



## A checklist of *Polygala* (Polygalaceae) in the Flora of Southern Africa region with notes on types

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### Abstract

As part of a revision of *Polygala* in the *Flora of Southern Africa* region, the types of all the names relevant for the region were assessed. A catalogue of the names and their types is provided along with information on the availability of online images of these types. For 22 accepted taxa, no images of the types of the names are available online. Twenty lectotypes are designated here.

### Introduction

As a first step towards a revision of the genus *Polygala* Linnaeus (1753: 701) (Polygalaceae) in the *Flora of Southern Africa* region (Botswana, Lesotho, Namibia, South Africa, and Swaziland), the typification of names published in the genus for this region was compiled and analysed. As a result, 20 lectotypes are designated here. We provide a list of the names and their types, along with information on the images of the types that are available online. For 22 accepted taxa, no images of the types of the names could be located on the web.

### Material and methods

With some corrections, the taxonomy of *Polygala* followed here coincides with Paiva (1998). The specimens cited are those seen by one of the authors (Paiva 1998) during the course of his revision of the genus. Specimens marked ‘!’ were examined in the scope of this paper. The following online resources were consulted: JSTOR Global Plants (2013), as well as the Zürich Herbaria Database (2013), Geneva Herbaria Catalogue (2013), Kew Herbarium Catalogue (2013), The Linnean Collections (2013) and Uppsala Herbarium (UPS) Database (2013). The acronyms of herbaria follow Thiers (2013).

### Results

The information on the types of 209 names was reviewed. Corrections were made to type citations in earlier literature where lectotypes were often confusingly referred to as holotypes. In Art. 9.9 of the *International Code of Nomenclature for algae, fungi and plants* (ICN) it is stated that the use of a term in a sense other than

*Polygala xerophytica* Chodat (1912: 329) [=*P. ephedroides*]

Syntypes:—NAMIBIA. Range 469 (B†), Trotha 142 (B†), Schultze 446 (B†), Range 674 (B†).

*Polygala zahlbruckneri* Hayek (1900: 45) [=*P. garcinii*]

Type:—SOUTH AFRICA. Penther 1482 (holotype W).

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## References

- Anonymous (1899) News. *The American Naturalist* 33 (389): 455–459.  
<http://dx.doi.org/10.1086/277302>
- Bergius, P.J. (1767) *Descriptiones Plantarum ex Capite Bonae Spei*. Laur. Salvii, Stockholm. 360 pp.
- Brown, N.E. (1895) 218. *Polygala producta*. *Bulletin of Miscellaneous Information Kew*. 1895: 142.  
<http://dx.doi.org/10.2307/4115436>
- Burchell, W. (1822) *Travels in the interior of Southern Africa* 1. Longman, Hurst, Rees, Orme, Brown and Green, London, 614 pp.
- Burtt Davy, J. (1924) New or Noteworthy South African Plants.: VI. *Bulletin of Miscellaneous Information Kew* 1924: 223–235.  
<http://dx.doi.org/10.2307/4111749>
- Burtt Davy, J. (1926) *A Manual of the Flowering Plants and Ferns of the Transvaal with Swaziland, South Africa*. Part 1. Longmans, Green and Co., London. 269 pp.
- Candolle, A.P. de (1824) *Prodromus systematis naturalis regni vegetabilis*, 1. Treuttel & Würtz Paris, 747 pp.  
<http://dx.doi.org/10.5962/bhl.title.286>
- Chodat, R.H. (1889) Contributions à la flore de Paraguay. *Mémoires de la Société de Physique et d'Histoire Naturelle de Genève* 30: 103–115.  
<http://dx.doi.org/10.1038/147566a0>
- Chodat, R.H. (1893) Monographia Polygalacearum. *Mémoires de la Société de Physique et d'Histoire Naturelle de Genève* 31(2): 1–500.
- Chodat, R.H. (1896) Polygalaceae novae vel parum cognitae. *Bulletin de l'Herbier Boissier* 4: 233–237.
- Chodat, R.H. (1912) Polygalaceae africanae IV. *Botanische Jahrbücher für Systematik, Pflanzengeschichte und Pflanzengeographie* 48: 309–336.  
<http://dx.doi.org/10.1038/023263a0>
- Chodat, R.H. (1914) Polygalaceae novae. *Botanische Jahrbücher für Systematik, Pflanzengeschichte und Pflanzengeographie* 52, Beibl. 115: 70–85.  
<http://dx.doi.org/10.1038/023263a0>
- Compton, R.H. (1931) The Flora of the Whitehill District. *Transactions of the Royal Society of South Africa* 19: 269–329.  
<http://dx.doi.org/10.1080/00359193109518840>
- Dietrich, A. (1834) Die Polygaleae. *Allgemeine Gartenzeitung* 2: 113–123.
- Dietrich, D. (1847) *Synopsis Plantarum seu enumeratio systematica plantarum*, volume 4. Weimar, B. F. Voigt, [731–] 1692 pp.  
<http://dx.doi.org/10.5962/bhl.title.168>
- Drège, J.F. (1843) *Zwei Pflanzengeographische Documente*. Unknown publisher Leipzig, 16 pp.
- Durand, T.A. & Schinz, H. (1898) *Conspectus Floræ Africæ*, volume 1. Jardin Botanique de l'État, Brussels, 268 pp.
- Ecklon, C.F. & Zeyher, C. (1835) *Enumeratio Plantarum Africæ Australis extratropicae qua collectae, determinatae et expositae*, volume 1. Perthes & Besser, Hamburg, 145 pp.  
<http://dx.doi.org/10.5962/bhl.title.48>
- Engler, A. (1894) Plantae Gürichianaæ. Ein Beitrag zur Kenntnis der Flora von Deutschsüdwestafrika. *Botanische Jahrbücher für Systematik, Pflanzengeschichte und Pflanzengeographie* 19: 128–152.
- Engler, A. (1895) Die Pflanzenwelt Ost-Afrikas und der Nachbargebiete. Teil C. Geographische Verlagshandlung

