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International Organization of Plant Biosystematists

Newsletter

No. 24

Edited by

K. M. Urbanska

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IOPB Newsletter No. 24

Contents

1. Editorial Comment

Dear IOPB Members,

Here comes your Newsletter. The included data are very interesting indeed and I thank all colleagues who contributed.
The vote count for IOPB Elections 1995-1998 is completed. It is regrettable that so few Members returned their ballots to the Nominating Committee. Please do try to do better next time, we are all busy but perhaps not THAT busy.... Our new Executive and Council are listed on pp. 29-30. We thank all colleagues who agreed to run for office. Best thanks also to all Members who are leaving our Council in July, and a cordial welcome to the new Council Members. The new Executive and Council will officially change at the IOPB General Meeting during the Tromsoe Symposium.
Individual research news included in this issue refer mostly to new publications. I am happy to see that my last appeal found some echo and thank all persons who took their time to inform us about their latest papers. Please send me more.
Two contributions in the "Profile of a Lab" column (pp. 5-9) come from very different parts of the world: the one from Canada was contributed by Dianne Fahlselt, the one from New Zealand and was sent in by Phil Garnock-Jones. Best thanks to both authors!
The columns "IOPB Chromosome Data" (pp. 9-22) and "News from Molecular Biosystematists" (pp. 22-24) are well-established by now. The editorial work of Clive Stace and Dan Crawford is very much appreciated.
Long live e-mail: I just received a most interesting letter from the new IOPB Member, Dr. Alexandra Berkutenko who works at Institute of Biological Problems of the North, Magadan, Russia. It explains how her recent book on medicinal plants from Alaska and the Russian Far East was born in co-authorship with Eleanor Viereck.Thanks Alexandra Naumovna, so nice of you to let us all know about the history behind the book (pp. 24-25). Let´s hope for further useful information from your country, so much needed in the scientific world.
Another book is that including papers presented at the last IOPB Symposium (see the purchase information on p 25.).The Editors of the book apologize for a rather long "labour" due to some unexpected problems but it was worthwhile, just you see.
The note from our Treasurer (pp. 26-27.) deals - again - with delays in paying the Membership dues. Please remember that the regular publication of the Newsletter depends on your fees. I should like very much to publish for once a happy Treasurer's note saying that all back dues have been payed - don't let him down...
I' ll need your contributions for the next Newsletter issue by **October 30, 1995 the latest**. In the next issue you'll get e.g., writeup on the IOPB Symposium in Tromsoe, hopefully also a report on the Workshop on Apomixis scheduled soon afterwards, and many other news.

Have a good summer,
The Editor

NOTE: Please write in capital letters or use typewriter while preparing your "Research News" sheet for the Newsletter. You don' t want to have some words misspelled in print, do you?
It would be of a great help of the contributions are sent both on RPS Microdisc (MC2HD 3.5 inch hard disc) as well as a printout. We are also able to convert the contributions received in an ASCII text file on 3.5 or 5.25 inch disc formatted for MacIntosh.

2. IOPB Elections for 1995-1998 period: Results

After the ballot processing, the results of IOPB Elections may be summed up as follows:

(i) As suggested by the Nominating Committee, The Executive was accepted en block and will consist of:

President: **Bengt E. Jonsell**

Vice-President (President Elect): **Konrad Bachmann**

Past President: **Peter H. Raven**

Secretary/Treasurer: **Peter C. Hoch**

Regional Treasurer for European currency: **Leo van Raamsdonk**

Newsletter Editor: **Krystyna M. Urbanska**

Newsletter Co-Editor for Chromosome Data: **Clive A. Stace**

Newsletter Co-Editor for Molecular News: **Daniel J. Crawford**

Member ex officio for 1998 Symposium in Amsterdam: **Hans C. M. den Nijs**

(ii) Council (names listed according to the decreasing number of votes, alphabetic order in case of an equal vote number):

Philip Garnock-Jones, New Zealand

David F. Murray, USA

Jorge V. Crisci, Argentina

Herbert Hurka, Germany

Jan Kirschner, Czechia

Tatsuyoshi Morita, Japan

Jürg Stöcklin, Switzerland

Suzanne I. Warwick, Canada

Randall J. Bayer, Canada

Shoichi Kawano, Japan

According to the IOPB Constitution, there may be maximum ten Council Members. We use this opportunity to thank all candidates who agreed to run for office. We also thank Ms. Junko Ueda, Secretary to Chairman of the Nominating Committee, for her work on the ballot processing.
The change of Executive and Council will come into effect at the General Meeting of IOPB during the Tromsoe Symposium.
The Nominating Committee:

Shoichi Kawano, Chair
Krystyna M. Urbanska
Hans C. M. den Nijs

3. Individual Research News

Berkutenko Alexandra, Portovaja Street 31/12 apt. 40, Magadan, 685014 Russia.
Recent publications:
BERKUTENKO A., 1993. The remarkable *Pinus pumila*. Internat. Dendrology Society Year Book 1992, London. 41-46.
BERKUTENKO A., 1994. Flora and vegetation of Spafariev island. Botan. Zhurnal, p. 1.
BERKUTENKO A., 1995. Flora and vegetation of Koni peninsula. (in print).

Czapik Romana, Dept. of Plant Cytology and Embryology. Institute of Botany, Jagellonian University, Grodzka 52, 31-044 Krakow, Poland.
Recent publications:
CZAPIK R., 1992-93. Development of embryo and endosperm after intra- and interspecific pollinations in *Rubus bellardii* Weihe. Acta biol. cracov. Ser. Bot. Vol. *XXXVI-XXXV*: 59-69.
CZAPIK R., 1994. How to detect apomixis in Angiospermae. Polish Bot. Stud. *8*: 13-21.
CZAPIK R., 1994. Studies on embryology and reproduction of Angiosperms - an introductory note. Polish Bot. Stud. *8*: 3-4.

Izmailow Romana, Dept. of Plant Cytology and Embryology. Institute of Botany Jagellonian University, Grodzka 52, 31-044 Krakow, Poland.
Recent publications:
IZMAILOW R., 1994. Further observations in embryo sac development in *Alchemilla* L. (subsection *Heliodrosium* Rothm.) Acta biol. cracov. Ser. Bot. Vol. *XXXVI*: 37-41.
IZMAILOW R., 1994. Embryo and endosperm relations at early stages of their development in *Alchemilla* subsect. *Heliodrosium* (Rosaceae).

Jankun Andrzej, Dept. of Plant Cytology and Embryology. Institute of Botany Jagellonian University, Grodzka 52, 31-044 Krakow, Poland.
Recent publications:
JANKUN A., 1994. Embryological studies in *Sorbus intermedia* (Rosaceae). Polish Bot. Stud. *8* : 69-74.

Marhold Karol, Institute of Botany, Slovak Academy of Sciences, Dubravska cesta 14, SK-842 23 Bratislava, Slovak Republic.
Recent publications:
MARHOLD K., 1994. Taxonomy of the genus *Cardamine* L. (*Cruciferae*) in the Carpathians and Pannonia. I. *Cardamine* pratensis group. Folia Geobot. Phytotax. *29*: 335-374.
MARHOLD K., 1994. Chromosome numbers of the genus *Cardamine* L. (*Cruciferae*) in the Carpathians and Pannonia. Phyton (Horn, Austria) *34*: 19-34.
MARHOLD K. and RAYNER T.G.J., 1994. Typification of the names of two species of the *Cardamine pratensis* group (*Brassicaceae*). Taxon *43*: 77-83.

Mouradian Larisa, Abovian Street 26a-57, 375001 Yerevan-I, Republic of Armenia.
Recent publications:
MOURADIAN L., 1994. Comparative carpo-anatomical characteristics of the subtribes of the tribe Cardueae.
MOURADIAN L., 1994. Parallelism in the structural changes of the achene envelopes of the *Compositae* representatives.
MOURADIAN L., 1994. Comparative morpho-anatomical investigation of the achenes of *Filifolium* Kitam. and related genera.

Nazarova Estella, Guyi str. 43, app. 11, Yerevan, 375076, Armenia.
Recent publications:

NAZAROVA E., 1994. The role of spontaneous hybridization and amphidiploidy in the evolution of subtribe *Scorzonerinae* (*Asteraceae*). Internat. Compos. Conference, Royal Botanic Garden, Kew, 1994: 127.

NAZAROVA E. and GOUKASIAN A.G., 1994. Caryosystematical investigation of Armenian grasses. 5th Botanical Conference, St. Petersburg, 1994.

NAZAROVA E., 1993. Caryological study of the genus *Steptorhamphus* Bunge (Lactuceae, Asteraceae). Caryologia (Florence) (accepted for publication, 1993).

Quinn Anthony, Dept. of Biological Sciences, Rutgers University, Piscataway, NJ 08855-1059 USA.
Recent publications:

QUINN A., MOWREY D.P., EMANUELE S.M. and WHALLEY R.D.B.1994. The "Foliage is the Fruit" hypothesis: *Buchloe dactyloides* (*Poaceae*) and the shortgrass prairie of North America. Amer. J. Bot. *81*: 1545-1554.

YIN T. and QUINN A., 1994. Effects of exogenous growth regulators and a gibberellin inhibitor on sex expression and growth form in buffalograss (*Buchloe dactyloides*), and their ecological significance. Bull. Torrey Bot. Club *121*: 170-179.

Turala-Szybowska Krystyna, Grodzka 521, 31-044 Krakow, Poland.
Recent publications:

TURALA-SZYBOWSKA K., 1992. Cytological differentiation of the anthers´tapetum in the tetraploid cytotype of *Ranunculus fluitans* Lam. Acta Biol. Cracov., Ser. Bot., Vol. *XXXIV-XXXV*, 1992-93, 37-44.

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4. Profile of a Lab

Current research in Lichen Systematics, Dept of Plant Sciences, University of Western Ontario, London, Ontario, N6A 5B7 Canada.

by Dianne Fahselt; e-mail: dfahselt@julian.uwo.ca

We are using biochemical approaches to lichen systematics, often with umbilicate species (*Umbilicaria*, *Lasallia*), but also *Stereocaulon*, *Xanthoria* and others. Populational variability has been one focus and, as a means of assessing genetic polymorphism, we have been subjecting crude protein extracts to isolectric focussing and staining for bands of enzyme activity. Some electromorphs are of considerable taxonomic significance, while others are of less, and in every population examined so far there is evidence of variation among thalli and evolutionary potential. One study in progress is attempting to discern why *Cladina* spp. (reindeer lichens) are less amenable to standard enzyme extraction methods than other lichens (with M. Trembley, research assistant). Electrophoretic phenotypes appear to be affected by certain environmental factors, as thalli growing near natural sources of H2S exhibit enzyme banding patterns that differ in some respects from those found in less fumigated sites.

Because enzyme polymorphism is considerable in both apotheciate and non-apotheciate lichens, we are exploring possible sources of this variation. In lichens of temperate regions, there are indications that levels of UV-absorbing secondary products are negatively correlated with variation in enzyme banding patterns (with A. Swanson, graduate student), and

whether this relationship occurs in arctic species will also be investigated (with G. Sinclair, research assistant). In another project, enzyme polymorphism in lichens is being appraised in areas that have been exposed to dust deposition from uranium mines. Study sites are near Elliot Lake, Canada, where uranium levels were previously investigated by other workers, but our material was collected after U mines had operated eight years more and then closed for two years. We found greatly decreased levels of U in lichen thalli, and are presently trying to determine the intrathalline location of U in order to explain such massive reductions. It appears that the effect of radionuclides on enzyme polymorphism depends on the species of lichen, but results are still being analyzed (with S. Tavares, graduate student).

