Phytotaxa 195 (3): 236–242
www.mapress.com/phytotaxa/

Article

ISSN 1179-3155 (print edition)
PHYTOTAXA
ISSN 1179-3163 (online edition)

http://dx.doi.org/10.11646/phytotaxa.195.3.3

A new synonym and a new combination in *Stipa aliena* Keng (Poaceae: *Stipa* sect. *Regelia*)

MARCIN NOBIS[1,3], ARKADIUSZ NOWAK[2] & POLINA D. GUDKOVA[3]

[1]*Department of Plant Taxonomy, Phytogeography and Herbarium, Institute of Botany, Jagiellonian University, Kopernika 27, PL-31-501 Kraków, Poland;*

[2]*Laboratory of Geobotany and Plant Conservation, Department of Biosystematics, Opole University, Oleska 48, PL-45-052 Opole, Poland;*

[3]*Laboratory of Biodiversity and Ecology, Institute of Biology, Tomsk State University, 36 Lenin Prospekt, Tomsk, 634050, Russia*

Corresponding author: m.nobis@uj.edu.pl

Abstract

Stipa section *Regelia* comprises three species occurring in mountainous areas of Central Asia. One of them, *S. smithii*, was described by Martinovský in 1970, but the taxon has been overlooked in later taxonomical studies. The species was described with two varieties, var. *smithii* and var. *macrocarpa*. As a result of our taxonomical studies, we find the typical variety of the taxon to be conspecific with *Stipa aliena*, and propose that the second one be recognized as *Stipa aliena* var. *macrocarpa* comb. nov. Remarks on species belonging to section *Regelia* and micromorphological patterns of their lemma morphologies are discussed. A key to species close to *S. aliena* is provided.

Keywords: Taxonomy, distribution, lemma micromorphology, key to species

Introduction

Stipa Linnaeus (1753: 78) is one of the largest genera in the family Poaceae in the Old World. It comprises over 150 species distributed in open grasslands and steppes, with the highest species diversity in warm temperate regions of Europe, Asia and North Africa (Nobis 2013, Nobis *et al.* 2014b). Species belonging to *Stipa* are taxonomically difficult and many are still under study (e.g. Kotukhov 1998a, 1998b, Noltie 1999, Gudkova 2012, Nobis 2010, 2011a, 2011b, 2012, 2013, 2014, Nobis *et al.* 2013, 2014a, 2014b, 2014c, Cataldo *et al*. 2012, Tzvelev 2012). In the Old World, *Stipa* is divided approximately into ten sections (Tzvelev 1974, 1993, 2012, Freitag 1985); however, the systematic position of some species in the genus is still unclear (Nobis 2013).

Stipa section *Regelia* Tzvelev (1974: 13) comprises three species, *Stipa regeliana* Hackel (1884: 130), *S. aliena* Keng (1941: 74) and *S. rohmooiana* Noltie (1999: 287), distributed in mountainous areas of Central Asia (Tian-Shan, Pamirs, Hindukush, Karakorum, Himalaya; Tzvelev 1968, 1976; Wu & Phillips 2006). The diagnostic character of this section is the awn, which is pilose in the lower part (with hairs up to 1.5 mm in length) and scabrous in the upper part (Tzvelev 1974). *Stipa regeliana* and *S. aliena* are separated by panicle, awn, anthecium and ligule characters (Wu & Phillips 2006). *Stipa rohmooiana* is very close to *S. aliena* (Noltie 1999) and its distinctiveness requires further study.

Recently, Tzvelev (2012)—based on the lack of an articulate junction between the awn and anthecium–transferred *Stipa regeliana* to the genus *Achnatherum* Palisot de Beauvois (1812: 19), as *A. regelianum* (Hackel) Tzvelev (2012: 22). Despite the fact that *Achnatherum* is a polyphyletic genus (Hamasha *et al.* 2012, Romaschenko *et al.* 2012), *S. regelina* does not fall in any of the *Achnatherum* clades; it groups with other species belonging to *Stipa*. *Achnatherum* and *Stipa* differ clearly in lemma micromorphology (Barkworth & Everett 1987; Romaschenko *et al*. 2012). The most typical lemma micromorphological characters of *Stipa* are: presence of long fundamental cells longer or equal in length than width, numerous hooks and not too numerous silica bodies. Because of the presence of numerous hooks (=crown cells) on the upper surface of lemma, this pattern is called "saw-like" (Romaschenko *et al.* 2012). In *Achnatherum* species, hooks are absent at least in the middle part of the lemma, long fundamental cells are shorter or equal in length than width and silica bodies are numerous and densely distributed; this pattern is referred to as "maize-like" (Romaschenko *et al.* 2012). We have examined patterns of the lemma micromorphology of most Eurasian species

