# Herbaria:
# living archives of BiOdivErSitY

**What is a herbarium?**

**What is a herbarium for?**

**Herbarium of the Charles University in Prague (PRC)**

Patrik Mráz

**Herbarium:** originally a book with illustrations of pharmaceutical plants


Piedro Andrea MATTHIOLI (1501-1577)


Herbář neboli bylinář (in Czech 1562)

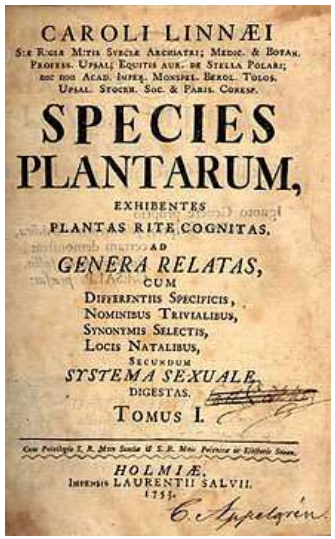
**Herbarium: collection of preserved plant & fungi specimens**

**1569**: Kessel (Germany)
**1570**: Bologna (Italy)

**~1700-1725**: the oldest preserved collection in Czechia

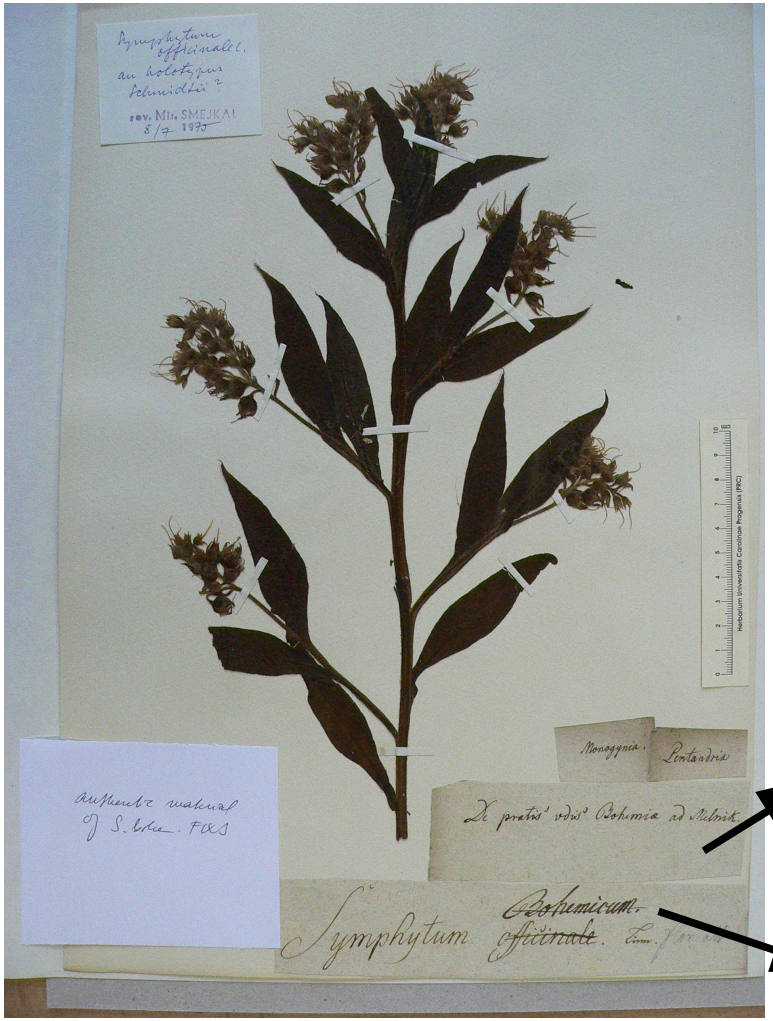
JAN FRANTIŠEK BECKOVSKÝ,
kněz zvt. řádu křížovníků s červenou hvězdou, historik český.
Zanechal nejstarší český herbář (sbírku zašlých rostlin).
* 18. VIII. 1658 v Německém Brodě, † 30. XII. 1725 v Praze.

**1753**: substantial impuls with starting of new herbarium collections


CAROLI LINNÆI
SPECIES
PLANTARUM,
EXHIBENTES
PLANTAS RITE COGNITAS,
AD
GENERA RELATAS,
CUM
DIFFERENTIIS SPECIFICIS,
NOMINIBUS TRIVIALIBUS,
SYNONYMIS SELECTIS,
LOCIS NATALIBUS,
SECUNDUM
SYSTEMA SEXUALE
DIGESTAS.
TOMUS I.
HOLMIÆ,
IMPENSIS LAURENTII SALVII.
1753.

**Herbarium:** collection of preserved plant & fungi specimens

usually dried and mounted on a sheet

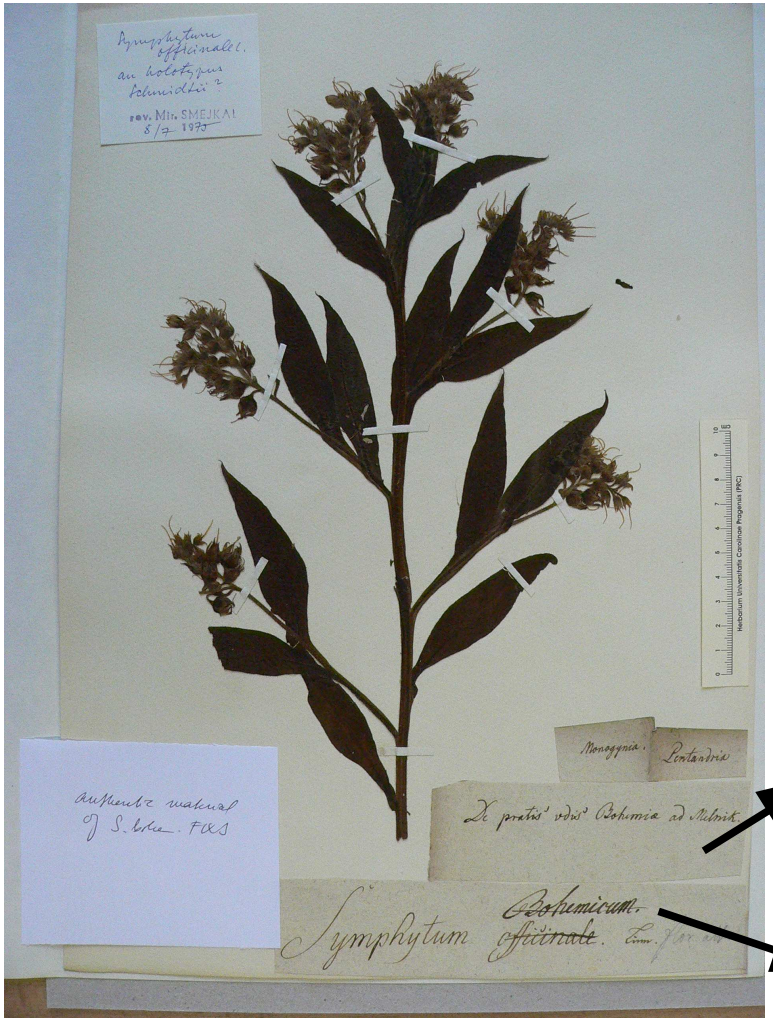



**locality, habitat, date:** *De pratis udis Bohemia ad Melnik* [before 1794]

**scientific name:** *Symphytum bohemicum*

**Herbarium:** collection of preserved plant & fungi specimens

usually dried and mounted on a sheet




**'hidden' information**
Collected by Franz Willibald Schmidt [1762-1796] in or before 1794 [name *S. bohemicum* F.W. Schmidt was published in *Flora Boëmica inchoata, exhibens plantarum regui Boemiae indigenarum species* [1794]

**locality, habitat, date:** *De pratis udis Bohemia ad Melnik* [before 1794]

**scientific name:** *Symphytum bohemicum*

**Herbarium:** collection of preserved plant & fungi specimens

… or in envelopes


**Herbarium:** collection of preserved plant & fungi specimens

… or glass / plastic bottles / boxes (fruits, seeds, large plant parts)

**Herbarium:** collection of preserved plant & fungi specimens

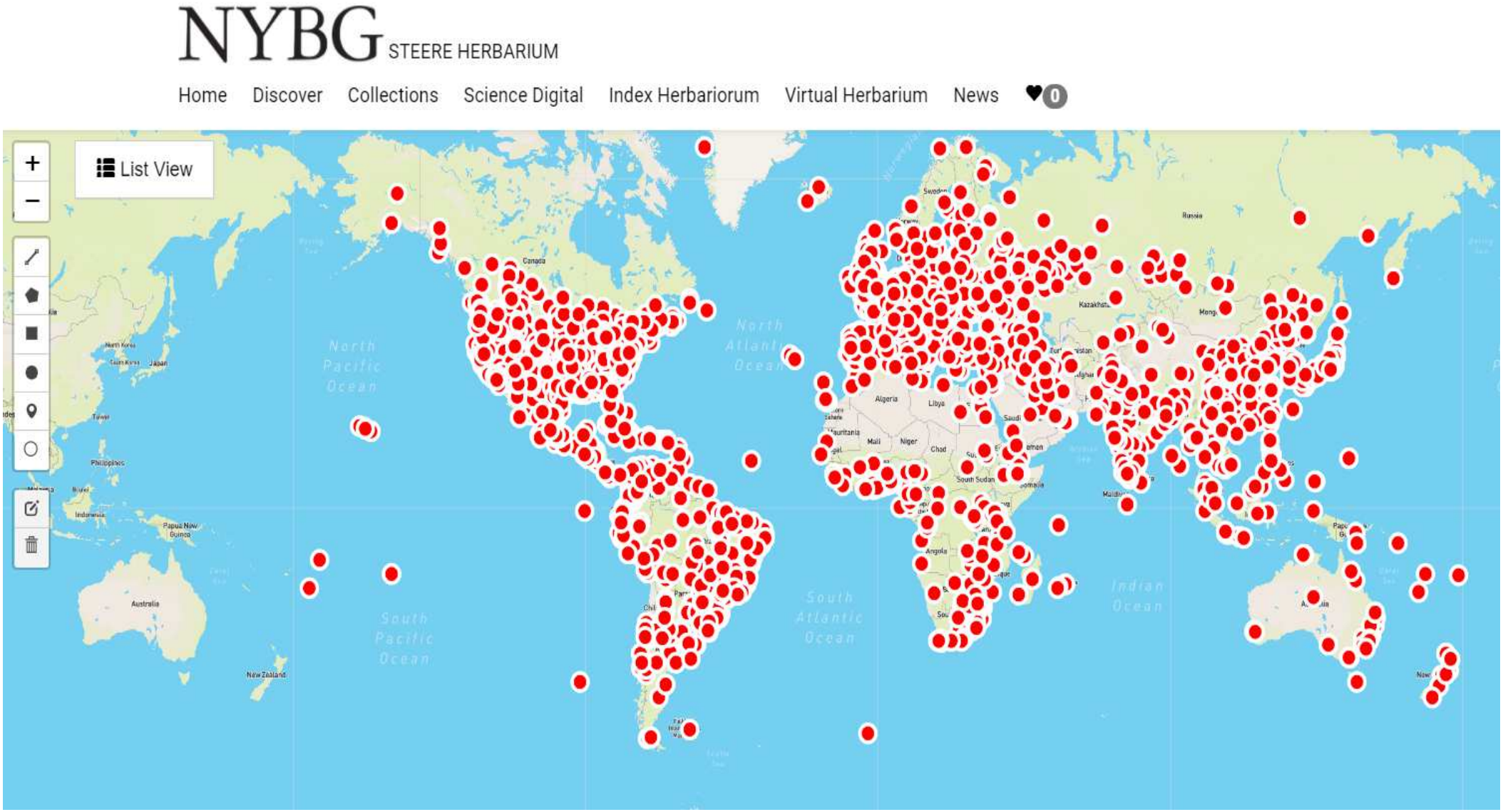
… or in other preservatives (alcohol, glycerol, ...)


**Herbarium:** specimens storing in the herbarium cabinets, compactors

**PRC**: Charles University

**PR**: National Museum

**Herbaria** **2721** active herbaria in **180** countries
**361,000,000** specimens



NYBG STEERE HERBARIUM






***NYBG has reopened its outdoor grounds, while the Steere Herbarium remains temporarily closed.** Learn more and visit our Virtual Herbarium.

Herbarium Code Search | Name or Location Search | Person Search

Search for herbaria by code

**NY** – offcial acronym / abbreviation

# The New York Botanical Garden

Overview | Collections Summary | Staff | Map

**Name**
The New York Botanical Garden

**Herbarium Code**
NY

**Current Status**
Active

**Correspondents**
Matthew Pace, Assistant Curator, mpace@nybg.org
Barbara Thiers, Patricia K. Holmgren Director of the Herbarium, Vice President for Science Administration, bthiers@nybg.org

**Contact**
The New York Botanical Garden
Email: bthiers@nybg.org

**Address**
William and Lynda Steere Herbarium
**The New York Botanical Garden**

Search for herbaria by code

Bronx, New York 10458-5126
U.S.A.
http://www.nybg.org

**CITES**
US 003

**Specialty**
**Taxonomic Coverage:** Algae, bryophytes, fungi, pteridophytes and angiosperms
**Geography:** Worldwide with greatest strength in tropical America and North America

**Notes**
Because of the COVID-19 outbreak, the New York Botanical Garden herbarium is closed until further notice. We are not able to send loans, including electronic loans, and we cannot host visitors. Please do not send us any packages during this period. NY diatoms transferred to CAS in 2002. The Brooklyn Botanic Garden Herbarium (BKL, ca. 350,000 specimens) is maintained separately, but is available for consultation and loans. Botanical library available to all researchers. Library includes over 260 400 volumes (105 000 book and monograph titles and nearly 11 000 serial titles), 125 000 reprints, collections of archives and manuscripts, seed catalogs and index semina, photographs, botanical art, and artifacts. The Library on-line catalog, is accessible at: http://library.nybg.org. Services include interlibrary loan, photocopying, photography, CD-ROM database searches, and literature searches. Most services are for a fee. The Library is the repository for the Taxonomic Literature II (Stafleu and Cowan) data files and for the archives of the American Society of Plant Taxonomists, Council on Botanical and Horticultural Libraries, Mycological Society of America, Organization for Flora Neotropica, Society for Economic Botany, Torrey Botanical Society, and others.

**Feedback**
Send comment or correction to the Editor of Index Herbariorum

# The New York Botanical Garden

Overview | **Collections Summary** | Staff | Map

**Number of Specimens**
7921000

| | Num. of Specimens | Num. Databased | Num. Imaged |
|---|---|---|---|
| Algae | 221000 | 155365 | 110822 |
| Bryophytes | 700000 | 448769 | 452485 |
| Fungi/Lichens | 700000 | 685635 | 441587 |
| Pteridophytes | 300000 | 223911 | 206980 |
| Seed Plants | 6000000 | 2686457 | 2228503 |

**Date Founded**
1891

**Updated**
08/02/2018

**Associated Institution**
*Associated gardens and universities:* New York Botanical Garden, Gregory Long, President; phone: [1] 718/ 817-8722; fax: [1] 718/ 220-1047. City University of New York. Columbia University. Cornell University. New York University. Yale University

**NY** – offcial acronym / abbreviation

**Incorporated Herbaria**
Barnard College (18 000 specimens) in 1901;
bryophytes of DS (4580 arctic and New York specimens) in 1968;
bryophytes of FSU (8158 specimens) in 1973;
bryophytes of KANU (4402 specimens) in 1969;
Columbia College of Pharmacy in 1945;
Columbia University (600 000 specimens) in 1895;
Cotton Branch, Agricultural Research Service, U.S. Department of Agriculture, College Station, Texas (19 918 specimens) in 1993;
DPU (127 119 specimens) in 1987;
E. Lay (Lichens of eastern U.S., especially New England, 17000 in 2010);
Ecological Herbarium, Mammal Department, American Museum of Natural History (632 specimens) in 1982;
fungi and algae of CM (41 905 specimens) in 1981;
fungi of CAS (ca. 3000) in 2002, Kohlmeyer herbarium of marine fungi (ca. 20,000 specimens) in 2009;
fungi of KSC (17 000 specimens) in 1997, fungi of NO (10 000 specimens) in 2000;
fungi of TEX (1116 specimens) in 1990, fungi of KIRI (211 specimens) in 1995;
fungi of UT (6479 specimens) in 1982, fungi of MASS (30 632 specimens) in 1989;
fungi of VPI (extra-regional only, ca. 25,000 specimens, 2012);
Hamilton College (6200 specimens) in 1983;
Herb Society of America, New York Unit (516 specimens) in 1996;
L. Biechele (lichens and bryophytes of Delmarva Penninsula, 400, 2010);
Mianus River Gorge Preserve (246 specimens) in 1996;
part of BROC (tropical specimens) in 1989;
part of DH (3470 specimens) in 1983;
part of GESU;
part of Gettysburg College (555 historical specimens) in 1993;
Princeton University (48 000 specimens) in 1945;
SEFES (3750 specimens);
Torrey Botanical Club in 1973;

**Important Collectors**

E. J. Alexander, J. A. Allen, G. P. Anderson, C. F. Austin, C. F. Baker, M. Bang, H. J. Banker, R. C. Barneby, J. H. Barnhart, M. E. Barr, J. Barratt, E. Bartholomew, J. C. Beatley, A. R. Bechtel, E. A. Bessey, G. N. Best, E. P. Bicknell, L. Biechele, H. E. Bigelow, A. O. Black, B. M. Boom, R. S. Breen, N. L. Britton, E. G. Britton, W. R. Buck, S. B. Buckley, G. S. Burlingham, W. W. Calkins, W. H. Camp, W. M. Canby, A. W. Chapman, A. H. Chivers, J. H. Christ, S. P. Churchill, F. E. Clements, F. S. Collins, J. M. Coulter, R. S. Cowan, L. Croizat, A. Cronquist, J. M. Cruxent, C. E. Cummings, A. H. Curtiss, D. C. Daly, S. Damon, C. C. Deam, I. Degener, O. Degener, H. M. Denslow, J. P. Dey, A. Ducke, K. P. Dumont, F. S. Earle, W. W. Eggleston, J. B. Ellis, A. D. E. Elmer, C. E. Fairman, H. Fleming, M. Fleming, S. Flowers, J. C. Frémont, P. A. Fryxell, A. O. Garrett, L. J. Gier, H. A. Gleason, R. D. Goos, R. Hagelstein, R. E. Halling, I. M. Haring, R. A. Harper, R. C. Harris, H. E. Hasse, R. L. Hauke, C. C. Haynes, A. A. Heller, L. K. Henry, G. B. Hinton, M. Hitchcock, N. H. Holmgren, G. E. Howard, M. A. Howe, H. S. Irwin, A. Jaeger, E. James, G. S. Jenman, O. E. Jennings, G. T. Johnson, J. Kallunki, C. H. Kauffman, D. D. Keck, E. P. Killip, M. B. Knauz, B. Kohlmeyer, J. Kohlmeyer, C. L. Kramer, B. A. Krukoff, C. E. O. Kuntze, D. Largent, E. Lay, W. H. Leggett, W. A. Leighton, J. Lendemer, P. V. LeRoy, C. L. Lesquereux, A. H. Liogier, J. L. Luteyn, D. T. MacDougal, K. K. Mackenzie, B. Maguire, G. E. Massee, C. J. I. Maximowicz, A. J. McClatchie, C. F. Meisner, E. D. Merrill, J. T. Mickel, O. K. Miller, N. Miller, W. Mitten, H. N. Moldenke, S. A. Mori, T. Morong, W. A. Murrill, G. V. Nash, M. Nee, P. J. O'Gara, A. M. Ottley, E. Palmer, P. M. Patterson, C. H. Peck, P. Pedraza, F. W. Pennell, N. Pike, G. T. Prance, C. G. Pringle, C. F. Reed, H. M. Richards, J. F. C. Rock, C. T. Rogerson, H. H. Rusby, P. A. Rydberg, H. P. Sartwell, A. Schneider, F. J. Seaver, J. A. Shafer, C. L. Shear, C. A. Shurtleff, J. K. Small, H. H. Smith, G. L. Smith, A. C. Smith, R. Spruce, H. Stansbury, F. W. Starmer, W. C. Steere, J. Steinbach, A. B. Stout, W. C. Sturgis, D. R. Sumstine, G. H. H. Tate, G. Tessmann, H. D. Thiers, W. W. Thomas, A. Tiehm, J. Torrey, R. Torrey, F. Tweedy, W. Uggla, L. M. Underwood, A. M. Vail, A. Vigener, S. Watson, W. H. Welch, A. Welden, H. Whittier, H. O. Whittier, L. Williams, R. S. Williams, P. Wilson, A. Wood, R. D. Wood, E. G. Worthley, C. Wright, J. J. Wurdack, T. G. Yuncker, T. Zanoni, S. M. Zeller, G. L. I. Zundel

**NY** – offcial acronym / abbreviation

# The New York Botanical Garden



## Correspondents

Matthew Pace, Assistant Curator, mpace@nybg.org
Barbara Thiers, Patricia K. Holmgren Director of the Herbarium, Vice President for Science Administration, bthiers@nybg.org

View Staff and Research Associates

| Person | Herbarium Code | Institution | Location | Research Pursuits |
|---|---|---|---|---|
| Barbara Ambrose | NY | The New York Botanical Garden | U.S.A. New York. Bronx. | Plant genomics |
| Bobbi Angell | NY | The New York Botanical Garden | U.S.A. New York. Bronx. | Botanical illustration |
| Kate E. Armstrong | NY | The New York Botanical Garden | U.S.A. New York. Bronx. | Myanmar/Southeast Asian floristics; *Manikara* (Sapotaceae) |
| Michael J. Balick | NY | The New York Botanical Garden | U.S.A. New York. Bronx. | Floristics of Pacific Island and Neotropical regions: tropical ethnobotany; toxic, medicinal and edible plants; biocultural conservation |
| Brian M. Boom | NY | The New York Botanical Garden | U.S.A. New York. Bronx. | Caribbean flora; neotropical Rubiaceae; plant conservation; economic botany |
| Laura Briscoe | NY | The New York Botanical Garden | U.S.A. New York. Bronx. | Hepaticae |
| William R. Buck | NY | The New York Botanical Garden | U.S.A. New York. Bronx. | Pleurocarpous mosses; moss flora of Chile |

## The largest herbaria in the world

| | |
|---|---|
| **K** – Royal Botanical Gardens, Kew, UK | 8,125,000 |
| **NY** – New York Botanical Garden, US | 7,900,000 |
| **P** – Muséum National de l`Histoire Naturelle, Paris, FR | 6,000,000 |
| **LE** – Lomonosov Institute of Botany, St. Petersburg, RU | 6,000,000 |
| **G** – Conservatoire et Jardin botaniques de la Ville de Genève, CH | 6,000,000 |

## The largest herbaria in Czechia

| | |
|---|---|
| **PRC –** Univerzita Karlova, Praha | 2,225,000 |
| **PR** – Národní muzeum, Praha | 2,000,000 |
| **BRNM** – Moravské zemské muzeum, Brno | 903,000 |
| **BRNU** – Masarykova Univerzita, Brno | 666,000 |
| **PRM** – Národní muzeum, Mykologické odd., Praha | 600,000 |
| **PRA** – Botanický ústav AVČR, Průhonice | 250,000 |

# INDEX HERBARIORUM

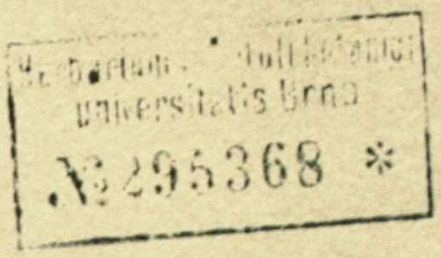
## Reipublicae bohemicae et Reipublicae slovacae

