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Grass (Gramineae) and rush (Juncaceae) specimens from Johannes Scheuchzer's collection at the Herbarium of Natural History Museum Vienna [W]

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Abstract

44 specimens of grasses (Gramineae) and 2 of rushes (Juncaceae) from the herbarium of the Swiss pre-Linnaean botanist Johannes Scheuchzer (1684–1738) are stored in the collections of the Natural History Museum Vienna [W]. Their historical, botanical and nomenclatural significance is briefly discussed.

Key Words: Scheuchzer; Gramineae, Juncaceae; historic collection.

Zusammenfassung

44 Belege der Gramineae und 2 der Juncaceae des Schweizer vor-linnéischen Sammlers Scheuchzer wurden im Herbarium des Naturhistorischen Museums Wien [W] identifiziert. Ihre historische, botanische und nomenklatorische Bedeutung wird diskutiert.

Introduction

The thoroughness and value of Johannes Scheuchzer's botanical works have made it difficult to believe that botany only represented a minor part of his life. He was born on March the 20th 1684 in Zürich. He travelled, at a very young age, through the Alps with his brother Johann Jacob (1672–1733), who was 12 years his senior and a pioneer palaeobotanist and palaeontologist (Stafleu & Cowan 1985). He participated in his brother's scientific activities before beginning studies in medicine. In 1703 he interrupted his studies to serve as a soldier in Holland where he met the Italian soldier and scholar Luigi Ferdinando Marsigli. He travelled with him through Switzerland, Holland and England later following him to Bologna to work as his secretary. He also carried out geological investigations and submitted an essay, dealing with mountain stratification, to the local Academy founded by Marsigli. He returned to Switzerland in order to continue with his studies of medicine. In January 1706, he completed his studies returning to the Dutch military service in 1710 as a physician. Scheuchzer was quite successful, not only as a physician, but also in fortification planning thanks to his knowledge in mathematics. From 1707 to 1720, he tried several times, in vain, to gain a position as a professor in Bologna, Padua, Basel and Zürich. In the meantime, he tenaciously continued with his scientific activities. Among other contributions, he published in 1708 the "Agrostographiae helveticae prodromus" (Scheuchzer 1708) and in 1719 his most

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important botanical work the "Agrostographia sive Graminum, Juncorum, Cyperorum, Cyperoidum, iisque affinium historia" (SCHEUCHZER 1719b). Both works were highly regarded by the scientific community. In 1724, Scheuchzer received a ten-year position as a senior civil servant in Switzerland. Only in 1733, after his brother's death did he take over the latter's stable position of chief physician to the town Zürich, as well as becoming a Professor of Physics at the Collegium Carolinum in Zürich. He enjoyed this well-deserved stability for only five years, as he died on March the 8th 1738 in Zürich, at the age of 51 (WYSS 1892).

Scheuchzer was an "agrostologist" in the wider sense of the term; his three major botanical works (SCHEUCHZER 1708, 1719a and 1719b) dealt with members of the current Poaceae, Juncaceae, Cyperaceae and Juncaginaceae families. Trinius (1778–1844), in his "Clavis Agrostographiae Antiquioris" (TRINIUS 1822) – where he made an effort to reduce ancient grass synonyms to the modern names – described Scheuchzer's work and importance as an agrostologist as follows: "*Ohnstreitig der erste gute und deutliche Agrostograph [...] Freylich sind die Beschreibungen sehr weitläuftig, allein Scheuchzer sagt gewiss nicht mit Unrecht: "levis in describendis plantis error maximas affert difficultates resque summe reddere dubias solet" und wollte darum lieber seine vo ligende Species bis ins kleinste Detail beschreiben; […] Zugleich aber hat diese allzu große Genauigkeit im Einzelnen ihn verleitet, manche offenbare Varietät als besondere Art aufzustellen*". {"Doubtless the first good and distinct grass specialist […] indeed his descriptions are very extensive, Scheuchzer himself rightly says: 'mistakes in plant descriptions easily lead to difficulties and make things doubtful' and for this reason he preferred to describe species in great detail; [...] at the same time his high accuracy misled him into considering some obvious varieties as separate species"}. Still TRINIUS (1822) observed that, for example, Scheuchzer was the first botanist to note the ligule – a fundamental diagnostic character in grasses – which he named "membranula" and interpreted as a part of the leaf sheath: "Et haec quidem foliorum pars [vagina], ad internam plerumque, rarò etiam ad externam foliorum basin in membranulam communiter terminata […]" (SCHEUCHZER 1719b: in the Agrostographia Chapter "Vocum & Terminorum in Re Graminea usitatorum Explicatio").

Scheuchzer's two "Agrostographiae"

In his "Operis Agrostographici idea seu Graminum, Juncorum, Cyperorum, Cyperoidum, iisque affinium methodus" (SCHEUCHZER 1719a), which was a forerunner of his most complete work, "Agrostographia sive Graminum, Juncorum, Cyperorum, Cyperoidum, iisque affinium historia" (SCHEUCHZER 1719b), Scheuchzer introduced three major groups of grasses: "Gramina spicata", "Gramina paniculata" and "Gramina reliqua et Graminibus affinia", the latter including members of the Juncacae and Cyperaceae. Lower ranks followed, sometimes comparable with current genera, down to the lowest, terminal ranks. Each terminal rank is introduced in the Agrostographia by one or more polynomials in sequence which he regarded as synonyms. The polynomials, as observed by JARVIS (2007), served as both a quick description (diagnosis) and as reference label for the concerned species and this well before the introduction of Linnaeus' binomial system in Species Plantarum (LINNAEUS 1753). Scheuchzer included in his Prodromus (SCHEUCHZER 1708) and in the Agrostographia (SCHEUCHZER 1719b)

Fig. 1: Agrostographiae helveticae prodromus, tab. IV.

many previously published polynomials – for example Caspar Bauhin's (1560–1624) or John Ray's (1627–1705) ones – with reference to the original publication. He also introduced numerous new, original polynomials, i.e. "Gr. Loliaceum, Corniculatum, montanum, spica partiali subhirsuta, fragili. Nob." A comprehensive botanical description followed: in many cases more than one page long with collection data; "Hoc Mense Junio collegi, in Monte Regio, vulgo die Rigi dicto, dictionis Suitensis, idque in sylvosis, ea parte, qua dictus mons ascenditur a vico Suitensium" [specimen W-Rchb. 1889-0251183, *Brachypodium sylvaticum* (HUDS.) P. BEAUV.]. Illustrations play a major role in Scheuchzer's works. In the 1708 Prodromus eight plates reproduce whole plants, 1–4 taxa being represented in each plate (Fig. 1). In the Agrostographia – besides the Prodromus plates attached at the end of the book – eleven new synoptic, high quality plates reproduce details of diagnostic importance, mostly inflorescence branches and single flowers (Fig. 2).

