

# Plant Exchange Networks in the 19<sup>th</sup> Century

## 200 Years of Citizen Science

Christof Nikolaus Schröder • German University of Administrative Sciences Speyer, Dept. of History / Justus-Liebig-University Giessen, Dept. of Systematic Botany / CNSflora • cns@cnsflora.de

### 101 Plant Exchange Organizations with year of foundation:

- 1819: Botanische Tauschanstalt in Prag, Praha (CZ)
- 1827: Apotheker-Verein in Norddeutschland, Botanische Tauschanstalt, Herford (DE)
- 1827: Süddeutsche Pflanzen-Tauschanstalt, Tübingen (DE)
- 1830: Botaniska Bytes-Sällskapet, Uppsala (SE)
- 1832: Botanischer Tauschverein, Erfurt (DE)
- 1836: Botanical Society of London, London (GB)
- 1836: Botanical Society of Scotland, Edinburgh (GB)
- 1840: Botanisk Forening i København, København (DK)
- 1842: Comptoir d'échanges botaniques, Strasbourg (FR)
- 1843: Stuttgarter botanische Tauschanstalt, Stuttgart (DE)
- 1843: Den botaniske Forening i København, København (DK)
- 1844: Skandinavisk-botanisk Bytteforening, Danske Afdeling, København (DK)
- 1844: Società di cambio di piante seche, Pisa (IT)
- 1845: Botanischer Tauschverein in Arnstadt, Arnstadt (DE)
- 1845: Botanischer Tauschverein in Wien, Wien (AT)
- 1850: Botaniska Sällskapet i Göteborg, Göteborg (SE)
- 1850: Leipziger botanischer Tauschverein, Leipzig (DE)
- 1852: Uppsala Botaniska Bytteforening, Uppsala (SE)
- 1852: Wiener Tausch-Herbarium, Wien (AT)
- 1854: Foreign Exchange Club, London (GB)
- 1854: Tausch-Verkehr mit mikroskopischen Präparaten, Gießen (DE)
- 1857: Kryptogamen-Tauschverein, Gießen (DE)
- 1858: Botanical Exchange Club of the Thürk. Natural History Society, Thürk. (DE)
- 1858: Botanischer Tauschverein [J. Focke], Nassau an der Lahn (DE)
- 1858: Botanischer Tauschverein - Trieliten, Praha (CZ)
- 1858: Landsk Botaniska Förening, Lund (SE)
- 1859: Botaniska Bytteforeningen i Strängnäs, Strängnäs (SE)
- 1859: Stockholms Lycei Botaniska Bytteforening, Stockholm (SE)
- 1862: Schlesischer Botanischer Tauschverein, Wroclaw (PL)
- 1863: Norrköpings botaniska bytteforening, Norrköping (SE)
- 1863: Société d'échanges Vogéso-rhénane, Mulhouse (FR)
- 1863: Jönköpings botaniska förening, Jönköping (SE)
- 1863: Kristianstads botaniska förening, Kristianstad (SE)
- 1863: Botaniska föreningen i Karlskrona, Karlskrona (SE)
- 1863: Kalmar botaniska förening, Kalmar (SE)
- 1863: Sällskapet Linneas botaniska bytteforening, Karlstad (SE)
- 1868: Botaniska Bytteforeningen Rosca, Visby (SE)
- 1868: Malmö botaniska förening, Malmö (SE)
- 1869: Berliner Botanischer Tauschverein, Berlin (DE)
- 1869: Falun Botaniska Bytteforening, Falun (SE)
- 1869: Helsingfors botaniska bytteforening, Helsingfors (FI)
- 1870: Schweizerischer Botanischer Tauschverein, Zürich (CH)
- 1870: Société Helvétique pour l'échange des plantes, Neuchâtel (CH)
- 1870: Tauschverein für Deutschlands Pflanzen, Königsberg (PU)
- 1872: Christiania botaniske Bytteforening, Oslo (NO)
- 1872: Nyköpings Botaniska Bytteforening, Nyköping (SE)
- 1872: Sociedad Botánica Barcelonesa, Barcelona (ES)
- 1873: Association rubologique, Lille (FR)
- 1873: Société dauphinoise pour l'échange des plantes, Grenoble (FR)
- 1875: Société d'échange pour l'avancement des sciences naturelles, Cannes (FR)
