

A Revision of the Genus *Aristida* L. (Poaceae) in Thailand

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ABSTRACT.– *Aristida* L. a genus of Poaceae in Thailand, is taxonomically revised. Five species are enumerated: *A. adscensionis*, *A. balansae*, *A. chinensis*, *A. culionensis* and *A. cumingiana*. Key, descriptions and illustration are provided.

KEY WORDS: *Aristida*; Poaceae; Revision; Thailand

INTRODUCTION

The genus *Aristida* belongs to the family Poaceae tribe Aristideae (Clayton and Renvoize, 1986). It is a medium-sized genus in the family currently regarded as comprising about 250 species and distributed mainly in the tropics and subtropics (Henrard, 1929). The genus is characterised by it has terete lemma with convolute margins. The lemma apex has a spirally twisted trifid awn or sometimes without (Lazarides, 1994). The genus is classified into 5 sections: *Aristida*, *Arthratherum*, *Pseudarthratherum*, *Pseudochaetaria* and *Schizachne* based on the awn and the lemma column (Clayton and Renvoize, 1986). The only work dealing with species in Thailand is those of Nanakorn and Norsangsri (2001) who listed seven species; *A. adscensionis*, *A. balansae*, *A. chinensis*, *A. culionensis*, *A. cumingiana*, *A. depressa* and *A. setacea*, and accepted by them at the time of publication, but did not give a key and descriptions. In an attempt to revise the recent collections of *Aristida* from Thailand, we have

found five species of the genus. They are commonly grasses in dry and sandy soil in dipterocarp forest. A key to species, descriptions, illustrations of the Thai *Aristida* are presented.

MATERIALS AND METHODS

This study is based on an examination of the Thai and Singaporean specimens form the following herbaria: Bangkok Herbarium (BK), The Forest Herbarium, National Park, Wildlife and Plant Conservation (BKF), Kasin Suvathabandhu Herbarium, Chulalongkorn University (BCU), Herbarium of Khon Kaen University (KKU), Prince of Songkla University Herbarium (PSU), Queen Sirikit Botanic Garden, Chiang Mai (QBG) and Herbarium and Nature Reserve, Singapore (SING), and fieldwork has been carried out throughout the country. The ecological data and localities were recorded.

Aristida

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L., Gen. Pl. ed. 5: 35. 1754; Merr., Fl. Manila: 99. 1912; Bor, Fl. Assam 5: 158. 1940; Bor, Grass Burm. Ceyl. Ind. & Pak. 1:

404. 1960; Maheshwari, Fl. Delhi: 399. 1963; Gilliland, Fl. Mal. 3: 111. 1971.

Perennial or annual grass, tufted and compacted or loose with or without rhizome. *Culm* terete, branched or unbranched; node and internode glabrous, smooth or sometimes with small ridges, not glaucous. *Leaf-sheath* tough, shorter or longer than internode; adaxial smooth, glabrous; abaxial slightly striate, glabrous or scabrous. *Ligule* a fringe of long hairs or ciliolate. *Collar* glabrous or hairy. *Auricle* ciliolate or hairy. *Blade* flat, thick, tough, narrowly linear; adaxial striate, hispid; abaxial slightly striate or smooth, glabrous or scabrous, involute, 1-3-nerved; margins with prickles. *Inflorescence* a loosely or densely contracted or a spreading panicle, erect or slightly bent, terminal and axillary; rachis terete; peduncle terete or angular. *Spikelet* 1-flowered, bisexual, lanceolate to narrowly lanceolate; pedicel angular, scabrous, uni-partite, bi-, tri- or poly-partite. *Glume* persistent, upper glume shorter or longer than the lower glume, lanceolate or narrowly lanceolate, acuminate or mucronate sometimes aristate, involute, 1-nerved; lower glume scaberulous on the vein; upper glume glabrous or scaberulous on the vein. *Lemma* sometimes twisted in the upper part and prolonged into 3 scabrid awns, brownish or sometimes tinged with purplish dots. *Callus* hirsute. *Palea* tough, obtuse. *Lodicules* 2, hyaline. *Stamens* 3, basifixed. *Ovary* with 2 styles and feathery stigmata. *Fruit* a caryopsis.

