



Deyeuxia himalaica (Poaceae, Agrostidinae): taxonomy and its first record from Myanmar

BEATA PASZKO

Department of Vascular Plant Systematics and Phytogeography, W. Szafer Institute of Botany, Polish Academy of Sciences, Lubicz 46, 31-512 Kraków, Poland. E-mail: b.paszko@botany.pl

Abstract

Deyeuxia himalaica, one of the rarest of the species of *Deyeuxia* known from southeastern Xizang, has been recorded for the first time on Myanmar's Irrawaddy Plateau. The species' taxonomy is clarified and discussed, especially in relation to the similar *D. scabrescens*. An amended diagnosis and description are provided.

Key words: *Calamagrostis*, China, *Deyeuxia scabrescens*, Irrawaddy Plateau, Sino-Himalayan region, spikelet morphology

Introduction

The species of *Calamagrostis* Adanson (1763: 31) and *Deyeuxia* Clarion ex Beauvois (1812: 43) in the areas surrounding Myanmar have been treated taxonomically in various ways. Although most floras covering adjacent regions recognized both genera (e.g. Bor 1960, Lu 1987a, 1987b, Liou 1987, Liou 1994, Sun 2003, Lu & Phillips 2006, Lu *et al.* 2006), Noltie (2000) recognized *Calamagrostis s. lat.* in the Flora of Bhutan, with 12 species. Recently, some species complexes within *Calamagrostis* Adanson (1763: 31) and related genera (Poaceae: Agrostidinae) have been studied and several taxonomical and nomenclatural problems resolved (Howard *et al.* 2009, Paszko & Nobis 2010, Paszko & Ma 2011, Paszko 2012a, 2013, Paszko & Pendry 2013a, Paszko & Soreng 2013, Paszko *et al.* 2013, Paszko in press), and new species discovered (Paszko 2012b, Paszko & Pendry 2013b, Paszko & Chen 2013).

Calamagrostis and *Deyeuxia* belong to the subtribe Agrostidinae (Poaceae), which is typically characterized by single-flowered spikelets (Clayton & Renvoize 1986). However, within *Deyeuxia* there are two taxa, *D. biflora* Keng (1941: 90) and *D. himalaica* Liou ex Chen (2001: 447), characterized by two-flowered spikelets. These taxa are both mentioned in the Flora of China (Lu *et al.* 2006), the first as a synonym of *D. suizanensis* (Hayata 1918: 83) Ohwi (1958: 211) and the second as an accepted species.

The current study found that the existing keys and descriptions are inadequate for identification of *D. himalaica* (Chen 2001, Lu *et al.* 2006). Although the account in the Flora of China highlighted the presence of two-flowered spikelets, the prevalence of this character in *D. himalaica* is actually rather low. Here, I clarify and discuss the taxonomy of *D. himalaica*, including its salient characteristics and distribution. I compare this species with its close relative *D. scabrescens* (Grisebach 1868: 79) Munro ex Duthie (Atkinson 1882: 628) and cite representative vouchers from China and Myanmar.

Deyeuxia himalaica Liou ex Chen (2001: 447) *s. lat.* (emend. Paszko). Figs. 1–2.

Deyeuxia himalaica Liou in Lu & Liou (1987: 215), *nom. inval.* (without Latin description and type).

Deyeuxia himalaica Liou in Lu (1987: 197), *nom. inval.* (without Latin description and type).

Type:—CHINA. Xizang: Mêdog Xian, South Doshong La, in alpine meadow, 3900–4000 m, 14 September 1974, *Qinghai Xizang Exped. 1033* (holotype PE!).

spicatum:—CHINA. Sichuan: Kangding Co., Mt. Jichou, Shadeliuba Community, 4400 m, 1 September 1982, Dong 29590 (CDBI, two sheets).