- 1876: Novény-cserégytel Budapest, Budapest (HU)
- 1878: Neuer Botanischer Tauschverein, Annen in Westfalen (DE)
- 1878: Société botanique rochelaise pour l'échange des plantes françaises, La Rochelle (FR)
- 1879: Comptoir parisien d'échange de plantes, Paris (FR)
- 1879: Internationaler botanischer Tauschverein, Berlin (DE)
- 1879: Nya Elementarskolans Botaniska Bytteforening, Stockholm (SE)
- 1879: Rheinischer Tauschverein, Wiesbaden, Stadtteil Biebrich (DE)
- 1880: Botanischer Verein von Elsass-Lothringen, Wasselonne (FR)
- 1882: International Botanical Exchange Club - Linnaea, Lund (SE)
- 1883: Botanischer Tauschverein für Baden, Freiburg im Breisgau (DE)
- 1883: Botanischer Tauschverein in Sondershausen, Sondershausen (DE)
- 1883: Europäischer Botanischer Tauschverein, München (DE)
- 1884: Botaniska Bytteforenandet Falun, Falun (SE)
- 1884: Malmö Botaniska Bytteforening, Malmö (SE)
- 1884: Watson Botanical Exchange Club, York (GB)
- 1885: Linköpings Botaniska Bytteforening, Linköping (SE)
- 1885: Thüringischer Botanischer Tauschverein, Schulpforte (DE)
- 1885: Västerbottens botaniska bytteforening, Västerbottens (SE)
- 1888: Botanical Exchange Club, Washington, D.C. (US)
- 1888: Bytteforeningen Flora, Uppsala (SE)
- 1890: Association Pyrénéenne pour l'échange des plantes, Foix (FR)
- 1890: Società Italiana per scambio di piante, Palermo (IT)
- 1891: Société pour l'Étude de la Flore Franco-helvétique, Paris (FR)
- 1892: Bryologischer Tauschverein, Annen in Westfalen (DE)
- 1892: Botaniska Bytteforeningen VIOLA, Kalmar (SE)
- 1892: Exchange Club of the Botanical Seminar of the University of Nebraska, Lincoln (US)
- 1892: Sandberg's Botanical Exchange Bureau, Minneapolis (US)
- 1892: Société du Sud-Est pour l'échange des plantes, Grémieu (FR)
- 1894: Stockholms Botaniska Bytteforening Floras Väner, Stockholm (SE)
- 1894: Norsk botanisk Bytteforening, Sandefjord (NO)
- 1896: The Moss Exchange Club, Saintfield (GB)
- 1897: Botanische Tauschanstalt am Jurjev'schen Botanischen Garten, Tartu (EE)
- 1897: Glumacsen-Tauschverein, Annen in Westfalen (DE)
- 1897: Wiener Kryptogamen-Tauschanstalt, Wien (AT)
- 1898: Prager Botanische Tauschanstalt, Praha (CZ)
- 1899: Tauschvermittlung für Herbarpflanzen, Berlin (DE)
- 1901: Société économe d'exsiccata, Le Mans (FR)
- 1903: Nürnberger Botanischer Tauschverein, Nürnberg (DE)
- 1904: Österviks botaniska bytteforening, Östervik (SE)
- 1904: Société d'échanges à Vierzon, Vierzon (FR)
- 1905: Canadian Botanical Exchange Bureau, St. Thomas (CN)
- 1905: Stettiner Vermittlungsanstalt für Herbarpflanzen, Szczecin (PL)
- 1906: Botanisk bytteforening vid Göteborgs latinläroverk, Göteborg (SE)
- 1907: Internationale Botanische Tauschanstalt zu Weimar, Weimar (DE)
- 1911: Société Française pour l'échange des plantes vasculaires, Versailles (FR)
- 1913: Uppsala Nya Botaniska Bytteforening, Uppsala (SE)
- 1914: American Botanical Exchange Bureau, Houston (US)
- 1920: Botanisk Bytteforening i København, København (DK)
- 1937: Société d'échanges Pteridophyta exsiccata, Paris (FR)
- 1947: Société d'échange des Micronectes, Paris (FR)
- 1947: Société d'échange des Muscinées, Saint-Etienne (FR)