KEY TO SPECIES

1. Lemma twisted in the upper and prolonged into 3 scabrid awns
 2. Glume aristate..... *A. balansae*
 2. Glume acuminate or mucronate.....
..... *A. culionensis*
1. Lemma untwisted
 3. Upper glume longer than lower glume
 4. Upper glume mucronate; lemma glabrous *A. adscensionis*

4. Upper glume acuminate; upper part of lemma scabrous.....
..... *A. cumingiana*
3. Upper glume shorter than lower glume...
..... *A. chinensis*

Aristida adscensionis L.

Figure 1

Aristida adscensionis L., Sp. Pl. 1: 82. 1753; Hook.f., Fl. Brit. Ind. 7: 223. 1897; Bor, Fl. Assam 5: 158. 1940; Sultan and Stewart, Grasses W. Pak. 2: 350. 1959; Bor, Grasses Burm. Ceyl. Ind. Pak.: 407. 1960; Maheshwari, Fl. Delhi: 399. 1963; Cope in Nasir, Fl. Pak. 143: 39. 1982.

Perennial grass, tufted, loose with rhizome. *Culm* branched, 30-35 cm high; node and internode glabrous, smooth. *Leaf-sheath* tough, 5-8 cm by 1-3.5 mm, shorter than internode; adaxial smooth; abaxial striate, scabrous. *Ligule* a fringe of long hairs. *Collar* glabrous. *Auricle* hairy. *Blade* tough, 1.5-1.8 cm by 0.5-2 mm; adaxial striate, hispid; abaxial striate, scabrous, involute; margins with prickles, 3-nerved. *Inflorescence* a loosely contracted panicle, erect, terminal and axillary, 15-25 by 2-4 cm; rachis terete, 7-13 cm long; peduncle terete. *Spikelet* narrowly lanceolate; pedicel angular, scabrous, uni- or bi-partite. *Lower glume* 4-7 mm long, 1-nerved, scaberulous on the vein, acuminate, lanceolate, involute, brownish sometimes tinged with purple dots. *Upper glume* 6-8 mm long, 1-nerved, scaberulous on the vein, mucronate, lanceolate, involute, pale brown. *Lemma* 6-9 mm long, longer than the lower glume and shorter or longer than the upper one, involute, smooth, slightly scabrous on the vein, brownish, untwisted, inarticulate; awn scabrous; central awn 1.5-2.5 cm long, erect; lateral awns 1-1.8 cm long. *Callus* 0.2-0.5 mm long, hirsute. *Palea* tough, obtuse, 0.5-1 by 0.1-0.3 mm. *Lodicule* hyaline, 0.8-1.5 by 0.1-0.4 mm, ovate to elliptics. *Anthers* yellow, 1-4 mm long. *Ovary* elliptic, 0.3- 0.5 mm long. *Caryopsis* fusiform, 5-7 mm long (Fig. 1).