We have also been engaged in a collaborative project involving well-preserved sub-fossils found emerging from beneath a glacier in Greenland by V. Alstrup (Denmark), after burial by ice for approximately 1350 years. This find is especially interesting because an adjacent area of tundra supports living vegetation similar to that which was preserved by freezing. At least 10 lichenologists have been or are now studying *Umbilicaria cylindrica* at two points in time, for example, some are comparing lichen secondary products or rDNA. In our lab, isozyme variation was evaluated in living thalli and, from sub-fossils, forms of esterase were extracted that retained activity after more than a millenium under ice.

Due to increased pressures on natural areas and general decline of habitat for lichens and other species, we are now assembling county-by-county accounts of ecologically significant natural areas in the Canadian province of Ontario. These are based largely on a vast body of quantitative vegetational information produced by P. Maycock and associates (Canada) using the Point-Quarter method of vegetational analysis. Ecologically significant locations where he and other field biologists have accumulated data, are being documented for publication. The strategy, following recommendations of the CBA, is intended to be a first step toward recognition of areas that should be protected and also to provide information concerning the source of compositional details that could be useful in revegetation of gauging the extent of change. The pilot inventory, establishing journal and format, was completed a few years ago, and funding has just recently become available for continuation of the work.

Recent publications:

FAHSELT D., 1991. Enzyme similarity as an indictor of evolutionary divergence: *Stereocaulon saxatile* H. Magn. Symbiosis *11*: 119-130.

FAHSELT D., 1992. Geothermal effects on multiple enzyme forms in the lichen *Cladonia mitis*. Lichenologist *24*: 181-192.

FAHSELT D., 1993. UV absorbance by thallus extracts of umbilicate lichens. Lichenologist *25*: 415-422.

FAHSELT D., 1994. Secondary biochemistry of lichens. Symbiosis *16*: 117-165.

FAHSELT D., 1994. Lichen sexuality from the perspective of multiple enzyme forms. Cryptogamic Botany *5*: (in press).

FAHSELT D., ALSTRUP V. and TAVARES S., 1995. Enzyme polymorphism in *Umbilicaria cylindrica* in Northwestern Greenland. Bryologist *98*: (accepted).

FAHSELT D., WU T.-W. and MOTT B., 1995. Instrumental neutron activation analysis of lichens following uranium mine closures in Ontario, Canada. Bryologist *98*: (submitted).

HAGEMAN C. and FAHSELT D., 1992. Relationships within the lichen family Umbilicariaceae based on enzyme electromorph data. Lichenologist *24*: 91-100.

MAYCOCK P.F. and FAHSELT D., 1987. An inventory of ecologically significant natural vegetation in the province of Ontario: I. Essex County. The Canadian Field-Naturalist *101*: 474-486.

* * *

Plant and fungal biosystematic research at Victoria University of Wellington, P.O. Box 600, Wellington, New Zealand.

by Phil J. Garnock-Jones, School of Biological Sciences.
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The New Zealand flora presents special attractions and challenges for the biosystematist:
- it has very high endemism (about 85%) at species level;
- a large number of species (about 10% of the 2200 indigenous flowering plants) are unnamed;
- adaptive radiation and local speciation are rife, particularly in some regions and also on island groups;
- the biogeography is fascinating, with ancient Gondwanic relicts and more recent immigrants;
- breeding systems and pollination biology reflect a fauna depauperate in some pollinator groups.

The School of Biological Sciences at Victoria University of Wellington has a strong group specializing in systematics and ecology of native and naturalised plants, fungi, and animals. Our research is often applied in conservation, particularly by New Zealand's Department of Conservation and zoological and botanical gardens.
Plant and fungal biosystematics research is conducted in the Systematics and Biodiversity Group of the School. We have a small research and teaching herbarium (WELTU) and access to the much larger herbarium and library at the Museum of New Zealand Te Papa Tongarewa (WELT). The School includes an Institute for Molecular Systematics where several plant projects in molecular systematics are now getting established. We have little space for experimental cultivation, but the University grounds house an extensive collection of native plants, many from documented sources, and we have a close relationship with Otari Native Botanic Garden. New Zealand's formost collection of native plants.

Current research by staff

Plant biosystematics

Dr John W. Dawson is preparing a monographic treatment of *Myrtaceae* subfam. Myrtoideae for Flore de la Nouvelle-Calédonie, following publication of the treatment of subfam. *Leptospermoideae* in 1992. Dr. Dawson also revised the family for Flora of Hawaii. Two highly acclaimed popular treatments on New Zealand botany, "Forest vines to Snow Tussocks" (1988) and "Lifestyles of New Zealand Forest Plants" (1993, with photographer Rob Lucas) have been published. The latter was short-listed for the Montana Book Awards; a companion account of coastal and alpine plants is in preparation.

Prof Phil J. Garnock-Jones. *Hebe* (*Scrophulariaceae*) is New Zealand's largest plant genus with about 100 species, many of them un-named. The un-named entities are being studied and named in collaboration with Dr Bruce Clarkson and Dr Bill Lee (Landcare Research Ltd) and Ms Andrea Brandon (B.Sc. [Hons] student) in preparation for a generic monograph. Generic limits in the complex are also being considered: a new genus *Heliohebe* was recently segregated, and the limits of *Parahebe* and *Chionohebe* will probably need to change. Recent publications have includeed research on *Asteraceae*, *Brassicaceae*, and *Ranunculaceae*.

Dr Lesley Milicich. Population variation in the Southern Hemisphere genus *Bulbinella* (*Liliaceae*) has been studied using enzyme electrophoresis and morphology. This has demonstrated the occurrence of limited gene exchange between some species, but overall there is a complex pattern of allopatric speciation. The ranks of several taxa will change following a cladistic analysis of morphological and enzyme data.

Dr Barry V. Sneddon. Revisions of *Colobanthus* (*Caryophyllaceae*) and *Microseris* (*Asteraceae - Lactuceae*) are continuing. In *Colobanthus* a number of new species will be described and breeding systems and hybridization will be discussed. For *Microseris*, the single and variable New Zealand species has been compared with Australian material and a revision is in preparation for Flora of Australia. Dr Sneddon is supervising a M.Sc. thesis on species limits in the *Clematis forsteri* complex (*Ranunculaceae*) using enzyme electrophoresis, cytology, and morphology.

Floral anatomy and pollen morphology

Dr F. Bruce Sampson. Dr Sampson's research involves the evolution and diversification of putatively primitive angiospems (*Magnoliidae*) concentrating at present on palynology, embryology, taxonomy, anatomy, floral morphology, and ultrastructure of *Witeraceae* and *Monimiaceae*. Current research includes a study of the pollen of *Lactoris* (*Lactoridaceae*) which contradicts previous studies, based on dried pollen of this archaic "weedy shrub", that pollen is saccate and indicates angiosperms may have an ancestry in Mesozoic saccate gymnosperms. He is involved in a collaborative project on pollen of indigenous *Gnaphalieae* with Dr Ilse Breitwieser (Berlin). A joint study with Dr Tammy Sage (Toronto) of pollen tube growth, penetration of the embryo-sac, and fertilisation in *Pseudowintera* is revealing new information on the nature of self-incompatibility in this primitive angiosperm. Dr Sampson is supervising a Ph.D. thesis investigating the monophyly of the mainly Australasian genus *Scleranthus* (*Caryophyllaceae*) using floral anatomy and molecular characters.

Molecular systematics

Prof Phil J. Garnock-Jones. A phylogenetic analysis of the *Hebe* complex has been published recently, and current research is directed towards a molecular phylogeny in collaboration with Dr Steven Wagstaff (Landcare Research, Christchurch). For this study and a proposed similar one on *Ourisia* (also *Scrophulariaceae*) several fast-evolving sequence are being considered, including internal transcribed spacers of nuclear ribosomal DNA, and the matK gene and the atpB-rbcL intergenic spacer of chloroplast DNA. Molecular studies of biogeography in *Nothofagus* (*Nothofagaceae*) are planned, and attempts to determine the mode of inheritance of chloroplast DNA in the genus are underway as a preliminary to this work. Prof Garnock-Jones is supervising a B.Sc. (Hons) project investigating phylogeny and biogeography of the world's southermost palms, *Rhopalostylis* (*Areaceae*) using sequences of the atpB-rbcL chloroplast intergenic spacer region.

Reproductive biology

Dr Katherine Dickinson, whose research is in the fields of community ecology and conservation, is supervising several student theses on autecology of native plants, including one on pollination, seed dispersal, and predation in native mistletoes (*Loranthaceae*).
Dr Bill Malcolm (Micro-Optics Ltd, Nelson) and **Prof P.J. Garnock-Jones** are investigating capsule dehiscence and seed dispersal in the *Hebe* complex, particularly the anatomy and ecology of hygrochastic dehiscence in *Chionohebe*. They are also looking at as-

pects of hygrochastic capsule dehiscence in *Oenothera*. Prof Garnock-Jones is also supervising two student theses on reproductive biology, on weedy scandent *Senecio* ssp. and on seed biology of *Glaucium flavum* (*Papaveraceae*).

Fungal taxonomy

Dr Ann Bell and **Dr. Dan Mahoney**. A book, Dung Fungi of New Zealand was published in 1983, and dung fungi remain a major focus. Current research includes revision of *Sordariaceae*, and curation of the fungal herbarium (part of WELTU), consisting of (mainly) coprophilus fungi collected from New Zealand and some exchange material with other world herbaria. Current student research includes taxonomy of the *Leotiales* (= *Helotiales*) and of the genus *Lophiodermium*. Dr Geoffrey Ridley conducted his Ph.D. research here on *Amanita* and *Russula*.

Algal systematics

Dr Margaret E. Gordon. Allozyme variation among New Zealand populations of *Gracilaria chilensis*, with Sompop Intasuwan, Ph.D. student 1988-1990. Allozyme analysis of putative epilithic species of *Porphyra* in New Zealand, with Dr William Brostoff, Postdoctoral Fellow, 1989-91. In January 1995 Dr Gordon collected samples of *Porphyra* populations in Chile that are currently referred to there as *P. columbina*, but believed by Chilean *Porphyra* taxonomists to be more than one species. The objective is to compare their DNA and/or allozyme profiles with those of Wellington and type-locality (Auckland Islands) *P. columbina*. The material collected for this part of the work may be offered to future students or to overseas collaborators.

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5. IOPB Chromosome Data 9

edited by Clive A. Stace,
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Please send contributions to Professor Stace at the above address (on a 3.5 inch Microdisc with text in ASCII-file and a printed copy) using the exact layout of the present list and stating whether or not you are a Member of IOPB. Neither proofs nor reprints will be made available, but the editor will acknowledge receipt of contributions and raise queries with authors if necessary.

Report by **H.M. CHAPMAN**, AgResearch, Canterbury Agriculture and Science Centre, Gerald Street, P O Box 60, Lincoln, New Zealand. Live plants held at the Department of Plant Science, University of St. Andrews, Fife, Scotland.

SAXIFRAGACEAE
Saxifraga oppositifolia L. n=26. Shore Line 1km E of Ny Alesund, Svalbard, Norway.

* * *

Reports by **Blanka DRUSKOVIC**, Institute of Biology, University of Ljubljana, Ljubljana, Karlovska 19, 11000 Slovenia. Vouchers with author.

APIACEAE

Aegopodium podagraria L. 2n=42. Slovenia: Klanec near Komenda. Druskovic s.n.
Anthriscus nitida (Wahlenb.) Haszlinsky 2n=16. Slovenia: Nevljica. Druskovic s.n.
Astrantia bavarica F.W.Schultz 2n=14. Slovenia: Solcava. Druskovic s.n.
Astrantia major L. 2n=28. Slovenia: Solcava. Druskovic s.n.
Athamantha turbith (L.) Brot. 2n=22. Slovenia: Divaca. Croatia: Velebit. Druskovic & Lovka s.n.
Grafia golaka (Hacq.) Rchb. 2n=22. Slovenia: Caven. Druskovic s.n.
Hladnikia pastinacifolia Rchb. 2n=22. Slovenia: Caven. Druskovic s.n.
Laserpitium archangelica Wulf. 2n=22: Slovenia: Ig. Druskovic s.n.
Laserpitium peucedanoides L. 2n=22. Slovenia: Draga & Zerjav. Druskovic s.n.
Pastinaca fleischmannii Hladnik ex Koch 2n=22. Slovenia: Ljubljana. Druskovic s.n.
Pastinaca sativa L. 2n=22. Slovenia: Ljubljana. Druskovic s.n.
Peucedanum austriacum (Jacq.) Koch 2n=22. Slovenia: Zerjav. Druskovic s.n.
Pimpinella major (L.) Huds. 2n=36. Slovenia: Kokrsko sedlo. Druskovic s.n.
Pleurospermum austriacum (L.) Hoffm. 2n=22. Slovenia: Ig. Druskovic s.n.
Seseli malyi A. Kern. 2n=22. Croatia: Velebit. Druskovic s.n.