from the tribe *Stipeae* (Nobis 2011, 2012, 2013, 2014, Nobis & Nobis 2013, Nobis *et al.* 2014, Nobis unpl.), and here provide illustrations of the lemma micromorphology of four species for the first time: *Stipa turkestanica* Hackel (1906: 59) subsp. *trichoides* (Smirnov 1925: 233) Tzvelev (1974: 17), *S. regeliana*, *S. aliena* and *Achnatherum pekinense* (Hance 1877: 268) Ohwi (1953: 66).

The lemma micromorphology of specimens representing *Stipa regeliana* clearly differs from the species of *Achnatherum,* and is similar to that of the other *Stipa* species (Fig. 1). As in other species of *Stipa*, *S. regeliana* has numerous hooks; fundamental long cells with side walls raised, tight and deeply convoluted (curves Ω-like); silica cells scattered and neighboring with cork cells. Silica cells in *S. regeliana* and *S. aliena* are elliptical, rounded to elongated with side-walls straight or with 1–2 shallow constrictions (similar to those observed in *Ptilagrostis* Grisebach 1852: 447; Nobis & Nobis 2013). In *S. turkestanica* subsp. *trichoides* and other species of *Stipa* (see Nobis 2012, 2013, 2014) silica cells are reniform, elliptic or rounded. Species of *Stipa* differ from *Achnatherum* in callus shape. In *Stipa*, calluses are more than 0.5 mm long and acute, whereas in *Achnatherum* calluses are generally shorter then 0.5 mm long and obtuse or subacute (Fig. 1). Given its position in molecular trees among species of *Stipa*, and lemma micromorphology similar to species of *Stipa*, *Achnatherum regelianum* should be treated as a synonym of *S. regeliana*.