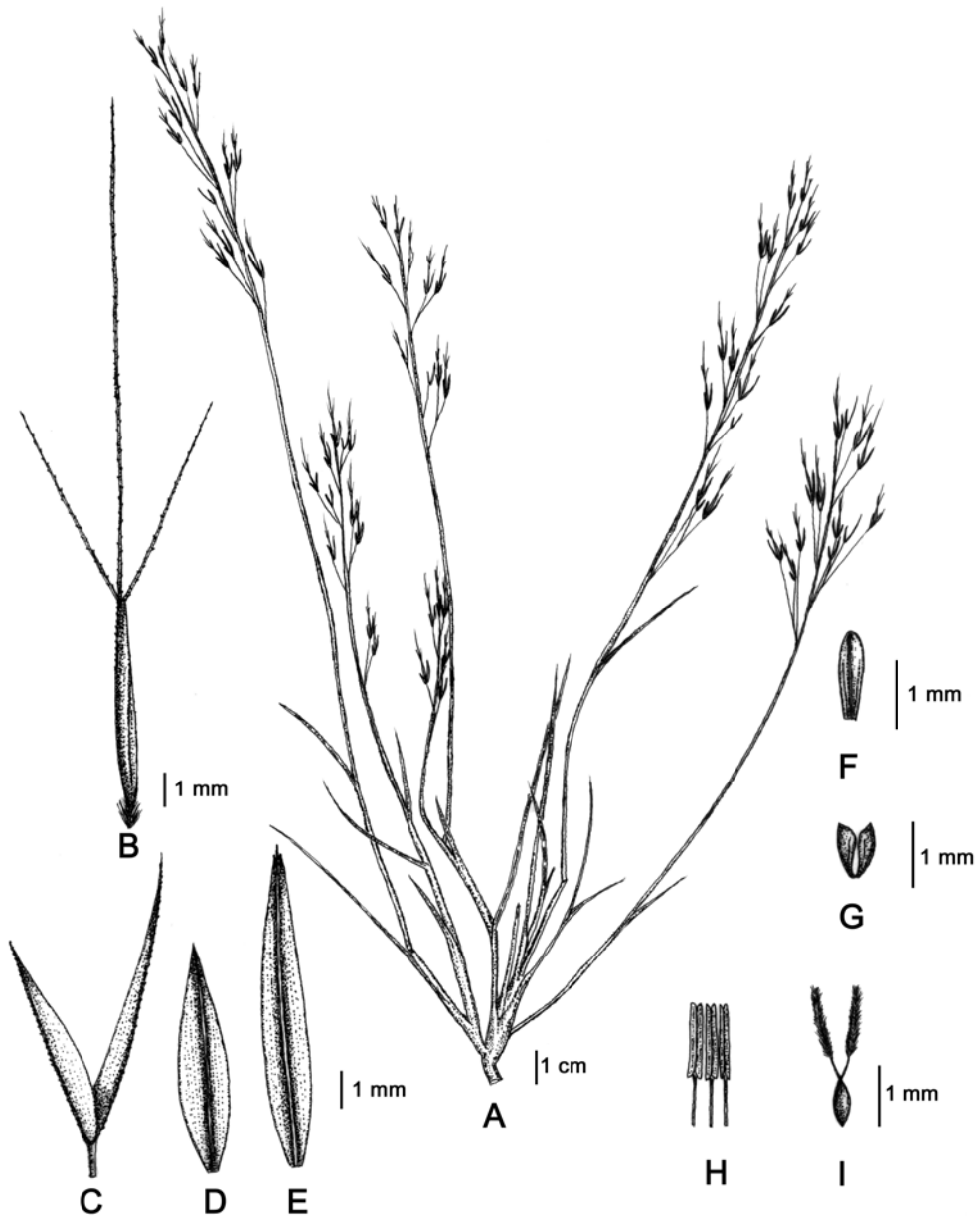


FIGURE 1. *Aristida adscensionis*: A. habit; B. floret; C. lower and upper glumes; D. lower glume; E. upper glume; F. palea; G. lodicules; H. anthers; I. ovary.

Thailand.- NORTH-EASTERN: Khon Kaen; EASTERN: Nakhon Ratchasima; SOUTH-WESTERN: Prachuap Khiri Khan; SOUTH-EASTERN: Rayong.

Distribution.- Pakistan, India (type), China.

Ecology.- Open area, on sandy soil in deciduous forest.

Vernacular.- Ya sam hang.

Specimens examined.- *W. Chaisongkram* 15 (KKU); *R. Geesink & P. Hiepto* 7887 (BKF); *A.S. Hitchcock* 7755 (SING); *HMB*.

1237 (SING); *A.F.G. Kerr* 16167 (BK); *Monad* 1479 (SING) & 2000 (SING).

***Aristida balansae* Henr.**

Figure 2

Aristida balansae Henr., Repert. Sp. Nov. Fedde. 17: 397. 1921.