CYPERACEAE

Carex acutiformis Ehrh. 2n=78. Slovenia: Brezovica near Trebnje & Ljubljana & Sentjernej. Druskovic s.n.
Carex alba L. 2n=54. Slovenia: Ceska koca & Ljubljana & Mance near Vipava. Druskovic s.n.
Carex appropinquata Schum. 2n=64. Slovenia: Mokronog & Sentjernej. Druskovic s.n.
Carex atrata L. 2n=52. Slovenia: Velo polje near Triglav. Druskovic s.n.
Carex atrata L. 2n=54. Slovenia: Mangartsko sedlo & Kanin. Druskovic s.n.
Carex bohemica Schreb. 2n=80. Slovenia: Slivnica on Pohorje. Druskovic s.n.
Carex brachystachys Schrank et Moll 2n=40. Slovenia: Huda luknja & Konjscica (Pokljuka) & Sviscaki. Druskovic s.n.
Carex brizoides L. 2n=58. Slovenia: Mokro polje (Sentjernej) & Sencur (Kranj). Druskovic s.n.
Carex canescens L. 2n=56. Slovenia: Bevke & Olseva. Druskovic s.n.
Carex capillaris L. 2n=54. Slovenia: Kanin & Mangartsko sedlo & Velo polje (Triglav). Druskovic s.n.
Carex caryophyllea Latour. 2n=66. Slovenia: Ig & Krvavi potok & Zeljne (Kocevje). Druskovic s.n.
Carex davalliana Sm. 2n=46. Slovenia: Jelovica & Ljubljana & Pokljuka & Toplice near Hotavlje. Druskovic s.n.
Carex diandra Schrank 2n=60. Slovenia: Zgornji Dolic. Druskovic s.n.
Carex digitata L. 2n=54. Slovenia: Branica near Stanjel & Hotavlje & Jezersko & Zgornje Laknice near Mokronog & Zeljne near Kocevje. Druskovic s.n.
Carex dioica L. 2n=52. Slovenia: Malo polje near Triglav & Zgornje Laknice near Mokronog & Zgornji Dolic. Druskovic s.n.
Carex distans L. 2n=74. Slovenia: Kostanjevica & Krvavi potok & Mance near Vipava & Zgornji Dolic. Druskovic s.n.
Carex divisa Huds. 2n=60. Slovenia: Seca & Sermin. Druskovic s.n.
Carex divulsa Stokes 2n=58. Slovenia: Branik & Osp. Druskovic s.n.
Carex stellulata Good. 2n=58. Slovenia: Bevke & Jelovica & Ljubljana. Druskovic s.n.
Carex elata All. 2n=76. Slovenia: Borovniski Pekel & Cerknica & Ljubljana. Druskovic s.n.

Carex elongata L. 2n=56. Slovenia: Bevke & Ljubljana. Druskovic s.n.
Carex extensa Good. 2n=60. Slovenia: Strunjan. Druskovic s.n.
Carex ferruginea Scop. 2n=40. Slovenia: Ceska koca & Malo polje near Triglav & Mangart. Druskovic s.n.
Carex firma Host 2n=34. Slovenia: Juliana & Mangartsko sedlo & Velo polje near Triglav. Druskovic s.n.
Carex flacca Schreb. 2n=76. Slovenia: Ig & Strunjan & Zgornji Dolic & Zeljne near Kocevje & Zerjav. Druskovic s.n.
Carex flava L. 2n=60. Slovenia: Cerknica & Ig & Ljubljana & Mokro polje near Sentjernej. Druskovic s.n.
Carex frigida All. 2n=58. Slovenia: Mangart. Druskovic s.n.
Carex fuliginosa Schkuhr 2n=40. Slovenia: Mangartsko sedlo. Druskovic s.n.
Carex gracilis Curt. 2n=84. Slovenia: Ig & Ljubljana & Mokro polje near Sentjernej. Druskovic s.n.
Carex halleriana Asso 2n=52. Slovenia: Branik & Rebrnice near Nanos & Sermin. Druskovic s.n.
Carex hirta L. 2n=112. Slovenia: Bevke & Ljubljana & Zeljne near Kocevje. Druskovic s.n.
Carex hostiana DC. 2n=56. Slovenia: Crna vas near Ljubljana. Druskovic s.n.
Carex humilis Leyss. 2n=38. Slovenia: Krvavi potok & Trenta. Druskovic s.n.
Carex kitaibeliana Degen 2n=36. Slovenia: Notranjski Sneznik. Druskovic s.n.
Carex lepidocarpa Tausch 2n=72. Slovenia: Crna vas near Ljubljana & Pijava Gorica & Zgornji Dolic. Druskovic s.n.
Carex limosa L. 2n=64. Slovenia: Ljubljana & Lovrenska barja on Pohorje. Druskovic s.n.
Carex michelii Host 2n=62. Slovenia: Slavnik. Druskovic s.n.
Carex montana L. 2n=38. Slovenia: Mance near Vipava & Zeljne near Kocevje. Druskovic s.n.
Carex mucronata All. 2n=36. Slovenia: Kokra & Olseva & Trenta & Velo polje. Druskovic s.n.
Carex nigra (L.) Reichart 2n=84. Slovenia: Pokljuka & Zgornji Dolic. Druskovic s.n.
Carex ornithopoda Willd. 2n=54. Slovenia: Borovniski Pekel & Cerknica & Ig & Hotavlje. Druskovic s.n.
Carex ornithopodioides Hausm. 2n=56. Slovenia: Velo polje. Druskovic s.n.
Carex otrubae Podp. 2n=60. Slovenia: Kostanjevica & Obrez near Brezice & Strunjan. Druskovic s.n.
Carex leporina L. 2n=66. Slovenia: Bevke & Jelovica & Ljubljana. Druskovic s.n.
Carex pairaei F. Schultz 2n=58. Slovenia: Boc & Ig & Secovlje. Druskovic s.n.
Carex pallescens L. 2n=64. Slovenia: Bevke & Jelovica & Kostanjevica. Druskovic s.n.
Carex panicea L. 2n=32. Slovenia: Bevke & Borovniski Pekel & Brezovica near Trebnje & Cerknica & Kostanjevica. Druskovic s.n.
Carex paniculata L. 2n=64. Slovenia: Borovniski Pekel & Ig & Zgornje Laknice near Mokronog. Druskovic s.n.
Carex parviflora Host 2n=54. Slovenia: Mangartsko sedlo & Velo polje near Triglav. Druskovic s.n.
Carex pauciflora Lightf. 2n=76. Slovenia: Pokljuka. Druskovic s.n.
Carex pendula Huds. 2n=60. Slovenia: Olseva & Fiesa. Druskovic s.n.
Carex pilosa Scop. 2n=44. Slovenia: Nova Gorica & Podhurska near Kamnik & Tomiselj & Zeljne near Kocevje. Druskovic s.n.
Carex pilulifera L. 2n=18. Slovenia: Ljubljana & Zeljne near Kocevje. Druskovic s.n.
Carex pseudocyperus L. 2n=66. Slovenia: Ljubljansko barje. Druskovic s.n.
Carex pulicaris L. 2n=60. Slovenia: Zejna dolina near Hotedrscica. Druskovic s.n.

Carex punctata Gaud. 2n=68. Slovenia: Bevke. Druskovic s.n.
Carex remota Grufb. 2n=62. Slovenia: Ig & Ljubljana & Olseva. Druskovic s.n.
Carex riparia Curt. 2n=72. Slovenia: Kapele near Brezice & Strunjan. Druskovic s.n.
Carex rostrata Stokes 2n=60. Slovenia: Velo polje & Pokljuka. Druskovic s.n.
Carex rupestris Bell. 2n=52. Slovenia: Mangartsko sedlo & Notranjski Sneznik. Druskovic s.n.
Carex sempervirens Vill. 2n=32. Slovenia: Konjscica & Mangartsko sedlo & Velo polje near Triglav. Druskovic s.n.
Carex serotina Merat 2n=68. Slovenia: Cerknica & Ig & Zejna dolina near Hotedrscica. Druskovic s.n.
Carex serotina Merat 2n=70. Slovenia: Ljubljana. Druskovic s.n.
Carex spicata Huds. 2n=60. Slovenia: Kortine near Rizana & Ljubljana & Obrez near Brezice. Druskovic s.n.
Carex sylvatica Huds. 2n=58. Slovenia: Borovniski Pekel & Mance near Vipava & Zeljne near Kocevje. Druskovic s.n.
Carex tomentosa L. 2n=48. Slovenia: Obrez near Brezice & Secovlje & Strunjan. Druskovic s.n.
Carex umbrosa Host 2n=62. Slovenia: Brezovica near Trebnje & Javorniski Rovt. Druskovic s.n.
Carex vesicaria L. 2n=82. Slovenia: Ig & Ljubljana. Druskovic s.n.
Carex vulpina L. 2n=66. Slovenia: Kostanjevica. Druskovic s.n.
Carex vulpina L. 2n=68. Slovenia: Krakovski gozd & Sotla. Druskovic s.n.

JUNCACEAE

Juncus acutiflorus Ehrh. 2n=40. Slovenia: Olseva & Prem. Druskovic s.n.
Juncus acutus L. 2n=48. Slovenia: Strunjan. Druskovic s.n.
Juncus alpinoarticulatus Chaix 2n=40. Slovenia: Ljubljansko barje & Velo polje near Triglav. Druskovic s.n.
Juncus articulatus L. 2n=80. Slovenia: Hrastovlje & Krakovski gozd & Ljubljansko barje & Rizana. Druskovic s.n.
Juncus bufonius L. 2n=106. Slovenia: Olseva & Zejna dolina (Hotedrscica). Druskovic s.n.
Juncus compressus Jacq. 2n=44. Slovenia: Koper & Pijava Gorica. Druskovic s.n.
Juncus conglomeratus L. 2n=42. Slovenia: Krakovski gozd & Pijava Gorica & Topolc. Druskovic s.n.
Juncus effusus L. 2n=42. Slovenia: Krakovski gozd & Ljubljansko barje. Druskovic s.n.
Juncus filiformis L. 2n=84. Slovenia: Lovrenska barja na Pohorju & Malo polje (Triglav) & Olseva. Druskovic s.n.
Juncus gerardii Lois. 2n=84. Slovenia: Koper. Druskovic s.n.
Juncus inflexus L. 2n=40. Slovenia: Ig & Rizana & Topolc. Druskovic s.n.
Juncus longicornis Bast. 2n=42. Slovenia: Hrastovlje & Secovlje. Druskovic s.n.
Juncus maritimus Lam. 2n=48. Slovenia: Secovlje & Strunjan. Druskovic s.n.
Juncus monanthos Jacq. 2n=30. Slovenia: Mangartsko sedlo & Velo polje near Triglav. Druskovic s.n.
Juncus tenuis Willd. 2n=84. Slovenia: Cerknica & Pekre near Maribor & Pijava gorica. Druskovic s.n.
Juncus trifidus L. 2n=30. Slovenia: Mangartsko sedlo. Druskovic s.n.
Luzula alpinopilosa (Chaix) Breistr. 2n=12. Slovenia: Mangart. Druskovic s.n.
Luzula campestris (L.) DC. 2n=12. Slovenia: Dobeno near Ljubljana & Hudo near Novo mesto & Jezersko & Jugorje & Mance near Vipava & Rakitna. Druskovic s.n.
Luzula forsteri (Sm.) DC. 2n=24. Slovenia: Branica near Stanjel & Hudo near Novo mesto & Loka near Zidani most & Maline near Semic. Druskovic s.n.
Luzula luzulina (Vill.) DT et Sarnth. 2n=24. Slovenia: Belscica & Jezersko & Olseva &