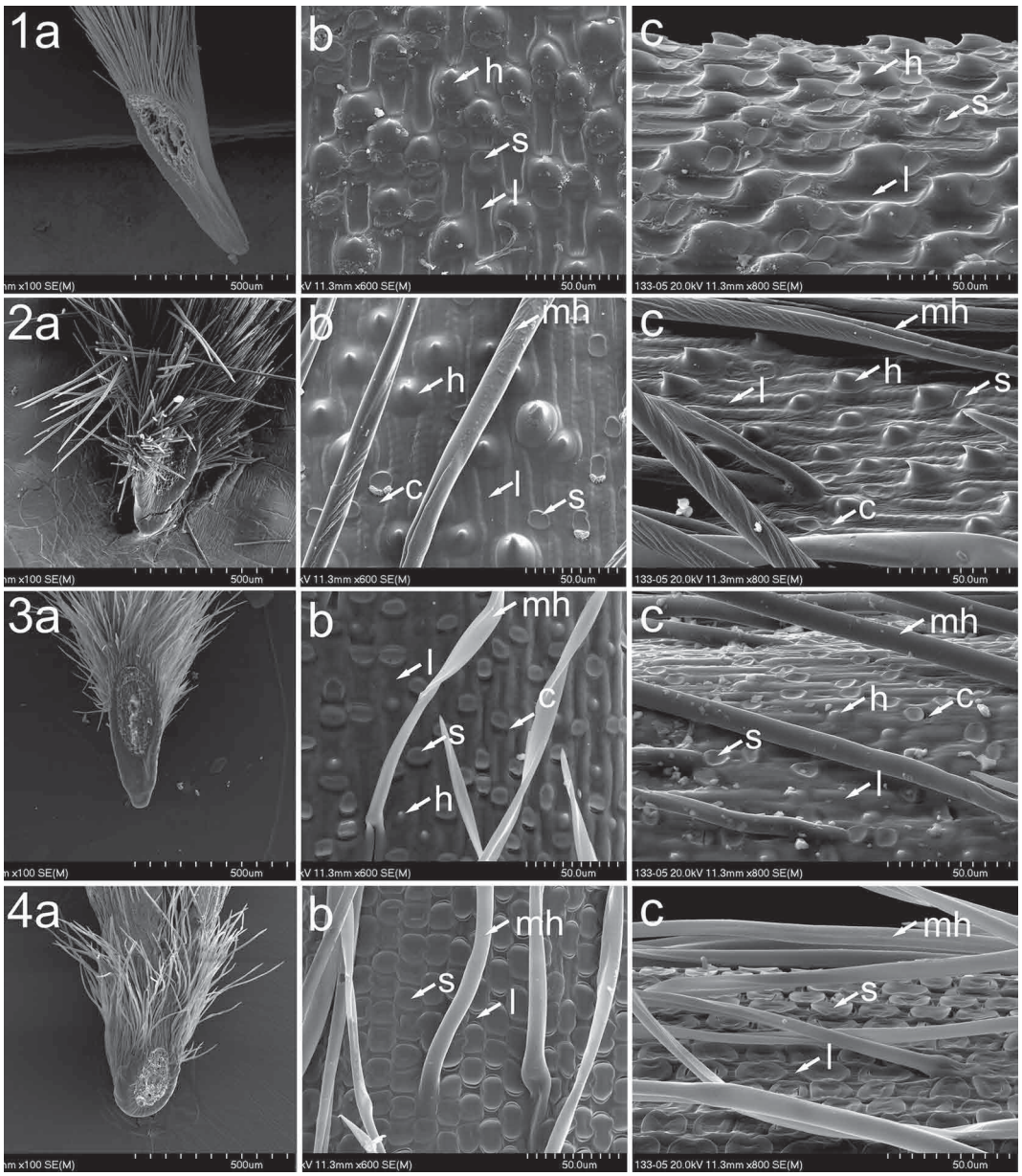

FIGURE 1. SEM morphology of the callus and lemma in *Stipa turkestanica* subsp. *trichoides* (1), *S. regeliana* (2), *S. aliena* (3), *Achnatherum pekinense* (4): (a) callus; (b–c) structure of the dorsal surface of lemma, (b) superior view, (c) lateral view. Abbreviations: h—hook, l—long cell, mh—macrohair, s—silica body, c—cork cell. All hooks are orientated to the distal apex. Vouchers: (1) Tajikistan, Zeravshan Mts, Iskanderdaria River Valley, E of Serimadarun Lake (near Iskanderkul Lake), 14 June 2011, *M. Nobis* (KRA); (2) *A.A. Yunatov, Yuan U-fen 623* (LE); (3) *R.J. Soreng, P.M. Peterson, S. Hang* (KUN 96455); (4) Japan, Shitoo Bitchuu-choo, prof. Okayama (prov. Bitchuu), 13 October 1983, *M. Furuse 52250* (NY).

In 1970, J.O. Martinovský described from Sichuan province in China another taxon from *Stipa* section *Regelia*, *Stipa smithii* Martinovský (1970: 162) with two varieties, var. *smithii* and var. *macrocarpa* Martinovský (1970: 163). He stressed that his new taxon is closely related to *S. regeliana*, and provided a set of characters with which he distinguished his new taxon from similar taxa in the region, namely: *S. regeliana*, *S. purpurea* Grisebach (1868: 82) and *S. penicillata* Handel-Mazzetti (1936: 226). However, Martinovský overlooked that, (1) the name of his new species was already used for the South American species *S. smithii* Hitchcock (1930a: 382) [currently recognized as *Nassella smithii* (Hitchcock) Barkworth (1990: 612)] and his name is thus an illegitimate homonym, and (2), a species very similar to *S. smithii*, named *S. aliena*, was described by Keng (1941) from Kansu [Gansu] province in China. Currently, *S. aliena* is known from central and south-western China (Gansu, Sichuan, Qinghai and Xizang provinces; Wu & Phillips 2006). Based on taxonomic revision of specimens representing *S. smithii* and *S. aliena* supported by their original descriptions (Martinovský 1970, Keng 1941), we determined that specimens of the typical variety of *S. smithii* Martinovský (known only from the holotype and isotype) are indistinguishable from those of *S. aliena* in terms of their general distribution ranges and taxonomically important morphological characters, such as character of leaves and ligules, length of glumes, length of anthecium, length of awn and character of the awn (Keng 1941, Wu & Phillips 2006). We thus treat *S. smithii* as conspecific with *S. aliena*. However, specimens described by Martinovský as *S. smithii* var. *macrocarpa* differ from those belonging to *S. aliena*, by having longer anthecia (9–12 vs 6.5–8.5. mm) and slightly longer awns (23–30 vs. 15–26 mm; see also Keng 1941, Wu & Phillips 2006). We therefore propose to recognize this taxon as a variety of *S. aliena*.