Acknowledgments

Research visits to herbaria at Beijing (PE), Chengdu (CDBI), Kolkata (CAL) and Sankt Petersburg (LE) were possible thanks to an exchange program between the Polish Academy of Sciences and its counterpart Academies. This study was financed in part from the statutory fund of the Institute of Botany of the Polish Academy of Sciences and received support from the SYNTHESYS Project (<http://www.synthesys.info>) which is financed by the European Community Research Infrastructure Action under the FP7 "Capacities" Program. Special thanks are due to Dave Boufford (A, GH), Rob Huxley (BM), David Harris (E), and Erik Smets (L) for responding to requests for loans and personal consultations of the specimens housed in their herbaria. I am thankful to Bing Liu (Institute of Botany, Chinese Academy of Sciences, Beijing, China) for reading several Chinese labels and Colin Pendry (Royal Botanic Garden Edinburgh) for valuable comments on the manuscript and linguistic advice.

References

- Adanson, M. (1763) *Familles des Plantes* 2. Vincent, Paris, 640 pp.
- Atkinson, E.T. (ed.) (1882) Flora of the Himalayas: with special reference to Kumaon, Garhwal, Nepal and Tibet. *Himalayan Districts of the North-western Provinces of India* 10: 299–670. Reprinted in: Atkinson, E.T. (ed.) (1980) *Flora of the Himalayas: with special reference to Kumaon, Garhwal, Nepal and Tibet*. Cosmo, New Delhi, pp. 299–670.
- Beauvois, A.M.F.J.P. (1812) Essai d'une nouvelle Agrostographie; ou nouveaux genres des Graminées; avec figures représentant les caractères de tous les genres. Chez l'auteur, Paris, 182 pp.
- Bor, N.L. (1960) *Grasses of Burma, Ceylon, India and Pakistan (excluding Bambuseae)*. Pergamon Press, London, 767 pp.
- Chen, W.L. (2001) Validation of *Deyeuxia himalaica* L. Liou. *Acta Phytotaxonomica Sinica* 39: 447–450.
- Clayton, W.D. & Renvoize, S.A. (1986) *Genera Graminum. Grasses of the world*. Royal Botanic Gardens, Kew, 389 pp.
- Escalona, F.D. (1988) *Systematics of Calamagrostis, section Deyeuxia, subsection Stylagrostis (Poaceae: Pooideae)*. PhD dissertation, Iowa State University, Ann Arbor, 229 pp.
- Grisebach, A. (1868) Ueber die Gramineen Hochasiens. *Nachrichten von der Königlichen Gesellschaft der Wissenschaften und von der Georg-Augusts-Universität* 1868: 61–93.
- Hayata, B. (1918) *Icones plantarum formosanmarum nec non et contributiones ad floram formosanam* 7. *Contributions to the Flora of Formosa* 6. Bureau of Productive Industries, Government of Formosa, Taihoku, 107 pp.
- Hedberg, I. & Hedberg, O. (1994) The genus *Colpodium* (Gramineae) in Africa. *Nordic Journal of Botany* 14: 601–607.
- Hooker, J.D. (1896) *Flora of British India* 7. L. Reeve & Co., London, 842 pp.
- Howard, T.G., Saarela, J.M., Paszko, B., Peterson, P.M. & Werier, D. (2009) New records and a taxonomic review of *Calamagrostis perplexa* (Poaceae: Poaeae: Agrostidinae), a New York state endemic grass. *Rhodora* 111: 155–170. <http://dx.doi.org/10.3119/08-5.1>
- Keng, Y.L. (1941) New grasses from Sikang Province. *Sunyatsenia* 6: 77–104.
- Kingdon-Ward, F. (1957) The great forest belt of North Burma. *Proceedings of the Linnean Society of London* 168: 87–96.
- Korthof, H.M. & Veldkamp, J.F. (1984) A revision of *Aniselytron* with some new combinations in *Deyeuxia* in SE Asia (Gramineae). *Gardens' Bulletin, Singapore* 37: 213–223.
- Kress, W.J., DeFilipps, R.A., Farr, E. & Kyi, D.Y.Y. (2003) A checklist of the trees, shrubs, herbs and climbers of Myanmar (revised from the original works by J. H. Lace and H. G. Hundley). *Contributions from the United States National Herbarium* 45: 1–590.
- Li, H., Guo, H.J. & Dao, Z.L. (2000) *Flora of Gaoligong Mountain*. Science Press, Beijing, 1344 pp.
- Linnaeus, C. (1753) *Species Plantarum* 1. L. Salvii, Holmiae (Stockholm), 560 pp.
- Liou, L. (1994) *Deyeuxia Clarion & Calamagrostis* Adans. In: Wang, W.T. (ed.) *Vascular Plants of the Hengduan Mts* 2. Science Press, Beijing, pp. 2232–2242.
- Lu, S.L. (1987a) *Deyeuxia Clarion, Calamagrostis* Adans. In: Kuo, P.C. (ed.) *Flora Reipublicae Popularis Sinicae* 9(3). Science Press, Beijing, pp. 188–229.
- Lu, S.L. (1987b) *Calamagrostis* Adans. In: Wu, C.Y. (ed.) *Flora Xizangica* 5. Science Press, Beijing, pp. 210–213.
- Lu, S.L. & Liou, L. (1987) *Deyeuxia Clarion*. In: Wu, C.Y. (ed.) *Flora Xizangica* 5. Science Press, Beijing, pp. 213–229.
- Lu, S.L. & Phillips, S.M. (2006) *Calamagrostis*. In: Wu, Z.Y., Raven, P.H. & Hong, D.Y. (eds.) *Flora of China—Poaceae* 22. Science Press, Beijing & Missouri Botanical Garden Press, St. Louis, pp. 359–361.
- Lu, S.L., Chen, W.L. & Phillips, S.M. (2006) *Deyeuxia Clarion* ex P. Beauvois. In: Wu, Z.Y., Raven, P.H. & Hong, D.Y. (eds.) *Flora of China—Poaceae* 22. Science Press, Beijing & Missouri Botanical Garden Press, St. Louis, pp. 348–359.

