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Lectotypifications in *Oxalis* (Oxalidaceae) for the Flora of Argentina

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Abstract

As part of a revision of *Oxalis* for the *Flora Argentina*, the types of all the relevant names for the country were assessed. Seven names were inadvertently lectotypified before 2001, but require second-step lectotypifications. As a whole, eleven lectotypes (first and second step) are designated here.

Introduction

In the last monographic treatment of the American species of *Oxalis* Linnaeus (1753: 433) (Oxalidaceae), Lourteig (1975, 1979, 1980a, 1980b, 1982, 1994, 2000) provided valuable type information for several names. While indicating specimens as "holotypes", this author effected several inadvertent lectotypifications (McNeill *et al.* 2012: Art. 9.9, Art. 9.23; Prado *et al.* 2015), when no lectotype was previously selected. In many of these cases, a second step lectotypification is required, to discriminate among samples available at some herbaria as multiple sheets (McNeill *et al.* 2012: Art. 9.17).

As a first step towards a revision of *Oxalis* for the *Flora Argentina*, in this work we provide a list of several names in *Oxalis* with the designation of their lectotypes.

Material & Methods

All names published in the genus, for Argentine taxa in *Oxalis*, were compiled and their protologues analyzed. Whenever possible, type specimens and other available original material were studied. To evaluate the taxonomic history of the relevant names in *Oxalis*, an extensive review of the literature was undertaken. Most of the cited specimens were previously studied or annotated by Lourteig (1975, 1979, 1980a, 1980b, 1982, 1994, 2000) while reviewing the American species of the genus, and we generally accept the synonyms proposed in her treatments. However, in some cases, field and herbarium studies were also conducted to confirm previous synonymizations.

Specimens of 21 herbaria were studied: BA, BAA, BAB, BAF, BM, BR, CONC, CORD, E, FI, GOET, HAL, GH, JE, K, L, LP, NY, M, MO, and P [herbarium acronyms according to Thiers (2017 onwards)]. Additionally, images of type specimens available at JSTOR (http://plants.jstor.org/) and at other digital herbaria [e.g. W Virtual Herbaria (http:// herbarium.univie.ac.at/database)] were also examined.

Results and discussion

Information on the types of 82 names was reviewed for the *Flora Argentina* project. The existence of numerous names without the assignation of types complicates the delimitation of *Oxalis* species and the understanding of the taxonomic treatments of the genus. Thus, eleven lectotypes are designated in this work. The synonymy of each name is further explained in the notes.

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LIST OF NAMES AND TYPIFICATIONS

Names are listed alphabetically. Accepted names are in bold italics, synonyms in italics. For specimens accessible online, their reference (mostly a barcode) is given (barcodes are alphanumeric, the initial letters correspond to each herbarium's acronym).

Oxalis amara Saint-Hilaire (1825: 119) [= ***Oxalis eriocarpa*** Candolle (1825: 23)]

Type:—BRAZIL. Rio Grande do Sul. Dans les paturages du Nbidi, 1816-21, *Saint Hilaire C² 1861* (lectotype P!, first-step designated by Lourteig [2000: 420]; second-step P-02440086! designated here, image available at http://plants.jstor.org/stable/viewer/10.5555/al.ap.specimen.p02440086; isolectotypes: P-02440084!, P-02440085!).

Note:—Lourteig (2000: 420) considered *O. amara* as a synonym of *O. eriocarpa.* After studying specimens of both species, no morphological difference could be found. Then, we follow in this study the synonymization proposed by Lourteig (2000).

Regarding the designation of the lectotype, Lourteig (2000) cited *"Saint Hilaire C² 1861"* (stored at P) as the holotype, which can be considered as a first-step lectotypification. Since three specimens of this collection are stored at this herbarium (i.e., P-02440084, P-02440085, and P-02440086), Lourteig's designation is here narrowed, by selecting P 02440086 as second-step lectotype. On the sheet, three individuals, separately labelled, are mounted. This specimen bears all the vegetative and reproductive parts (flowers and fruits) in a perfect state of preservation, fits unequivocally the original description, and it is the only that bears a label annotated by the describing author as "*Oxalis amara* A. de St.Hil!".