Taxonomic treatment

Stipa aliena Keng (1941: 74)

Type:—China, Kansu province, Labrang, grassy swampy places, alt. 3000 m, 17 Oktober 1934, *C.W. Yao 502* [Herbarium Biological Laboratory, the Science Society of China] (N 57946).

= *Stipa smithii* Martinovský (1970: 162) *nom. hom. illeg.,* non *S. smithii* Hitchcock (1930a: 382), *syn. nov*. Type:—Sina, prov. Sze-ch'uan, reg. bor.-occid.: Sankar-von-mâ, c. 45 km bor.-orient. versus in prato, c. 4100 m s.m., 2 September 1922, *leg. Harry Smith*, Plantae sinenses 4287 (holotype UPS!, isotypes UPS!, LD)

Selected specimens studied:—CHINA. Sichuan prov., ca. 2 km S of Waqen, ca. 60 km SW of Zorge, 18 September 1997, *R.J. Soreng, P.M. Peterson, S. Hang s.n.* (KUN 96455); Xizang prov., Bamda, grassland, alt. 4577 m, 13 August 1976 (KUN 319415); Xizang prov., Nyingchi County, Anerla Pass, 28 August 1976, *Wu et al. 5088* (KUN 319397); Xizang prov., Boxoi, from Rawu Lake to Baima, alt. 4200 m, 27 August 1973, *Qing-Zang Exped. 73-1266* (KUN 824126); Sichuan prov., Matgeet Sankar, c. 3500 m a.s.l., 3 September 1922, *H. Smith 4316* (UPS); Qinghai prov., Yushu Xian, SE of Mozhong, 27 August 1996, *T.N. Ho et al. 2492* (E); Gansu prov., E Nan-Shan, mountain pass between Ubei and Panchizhoi, alt. 2820 m, 9 October 1957, *A.A Yunatov 86* (LE); Qinghai prov., 108 km W of Sinin, alt. 3400 m, 5 August 1959, *M.P. Petrov s.n.* (LE).

Stipa aliena var. ***macrocarpa*** (Martinovský) M. Nobis *comb. nov.*

Basionym:—*Stipa smithii* var. *macrocarpa* Martinovský (1970: 163).

Type:—Sina, prov. Sze-ch'uan, reg. bor.-occid., Tsipula, in prato alpino graminoso, alt. c. 4000 m s.m., 2 August 1922, *leg. Harry Smith*, *Plantae sinenses 4148* (holotype UPS!, isotypes LD, MOIS!).

Specimens studied:—CHINA. Sichuan prov., Tsipula, alt. c. 4000 m a.s.l., 2 August 1922, *H. Smith 4148* (UPS, MOIS).

Stipa regeliana Hackel (1884: 130)

Type:—(USSR Kirgisia) Issikul, Musart, 2300–2650 m, August 1877, *Regel* (holotype W).

≡ *Achnatherum regelianum* (Hackel) Tzvelev (2012: 22), *syn. nov.*

= *Stipa purpurascens* Hitchcock (1930b: 95). Type:—China, Kansu province, south of Sining, in the La Che Tze Mountains, alt. 3350 to 3900, *R.C. Ching 686* (US 1245701).