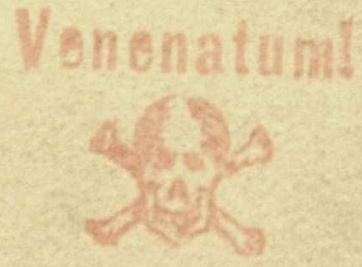
ZPRÁVY
České botanické společnosti, Příloha 2001/1

BULLETIN
Slovenskej botanickej spoločnosti pri SAV, Suplement 7

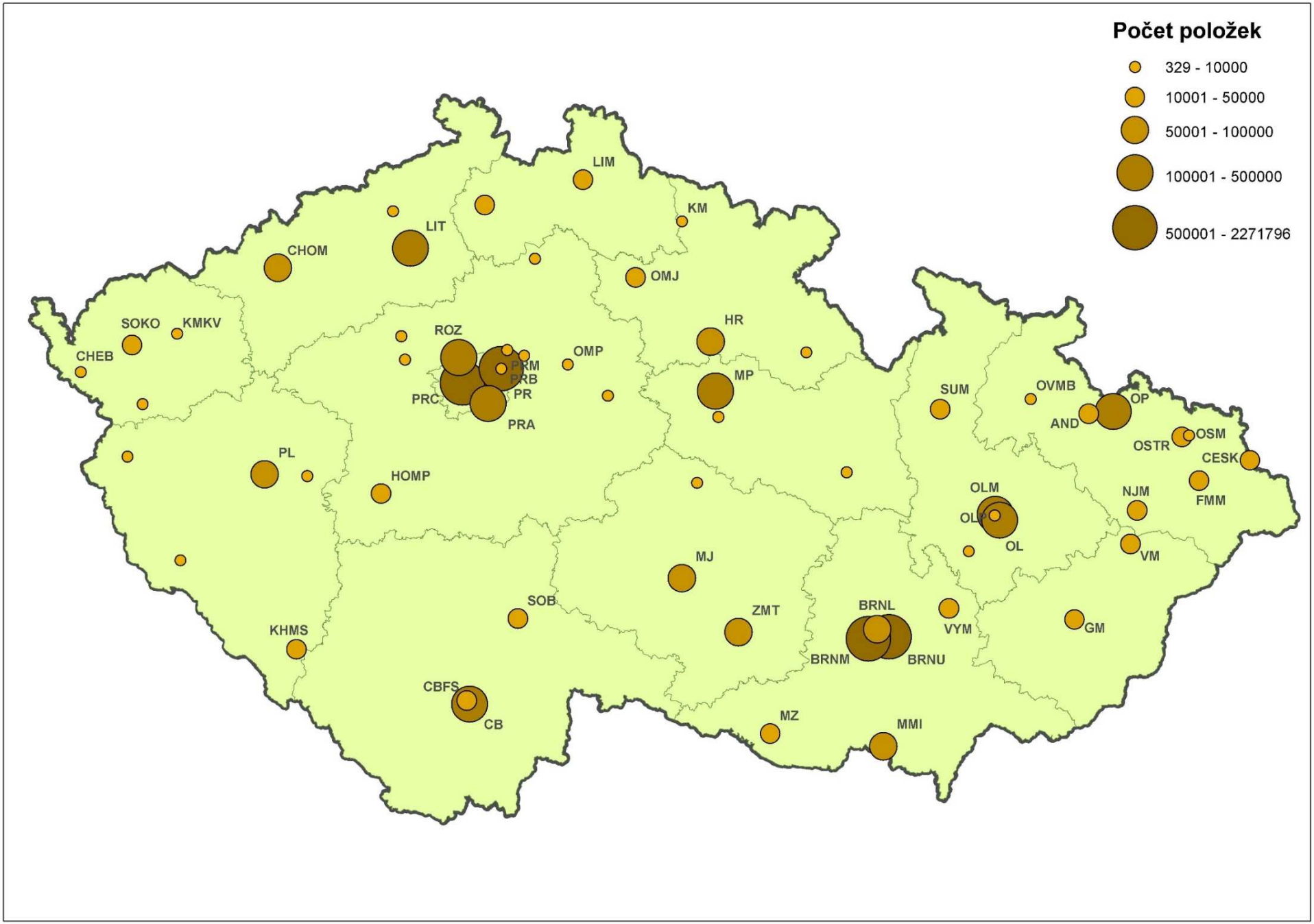
PRAHA, BRATISLAVA 2001

# Inventura 2019



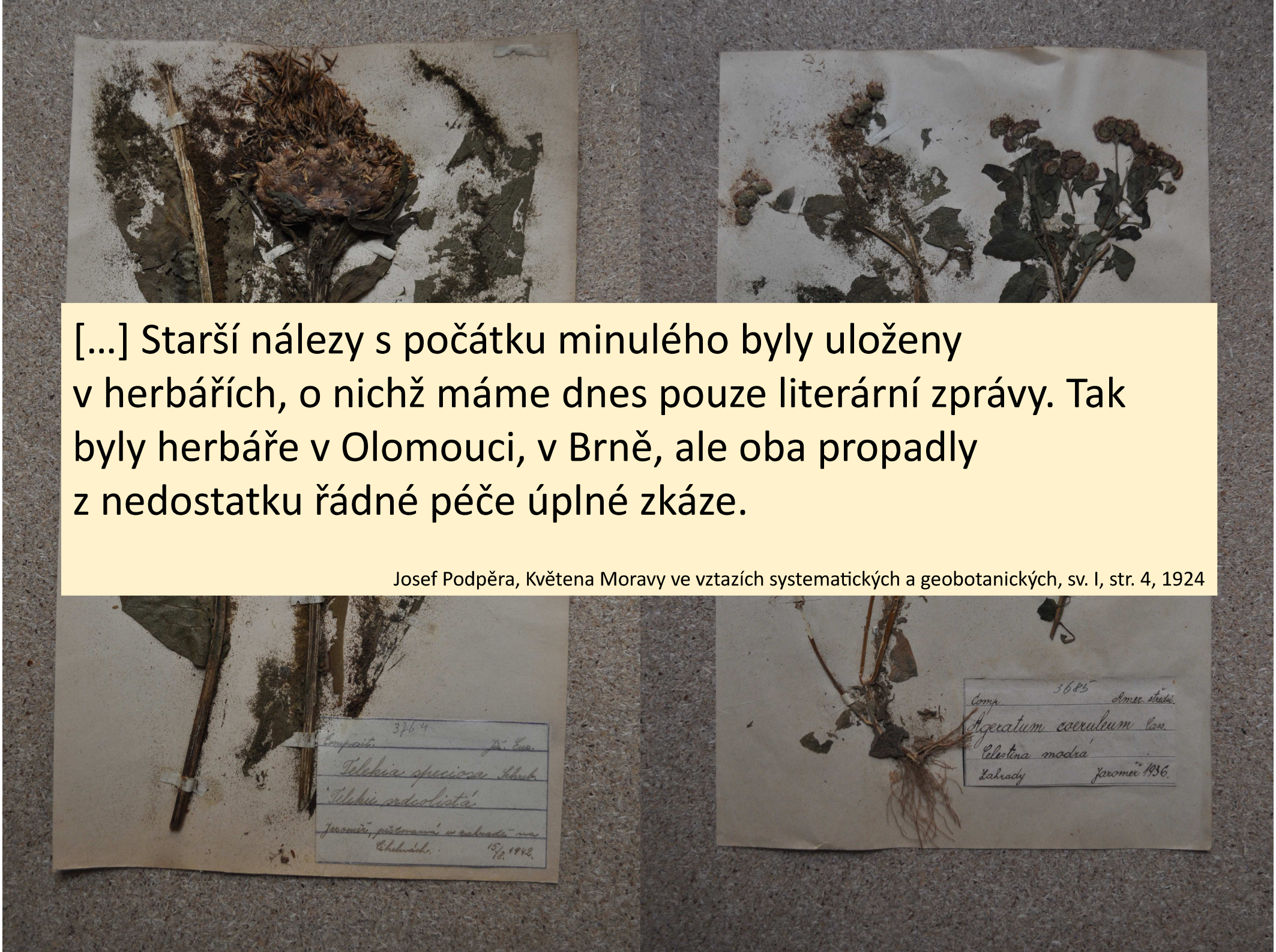




- webový formulář
- různá podrobnost a kvalita odpovědí
- celkem **64 institucionálních sbírek**
- z toho **45 institucí s mezinárodním akronymem**
- celkem **9,19 mil. herbářových položek**
- **od roku 1999 přibylo 1,45 mil. herbářových položek**
- 1,45 mil. herbářových položek katalogizováno elektronicky
- typový materiál v 18 sbírkách
- bude připravena databáze přístupná přes web


Počet položek
329 - 10000
10001 - 50000
50001 - 100000
100001 - 500000
500001 - 2271796
LIM
KM
LIT
CHOM
OMJ
SOKO
KMKV
CHEB
ROZ
PRM
PRB
PR
PRC
PRA
OMP
HR
MP
SUM
OVMB
OP
AND
OSM
OSTR
CESK
FMM
NJM
PL
HOMP
OLM
OLP
OL
VM
MJ
SOB
ZMT
BRNL
VYM
GM
KHMS
BRNM
BRNU
CBFS
CB
MZ
MMI

## Herbarium management

- herbarization / drying
- acquiring new accessions
- preparing material for visits / mounting
- preventive treatments against pest
- visit / loans systems




[…] Starší nálezy s počátku minulého byly uloženy v herbářích, o nichž máme dnes pouze literární zprávy. Tak byly herbáře v Olomouci, v Brně, ale oba propadly z nedostatku řádné péče úplné zkáze.

Josef Podpěra, Květena Moravy ve vztazích systematických a geobotanických, sv. I, str. 4, 1924

Těm pak, kdož cokoli publikovati chtějí, kladu na srdce jako povinnost, by hleděli zachovati doklady svých publikací a udali vždy, kde jsou uloženy. Zde právě sluší vytknouti význam veřejných sbírek (universitních, musejních) pro uchování dokladů vědecké práce. **Každá práce, k níž nemáme dokladů, jest dnes bezcennou.**

Josef Podpěra, Květena Moravy ve vztazích systematických a geobotanických, sv. I, str. 3, 1924

Herbarium specimens are **essentially** useful for:

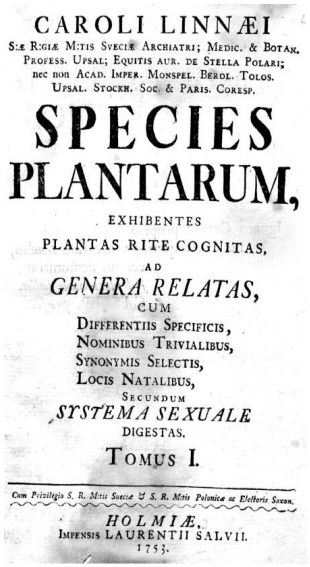
- **plant identification**
- **determination of species locations, ranges, ecology, flowering / fruiting periods ...**

# Herbarium specimens are trandionaly and essentialy used for:

- taxonomy and systematics / phylogeny
- nomenclature and typification

**Each plant name** is interprated by its corresponding **(nomenclatural) type,** which had been served for taxon description (usually **herbarium specimen,** more rarely illustration) :

## esential for evaluation of the biodiversity



CAROLI LINNÆI

S:æ R:glæ M:tis Sveciæ Archiatri; Medic. & Botan. Profess. Upsal; Equitis aur. de Stella Polari; nec non Acad. Imper. Monspel. Berol. Tolos. Upsal. Stockh. Soc. & Paris. Coresp.

SPECIES PLANTARUM,

EXHIBENTES

PLANTAS RITE COGNITAS,

AD

*GENERA RELATAS,*

CUM

Differentiis Specificis,
Nominibus Trivialibus,
Synonymis Selectis,
Locis Natalibus,

Secundum

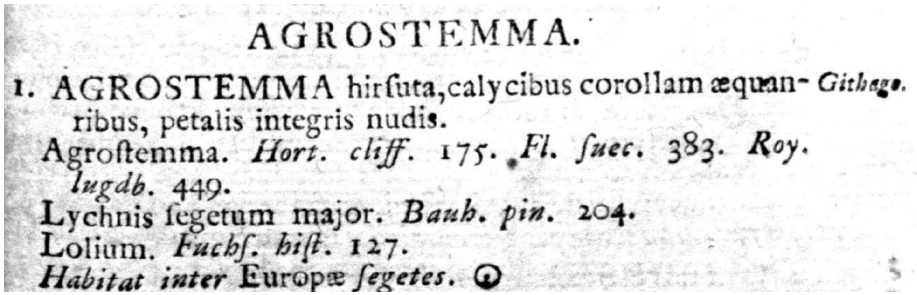
*SYSTEMA SEXUALE*

DIGESTAS.

Tomus I.

Cum Privilegio S. R. Mtis Suecie & S. R. Mtis Polonice ac Electoris Saxon.

HOLMIÆ,
Impensis LAURENTII SALVII.
1753.



AGROSTEMMA.

1. AGROSTEMMA hirsuta, calycibus corollam æquantibus, petalis integris nudis. *Githago.*
Agrostemma. *Hort. cliff.* 175. *Fl. suec.* 383. *Roy. lugdb.* 449.
Lychnis segetum major. *Bauh. pin.* 204.
Lolium. *Fuchs. hist.* 127.
*Habitat inter* Europæ *segetes.* ☉

Lectotype of *Agrostemma githago* L. stored in LINN ( LINN-HL601-1)

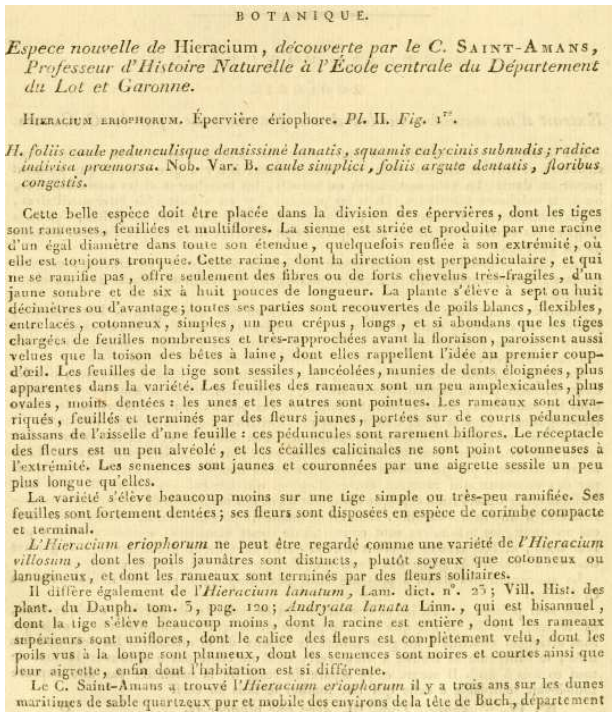
The LINNEAN SOCIETY of London BOTANICAL Journal of the Linnean Society

*Botanical Journal of the Linnean Society*, 2012, **169**, 365–377. With 4 figures

# High genetic and morphological diversity despite range contraction in the diploid *Hieracium eriophorum* (Asteraceae) endemic to the coastal sand dunes of south-west France

DAVID J. FREY[1]*, CHRISTOPH R. HAAG[1], GREGOR KOZLOWSKI[1,2], JEAN-MARC TISON[3] and PATRIK MRÁZ[1]

[1]*Department of Biology, and* [2]*Department of Geosciences, University of Fribourg, Chemin du Musée 10, 1700 Fribourg, Switzerland*
[3]*Chemin du Valentier, 38540 Heyrieux, France*



BOTANIQUE.

*Espece nouvelle de* Hieracium, *découverte par le C.* Saint-Amans, *Professeur d'Histoire Naturelle à l'École centrale du Département du Lot et Garonne.*

Hieracium eriophorum. Épervière ériophore. *Pl.* II. *Fig.* 1re.

*H. foliis caule pedunculisque densissimè lanatis, squamis calycinis subnudis; radice indivisa præmorsa.* Nob. Var. B. *caule simplici, foliis argutè dentatis, floribus congestis.*

Cette belle espèce doit être placée dans la division des épervières, dont les tiges sont rameuses, feuillées et multiflores. La sienne est striée et produite par une racine d'un égal diamètre dans toute son étendue, quelquefois renflée à son extrémité, où elle est toujours tronquée. Cette racine, dont la direction est perpendiculaire, et qui ne se ramifie pas, offre seulement des fibres ou de forts chevelus très-fragiles, d'un jaune sombre et de six à huit pouces de longueur. La plante s'élève à sept ou huit décimètres ou d'avantage; toutes ses parties sont recouvertes de poils blancs, flexibles, entrelacés, cotonneux, simples, un peu crépus, longs, et si abondans que les tiges chargées de feuilles nombreuses et très-rapprochées avant la floraison, paroissent aussi velues que la toison des bêtes à laine, dont elles rappellent l'idée au premier coup-d'œil. Les feuilles de la tige sont sessiles, lancéolées, munies de dents éloignées, plus apparentes dans la variété. Les feuilles des rameaux sont un peu amplexicaules, plus ovales, moins dentées : les unes et les autres sont pointues. Les rameaux sont divariqués, feuillés et terminés par des fleurs jaunes, portées sur de courts pédoncules naissans de l'aisselle d'une feuille : ces pédoncules sont rarement biflores. Le réceptacle des fleurs est un peu alvéolé, et les écailles calicinales ne sont point cotonneuses à l'extrémité. Les semences sont jaunes et couronnées par une aigrette sessile un peu plus longue qu'elles.

La variété s'élève beaucoup moins sur une tige simple ou très-peu ramifiée. Ses feuilles sont fortement dentées; ses fleurs sont disposées en espèce de corimbe compacte et terminal.

*L'Hieracium eriophorum* ne peut être regardé comme une variété de *l'Hieracium villosum*, dont les poils jaunâtres sont distincts, plutôt soyeux que cotonneux ou lanugineux, et dont les rameaux sont terminés par des fleurs solitaires.

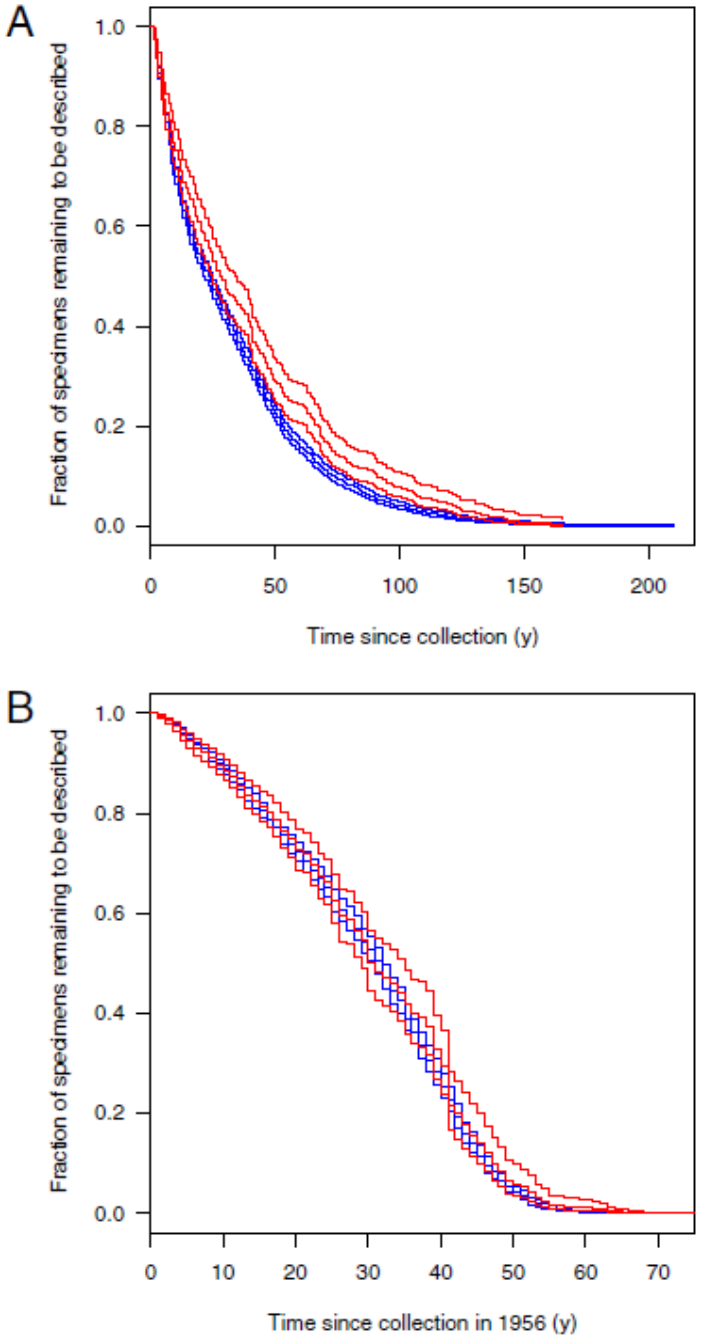
Il diffère également de l'*Hieracium lanatum*, Lam. dict. n°. 25; Vill. Hist. des plant. du Dauph. tom. 3, pag. 120; *Andryata lanata* Linn., qui est bisannuel, dont la tige s'élève beaucoup moins, dont la racine est entière, dont les rameaux supérieurs sont uniflores, dont le calice des fleurs est complètement velu, dont les poils vus à la loupe sont plumeux, dont les semences sont noires et courtes ainsi que leur aigrette, enfin dont l'habitation est si différente.

Le C. Saint-Amans a trouvé l'*Hieracium eriophorum* il y a trois ans sur les dunes maritimes de sable quartzeux pur et mobile des environs de la tête de Buch, département

Lectotype of *Hieracium eriophorum* St. Amans

# Herbaria are a major frontier for species discovery

Fig. 1. Herbarium specimen of *Strobilanthes frondosa* first collected (*C*) in 1924 from Burma (Cooper 5943A), published 70 y later (*D*) in 1994 (24). In this example, *I* equals 70 y. The specimen is from the Royal Botanic Garden Edinburgh (photo courtesy of Prashant Awale).




*Bebber et al PNAS* 2010

# Herbaria are a major frontier for species discovery

Our results imply that significant numbers of undescribed species have already been collected and are housed in herbaria, awaiting detection and description. Based on current estimates

**tions involving specimens >50 y old. Extrapolation of these results suggest that, of the estimated 70,000 species still to be described, more than half already have been collected and are stored in herbaria. Effort, funding, and research focus should, therefore, be directed as much to examining extant herbarium material as collecting new material in the field.**

*Bebber et al PNAS* 2010

herbarium specimen as a **voucher** (can be revised at any moment!)

Nábělek V, Věda Přírodní, 1939: New sedge for Slovakia [*Carex vaginata*]

… **but it was just missidentified with *Carex panicea***

Thaiszia - J. Bot., Košice, 12: 185-189, 2002
http://www.upjs.sk/bz/thaiszia/index.html

THAISZIA
JOURNAL OF
BOTANY

***Carex vaginata* TAUSCH a wrongly reported species from Slovakia.**

PATRIK MRÁZ

herbarium specimen as a **voucher** (can be revised everytime!)

Nábělek V, Věda Přírodní, 1939: New sedge for Slovakia [*Carex vaginata*]

**Nová ostřice pro Slovensko.**

Nenapomenutelný dojem zanechají v květnu se rozvíjející louky v horských údolích centrálních Karpat na Slovensku. Obvyklými krásou vynikají vysoko položené zářivé louky v okolí Telgartu, Vernáru a Ľadovej Jaskyně. Nevšímnuté o jiném nářetí a tak pestrobarevným krytem; pro květy nevidět ani čerstvou májovou zeleň listů. Tmavě modré, bílé a různé vitody střídají se s červeno-žlutými kukátky, světle-modrými hořci, žlutým upolínem, s bílými kůřatými a oranžkami, červenými vstavači a pbrtarými prvosenkami žlutými i modrými (*Primula farinosa*) s hladkými květy a perleťově se leskoucími listy. Však i rostliny skromnějšího vzhledu mají zde pravé eldorádo, hlavně pro ostřice rostí vodou prosáklé louky a břehy horských bystřin ideální stanoviště. Nejčastěji zde jako nejbujnější horskou ostřici zobánkatou (*C. rostrata*) a ohrnuté trsy o. latnaté (*paniculata*), jinak vzácnou trsnatou (*caespitosa*) i tuhou (*Hudsoni*) a měřenci obou. Na pokraji lesa buji následné trsy o. stinné (*umbrosa*) a drobounké kytičky ostřice rusé (*flava*) a Oederovy (*Oederi*). Z plazivých je zde ovšem běžná (*gracilis*) a obecná (*Goodenough*)

Ostřice pochvatá, Carex vaginata TAUSCH.