Exchange clubs used printed labels with their name or rubber stamps to mark the specimens which they received from their members:

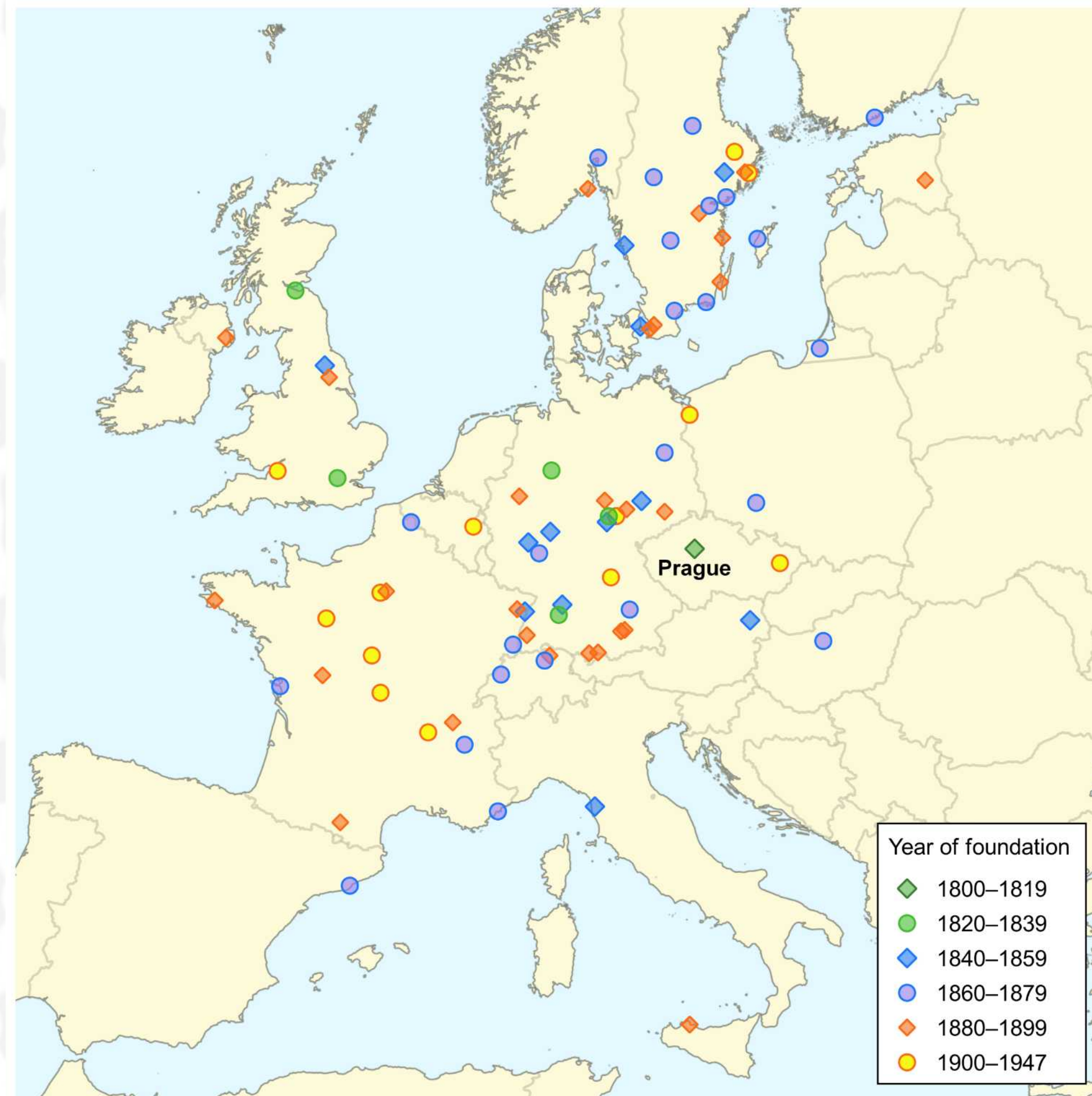


A: Botanischer Tauschverein in Wien (P 0184485, CC BY 4.0); B: Botanischer Tauschverein Erfurt (JE s.n., Photo CNS); C: Association Pyrénéenne pour l'échange des plantes (CH E015821, CC BY 4.0); D: Comptoir d'échanges de Strasbourg (P 0321576, CC BY 4.0); E: Novény-cserégytel Budapest (L 3666898, CC 0.0); F: Botanical Society of London - Botanical Exchange Club of the British Isles (1880-1901) (SLBI s.n.); G: Wiener Tausch-Herbarium (WU s.n., Photo CNS); H: Jönköpings botaniska förening (CAS 650626, CC 0.0); I: Nyköpings Botaniska Bytteforening (CH E005000, CC BY 4.0); J: Société Helvétique pour l'échange des plantes (L 286036, CC 0.0).