Oxalis bisfracta Turczaninow (1863: 595)

Type:—BOLIVIA. Oruro, *D'Orbigny 1485* (lectotype P!, first-step designated by Lourteig [2000: 384]; second-step P-02440113! designated here, image available at http://plants.jstor.org/stable/viewer/10.5555/al.ap.specimen.p02440113; isolectotypes: BR-0000005286843!, G-00383329!, KW-001001035!, P-02440114!, W-Rchb.1889-0118459!).

Note:—In the protologue, Turczaninow (1863) cited the gathering "Bolivia, prope Oruro, d'Orbigny N° 1495". Lourteig (2000: 384) wrote: "Holót. P, Isót. G, W".

Further duplicates were located by us at BR and KW (see above). In particular, there is no doubt that the specimen stored at KW (formerly at CW), i.e. KW-001001035, is part of the original material studied by Nicolai Turczaninow, as he performed his investigation in this institution (Stafleu & Cowan 1986), and also considering the title of the work in which the protologue was published: "Animadversiones ad Catalogum primum et secundum Herbarii Universitatis Charkoviensis". In addition, it is even possible that Turczaninow never saw the specimens cited by Lourteig. Nevertheless, all the specimens belonging to the gathering cited by Turczaninow in the protologue are syntypes according to Art. 9.3 and Art. 9.5. Therefore, as they represent the same taxon according to our examination, Lourteig's designation cannot be superseded. However, there is no evidence that any specimen was the only element on which Turczaninow based the original description. Thus, following McNeill (2014) and Art. 40 Note 1, use of term "holotype" by Lourteig (2000) is an error to be corrected to lectotype (Art 9.9). Finally, as at P two pertinent specimens are preserved, we propose a second-step lectotypification by selecting P-02440113, which is the best preserved.

Oxalis breviramulosa Rusby (1893: 13) [= ***Oxalis bisfracta*** Turcz. (1863: 595)]

Type:—BOLIVIA. La Paz, 10000 ft, 1890, *Bang 195* (replacement lectotype NY 00385310!, designated here, image available at http://plants.jstor.org/stable/viewer/10.5555/al.ap.specimen.ny00385310; isolectotypes: BR-0000008551030!, E-00326125!, F-0066560F!, GH-00100483!, GH-00100484!, K-000531708!, MO-251399!, MSC-0092500!, NY-00385309!, PH-00017750!, US-00100984!).

Note:—In the protologue of *O. breviramulosa*, there is no mention of the herbarium where the original material was deposited, i.e. "Vic. La Paz, 10,000 ft., 1890 (195)" (Rusby 1893). Lourteig (2000: 384) indicated that the "holotype" was stored at P, but we were not able to find any specimen from *Bang 195* in this institution. It is therefore necessary to select a replacement lectotype from amongst the remaining syntypes in accordance with Art. 9.11. We found several specimens belonging to this gathering in other herbaria and we made the selection between the two sheets stored at NY, where Henry Rusby worked (Stafleu & Cowan 1986). The designated lectotype consists of several individuals and bears Rusby's handwriting annotation "*Oxalis breviramulosa*, Rusby sp. n". Moreover, George Eiten in 1955 recognized this specimen as the "holotype" of *O. breviramulosa* (see label).

We considered this name as a synonym of *Oxalis bisfracta* in agreement with the "determinavit" labels placed by Eiten and Lourteig in the lectotype sheet, and published in Lourteig (2000: 384).

Oxalis caespitosa Saint-Hilaire (1825: 122) [= ***Oxalis conorrhiza*** Jacquin (1794: 26)]

Type:—BRAZIL. São Paulo, dans les pâturages près Pascaria, 1816, *St.-Hilaire C² 1341* (lectotype P!, first-step designated by Lourteig [2000: 393]; second-step P-00724071!, designated here, image available at http://plants.jstor.org/stable/viewer/10.5555/al.ap.specimen.p00724071; isolectotypes: P-00724072!, P-00724073!).