219

… since then this record has been cited many times …

… treated as critically endangered or extinct ...

Herbarium specimens are **used** for:

- **monographs** of selected taxonomic groups
- **regional / national floras**


Kľúč na určenie druhov

1a Prívesky medzi kališnými zubmi prítomné ..... 2
1b Prívesky medzi kališnými zubmi chýbajú ..... 5
2a Blizna 5-ramenná. Tobolka 5-puzdrová ..... **1.** *C. medium*
2b Blizna 3-ramenná. Tobolka 3-puzdrová ..... 3
3a Kvety smotanovobiele. Rastliny u nás pestované ..... **2.** *C. alliariifolia*
3b Kvety (okrem ojedinelých albinotických jedincov) vždy modré alebo modrofialové. Rastliny u nás pôvodné ..... 4
4a Rastliny trváce. Zuby kalicha 12–18 mm dlhé, prívesky medzi kališnými zubmi 0,5–1 mm dlhé. Súkvetie strapec, vzácne kvety jednotlivé ..... **3.** *C. alpina* subsp. *alpina*
4b Rastliny dvojročné. Zuby kalicha 7–9 mm dlhé, prívesky medzi kališnými zubmi 1,5–3 mm dlhé. Súkvetie metlina ..... **4.** *C. sibirica*
5a Kvety sediace, v hlávkach, zväzočkoch, klbkách alebo v prerušovaných klasoch zväzočkov ..... 6
5b Kvety stopkaté, v strapcoch, metlinách alebo jednotlivé ..... 8
6a Byliny páperité až plstnaté, mäkko chlpaté, riedko srstnaté alebo holé ..... **5.** *C. glomerata*
6b Byliny husto srstnaté alebo odstávajúco štetinato chlpaté ..... 7
7a Súkvetie mnohokvetá vrcholová hlávka a bočné pazušné málokveté zväzočky ..... **6.** *C. cervicaria*
7b Súkvetie prerušovaný klas zväzočkov ..... **7.** *C. macrostachya*
8a Stredné a horné byľové listy široké nad 3 mm ..... 9
8b Stredné a horné byľové listy široké do 2 (–3) mm ..... 18
9a Kvety jednotlivé (ojedinele 2–3-kveté súkvetie). Stredné a horné byľové listy dlho stopkaté ..... **12.** *C. carpatica*
9b Kvety v súkvetí. Stredné a horné byľové listy krátko stopkaté alebo sediace ... 10

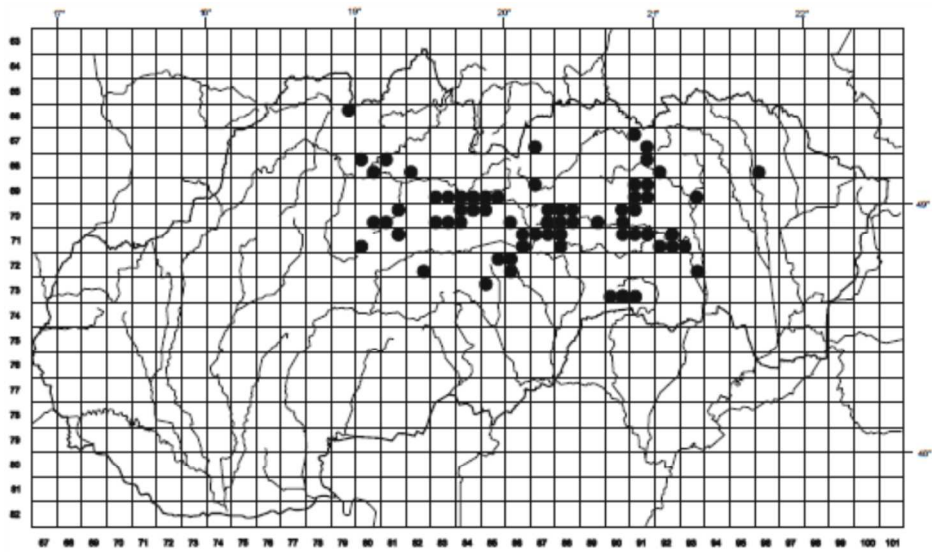
# Herbarium specimens are **used** for:

- **monographs** of selected taxonomic groups
- **regional / national floras / atlases**

Biológia, ekológia, fytocenológia. Hemikryptofyt. Kvitnutie jún–august. Rastie na skalách, strmých skalných stenách a sutinách, v kameňolomoch na vápencoch a dolomitoch, často v inverzných roklinách, sekundárne zavlečením (s vápencovým štrkom) okolo železničných tratí v planárnom až montánnom stupni (nevystupuje nad hornú hranicu lesa). Maximum: 1 600 m n. m., 21b, vrch Chleb, pri ceste na chatu (Ščepka 1954 SAV – zavlečený); 1 350 m n. m. okr. 22, Čertovica, pod Krakovou hoľou (Sillinger 1931 PRC). Vyskytuje sa v rastlinných spoločenstvách karbonátových sutín kolínneho až montánneho stupňa zväzov *Cystopteridion* (charakteristický druh) a *Seslerio-Asterion alpini,* je tiež charakteristický druh karbonátových sutín radu *Galio-Parietarietalia officinalis*.

Pannonicum. **3.** Zádiel, Zádielska dolina – Havrania skala – obec Bôrka. – Turňa nad Bodvou (Chyzer 1879 BP; veľa údajov od rôznych autorov; Goliašová 2004 SLO). – Háj, Hájska dolina – Hačava. – pri jaskyni Snežná diera (Jávorka 1907 BP; viac autorov; Goliašová 2004). – Jasov, nad obcou (Jos. Dostál 1932 PRC). **6.** Vieska nad Žitavou, Arborétum Mlyňany (F. Nábělek 1954 BRA – splanená bielokvetá forma). **7.** Košice, Jesenná ulica, splanený (Mráz 1998, 2005).

Carpaticum. **15.** Dobšiná, okolie obce (Borbás 1902 BP; Domin 1919 PRC; Skřivánek 1934 PRC). – Dobšiná, vrch Skala (Lengyel 1911 BP). – Dobšiná, vrch Langerberg (Lengyel 1929 BP). – Olcnava, Bielovodská dolina [Štech in Mráz et Mrázová (eds.), Bull. Slov. Bot. Spoločn. Suppl. 9: 44, 2003]. – Galmus, Olcnavský potok (Marsa 1958 BRA). – Slovinky, Poráčska dolina (Chrtek et Chrtková 1984 PR). – Slovinky, Slovinská skala [Mráz in Mráz et Mrázová (eds.) l. c.]. – Krompachy, Biela skala (Feráková in Mráz et Mrázová (eds.) l. c.). – Prakovce, Cimerplac, na lesnej ceste s vápencovou výsypkou (Mráz 2005 herb. Mráz). – Kojšov, Folkmarská skala (J. Michalko et Ščepka 1960 SAV; Hrouda in Mráz et Mrázová (eds.) l. c.). – Kojšov, Murovaná skala (Jos. Dostál 1927 PRC; J. Michalko 1965 SAV). – Kojšov, Turniská (Mráz et Mrázová



Mapa 48. *Campanula carpatica* Jacq.

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Druhy Vegetace Určování Ke stažení Kontakty Přihlášení


**Druhy**
Vyhledávejte vlastnosti druhů, mapy, obrázky a další.

**Vegetace**
Vyhledávejte informace o vegetačních jednotkách, mapy a obrázky.

**Určování**
Určování druhů a vegetačních jednotek pomocí různých kritérií.

**Ke stažení**
Stáhněte volně přístupná data, např. kompletní seznam druhů, Červený seznam a ekologické indikační hodnoty.

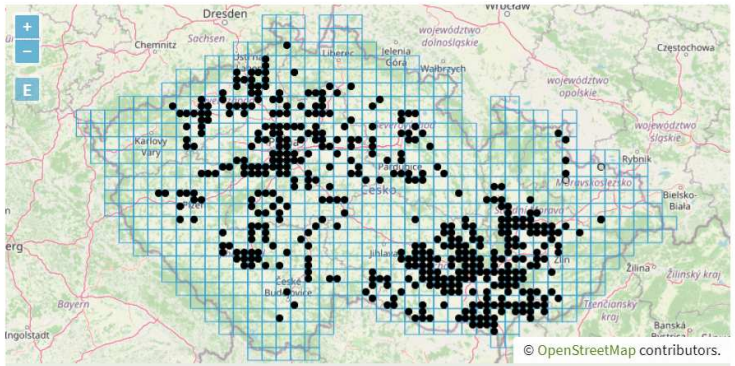
PLADIAS

Druhy Vegetace Určování Ke stažení Kontakty

## *Centaurea stoebe* subsp. *stoebe* – chrpa latnatá drobnoúborná

Druhy → *Spermatophytina* → *Magnoliopsida 2* → *Asterales* → *Asteraceae* → *Centaurea* → *Centaurea stoebe* → *Centaurea stoebe* subsp. *stoebe*

Přehled Vlastnosti Rozšíření Obrázky Květena ČR Nomenklatura




Výpisy nálezů z konkrétního pole získáte, pokud na ně kliknete.

**Informace k mapě**

Aktuální správce mapy: Patrik Mráz

Poslední změna: 15.1.2020 ?

**Legenda**

● *revidovaný údaj* ○ *nerevidovaný údaj*

V mapě se nezobrazují záznamy bez uvedených souřadnic a záznamy označené jako chybné nebo pochybné.

přepnout na mapu revizí

publikovaná mapa z 30.8.2018

údaje k mapě

*Preslia 90: 235–346, 2018*



# Distributions of vascular plants in the Czech Republic. Part 6

**Rozšíření cévnatých rostlin v České republice. Část 6**

Zdeněk Kaplan[1,2], Petr Koutecký[3], Jiří Danihelka[1,4], Kateřina Šumberová[1], Michal Ducháček[5], Jitka Štěpánková[1], Libor Ekrt[3], Vít Grulich[4], Radomír Řepka[6], Karel Kubát[7], Patrik Mráz[2], Jan Wild[1] & Josef Brůna[1]

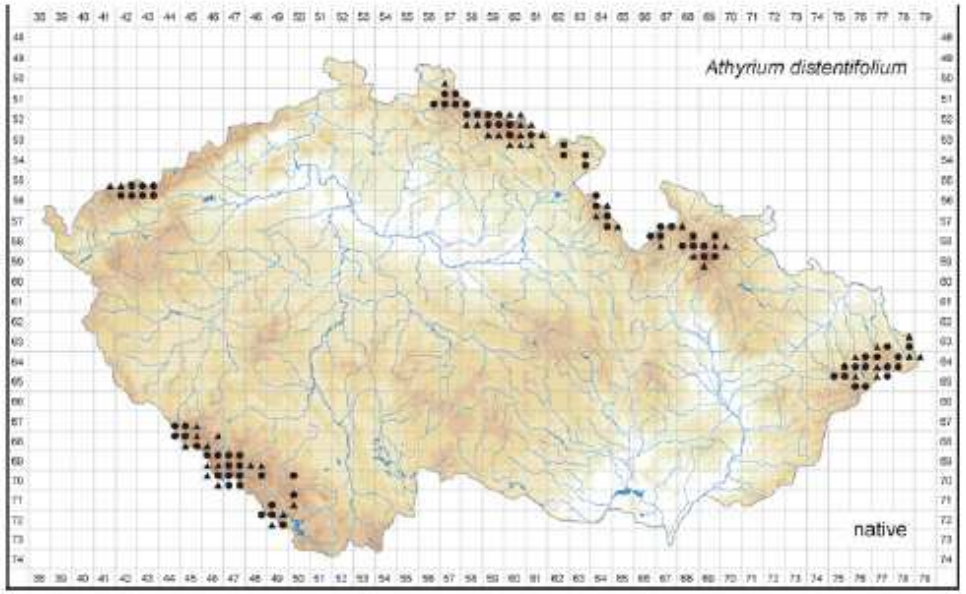



Fig. 1. – Distribution of *Athyrium distentifolium* in the Czech Republic: ● occurrence documented by herbarium specimens (79 quadrants), ▲ occurrence based on other records (47 quadrants). Prepared by Libor Ekrt.

*J. Phycol.* **37**, 1091–1109 (2001)

# SOLVING TAXONOMIC AND NOMENCLATURAL PROBLEMS IN PACIFIC GIGARTINACEAE (RHODOPHYTA) USING DNA FROM TYPE MATERIAL[1]

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*Paul C. Silva*

Herbarium, University of California, Berkeley, California 94720-2465

*and*

*Max H. Hommersand*[2]

Department of Biology, Coker Hall, University of North Carolina, Chapel Hill, North Carolina 27599-3280

**Molecular data obtained by a procedure for extracting PCR-amplifiable nuclear and chloroplast DNA from old and formalin-fixed red algal herbarium specimens were used to elucidate problems in the systematics of Pacific Gigartinaceae. Correspondence between nucleotide sequences of the internal transcribed spacer 1 region or the RUBISCO spacer from type specimens and modern collections supports the following conclusions. (1) The type of *Fucus cordatus* Turner, now *Iridaea cordata* (Turner) Bory, came from the southern hemisphere (probably from Isla de los Estados, Argentina) rather than G., and *Gigartina pectinata* E.Y. Dawson represent a single species: *Chondracanthus squarrulosus* (S. et G.) comb. nov.**

**_Key index words:_ Chondracanthus; DNA; Gigartinaceae; herbarium specimens; *Iridaea*; ITS 1; *Mazzaella*; PCR; red algae; RUBISCO spacer; type material**

**_Abbreviations:_ ITS, internal transcribed spacer**

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Marine macroalgae are preserved and stored today largely as they have been for 300 years. They are

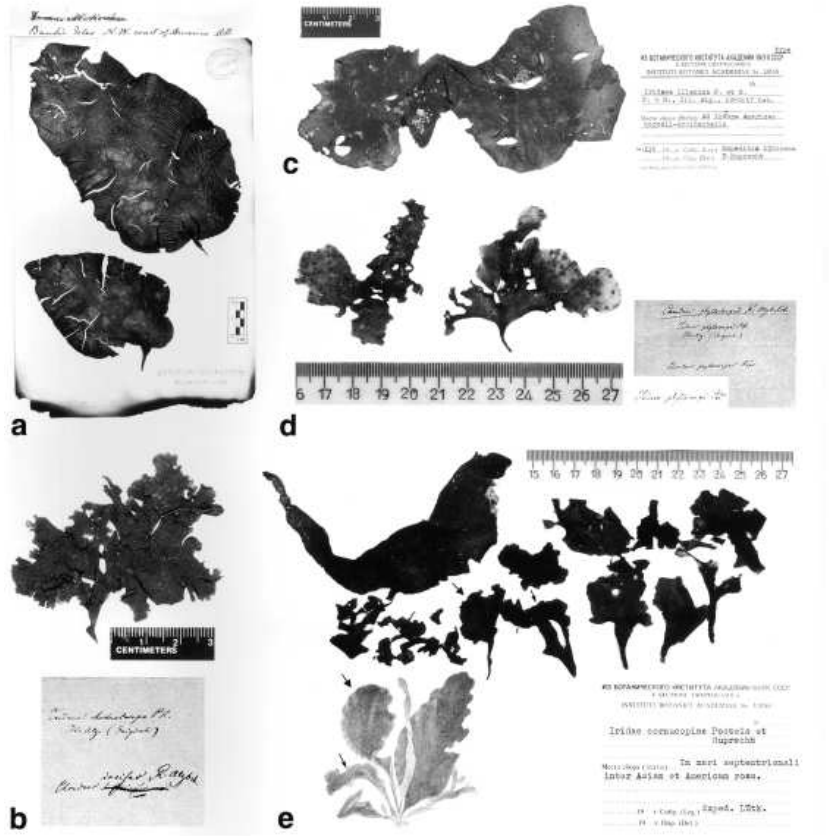


FIG. 4. Habits of type specimens reported from the northeastern Pacific that were DNA sequenced in this study. (a) *Fucus cordatus* Turner (E) (photo by G. L. Leister). (b) *Iridaea heterocarpa* P. et R. (LE). (c) *Iridaea lilacina* P. et R. (LE). (d) *Iridaea phyllocarpa* P. et R. (LE). (e) *Iridaea cornucopiae* P. et R. (LE). Top: Photo by S. Lindstrom. Bottom: Illustration of *Iridaea cornucopiae* in P. et R. (1840, Pl. XXXVIII, fig. b). Broad and narrow arrows indicate correpondence of two blades illustrated by Posels and Ruprecht with specimens in the type collection.

*Mycol. Res.* **108** (7): 781–786 (July 2004). © The British Mycological Society
DOI: 10.1017/S0953756204000310 *Printed in the United Kingdom.*



# Controversy over *Hygrophorus cossus* settled using ITS sequence data from 200 year-old type material

**Ellen LARSSON* and Stig JACOBSSON**

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*E-mail: ellen.larsson@botany.gu.se*

*Received 21 April 2003; accepted 15 April 2004.*

Sowerby described *Agaricus cossus* in 1799. The fungus possessed a smell, resembling that of a wounded larva of *Cossus cossus* (*Lepidoptera*). The species belongs in *Hygrophorus*, and since more than one white *Hygrophorus* species has this distinctive smell the epithet *cossus* has been variously interpreted. The complete internal transcribed spacer (ITS) region of the original type collection made in 1794, preserved in the Royal Botanic Gardens Kew herbarium, was successfully sequenced. Comparison with the ITS sequences from four other white aromatic-acidulous smelling *Hygrophorus* species, including the type specimen of *H. quercetorum*, showed that *H. cossus* is a species associated with *Quercus* and an older name for *H. quercetorum*. The differences in basidiome colouration developing with age and host-tree association appear to be the most useful characters to discriminate between the four species with a *Cossus cossus* smell. A table of morphological and ecological characters is provided.

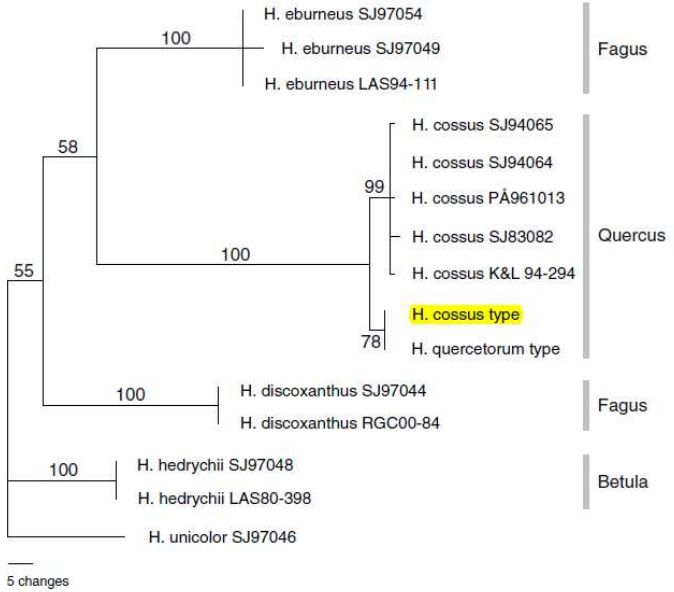



**Fig. 1.** One of 80 most parsimonious trees generated from a dataset of the complete ITS rDNA region and using *Hygrophorus unicolor* as outgroup. The tree is presented as a phylogram and bootstrap values are indicated on branches. Host-tree connection of the specimens is indicated with bars.

OPEN ACCESS Freely available online

PLOS | ONE

# Genomic Treasure Troves: Complete Genome Sequencing of Herbarium and Insect Museum Specimens

**Martijn Staats[1], Roy H. J. Erkens[2,3], Bart van de Vossenberg[4], Jan J. Wieringa[1,5], Ken Kraaijeveld[6], Benjamin Stielow[7], József Geml[8], James E. Richardson[9,10], Freek T. Bakker[1]***

**1** Biosystematics Group, Wageningen University, Wageningen, The Netherlands, **2** Maastricht Science Program, Maastricht University, Maastricht, The Netherlands, **3** Ecology and Biodiversity Group, Department of Biology, Utrecht University, Utrecht, The Netherlands, **4** Dutch National Plant Protection Organization, National Reference Centre, Wageningen, The Netherlands, **5** Netherlands Centre for Biodiversity Naturalis (section NHN), Herbarium Vadense (WAG), Wageningen University, Wageningen, The Netherlands, **6** Department of Human Genetics/Leiden Genome Technology Center, Leiden University Medical Center, Leiden, The Netherlands, **7** Centraalbureau voor Schimmelcultures Fungal Biodiversity Centre (CBS-KNAW), Utrecht, The Netherlands, **8** Naturalis Biodiversity Center, Section National Herbarium of the Netherlands, Leiden, The Netherlands, **9** Royal Botanic Garden Edinburgh, Inverleith Row, Edinburgh, United Kingdom, **10** Laboratorio de Botánica y Sistemática, Universidad de Los Andes, Apartado Aéreo 4976, Bogotá, Colombia

## Abstract

Unlocking the vast genomic diversity stored in natural history collections would create unprecedented opportunities for genome-scale evolutionary, phylogenetic, domestication and population genomic studies. Many researchers have been discouraged from using historical specimens in molecular studies because of both generally limited success of DNA extraction and the challenges associated with PCR-amplifying highly degraded DNA. In today's next-generation sequencing (NGS) world, opportunities and prospects for historical DNA have changed dramatically, as most NGS methods are actually designed for taking short fragmented DNA molecules as templates. Here we show that using a standard multiplex and paired-end Illumina sequencing approach, genome-scale sequence data can be generated reliably from dry-preserved plant, fungal and insect specimens collected up to 115 years ago, and with minimal destructive sampling. Using a reference-based assembly approach, we were able to produce the entire nuclear genome of a 43-year-old *Arabidopsis thaliana* (Brassicaceae) herbarium specimen with high and uniform sequence coverage. Nuclear genome sequences of three fungal specimens of 22–82 years of age (*Agaricus bisporus, Laccaria bicolor, Pleurotus ostreatus*) were generated with 81.4–97.9% exome coverage. Complete organellar genome sequences were assembled for all specimens. Using *de novo* assembly we retrieved between 16.2–71.0% of coding sequence regions, and hence remain somewhat cautious about prospects for *de novo* genome assembly from historical specimens. Non-target sequence contaminations were observed in 2 of our insect museum specimens. We anticipate that future museum genomics projects will perhaps not generate entire genome sequences in all cases (our specimens contained relatively small and low-complexity genomes), but at least generating vital comparative genomic data for testing (phylo)genetic, demographic and genetic hypotheses, that become increasingly more horizontal. Furthermore, NGS of historical DNA enables recovering crucial genetic information from old type specimens that to date have remained mostly unutilized and, thus, opens up a new frontier for taxonomic research as well.