Pokljuka. Druskovic s.n.
Luzula luzuloides (Lam.) Dandy et Wilm. 2n=12. Slovenia: Hudo near Novo mesto & Klanec near Komenda & Olseva & Pokljuka & Trnovski gozd & Turjak. Druskovic s.n.
Luzula multiflora (Retz.) Lej. 2n=24. Slovenia: Jezersko & Murska Sobota. Druskovic s.n.
Luzula multiflora (Retz.) Lej. 2n=36. Slovenia: Gorenje Lezece & Zgornji Ig & Smarnogorska Grmada. Druskovic s.n.
Luzula nivea (L.) DC. 2n=12. Slovenia: Kluze near Bovec & Matajur & Vrsic & Trenta. Druskovic s.n.
Luzula pilosa (L.) Willd. 2n=66. Slovenia: Hudo near Novo mesto & Komenda & Pokljuka & Trnovski gozd & Turjak. Druskovic s.n.
Luzula sylvatica (Huds.) Gaud. subsp. sieberi (Tausch) K. Richter 2n=12. Slovenia: Mangart & Vrsic. Druskovic s.n.
Luzula spicata (L.) Lam. 2n=12. Slovenia: Mangart & Velo polje. Druskovic s.n.
Luzula sudetica (Willd.) DC. 2n=36. Slovenia: Mangartsko sedlo. Druskovic s.n.
Luzula sylvatica (Huds.) Gaud. 2n=12. Slovenia: Krim & Rogla on Pohorje & Trnovski gozd & Zerjav. Druskovic s.n.

SALICACEAE

Populus tremula L. 2n=38. Slovenia: Zerjav. Druskovic s.n.
Salix alba L. 2n=76. Slovenia: Brezovica-Bevke & Vremska dolina & Zalog near Komenda. Druskovic s.n.
Salix alpina Scop. 2n=38. Slovenia: Matajur & Velo polje near Triglav. Druskovic s.n.
Salix appendiculata L. 2n= 38. Slovenia: Jezersko & Kokra near Kranj & Log pod Mangartom & Trenta & Zgornja Trenta & Zerjav. Druskovic s.n.
Salix aurita L. 2n=76. Slovenia: Bevke & Crnivec & Jezersko. Druskovic s.n.
Salix caprea L. 2n= 38. Slovenia: Jezersko & Log pod Mangartom & Trnovski gozd & Vremska dolina & Zelimlje & Zerjav. Druskovic s.n.
Salix cinerea L. 2n=76. Slovenia: Bevke & Ostrozno & Zalog near Komenda & Zelimlje. Druskovic s.n.
Salix eleagnos Scop. 2n= 38. Slovenia: Ceska koca & Jezersko & Krim & Log pod Mangartom & Trenta. Druskovic s.n.
Salix fragilis L. 2n= 38 Slovenia: Planinsko polje. Druskovic s.n.
Salix fragilis L. 2n=76. Slovenia: Cerknica & Jezersko & Hotiza near Mura. Druskovic s.n.
Salix glabra Scop. 2n=38. Slovenia: Kokra & Mangart & Trenta & Zerjav. Druskovic s.n.
Salix herbacea L. 2n=38. Slovenia: Mangart. Druskovic s.n.
Salix nigricans Sm. 2n= 114. Slovenia: Col-Predmeja & Trnovski gozd. Druskovic s.n.
Salix purpurea L. 2n= 38. Slovenia: Bevke & Jezersko & Log pod Mangartom & Zalog near Komenda & Trenta. Druskovic s.n.
Salix reticulata L. 2n=38. Slovenia: Mangartsko sedlo. Druskovic s.n.
Salix retusa L. 2n=114. Slovenia: Trnovski gozd & Mangartsko sedlo & Matajur & Zerjav. Druskovic s.n.
Salix rosmarinifolia L. 2n=38. Slovenia: Olsevo & Zejna dolina near Hotedrscica. Druskovic s.n.
Salix triandra L. 2n=44. Slovenia: Hotiza near Mura. Druskovic s.n.
Salix triandra L. 2n=88. Slovenia: Ormoz. Druskovic s.n.
Salix viminalis L. 2n=38. Slovenia: Polhov Gradec & Rakitna. Druskovic s.n.
Salix waldsteiniana Willd. 2n=38. Slovenia: Matajur & Mangartsko sedlo. Druskovic s.n.

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ACERACEAE
Acer campestre L. 2n=26. Slovenia: Zerjav. Druskovic s.n.
Acer pseudoplatanus L. 2n=52. Slovenia: Zerjav. Druskovic s.n.
AMARYLLIDACEAE
Galanthus nivalis L. 2n=24. Slovenia: Plave & Straza. Druskovic s.n.
Leucojum aestivum L. 2n=22. Slovenia: Planinsko Polje & Zelimlje. Druskovic s.n.
Leucojum vernum L. 2n=20. Slovenia: Krim & Nova Stifta & Zelimlje. Druskovic s.n.
Narcissus exsertus Haw. 2n=14+0–1B. Slovenia: Golica & Javorniski Rovt. Druskovic s.n.
ARACEAE
Arum maculatum L. 2n=56. Slovenia: Gorjanci. Lovka s.n.
ASCLEPIADACEAE
Vincetoxicum hirundinaria Medicus 2n=22. Slovenia: Zerjav. Druskovic s.n.
ASTERACEAE
Achillea millefolium L. 2n=54. Slovenia: Zerjav. Druskovic s.n.
Amphoricarpos neumayeri Vis. 2n=24. Montenegro: Orjen. Lovka s.n.
Aster bellidiastrum (L.) Scop. 2n=18. Slovenia: Zerjav. Druskovic s.n.
Bellis perennis L. 2n=18. Croatia: Kanegra. Lovka s.n.
Buphthalmum salicifolium L. 2n=20. Slovenia: Zerjav. Druskovic s.n.
Carduus crassifolius Willd. 2n=18. Slovenia: Kokrsko sedlo. Druskovic s.n.
Carlina acaulis L. 2n=20. Slovenia: Zerjav. Druskovic s.n.
Centaurea fritschii Hayek 2n=20. Slovenia: Cezsoca & Juliana. Druskovic s.n.
Centaurea jacea L. 2n=44. Slovenia: Zerjav. Druskovic s.n.
Centaurea macroptilon Borbás 2n=44. Slovenia: Zerjav. Druskovic s.n.
Cirsium arvense (L.) Scop. 2n=34. Slovenia: Zerjav. Druskovic s.n.
Cirsium carniolicum Scop. 2n=34. Slovenia: Kranjska gora. Lovka s.n.
Cirsium erisithales (Jacq.) Scop. 2n=34. Slovenia: Zerjav. Druskovic s.n.
Crepis aurea (L.) Cass. 2n=14. Slovenia: Triglavska jezera. Lovka s.n.
Crepis terglouensis (Hacq.) A. Kern. 2n=18. Slovenia: Planika. Lovka s.n.
Eupatorium cannabinum L. 2n=20. Slovenia: Zerjav. Druskovic s.n.
Leontodon incanus (L.) Schrank 2n=8. Slovenia: Zerjav. Druskovic s.n.
Leucanthemum ircutianum (Turcz.) DC. 2n=36. Slovenia: Zerjav. Druskovic s.n.
Senecio ovirensis (Koch) DC. 2n=48. Slovenia: Zerjav. Druskovic s.n.
Solidago virgaurea L. 2n=18. Slovenia: Zerjav. Druskovic s.n.
Tussilago farfara L. 2n=60. Slovenia: Zerjav. Druskovic s.n.
BETULACEAE
Alnus viridis (Chaix) DC. 2n=28. Slovenia: Zerjav. Druskovic s.n.
Betula pendula Roth 2n=28. Slovenia: Zerjav. Druskovic s.n.
BORAGINACEAE
Moltkea petraea (Tratt.) Vis. 2n=16. Montenegro: Kotor. Lovka s.n.
Pulmonaria officinalis L. 2n=16. Slovenia: Bostanj & Moravce & Kocevski Rog & Krim & Vipava & Tabor. Druskovic & Lovka s.n.
Pulmonaria stiriaca Kerner 2n=24. Slovenia: Ljubljana. Druskovic s.n.
BRASSICACEAE
Alyssum montanum L. 2n=16. Slovenia: Hrusica & Sezana & Senozece. Druskovic s.n.
Alyssum montanum L. 2n=32. Croatia: Djurdevac. Druskovic s.n.
Alyssum montanum L. 2n=48. Slovenia: Zice. Croatia: Resenik & Smeroviste. Druskovic s.n.
Biscutella laevigata L. 2n=36. Slovenia: Zerjav. Druskovic s.n.

Cardamine matthioli Moretti 2n=16. Slovenia: Ljubljansko Barje. Druskovic s.n.
Cardamine matthioli Moretti 2n=32. Slovenia: Ljubljansko Barje & Pokljuka & Kranj. Druskovic s.n.
Erysimum sylvestre Scop. 2n=14. Slovenia: Zerjav. Druskovic s.n.
Thlaspi kerneri Huter 2n=18. Slovenia: Sija. Druskovic s.n.
Thlaspi praecox Wulf. 2n=14. Slovenia: Zerjav. Druskovic s.n.

CAMPANULACEAE

Campanula caespitosa Scop. 2n=34. Slovenia: Zerjav. Druskovic s.n.
Campanula persicifolia L. 2n=16. Sovenia: Zerjav. Druskovic s.n.
Campanula rotundifolia L. 2n=68. Slovenia: Zerjav. Druskovic s.n.
Phyteuma orbiculare L. 2n=22. Slovenia: Zerjav. Druskovic s.n.

CANNABACEAE

Humulus lupulus L. 2n=20. Slovenia: Ljubljana & Nova Gorica. Lovka s.n.

CAPRIFOLIACEAE

Sambucus ebulus L. 2n=36. Slovenia: Zerjav. Druskovic s.n.

CARYOPHYLLACEAE

Dianthus sylvestris Wulf. 2n=30. Slovenia: Zerjav. Druskovic s.n.
Melandrium rubrum (Weigel) Garcke 2n=24. Slovenia: Crna prst & Zerjav. Druskovic s.n.
Minuartia verna (L.) Hiern 2n=24. Slovenia: Zerjav. Druskovic s.n.
Silene alpestris Jacq. 2n=24. Slovenia: Zerjav. Druskovic s.n.
Silene nutans L. 2n=24. Slovenia: Zerjav. Druskovic s.n.
Silene quadridentata (Murr.) Pers. 2n=24. Slovenia: Zerjav. Druskovic s.n.

CELASTRACEAE

Euonymus europaeus L. 2n=64. Slovenia: Zerjav. Druskovic s.n.

CISTACEAE

Helianthemum alpestre (Jacq.) DC. 2n=22. Slovenia: Prisojnik. Druskovic s.n.
Helianthemum ovatum (Viv.) Dum. 2n=20. Slovenia: Zerjav. Druskovic s.n.

CORNACEAE

Cornus sanguinea L. 2n=22. Slovenia: Zerjav. Druskovic s.n.

CUPRESSACEAE

Juniperus communis L. 2n=22. Slovenia: Zerjav. Druskovic s.n.