Note:—Lourteig (2000) indicated as the "holotype" (actually lectotype) a specimen stored at P, but as there are three pertinent sheets at P (i.e., P-00724071, P-00724072, P-00724073), a second-step lectotypification is here proposed. The designated lectotype (P-00724071) is composed by 7 individuals and bears numerous flowers and fruits; it is in a perfect state of preservation, and fits unambiguously the diagnostic morphological traits of the protologue. We accept the synonymization with *O. conorrhiza* proposed by Lourteig (2000).

Oxalis cineracea Saint-Hilaire (1825: 123) [= ***Oxalis conorrhiza*** Jacq. (1794: 26)]

Type:—[URUGUAY] Pâturages naturels près l'Estancia del Velhaco, province Cisplatine, 1816, *Saint-Hilaire C² 2464-ter* (lectotype P!, first-step designated by Lourteig [2000: 393]; second-step P-00724021! designated here, image available at http://plants.jstor.org/stable/viewer/10.5555/al.ap.specimen.p00724021; isolectotypes: P-00724022!, P-00724023!, F-0066506!).

Note:—Between the two available specimens of Saint-Hilaire *C² 2464-ter* at P indicated by Lourteig (2000), we choose P-00724021 as lectotype, because it is represented by several flowered specimens and it bears a label with a handwritten annotation by the describing author.

We agree with Lourteig (2000) in considering *Oxalis cineracea* as a synonym of *O. conorrhiza* since not conspicuous differences were found in the analyzed material.

Oxalis cordobensis Knuth (1919: 301) var. *humilior* Knuth (1919: 301) [= ***Oxalis conorrhiza*** Jacq. (1794: 26)]

Type:—[URUGUAY] Dpto. Artigas, Cuaró, 1 X 1894, *Osten 3129* (lectotype SI-003129! designated here, image available at http://plants.jstor.org/stable/viewer/10.5555/al.ap.specimen.si003129).

Note:—In the protologue, Knuth (1919: 301) cited two gatherings, "*Berg n. 43* (Argertinien)" and "*Osten n. 3129* (Uruguay)". Lourteig (2000: 393) wrote: "type not established, the material coincides with the species". The specimen *Berg n. 43* (LP-011014) constitutes dubious material, since it bears an inflorescence that it is not in concordance with the original description (see the circled material in the herbarium specimen). Then, we chose the specimen SI-003129, which matches unequivocally the protologue and contains two individuals presenting well-preserved fruits and flowers. Furthermore, SI-003129 is likely a duplicate of the syntype studied by Knuth at B and possible destroyed during the Second World War (Hiepko 1987).

After exploring morphological characters, no difference was found among specimens of *Oxalis cordobensis* var. *humilior* and *O. conorrhiza*, so we follow the synonymization proposed by Lourteig (2000).

Oxalis cytisoides Zuccarini (1825: 178)

Type:—BRAZIL. Rio Janeiro, s.d., *Martius s.n.* (lectotype M-0172253! designated here, image available at http://plants.jstor.org/stable/viewer/10.5555/al.ap.specimen.m0172253; isolectotypes: M-0172254!, MO-251371!).

Note:—In the protologue the collector and the locality are mentioned, as "*Crescit in Brasiliae umbrosis prope Rio de Janeiro a clar. Eq. de Martius ibidem detecta. Floret Januario, Februario*", but there is no reference to a particular specimen. Two specimens were found at M, where Joseph Zuccarini worked (Stafleu & Cowan 1988), matching the original description: M-0172253 and M-0172254 (syntypes). The first one bears a single branch with fully developed infructescences and a small fragment, while the second one bears two branches with partially developed inflorescences. Additionally, a specimen at MO was located (MO-251371), surely a duplicate ex M. M-0172253 is in a better state of conservation, so it is selected here as the lectotype.