# Genetic identity of putative Linnaean plants: Successful DNA amplification of Linnaeus's crab apple *Malus baccata*

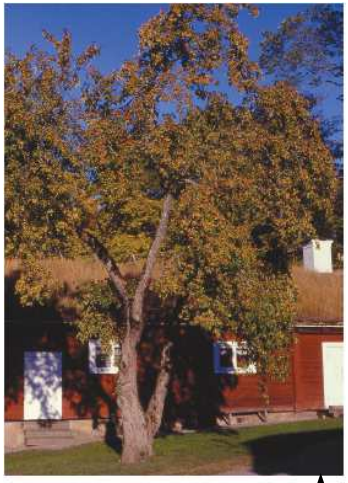
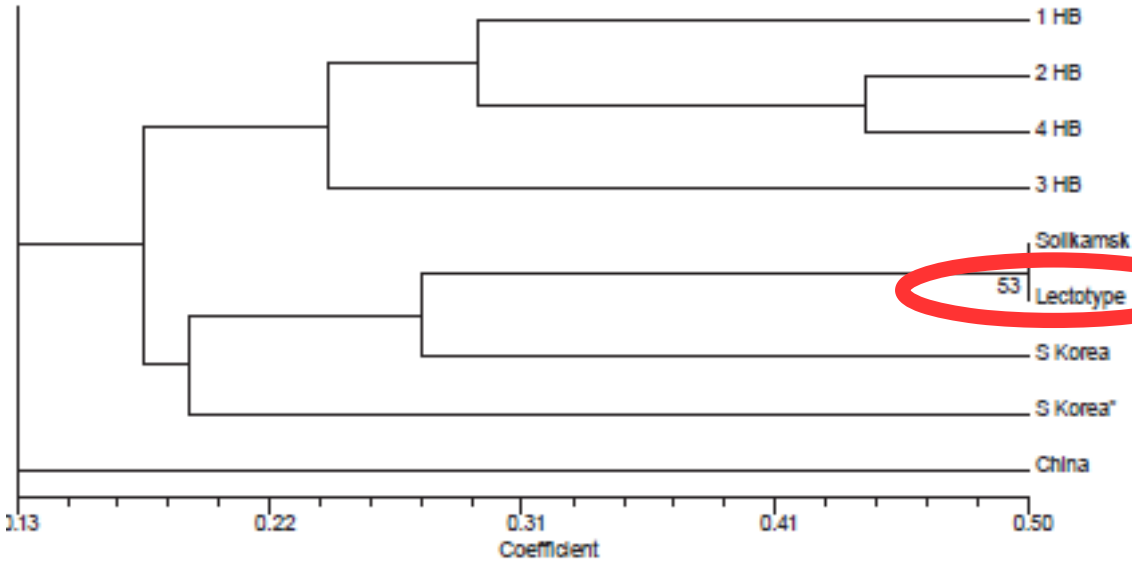


Fig. 2. *Malus baccata* tree probably planted by Linnaeus in the [illegible]rt-yard in Linnaeus's Hammarby, Uppsala, Sweden.




# Increased interest in herbarium collections used in environmental studies

- climate change
- plant invasions
- conservation biology

Perspectives in Plant Ecology, Evolution and Systematics 15 (2013) 68–76

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Perspectives in Plant Ecology, Evolution and Systematics

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Review

# Biological collections in an ever changing world: Herbaria as tools for biogeographical and environmental studies

Claude Lavoie*

*École supérieure d'aménagement du territoire et de développement régional, Université Laval, Quebec City, Quebec G1A 0V6, Canada*

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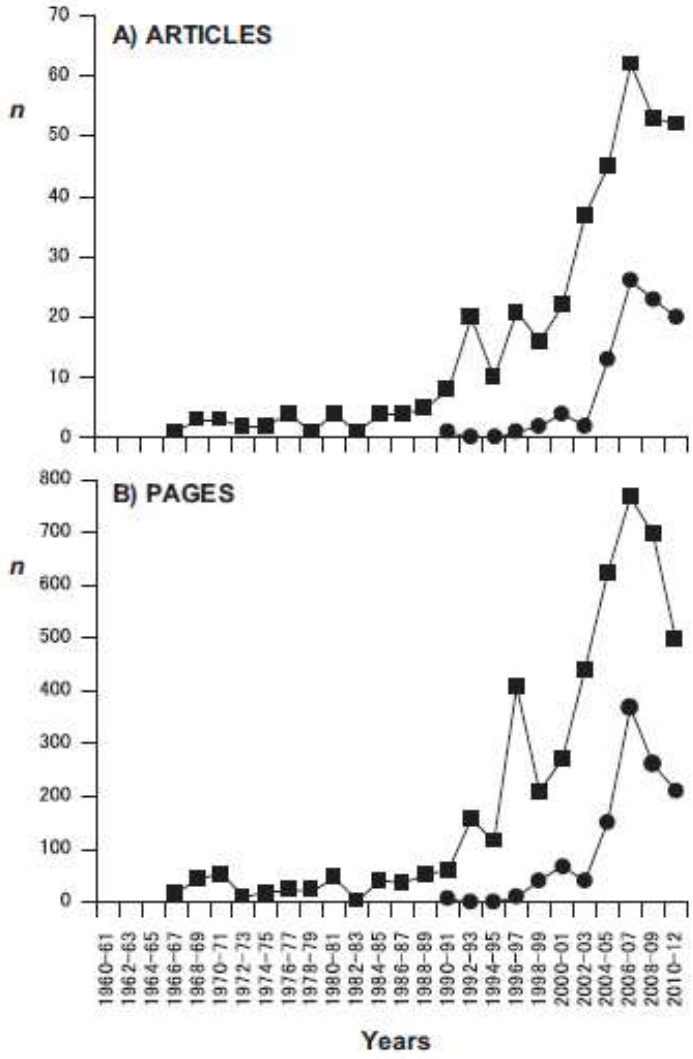


**Fig. 1.** Peer-reviewed articles with original data that used herbarium specimens for documenting biogeographical patterns or environmental changes and published from 1966 to February 2012. (A) Published articles per two-year period (January and February 2012 included in 2010–2011 data); (B) published pages per two-year period; squares: all articles (or pages); circles: only articles (or pages) with computerized collection(s) as information source(s) for herbarium specimens.

Perspectives in Plant Ecology, Evolution and Systematics 15 (2013) 68–76

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**Table 4**
Number of consultations of the herbaria of specific countries that were necessary for documenting biogeographical patterns or environmental changes in peer-reviewed studies published from 1933 to February 2012. International consultations (for specimens not collected in the country of the herbaria) are indicated. Only countries with at least ten consultations for their herbaria are listed.

| Country | Consultations (*n*) | International consultations (*n*) | % of consultations that were international |
|---|---|---|---|
| United States | 1514 | 151 | 10.0 |
| Canada | 232 | 34 | 14.7 |
| United Kingdom | 86 | 68 | 79.1 |
| Czech Republic | 64 | 0 | 0 |
| Germany | 62 | 19 | 30.6 |
| France | 57 | 21 | 36.8 |
| Switzerland | 55 | 19 | 34.5 |
| Australia | 55 | 10 | 18.2 |
| Mexico | 48 | 0 | 0 |
| Sweden | 30 | 18 | 60.0 |
| Republic of South Africa | 25 | 7 | 28.0 |
| Austria | 25 | 6 | 24.0 |
| China | 25 | 0 | 0 |
| The Netherlands | 23 | 21 | 91.3 |
| Belgium | 19 | 19 | 100 |
| Brazil | 18 | 0 | 0 |
| Finland | 16 | 4 | 25.0 |
| Italy | 16 | 2 | 12.5 |
| New Zealand | 15 | 3 | 20.0 |
| Argentina | 15 | 0 | 0 |
| Denmark | 14 | 11 | 78.6 |
| Spain | 14 | 2 | 14.3 |
| Japan | 12 | 6 | 50.0 |
| Norway | 12 | 0 | 0 |

'herbarium AND **climate change**'

Western North American Naturalist 62(3), © 2002, pp. 348–359

# HISTORICAL VARIATIONS IN $\delta^{13}C_{LEAF}$ OF HERBARIUM SPECIMENS IN THE SOUTHWESTERN U.S.

Lisa C. Pedicino[1,3], Steven W. Leavitt[1], Julio L. Betancourt[2], and Peter K. Van de Water[1,4]

ABSTRACT.—The uncontrolled, global increase in atmospheric $CO_2$ concentration (ca 80 ppmv) and decline in $\delta^{13}C_{air}$ (ca 1.5‰) since industrialization provide experimental boundary conditions by which to assess physiological response of vegetation. To examine consequences of these global atmospheric changes in the southwestern U.S., 350 specimens of *Atriplex confertifolia, A. canescens, Ephedra viridis, Pinus edulis, P. flexilis, Juniperus scopulorum,* and *Quercus turbinella* of precisely known age spanning the last 150 years were acquired from 9 herbaria. Cellulose analysis of $\delta^{13}C_{plant}$ and estimation of isotopic discrimination ($\Delta$) permitted calculation of water-use efficiency (A/g). The $\delta^{13}C_{plant}$ chronologies of $C_4$ *Atriplex* spp. show some promise as a reliable proxy for $\delta^{13}C_{air}$ because their mean trends approximate the known $\delta^{13}C_{air}$ chronology. However, the high variability would necessitate multiple samples at any time period to accurately represent the mean. The generally increasing A/g trends of the 5 $C_3$ species are particularly pronounced for *P. edulis* and, after the 1950s, for *J. scopulorum,* but less evident for *P. flexilis, E. viridis,* and *Q. turbinella,* evidencing possible differences in species response to rising $CO_2$ concentrations. The trends are statistically noisy, however, possibly due to complex microclimates, extreme seasonality, and great interannual variability typical of the southwestern U.S. Herbarium specimens, at least in the Southwest, may be less useful for precise detection of direct $CO_2$ effects on plant physiology than tree rings, where the variability can be constrained to a single individual over time.

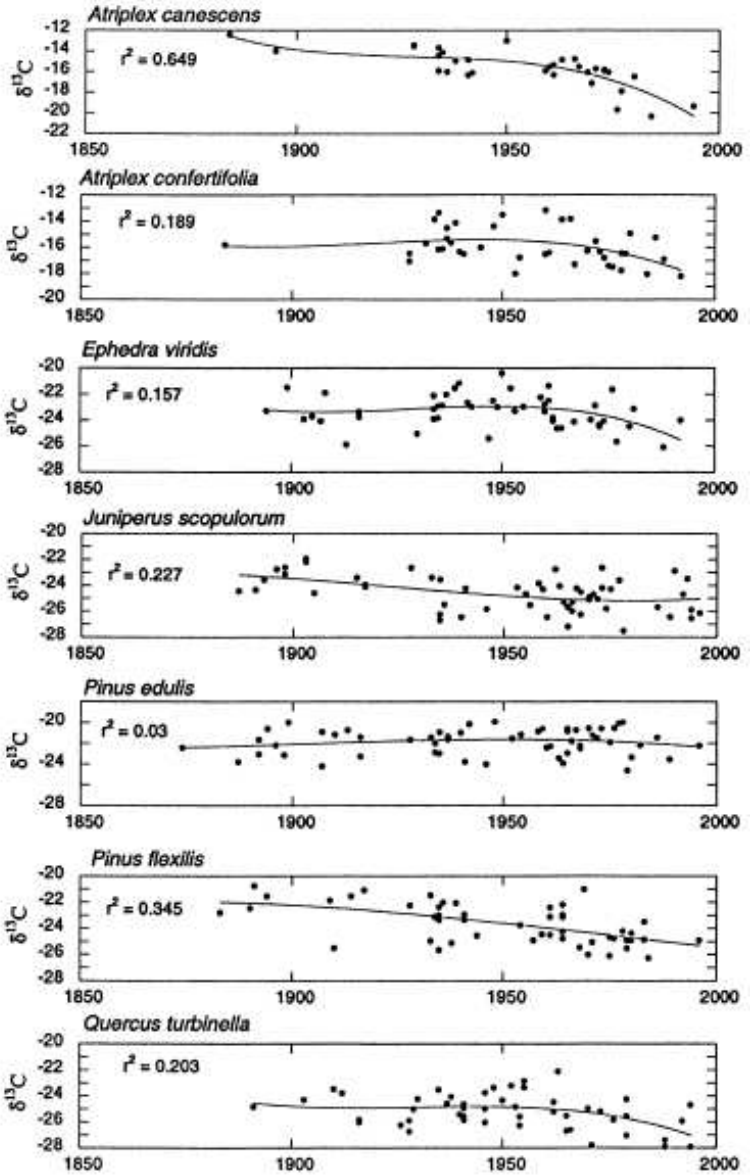


Fig. 3. Chronologies of herbarium leaf whole-tissue $\delta^{13}C$ for each of 7 species.

'herbarium AND **climate change**'

New Phytologist

Research

# Thirteen decades of foliar isotopes indicate declining nitrogen availability in central North American grasslands

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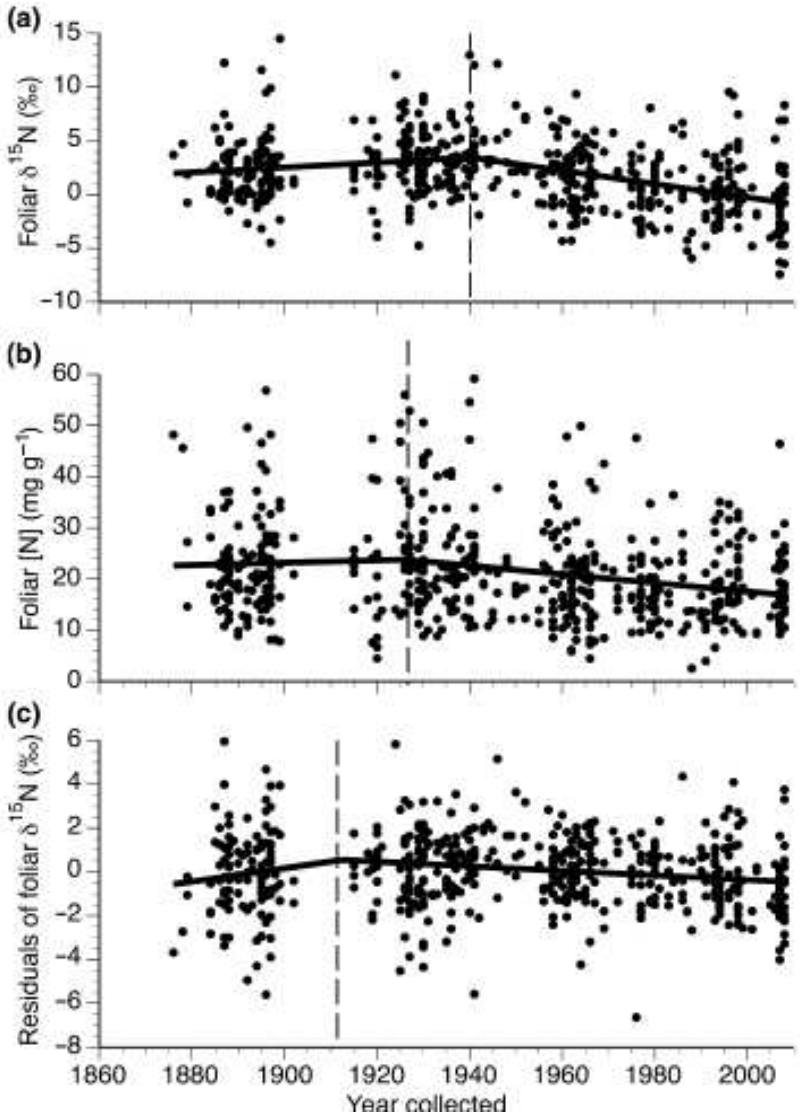
**Key words:** grasslands, herbarium, isotopes, Kansas, nitrogen deposition.

## Summary

- Humans are increasing both the deposition of reactive nitrogen (N) and concentrations of atmospheric $CO_2$ on Earth, but the combined effects on terrestrial ecosystems are not clear. In the absence of historical records, it is difficult to know if N availability is currently increasing or decreasing on regional scales.
- To determine the nature and timing of past changes in grassland ecosystem dynamics, we measured the composition of stable carbon (C) and N isotopes in leaf tissue from 545 herbarium specimens of 24 vascular plant species collected in Kansas, USA from 1876 to 2008. We also parameterized a simple model of the terrestrial N cycle coupled with a stable isotope simulator to constrain processes consistent with observed patterns.
- A prolonged decline in foliar N concentrations began in 1926, while a prolonged decline in foliar $\delta^{15}N$ values began in 1940. Changes in the difference between foliar and atmospheric C isotopes reveal slightly increased photosynthetic water use efficiency since 1876.



'herbarium AND **climate change**'

American Journal of Botany 91(8): 1260–1264. 2004.

# HERBARIUM SPECIMENS DEMONSTRATE EARLIER FLOWERING TIMES IN RESPONSE TO WARMING IN BOSTON[1]

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ABRAHAM J. MILLER-RUSHING,[2] AND PETER DEL TREDICI[3]

[2]Biology Department, Boston University, Boston, Massachusetts 02215 USA; and [3]Arnold Arboretum of Harvard University, Jamaica Plain, Massachusetts 02130-3500 USA

Museum specimens collected in the past may be a valuable source of information on the response of species to climate change. This idea was tested by comparing the flowering times during the year 2003 of 229 living plants growing at the Arnold Arboretum in Boston, Massachusetts, USA, with 372 records of flowering times from 1885 to 2002 using herbarium specimens of the same individual plants. During this period, Boston experienced a 1.5°C increase in mean annual temperature. Flowering times became progressively earlier; plants flowered 8 d earlier from 1980 to 2002 than they did from 1900 to 1920. Most of this shift toward earlier flowering times is explained by the influence of temperature, especially temperatures in the months of February, March, April, and May, on flowering time. Plants with a long flowering duration appear to be as useful for detecting responses to changing temperatures as plants with a short flowering duration. Additional studies using herbarium specimens to detect responses to climate change could examine specimens from specific, intensively collected localities, such as mountain peaks, islands, and unique habitats.

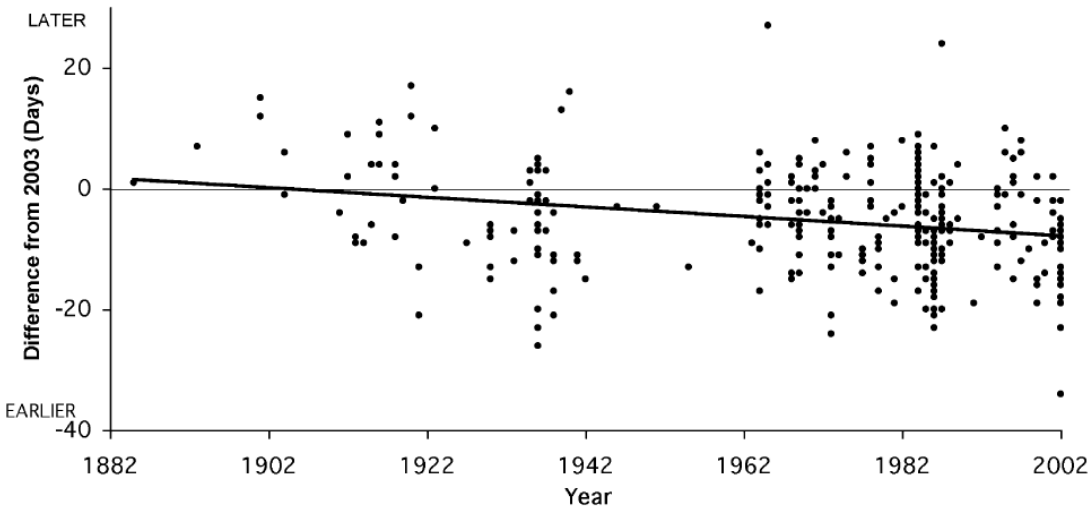


Fig. 2. Changes in flowering times of plants at the Arnold Arboretum over time: number of days plants flowered earlier or later in the past than they did in 2003 calculated as the Julian date the herbarium specimen was collected subtracted from the peak flowering date in 2003. Negative values indicate that a plant flowered on an earlier date than that it did in 2003. The line is the best fit line for the series.

'herbarium AND **plant invasions**'

ELSEVIER

*Biological Conservation* **74** (1995) 41–48

0006-3207/95/$09.50+.00

0006-3207(95)00013-5

# INVASION DYNAMICS OF *Impatiens glandulifera* — A CENTURY OF SPREADING RECONSTRUCTED

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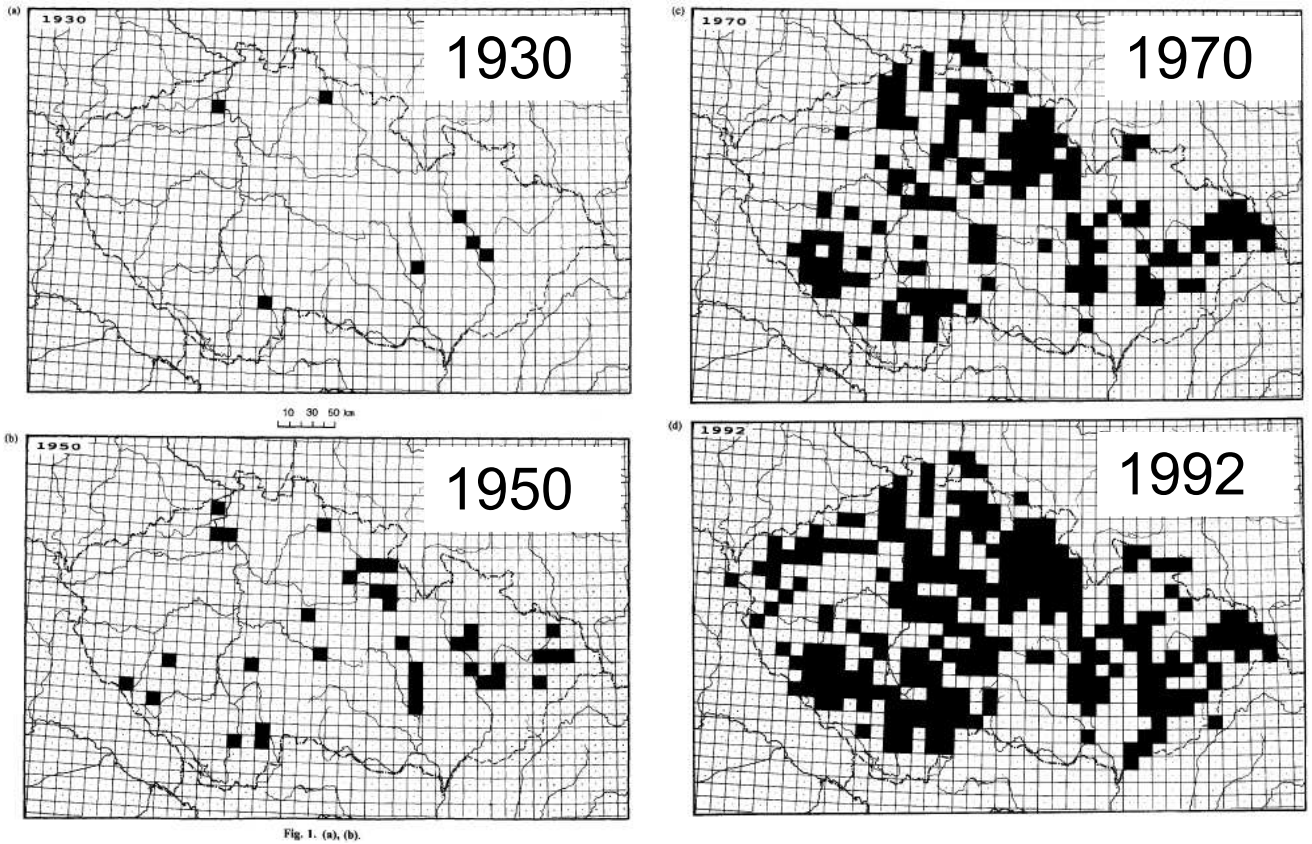
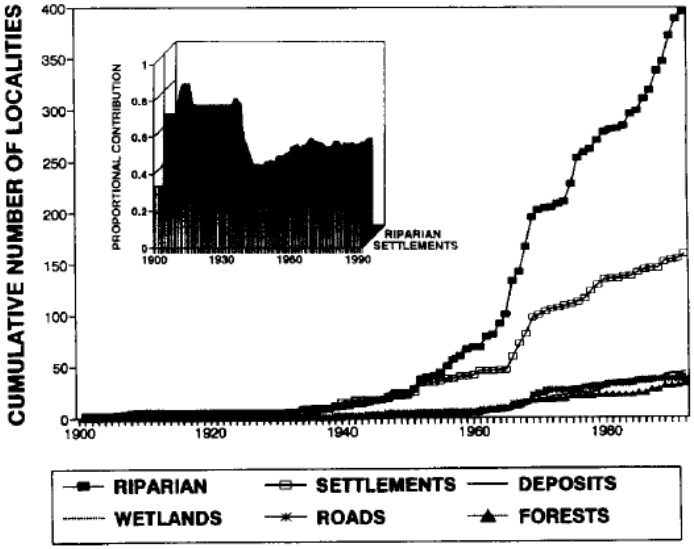



Fig. 1. (a), (b).