Scheuchzer's collections

Scheuchzer's plant collections seem to be spread over several European herbaria: in ZT, together with his brother Johann Jacob's herbarium (minor parts of which are also in E and OXF), in P-HA and, with regards to grasses, in BM, bound within the volumes of Sir Hans Sloane's (1660–1753) herbarium (STAFLEU & COWAN 1985).

Fig. 2: Agrostographia, tab. V.

Scheuchzer's specimens in the Natural History Museum Vienna [W][1]

All of the specimens stored in W were part of the Heinrich Gustav Reichenbach filius (1824–1889) herbarium which was left to W according to the owner's last will. The specimens are not mounted on original sheets but on the standard sheets of the Reichenbach Herbarium in W. They are not glued to the sheets, as in Sloane's herbarium, but just mounted to them by means of thin paper stripes. They are astonishingly well preserved. With a few exceptions they bear the original labels, handwritten by Scheuchzer (e.g. *Gaudinia fragilis*, W-Rchb. 1889-0241999, Fig. 3), as deduced by comparing them with his specimens in Sloane's herbarium at BM (Fig. 4a). Each label consists of a polynomial from the Prodromus or Agrostographia (Figs. 4b–d), simply followed by the reference page for the original Scheuchzer polynomials, or, additionally followed by its original author (Caspar Bauhin, Johann Bauhin and John Ray in the case of W) for previously published polynomials.

Most specimens were later updated according to the binomial system. The binomial was simply added on the original label apparently always by the same person whose identity is so far uncertain.

Moreover, most specimens bear a second label with the statement "ex herb. J. Scheuchzeri" and mostly confirm the binomial from the original label (Figs. 3, 4d, 9). By comparison of handwriting samples (BURDET 1973), it could be deduced with valid certainty that these labels were compiled by the German botanist Johannes Nicolaus Buek II (Hamburg, 1779 – Frankfurt an der Oder, 1856; STANGE 1862)[2]. Buek's main herbarium is today stored in W, as it was part of Reichenbach's herbarium (STAFLEU & COWAN 1976) in 1889, when this was acquired by W.

Statements such as "communicata a D. no Jussieu ex herb. J. Scheuchzeri" and "H. P. 1795" occur on some sheets suggesting that at least some of the specimens were stored in the Herbarium Jussieu in Paris (P-JU) for a certain period of time. Afterwards or, possibly from different sources[3], the specimens came apparently into Buek's hands. Buek's herbarium became then Reichenbach's property after Buek's death (STANGE 1862, STAFLEU & COWAN 1976).

Results

Forty-six specimens from Scheuchzer's herbarium – 44 grasses, 2 rushes – are stored in W. Forty-three of them bear Scheuchzer's original, handwritten labels. Three specimens lack original labels but they are annotated by Buek II as belonging to Scheuchzer's herbarium. The specimens were originally assigned to 42 different polynomials by Scheuchzer. Currently they are stored under 41 different names. Twenty-seven specimens represent direct/indirect original material for 29 – according to ICN validly published – binomials. Twenty-nine specimens belong to polynomials, which are illustrated by a plate in

[1] Abbreviations of herbaria following THIERS (2014).

[2] Not to be confused with his homonymous father, the botanist Johannes Nicolaus Buek I (Hamburg 1736–1812; STAFLEU & COWAN 1976).

[3] One of the labels bears the statement: "ex. herb. Scheuchzeri a fratre meo accepi 1801". J.N. Buek's elder brother had left Hamburg to work in Saint Petersburg as a gardener; later he became court-gardener there. Through his brother, Buek came into contact with many important contemporary botanists (STANGE 1862).