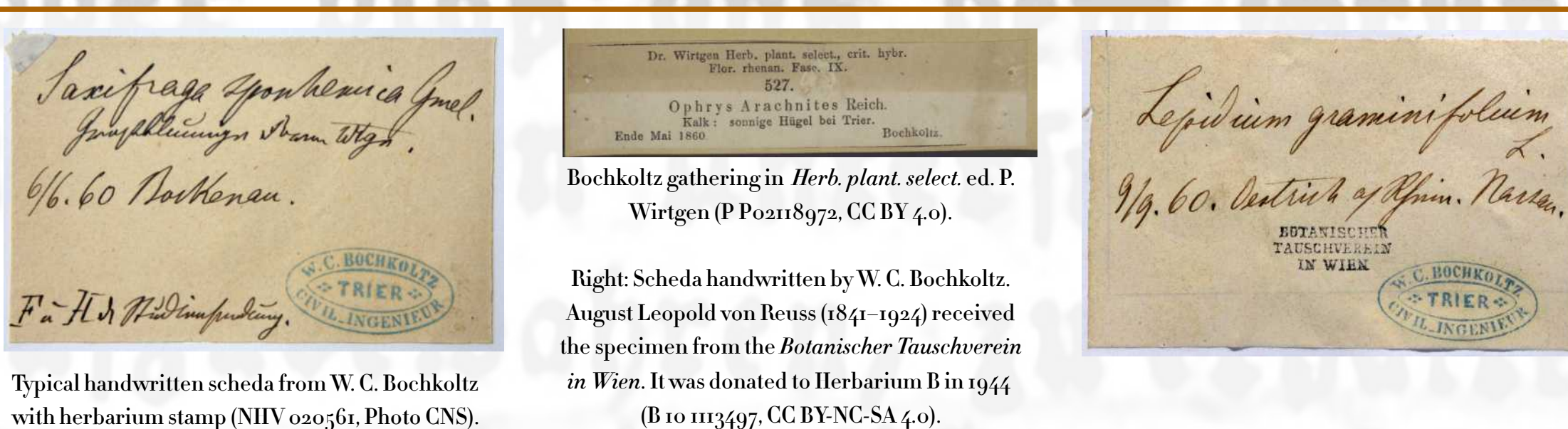
### «Real» Plant Exchange Organizations Founded From 1819 to 1947

Definition of «real plant exchange organization»:

- exchange plant for plant (not plant for butterfly etc.)
- «pro mutua commutatione» = mutual exchange
- no commercial or financial interest (not for sell)



Not on the Map: Botanical Exchange Club, Washington, D.C. (US, 1888); Exchange Club of the Botanical Seminar of the University of Nebraska, Lincoln (US, 1893); Sandberg's Botanical Exchange Bureau, Minneapolis (US, 1893); Canadian Botanical Exchange Bureau, St. Thomas (CN, 1905); American Botanical Exchange Bureau, Houston (US, 1914).