'herbarium AND **plant invasions**'

Journal of Biogeography (J. Biogeogr.) (2006) **33**, 665–673

ORIGINAL ARTICLE

# The historical spread of *Ambrosia artemisiifolia* L. in France from herbarium records

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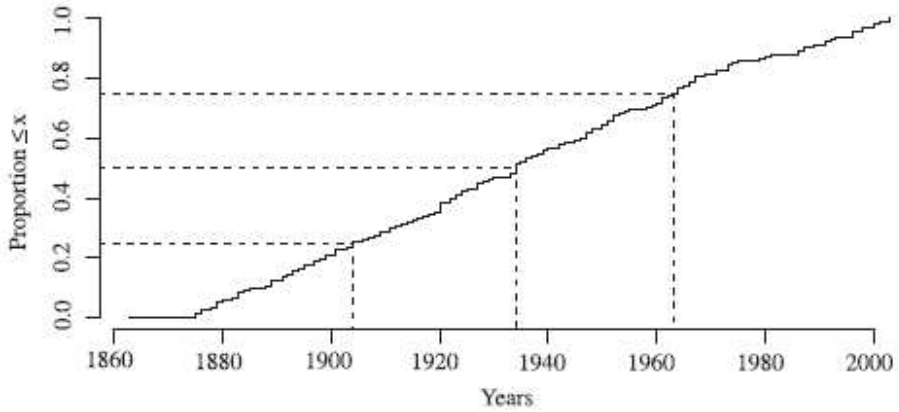
## ABSTRACT

**Aim** The problems in public health and field management in France caused by *Ambrosia artemisiifolia* L. require a better knowledge of the introduction and naturalization of this species in both the past and present.

**Location** France.

**Methods** The pattern of spread of *A. artemisiifolia* was investigated through the study of herbarium specimens. More than 1200 specimens were found in 58 herbaria and virtual herbaria in France and in bordering countries. The spread was analysed by mapping the localities for each 30-year period since 1863. Specific indications as 'new plant' were used to determine the timing of the introduction of the species into a new area.



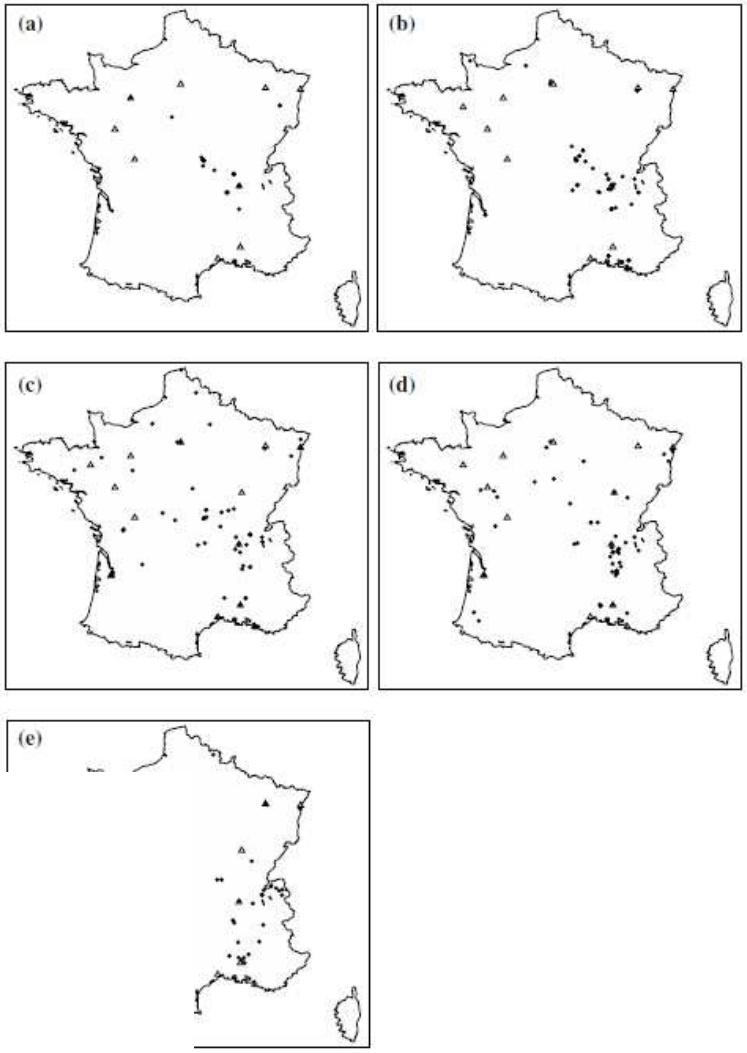




**Figure 3** Cumulative distribution of the number of herbarium specimens through time.

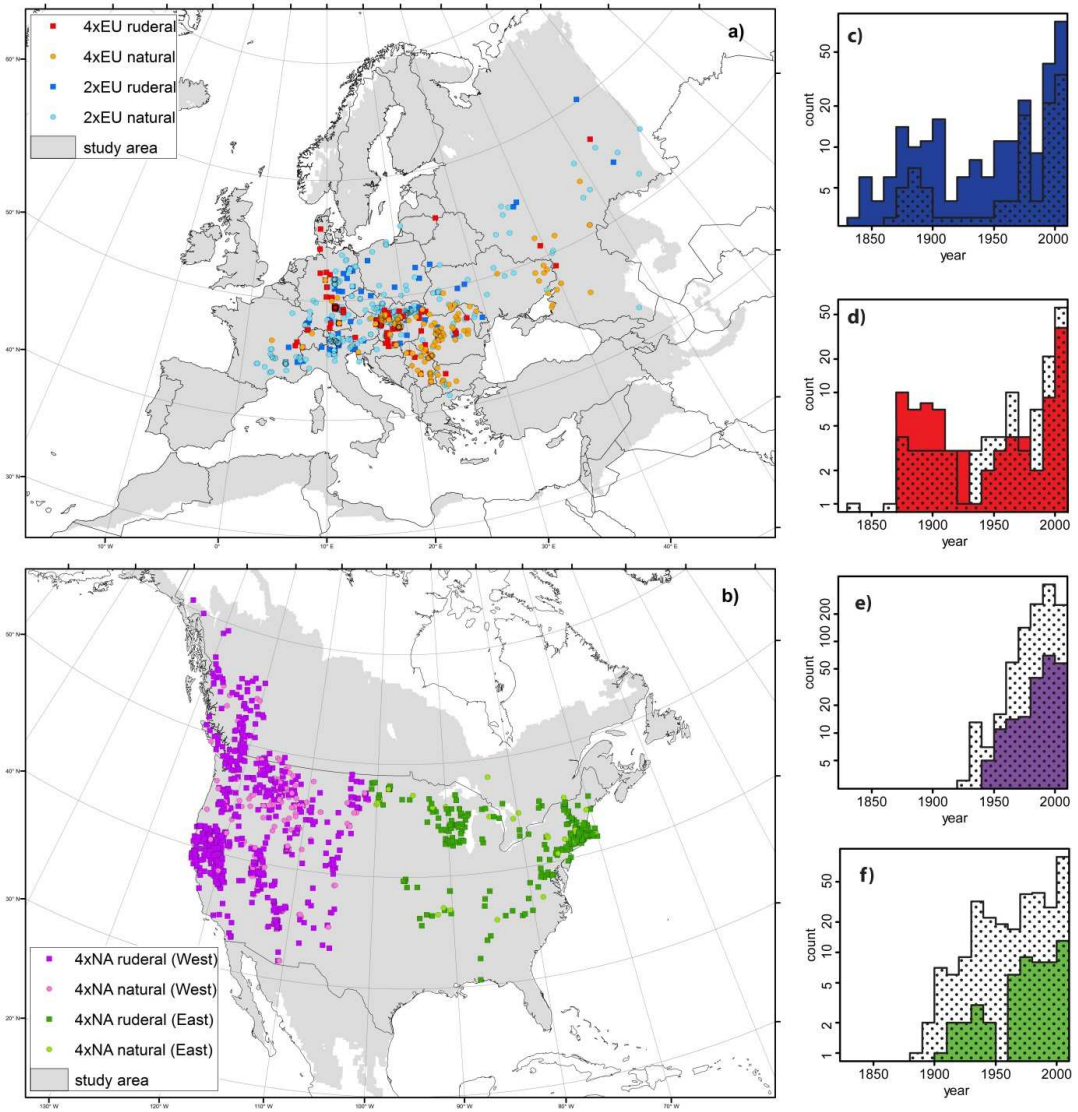
'herbarium AND **plant invasions**'

*Journal of Biogeography (J. Biogeogr.)* (2014) **41**, 1126–1136

ORIGINAL ARTICLE

# Contrasting spatio-temporal climatic niche dynamics during the eastern and western invasions of spotted knapweed in North America

Olivier Broennimann[1]*, Patrik Mráz[2,3], Blaise Petitpierre[1], Antoine Guisan[1,4†] and Heinz Müller-Schärer[2†]



'herbarium AND **plant invasions**'

Journal of Biogeography (J. Biogeogr.) (2014) **41**, 1126–1136

ORIGINAL ARTICLE

# Contrasting spatio-temporal climatic niche dynamics during the eastern and western invasions of spotted knapweed in North America

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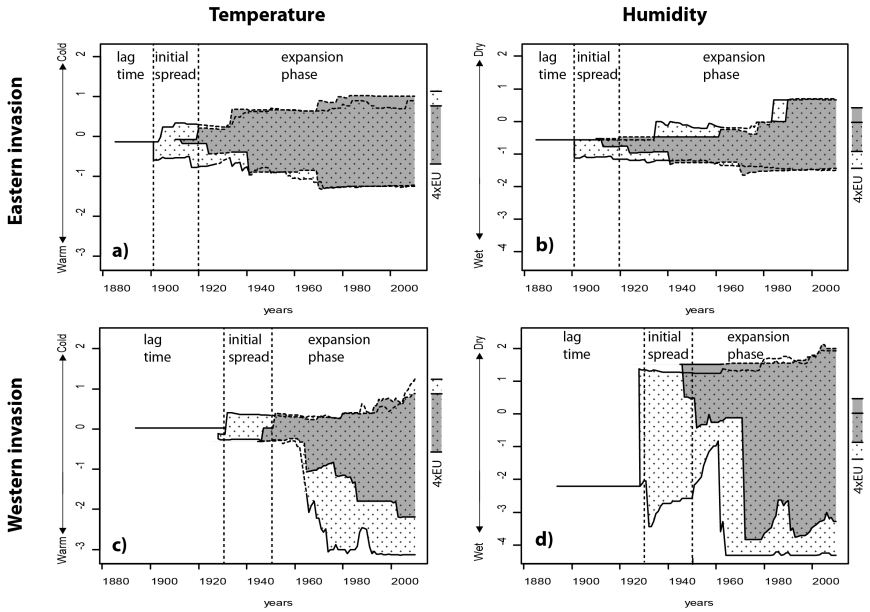


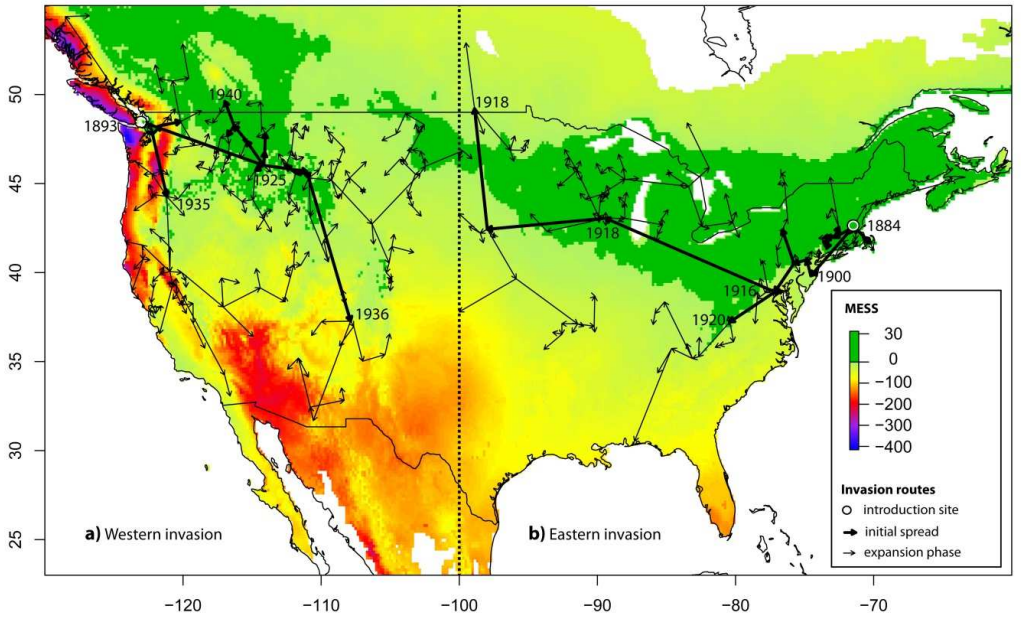

'herbarium AND **animal invasions**'

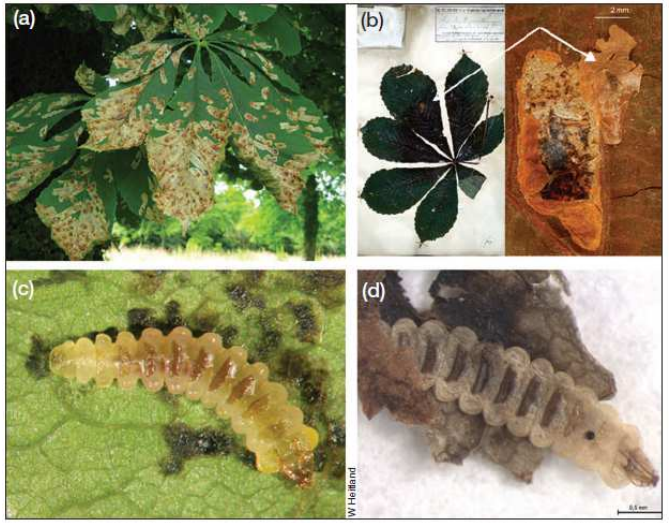


***Figure 2.*** *(a) Typical late-summer damage by horse-chestnut leaf miner. (b) Archival herbarium specimen (Heldreich 11 Aug 1879, Kew; represented at three other herbaria) with mine and extracted "spinning-stage" larva of* C ohridella *(indicated by the white arrows); scale bar 2 mm. (c) Modern "tissue-feeding" L4-stage larva of* C ohridella. *(d) Pressed L4-stage larva of* C ohridella *extracted from archival leaf mine; scale bar 0.5 mm (Markgraf 28 Jun 1928, #1513, Berlin).*



# Tracking origins of invasive herbivores through herbaria and archival DNA: the case of the horse-chestnut leaf miner

David C Lees[1,2*], H Walter Lack[3], Rodolphe Rougerie[4,5], Antonio Hernandez-Lopez[1], Thomas Raus[3], Nikolaos D Avtzis[6], Sylvie Augustin[1†], and Carlos Lopez-Vaamonde[1†]

Determining the native geographic range or origin of alien invasive species is crucial to developing invasive species management strategies. However, the necessary historical dimension is often lacking. The origin of the highly invasive horse-chestnut leaf-mining moth *Cameraria ohridella* has been controversial since the insect was first described in 1986 in Europe. Here, we reveal that herbarium collections across Europe indicate a Balkan origin for *C ohridella*. We successfully amplified nuclear DNA and mitochondrial DNA barcode fragments from larvae pressed within leaves of herbarium samples collected as early as 1879. These archival sequences confirm an identity of *C ohridella* and set back its history in Europe by more than a century. The herbarium samples uncovered previously unknown mitochondrial haplotypes and locally undocumented alleles, showing local outbreaks of *C ohridella* back to at least 1961 and dynamic frequency changes that may be associated with road development. This case history demonstrates that herbaria are greatly underutilized in studies of insect–plant interactions, herbivore biodiversity, and invasive species' origins.

*Front Ecol Environ* 2011; 9(6): 322–328, doi:10.1890/100098 (published online 21 Jun 2011)

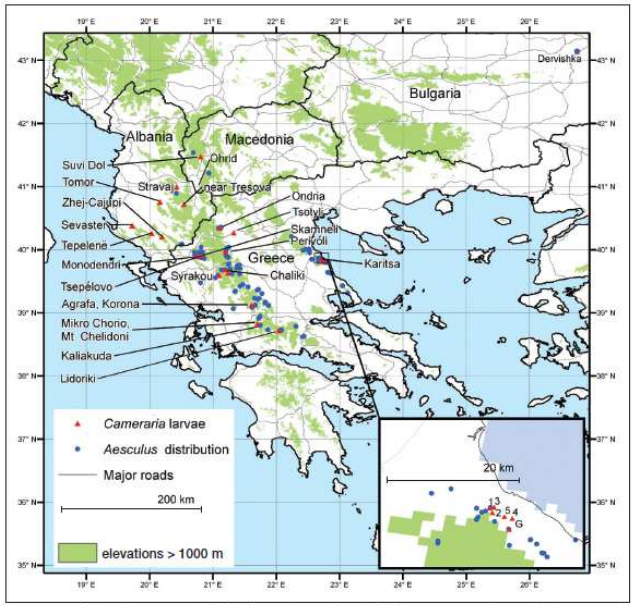


***Figure 1.*** *Distribution of* Cameraria ohridella *larvae and pupae found in herbarium specimens of* Aesculus hippocastanum *(1879–1981; red triangles) as compared with or in addition to the known natural distribution of horse-chestnut (best known for Greece: Avtzis et al. 2007; Valade et al. 2009; Flora Hellenica database; blue circles). Many sites are remote from principal roads but one now serves Karitsa. At Karitsa (inset), recent* C ohridella *samples (2008: points 1, 2, and 3) are very close to archival samples (1974: point 4; 1981: point 5, Raus collections; 1936: point G, Grebenchikoff collection).*

'herbarium AND **plant invasions**'

*Diversity and Distributions, (Diversity Distrib.)* (2007)

BIODIVERSITY RESEARCH

# Tracking biological invasions in space and time: elucidating the invasive history of the green alga *Codium fragile* using old DNA

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*School of Biological Sciences, The Queen's University of Belfast, 97 Lisburn Road, Belfast BT9 7BL, Northern Ireland*

## ABSTRACT

With the advent of 'ancient DNA' studies on preserved material of extant and extinct species, museums and herbaria now represent an important although still underutilized resource in molecular ecology. The ability to obtain sequence data from archived specimens can reveal the recent history of cryptic species and introductions. We have analysed extant and herbarium samples of the highly invasive green alga *Codium fragile*, many over 100 years old, to identify cryptic accessions of the invasive strain known as *C. fragile* ssp. *tomentosoides*, which can be identified by a unique haplotype. Molecular characterization of specimens previously identified as native in various regions shows that the invasive *tomentosoides* strain has been colonizing new habitats across the world for longer than records indicate, in some cases nearly 100 years before it was noticed. It can now be found in the ranges of all the other native haplotypes detected, several of which correspond to recognized subspecies. Within regions in the southern hemisphere there was a greater diversity of haplotypes than in the northern hemisphere, probably as a result of dispersal by the Antarctic Circumpolar Current. The findings of this study highlight the importance of herbaria in preserving contemporaneous records of invasions as they occur, especially when invasive taxa are cryptic.

*Correspondence: Dr Jim Provan, School of Biological Sciences, The Queen's University of

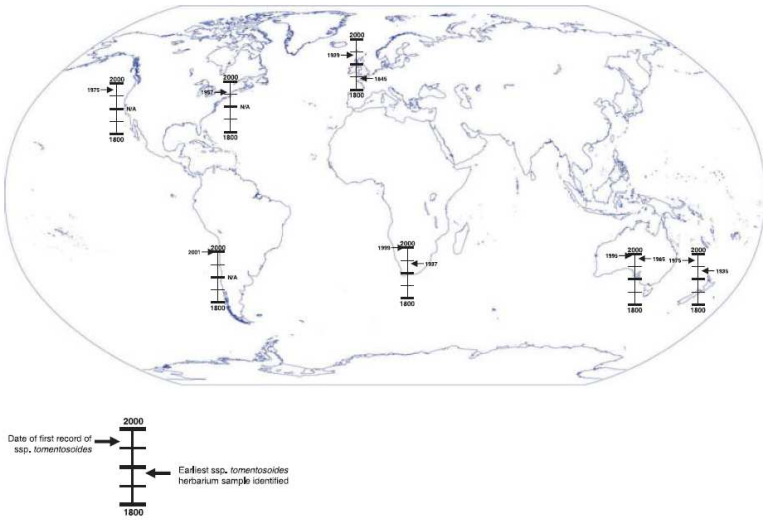


Figure 4 'Timelines' showing where earliest record of ssp. *tomentosoides* in various regions (left of scale) was predated by earliest herbarium sample identified as ssp. *tomentosoides* in that region (right of scale). N/A – no herbarium material predating initial record of introduction analysed.

PROCEEDINGS OF THE ROYAL SOCIETY B

*Proc. R. Soc. B* (2009) 276, 843–851
doi:10.1098/rspb.2008.1447
*Published online* 25 November 2008

# Gourds afloat: a dated phylogeny reveals an Asian origin of the gourd family (Cucurbitaceae) and numerous oversea dispersal events

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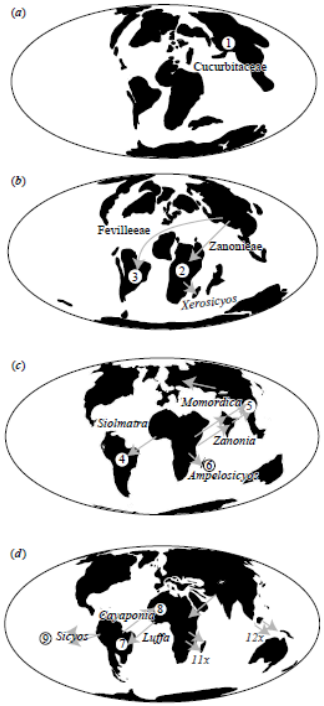
Knowing the geographical origin of economically important plants is important for genetic improvement and conservation, but has been slowed by uneven geographical sampling where relatives occur in remote areas of difficult access. Less biased species sampling can be achieved when herbarium collections are included as DNA sources. Here, we address the history of Cucurbitaceae, one of the most economically important families of plants, using a multigene phylogeny for 114 of the 115 genera and 25 per cent of the 960 species. Worldwide sampling was achieved by using specimens from 30 herbaria. Results reveal an Asian origin of Cucurbitaceae in the Late Cretaceous, followed by the repeated spread of lineages into the African, American and Australian continents via transoceanic long-distance dispersal (LDD). North American cucurbits stem from at least seven range expansions of Central and South American lineages; Madagascar was colonized 13 times, always from Africa; Australia was reached 12 times, apparently always from Southeast Asia. Overall, Cucurbitaceae underwent at least 43 successful LDD events over the past 60 Myr, which would translate into an average of seven LDDs every 10 Myr. These and similar findings from other angiosperms stress the need for an increased tapping of museum collections to achieve extensive geographical sampling in plant phylogenetics.