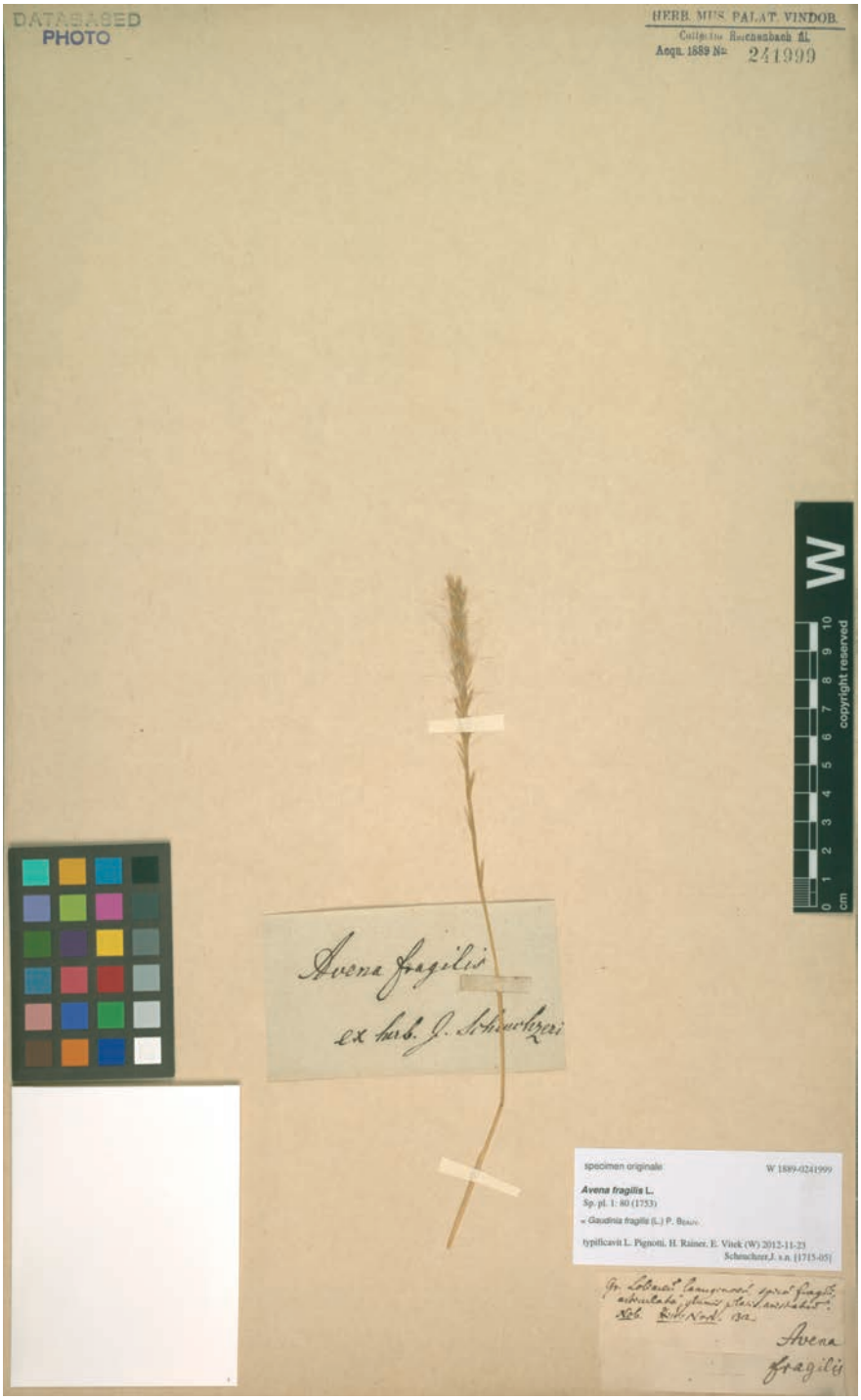

Fig. 3: *Gaudinia fragilis*. Scheuchzer's specimen from H.G. Reichenbach's collection with additional label of Buek [W 1889-0241999].

Fig. 4: Label of specimens written by Scheuchzer. a) *Carex montana*, Scheuchzer's specimen in Sir H. Sloane's herbarium in BM; b) Label of *Poa alpina* [W-Rchb. 1889-0247162, Fig. 6]; c) Label of *Festuca rubra* [W-Rchb. 1889-0251435, Fig. 8]; d) Label of *Vulpia bromoides*, with additional label of Buek [W-Rchb. 1889-0258151, Fig. 9].

the Prodromus or the Agrostographia: four plates from the Prodromus (Tabulae III, IV, VI, the latter with 2 pictures) reproducing whole plants and 25 from the Agrostographia (Tabulae I–VI) reproducing details of the inflorescence. The specimens could have represented the model at least for a part of the drawings (Figs. 5, 6), although this is not always easy to judge, e. g. with reproductions of inflorescence details (Figs. 7–9).

The results summarised above are exposed in detail in Tables 1–3.

The specimens bearing polynomials mentioned as synonyms within currently valid descriptions, and interpreted as original material for such names, are listed in Table 1. Names by G.A. Scopoli, J.C.D. von Schreber, A. Gouan and C. Allioni occur in the list in addition to names by C. Linnaeus. References to Scheuchzer's plates are reported. The

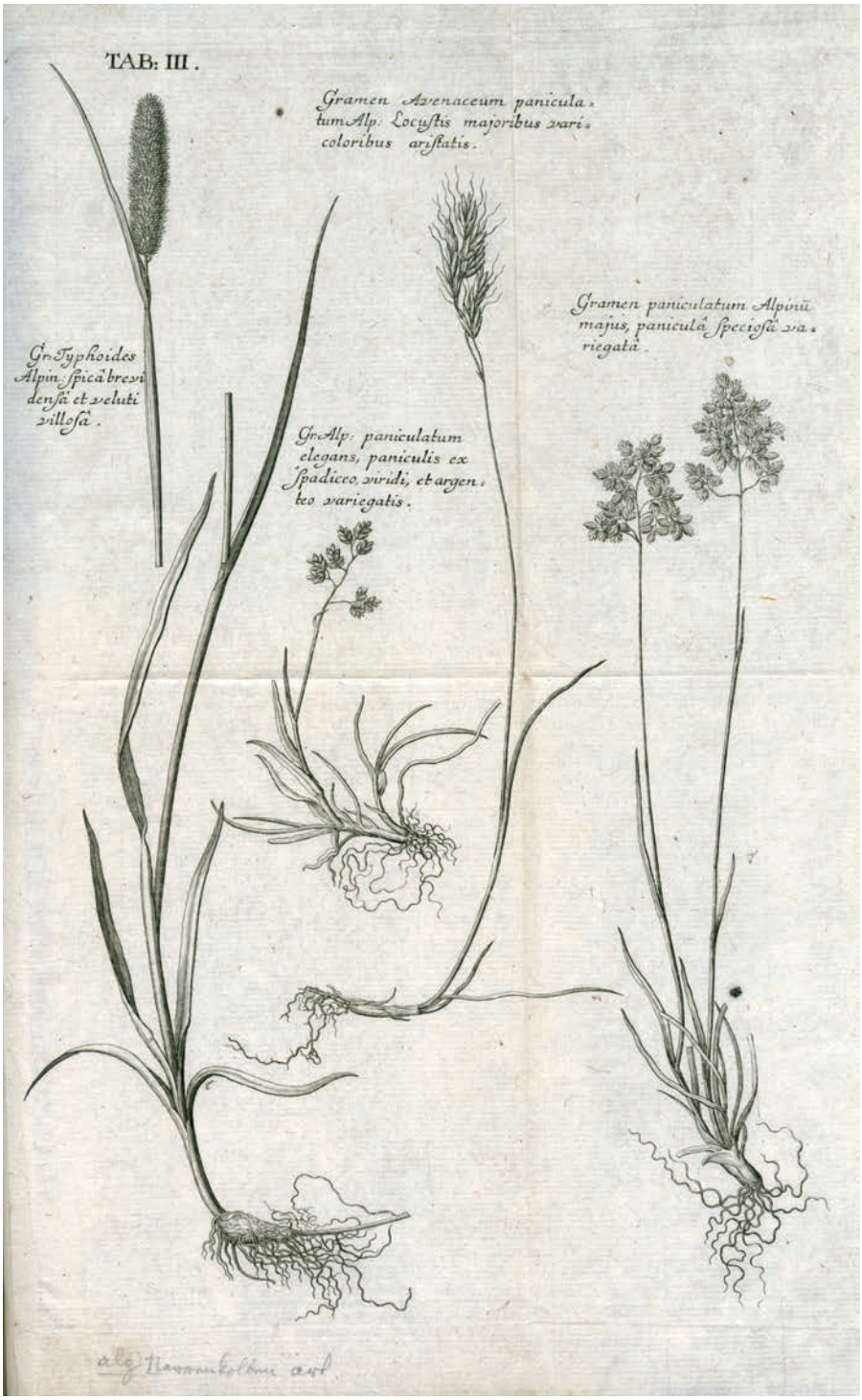

Fig. 5: *Poa alpina*. Agrostographiae helveticae prodromus, tab. III.