DIPSACACEAE

Knautia drymeia Heuff. 2n=20. Slovenia: Kokrsko sedlo. Druskovic s.n.
Knautia drymeia Heuff. 2n=40. Slovenia: Zerjav. Druskovic s.n.
Knautia illyrica G. Beck 2n=40. Slovenia: Hrastovlje. Druskovic s.n.
Scabiosa lucida Vill. 2n=16. Slovenia: Zerjav. Druskovic s.n.

ERICACEAE

Erica herbacea L. 2n=24. Slovenia: Zerjav. Druskovic s.n.
Vaccinium vitis-idaea L. 2n=24. Slovenia: Zerjav. Druskovic s.n.

EUPHORBIACEAE

Euphorbia amygdaloides L. 2n=20. Slovenia: Zerjav. Druskovic s.n.
Euphorbia cyparissias L. 2n=20. Slovenia: Zerjav. Druskovic s.n.
Mercurialis perennis L. 2n=42. Slovenia: Zerjav. Druskovic s.n.

FABACEAE

Anthyllis vulneraria L. 2n=12. Slovenia: Zerjav. Druskovic s.n.
Astragalus illyricus Bernh. 2n=16. Slovenia: Hrastovlje. Lovka s.n.
Chamaecytisus hirsutus (L.) Briq. 2n=96. Slovenia: Zerjav. Druskovic s.n.
Hippocrepis comosa L. 2n=14. Slovenia: Zerjav. Druskovic s.n.
Lotus corniculatus L. 2n=24. Slovenia: Zerjav. Druskovic s.n.
Robinia pseudoacacia L. 2n=22. Slovenia: Zerjav. Druskovic s.n.
Tetragonolobus maritimus (L.) Roth 2n=14. Slovenia: Draga. Druskovic s.n.

Vicia sepium L. 2n=14. Slovenia: Zerjav. Druskovic s.n.

FAGACEAE

Fagus sylvatica L. 2n=24. Slovenia: Zerjav. Druskovic s.n.

GENTIANACEAE

Gentiana asclepiadea L. 2n=44. Slovenia: Zerjav. Druskovic s.n.
Gentiana cruciata L. 2n=52. Slovenia: Zerjav. Druskovic s.n.
Gentiana verna L. 2n=28. Slovenia: Zerjav. Druskovic s.n.
Gentiana verna L. 2n=28+0–2B. Slovenia: Gorica. Druskovic s.n.
Gentianella ciliata (L.) Borkh. 2n=44. Slovenia: Zerjav. Druskovic s.n.

IRIDACEAE

Iris pseudacorus L. 2n=24. Slovenia: Cerknica & Dragonja & Ig. Druskovic & Lovka s.n.
Iris pseudacorus L. 2n=34. Slovenia: Dragonja & Ig. Druskovic & Lovka s.n.

LAMIACAE

Ajuga genevensis L. 2n=32. Slovenia: Zerjav. Druskovic s.n.
Acinos alpinus (L.) Moench 2n=18. Slovenia: Zerjav. Druskovic s.n.
Betonica jacquinii Gren. et Godr. 2n=16. Slovenia: Zerjav. Druskovic s.n.
Galeobdolon flavidum (F. Herm.) Holub 2n=18. Slovenia: Krvavec. Druskovic s.n.
Galeopsis pubescens Bess. 2n=16. Slovenia: Zerjav. Druskovic s.n.
Salvia glutinosa L. 2n=16. Slovenia: Zerjav. Druskovic s.n.
Teucrium chamaedrys L. 2n=64. Slovenia: Zerjav. Druskovic s.n.

LEMNACEAE

Lemna minor L. 2n=44. Slovenia: Petanjci. Druskovic s.n.
Lemna minor L. 2n=66. Slovenia: Zvirce. Druskovic s.n.

LILIACEAE

Lilium martagon L. 2n=24. Slovenia: Crna prst & Rob & Komen & Vipava & Mala gora. Druskovic & Lovka s.n.
Polygonatum multiflorum (L.) All. 2n=18. Slovenia: Ljubljana & Sostanj & Skocjanske jame & Zgornje Jezersko & Zelimlje. Druskovic s.n.
Polygonatum odoratum (Mill.) Druce 2n=20. Slovenia: Zerjav. Druskovic s.n.
Polygonatum verticillatum (L.) All. 2n=28. Slovenia: Sviscaki & Vojsko & Sostanj & Zgornje Jezersko. Druskovic s.n.
Ruscus aculeatus L. 2n=40. Slovenia: Skocjanske jame. Lovka s.n.
Tofieldia calyculata (L.) Wahlenb. 2n=30. Slovenia: Lepa Komna. Lovka s.n.
Veratrum album L. 2n=32. Slovenia: Breginjski Stol. Lovka s.n.

LINACEAE

Linum angustifolium Huds. 2n=30. Croatia: Krk. Lovka s.n.
Linum julicum Hayek 2n=18. Slovenia: Kokrsko sedlo. Druskovic s.n.

OLEACEAE

Fraxinus excelsior L. 2n=46. Slovenia: Zerjav. Druskovic s.n.
Fraxinus ornus L. 2n=46. Slovenia: Zerjav. Druskovic s.n.

ORCHIDACEAE

Cephalanthera rubra (L.) L.C. Rich. 2n=36. Slovenia: Spodnja Slivnica. Lovka s.n.
Ophrys sphegodes Mill. 2n=36. Croatia: Motovun. Lovka s.n.
Orchis coriophora L. 2n=36. Croatia: Rab. Lovka s.n.

PAEONIACEAE

Paeonia officinalis L. 2n=20. Croatia: Kanfanar. Lovka s.n.

PINACEAE

Abies alba Mill. 2n=24. Slovenia: Pohorje & Jelovica & Mezakla & Rakitna & Sneznik & Trnovski gozd. Druskovic s.n.
Larix decidua Mill. 2n=24. Slovenia: Pohorje & Peca & Radlje & Sostanj. Druskovic s.n.
Picea abies (L.) Karsten 2n=24. Slovenia: Pohorje & Trnovski gozd & Brezice & Cerkno & Gorjanci & Ljubljana & Mezakla. Druskovic s.n.

Pinus nigra Arnold 2n=24. Slovenia: Vipava & Sezana & Rakitna & Vipavska dolina. Druskovic s.n.
Pinus sylvestris L. 2n=24. Slovenia: Pohorje & Cerkno & Rakitna & Zerjav. Druskovic s.n.

PLANTAGINACEAE

Plantago argentea Chaix 2n=12. Slovenia: Kazlje & Prestranek. Druskovic s.n.
Plantago lanceolata L. 2n=12. Slovenia: Gorenja vas & Ig & Jezersko & Koper & Krakovski gozd & Mojstrana. Druskovic s.n.
Plantago major L. 2n=12. Slovenia: Col & Hotavlje & Skofja Loka & Sostanj & Vipava. Druskovic s.n.
Plantago media L. 2n=24. Slovenia: Ig & Koper & Ljubljana & Zerjav. Druskovic s.n.

POACEAE

Anthoxanthum aristatum Boiss. 2n=10. Croatia: Mirna in Istria. Lovka s.n.
Calamagrostis varia (Schrad.) Host 2n=28. Slovenia: Zerjav. Druskovic s.n.
Deschampsia flexuosa (L.) Trin. 2n=26. Slovenia: Zerjav. Druskovic s.n.
Koeleria pyramidata (Lam.) Domin 2n=14. Slovenia: Zerjav. Druskovic s.n.
Poa alpina L. 2n=33. Slovenia: Okreselj. Druskovic s.n.
Poa trivialis L. 2n=14. Slovenia: Zerjav. Druskovic s.n.
Sesleria albicans Kit. ex Schultes 2n=28. Slovenia: Zerjav. Druskovic s.n.

POLYGALACEAE

Polygala amara L. 2n=34. Slovenia: Zerjav. Druskovic s.n.

POLYGONACEAE

Rumex scutatus L. 2n=20. Slovenia: Draga. Druskovic s.n.

POLYPODIACEAE

Asplenium viride Huds. 2n=72. Slovenia: Col-Javornik. Lovka s.n.
Pteridium aquilinum (L.) Kuhn 2n=104. Slovenia: Zerjav. Druskovic s.n.

PRIMULACEAE

Cyclamen neapolitanum Ten. 2n=34. Macedonia: Ohrid. Lovka s.n.
Cyclamen purpurascens Mill. 2n=34. Slovenia: Zerjav. Montenegro: Kotor. Druskovic & Lovka s.n.
Primula auricula L. 2n=62. Slovenia: Matavun. Druskovic s.n.
Primula columnae Ten. 2n=22. Bosnia and Herzegovina: Sarajevo-Gorazde. Lovka s.n.
Primula elatior (L.) Hill. 2n=22. Slovenia: Crna prst. Lovka s.n.
Primula farinosa L. 2n=18. Slovenia: Kranjska gora. Lovka s.n.
Primula vulgaris Huds. 2n=22. Slovenia: Zerjav. Druskovic s.n.

RANUNCULACEAE

Aconitum angustifolium Bernh. 2n=48. Slovenia: Breginjski stol & Komna. Lovka s.n.
Actaea spicata L. 2n=16. Slovenia: Crna prst. Lovka s.n.
Anemone hortensis L. 2n=16. Slovenia: Dragonja. Croatia: Veliki Ston. Lovka s.n.
Anemone nemorosa L. 2n=16. Slovenia: Golac-Plesevica. Lovka s.n.
Anemone trifolia L. 2n=32. Slovenia: Vrsic. Lovka s.n.
Aquilegia einseleana F. W. Schultz 2n=16. Slovenia: Breginjski Stol & Ticarica & Ukanc. Druskovic s.n.
Ficaria calthaefolia Rchb. 2n=16. Bosnia and Herzegovina: Blagaj. Croatia: Buje & Karlobag & Rovinj & Katun. Lovka s.n.
Ficaria calthaefolia Rchb. 2n=16+0–9B. Croatia: Krk & Limski Kanal & Peljesac & Visnjan-Badjerna. Lovka s.n.
Ficaria calthaefolia Rchb. 2n=32. Slovenia: Prvacina & Ranik & Strunjan. Croatia: Korcula & Mirna in Istria & Zuzici. Lovka s.n.
Ficaria grandiflora Robert 2n=32. Croatia: Korcula & Mirna in Istria.
Ficaria grandiflora Robert 2n=40. Croatia: Vizinada. Lovka s.n.
Helleborus niger L. 2n=32. Slovenia: Jezersko & Kamniska Bistrica & Mojstrana &

Pijava Gorica & Turjak & Zerjav. Druskovic s.n.
Hepatica nobilis Mill. 2n=14. Slovenia: Velika Planina & Vogel & Zerjav. Druskovic s.n.
Ranunculus montanus Willd. 2n=16. Croatia: Mali Platak & Risnja. Macedonia: Sar Planina. Lovka s.n.
Ranunculus nemorosus DC. 2n=16. Slovenia: Zerjav. Druskovic s.n.
Ranunculus oreophilus MB. 2n=16. Slovenia: Caven. Druskovic s.n.
RHAMNACEAE
Rhamnus cathartica L. 2n=24. Slovenia: Zerjav. Druskovic s.n.
ROSACEAE
Crataegus monogyna Jacq. 2n=34. Slovenia: Zerjav. Druskovic s.n.
Filipendula vulgaris Moench 2n=14. Slovenia: Kazlje. Druskovic s.n.
Fragaria vesca L. 2n=14. Slovenia: Zerjav. Druskovic s.n.
Potentilla alba L. 2n=28. Slovenia: Divaca & Mala gora. Druskovic & Lovka s.n.
Potentilla crantzii Beck. 2n=35. Slovenia: Velika planina. Lovka s.n.
Pyrus pyraster (L.) Borkh. 2n=34. Slovenia: Zerjav. Druskovic s.n.
Rubus saxatilis L. 2n=28. Slovenia: Zerjav. Druskovic s.n.
Sorbus aria (L.) Cr. 2n=34. Slovenia: Zerjav. Druskovic s.n.
Spiraea decumbens Koch 2n=36. Slovenia: Juliana. Druskovic s.n.
RUBIACEAE
Galium album Mill. 2n=44. Slovenia: Zerjav. Druskovic s.n.
Galium anisophyllon Vill. 2n=66. Slovenia: Zerjav. Druskovic s.n.
SCROPHULARIACEAE
Digitalis grandiflora Mill. 2n=56. Slovenia: Zerjav. Druskovic s.n.
Verbascum nigrum L. 2n=30. Slovenia: Zerjav. Druskovic s.n.
THYMELEACEAE
Daphne mezereum L. 2n=18. Slovenia: Zerjav. Druskovic s.n.
VALERIANACEAE
Valeriana tripteris L. 2n=16. Slovenia: Zerjav. Druskovic s.n.
VIOLACEAE
Viola odorata L. 2n=20. Croatia: Livade in Istria. Lovka s.n.