- Dietrich Reimer, Berlin, 433 pp.
- Exell, A. W. (1928) A new species of *Polygala* from South-West Africa. *Journal of Botany* 66: 299.
- Exell, A.W. (1957) *Polygalae novae*. *Boletim da Sociedade Broteriana*, Ser. 2, 31: 5–14.
- Exell, A.W. (1960) Polygalaceae. IN: Exell, A.W. & Wild, H. (eds) *Flora Zambesiaca* volume 1, Crown Agents for Overseas Governments and Administration, London, p. 303–336.
- Ficalho, C. & Hiern, W.P. (1881) On Central-African Plants collected by Major Serpa Pinto. *Transactions of the Linnean Society of London, Botany* 2: 11–36.  
<http://dx.doi.org/10.1111/j.1095-8339.1881.tb00002.x>
- Figueiredo, E., Paiva, J. & Smith, G.F. (2013) Typification of two Linnean names in *Polygala* (Polygalaceae): *P. bracteolata* and *P. myrtifolia*. *Taxon* 62: 807–808.  
<http://dx.doi.org/10.12705/624.4>
- Figueiredo, E., Paiva, J. & Smith, G.F. (in press) The reinstatement of *Polygala affinis* DC. and the identity of *Polygala scabra* L. (Polygalaceae). *Bothalia*.
- Fresenius, J.P.G.W. (1837) Beiträge zur Flora von Abissinien. *Abhandlungen aus dem Gebiete der Beschreibenden Naturforschenden Gesellschaft in Frankfurt am Main* 2: 265–286.
- Gandoger, M. (1913) L'Herbier Africain de Sonder. *Bulletin de la Société botanique de France* 60: 454–462.
- Geneva Herbaria Catalogue (2013). *Catalogue des herbiers de Genève (CHG)*.  
*Conservatoire & Jardin botaniques de la Ville de Genève*. <http://www.ville-ge.ch/musinfo/bd/cjb/chg/index.php?lang=en> [accessed in March 2013]
- Harvey, W.H. & Sonder, O.W. (1860) *Flora Capensis*, volume 1. Hodges, Smith & Co., Dublin, 546 pp.
- Hasskarl, J. (1864) Polygalaceae, praesertim indicae. *Annales Musei Botanici Lugduno-Batavi* 1: 142–196.
- Hayata, B. (1908) *Polygala armata*. *Journal of the College of Science, Imperial University of Tokyo* 25: Art. 19, 54.
- Hayek, A. (1900) Polygalaceae. IN: Zahlbruckner, A. Plantae Pentherianae. *Annalen des K. K. Naturhistorischen Hofmuseums* 15: 42–46.
- Hoffmannsegg, J.C. (1841) *Polygala pilifera*. *Preiss-Verzeichniss der Pflanzen im Gräfl. Hoffmannseggischen Garten zu Dresden*, ed. X: 82.
- JSTOR Global Plants (2013) <http://plants.jstor.org/> [accessed in March 2013]
- Jarvis, C. (2007) *Order out of chaos. Linnean plant names and their types*. The Linnean Society & The Natural History Museum, London, 1016 pp.
- Ker Gawler, J.B. (1822) *Polygala latifolia*, *Polygala ligularis*, *Polygala myrtifolia*. *The Botanical Register* 8: T.637, T.645, T.669.