Fig. 6: *Poa alpina*. Scheuchzer's specimen from H.G. Reichenbach's collection [W-Rchb. 1889-0247162].

Fig. 7: *Festuca rubra* and *Vulpia bromoides*. Agrostographia, tab. VI, figs. 9 and 10.

Fig. 8: *Festuca rubra*. Scheuchzer's specimen from H.G. Reichenbach's collection [W-Rchb. 1889-0251435].

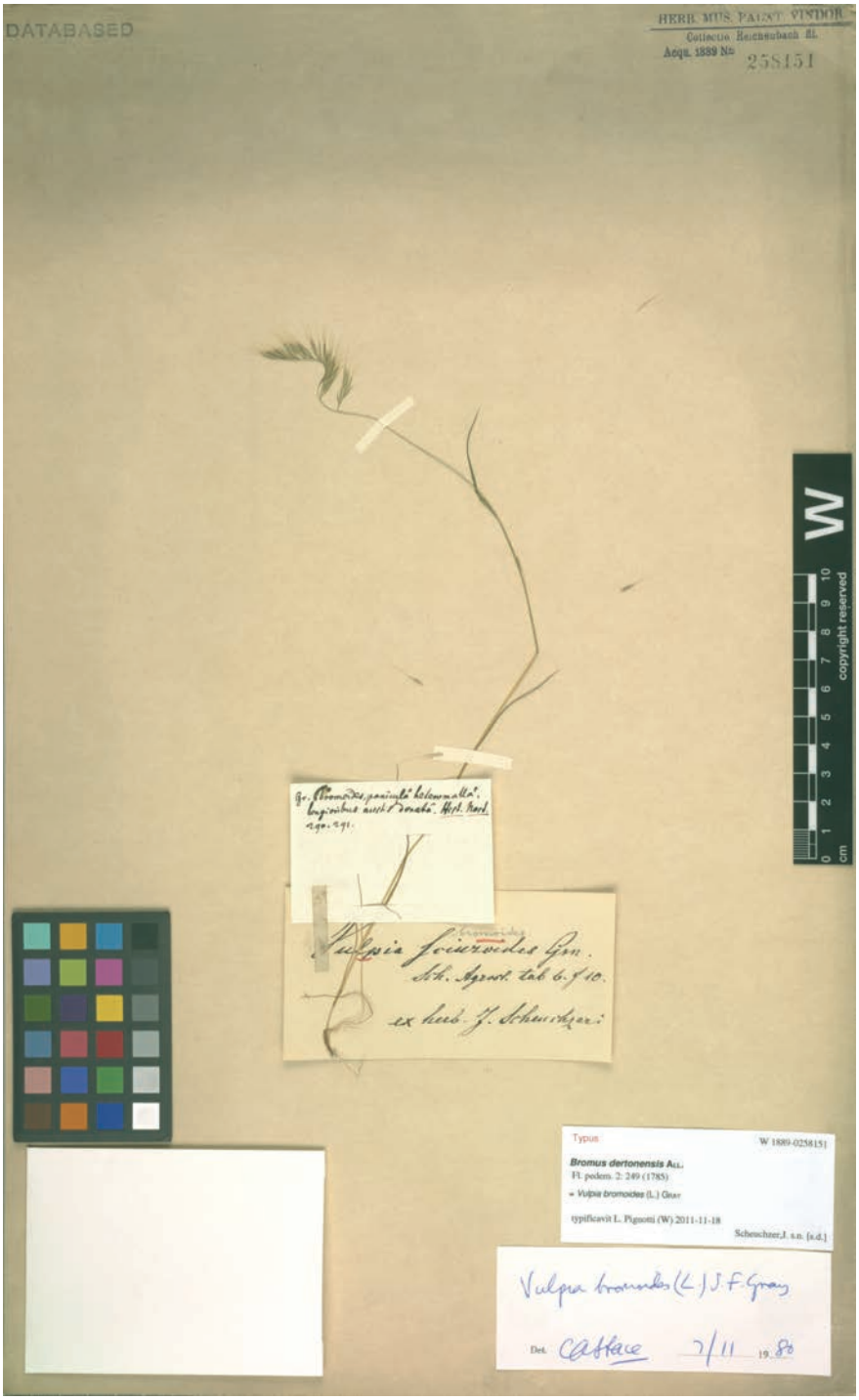

Fig. 9: *Vulpia bromoides*. Scheuchzer's specimen from H.G. Reichenbach's collection with additional label of Buek [W-Rchb. 1889-0258151].

Tab. 1: Specimens representing direct/indirect original material for valid names. Most of them are illustrated by a plate in Scheuchzer. Ahp = Agrostographiae helveticae prodromus (1708), Agr. = Agrostographia (1719b).