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Reports by **L. MICHAEL HILL**, Department of Biology, Bridgewater College, Bridgewater, Virginia 22812. Localities in Virginia. Vouchers at BDWR. This work was supported by the Gwathmey Memorial Trust.

ACERACEAE
Acer pennsylvanicum L. 2n=26. Hill 91578.
ASCLEPIADACEAE
Asclepias exaltata L. 2n=22. Hill 92597.
Asclepias syriaca L. 2n=22. Hill 91825.
ASTERACEAE
Centaurea maculosa Lam. 2n=36. Hill 93486.
Erigeron annuus (L.) Persoon 2n=27. Hill 90299.
BRASSICACEAE
Descurainia sophia (L.) Prantl n=14. Hill 89731.
CAMPANULACEAE
Lobelia siphilitica L. 2n=14. Hill 91256.
CARYOPHYLLACEAE
Silene stellata (L.) Aiton f. 2n=34. Hill 90723.

FABACEAE
Lathyrus latifolius L. 2n=14. Hill 91467.
LILIACEAE
Erythronium americanum Ker. 2n=48. Hill 92556.
Polygonatum biflorum (Walter) Ell. 2n=20. Hill 89567.
Trillium grandiflorum (Michx.) Salisb. 2n=10. Hill 89776.
Trillium nivale Riddell 2n=10. Hill 90445.
Trillium pusillum var. ***monticulum*** Botkin & Reveal 2n=10. Hill 90447.
Trillium pusillum var. **virginianum** Fern. 2n=10. Hill 90587.
Trillium sessile L. 2n=10. Hill 89437.
PHYTOLACCACEAE
Phytolacca americana L. 2n=36. Hill 91843.
PLANTAGINACEAE
Plantago lanceolata L. 2n=12. Hill 92369.
Plantago rugellii Dcne. 2n=24. Hill 92641.
RANUNCULACEAE
Anemone quinquefolia L. 2n=32. Hill 91435.
Ranunculus allegheniensis Britton 2n=16. Hill 91448.
Thalictrum thalictroides (L.) Eames & Bowen 2n=14. Hill 90221.
SAXIFRAGACEAE
Heuchera americana L. 2n=14. Hill 90723.
Mitella diphylla L. 2n=14. Hill 91623.
VIOLACEAE
Viola palmata L. 2n=54. Hill 89357.
VITACEAE
Parthenocissus quinquefolia (L.) Planchon 2n=40. Hill 92001.

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Reports by **V. IRUDAYARAJ** and **V.S. MANICKAM**, Department of Botany, St Xavier's College, Palayamkottai, Tamilnadu, India - 627 002. All the localities are in the western Ghats, India. Vouchers are in SXCH (St Xavier's College Herbarium). The work was done with the financial support of Rev. Fr. P.J. Ubelmesser s.j., Germany and Hubert Hanggi s.j., Switzerland.

Actiniopteris radiata (Sw.) Link n=87 (3x apog.). Nilgiris, Coonoor road, 900m (XCH 3388).
Adiantum capillus-veneris L. n=30. Nilgiris, Coonoor road, 1000m (XCH 3390).
Adiantum raddianum Presl n=114. Nilgiris, Coonoor road 1000m (XCH 3389).
Asplenium affine Sw. forma affine Sledge n=144. Kothayar hills, Kakachi steam, 1100m (XCH 3382).
Bolbitis semicordata (Baker) Ching n=41. Nilgiris, Nadugani, Gene Pool forest, 1300m (XCH 3541).
Christella dentata (Forssk.) Brownsey & Jermy n=72. Goa, Dudhsagar water falls, 245m (XCH 3499).
Christella papilio (Hope) Holttum n=36. Munnar hills, High range, 1050m (XCH 3543).
Christella parasitica (L.) H. Lev. n=36. Palni Hills, Kodaikanal, 1700m (XCH 3340). n=72, same locality (XCH 3341).
Cyclosorus interruptus (Willd.) H. Ito n=36. Kothayar hills, Upper Kothayar, 1400m (XCH 3375).
Dryopteris cochleata (Buch. Ham. ex D. Don) C. Chr. n=41. Nilgiris, Gudalur-Naduvattom road, 2200m (XCH 3384).
Grammitis medialis (Baker) Sledge n=36. Kothayar hills, Kakachi stream, 1100m (XCH

3551).
Humata repens (L. f.) Diels n=123 (3x apog.). Kothayar hills, Dam valley, 1500m (XCH 3565).
Macrothelypteris torresiana (Gaudich) Ching n=62. Nilgiris, Keelnadugani, 1300m (XCH 3539).
Pteris biaurita L. n=2n=58 (2x apog.). Kothayar hills, near Manjolai, 700m (XCH 3351). n=2n=87 (3x apog.). Perya, Wyanad district, Kerala, 750m (XCH 3547).
Tectaria coadunata (J. Sm.) C. Chr. var. hirsuta Holttum n=40. Nilgiris, Naduvattom-Gudalur road, 2200m (XCH 3585).
Trichomanes schmidianum Zenker ex Taschn. n=72. Palni Hills, Reservoir shola, 2100m (XCH 3548).
Trigonospora caudipinna (Ching) Sledge s.l. n=36. Nilgiris, Nadugani Gene Pool forest, 1300m (XCH 3540).

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Reports by **Milan LOVKA**, Institute of Biology, University of Ljubljana, Ljubljana, Karlovska 19, 11000 Slovenia. Vouchers with author.

IRIDACEAE
Crocus albiflorus Kit. 2n=8. Croatia: Biokovo. Lovka s.n.
Crocus biflorus Mill. 2n=30. Croatia: Badanj & Karlobag. Lovka s.n.
Crocus chrysanthus Herb. 2n=12. Macedonia: Kicevo & Strumica. Lovka s.n.
Crocus heuffelianus Herb. 2n=18+0–6B. Slovenia: Skocjanske jame. Lovka s.n.
Crocus malyi Vis. 2n=30. Croatia: Velebit. Lovka s.n.
Crocus napolitanus (Ker-Gawl.) Mord. 2n=12. Slovenia: Sevnica. Lovka s.n.
Crocus napolitanus (Ker-Gawl.) Mord. 2n=16+0–2B. Slovenia: Preloze. Lovka s.n.
Crocus reticulatus Hoppe et Hornsch. 2n=12+0–1B. Slovenia: Krajna vas. Lovka s.n.
Crocus reticulatus Hoppe et Hornsch. 2n=12+2B. Slovenia: Stanjel. Lovka s.n.
Gladiolus imbricatus L. 2n=60. Slovenia: Breginjski Stol. Lovka s.n.
Iris germanica L. 2n=44. Slovenia: Izola & Strunjan. Croatia: Rovinj & Veliki Ston. Lovka s.n.
Iris graminea L. 2n=28. Slovenia: Breginjski Stol & Sneznik. Lovka s.n.
Iris graminea L. 2n=34. Slovenia: Turjak. Lovka s.n.
Iris graminea L. 2n=36. Slovenia: Breginjski Stol. Lovka s.n.
Iris illyrica Tommasini 2n=24. Slovenia: Nanos & Osp & Skocjanske jame. Bosnia and Herzegovina: Buna. Croatia: Korcula & Rupa & Sibenik. Lovka s.n.
Iris variegata L. 2n=24. Serbia: Deliblatska Pescara. Lovka s.n.
LILIACEAE
Allium ampeloprasum L. 2n=16. Slovenia: Dragonja & Slavnik. Croatia: Sv. Grgur. Lovka s.n.
Allium carinatum L. 2n=16. Montenegro: Prokletije, Grbaja. Lovka s.n.
Allium carinatum L. 2n=24. Slovenia: Cerkno & Golac. Bosnia and Herzegovina: Visegrad & Sarajevo. Serbia: Zlatibor. Lovka s.n.
Allium dalmaticum A. Kern. 2n=16+0–2B. Croatia: Peljesac. Lovka s.n.
Allium dalmaticum A. Kern. 2n=32. Croatia: Istra, Tar. Lovka s.n.
Allium flavum 2n=16. Serbia: Deliblatska Pescara. Lovka s.n.
Allium margaritaceum Sm. 2n=16+0–2B. Croatia: Peljesac. Lovka s.n.
Allium neapolitanum Cyr. 2n=35. Montenegro: Boka Kotorska, Kamenari. Lovka s.n.
Allium pulchellum G. Don 2n=16. Slovenia: Slavnik. Serbia: Mojkovac-Zabljak. Lovka s.n.
Allium roseum L. 2n=16. Montenegro: Orjen. Lovka s.n.

Allium roseum L. 2n=32. Croatia: Pula & Split. Lovka s.n.
Allium roseum L. 2n=40. Slovenia: Strunjan. Lovka s.n.
Allium roseum L. 2n=48. Croatia: Peljesac, Potomlje. Lovka s.n.
Allium sibiricum L. 2n=16. Macedonia: Solunska glava. Lovka s.n.
Allium sphaerocephalum L. 2n=16. Croatia: Crikvenica. Lovka s.n.
Allium subhirsutum L. 2n=14. Croatia: Split & Mali Ston & Podaca. Lovka s.n.
Allium ursinum L. 2n=16. Croatia: Mali Rajinac. Lovka s.n.
Allium vineale L. 2n=32. Serbia: Raska. Lovka s.n.
Convallaria majalis L. 2n=38. Slovenia: Golac-Plesevica. Lovka s.n.
Fritillaria meleagris L. 2n=24. Slovenia: Ig. Lovka s.n.
Fritillaria tenella M. B. 2n=18+0–6B. Slovenia: Morevz. Lovka s.n.
Lilium carniolicum Bernh. 2n=24. Slovenia: Kurescek. Lovka s.n.
Lilium carniolicum Bernh. 2n=24+2–5B. Slovenia: Mali Musec. Lovka s.n.
Muscari botryoides (L.) Mill. 2n=18. Slovenia: Tublje & Slavnik. Lovka s.n.
Muscari botryoides (L.) Mill. 2n=36. Slovenia: Golac. Montenegro: Orjen. Lovka s.n.
Muscari botryoides (L.) Mill. 2n=54. Slovenia: Slavnik. Croatia: Biokovo. Lovka s.n.
Muscari comosum (L.) Mill. 2n=18. Slovenia: Tublje. Croatia: Livade in Istria. Macedonia: Galicica. Bosnia and Herzegovina: Mostar. Montenegro: Titograd. Lovka s.n.
Muscari racemosum (L.) Mill. 2n=18. Croatia: Drvenik. Lovka s.n.
Muscari racemosum (L.) Mill. 2n=36. Slovenia: Rizana. Croatia: Istria, Novigrad & Peljesac, Veli Ston. Montenegro: Cijevna. Lovka s.n.
Muscari racemosum (L.) Mill. 2n=45. Slovenia: Strunjan. Croatia: Rovinj & Korcula & Veli Ston & Brac. Lovka s.n.
Muscari racemosum (L.) Mill. 2n=54. Croatia: Split & Jelsa na Hvaru. Serbia, Kosovo: Djakovica. Lovka s.n.
Ornithogalum comosum L. 2n=18, 2n=19, 2n=20, 2n=21, 2n=24, 2n=27, 2n=3x=27. Croatia: Umag. Lovka s.n.
Ornithogalum dalmaticum Speta 2n=36. Croatia: Obrovac & Rupa & Jablanac & Marcana. Lovka s.n.
Ornithogalum dalmaticum Speta 2n=35+1B, 2n=36+1B, 2n=37+1B. Croatia: Sukosan. Lovka s.n.
Ornithogalum excapum Ten. 2n=18, 2n=19, 2n=20. Croatia: Budva & Zadar & Peljesac & Rovinj. Lovka s.n.
Ornithogalum kochii Parl. 2n=18+0–9B. Slovenia: Izola & Sezana & Dolje Lezece. Lovka s.n.
Ornithogalum kochii Parl. 2n=19. Slovenia: Dolnje Lezece. Lovka s.n.
Ornithogalum kochii Parl. 2n=22+0–1B. Slovenia: Dolnje Lezece. Lovka s.n.
Ornithogalum kochii Parl. 2n=3x=27. Croatia: Rovinj. Lovka s.n.
Ornithogalum montanum Cyr. 2n=14. Macedonia: Dojran. Lovka s.n.
Ornithogalum refractum Kit. 2n=53, 2n=54. Slovenia: Dragonja. Croatia: Kastel & Starigrad na Hvaru. Lovka s.n.
Ornithogalum sphaerocarpum A. Kern. 2n=16. Slovenia: Rizana. Croatia: Umag. Lovka s.n.
Ornithogalum sphaerocarpum A. Kern. 2n=20. Croatia: Umag. Lovka s.n.
Ornithogalum televrinum Speta 2n=70+2B, 2n=72, 2n=73, 2n=76. Croatia: Jablanac. Lovka s.n.
Scilla autumnalis L. 2n=36. Macedonia: Gevgelija. Lovka s.n.
Scilla bifolia L. 2n=36. Slovenia: Slavnik. Lovka s.n.