Perennial grass, tufted, compacted with rhizome. *Culm* unbranched, 90-120 cm high; node and internode glabrous, smooth. *Leaf-sheath* tough, 10-60 cm by 5-10 mm, longer than internode, adaxial smooth; abaxial striate, glabrous. *Ligule* a fringe of long hairs. *Collar* glabrous. *Auricle* hairy. *Blade* tough, 40-140 cm by 3-6 mm, adaxial striate, hispid; abaxial striate, scabrous, involute; margins with prickles, 1-nerved. *Inflorescence* a densely contracted panicle, erect, terminal and axillary, 60-80 by 2-4 cm; rachis terete, 40-50 cm long; peduncle terete. *Spikelet* narrowly lanceolate; pedicel angular, scabrous, uni- or bi-partite. *Lower glume* 4-7 mm long, 1-nerved, scaberulous on the vein, awn 4-8 mm long, lanceolate, involute, aristate, brownish. *Upper glume* 6-8 mm long, 1-nerved, scaberulous on the vein, awn 3-6 mm long, lanceolate, involute, aristate, pale brown. *Lemma* 1-2 cm long, longer or shorter than the lower glume and shorter or longer than the upper one, involute, smooth, slightly scabrous on the vein, brownish, twisted; awn scabrous; central awn 2-5 cm long, erect; lateral awns 1.5-3.5 cm long. *Callus* 0.5-1 mm long, hirsute. *Palea* tough, obtuse, 1-2 by 0.2-0.8 mm. *Lodicules* hyaline, 1-1.5 by 0.1-0.4 mm, ovate to elliptic. *Anthers* yellowish to brownish, 1-3.5 mm long. *Ovary* elliptic, 0.5-1 mm long. *Caryopsis* fusiform, 0.5-1 cm long (Fig. 2).

Thailand.- NORTHERN: Chiang Mai; NORTH-EASTERN: Loei, Nong Bua Lum Phu, Udonthani, Sakon Nakhon, Khon Kaen; EASTERN: Chaiyaphum, Nakhon Ratchasima, Si Sa Ket, Ubon Ratchathani; SOUTH-WESTERN: Phetchaburi; CENTRAL: Saraburi, Nakhon Nayok; SOUTH-EASTERN: Chon Buri, Trat.

Distribution.- South and South East Asia (Vietnam-type).

Ecology.- Common in dry deciduous forest.

Vernacular.- Ya faek mai (Loei); Ya hang suea (Nakhon Ratchasima); Ya hang ma chingchok (Phetchabun); Ya phraek mai (Prachin Buri).

Specimens examined.- *BGO. Staff* 5333 (QBG); *W. Chaisongkram* 22 (KKU); *Kasin* 450 (BK); *A.F.G. Kerr* 15723 (BK), 19820 (BK) & 20579 (BK); *J.F. Maxwell* 71-758 (BK), 74-1031 (BK) & 76-562 (BK); *Pradit* 551 (BK), & 658 (BK); *Put* 2027 (BK), 2219 (BK) & 4241 (BK); *Sakol* 174 (BK) & 717 (BK); *P. Sangkhachand* 194 (BK); *T. Smitinand* 1828 (BKF) & 2012 (BKF).

***Aristida chinensis* Munro**

Figure 3

Aristida chinensis Munro, Proc. Am. Acad. iv. 65: 363. 1864; Balansa, Morot. Journ. de Bot.: 163. 1890.

Perennial grass, tufted, compacted with rhizome. *Culm* unbranched, 50-70 cm high; node and internode glabrous, smooth. *Leaf-sheath* tough, 2-20 cm by 2-5 mm, shorter or longer than internode; adaxial smooth; abaxial striate, scabrous. *Ligule* a fringe of long hairs. *Collar and auricle* hairy. *Blade* tough, 15-45 cm by 1-2 mm; adaxial striate, hispid; abaxial scabrous, involute, margins with prickles, 3-nerved. *Inflorescence* a very loosely spreading panicle, erect or slightly bent, terminal, 35-65 by 15-20 cm; rachis angular, 20-40 cm long; peduncle terete. *Spikelet* narrowly lanceolate; pedicel angular, scabrous, bi-partite, axil with long hairs. *Lower glume* 1-1.5 cm long, 1-nerved, scaberulous on the vein, acuminate, lanceolate, involute, pale yellow or purplish. *Upper glume* 0.5-1 cm long, 1-nerved, scaberulous on the vein, mucronate, lanceolate, involute, pale purple. *Lemma* 0.5-1 cm long, shorter than the lower glume and shorter than the upper or as short as the upper one, involute, smooth, slightly scabrous on the vein, brownish, untwisted, inarticulate; awn