Polynomial handwritten by Scheuchzer on the label	**The polynomial is mentioned in the protologue of ... Validly designated lectotype acc. to Jarvis (2007)**	**Current location of the specimen in W, Herb. Nr. and web link**
Gr. parvum, paniculatum, alpinum, panicula spadicea?, aristatum. Agr. prod. Hist. Nost. 140. [Ahp: 22–23, tab. IV, fig. 1. (whole plant)]	***Agrostis alpina*** Scop., Fl. Carn., ed. 2, 1: 60–61 (1771). Scheuchzer's plate is mentioned.	***Agrostis rupestris*** All. W-Rchb. 1889-0240472 http://herbarium.univie.ac.at/database/detail.php?ID=174418
Gramen Avenaceum montanum, panicula angusta e dilutissimo fusco albicante. Hist. Nost. 507. [Agr.: 507–509]	***Agrostis arundinacea*** L. Sp. pl. 1: 61 (1753). Lectotype (Veldkamp in Cafferty & al. 2000: 243): Amman 26, Herb. Linn. No. 84.7 [LINN].	***Calamagrostis*** sp. W-Rchb. 1889-0241701 http://herbarium.univie.ac.at/database/detail.php?ID=187364
Gr. Arundinaceum, panicula densa viridi- argentea splendente, aristata. Hist. Nost. 146. [Agr.: 146–147, tab. III, fig. 11 A., B. (spikelet and flower)]	***Agrostis calamagrostis*** L. Syst. nat., ed. 10. 2: 872 (1759). Scheuchzer's plate and polynomial are not explicitly mentioned, only "Scheuch. Gram. 146". Lectotype (Vázquez 1995: 184): "Arista recta prodeunte ex ipso alterutrius glumae apice, Folliculo longiore villoso" in Scheuchzer, J., Agrostographia: 146, t. 3, f. 11 A, B, 1719.	***Achnatherum calamagrostis*** (L.) P. Beauv. W-Rchb. 1889-0244411 http://herbarium.univie.ac.at/database/detail.php?ID=50425 The specimen could be designated as epitype.
Gr. minimum, spica brevi, habitiore nostrum. Raji syn.: 253. Hist. Nost. 219. [Agr.: 219–220]	***Aira praecox*** L. Sp. Pl. 1: 65–66 (1753). Type cons. (Cope 1992: 556): Herb. Linn. No. 85.21 [LINN].	***Aira praecox*** L. W-Rchb. 1889-0244466 http://herbarium.univie.ac.at/database/detail.php?ID=174988
Gramen Avenaceum, paniculatum, Alpinum, humile, Locustis in spicam collectis, varicoloribus, aristatis. Agr. Prodr. Hist. Nost. 221. [Ahp: 24, tab. VI (whole plant)]	***Aira spicata*** L. Sp. Pl. 1: 64 (1753). Scheuchzer's plate VI from Prodr. is mentioned. Lectotype (Louis-Marie 1928: 238):[icon] "Gramen Avenaceum, paniculatum, Alpinum, humile, Locustis in spicam collectis, varicoloribus, aristatis" in Scheuchzer, J., Agr. Prodr.: 24, t. 6. 1708.	***Trisetum spicatum*** (L.) K. Richt. W-Rchb. 1889-0247911 http://herbarium.univie.ac.at/database/detail.php?ID=172593 The specimen could be designated as epitype.
Aegilops bromoides juba purpurascente J. B. [J. Bauhin] Hist. Nost. 267. [Agr.: 267–270, tab. VI, fig. 1 A, B, a, b, c (spikelet and flower)]	***Andropogon gryllus*** L. Cent. Pl. 2: 33 (1756). Scheuchzer's plate is not mentioned. Lectotype (Meikle 1985: 1863): Séguier, Herb. Linn. No. 1211.2 [LINN].	***Chrysopogon gryllus*** (L.) Trin. W-Rchb. 1889-0248244 http://herbarium.univie.ac.at/database/detail.php?ID=189492

Polynomial handwritten by Scheuchzer on the label	The polynomial is mentioned in the protologue of ... Validly designated lectotype acc. to JARVIS (2007)	Current location of the specimen in W, Herb. Nr. and web link
Gr. Arundinaceum, plumosum album C. B. Hist. Nost. 136. [Agr.: 136–138, tab. III, Fig. 7 A (spikelet), B (flower)]	***Andropogon ravennae*** L. Sp. Pl. ed. 2., 2: 1481 (1763). Scheuchzer's plate is not mentioned. Lectotype (COPE in CAFFERTY & al. 2000: 246): Herb.Linn. No. 77.4 [LINN].	***Saccharum ravennae*** (L.) MURRAY W-Rchb. 1889-0253479 http://herbarium.univie.ac.at/database/detail.php?ID=237893
Gr. loliaceum, lanuginosum, spica fragili, articulata, glumis pilosis, aristatum. Nob. Hist. Nostr. 32. [Agr.: 32–33, tab. I, fig. 7 G (spikelet)]	***Avena fragilis*** L. Sp. Pl. 1: 80 (1753). Scheuchzer's plate is not mentioned. Lectotype (SCHOLZ in CAFFERTY & al. 2000: 247): Herb. Linn. No. 43.19 [S].	***Gaudinia fragilis*** (L.) P. BEAUV. W-Rchb. 1889-0241999 http://herbarium.univie.ac.at/database/detail.php?ID=211836
Gr. bromoides, panicula heteromalla, longioribus aristis donata. Hist. Nost. 290. 291. [Agr.: 290–291, tab. VI, fig. 10 (panicle branch)]	***Bromus dertonensis*** ALL. Fl. pedem. 2: 249 (1785). Scheuchzer's plate and specimens are mentioned.	***Vulpia bromoides*** (L.) GRAY W-Rchb. 1889-0258151 http://herbarium.univie.ac.at/database/detail.php?ID=265328 The specimen can be considered type.
Gr. Bromoides, aquaticus, latifolius, panicula sparsa, tenuissime aristata. Hist. Nost. 264. [Agr.: 264–265, tab. V, fig. 17 (panicle branch)]	***Bromus giganteus*** L. Sp. Pl. 1: 77–78 (1753). Scheuchzer's plate is not mentioned. Lectotype (DARBYSHIRE in CAFFERTY & al. 2000: 248): Herb. A. van Royen No. 913.62-78 [L].	***Festuca gigantea*** L. W-Rchb. 1889-0256405 [probably soon under ***Schedonorus giganteus*** (L.) HOLUB] http://herbarium.univie.ac.at/database/detail.php?ID=284207
Gr. spica subrotundâ echinatâ, vel Gramen echinato capitulo C. B. Pin: 3 [C. Bauhin, Pinax theatri botanici: 3. 1623]. Hist. Nost. 74 [Agr.: 74–76, tab. II, fig. A (spikelet), B (flower)]	***Cenchrus capitatus*** L. Sp. Pl. 2: 1049 (1753). Scheuchzer's plate is not mentioned. Lectotype (MEIKLE 1985: 129): Löfling 105, Herb. Linn. No. 1217.6 [LINN].	***Echinaria capitata*** (L.) DESF. W-Rchb. 1889-0257552 http://herbarium.univie.ac.at/database/detail.php?ID=195500
Gramen glumis variis. C. B. Hist. Nost. 83. [Agr.: 83–84, tab. II, fig. 9 A (glumes), B (spikelet)]	***Cynosurus caeruleus*** L. Sp. Pl. 1: 72 (1753). Scheuchzer's plate is not mentioned. Lectotype (RAUSCHERT 1969: 412): [icon] "Gramen glumiis variis" in Bauhin, C., Prodr. Theatri Bot.: 21. 1620. Epitype (FOGGI et al. 2002: 1103): Herb. Bauhin "Gramen glumis variis. Monspel." [BAS].	***Sesleria caerulea*** (L.) ARD. W-Rchb. 1889-0246401 http://herbarium.univie.ac.at/database/detail.php?ID=250256
Gramen alopecuroides spica aspera. C. B. Pin. 4. [BAUHIN 1623: 4] Hist. Nost. 80. [Agr.: 80–81, tab. II, fig. 8 B (sterile spikelet), D (fertile spikelet)]	***Cynosurus echinatus*** L. Sp. Pl. 1: 72 (1753). Scheuchzer's plate is not mentioned. Lectotype (VELDKAMP in CAFFERTY & al. 2000: 249): Herb. A. van Royen No. 913.62-79 [L].	***Cynosurus echinatus*** L. W- Rchb. 1889-0253952 http://herbarium.univie.ac.at/database/detail.php?ID=190913