Selected specimens studied:—KYRGYZSTAN. Transalai Alatau, Kara-Bulak, upper Issyk River, 9 September 1943, *V.P. Goloskokov* (LE); Tian-Shan, left slope of the Kaendy River Valley, 12 August 1960, *N. Shrylevich* (LE); Tian-Shan, Ketmen' Mts, Chulak Valley, 11 August 1963, *S.A. Aryetangaliev* (LE); Tian-Shan, Dzhety-Oguzovskii region, Syrty, 80 km SSW of Pokrovki settl., 20 July 1935, *N. Savich & G. Sabardina* (LE); central Tian-Shan, right slope of the Inylzek River, 27 August 1939, *V. Yakovleva 41* (LE); Terskei Alatau, Dhzalgys-Tyur Mts, 27 Jyly 1937, *I.V. Vykhodtseva* (FRU). TAJIKISTAN. Eastern Pamir Mts, upper Western Pshart River Valley, alt. 3700 m, 9 August 1968, *S.S. Ikonnikov 19055* (LE); Eastern Pamir Mts, Ak-tash, alt. 4000 m, 22 July 1953, *S.S. Ikonnikov* (LE). PAKISTAN. Hazara, NW Himalaya, lower Kaghan Vy, Mt. Makra top, N 34°34', E 73°30', 14 September 1995, *B. Dickoré 13223* (MSB 152897). CHINA. Xinjang, eastern Tian-Shan, Katyl pass, near Bain-Bulak, 15 August 1958, *A.A. Yunatov & I.F. Yuan 624* (LE); Xinjang, northern slope of Tian-Shan, Manu-Gol River Valley, 22 July 1957, *A.A. Yunatov et al. 1001* (LE); Xizang, S Tibet, Tibetan Himalaya, Everest E, head Kangchung Gl, 13 km E of Everest top, N 28°59', E 78°2', alt. 5290 m, 18 Oktober 1989, *B. Dickoré 6527* (MSB 152896); Xizang, E Tibet, Mekong–Salween divide, Salween tributary, Bamda–Nujiang, NE of pass (Camp 3), N 30°10', E 97°17', alt. 4660 m, 6 July 1994, *B. Dickoré 98970* (MSB 152894, MSB 152893); Xizang, S Tibet, Tibetan Himalaya, NE of Bhutan, N of Cona, N 28°7', E 91°54', alt. 4720 m, 30 July 1994, *B. Dickoré 10172* (MSB 152892). INDIA. Jammu and Kashmir State, Ladakh, Pangong, Parma village to Sato village, valley, N 33°48.5', E 78°20.8', alt. 4650 m, 23 September 2003, *L. Klimeš 3590* (PR); Jammu and Kashmir State, Ladakh, Indus Vy, Sham (W), Parmas [Phocha Tokpo] valley above Do, N 34°25.84', E 77°0.98', alt. 4500–4580 m, 21 September 2005, *L. Klimeš 6463* (PR); Jammu and Kashmir State, Ladakh, Shyok, Chumic Yogma, N 33°48.5', E 78°20.8', alt. 4940–4960 m, 24 September 2004, *L. Klimeš 5033* (PR).

Stipa rohmooiana Noltie (1999: 287)

Type:—India, Sikkim, Chugya, 15000 ft, 12 September, *Rohmoo 277* (holotype E!, isotype K!).

Selected specimens studied:—Flora of East Himalaya [India], Chugya, alt 1500 ft, 12 September 1912, *Rhomoo Lepcha 227* (E, K); Flora of East Himalaya [India], Chaerlung, alt 1600 ft, 12 September 1912, *Rhomoo Lepcha 385* (E).

Key to species close to *Stipa aliena* in Central Asia

This key is based on our taxonomical revision of this group of species, supplemented by data from other taxonomical studies (e.g. Tzvelev 1968, Kuo & Sun 1982, 1987, Lu & Wu 1996, Wu & Wang 1999, Wu & Phillips 2006, Nobis *et al.* 2014).

1. Awn plumose throughout its length, hairs on seta over 0.3 mm long 2
– Awn plumose on column and scabrous on seta 4
2. Panicle compressed, branches straight, 0.5–4 cm long; hairs on awn column 1.3–2.4 mm long and longer than those on seta, which are 0.3–2.3 mm long 3
– Panicle lax, branches flexuous, 3–6 cm long; hairs on awn column 1.5–2 mm long and somewhat shorter than those on seta, which are 2–3 mm long .... *S. purpurea*
  a. anthecium 7–9 mm long, glumes 12–19 mm long .... *S. purpurea* var. *purpurea*
  – anthecium 9.5–15 mm long, glumes 17–25 mm long ....*S. purpurea* var. *arenosa* Tzvelev (1968: 60)
3. Anthecium (6.0–)6.5–7.5(–7.7) mm long, hairs on seta (0.3–)0.5–1.1(–1.4) mm long, ligules of basal leaves up to 2 mm long .... *S. roborowskyi* Roshevitz (1920: 1)
– Anthecium (7.0–)8.3–9.5(–10.5) mm long, hairs on seta (1.0–)1.3–2.0(–2.3) mm long, ligules of basal leaves 2–9 mm long ....*S. klimesii* M. Nobis (2014: 174 [166])
  a. sheaths of culm leaves glabrous ....*S. klimesii* var. *klimesii*
  – sheaths of culm leaves shortly pubescent .... *S. klimesii* var. *pubescens* M. Nobis (2014: 176 [168])
4 Awn column with hairs up to 1.5 mm long 5
– Awn column with hairs 2–4 mm long 6
5. Ligules of basal leaves 1–1.5 mm long, panicle lax....*S. aliena* [incl. *S. rohmooiana*]
a. anthecium 6.3–8.5 mm long, awn 15–26 mm long....*S. aliena* var. *aliena*
– anthecium 9–12 mm long, awn 23–30 mm long .... *S. aliena* var. *macrocarpa*
– Ligules of basal leaves 4–6 mm long, panicle contracted .... *S. regeliana*
6. Panicle lax, branches over 3 cm long, anthecium 5–8 mm long .... *S. penicillata*
  a. sheaths and leaves scabrous ....*S. penicillata* var. *penicillata*
  – sheaths and leaves shortly pubescent ....*S. penicillata* var. *hirsuta* P.C. Kuo & Y. H. Sun (1984: 89)
– Panicle contracted, branches up to 3 cm long, anthecium 4–6 mm long 7
7. Glumes 6.0–8.0(–8.5) mm long, awn over 21 mm long.... *S. subsessiliflora* (Ruprecht 1869: 35) Roshevitz (1915: 50)
– Glumes (9.0–)9.5–13.5 mm long, awn up to 19 mm long....*S. basiplumosa* Munro ex J.D. Hooker (1896: 229)