RANUNCULACEAE

Anemone hortensis L. 2n=16. Croatia: Limski Kanal & Mirna & Tar. Lovka s.n.
Ficaria calthaefolia Rchb. 2n=16. Slovenia: Portoroz. Croatia: Limski Kanal & Visnjan & Kanfanar & Rovinj. Lovka s.n.

Ficaria calthaefolia Rchb. 2n=16+0–9B. Croatia: Krk & Karlobag
Ficaria calthaefolia Rchb. 2n=3x=24. Croatia: Vela Luka na Korculi. Lovka s.n.
Ficaria calthaefolia Rchb. 2n=32. Slovenia: Rizana. Croatia: Cvitani & Jablanac & Mali Stron. Lovka s.n.
Ficaria calthaefolia Rchb. 2n=40. Croatia: Vizinada. Lovka s.n.
Helleborus odorus W.K. 2n=32. Slovenia: Grosuplje & Slavnik. Croatia: Savudrija. Lovka s.n.

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Reports by **G. MANSION** and **S. BLAISE**, Laboratoire de Biologie Végétale, URA no 1492, Bâtiment 362, Université Paris Sud, 91405 Orsay Cedex, FRANCE. Vouchers in VIL. All locations in France.

FABACEAE
Lotus angustissimus L. 2n=12. Pelouse - garrigue à *Brachypodium phoenicoides*, à Poulx, dans la région nîmoise, Gard, 23.06.94. G. Mansion s.n. Garrigue sèche à *Juniperus oxycedrus*, au pied du Pic St Loup, près de Montpellier, Hérault, 25.06.94. G. Mansion s.n.
Lotus delortii Timb. Lagr. ex F.W. Schulz 2n=24. Vinsobres, route de Fresquet, Drôme, 390m. R. Delpech s.n.
Lotus hispidus DC. 2n=24. Pointe de Crozon, Finistère. G. Bernard s.n.
Lotus preslii Ten. 2n=24. Arrière-dune à *Crucianella maritima* près de Carnon, Hérault, 25.06.94. G. Mansion s.n. Pré humide, à proximité de l'étang de Vaccarès, Bouches du Rhône, 26.06.94. G. Mansion s.n.

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Reports by **A.E. STAHEVITCH**, Plant Health Risk Assessment Unit, Food Production and Inspection Branch, Animal and Plant Health Directorate, Agri-Food Canada, Ottawa, Ontario K2H 8P9, Canada and **W.F. GRANT**, Department of Plant Science, P. O. Box 4000, Macdonald Campus of McGill University, Ste Anne de Bellevue, Quebec H9X 3V9, Canada. Vouchers in MTMG.

BALSAMINACEAE
Impatiens hookeriana Arn. 2n=50. Elkaduna, Sri Lanka, growing on ledges of cliff, Casle Howard Estate, ex Royal Botanic Gardens, Kew, Kew 417-77-03407.
Impatiens leptopoda Arn. 2n=8. Nuwara Eliya District, Sri Lanka, Grey-Wilson and Silva No. 3055, 1978, ex Royal Botanic Gardens, Kew, Kew 429-78-04541.
Impatiens stenantha Hook. f. 2n=18. East Nepal: Grey-Wilson, ex Royal Botanic Gardens, Kew, Kew 80-958.
Impatiens zombensis Bak. f. 2n=16, 1 plant 2n=16+1B. Malawi: Gassner and Cribb 162, ex Royal Botanic Gardens, Kew, Kew 082-82-08035.

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6 News from Molecular Biosystematists 5

edited by Dan J. Crawford
Department of Plant Biology
The Ohio State University,
Columbus, Ohio 43210-1293, USA
Fax: 614-292-6345

Pleae send your contributions to Professor Crawford at the above adress, if possible on RPS Microdisc with text in ASCII-file on 3.5" or 5.25" disc formatted for MacIntosh, and stating whether or not you are IOPB Member. Thank you.

News of molecular systematic activities from the lab of Jeff and Jane Doyle, L.H. Bailey Hortorium, Cornell University, Ithaca, NY 14853 USA.

The main focus of research in the lab continues to be the *Leguminosae* - not surprisingly, considering the size and diversity of that family. We (at this point primarily Jane Doyle, who has taken over from former postdoc Dr Julie Ballenger, now on the faculty at Columbus College, Georgia) are in the process of concluding an phylogenetic study of the family based on rbcL sequences. Members of the lab have been engaged in a number of projects on structural evolution of organellar genomes; most of these have either directly involved, or have grown out of, collaboration with Dr Jeff Palmer at Indiana University. One such collaborative project (conducted by Jane Doyle) has recently been completed and is now in press: a survey of some 400 genera of legumes for losses of several chloroplast genes and introns. Two smaller follow-up projects involve the intron of the chloroplast gene rpl2. One, focusing on the large tropical caesalpinioid genus *Bauhinia*, is a collaboration with Dr Richard Wunderlin (University of South Florida), and has been conducted primarily by undergraduate student Mary Lai, initially with direction from Julie Ballenger and with help from a second undergraduate, Jennifer Sceppa. Results suggest multiple independent intron losses within the genus, a hypothesis that Mary is testing in a companion phylogenetic study using nrDNA ITS sequences. The second rpl2 study is a survey of the tribe *Desmodieae*, conducted by Hortorium graduate student Donovan Bailey, and is part of a larger collaboration on this tribe and the tribe *Phaseoleae* with Drs Hiroyoshi Ohashi, Tomoyuki Nemoto, and Tadashi Kajita of Tohoku University, Sendai, Japan. Two other sets of collaborative projects with Jeff Palmer are in progress. Jane Doyle (with Julie Ballenger) has finished a project on the distribution of a 50 kb cpDNA inversion in the *Leguminosae* using mapping and PCR. Jane has also screened our 400 genus legume sample for the presence of the mitochondrial gene coxII, which has been transferred to the nucleus in flowering plants and lost from the mitochondrial genomes of some legumes. Taxa screened and phylogenetically analyzed in our lab have been sent to the Palmer lab where they are being used in studies of the evolution of coxII expression in the two compartments and in reconstructing the phylogeny of the nuclear copy of the gene.

After a long hiatus, we have in the last year or so become involved again in a number of projects involving the perennial relatives of soybean (*Glycine*) and generic allies. These collaborative projects currently include a study of chloroplast and nuclear microsatellite variation (with Drs Wayne Powell of the University of Dundee, Scotland and Antoni Rafalsji of DuPont, Inc.), two separate investigations (one with Dr Paul Keim of the Northern Arizona University, the other with Dr Randy Shoemaker of Iowa State University) of several different homeologous nuclear loci in paleopolyploid *Glycine*, and a study of nuclear rDNA ITS variation in the genus (with Dr Dan Nickrent, Southern Illinois University). Finally, Dr Charlie Werth (Texas Tech University), during his recent visit to

the lab, began a study of concerted evolution in leghemeglobin genes of diploid and polyploid *Glycine* species.

The main theme of work in the lab for the next few years is likely to be the molecular evolution of nodulation in *Leguminosae*. The basic premise is that our phylogenetic results, along with those of other workers and conventional taxonomy, all suggest the perhaps unlikely hypothesis of multiple independent origins of this complex syndrome in the family. Our goal is to test this by studying phylogeny and expression patterns of several gene families that include genes encoding "nodulins" - proteins expressed uniquely or predominantly in the nodule. Few nodulin genes have been described outside peas, soybean, alfalfa, etc. and none whatsoever from *Caesalpinioideae* or *Mimosoideae*. Our studies have begun with one of the best-characterized gene families that include nodulins, glutamine synthetase (GS). We have developed primers that amplify the various paralogous members of the cytosolic GS subfamily; a separate project, conducted by a former lab undergraduate, Susan Kim, centered on the chloroplast-expressed member of this nuclear gene family. Jane Doyle has isolated and sequenced portions of several of these cytosolic genes from caesalpinioid and mimosoid legumes, a task complicated by the presence of 11 introns in these genes. An undergraduate in the lab, Gary Fanjiang, is currently characterizing the family structurally from *Chamaecrista* and plans expression studies this summer. This genus is of particular interest as a possible independent origin of nodulation (its putative sister genus *Senna*, does not nodulate), as well as for the diversity of developmental patterns of nodulation among its members. Another undergraduate, Eric Schranz, is in the process of constructing a phylogenetic hypothesis for selected members of this complex genus using nrDNA ITS variation; implications for the evolution of nodulation will be interpreted collaboratively with nodulation physiologist/anatomist Dr Janet Sprent (University of Dundee, Scotland).

Other non-legume projects nearing publication include an nrDNA ITS phylogenetic analysis of *Gentiana* (by Yong-Ming Yuan, a former visitor to the lab, and his advisor, Dr Philippe Kuepfer, University of Neuchâtel, Switzerland), and cpDNA RFLP studies of *Juglandaceae* (by long-ago lab undergraduate student Dr Jim Smith, now on the faculty of Boise State University, Idaho), and *Pontederiaceae* (by former postdoc Dr Joshua Kohn, now on the faculty of the University of California at San Diego, and Dr Spencer Barrett of the University of Toronto). My graduate student, Eve Emshwiller, is conducting a phylogenetic/ethnobotanical thesis project on the Andean tuber crop, oca (*Oxalis tuberosa*), and an undergraduate student, Deon Sutherland, is beginning a follow-up study of a local hybridizing population of *Claytonia virginica* and *C. caroliniana* (*Portulaceae*) we first described in 1988. Other la denizens include Hortorium graduate students Larry Kelly (student of Dr Melissa Luckow), who is working on cpDNA and nrDNA ITS variation in *Aristolochiaceae* and Hazel Cropper (student of Dr Kevin Nixon), who is beginning molecular work on a group of arecoid palms. Another fruitful collaboration has involved Marcie Fisher, a recent Plant Breeding Ph.D. (student of Dr Molly Kyle) whose thesis included an exhaustive phylogenetic analysis of complete (ca. 10 kb) nucleic acid sequences of 14 potyviruses, a group of viruses that includes serious pests of legumes. Apart from keeping track of the above studies, my own recent or ongoing projects at different hierarchical/organizational levels, evolution of homeotic plant genes, and the unsuitability of gene tree topologies for delimiting species.