Polynomial handwritten by Scheuchzer on the label	The polynomial is mentioned in the protologue of ... Validly designated lectotype acc. to JARVIS (2007)	Current location of the specimen in W, Herb. Nr. and web link
Gr. Arundinaceum, locustis viridi-spadiceis, loliaceis, breviùs aristatis. Hist. Nost. 266. [Agr.: 266–267, tab. V, fig. 18 (panicle branch)]	***Festuca arundinacea*** SCHREB. Spic. fl. lips.: 57 (1771). Scheuchzer's plate is mentioned. Lectotype (REVEAL et al. 1991: 135–137): [icon] Scheuchzer, J., Agrostographia, tab. V, fig. 18. 1719.	***Festuca arundinacea*** SCHREB. [probably soon under ***Schedonorus arundinaceus*** (SCHREB.) DUMORT.] W-Rchb. 1889-0256329 http://herbarium.univie.ac.at/database/detail.php?ID=281926 The specimen could be designated as epitype.
Gr. pratense, panicula duriore, laxa, unam partem spectante. Raij [J. Ray]. Hist. Nost. 285. [Agr.: 285–286]	***Festuca duriuscula*** L. Sp. Pl. 1: 74 (1753). Lectotype (VAN DER MEIJDEN in CAFFERTY & al. 2000: 250): Herb. A. van Royen No. 913.7-451 [L].	***Festuca rubra*** L. subsp. ***rubra*** W-Rchb. 1889-0250345 http://herbarium.univie.ac.at/database/detail.php?ID=283619
[Original Scheuchzer label missing. According to J. N. Buek II's annotation, referable to Agr.: 293, tab. VI, fig. 11 (panicle branch)]	***Festuca pseudomyuros*** SOY.-WILL. Ann. Sci. Nat. (Paris) 7: 445 (1826). Scheuchzer's plate is mentioned, but not the polynomial.	***Vulpia myuros*** (L.) C.C. GMEL. var. ***myuros*** W-Rchb. 1889-0258184 http://herbarium.univie.ac.at/database/detail.php?ID=265995
Gramen alpinus pratense, panicula duriore, laxa spadicea; locustis majoribus. Hist. Nost. 287. Varietas major et minor. [Agr.: 287–288, tab. VI, fig. 9 (panicle branch)]	***Festuca rubra*** L. Sp. Pl. 1: 74 (1753). Scheuchzer's plate is not mentioned. Lectotype (JARVIS et al. 1987: 302): Linnaeus s. n. [GB].	***Festuca rubra*** L. W-Rchb. 1889-0251435 http://herbarium.univie.ac.at/database/detail.php?ID=287755
Gr. secalinum bulbosa radice seu ex Alepo Bauhini. Barrel. Ic. 112. II [BARRELIER 1714]. Hist. Nost. 19. [Agr.: 19–20]	***Hordeum bulbosum*** L. Cent. Pl. 2: 8 (1756). Lectotype (JØRGENSEN 1982: 423): Hasselquist, Herb. Linn. No. 103.3, base only [LINN].	***Hordeum bulbosum*** L. W-Rchb. 1889-0249528 http://herbarium.univie.ac.at/database/detail.php?ID=214029
Gr. spicatum tomentosum longissimis aristis donatum. Inst: 517. Hist. Nost. 58. [Agr.: 58–59, tab. II, fig. 4 B, C (flowers)]	***Lagurus ovatus*** L. Sp. Pl. 1: 81 (1753). Scheuchzer's plate is not mentioned. Lectotype (MEIKLE1985: 1788): Herb. Linn. No. 96.1 [LINN].	***Lagurus ovatus*** L. W-Rchb. 1889-0244520 http://herbarium.univie.ac.at/database/detail.php?ID=221783
Gramen Avenaceum, spica simplici, locustis densissimis, candicantibus & lanuginosis. Inst. 5.2.4. Hist. Nost. 174. [Agr.: 174–176, tab. III, fig. 16 G, H, I, K (panicle branch, glumes and flowers)]	***Melica ciliata*** L. Sp. Pl. 1: 81 (1753). Scheuchzer's plate is not mentioned. Lectotype (COPE in CAFFERTY & al. 2000: 252): Herb. Linn. No. 86.1 [LINN].	***Melica ciliata*** L. W-Rchb. 1889-0246569 http://herbarium.univie.ac.at/database/detail.php?ID=221326