Acknowledgments

We would like to express our gratitude to the curators of E, GOET, K, KRA, KUN, LE, MOIS, MSB, NY, PE, PR,UPS for making the collections of the genus *Stipa* available for study, and Wenli Chen for help in translating a part of chinese labels. Special thanks to Jeffery M. Saarela for his valuable comments and improvements to the first version of the manuscript. The research was partially funded by the National Science Centre, project no. UMO-2013/09/B/NZ8/03287.

References

Barkworth, M.E. (1990) *Nassella* (Graminae, Stipeae): revised interpretation and nomenclatural changes. *Taxon* 39: 597–614. http://dx.doi.org/10.2307/1223366

Cataldo, D., Giardina, S.A., Moraldo, B. & Raimondo, F.M. (2012) *Stipa valdemonensis* (Poaceae), a new species from Sicily. *Plant Biosystems* 146(3): 658–663. http://dx.doi.org/10.1080/11263504.2012.700961

Freitag, H. (1985) The genus *Stipa* (Gramineae) in southwest and south Asia. *Notes from the Royal Botanical Garden, Edinburgh* 42: 355–489.

Grisebach, A. (1868) Ueber die Gramineen Hochasiens. Nachrichten von der Königlichen Gesellschaft der Wissenschaften und von der Georg-Augusts-Universität 3: 61–93.

Grisebach, A. (1852) Ptilagristis. *In:* Ledebour, C.F. (Ed.) *Flora Rossica sive Enumeratio Plantarum in Totius Imperii Rossici Provinciis Europaeis, Asiaticis, et Americanis Hucusque Observatarum,* 4. Sttudgartiae, Sumtibus Librariae E. Schweizerbart, pp. 447–448.

Gudkova, P.D. (2012) Annotated list of the *Stipa* L. species (Poaceae) from South Siberia. *Sistematicheske Zametki po Materalam Gerbarya im. P.N. Krylova Tomskogo Gosudarstvennogo Universiteta* 105: 22–31.

Hackel, E. (1884) Gramina nova vel minus nota. *Sitzungsberichte der Mathematisch-Naturwissenschaftlichen Classe der Kaiserlichen Akademie der Wissenschaften 89: 123–136.*

Hackel, E. (1906) Gramineae novae turkestanicae. *Journal of Botanical Taxonomy and Geobotany* 26: 55–60.

Hamasha, H.R., von Hagen, K.B. & Röser, M. (2012) *Stipa* (Poaceae) and allies in the Old World: molecular phylogenetics realigns genus circumscription and gives evidence on the origin of American and Australian lineages. *Plant Systematics and Evolution* 298: 351–367. http://dx.doi.org/10.1007/s00606-011-0549-5

Hance, H.F. (1877) Supplementary note on intoxicate grasses. *Journal of Botany* 15: 267–268.

Handel-Mazzetti, H. (1936) Kleine Beiträge zur Kenntnis der Flora von China. *Oesterreichische Botanische Zeitschrift* 85: 226–227. http://dx.doi.org/10.1007/BF01255464

Hooker, J.D. (1896) *Flora of British India*, 7. L. Reeve & Co., London, 842 pp.

Hitchcock, A.S. (1930a) *Stipa smithii* Hitchc., sp. nov. *Journal of the Washington Academy of Sciences* 20: 382–383.

Hitchcock, A.S. (1930b) Fifteen new species of grasses, six from Africa, seven from China. *Proceedings of the Biological Society of Washington* 43: 89–96.

