



## Taxonomic enumeration of the tribe *Aristideae* (Aristidoideae: Poaceae) in India

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### ABSTRACT

Based on literature survey, herbarium consultation and authors' fieldwork, an updated checklist of 17 species of the tribe *Aristideae* (Poaceae) under two genera reported to occur in India has been prepared and presented in this paper. General note on the tribe and key to genera and species have been provided along with correct botanical name, synonym (s), citation of nomenclatural type, chromosome number (wherever available) and distribution of each species in the enumeration. Two species namely, *Aristida redacta* and *Aristida stocksii* are endemic to India.

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### 1. Introduction

The grasses (Poaceae) are undoubtedly the most important group of plants in view of their economic and ecological significance. They provide all the major cereal crops for human consumption and forage for wild and domestic herbivores. Till date, 12 subfamilies, 51 tribes, 80 sub-tribes, 771 genera and ca. 12074 species have been recognised in the family Poaceae (Soreng *et al.*, 2014). Among them, members of the tribe *Aristideae* (subfamily: Aristidoideae) are wide spread in the tropical and subtropical regions of the world. In general, many species of the genera *Aristida* and *Stipagrostis* are adapted to arid and semi-arid environments, such as deserts and sand dunes (Danin, 1996) and are conspicuous components of some vegetation types. The subfamily Aristidoideae Caro (1982) contains only one tribe *Aristideae* C. E. Hubbard (1960) with three genera: *Aristida* with 290 species, *Stipagrostis* with 50 species and *Sartidia* with 5 species and they are distributed throughout the world (Balkwill *et al.*, 2011; Bourreil, 1967; Cerros *et al.*, 2011; Clayton & Renvoize, 1986; Ghosemkhani *et al.*,

2008; De Winter, 1965; Watson & Dallwitz, 1992). Members of *Aristideae* are characterised by their paniculate inflorescence, spikelets with bisexual florets, 2 glumes, female-fertile floret one, which consist of a single cylindrical, elongated floret per spikelet; and ligule with a dense fringe of hairs. The lemma is with three-awns (the awns separate from each other), palea short, less than half the length of lemma, involutes or with overlapping margins and often have a sharp-pointed callus and the floret disarticulating above long glume, lodicules present or rarely absent, stamens 1 to 3, ovary glabrous, styles 2, free, close, stigmas 2, caryopsis with the hilum short or long linear, endosperm hard (Cerros *et al.*, 2011).

The first comprehensive account of the genus *Aristida* was provided by Hooker (1897) in Flora of British India, which enumerated 11 species. Subsequently, Bor (1960) reported the occurrence of 21 species from the Indian subcontinent. Karthikeyan *et al.* (1989) reported 10 species in Florae Indicae Enumeration and Moulik (1997) enumerated 11 species and 2 varieties of *Aristida* and 9

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species of *Stipagrostis* from India. An enumeration of 10 species of *Aristida* and 7 species of *Stipagrostis* have been provided below along with correct botanical name, synonym (s), citation of nomenclatural type, chromosome number (wherever available) and range of distribution of each species. Besides, the keys to genera and species have been provided for easy identification of taxa. Two species namely, *Aristida redacta* and *Aristida stocksii* are found to be endemic to India.

#### Key to genera of *Aristideae* C. E. Hubb.

- 1 Awns all or only the central awn plumose ..... *Stipagrostis*  
 1 Awns never plumose. .... *Aristida*

#### Enumeration of taxa

**ARISTIDA** L. Gen. Pl. ed. 5, 35 (1754) *et in* Sp. Pl. ed. 1, 82 (1753)

[Type: *Aristida adscensionis* L. Gen. Pl. ed. 5: 1754; Sp. Pl. ed.1, 82 (1753). *Kieboul* Adans., Fam., Pl. 2: 31. 1763. *Chaetaria* P. Beauv., Ess. Agrostogr., 30. t. 8. f. 5, 6. 1812. *Curtopogon* P. Beauv., Ess. Agrostogr., t. 8. f. 7. 1812. *Arthratherum* P. Beauv., Ess. Agrostogr., t. -8. f. 8., *Streptachne* H.B.K., Nov. Gen. Et Sp. 1: 124. t. 40. 1816. *Trixostis* Rafin. in Ser. Bull. Bot. 1: 221. 1830. *Moulinsia* Rafin. in Bull. Bot. Geneva 1: 221. 1830. *Schistachne* Fig. et De Not. in Mem. Acad. Torin, ser. 2. 12: 252. 1852.