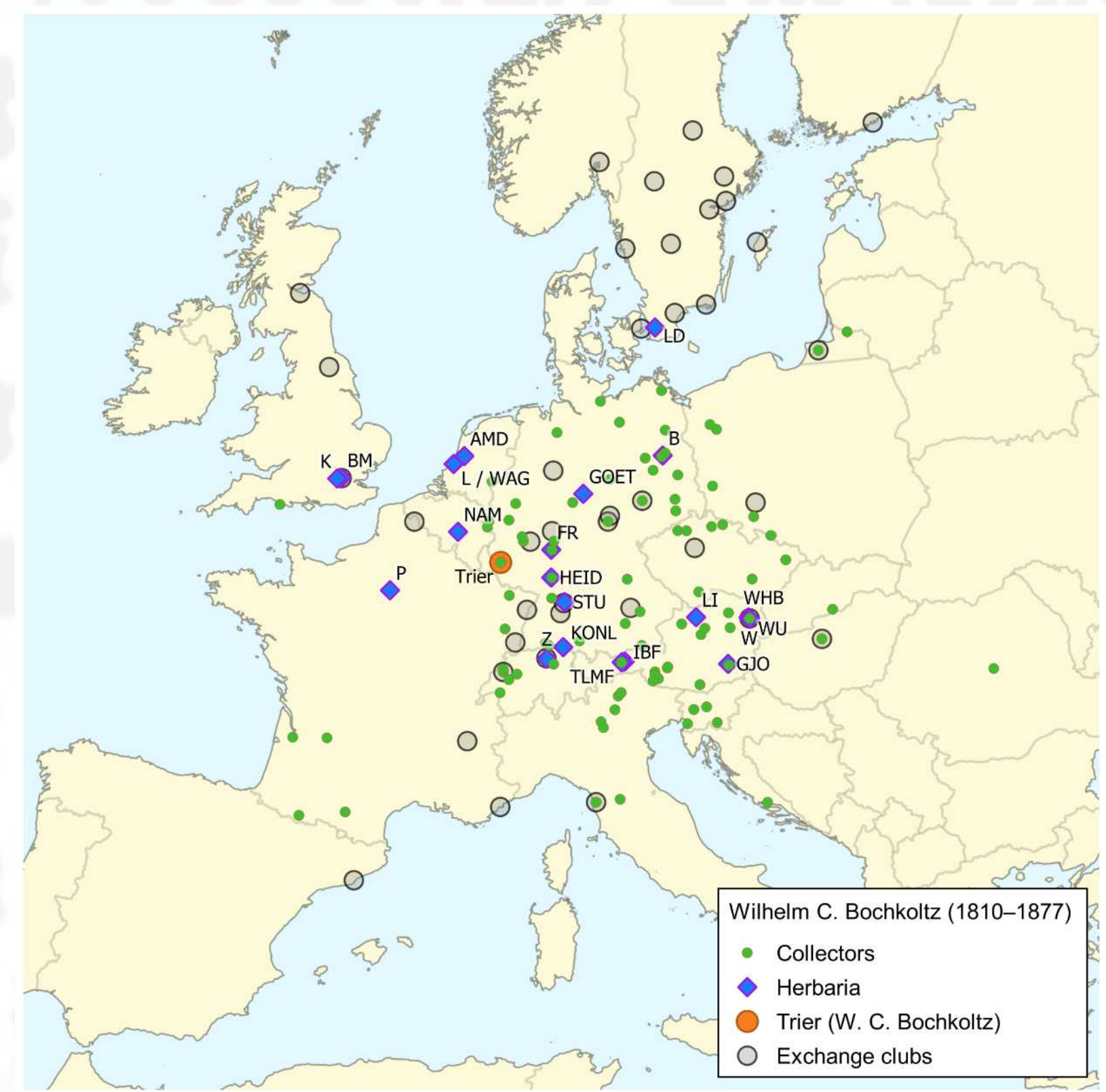
Typical handwritten scheda from W. C. Bochkoltz with herbarium stamp (MIV 020561, Photo CNS).