* * *

7. How a Book was Born

The book is "Medicinal and Edible Plants of Alaska and the Russian Far East", the authors - Alexandra N. Berkutenko and Eleanor Viereck. They live on different sides of the Bering Strait: Alexandra on the Okhots sea shore, Eleanor - in Alaska. The book readers have the opportunity to compare the traditions of medicinal and other uses of plants by aboriginal people and newcomers in Alaska, Chukotchka, the Okhotsk-Kolymsk regions and Kamchatka. Alexandra Berkutenko regards as "co-authors" also the Russian naturalists Middendorf, Krasheninnikov, Argentov and Bulichjov who travelled in remote Siberian areas 100-200 years ago; they extensively studied native and the non-native human population and their use of indigenous plants.

Now the story of the book, told by Alexandra:

Many ears ago people, plants and animals migrated in both directions across the Beringia Bridge so that after its disparition they separated but retained the features of their common origin. In the last two centuries, the Non-Natives joined the indigenous people on banks of the Bering Strait.

But Russian and American people who in former times lived around the Bering Strait side by side, were until recently separated by more than the geography: The Iron Curtain blocked information exchange so that e.g. the same plant species were separately diagnosed, differently named, and considered only Asian or only American. Ethnobotany was also studied independently on either side of the Bering Strait.

But times they are-a-changin'... Magadan, the main city of the Kolymsk region and Anchorage in Alaska are now connected by regular flights. E-mail made exchange of information amongst scientists effective. Only a few years ago, a rapid and successful international communication would be an unheard event in Russia; nowadays, everybody takes for granted faxes, e-mail, radiophones, joint expeditions.

One day Catherine Wright, a botanist from Alaska, well-cocooned in her fur jacket in expectation of Siberian frosts arrived to Magadan to attend a conference. She told her Russian colleague about a book by Eleanor Viereck on medicinal plants growing in Alaska wilderness, and Aleksandra considered later a translation of the book. What first started as a modest attempt at translation with perhaps minor additions, became in the fullness of time a newly-structured volume: each plant species was commented upon first by the American author, then by the Russian one.

The co-authors never have seen one another, only came to know one another by their voice.

Writes Alexandra Berkutenko:

"In these days, I speak on our local radio about 'The World of the Northern Plants'. People say they like to listen; their joy is my reward, the radio has no money to pay. We have a late spring in Magadan now, there is snow everywhere, people can only hear my stories about plants but they will use their knowledge later when the summer comes to Siberia."

* * *

8. Book on the IOPB Symposium 1992

Writes Peter C. Hoch, editor:

The book on IOPB Symposium 1992 has been published and is now ready for selling. Details:

"Experimental and Molecular Approaches to Plant Biosystematics", eds., P.C. HOCH and A.G. STEPHENSON, May 1995, Monographs in Systematic Botany from the Missouri Botanical Garden, Vol. *53*, 416 pp. ISBN 0-915279-30-4.
Postpaid cost: US$ 60 (for U.S. orders), US$ 62 (overseas).
Orders may be placed to Department Eleven, Missouri Botanical Garden, P.O. Box 299, St. Louis, MO 63166-0299, USA. Tel. +314/577-9534. Fax: +314/577-9594;
or contact Peter Hoch at e-mail: hoch @mobot.mobot.org
Some copies for purchase will be available at the IOPB meeting in Tromsoe (July-August 1995) at the US cost (US$ 60); Visa and Mastercard charges will be accepted on site, in addition to cash US$. Orders for additional copies will also be taken at that time.

* * *

9. Note from the Treasurer

Reminder: pay your fees now!

Our organization now has approximately 290 members, from almost 40 countries worldwide. The conclusion may be that IOPB is (very) slowly growing, which is doubtless a positive point. With the Tromsø symposium within a few weeks from now, I think we will be able to welcome a number of colleagues as new members. History learns that attending a symposium trigger many to join the organization.
However, I have also reason to doubt the increase of IOPB because history also learns me that quite a number of members are so far back in paying their fees that we must conclude that they do not want to join us any longer. This means that at the occasion of the traditional symposium, I have to remove them from the directory. Making up the administration in my preparation for secretary/treasurer report at the business meeting in Tromsø, I have to conclude that approximately 60 individual members did not yet pay their fees for the period that is to end by July (1993-1995). Of course, those few that for various reasons are out special guests, and for that reason have got the status of non-paying member are not included in this figure. I hope that by the time you will read this you will have received the separately sent reminder-invoice, and that the pertaining people will have reacted promptly this time. I am afraid that if not, the new secretary/treasurer will have to announce in the next issue of this newsletter on the one hand that the total figure of the directory arose with some tens of new and very welcome members, but, on the other hand, will have to tell that at the same time IOPB has shrunken due to the large number of back standing (former) members.
For those that will fulfill their duties, please be aware of the payment instructions. You will save IOPB a lot of banking costs if you just follow the suggestions below.
Thanks a lot for your cooperation.

Membership fees for 1993-1995

As stated before, the personal membership fees for the now practically past period through 1995 are set at US$ 33.-- (or the equivalent of DFL 66.--). Members may pay their fees for two periods in once: the fees for the next period (for the years 1996-1998) have also been set at US$ 33.--. Later possible rise of the fees will not be charged to those members who pay now for this period too. The total amount for these almost century-transgressing membership period thus is US$ 66.--, equalling DFL 132.--.

Dutch Florin payments:

- Send an **Eurocheque** to J.C.M. den Niijs, amounting **DFL 66.--** (or DFL 132.-- fot two membership periods) made payable to J.C.M. den Nijs - IOPB

or

- Send an **International Postal Money Order**, amounting **DFL 66.--** (or DFL 132.--, see above) made payable to J.C.M. den Nijs - IOPB.

These Eurocheques and Postal Money Orders should be sent to:

Hans H.M. den Nijs
Hugo de Vries Laboratory, University of Amsterdam
Kruislaan 318
NL-1098 SM Amsterdam (The Netherlands)

US Dollar payments:

- Send a cheque, made out to **IOPB**, and amounting US$ 33.-- (or US$ 66.-- for two membership periods).

Cheques should be sent to:

Dr Peter C. Hoch
Missouri Botanical Garden
P.O. Box 299
St. Louis, Missouri 63166-0299, USA

The membership fee for Institutional members amounts US$ 40.-- (equalling DFL 80.--) for the three-year period, postage not included (to be added to the amount due: US$ 10.--, or DFL 20.--.

Thank you very much for your cooperation.
Dr Hans C.M. den Nijs, secretary/treasurer

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10. Meetings - Past and Future

December 6-7, 1995
Evolution on Islands, London, UK. For information contact The Scientific Meetings Secretary, The Royal Society, 6 Carlton House Terrace, London, SW1 5AG, UK.

February 21-22, 1996
Plant Life Histories: Ecological Correlates and Phylogenetic Constraints, London, UK. For information contact: The Scientific Meetings Secretary, The Royal Society, 6 Carlton House Terrace, London SW1 5AG, UK.

March 27-29, 1996
Restoration Ecology for Sustainable Development, Zurich, Switzerland (First International Conference). For information contact: Geobotanical Institute SFIT Zurich, Secretary,
Fax: +41 1 632 12 15

* * *

11. Requests for Information and Material

BERKUTENKO A. Dr, Portovaja Street 31/12 apt. 40, Magadan 685014 Russia, would appreciate research material and information on taxonomy of *Cruciferae*.

MARHOLD K. Dr, Institute of Botany, Slovak Academy of Sciences, Dubravska cesta 14, SK-842 23 Bratislava, Slovak Republic. E-mail: botukmar@savba.savba.sk. Fax: + 42 7 371948), would appreciate herbarium specimens of *Cardamine amara* L. (s.l.) from the area of Greece.

MOURADIAN L. Dr, Abovian Street 26a-57, 375001 Yerevan-I, Republic of Armenia, would appreciate material on fruits of the representatives of the *Compositae*, the *Calycer-aceae* and the *Dipsacaceae*. Information on the anatomy and the morphology of the fruits of the representatives of the *Compositae*, the *Calcyceraceae* and the *Dipsacaceae*.

NAZAROVA E. Dr, Guyi str. 43, app. 11, Yerevan, 375076, Armenia, would appreciate any information on current research in biosystematics; after collapse of USSR there is a tremendous lack of information in Armenia. The short funds are limiting their abilities to subscribe for the scientific literature.

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12. Miscellaneous News and Notes

Change of address:

Dr Colin J. Webb
Landcare Research
P.O. Box 69
Lincoiln 8152
New Zealand

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Tetsukazu YAHARA, Dept. of Biology, Univ. of Tokyo, Komaba 3-8-1, Meguro-ku, Tokyo 153, Japan. Phone: 81-3-3485-6043; Fax: 81-3-3485-2904.

* * *

International Organization of Plant Biosystematists

The International Organization of Plant Biosystematists, founded in 1960, acts on several levels from coordinating and publishing information on biosystematics to organizing international conferences in a triennial time schedule. The IOPB is open to all persons working or interested in biosystematics which is interpreted in a broad sense. The more recent volumes from the conferences held in Zürich (K. M. Urbanska, ed., 1987: Differentiation Patterns in Higher Plants) and Kyoto (S. Kawano, ed., 1990: Biological Approaches and Evolutionary Trends in Plants) give extensive insight in the field IOPB deals with.

The IOPB Newsletter in published twice a year and mailed to all Members. It includes reports on current research, requests for material and information, announcements of meetings, etc. Two permanent features in the Newsletter are "**IOPB Chromosome Data**" and "**News from Molecular Biosystematists**", respectively edited by Prof. Dr. Clive A. Stace, Dept. of Botany, University of Leicester, Leicester LE1 7RH, UK., and Prof. Dr. Dan J. Crawford, Dept. of Botany, Ohio State University, Columbus, Ohio 43210-1293, USA. The Newsletter Editor is Prof. Dr. Krystyna M. Urbanska, Geobotanisches Institut ETH, Zürichbergstrasse 38, CH-8044 Zürich, Switzerland. IOPB Members automatically have free publishing right of their data and news.

At present, IOPB Membership is for the three-year period between the Symposia.The next Symposium will be held in Scandinavia in 1995.

IOPB Membership fee for individuals is US$ 33.- for 1993-1995, Institutional Membership fees are set at US$ 40.- for the same period. Detailed information on the payment system can be found in the Newsletter, and will be provided by the Treasurer upon the receipt of the application form.

Any inquiries about joining IOPB, Newsletter subscription, etc., as well as the application form should be mailed to the Secretary/Treasurer:

Dr. Hans C. M. den Nijs, Hugo de Vries Lab, University of Amsterdam
Kruislaan 318, NL-1098 SM Amsterdam, The Netherlands
Phone: 31-20-525-7660; Fax: 31-20-525-7662; E-mail: nijs@popmail.bio.uva.nl

Please don't send such mail to the Newsletter Editor, it delays the procedure!!

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IOPB - MEMBERSHIP APPLICATION FORM (please print)

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Mr./ Ms.	Last name	First name, middle initial

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....

Address

Date: Signature:

Research News Form

for the International Organization of Plant Biosystematists Newsletter

(IOPB Newsletter)

Typewritten or in capital letters

.....	.....	.....
Last name	First name (Mr., Ms.)	Title

Address:

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Requests for research material and information:

Articles and reports should be attached

To be sent to Krystyna M. Urbanska, Geobotanisches Institut ETH, Stiftung Rübel, Zürichbergstrasse 38, CH-8044 Zürich, Switzerland

* Please select **three** titles and add the remainder as e.g. "seven further papers".