Polynomial handwritten by Scheuchzer on the label	The polynomial is mentioned in the protologue of ... Validly designated lectotype acc. to JARVIS (2007)	Current location of the specimen in W, Herb. Nr. and web link
Gr. exile, arundinaceum, minimum, acumine reflexo. Bocc. Mus. Tab. 57 [BOCCONE 1697]. Hist. N. 41. [Agr.: 41–42, tab. I, fig. 7 I (spike)]	1. ***Nardus incurva*** GOUAN Hortus Monsp.: 33 (1762-04). Scheuchzer's plate is mentioned. 2. ***Nardus aristatus*** L. Sp. Pl. ed. 2, 1: 78 (1762-09). Scheuchzer's plate is not mentioned.	***Psilurus incurvus*** (GOUAN) SCHINZ & THELL. W-Rchb. 1889-0253075 http://herbarium.univie.ac.at/database/detail.php?ID=233770
Gr. Dactylon, radice repente s. officinarum. Inst. 520 [Bauhin 1650–51]. Hist. Nost. 104. [Agr.: 104–106, tab. II, fig. 11 I (spike)]	***Panicum dactylon*** L. Sp. Pl. 1: 58 (1753). Scheuchzer's plate is not mentioned. Lectotype (CLAYTON & HARLAN: 186 (1970): Herb. Linn. No. 80-35 [LINN].	***Cynodon dactylon*** (L.) PERS. W-Rchb. 1889-0257522 http://herbarium.univie.ac.at/database/detail.php?ID=190831
Gr. palustre, paniculatum, altissimum. C. B. Hist. Nost. 191. [Agr.: 191–192, tab. IV, fig. 1 (panicle branch)]	***Poa acquatica*** L. Sp. Pl. 1: 67 (1753). Scheuchzer's plate is not mentioned. Lectotype (COPE in CAFFERTY & al. 2000: 252): Herb. Linn. No. 87.1 [LINN].	***Glyceria maxima*** (HARTM.) HOLMB. W-Rchb. 1889-0244191 http://herbarium.univie.ac.at/database/detail.php?ID=212200
Gr. Alpinum, paniculatum, majus, panicula "speciosa" variegata. Agr. Prod. Hist. Nost. 186. [Ahp: 20, tab. III (whole plant)]	***Poa alpina*** L. Sp. Pl. 1: 67. Scheuchzer's plate is not mentioned. Lectotype (SORENG in CAFFERTY & al. 2000: 254): Herb. Linn. No. 87.2 [LINN].	***Poa alpina*** L. W-Rchb. 1889-0247162 http://herbarium.univie.ac.at/database/detail.php?ID=227663
Gr. alpinum, latifolium, panicula laxa, foliacea, foliolis in panicula paucioribus & mage crispis. Hist. Nost. 212. [Agr.: 212–213, tab. IV, fig. 14 (viviparous spikelet)]	***Poa alpina*** var. ***vivipara*** L. Sp. Pl. 1: 67 (1753). Scheuchzer's plate is not mentioned. Lectotype (SORENG in CAFFERTY & al. 2000: 254): Herb. Linn. No. 87.4 [LINN].	***Poa alpina*** L. W-Rchb. 1889-0247200 http://herbarium.univie.ac.at/database/detail.php?ID=227666
Juncus laevis panicula "conglomerata". Hist. Nost. 343. [Agr.: 343]	***Juncus conglomeratus*** L. Sp. Pl. 1: 326 (1753). Lectotype (SNOGERUP 1970: 428): Herb. A. van Royen No. 904.145-425 [L].	***Juncus conglomeratus*** L. W-Rchb 1889-0273545A http://herbarium.univie.ac.at/database/detail.php?ID=309866
Juncoides, vel Gram: hirsutum nemorosum, angustifolium, alpinum, paniculis obscure rufescentibus. Hist. Nost. 312. [Agr.: 312, refers to Ahp.: 25, tab. 6 (whole plant)]	1. ***Juncus pilosus*** L. Sp. Pl. 1: 329 (1753). Scheuchzer's plate is not mentioned. 2. ***Juncus spadiceus*** ALL. Fl. Pedem. 2: 216 (1785). Scheuchzer's plate is not mentioned, but the specimen.	***Luzula alpinopilosa*** (CHAIX) BREISTR. subsp. ***alpinopilosa*** W-Rchb. 1889-0268373 http://herbarium.univie.ac.at/database/detail.php?ID=310344 The specimen can be regarded as a type for *Juncus spadiceus*.

Table 2: Specimens not representing direct/indirect original material for valid names, but illustrated by a plate in Scheuchzer.

Polynomial handwritten by Scheuchzer on the label	Current location of the specimen in W, Herb. Nr. and web link
Gr. caninum, supinum, paniculatum, folio varians. C. B. Hist. Nost. 141. [Agr.: 171, tab. III, fig. 9 C. (panicle branch)]	***Agrostis canina*** L. W-Rchb. 1889-0240432 http://herbarium.univie.ac.at/database/detail.php?ID=50157
Gr. foliis junceis, oblongis, radice albâ. B. C. Hist. Nost. 242. [Agr.: 242, tab. IV, fig. 29 (panicle branch), 30. (spikelet)]	***Agrostis stolonifera*** L. W-Rchb. 1889-0240434 http://herbarium.univie.ac.at/database/detail.php?ID=38161
Gr. paniculatum, purpuro-argenteis Locustis, delicatissimis. Hist. Nost. 233. [Agr.: 233, tab. IV, fig. 23. (panicle branch)]	***Aira caryophyllea*** subsp. ***plesiantha*** (JORD.) K. RICHT. W-Rchb. 1889-0244568 http://herbarium.univie.ac.at/database/detail.php?ID=294905
Gr. pratense spica purpurea ex utriculo prodeunte, vel Gramen folio spica amplexante. C. B. pin. B. Hist. N. 55. [Agr.: 55, tab. II, fig. 3 B (spikelet), D (glumes), G (flower), H (seed)]	***Alopecurus rendlei*** EIG W-Rchb. 1889-0246048 http://herbarium.univie.ac.at/database/detail.php?ID=175766
Gramen Avenaceum, alpinum, glabrum, acutifolium, locustis aristatis in spicam dispositis. Hist. Nost. 228. [Agr.: 228, tab. IV, fig. 21 (panicle branch), 22 (spikelet)]	***Avenula pratensis*** (L.) DUMORT. W-Rchb. 1889-0243854 http://herbarium.univie.ac.at/database/detail.php?ID=212875
Gr. panicula multiplici majus C. B. Hist. Nost. 271 [Agr.: 271, tab. VI, fig. 2 (panicle branch)]	***Catapodium rigidum*** (L.) C. E. HUBB. W-Rchb. 1889-0258419 http://herbarium.univie.ac.at/database/detail.php?ID=188386
Gr. Avenaceum, pratense, elatius, paniculâ densâ, flavescente, locustis majoribus, villosum. Hist. Nost. 225. [Agr.: 225, tab. IV, fig. 19. (spikelet)]	***Trisetum flavescens*** (L.) P. BEAUV. W- Rchb. 1889-0242160 http://herbarium.univie.ac.at/database/detail.php?ID=377149
[Original Scheuchzer label missing. According to J. N. Buek II's annotation, referable to Agr.: 294, tab. VI, fig. 12 (panicle branch)]	***Vulpia ciliata*** DUMORT. subsp. ***ciliata*** W-Rchb. 1889-0258040 http://herbarium.univie.ac.at/database/detail.php?ID=265368

Table 3: Specimens not representing direct/indirect original material for valid names and not illustrated by any plate in Scheuchzer.