Bochkoltz gathering in Herk. plant. select. ed. P. Wirgen (P 02118972, CC BY 4.0).

Right: Scheda handwritten by W. C. Bochkoltz. August Leopold von Bessey (1841-1924) received the specimen from the Botanischer Tauschverein in Wien. It was donated to Herbarium B in 1944 (B 10 113397, CC BY-NC-SA 4.0).

### Herbarium Wilhelm Christoph Bochkoltz (1810-1877)

W. C. Bochkoltz came from a bourgeois family in Trier. He studied Chemical Engineering in Metz and Paris. As a Civil engineer he was director of steel works, retired 1858, and after that — he was unmarried —, dedicated himself to nothing else but botany. He was one of the most important collectors of *Saxifraga sponhemica*. As a member of the *Wiener Botanischer Tauschverein* and several botanical societies, he sent more than 1,500 specimens to be distributed by the WBT. His private herbarium comprised ca. 10,000 specimens, about the half of them collected by himself, the other half acquired by exchange. He contributed to several series of exsiccata. Nowadays Bochkoltz specimens are found in 23 herbaria. A sample of 755 specimens in HEID revealed 111 collectors in his herbarium, e.g. the young student Adolf Engler (1844-1930, author of *Die natürlichen Pflanzenfamilien* with K. Prantl, 1887-99 and *Das Pflanzenreich* 1900-37), Carl Baenitz (1837-1913, editor of *Herbarium Europaeum*), and Anton Joseph Kerner (1831-1898, editor of *Flora exsiccata Austro-Hungarica*). The map shows exchange clubs only existing within the lifetime of Bochkoltz.



Wilhelm C. Bochkoltz (1810-1877)  
 ● Collectors  
 ● Herbaria  
 ● Trier (W. C. Bochkoltz)  
 ● Exchange clubs

