = 28$, CHN. Bulgaria, Rila Mts, cirque of the Seven Rila Lakes (Sedemte Rilski Ezera), on rocks above Babreka lake, 42.20087°N, 23.30751°E, ca. 2410 m, 01 Sep 2009, D. Ivanova RL 01-09-09 & R. Gorgorov (Fig. 30B; SOM); Bulgaria, Pirin Mts, near Dzhamdzhievi skali below Vihren peak, 41.76852°N, 23.41233°E, 2200–2300 m, 23 Sep 2009, V. Vladimirov V-No-72 & D. Ivanova (SOM); Bulgaria, Stara Planina Mts (Central), by the path between Beklemeto

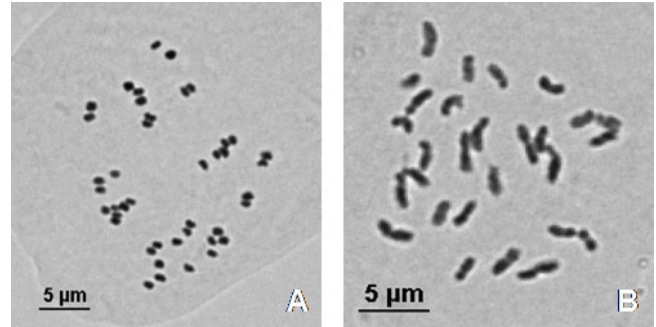


Fig. 30. Metaphase chromosome plate of: A, *Geum montanum* (V 10-159); B, *Saxifraga paniculata* (RL 01-09-09).

and Kozya Stena peak, north-exposed slope, 17 Jun 2009, S. Bancheva D-17(2) (SOM).

This is the first report on Bulgarian accessions.

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