'herbarium AND **phylogeny / biogeography**'

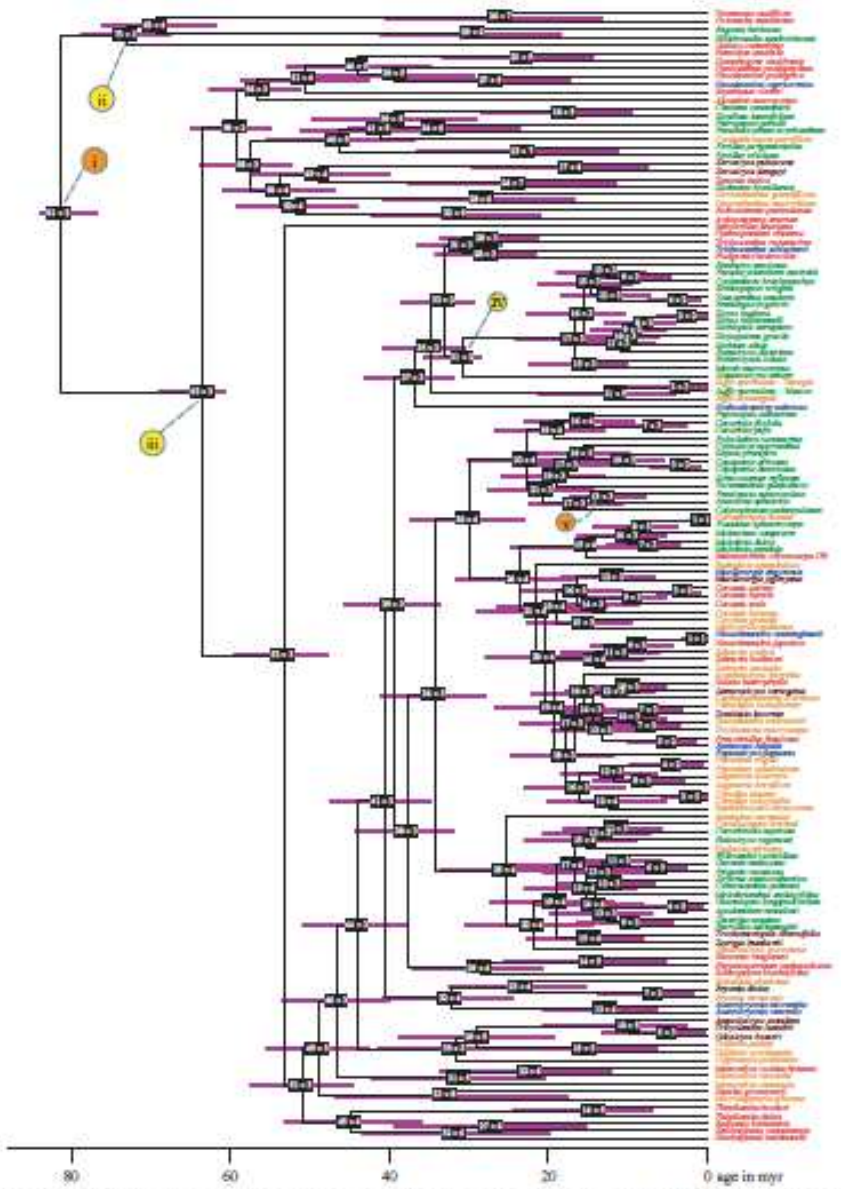



Figure 2. Chronogram obtained for Cucurbitaceae under a Bayesian autocorrelated rates relaxed clock model applied to the combined data (5031 nucleotides) and calibrated with three minimal (yellow) and two maximal (orange) constraints as in run (*d*) of §2(*d*). Age estimates with their 95% confidence ranges shown in purple. Rooting follows Zhang *et al.* (2006). Green, America (including Galapagos, Hawaii and the Caribbean); yellow, mainland Africa; brown, Madagascar; red, Asia; blue, Australia/New Guinea/Polynesia; black, Europe.

'herbarium AND **evolution**'

SCIENCE VOL 302 17 OCTOBER 2003

# Hybridization Between *Brassica napus* and *B. rapa* on a National Scale in the United Kingdom

**Mike J. Wilkinson,[1]* Luisa J. Elliott,[2] Joël Allainguillaume,[1] Michael W. Shaw,[1] Carol Norris,[3] Ruth Welters,[4] Matthew Alexander,[4] Jeremy Sweet,[3] David C. Mason[2]**

Measures blocking hybridization would prevent or reduce biotic or environmental change caused by gene flow from genetically modified (GM) crops to wild relatives. The efficacy of any such measure depends on hybrid numbers within the legislative region over the life-span of the GM cultivar. We present a national assessment of hybridization between rapeseed (*Brassica napus*) and *B. rapa* from a combination of sources, including population surveys, remote sensing, pollen dispersal profiles, herbarium data, local Floras, and other floristic databases. Across the United Kingdom, we estimate that 32,000 hybrids form annually in waterside *B. rapa* populations, whereas the less abundant weedy populations contain 17,000 hybrids. These findings set targets for strategies to eliminate hybridization and represent the first step toward quantitative risk assessment on a national scale.

brukev řepka

brukev řepák

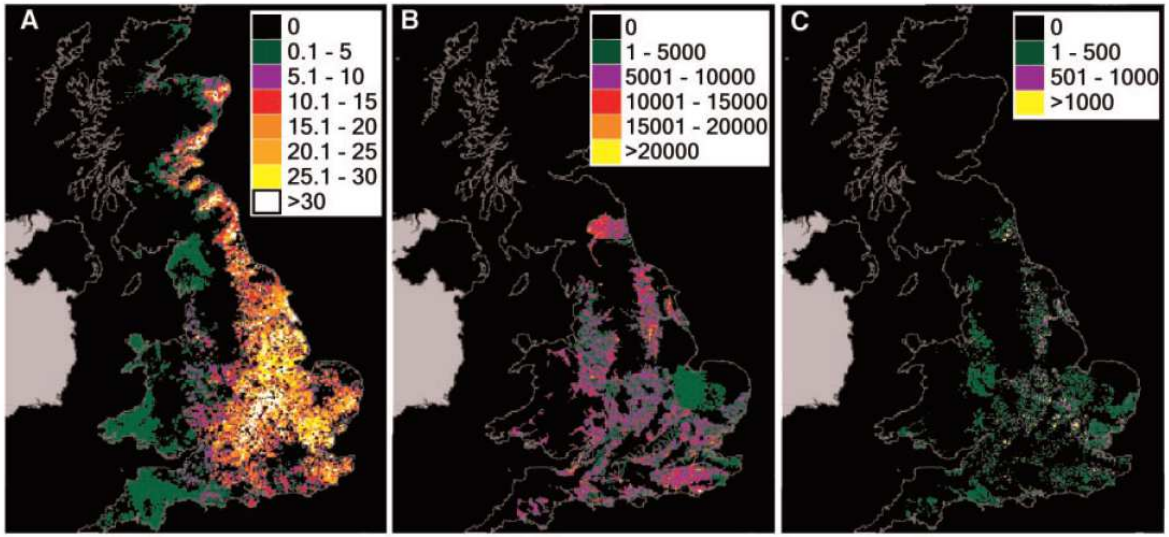



**Fig. 1.** Rapeseed–waterside *B. rapa* sympatry. (The gray areas represent the Republic of Ireland, which was not studied.) (**A**) Rapeseed cultivation (ha/2 km$^2$ per annum). (**B**) Density of waterside *B. rapa* (plant numbers/2 km$^2$ per annum). (**C**) Waterside *B. rapa* plants within 30 m of rapeseed (plant numbers/2 km$^2$ per annum).

'herbarium AND **evolution**'

*Evolution*, 57(7), 2003, pp. 1520–1534

# COMPONENTS OF REPRODUCTIVE ISOLATION BETWEEN THE MONKEYFLOWERS *MIMULUS LEWISII* AND *M. CARDINALIS* (PHRYMACEAE)

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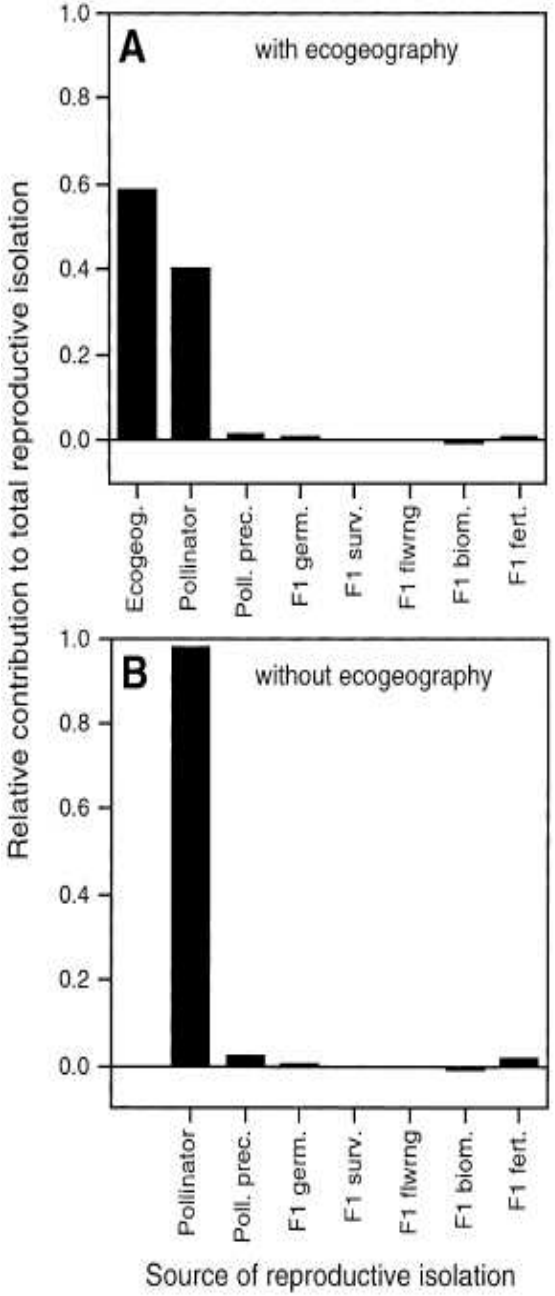
*Abstract.*—Evolutionists have long recognized the role of reproductive isolation in speciation, but the relative contributions of different reproductive barriers are poorly understood. We examined the nature of isolation between *Mimulus lewisii* and *M. cardinalis*, sister species of monkeyflowers. Studied reproductive barriers include: ecogeographic isolation; pollinator isolation (pollinator fidelity in a natural mixed population); pollen competition (seed set and hybrid production from experimental interspecific, intraspecific, and mixed pollinations in the greenhouse); and relative hybrid fitness (germination, survivorship, percent flowering, biomass, pollen viability, and seed mass in the greenhouse). Additionally, the rate of hybridization in nature was estimated from seed collections in a sympatric population. We found substantial reproductive barriers at multiple stages in the life history of *M. lewisii* and *M. cardinalis*. Using range maps constructed from herbarium collections, we estimated that the different ecogeographic distributions of the species result in 58.7% reproductive isolation. *Mimulus lewisii* and *M. cardinalis* are visited by different pollinators, and in a region of sympatry 97.6% of pollinator foraging bouts were specific to one species or the other. In the greenhouse, interspecific pollinations generated nearly 50% fewer seeds than intraspecific controls. Mixed pollinations of *M. cardinalis* flowers yielded >75% parentals even when only one-quarter of the pollen treatment consisted of *M. cardinalis* pollen. In contrast, both species had similar siring success on *M. lewisii* flowers. The observed 99.915% occurrence of parental *M. lewisii* and *M. cardinalis* in seeds collected from a sympatric population is nearly identical to that expected, based upon our field observations of pollinator behavior and our laboratory experiments of pollen competition. $F_1$ hybrids exhibited reduced germination rates, high survivorship and reproduction, and low pollen and ovule fertility. In aggregate, the studied reproductive barriers prevent, on average, 99.87% of gene flow, with most reproductive isolation occurring prior to hybrid formation. Our results suggest that ecological factors resulting from adaptive divergence are the primary isolating barriers in this system. Additional studies of taxa at varying degrees of evolutionary divergence are needed to identify the relative importance of pre- and postzygotic isolating mechanisms in speciation.



'herbarium AND **declining of rare species / conservation biology**'

The Linnean Society of London BOTANICAL Journal of the Linnean Society

*Botanical Journal of the Linnean Society*, 2012, **169**, 365–377. With 4 figures

# High genetic and morphological diversity despite range contraction in the diploid *Hieracium eriophorum* (Asteraceae) endemic to the coastal sand dunes of south-west France

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[3]*Chemin du Valentier, 38540 Heyrieux, France*

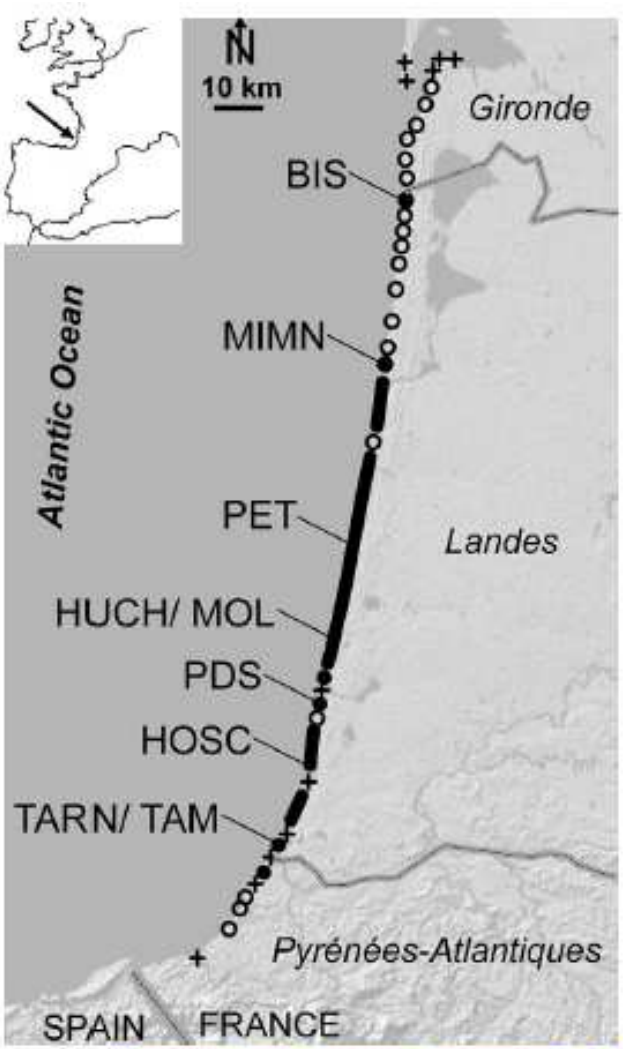


**Figure 1.** Historical and current distribution of *Hieracium eriophorum* and sampling sites (see Table 1). The thick line and the filled circles represent sites with presence records between 2001 and 2010 (the thick line representing the continuous distribution without gaps > 2 km). Empty circles show absence records collected between 2001 and 2010, but not all absence records are mapped to simplify the illustration. Crosses indicate extinctions, i.e. sites with former (1850–2000) records but confirmed absence between 2001 and 2010.

'herbarium AND **metabolism**'

THE LINNEAN SOCIETY of London BOTANICAL Journal of the Linnean Society

*Botanical Journal of the Linnean Society*, 2010, **163**, 194–222. With 1 figure

# The incidence of crassulacean acid metabolism in Orchidaceae derived from carbon isotope ratios: a checklist of the flora of Panama and Costa Rica

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[3]*Botany & Plant Sciences, University of California, 2150 Batchelor Hall, Riverside, CA 92521, USA*

*Received 27 July 2009; revised 29 November 2009; accepted for publication 7 May 2010*

Leaf carbon stable isotopic composition data for 1002 orchid species representing 61% of the total number of orchid species described for Panama and Costa Rica were obtained from herbarium specimens to survey the occurrence of crassulacean acid metabolism (CAM). Carbon isotopic composition of leaf material showed a bimodal distribution with modes at –28‰, indicating $C_3$ photosynthesis, and at –15‰, indicating pronounced CAM photosynthesis. Strong CAM was present in 9.5% of species and in 31 of 162 genera studied. Twelve of these genera were not previously known to contain species exhibiting CAM. A checklist of orchids of Panama and Costa Rica with their $\delta^{13}C$ values and an updated list of all known orchid genera that possess species with the ability to perform CAM are presented.


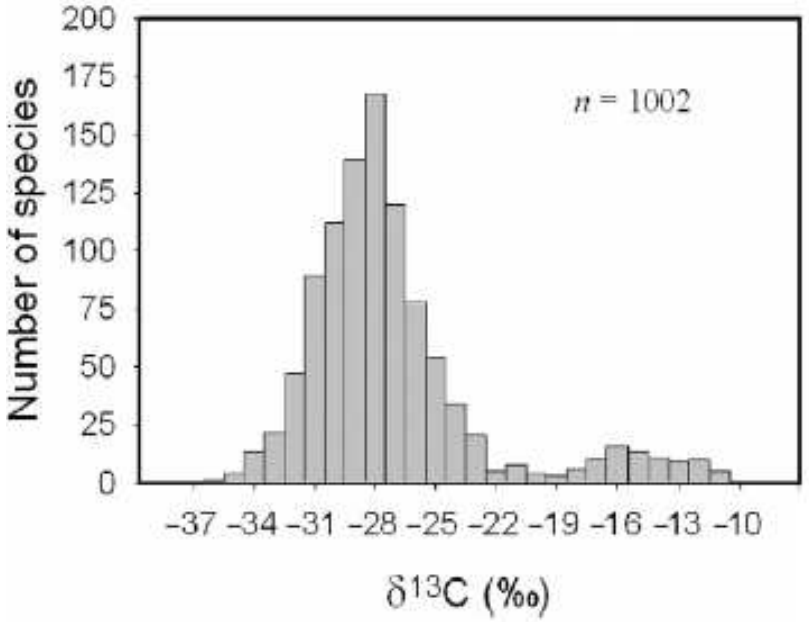


**Figure 1.** Frequency of leaf $\delta^{13}C$ values for 1002 Panamanian and Costa Rican orchid species. Each bar represents a 1‰ range of $\delta^{13}C$ values. Samples were collected at the Marie Selby Botanical Gardens Herbarium (SEL), the Missouri Botanical Gardens Herbarium (MO), the University of Florida Herbarium (FLAS), the University of Panama Herbarium (PMA) and Smithsonian Tropical Research Institute Herbarium (SCZ).

'herbarium AND **metabolism**'

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Environmental Pollution 133 (2005) 303–314
ENVIRONMENTAL POLLUTION
www.elsevier.com/locate/envpol

# UV-absorbing compounds in subarctic herbarium bryophytes

S. Huttunen*, N.M. Lappalainen, J. Turunen

*Botany Division, Department of Biology, P.O. Box 3000, FIN-90 014 University of Oulu, Finland*

Received 5 March 2004; accepted 31 May 2004

*UV-B-absorbing compounds in subarctic herbarium bryophytes indicate the radiation climate of the collecting site and time.*

**Abstract**

The UV-B-absorbing compounds of herbarium specimens of 10 subarctic bryophyte species collected during the years 1926–1996 and available at the Botanical Museum, University of Oulu, were studied. We studied whether herbarium specimens reflect changes in the past radiation climate through their methanol-extractable compounds. The order of gametophytes based on the average amount of total compounds (sum of $A_{280-320\ nm}$) per mass from the lowest to the highest was *Polytrichum commune*, *Pleurozium schreberi*, *Hylocomium splendens*, *Sphagnum angustifolium*, *Dicranum scoparium*, *Funaria hygrometrica*, *Sphagnum fuscum*, *Sphagnum warnstorfii*, *Sphagnum capillifolium* and *Polytrichastrum alpinum*, and the amount of UV-B-absorbing compounds per specific surface area correlated with the summertime daily global radiation and latitude. *P. alpinum*, *F. hygrometrica* and three *Sphagnum* species seem to be good indicators for further studies. The amount of UV-B-absorbing compounds revealed no significant trends from the 1920s till the 1990s, with the exception of *S. capillifolium*, which showed a significant decreasing trend.

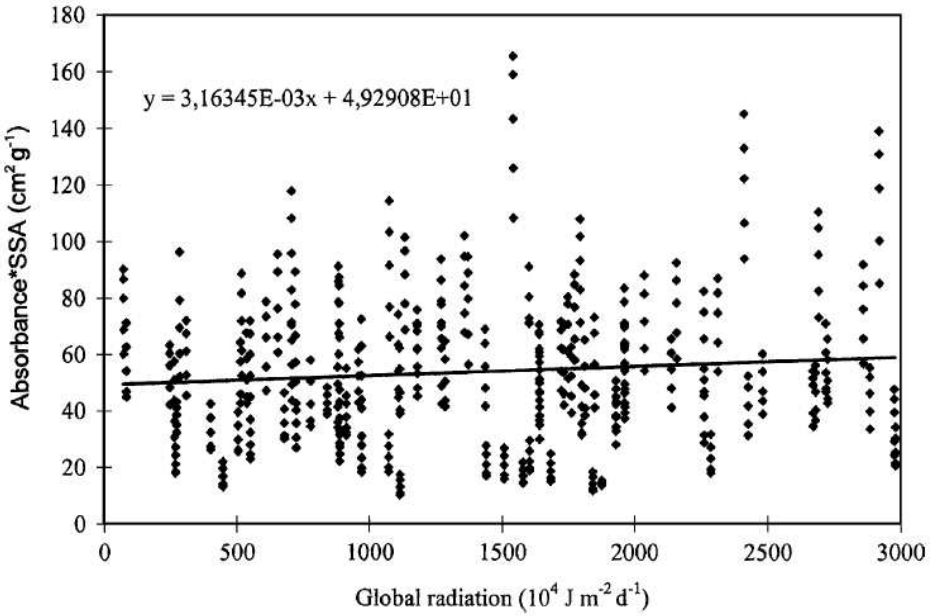



Fig. 6. Absorbance of all species for UV-B-absorbing compounds × S-SA versus daily global radiation (at Sodankylä since 1953) on the collecting date ($n = 97$, $t = 1.669$, $P < 0.1$). The vertical symbols stand for five different wavelengths (485 measurements). The values for 280 nm are generally at the top of the vertical lines and 320 nm at the bottom.

'herbarium AND **pollution**'

*Environmental Pollution* **88** (1995) 193–205

0269-7491/95/$09.50

ELSEVIER

# DEPOSITION OF FIXED ATMOSPHERIC NITROGEN AND FOLIAR NITROGEN CONTENT OF BRYOPHYTES AND *Calluna vulgaris* (L.) HULL

C. E. R. Pitcairn, D. Fowler

*Institute of Terrestrial Ecology, Bush Estate, Penicuik, Midlothian UK, EH26 OQB*

&

J. Grace

*IERM, Division of Biological Sciences, University of Edinburgh, Kings Buildings, Mayfield Road, Edinburgh, UK*

(Received 3 December 1993; accepted 30 March 1994)

**Abstract**

*Atmospheric deposition of fixed nitrogen as nitrate and ammonium in rain and by dry deposition of nitrogen dioxide, nitric acid and ammonia has increased throughout Europe during the last two decades, from 2–6 kg N ha$^{-1}$ year$^{-1}$ to 15–60 kg N ha$^{-1}$ year$^{-1}$. The nitrogen contents of bryophytes and the ericaceous shrub* Calluna vulgaris *have been measured at a range of sites, with the objective of showing the degree to which nitrogen deposition is reflected in foliar plant nitrogen. Tissue nitrogen concentrations of herbarium bryophyte samples and current samples of the same species collected from the same sites were compared. No significant change in tissue nitrogen was recorded at a remote site in north-west Scotland where nitrogen inputs are small (<6 kg N ha$^{-1}$ year$^{-1}$). Significant increases in tissue N occurred at four sites ranging from 38% in central Scotland to 63% in Cumbria where nitrogen inputs range from 15 to 30 kg N ha$^{-1}$ year$^{-1}$. The relationships found between the estimated input of atmospheric nitrogen and the tissue nitrogen 1990 the data suggest an increase in nitrogen deposition of 2 kg N ha$^{-1}$ every 10 years.*

*Keywords:* Atmospheric, nitrogen, deposition, bryophytes, *Calluna*.