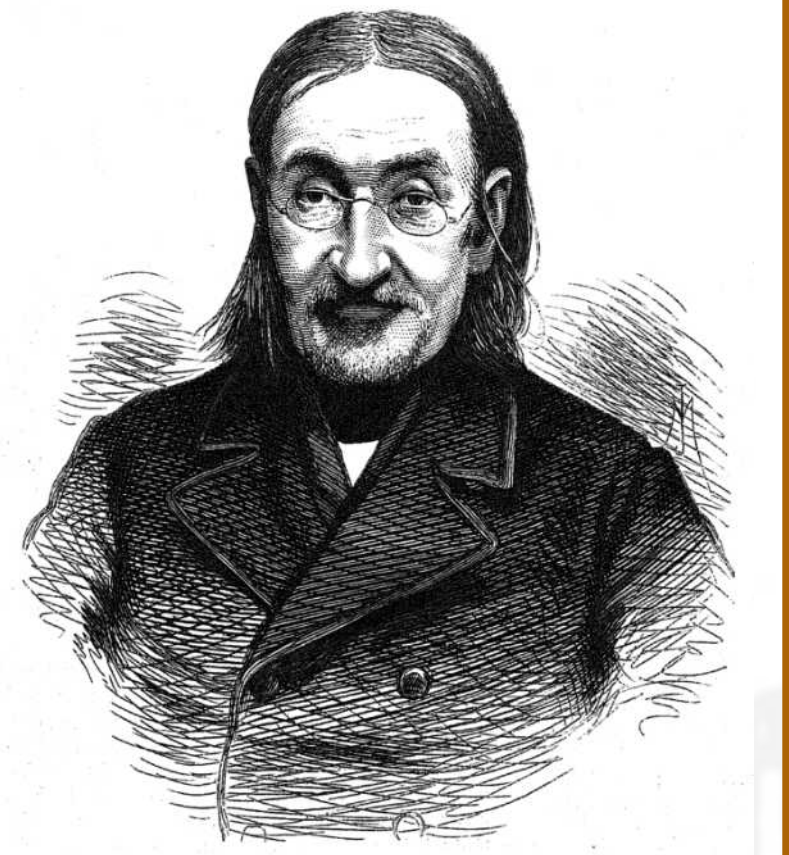
### Technical Notes

The backbone of the project is a relational database (MySQL) with PHP-scripts as frontend. The database contains [2022-09-12] 973 datasets of individuals, institutions and organizations, most of them georeferenced and with biographical or historiographical data, 378 bibliographical references to and 915 deeply recorded datasets of specimens of *Saxifraga sponhemica*.

Two WikiProjects proposed a new Wikidata property «CNSflora ID». This was accepted by the community and implemented in December 2021. In consequence Wikidata elements have been created for all individuals and organizations in the database if not yet existing.



The first plant exchange organization was founded in 1819 by Philipp Maximilian Opiz (1787-1858) in Prague, the *Pflanzen-Saamen- und Insekten-Tausch-Anstalt* with 36 founding members from Central Europe. In the last year of activity, this organization had more than 850 members worldwide. It was the largest organization, the smallest one was the *Société d'échanges à Vierzon* with eleven members and 233 numbers in the catalogue 1904. The largest ones distributed in total nearly two million specimens each, the smaller a few thousands only:



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Organization	Year	specimens exchanged
<i>Wiener Botanischer Tauschverein</i>	1845-1914	1.800.000
<i>Opiz's Pflanzen-Tauschanstalt Prague</i>	1819-1857	1.700.000
<i>Den botaniske Forening i København</i>	1848-1905	750.000
<i>Botanischer Verein in Elsass-Lothringen</i>	1880-1887	150.000
<i>Malmö botaniska förening</i> (29 members)	1868-1871	3.000