- Kew Herbarium Catalogue (2013) <http://apps.kew.org/herbcat/navigator.do> [accessed in March 2013]
- Lamarck, J.-B.P.A.M. & Poiret, J.L.M. (1804) *Encyclopédie méthodique: botanique*. Volume 5. H. Agasse, Paris, 758 pp.  
<http://dx.doi.org/10.5962/bhl.title.824>
- Lehmann, J. (1830) *Delectus seminum, quae in horto Hamburgensium botanico e collectione anni 1830 mutuae commutationi offeruntur*. Hamburg.
- Levyns, M. (1955) The species of *Polygala* in the south-western Cape Province. *The Journal of South African Botany* 21: 9–49.
- Linnaeus, C. (1753) *Species Plantarum*. Impensis Laurentii Salvii, Stockholm, 1200 pp.
- Linnaeus, C. (1763) *Species Plantarum*, edition 2, volume 2. Laurentii Salvii, Stockholm, 1682 pp.
- Linnaeus, C. (1771) *Mantissa Plantarum 2 Altera*. Laurentii Salvii, Stockholm, 587 pp.
- Linnaeus, C. (1782) *Supplementum Plantarum Systematis Vegetabilium*. Orphanotrophei, Brunsviga, 468 pp.  
<http://dx.doi.org/10.5962/bhl.title.555>
- Loddiges, C. (1820) *Botanical Cabinet; Consisting of Coloured Delineations of Plants from all Countries*, volume 5. Loddiges & Sons, London.
- Loddiges, C. (1824) *Botanical Cabinet; Consisting of Coloured Delineations of Plants from all Countries*, volume 10. J. & A. Arch, Longman, Rees, Orne, Brown & Green, & Loddiges & Sons, London.
- Loddiges, C. (1827) *Botanical Cabinet; Consisting of Coloured Delineations of Plants from all Countries*, volume 13. J. & A. Arch, Longman, Rees, Orne, Brown & Green, & Loddiges & Sons, London.
- MacOwan, P. (1890) New Cape Plants. *Journal of the Linnean Society Botany*, 25: 385–394.  
<http://dx.doi.org/10.1111/j.1095-8339.1890.tb02406.x>
- Markötter, E.I. (1930) 'n Plangeteografiese skets en die flora van Witzieshoek, O.V.S.; Oliviershoekpas, Natal; en Koolhoek, O.V.S. *Annale van die Universiteit van Stellenbosch* 8, A, 1: 1–50.
- McNeill, J., Barrie, F.R., Buck, W.R., Demoulin, V., Greuter, W., Hawksworth, D.L., Herendeen, P.S., Knapp, S., Marhold, K., Prado, J., Prud'homme van Reine, W.F., Smith, G.F., Wiersema, J.H. & Turland, N.J. (eds.) (2012) *International Code of Nomenclature for algae, fungi, and plants (Melbourne Code) adopted by the Eighteenth International Botanical Congress Melbourne, Australia, July 2011*. Koeltz Scientific Books, Königstein. [Regnum Vegetabile 154], 208 pp.
- Meisner, C.F. (1842) Contributions towards a Flora of South Africa. *The London Journal of Botany* 1: 459–476.