## INTRODUCTION

The major sources of deposited atmospheric nitrogen (N) are the gases nitric oxide (NO), nitrogen dioxide ($NO_2$) and ammonia ($NH_3$). Emissions of oxides of nitrogen ($NO_x$) in the UK primarily arise from the combustion of fossil fuels but also from biomass burning, lightning, $NH_3$ oxidation, microbial soil processes, stratospheric input and marine photolytic and biological processes. Ammonia emissions arise mainly from agriculture, particularly livestock farming and animal wastes.

The deposition of N from the atmosphere over large areas of Europe has increased during the last two

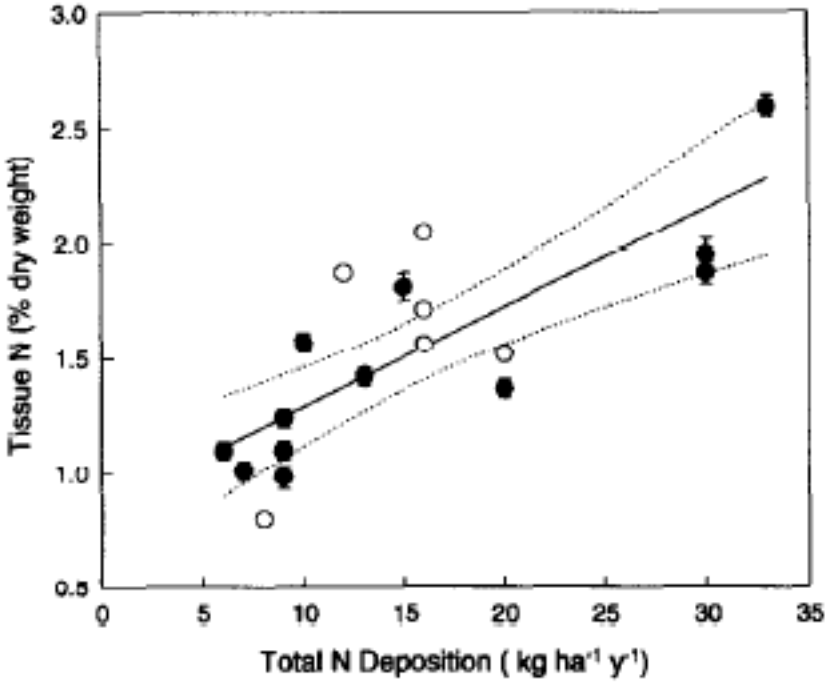
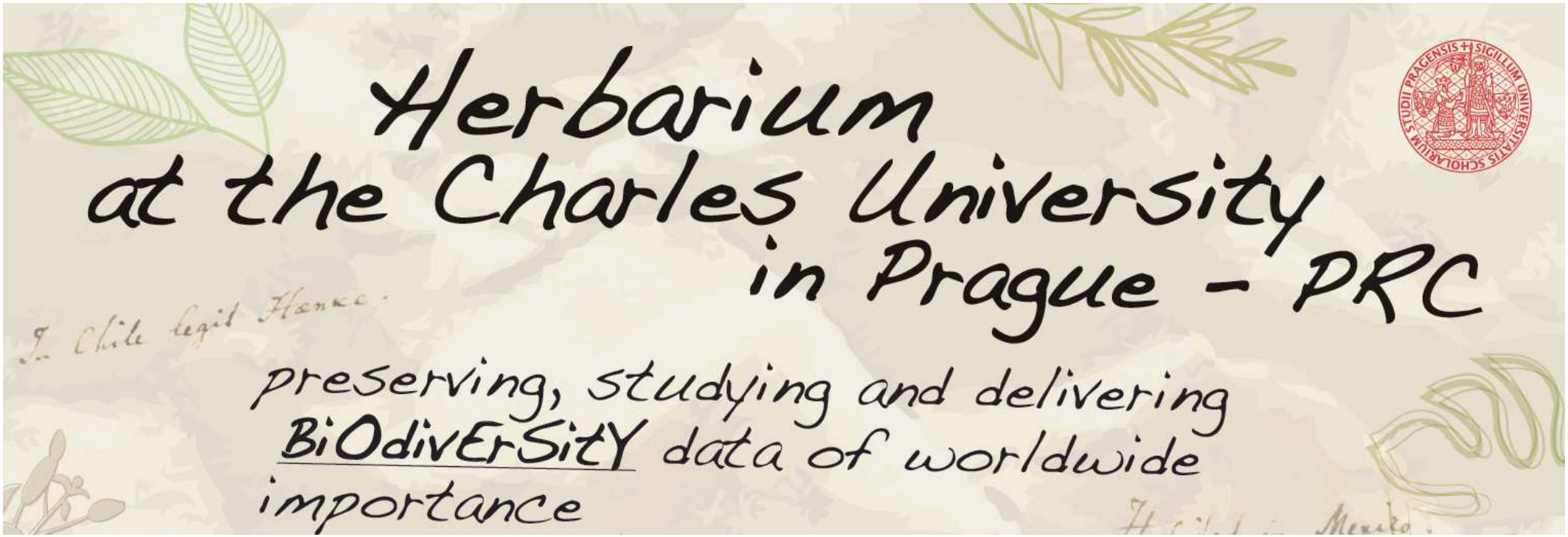



**Fig. 6.** Relationship between tissue N content of *Calluna* and total N deposition at a range of sites in the UK (● - mean values with standard error bars, ○ - unreplicated estimate). $y = 0{\cdot}83 + 0{\cdot}45\ x$, $p = 0{\cdot}01$, $r^2 = 0{\cdot}67$.

# Herbaria:
# living archives of BiOdivErSitY

## Herbarium of the Charles University in Prague (PRC)


Herbarium
at the Charles University
in Prague - PRC
preserving, studying and delivering
BiOdivErSitY data of worldwide
importance

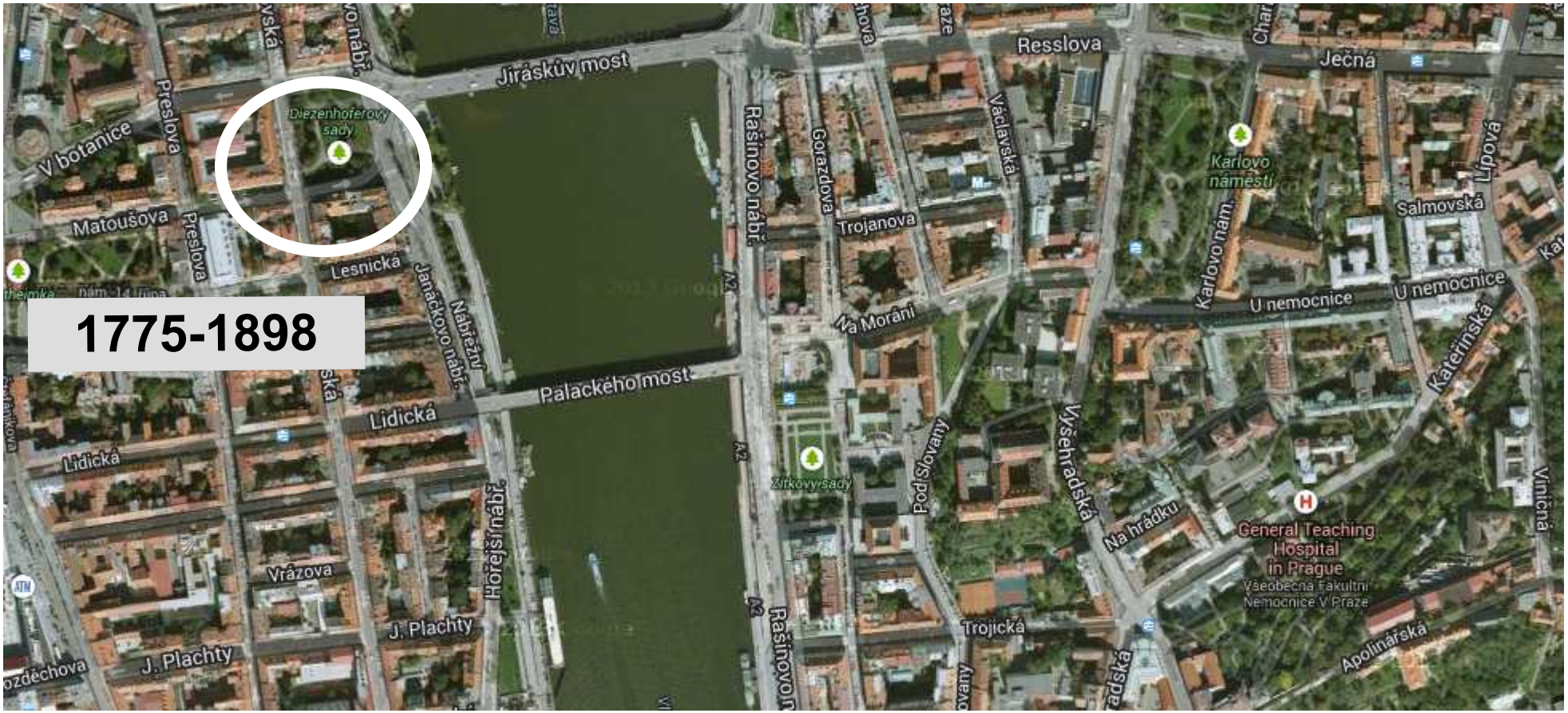
# Herbarium PRC at the Charles University in Prague

- founded in 1775 together (with the botanical garden)
- belongs to the 25 oldests herbaria in world
- ca 2,500,000 specimens (the largest herbarium in Czechia)
- belongs to the 25 largest herbaria in the World
- **top 10 housing by universities!**

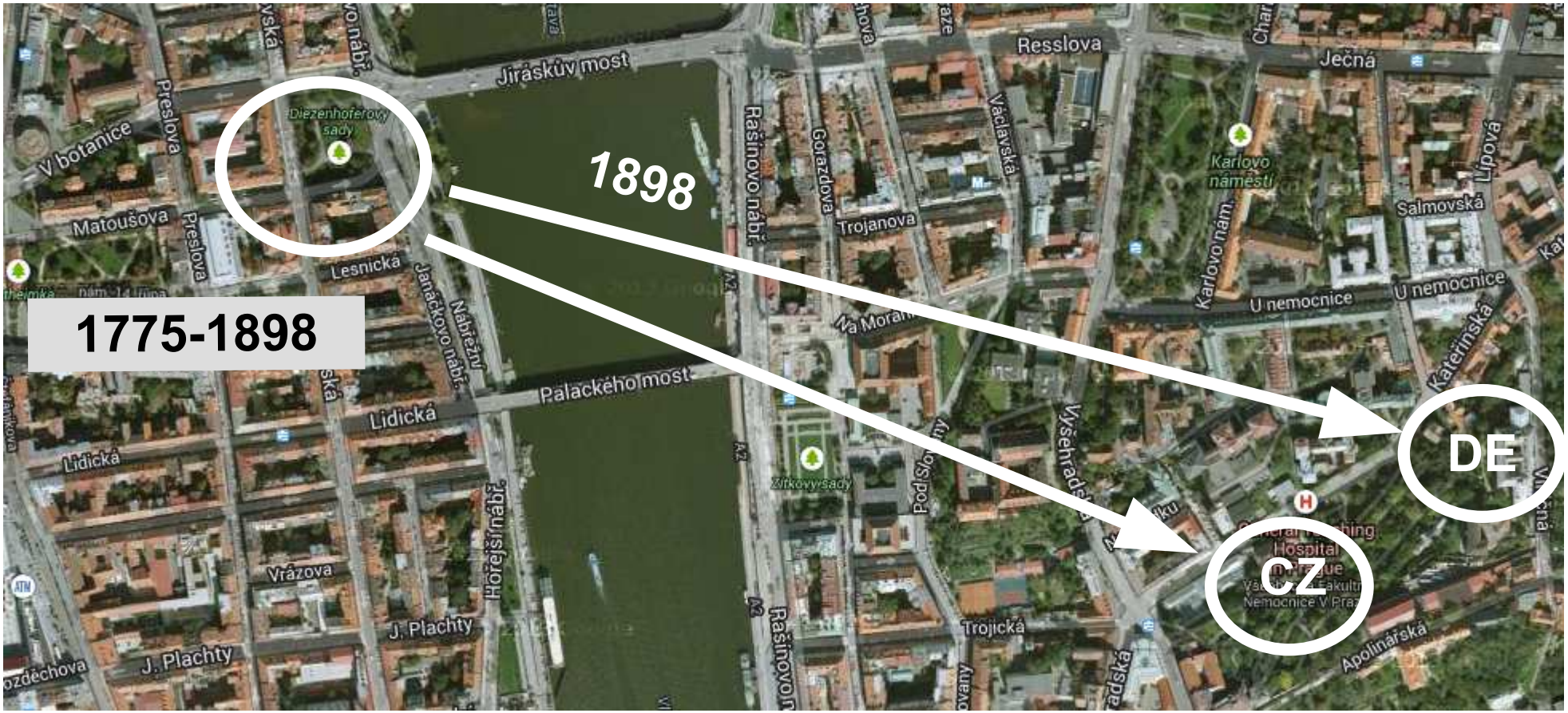
# Herbarium PRC at the Charles University in Prague

- founded in 1775 alongside the botanical garden

Joseph Gottfried MIKAN (1743-1814)


1775-1898
Jiráskův most
Palackého most
Resslova
Ječná
Karlovo náměstí
Karlovo nám.
Salmovská
Lipová
U nemocnice
Katerinská
Viničná
Na hrádku
Vyšehradská
Pod Slovany
Trojanova
Gorazdova
Václavská
Rašínovo nábř.
Na Moráni
Žitkovy sady
Diezenhoferovy sady
V botanice
Preslova
Matoušova
Lesnická
Janáčkovo nábř.
Náplavní
Lidická
Vrázova
J. Plachty
Hořejší nábř.
Trojická
Apolinářská
General Teaching Hospital in Prague
Všeobecná fakultní nemocnice v Praze


PRAHA.
Botanická zahrada.
15/10. 1907
Světlotisk A. J. Koppe, Praha-Smíchov.


1775-1898
1898
DE
CZ
Jiráskův most
Palackého most
Lidická
Lesnická
Resslova
Ječná
Karlovo náměstí
U nemocnice
Trojanova
Trojická
Apolinářská
Salmovská
Lipová
Kateřinská
Václavská
Gorazdova
Rašínovo nábř.
Hořejší nábř.
Janáčkovo nábř.
Náplavní
Preslova
Matoušova
V botanice
Diezenhoferovy sady
Žižkovy sady
Vrázova
J. Plachty
Hospital
Nemocnice V Pra

**1882** – herbarium established  at the Czech University

**1898** – the German and Czech herbaria moved from Smíchov

**1939** – closure of the Czech University

**1944** – evacuation at the Kout castle

Adolf PASCHER
(1881-1945)

Kout na Šumavě - bývalý zámek a býv. škola v přírodě 10. 2. 2013

Prag, den 22.4.1944.

Herrn
Wilhelm Baron v. Heyden -
Linden,

Kauth,
bei Taus.

708/44.

Sehr geehrter Herr Baron!

Nun weiss ich nicht, habe ich bei meinem letzten Briefe nur die Absicht gehabt, Sie um freundliche Ueberlassung von Roggenähren zu bitten, oder hab' ich es wirklich getan? Im letzteren Falle bitte ich Sie, den Brief hier zu ignorieren. Es läuft auch hier so viel an Arbeit zusammen, jetzt Wehrmachtskurse neben dem ohnehin bereits sehr starken Betrieb, dass man manchmal Einzelnes nicht mehr klar hat.
Sollte ich nicht gebeten haben, so lege ich Ihnen, sehr geehrter Herr Baron, die Bitte vor.
Mit den besten Grüssen und Wünschen,

Ihr ergebener

A. Pascher.

**1945 –20??** merging of the DE & CZ herbaria

https://botany.natur.cuni.cz/cevnate/prc/index.php?lang=en

# HERBARIUM COLLECTIONS AT THE CHARLES UNIVERSITY IN PRAGUE (PRC)

Česky
English

General information and brief history
Algae
Bryophytes
Fungi
Lichens
Vascular plants
Collection of seeds and fruits
Databases
Loans
Visits
Staff
Publications and media on PRC
Links

Address:
Herbarium of the Charles University in Prague
Benátská 2, 12801, Praha
Czech Republic
Phone: +420 221951642

## General information

The herbarium collection of the Charles University in Prague (Herbarium Universitatis Carolinae Pragensis, international herbarium acronym: PRC) houses more than 2,200,000 specimens of algae, bryophytes, fungi, lichens and vascular plants. A seed collection consisting of more than 20,000 samples and representing ca 11,000 taxa of vascular plants is also a part of PRC. Due to its size, age (founded in 1775), geographical coverage and importance (tens of thousands of type specimens),the PRC collection belongs to the 25 biggest and oldest herbaria in the world and the collections within which are housed by the university institutions are ranked in the top 10 (Index Herbariorum, the 8th printed edition, 1990). The PRC collections contribute to a wide range of scientific activities in plant systematics, ecology, biogeography, floristics, conservation biology and paleoecology at the Charles University and in other institutions throughout the world.

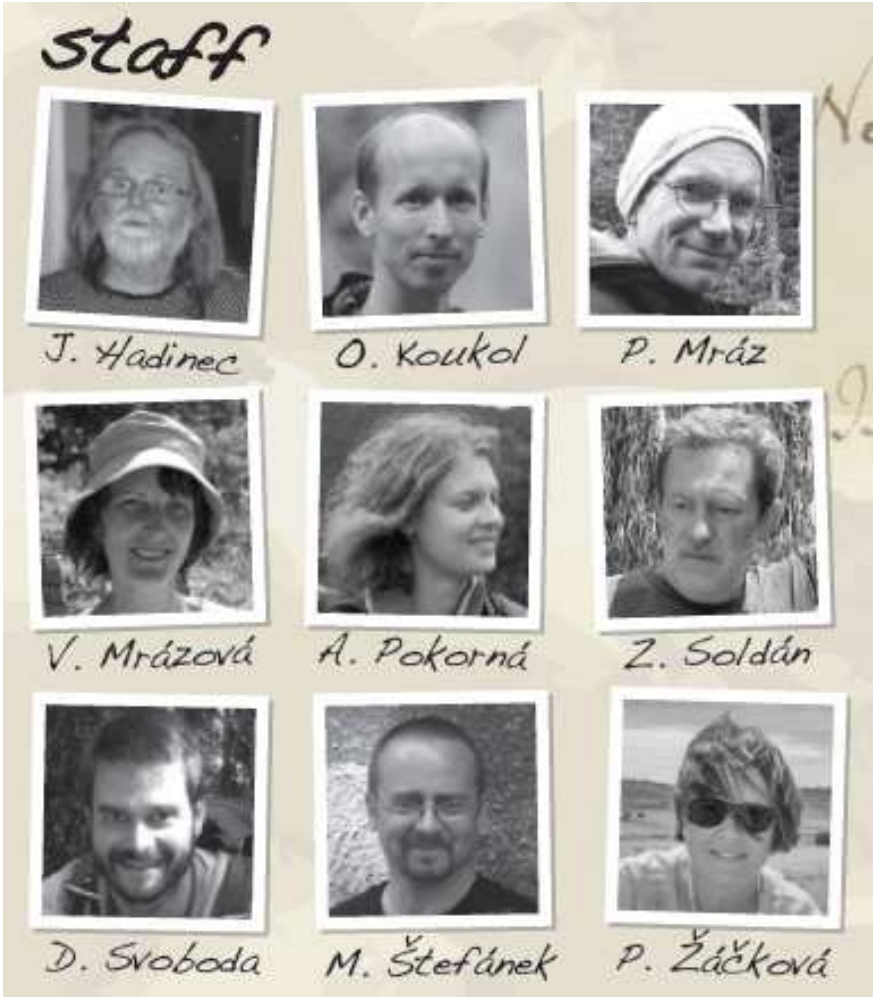
## Brief history of the herbarium's collections at the Charles University in Prague

The university herbarium was founded together with the botanical garden in 1775 by Professor J.G. Mikan (1743-1814). The botanical garden and the herbarium's depositories were originally placed in the Smichov ward. Today, only the names of the streets 'Preslova' and 'V Botanice' remain in its original placement. The remnants of the original garden can still be seen in the form of a small park area in front of the administration office of the Středočeský kraj region (Zborovská street), on the left bank of Vltava river. The most important curator in the 19th century was Professor V.F. Kostelecký (1801-1887). During his period the botanical garden and herbarium became one of the most famous botanical institutions in Europe. In 1882 the Charles University, including the botanical institute, was divided into two parts, Czech and German. Because of frequent floods that regularly damaged the botanical garden, two botanical institutions were moved in 1898 into two new, almost identical buildings built on the slopes of the right bank of the river of Vltava. While the Botanical Institute of the Czech University was placed on Benátská 2, where the Department of Botany, Botanical Garden and Herbarium collections are currently housed, the German part, including the entire herbarium collection, was placed on Viničná 5. At the Czech University, new collections have been created mainly due to the efforts of Professors J. Velenovský (1858-1949) and K. Domin (1882-1953) and their students. During World War II, both Czech and German collections were evacuated and temporarily stored in the provisory depository at the 'Kout' castle in the Šumava Mts (Böhmerwald). Unfortunately, a part of the collection was damaged due to unsuitable storage conditions. After the war the German University was cancelled and both herbariums were merged and moved to Benátská 2. In the coming years, many employees and students greatly contributed to the renovation of the collections. In 1987, an administrative intervention caused the loss of ca one third of depositories and herbarium collections are still suffering from this. In the same year, the important paleobotanical collection of J. Velenovský was moved to the Department of Geology.