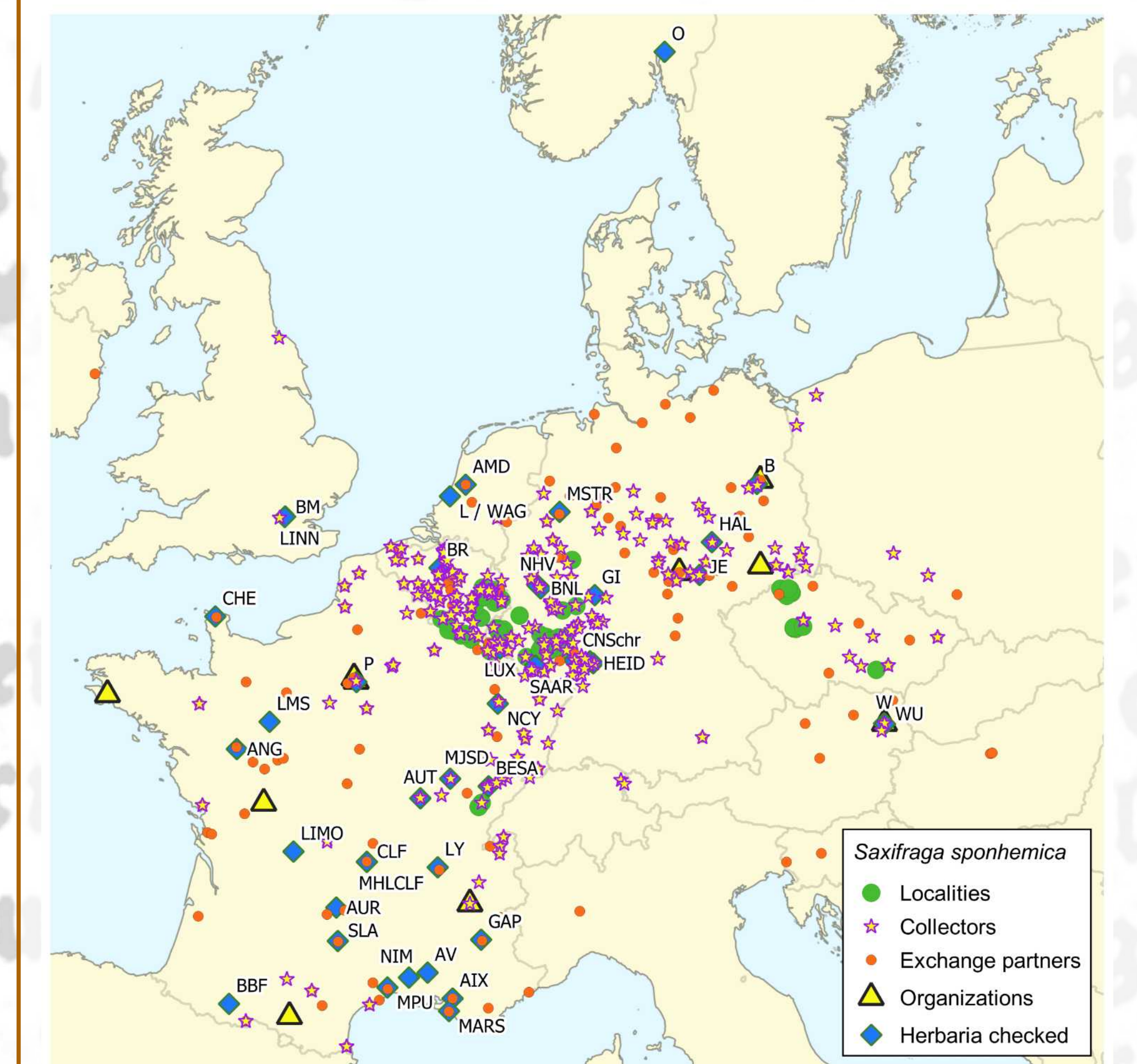
From 1819 to 1947 at least 101 organizations were founded. They distributed a total of about 15-20 million specimens. Only a few members were professional academic botanists, most members had completely different professions: pharmacists, catholic priests, protestant pastors, entrepreneurs, judges, civil servants, day labourers, etc. — citizens of all kind. These «citizen scientists» founded the basis of institutional herbaria and digital repositories.

### *Saxifraga sponhemica* C.C.Gmel. — A Rare Central-European Endemic



Photo: CNS.

Around 1790 Carl Christian Gmelin (1762-1837) discovered an undescribed Saxifrage in South-West Germany. In 1806 he published this novelty under the name *Saxifraga sponhemica*. Plant hunters from all Europe began to search for new localities and collected a large number of specimens, which were intensively exchanged by individuals as well as exchange clubs. Nowadays specimens are found in many herbaria.



Most collectors of *S. sponhemica* (242 individuals have been identified) lived near the initially discovered populations, but some enthusiasts travelled long distances to collect this rarity. Exchange partners (233 individuals) who received specimens distributed by ten organizations usually lived more or less far away from the localities. Some recipients and collectors lived near institutional herbaria (42 herbaria successfully checked) and bequeathed their collection to such a herbarium. Therefore *S. sponhemica* is a good taxon to study exchange activities.

*S. sponhemica* [syn. ad *Saxifraga rosacea* subsp. *sponhemica* (C.C.Gmel) D.A.Webb] is a glacial relict growing on scree slopes facing from Northwest to Northeast, ideally above streams or small rivers. It doesn't tolerate full sun, but is threatened by too much shadow as well. Some populations are currently endangered by shrubs, trees, and especially blackberries, making large profit from atmospheric nitrogen impact.