- Ma, H.Y., Peng, H. & Li, D.Z. (2005) Taxonomic significance of leaf anatomy of *Aniselytron* (Poaceae) as an evidence to support its generic validity against *Calamagrostis* s.l. *Journal of Plant Research* 118: 401–414.
- Miehe, G., Winiger, M., Böhmer, J. & Zhang, Y.L. (2001) The climatic diagram map of High Asia. Purpose and concepts. *Erdkunde* 55: 94–97.
- Nobis, M., Nowak, A., Nobis, A., Paszko, B., Piwowarczyk, R., Nowak, S. & Plášek, V. (2014) Contribution to the flora of Asian and European countries: new national and regional vascular plant records. *Acta Botanica Gallica*. <http://dx.doi.org/10.1080/12538078.2013.871209>
- Noltie, H.J. (2000) *Flora of Bhutan*, 3(2)—*The Grasses of Bhutan*. Royal Botanic Garden Edinburgh & Royal Government of Bhutan, Edinburgh, 883 pp.
- Ohwi, J. (1958) Notes on some plants from Japan and neighbours, 3. *Journal of Japanese Botany* 33: 209–213.
- Paszko, B. (2012a) Taxonomic revision of *Calamagrostis filiformis*, *C. tripilifera* and their allies (Poaceae: Agrostidinae). *Polish Botanical Journal* 57: 335–346.
- Paszko, B. (2012b) *Calamagrostis gamblei* sp. nov. (Poaceae) from the Western Himalayas, NW India. *Polish Botanical Journal* 57: 327–334.
- Paszko, B. (2013) The identity of *Calamagrostis emodensis* var. *brevisetata* (Poaceae, Agrostidinae). *Phytotaxa* 118: 35–42. <http://dx.doi.org/10.11646/phytotaxa.118.2.2>
- Paszko, B. (in press). Taxonomic reassessment of *Calamagrostis garhwalensis* (Poaceae: Agrostidinae). *Phytotaxa*.
- Paszko, B. & Chen, W.L. (2013) *Deyeuxia sorengii* sp. nov. (Poaceae, Agrostidinae) from Qinghai-Tibetan Plateau. *Nordic Journal of Botany* 31: 551–555. <http://dx.doi.org/10.1111/j.1756-1051.2012.01791.x>
- Paszko, B., Chen, W.L. & Szczepaniak, M. (2013) *Deyeuxia debilis* (Poaceae, Agrostidinae): typification, taxonomy and update of the Chinese distribution. *Phytotaxa* 135: 1–10. <http://dx.doi.org/10.11646/phytotaxa.135.1.1>
- Paszko, B. & Ma, H.Y. (2011) Taxonomic revision of the *Calamagrostis epigeios* complex with particular reference to China. *Journal of Systematics and Evolution* 49: 495–504. <http://dx.doi.org/10.1111/j.1759-6831.2011.00140.x>
- Paszko, B. & Nobis, M. (2010) The hybrid origin of *Calamagrostis* × *gracilescens* (Poaceae) in Poland inferred from morphology and AFLP data. *Acta Societatis Botanicorum Poloniae* 79: 51–61. <http://dx.doi.org/10.5586/asbp.2010.008>