Polynomial handwritten by Scheuchzer on the label	Current location of the specimen in W, Herb. Nr. and web link
Gr. avenaceum, lanuginosum, utriculis lanugine flavescentibus. Hist. Nost. 241. [Agr.: 241]	***Avena fatua*** L. W-Rchb. 1889-0250652 http://herbarium.univie.ac.at/database/detail.php?ID=184029 W-Rchb. 1889-0250653 http://herbarium.univie.ac.at/database/detail.php?ID=184031
Gr. loliaceum, Corniculatum, montanum, spica partiali subhirsuta, fragili. Hist. Nost. 38. [Agr.: 38]	***Brachypodium sylvaticum*** (Huds.) P. Beauv. W- Rchb. 1889- 0251183 http://herbarium.univie.ac.at/database/detail.php?ID=295073
Gr. arundinaceum, paniculatum, montanum, panicula spadiceo-viridi, semine papposo. Hist. Nost. 124. [Agr.: 124]	***Calamagrostis canescens*** (Weber) Roth W- Rchb. 1889-0245341 http://herbarium.univie.ac.at/database/detail.php?ID=295066
Graminis spica Triticea compacta, hirsuti aristati varietas aristis longioribus donata. Hist. Nostr. 10. [Agr.: 10]	***Elymus caninus*** (L.) L. W- Rchb. 1889-0251862 http://herbarium.univie.ac.at/database/detail.php?ID=39611
[Original Scheuchzer label missing; annotated by J. N. Buek II as Herb. Scheuchzer]	***Elymus repens*** (L.) Gould W-Rchb. 1889-0251861 http://herbarium.univie.ac.at/database/detail.php?ID=47474
Gramen pratense, paniculatum, elatius, panicula laxa, heteromalla. Hist. Nost. 289. [Agr.: 289]	***Festuca rubra*** L. W- Rchb. 1889-0251433 http://herbarium.univie.ac.at/database/detail.php?ID=287832
Gr. loliaceum angustiore folio & spica. C.B. spicis partialibus rariùs & à se invicem remotiùs sitis. Raij. Hist. Pl. 1263. Hist. N. 26. [Agr.: 26]	***Lolium perenne*** L. W-Rchb. 1889-0251302 http://herbarium.univie.ac.at/database/detail.php?ID=213382
Gr. Typhinum, maritimum minus. Raij Hist. 1267. Hist. Nost. 54 [Agr.: error for 63].	***Phleum arenarium*** L. W-Rchb. 1889-0237644 http://herbarium.univie.ac.at/database/detail.php?ID=226963
Gr. paniculatum, aquaticum, angustifolium, panicula speciosa, locustis parvis. Hist. Nost. 184. [Agr.: 184]	***Poa palustris*** L. W-Rchb. 1889-0070140 http://herbarium.univie.ac.at/database/detail.php?ID=230336
Gr. paniculatum, angustifolium, montanum, panicula densa, locustis parvis, muticis. Hist. Nost. 180. [Agr.: 180]	***Poa trivialis*** L. W-Rchb. 1889-0246965 http://herbarium.univie.ac.at/database/detail.php?ID=232618

observation of whether the plate is mentioned in the protologue – with the polynomial – is added. The validly designated lectotype is reported when available (from JARVIS 2007). Specimens eligible to be epitypes are identified, as well as the type specimens of *Bromus dertonensis* ALL., and *Juncus spadiceus* ALL., where Scheuchzer's specimens are explicitly mentioned in the protologue.

The specimens bearing polynomials not mentioned in valid descriptions, but illustrated by a plate, are listed in Table 2.

The specimens bearing polynomials not mentioned in valid descriptions and not illustrated by any plates, are listed in Table 3.

For each specimen, the herbarium number and the link to its dataset and digital image on Virtual Herbaria http://herbarium.univie.ac.at/database/search.php is provided in the end column.

Scheuchzer's specimens as "original material"

Scheuchzer's specimens are of undisputable historical significance but they may also prove meaningful in answering nomenclatural questions. Scheuchzer's works were a major source of information for agrostologists. Scheuchzer's polynomials are mentioned as synonyms in the original descriptions of many common grasses described by Linnaeus and by others. As stated earlier plates illustrate some of the polynomials in Scheuchzer's Agrostographiae. At times the plates are mentioned in the original descriptions together with the polynomial at other times not. Some polynomials are not illustrated by any plates. In most cases no specimens are mentioned. This was the usual practice among botanists in the eighteenth century. The meaning of these citations especially when no plates are mentioned or exist, has been differently interpreted and, consequently the meaning of Scheuchzer's specimens in this regard. Can these citations be considered as potential sources of original material anyway or, is this just possible when illustrations are mentioned or at least exist? The illustrations are in fact the only element surely seen by the authors as they had Scheuchzer's books in hand, but there is no evidence that they could have seen the specimens if they did not explicitly mention them. This is particularly true in the case with Linnaean names. In the Linnaean Plant Name Typification Project only specimens or illustrations indisputably seen by Linnaeus have been regarded as original elements eligible for lectotypification (JARVIS 2007). In this view Scheuchzer's specimens would at the most be regarded as so called "typotypes" (specimens from which a type plate was drawn, as defined by STEARN, 1957) when a plate exists since the latter was without doubt seen by Linnaeus. Nevertheless, "typotype" (and "Voucher specimen" as used when the relationship between the type plate and the specimen is doubtful; see JARVIS 2007) is a category without a type status, since it is not dealt with in the ICN (MCNEILL et al. 2012). On the other hand, according to the definition of the original material given in the ICN, Article 9.3.[4], we are inclined to consider these

[4] Article 9.3. (MCNEILL et al. 2012): "For the purposes of this *Code*, original material comprises the following elements: (a) those specimens and illustrations (both unpublished and published either prior to or together with the protologue) upon which it can be shown that the description or diagnosis validating the name was based; (b) the holotype and those specimens which, even if not seen by the author of the description or diagnosis validating the name, were indicated as types (syntypes or paratypes) of the name at its valid publication; and (c) the isotypes or isosyntypes of the name irrespective of whether such specimens were seen by either the author of the validating description or diagnosis, or the author of the name".

specimens as "original material" for the binomials. The specimens are original material for Scheuchzer's polynomials since they were personally annotated by him as belonging to them. The polynomials are mentioned in the original descriptions of the binomials. The binomials, although indirectly, are based on those specimens. We can say that the specimens are an integral part of the process that led, through different generations of botanists, to the definition of the names. Finally, we observe that Scheuchzer's specimens can serve as preferential epitypes for the numerous names that have a Scheuchzer plate as lectotype (see in this regard, e.g. REVEAL et al. 1991 in the case of *Festuca arundinacea* SCHREB.).

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Review of Publication

Atlas Florae Europaeae, volume 16, Rosaceae

Volume 16 of Atlas Florae Europaeae was printed, treating part of the Rosaceae family, including genera with notorious difficult taxonomy. The problems are alien species coming up here and there, being misidentified or not noted, domestication and hybrids of wild and cultivated species and the missing of reliable data. Though the Atlas is a collaborative effort of a high number of botanists, fig. 1 gives a good impression of the gaps not possible to fill in and of the bad information level in some countries.

In general it is a race against time. Electronic media as GBIF deliver on the first sight comparable dot maps. But both – the printed and the electronic output – have their advantage and weakness. The data in the printed volume are checked and consolidated, classified (native / not native / extinct etc.) and based on a reliable taxonomy. The big weakness in comparison with electronic records, is the impossibility, to go back to the sources for each single dot in the map.

Anyway, this volume as the (still available) ones before is an essential part of each botanical library.

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