Cytology: chromosome base number,  $x=11$  &  $12$ ,  $2n=22$ ,  $24$ ,  $36$ ,  $44$ ,  $48$  &  $66$ .  $2$ ,  $4$  &  $6$  ploid.

Distribution: Temperate and subtropical. Xerophytic.

#### Key to species of *Aristida* L.

- 1 No articulation between the lemma and the awns  
 2 Lateral awns much reduced and of a different texture from the third awn ..... *A. redacta*  
 2 Lateral awns well-developed, if shorter than the central awn, of the same texture  
 3 Annual; awns unequal ..... *A. cumingiana*  
 3 Annuals or perennials; awns equal  
 4 Panicles contracted  
 5 Spikelets more than 12 mm long; floret callus 1.5 mm long ..... *A. setacea*  
 5 Spikelets up to 12 mm long; floret callus 0.5 mm long ..... *A. adscensionis*  
 4 Panicles effuse; often as broad as long

- 6 Spikelets green or yellow at maturity; lower glume 12 mm long with an awn 2 mm long; upper glume 18 mm long, shortly awned; lemma 12 mm long with callus 2 mm long; panicle 20 cm long ..... *A. hystrix*  
 6 Spikelets purplish at maturity; lower glume 15 mm long; upper glume up to 20 mm long; inclusive of an awn 5 mm long; lemma up to 15 mm long with callus 1 mm long; panicle 30-40 cm long ..... *A. cyanantha*  
 1 Articulation between the lemma and the awns  
 7 Articulation between the awns and the lemma situated at the top of the column, i.e. just below the spreading awns ..... *A. mutabilis*  
 7 Articulation is between the tip of the lemma and the base of the column  
 8 Lower glume shorter than the upper; callus forked at the base ..... *A. hystricula*  
 8 Lower glume always longer than the upper; base of the callus pointed  
 9 Lower glume 25-28 mm long; the upper glume 6 mm long ..... *A. stocksii*  
 9 Lower glume 20 mm long; the upper glume 15-19 mm long ..... *A. funiculata*

*Aristida adscensionis* L. Sp. Pl. 82. 1753. *Aristida interrupta* Cavan., Ic. et Desr. Pl. 5: 45.t. 471.f.2.1799. *A. canariensis* Willd., Enum. Pl. Berol. 99. 1809. *A. divaricata* Jacq., Eclog. Gram. Rar. 7.t.6. 1813. *A. coarctata* H.B.K., Nov. Gen. et Sp. 1: 122. 1816. *A. fasciculata* Torr. in Ann. Lyc. Nat. Hist. 1: 154. 1824. *A. nigrescens* J.S. Presl ex C.B.Presl. Rel. Haenk. 1: 223. 1830. *A. curvata* Nees var. *abyssinica* A.Rich. Tent. Fl. Abyss. 2: 392. 1851. *A. maritima* Steud., Syn. Pl. Glum. 1: 137. 1854. *A. schaffneri* Fourn., Mex. Pl. 2: 78. 1886. *A. heymannii* Regel in Act. Hort. Petrop. 7: 649. 1881. *A. debilis* Mez in Fedde, Rep. Sp. Nov. 17: 151. 1921. *A. pumila* Dene in Ann. Sci. Nat. Ser. 2. 40: 85. 1835.

Distribution: INDIA (Jammu & Kashmir, Kerala, Maharashtra, Punjab, Rajasthan, Tamil Nadu and Uttar Pradesh), BURMA, PAKISTAN and SRI LANKA.

*Aristida cumingiana* Trin. & Rupr., Sp. Gram. Stipac. 141. 1892. *A. capillacea* Caran., Ic. et Desr. Pl. 5:43. 1799. *A. trichodes* (Nees) Walpers in Ann. Bot. Syst. 3: 753. 1853. *Chaetaria trichodes* Nees ex Lindl. in Hook., Kew J. Bot. 2: 101. 1850. *Aristida delicatula* Hochst. ex A.Rich., Tent. Fl. Abyss. 2: 393. 1851.