- Nuttall, T. (1818) *The Genera of North American Plants*. Publ. by author, Philadelphia, 312 pp.
- Oliver, D. (1868) *Flora of Tropical Africa*. Volume 1. L. Reeve, London, 479 pp.
- Paiva, J. (1998) *Polygalarum africanarum et madagascariensium prodromus atque gerontogaei generis Heterosamara Kuntze, a genere Polygala L. segregati et a nobis denuo recepti, synopsis monographica*. *Fontqueria* 50: 1–346.
- Paiva, J. (2007) *Polygalaceae*. IN: Beentje, H. J. & Ghazanfar, S. A. (eds.) *Flora of Tropical East Africa*. Royal Botanic Gardens, Kew, 64 pp.
- Paiva, J., Figueiredo, E. & Smith, G.F. (2013) *Polygala retiefiana* (Polygalaceae), a new species described from South Africa. *Phytotaxa* 117(1): 30–34.  
<http://dx.doi.org/10.11646/phytotaxa.117.1.4>
- Peters, W.C.H. (1862) *Naturwissenschaftliche Reise nach Mossambique* volume 1. G. Reimer, Berlin, 304 pp.  
<http://dx.doi.org/10.5962/bhl.title.53810>
- Presl, C.B. (1845) *Polygala. Abhandlungen der Königlichen Böhmischen Gesellschaft der Wissenschaften* ser. 5, 3: 445.
- Rendle, A.B., Baker, E.G., Moore, S. & Gepp, A. (1911) A contribution to our knowledge of the flora of Gazaland. *The Journal of the Linnean Society, Botany* 40: 1–245.  
<http://dx.doi.org/10.1111/j.1095-8339.1911.tb00869.x>
- Schinz, H. (1888) Beiträge zur Kenntnis der Flora von Deutsch-Südwest-Afrika und der angrenzenden Gebiete I. *Verhandlungen des Botanischen Vereins für die Provinz Brandenburg* 29: 44–64.
- Schinz, H. (1908) Polygalaceae. *Bulletin de l'Herbier Boissier* 8: 634.
- Schinz, H. (1910) Beiträge zur Kenntnis der afrikanischen Flora (XXIII). *Vierteljahrsschrift der Naturforschenden Gesellschaft in Zürich* 55: 233–247.
- Schinz, H. (1931) *Polygala subcarnosa*. *Vierteljahrsschrift der Naturforschenden Gesellschaft in Zürich* 76: 145.
- Schlechter, R. (1898) Decades plantarum novarum austro-africanarum. *Journal of Botany* 36: 23–28.
- Sibthorp, J. & Smith J.E. (1813) *Florae Graecae prodromus*. London, Richard Taylor, 422 pp.
- Siebert, S.J., Retief, E., van Wyk, A.E. & Struwig, M. (2010) A new species of *Polygala* (Polygalaceae) from ultramafic soils in Sekhukhuneland, South Africa, with notes on its ecology. *South African Journal of Botany* 76(2): 345–353.  
<http://dx.doi.org/10.1016/j.sajb.2010.01.003>
- Sims, J. (1816) *Polygala speciosa*. *Botanical Magazine* 43: Tab. 1780.
- Smith, G.F. & Figueiredo, E. (2013) Type specimens online: What is available, what is not, and how to proceed; Reflections based on an analysis of the images of type specimens of southern African *Polygala* (Polygalaceae) accessible on the worldwide web. *Taxon* 62: 801–806.  
<http://dx.doi.org/10.12705/624.5>
- Sonder, W. (1850) Beiträge zur Flora von Sudafrica. *Linnaea* 23: 1–138.
- The Linnean Collections (2013) <http://www.linnean-online.org/> [accessed in March 2013]
- Thiers, B. (2013) *Index Herbariorum*. The New York Botanical Garden, New York. Available <http://sciweb.nybg.org/science2/IndexHerbariorum.asp> [accessed in March 2013]
- Thunberg, C.P. (1800) *Prodromus plantarum Capensium* volume 2. Litteris Joh. Fr. Edman, Reg. Acad. Typogr., Uppsala, 192 pp.
- Turczaninow, N.S. (1854) Animadversiones ad primam partem herbarii Turczaninowiani, nunc Universitatis Caesareae Charkowiensis. *Bulletin de la Société Imperiale des Naturalistes de Moscou* 27 (3): 272–372.
- Uppsala Herbarium (UPS) Database (2013) <http://130.238.83.220/botanik/findrecords.php?-link=Find> [accessed in March 2013]
- Walter, T. (1788) *Flora Caroliniana*. J. Frazer, London, 263 pp.
- Zürich Herbaria Database (2013) <http://www.zuerich-herbarien.unizh.ch/> [accessed in March 2013]