# Herbarium PRC at the Charles University in Prague

- belongs to the **25 oldests herbaria in the world**
- ca **2,200,000** specimens (**the largest herbarium in Czechia**)

| | |
|---|---|
| • **vascular plants** | **2,000,000** |
| • **bryophytes** | **80,000** |
| • **lichens** | **30,000** |
| • **fungi** | **80,000** |
| • **macroalgae** | **5,000** |
| • **seeds & fruits** | **21,000** |



# The most important curators:

František Vincenc KOSTELETZKY
(1801-1887)

Heinrich Moritz WILLKOMM
(1821-1895)


Richard WETTSTEIN (1863-1931)

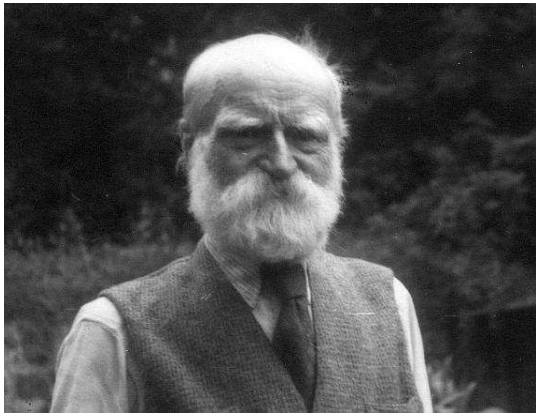
Ladislav ČELAKOVSKÝ
(1834-1902)

# The most important curators:

Günther BECK von MANNAGETTA und LERCHENAU (1856-1931)

Adolf PASCHER (1881-1945)

Josef DOSTÁL (1903-1999)



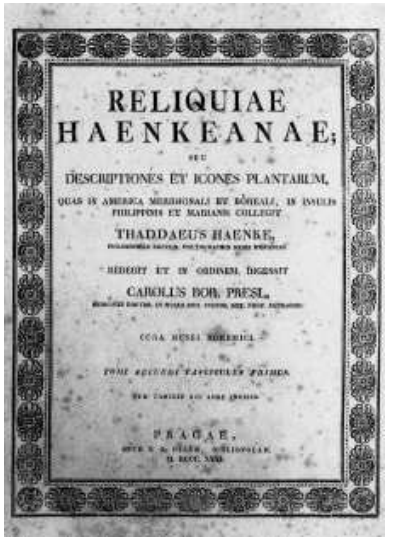
Josef VELENOVSKÝ (1858-1949)

Karel DOMIN (1882-1953)

# Herbarium PRC at the Charles University in Prague

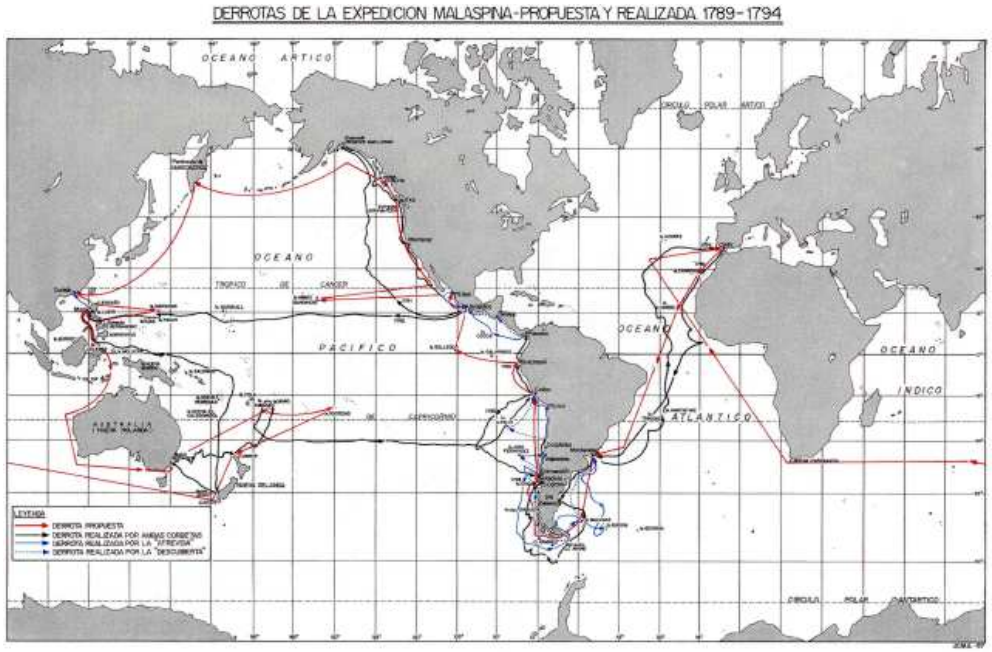
Important collections:


Thadeus HAENKE (1761-1816)

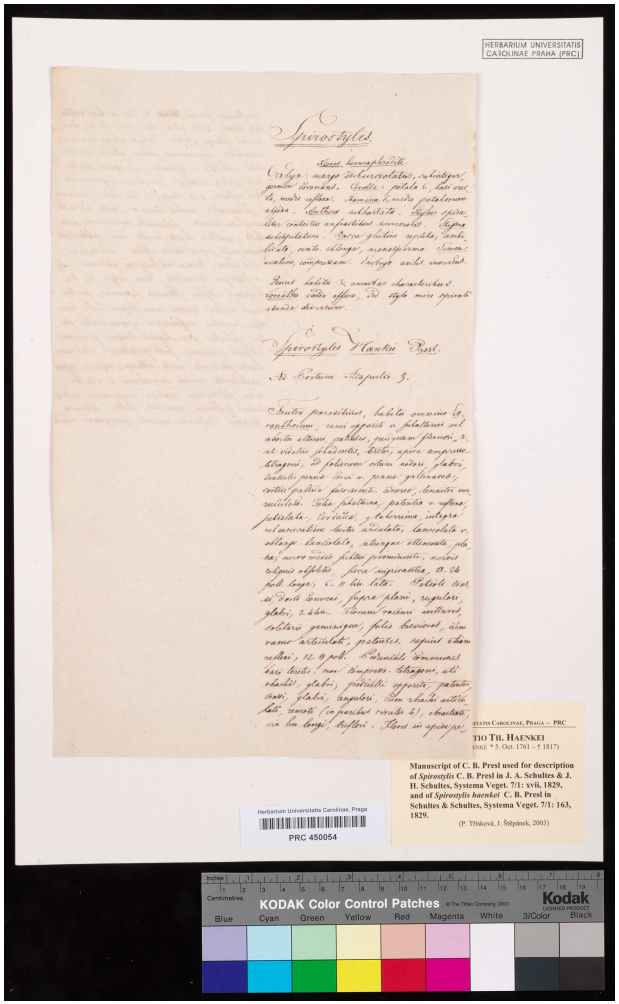


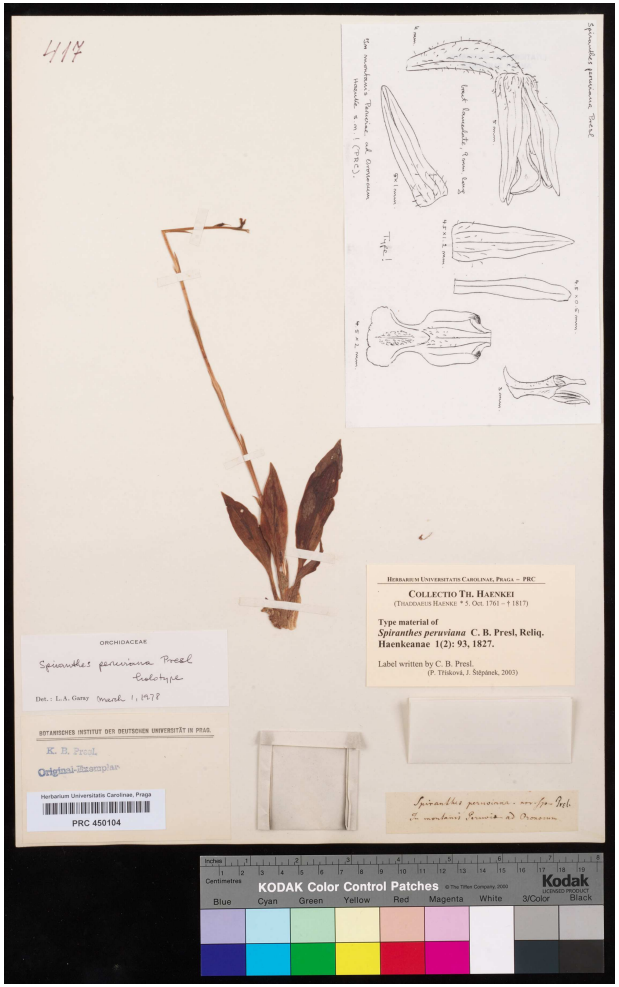

Karel Bořivoj PRESL (1794-1852)

https://www.ceskatelevize.cz/ivysilani/10169539755-dvaasedmdesat-jmen-ceske-historie/209572232200014-tadeas-haenke/titulky




SUBLIMAT 1929
HERBARIUM UNIVERSITATIS CAROLINAE PRAHA
Herbarium Universitatis Carolinae, Praga – PRC
COLLECTIO TH. HAENKEI
(THADDAEUS HAENKE * 5. Oct. 1761 – † 1817)
Type material of
Schismoceras disticha C. B. Presl,
Reliq. Haenkeanae 1(2): 96, 1827.
Label written by C. B. Presl.
(P. Třísková, J. Štěpánek, 2003)
BOTANISCHES INSTITUT DER DEUTSCHEN UNIVERSITÄT IN PRAG.
K. B. Presl.
Herbarium Universitatis Carolinae, Praga
PRC 450050
KODAK Color Control Patches
Blue Cyan Green Yellow Red Magenta White 3/Color Black


HERBARIUM UNIVERSITATIS CAROLINAE PRAHA (PRC)
Spirostylles
Spirostylis Haenkii Presl.
Herbarium Universitatis Carolinae, Praga – PRC
TIO TH. HAENKEI
(PRAG * 5. Oct. 1761 – † 1817)
Manuscript of C. B. Presl used for description of Spirostylis C. B. Presl in J. A. Schultes & J. H. Schultes, Systema Veget. 7/1: xvii, 1829, and of Spirostylis haenkei C. B. Presl in Schultes & Schultes, Systema Veget. 7/1: 163, 1829.
(P. Třísková, J. Štěpánek, 2003)
Herbarium Universitatis Carolinae, Praga
PRC 450054
KODAK Color Control Patches
Blue Cyan Green Yellow Red Magenta White 3/Color Black


417
ORCHIDACEAE
Spiranthes peruviana Presl
Lectotype
Det.: L.A. Garay March 1, 1978
BOTANISCHES INSTITUT DER DEUTSCHEN UNIVERSITÄT IN PRAG.
K. B. Presl.
Original-Exemplar
Herbarium Universitatis Carolinae, Praga – PRC
COLLECTIO TH. HAENKEI
(THADDAEUS HAENKE * 5. Oct. 1761 – † 1817)
Type material of
Spiranthes peruviana C. B. Presl, Reliq. Haenkeanae 1(2): 93, 1827.
Label written by C. B. Presl.
(P. Třísková, J. Štěpánek, 2003)
Herbarium Universitatis Carolinae, Praga
PRC 450104
KODAK Color Control Patches
Blue Cyan Green Yellow Red Magenta White 3/Color Black

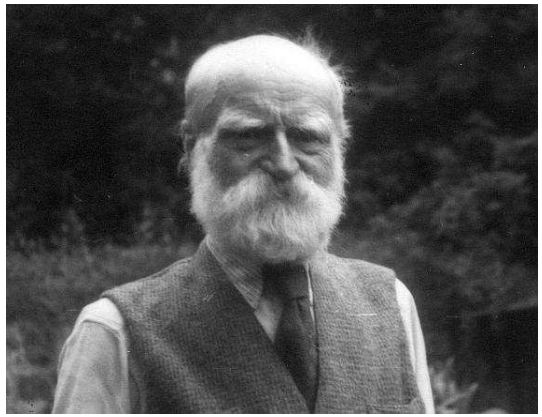
# The most important collections:

Ignaz Friedrich TAUSCH
(1793-1849)

IPNI: **937**

Günther BECK von MANNAGETTA
und LERCHENAU
(1856-1931)

IPNI: **868**



Josef VELENOVSKÝ
(1858-1949)

IPNI: **562**

**2000** species of **fungi**

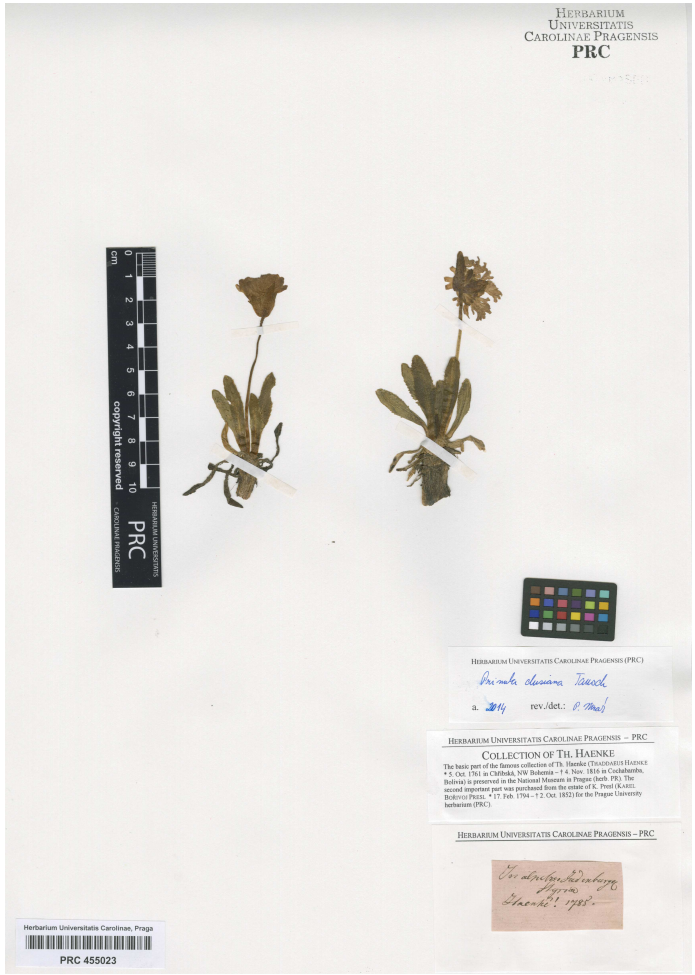
# The oldest speciemens:


Johann Christian
BUXBAUM
(1693-1730)


Johann Georg GMELIN
(1709-1755)


Giovanni Antonio
SCOPOLI
(1723-1788)

# The oldest speciemens:




Thaddäus HAENKE
(1763-1817)


Franz Willibald SCHMIDT
(1764-1796)

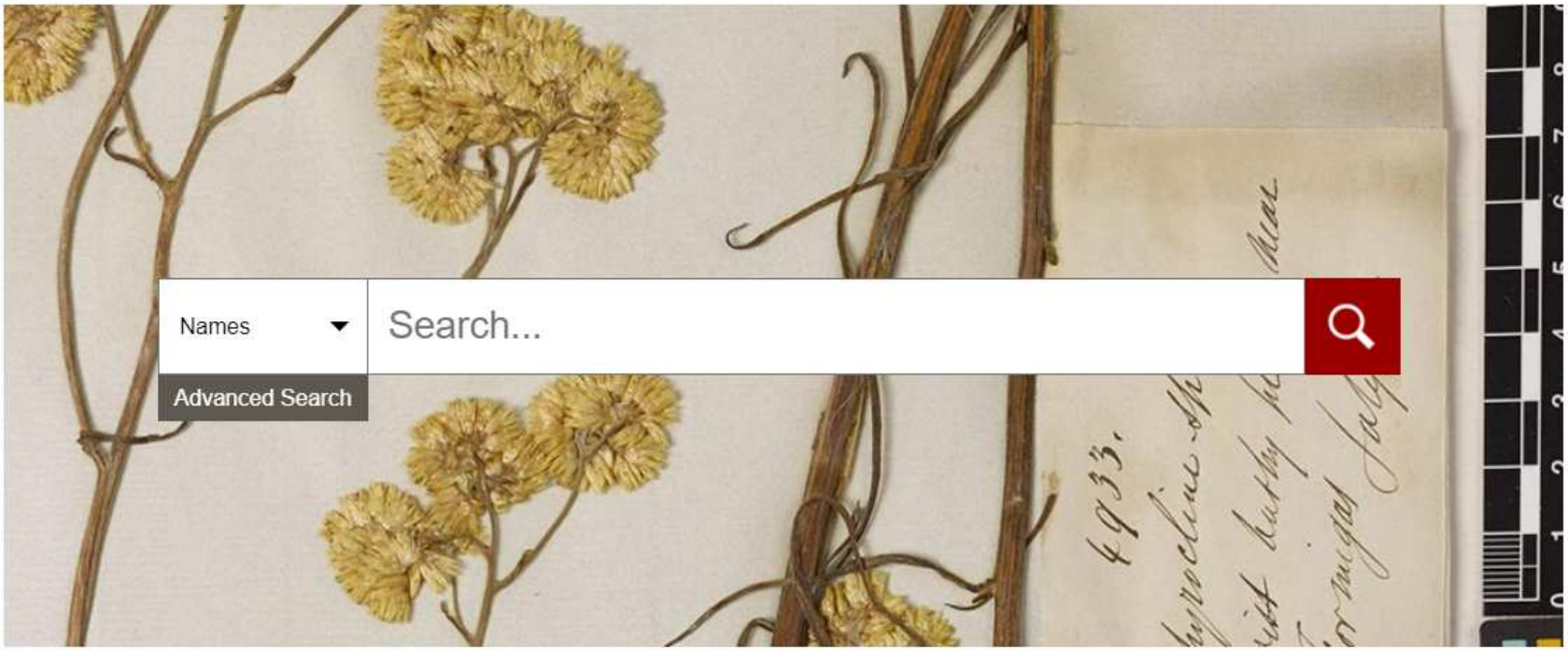
plants.jstor.org

# Global Plants

JSTOR





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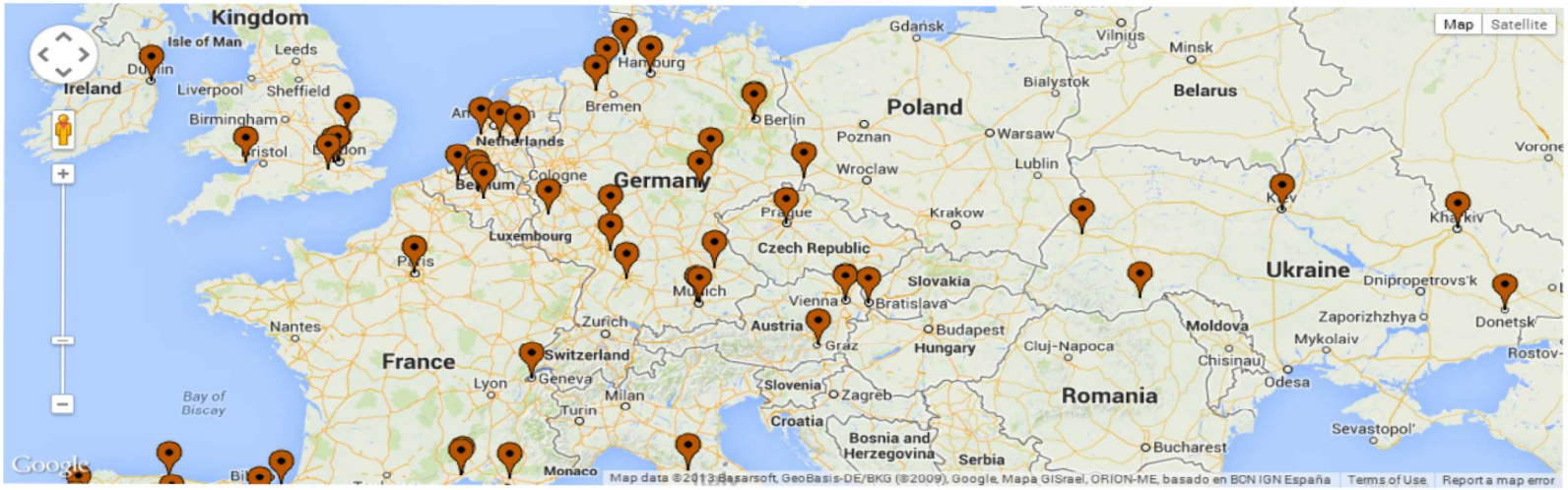
Browse | My profile | About

Global Plants Initiative (GPI) Partners



# Virtual Herbaria

JACQ

Home | General Information | Collections | Reference systems

## *Collections of participating institutions*

# Virtual Herbaria JACQ

Home | General Information | Collections | Reference systems

Institution: Herbarium PRC
Collection:
Family:
ident. history:
Collector:
Collector #:
Continent:
Region:
Herbar #:
Collection #:
Taxon:
incl. syn.
Series:
Country:
State/Province:
Locality:

All records / Type records only

Display only records containing images: Yes / No

Search Reset

**Last database update 2020-12-14**

## Search Tips

**general**
search is not **case sensitive**
fields are automatically linked by **AND**
for partial strings the **%** sign can be used as a wildcard

**taxon search**
queries for a genus can be sent as "genus name" "blank space" and the "%" sign:
searchstring **"Oncidum %"** yields all data for **Oncidium** plus all data for transferred names, e.g. **Cyrtochilum**, etc.

typing the initial letters for "genus" and "epithet" are sufficient as search criteria:
**"p bad"** yields all taxa where genus starts with **"p"** and epithet starts with **"bad"** results include e.g. ***Parmelia badia*** **Hepp**, ***Peziza badia*** **Pers.** or ***Poa badensis*** **Haenke ex Willd.**

# Virtual Herbaria JACQ

Home | General Information | Collections | Reference systems

**33644 records found**

Create map | download KML | download CSV

‹ Prev | 1 | 2 | 3 | 4 | 5 | 6 | 7 | ... | 337 | Next ›

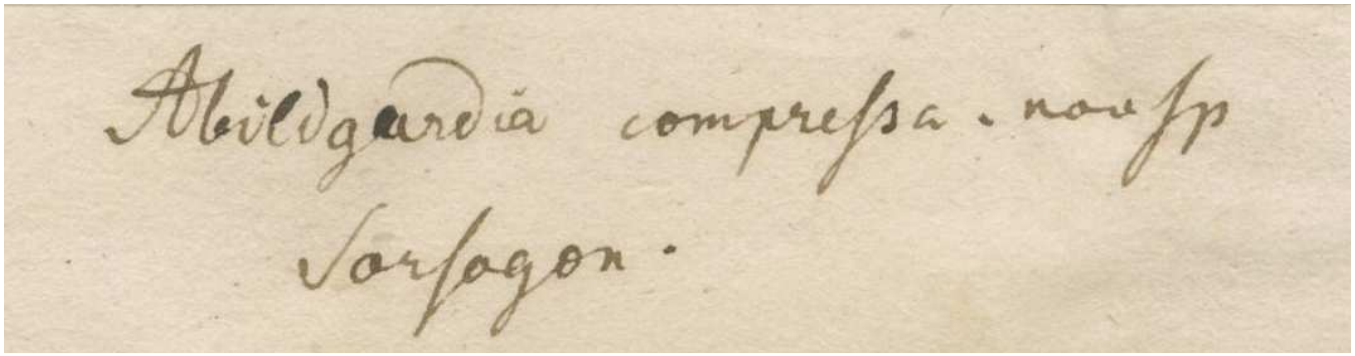
100

| Taxon | Collector | Date | Location | Typus | Coll. | Lat/Lon | NCBI |
|---|---|---|---|---|---|---|---|
| Aa | Stančík,D. 2797 | 1999-03-05 | Colombia. Nariño | | PRC 421199 | | |
| Aa | Sklenář, P. & Sklenářová,V. 2354 | 1997-07-02 | Ecuador. Chimborazo | | PRC 439779 | M | |
| Aa | Sklenář, P. & Sklenářová,V. 3292 | 1997-08-09 | Ecuador. Tungurahua | | PRC 439780 | M | |
| Aa | Sklenář, P. & Sklenářová,V. 3226 | 1997-08-08 | Ecuador. Tungurahua | | PRC 439781 | M | |
| Aa weberbaueri Schltr. | Stančík,D. | 1993-09-19 | Peru. Cuzco | | PRC 430805 | | |
| Abies | Zdvořák,P. 6825 | 2017-09-06 | Czech Republic. Litoměřice | | PRC 426487 | M | |
| Abies | Zdvořák,P. 3202 | 2014-04-19 | Czech Republic. Česká Lípa | | PRC 428932 | M | |
| Abies | Zdvořák,P. 3213 | 2014-04-16 | Czech Republic. Litoměřice | | PRC 429021 | M | |
| Abies | Zdvořák,P. 3201 | 2014-04-19 | Czech Republic. Česká Lípa | | PRC 429022 | M | |
| Abildgaardia compressa J. Presl & C. Presl | Haenke,T.P.X. s.n. [s.d.] | s.d. | Philippines | T | PRC 450388 | | |
| Abildgaardia compressa J. Presl & C. Presl | Haenke,T.P.X. s.n. [s.d.] | s.d. | Philippines | T | PRC 450389 | | |
| Abildgaardia nervosa J. Presl & C. Presl | Haenke,T.P.X. s.n. [s.d.] | s.d. | Philippines | T | PRC | | |

| | |
|---|---|
| Stable Identifier | |
| Collection | **PRC-Phanerogamae 450388** |
| Type information | **Typus for Abildgaardia compressa J. Presl & C. Presl**<br>Reliq. haenk. 1 (3): 179 (1828-07)<br>Current Name: *Fimbristylis ovata (Burm. f.) J. Kern* |
| Typified by | **P. Třísková, J. Štěpánek 2003** |
| Taxon | **Abildgaardia compressa J. Presl & C. Presl** |
| Family | **Cyperaceae** |
| Collector | **Haenke,T.P.X. s.n. [s.d.]** |
| Date | **s.d.** |
| Location | **Philippines** |
| Label | **Sorzogon** |
| det./rev./conf./assigned | **Presl** |
| ident. history | **Presl: Abildgaardia compressa** |
| annotations | |

( JPEG2000, TIFF )


COLLECTIO TH. HAENKEI
Type material of
Abildgaardia compressa J. S. Presl et C. B. Presl in C. B. Presl, Reliq. Haenkeanae 1(3): 179, 1828.
Label written by C. B. Presl
PRC 450388
PRC


Abildgaardia compressa. nov sp
Sorsogon.