Distribution: INDIA (Madhya Pradesh, Bihar), CHINA, INDONESIA, LASOS, MYANMAR, NEPAL, NEW

GUINEA, PHILIPPINES, THAILAND, VIETNAM, AFRICA and NORTH AUSTRALIA.

*Aristida cyanantha* Steud., Syn. Pl. Glumac. 10 (2): 141. 1854; Boiss., Fl. Or. 5:492. 1884. Hoo.f. Fl. Brit. Ind. 7: 225. 1896; Bor. Grasses Burma Ceyl. Ind. Pak. 409. 1960.

Distribution: INDIA (Himalayas, Jammu Kashmir, Uttar Pradesh), AFGHANISTAN, NEPAL and PAKISTAN.

*Aristida funiculata* Trin. et Rupr., Sp. Gram. Stipac. 159. 1842. *A. stipacea* Ehrenb. et Hempr. ex Trin. et Rupr. Sp. Gram. Stip. 159. 1892. *A. macranthera* A.Rich., Tent. Fl. Abyss. 55. 2: 393. 1851. *A. kotschyi* Hochst. ex Steud., Syn. Pl. Glum. 1: 142. 1854; Hook.f. Fl. Brit. Ind. 7: 226. 1896; Blatter & McCann, Bombay Grasses, 214. 1935; Bor. Grasses Burma Ceyl. Ind. Pak. 410. 1960.

Distribution: INDIA (Punjab, Rajasthan and Tamil Nadu), ARABIA, NORTH AFRICA and PAKISTAN.

*Aristida hystriacula* Edgew. J. Proc. Linn. Soc. Bot. 6, 208. 1862; Bor. Grasses Burma, Ceyl. Ind. Pak. 410. 1960.

Distribution: INDIA (Punjab) and PAKISTAN.

*Aristida hystrix* L.f., Suppl. Pl. 113. 1781. *Aristida rigida* Roth, Nov. Pl. Sp. 42. 1821 non Cavan 1799. *Chaetaria hystrix* (Linn.f.) P.Beauv., Ess. Agrost. 30. 1812.

Distribution: INDIA (Madhya Pradesh, Tamil Nadu and Kerala) SRI LANKA.

*Aristida mutabilis* Trin. & Rupr., Sp. Gram. Stipac. 150. 1842. *Aristida longeradiata* Steud., Syn. Pl. Glum. 1: 140. 1854. *Aristida articulata* Edgew. J. Linn. Soc. Bot. 6: 209. 1862; Hook. f. Fl. Brit. Ind. 7: 226. 1896; Blatter & McCann, Bombay Grasses 212. 1935; Bor. Grasses Burma, Ceyl. Ind. Pak. 411. 1960.

Distribution: INDIA (Punjab, Rajasthan & Tamil Nadu), ARABIA, TROPICAL AFRICA, and PAKISTAN.

*Aristida redacta* Stapf in Bull. Misc. Inform. Kew 85. 1892. *Stipa aristoides* Stapf ex Lisboa in J. Bomb. Nat. Hist. Soc. 7: 358. 1892.

Distribution: INDIA (Karnataka, Madhya Pradesh, Maharashtra, Rajasthan, Tamil Nadu & West Bengal), Endemic.

*Aristida setacea* Retz., Observ. Bot. (Retzius) 4: 22. 1786. *Chaetaria setacea* (Retz.) P.Beauv., Ess. Agrost. 30: 158. 1812. *Aristida quinquesets* Steud., Syn. Pl. Glum. 1: 420. 1855.

Distribution: INDIA (Andhra Pradesh, Bihar, Gujarat, Himachal Pradesh, Karnataka, Kerala, Madhya Pradesh,

Maharashtra, Odisha, Rajasthan, Tamil Nadu, Uttar Pradesh & West Bengal), MYANMAR, SRILANKA, AFRICA, MADAGASCAR, ASIA-TROPICAL, BURMA, MALESIA and INDO-CHINA.

*Aristida stocksii* (Hook.f.) Domin in Biblioth. Bot. Heft 85: 338. 1915. *Aristida funiculata* var *stocksii* Hook.f., Fl. Brit. Ind. 7: 227. 1897.

Distribution: INDIA (Andhra Pradesh, Karnataka & Maharashtra), Endemic (Anil Kumar *et al.*, 2016).