- Paszko, B. & Pendry, C.A. (2013a) *Agrostis griffithiana* (Poaceae: Agrostidinae)—typification, a new synonym and an update of the distribution in India. *Phytotaxa* 140: 26–34. <http://dx.doi.org/10.11646/phytotaxa.140.1.2>
- Paszko, B. & Pendry, C. (2013b) *Deyeuxia gaoligongensis* (Poaceae: Agrostidinae), a new species from Gaoligong Shan in Yunnan, China. *Phytotaxa* 93: 40–46. <http://dx.doi.org/10.11646/phytotaxa.93.1.3>
- Paszko, B. & Soreng, R.J. (2013). Species delimitation and name application in *Deyeuxia abnormis*, *Agrostis zenkeri*, *A. pleiophylla* and related taxa (Poaceae: Agrostidinae). *Phytotaxa* 111: 1–26. <http://dx.doi.org/10.11646/phytotaxa.111.1.1>
- Persoon, C.H. (1805) *Synopsis plantarum seu enchiridium botanicum* 1. J. G. Cotta, Tübingen, Germany, 546 pp.
- Presl, C.B. (1830) *Reliquiae Haenkeanae* 1. J.F. Calve, Praha, pp. 356.
- Richter, K. (1890) *Plantae Europaeae. Enumeratio systematica et synonymica plantarum phaenogamicarum in Europa sponte crescentium vel mere inquilinarum* 1. W. Engelmann, Leipzig, 378 pp.
- Singh, G. (1984) Nomenclatural notes on Asiatic *Calamagrostis* (Poaceae). *Taxon* 33: 94–95.
- Sodiolo, P.L. (1889) Gramineas ecuatorianas de la provincia de Quito. *Anales de la Universidad Central del Ecuador* 3: 474–484.
- Soreng, R.J. & Fish, L. (2011) *Catabrosa* versus *Colpodium* (Poaceae: Poaceae) in southern Africa, with a key to these genera and their species in Africa. *Kew Bulletin* 66: 1–10. <http://dx.doi.org/10.1007/s12225-011-9267-y>
- Stuedel, E.G. (1840) *Nomenclator Botanicus* 1. Ed. 2. J.G. Cotta, Stuttgart & Tübingen, 852 pp.
- Sun, B. (2003) *Deyeuxia* Beauv. In: Sun, B., Li, D. & Xue, J. (eds.) *Flora Yunnanica—Spermatophyta* 9. Science Press, Beijing, pp. 372–382.
- Trinius, C.B. (1841) Gramina Agrostidea II, Callo rotundo (Agrostea). *Mémoires de l'Académie Impériale des Sciences de Saint-Petersbourg, ser. 6, Sciences Mathématiques, Physiques et Naturelles* 2, *Sciences Naturelles* 6: 247–390.
- Weddell, H.A. (1875) Les *Calamagrostis* des Hautes Andes. *Bulletin de la Société Botanique de France* 22: 173(err. typ. 153)–180.
- Wu, Z.L. & Phillips, S.M. (2006) *Trisetum* Persoon. In: Wu, Z.Y., Raven, P.H. & Hong, D.Y. (eds.) *Flora of China—Poaceae* 22. Science Press, Beijing & Missouri Botanical Garden Press, St. Louis, pp. 325–330.