Oxalis darwinii Ball (1884: 214) [= ***Oxalis lasiopetala*** Zuccarini (1825: 149)]

Type:—ARGENTINA. Buenos Aires. Bahía Blanca, 1884, *Claraz 100* (lectotype K-000531759! designated here, image available at http://plants.jstor.org/stable/viewer/10.5555/al.ap.specimen.k000531759).

Note:—John Ball described the species mentioning three gatherings by Georges Claraz: No. 57, 58 and 100. These specimens are mounted on a single sheet stored at Kew. Following the synonymization of *O. darwinii* under *O. lasiopetala* (described as pink to purple flowered) in Lourteig (2000), we chose K-000531759 (i.e. "*Claraz 100*") (pale blue flowered) as lectotype of *O. darwinii* among the cited syntypes, because it is represented by three well-preserved individuals with fruits and flowers. Meanwhile, K-000531758 (i.e., "*Claraz 57*"), is well-conserved but it is described in the protologue with yellow flowers (probably a different taxa), and K-000531757 ("*Claraz 58*") is described as violet flowered but it is not well-preserved.

Oxalis geminata Gillies ex Hooker & Arnott (1833: 163) [= ***Oxalis squamata*** Zuccarini (1825: 157)]

Type:—[ARGENTINA] Andes of Chile, Villavicenzio, *Cuming 172* (lectotype K, first-step designated by Lourteig (2000: 455)]; second-step K 000531764! designated here, image available at http://plants.jstor.org/stable/viewer/10.5555/al.ap.specimen.k000531764, isolectotypes: E-322340!, BR-05280223!, FI-006240!, K-000531763!).

Note:—In the protologue of *O. geminata*, Hooker & Arnott (1833) mentioned "Andes of Chili, *Cuming* (N. 172) Villavicenzio, (5000 feet,)" and "El Cerro de San Pedro Nolasco, Andes of Mendoza and Chili*, Dr. Gillies*". Lourteig (2000) made an inadvertent lectotypification by choosing the Cuming's specimen at K, but made a mistake in the collection number ("*Cuming 127*" instead of "*Cuming 172*"). Between the two specimens of "*Cuming 172*" housed at K, we select K-000531764 (including two individuals) as second-step lectotype.

Oxalis leptocaulos Philippi (1893: 902) [= ***Oxalis hypsophila*** Philippi (1893: 903)]

Type:—CHILE. Región de Atacama. Pedernales, 3600 m, 1884, *San Roman s.n.* (lectotype SGO, first-step designated by Lourteig [2000: 466]; second-step SGO- 000000325! designated here, image available at http://plants.jstor.org/stable/viewer/10.5555/al.ap.specimen.sgo000000325; isolectotype: SGO-000000326!).

Note:—Lourteig (2000: 466) made an inadvertent lectotypification but only mentioned "Holotype and Isotype stored at SGO". We propose a second-step lectotypification and choose SGO-000000325 as lectotype. This specimen is in perfect state of preservation, and perfectly fits the original description.

From the study of the type specimens, abundant herbarium material and recognition of the species in the field, it has been found that *O. leptocaulos* is undistinguishable from *O. hypsophila*.

Oxalis paludosa Saint-Hilaire (1825: 121)

Type:—BRAZIL. Rio Grande do Sul, marais prés le ruisseau Grapuita, 1816-1821, *Saint Hilaire C² 2580* (lectotype P!, first-step designated by Lourteig [2000: 388]; second-step P-02440278! designated here, image available at http://plants.jstor.org/stable/viewer/10.5555/al.ap.specimen.p02440278; isolectotypes: P-02440279!, P-02440280!).

Note:—In the protologue, Saint Hilaire (1825: 121) wrote: "Inveni in pascuis paludosis desertorum provinciae *Rio Grande do Sul* prope rivulum *Garapuità*, haud longe a littoribus fluminis *Uruguay*. Januario florebat". Lourteig (2000: 388) effected an inadvertent lectotypification but did not discriminate among the three specimens of *Saint Hilaire C² 2580* at P. The lectotype selected here (P-02440278) is the most complete specimen, perfectly fits the original description and bears two labels annotated by the describing author.

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