**STIPAGROSTIS** Nees. in Linn 7: 290. 1832.

[Type: *Stipagrostis capensis* Nees in Linnaea 7 (3): 291. 1832. *Stipagrostis* (Nees) Benth. & Hook.f. Gen. Plan. 3 (2): 1141. 1883. *Stipagrostis* (Nees) Trin. & Rupr. Sp. Gram. Stipac. 163. 1842. *Stipagrostis* (Nees) Henrad, Meded. Rijks-Herb. 38: 34, 45-46. 1929.]

Cytology: Chromosome base number,  $x=11$ .  $2n=22$  and  $44$ . 2 and 4 ploid.

Distribution: INDIA, AFRICA and SOUTHWEST ASIA.

#### Key to species of *Stipagrostis*

- 1 Central awn feathery throughout or at its upper part; lateral awns glabrous
- 2 Lowest leaf-sheaths pilose ..... *S. plumosa*
- 2 Lowest leaf-sheaths not pilose
- 3 Central awn plumose throughout
- 4 Glumes sub-equal, column of lemma about 8 mm long ..... *S. uniplumis*
- 4 Glumes unequal, column of lemma about 15 mm long ..... *S. paradisca*
- 3 Central awn plumose in upper half, naked below
- 5 Leaf-blades filiform ..... *S. obtusa*
- 5 Leaf-blades lanceolate ..... *S. ciliata*
- 1 All the awns including lateral plumose
- 6 Lower leaf sheaths pilose; central awn much longer than the laterals ..... *S. griffithii*
- 6 Lower leaf-sheaths glabrous; central awn as long as the laterals ..... *S. pungens*

*Stipagrostis ciliata* (Desf.) De Winter in Kirkia 3: 133. 1963. *Aristida ciliata* Desf. In Schrad. Neues J. Hot. 3: 255. 1809. *Aristida schimperi* Hochst. ex Steud. Ex Steud., Syn. Pl. Glum. 1: 143. 1854.

Distribution: INDIA (Punjab), AFGHANISTAN, ARABIA, EGYPT, ETHIOPIA, NORTH AFRICA, PAKISTAN and SUDAN.

*Stipagrostis griffithii* (Henrard.) De Winter in Kirkia 3: 134. 1963. *Aristida griffithii* Henrd. in Meded. Rijks Herb. Leiden 54: 213. 1926.

Distribution: INDIA (Punjab), ASIA- TEMPERATE, AFGHANISTAN and WESTERN ASIA.

*Stipagrostis obtusa* (Delile) Nees in Linnaea 7: 293. 1832. *Aristida obtusa* Delile, Fl. Egypt. 175. t. 13. f. 2. 1792.

Distribution: INDIA (Jammu & Kashmir), AFRICA, ARABIA, EGYPT and PAKISTAN

*Stipagrostis paradisea* (Edgew.) De Winter in Kirkia 3: 135. 1963. *Aristida paradisea* Edgew. J. Asiat. Soc. Beng. 16: 1219. 1848.

Distribution: INDIA (N.W. Himalayas, Jammu & Kashmir), ARABIA, BALUCHISTAN, PAKISTAN and SOMALIA.

*Stipagrostis plumosa* Munro ex T. Anderson in J. Linn. Soc. Bot. 5 (Suppl.1): 40. 1860. *Aristida plumosa* Linn. Sp. Pl. ed. 2: 1666. 1763.

Distribution: INDIA (Punjab), AFGHANISTAN and PAKISTAN.

*Stipagrostis punges* (Desf.) De Winter in Kirkia 3: 135. 1963. *Aristida punges* Desf., Fl. Atlant. 1: 109. t. 35. 1798.

Distribution: INDIA (Rajasthan), AFGHANISTAN, AFRICA and EGYPT.

*Stipagrostis uniplumis* (Litcht.) De Winter in Kirkia 3: 136. 1963. *Stipagrostis pogonopila* (Jaub. & Spach) de Winter in Kirkia 3: 135. 1963. *Arthratherum pogonoptilum* Jaub. et Spach, Illus. Pl. Orient. 4: 56. 1851. *Aristida pogonopila* (Jaub. et Spach) Schweinfurth et Ascherson, Beitr. Fl. Aethiop. 306. 1867.

Distribution: INDIA (Punjab) and PAKISTAN

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