Keng, Y.L. (1941) An enumeration of grasses of Kansu Province. *Sunyatsenia* 6(1): 52–76.

Kotukhov, Yu. (1998a) New species of grasses (Poaceae) from south Altai, Saur and Tarbagatai. *Turczaninowia* 1(1): 7–21.

Kotukhov, Yu. (1998b) New species of the genus *Stipa* L. (Poaceae) from western Kazakhstan. *Turczaninowia* 1(2): 9–15.

Kuo, P.C. & Sun, Y.H. (1982) A preliminary study on the classification, distribution and ecological nature of genus *Stipa* L. of China. *Acta Phytotaxonomica Sinica* 20: 34–44.

Kuo, P.C. & Sun, Y.H. (1984) *Stipa penicillata* var. *hirsuta*. *Bulletin of Botanical Research, Harbin* 4(4): 89.

Kuo, P.C. & Sun, Y.H. (1987) Stipa Linn. *In*: Kuo, P.C. (Ed.) *Flora Reipublicae Popularis Sinicae* 9(3). Science Press, Beijing, pp. 268–287.

Linnaeus, C. (1753) *Species Plantarum*, 1. L. Salvii, Holmiae (Stockholm), 560 pp. http://dx.doi.org/10.5962/bhl.title.669

Lu, S.L. & Wu, Z.L. (1996) On the geographical distribution of the genus *Stipa* L. in China. *Acta Phytotaxonomica Sinica* 34: 242–253.

Martinovský, J.O. (1970) *Stipa smithii* Martinovský, eine neue Chinesische Federgrasart. XX. Beitrag zur Kenntnis der Federgrassippen. *Svensk Botanisk Tidskrift* 64(2): 158–164.

Nobis, M. (2010) *Stipa adamii* sp. nov. (Poaceae) from the western Tian-Shan, and some remarks on the taxa of the section *Smirnovia* occurring in Kazakhstan. *Nordic Journal of Botany* 28: 733–738.
http://dx.doi.org/10.1111/j.1756-1051.2010.00968.x

Nobis, M. (2011a) *Stipa* ×*brozhiana* (Poaceae) nothosp. nov. from the western Pamir Alai Mts (Middle Asia) and taxonomical notes on *Stipa* ×*tzvelevii*. *Nordic Journal of Botany* 29: 458–464.
http://dx.doi.org/10.1111/j.1756-1051.2011.01127.x

Nobis, M. (2011b) Remarks on the taxonomy and nomenclature of the *Stipa tianschanica* complex (Poaceae), on the base of a new record for the flora of Tajikistan (central Asia). *Nordic Journal of Botany* 29: 194–199.
http://dx.doi.org/10.1111/j.1756-1051.2010.00869.x

Nobis, M. (2012) *Stipa narynica* sp. nov. (Poaceae) from the western Tian-Shan Mountains. *Nordic Journal of Botany* 30: 70–76.
http://dx.doi.org/10.1111/j.1756-1051.2011.01403.x

Nobis, M. (2013) Taxonomic revision of the *Stipa lipskyi* group (Poaceae: *Stipa* section *Smirnovia*) in the Pamir Alai and Tian-Shan Mountains. *Plant Systematics and Evolution* 299: 1307–1354.
http://dx.doi.org/10.1007/s00606-013-0799-5

Nobis, M. (2014) Taxonomic revision of the Central Asiatic *Stipa tianschanica* complex (Poaceae) with particular reference to the epidermal micromorphology of the lemma. *Folia Geobotanica* 49: 283–308.
http://dx.doi.org/10.1007/s12224-013-9164-2

Nobis, M., Ebel, A.L., Nowak, A., Turginov, O.T., Kupriyanov, A.N., Nobis, A., Olonova, M.V., Paszko, B., Piwowarczyk, R., Chen, W.L., Gudkova, P.D., Klichowska, E., Nowak, S. & Pujadas-Salvà, A.J. (2014a) Contribution to the flora of Asian and European countries: new national and regional vascular plant records, 2. *Acta Botanica Gallica: Botany Letters* 161(2): 209–221.
http://dx.doi.org/10.1080/12538078.2014.921643

Nobis, M. & Nobis, A. (2013) *Ptilagrostis milleri* comb. nov. (Poaceae: Stipeae). *Nordic Journal of Botany* 31: 623–625.
http://dx.doi.org/10.1111/j.1765-1051.2013.00115.x

Nobis, M., Nobis, A., Nowak, A. & Nowak, S. (2014b) *Stipa klimesii* (Poaceae), a new species from Western Himalayas (India). *Phytotaxa* 174(3): 173–180.
http://dx.doi.org/10.11646/phytotaxa.174.3.6

Nobis, M., Nowak, A. & Nobis, A. (2013) *Stipa zeravshanica* sp. nov. (Poaceae), an endemic species from rocky walls of the western Pamir Alai Mountains (middle Asia). *Nordic Journal of Botany* 31: 666–675.
http://dx.doi.org/10.1111/j.1756-1051.2013.00184.x

Nobis, M., Nowak, A., Nobis, A., Paszko, B., Piwowarczyk, R., Nowak, S. & Plašek, V. (2014c) Contribution to the flora of Asian and European countries: new national and regional vascular plant records. *Acta Botanica Gallica: Botany Letters* 161: 81–89.
http://dx.doi.org/10.1080/12538078.2013.871209

Noltie, H.J. (1999) Notes relating to the flora of Bhutan: XXXVIII. Gramineae I, tribe Stipeae. *Edinburgh Journal of Botany* 56: 285–292.
http://dx.doi.org/10.1017/S0960428600001141

Ohwi, J. (1953) *Achnatherum pekinense. Bulletin of the National Science Museum, Tokyo* 33: 66.

Palisot de Beauvois, A.M.F.J. (1812) *Essai d'une nouvelle Agrostographie.* Imprimerie de Fain: Paris.

Romaschenko, K., Peterson, P.M., Soreng, R.J., Garcia-Jacas, N., Futorna, O. & Susanna, A. (2012) Systematics and evolution of the needle grasses (Poaceae: Pooideae: Stipeae) based on analysis of multiple chloroplast loci, ITS, and lemma micromorphology. *Taxon* 61: 18–44.

Roshevitz, R.Yu. (1915) *Stipa* L. *In*: Fedchenko, B.A. (Ed.) Spisok ruskikh rastenii. [Suppl. 2] *Izvestiya Imperatorskago Botaniceskago Sada Petra Velikago* 14: 48–50.

Roshevitz, R.Yu. (1920) *Stipa* novae Asiae centralis. *Botanicheskie Matreialy Gerbarya Glavnogo Botanicheskogo Sada R.S.F.S.R.* 1(6): 1–4.

Ruprecht, F.J. (1969) *Lasiagrostis subsessiliflora* Ruprecht. *In*: Osten-Sacken, F. von & Ruprecht, F.J., Sertum tianschanicum: Botanische Ergebnisse einer Reise im mittleren Tian-Schan. *Memoires de l'Academie Imperiale des Sciences de Saint-Petersbourg* 14(4): 1–74.

Smirnov, P.A. (1925) Die neuen russischen Stipa-Pennata-Arten. Repertorium specierum novarum regni vegetabilis. *Centralblatt für Sammlung und Veröffentlichung von Einzeldiagnosen neuer Pflanzen* 21: 231–235.

Tzvelev, N.N. (1968) Zlaki (Gramineae). *In*: Grubov, V.I. (Ed.) *Rastieniya Centralnoi Azii. Po materialam Botanicheskogo Instituta im. V.L. Komarova (Plantae Asiae Centralis, secus materies Instituti botanici nomine V.L. Komarovii),* 4. Leningrad, Nauka, pp. 1–243 + 12 maps.

Tzvelev, N.N. (1974) Zametki o Tribe Stipae Dum. semeistva zlakov (Poaceae) v SSSR—Notulae dr tribu Stipae Dum. (fam. Poaceae) in URSS. *Novosti Sistematiki Vysshikh Rastenii* 11: 4–21.

Tzvelev, N.N. (1993) Some notes on the grasses (Poaceae) of the Caucasus. *Botanicheskii Zhurnal* 78(10): 83–95.

Tzvelev, N.N. (2012) Notes on the tribe Stipeae Dumort. (Poaceae). *Novosti Sistematiki Vysshikh Rastenii* 43: 20–29.

Wu, Z.L. & Phillips, S.M. (2006) Tribe Stipae. *In*: Wu, Z.Y., Raven, P.H. & Hong, D.Y. (eds.) *Flora of China (Poaceae)*, 22. Beijing: Science Press and St. Louis: Missouri Botanical Garden Press, pp. 188–212.

Wu, Y.H. & Wang, Q.J. (1999) *The grasses of Karakorum and Kunlun Mountains*. Qinghai People's Publishing House, Xining, 168 pp.