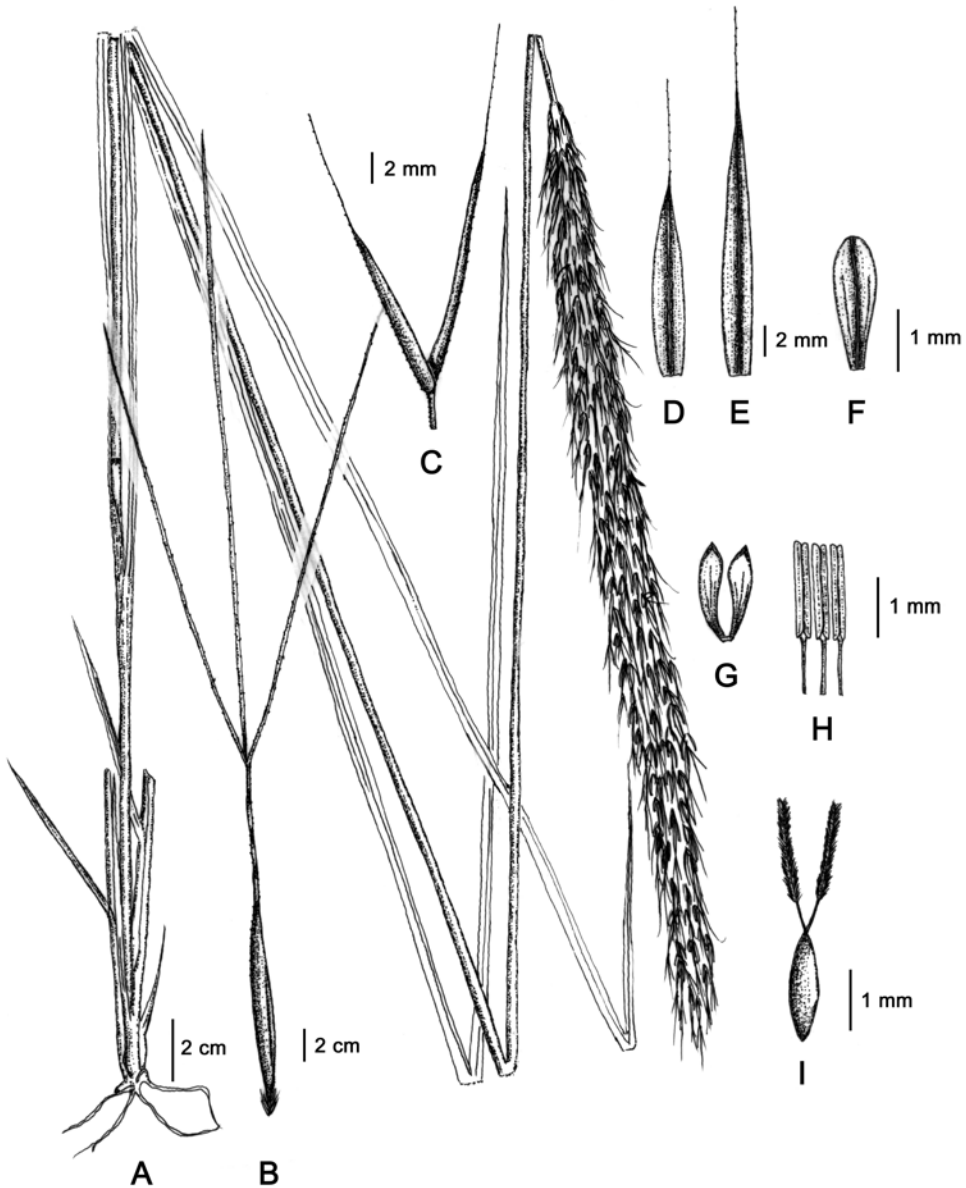


FIGURE 2. *Aristida balansae*: A. habit; B. floret; C. lower and upper glumes; D. lower glume; E. upper glume; F. palea; G. lodicules; H. anthers; I. ovary.

scabrous; central awn 1.5-2.5 cm long, erect; lateral awns 1-2 cm long. *Callus* 0.5-1 mm long, hirsute. *Palea* tough, obtuse, 0.5-1.5 by 0.1-0.5 mm. *Lodicules* hyaline, 0.5-2 by 0.1-0.5 mm, lanceolate or narrowly ovate. *Anthers* yellow, ca. 1.2 mm long. *Ovary* elliptic, 0.5-1.5 mm long. *Caryopsis* fusiform, 0.3-0.8 cm long (Fig. 3).

Thailand.- NORTHERN: Chiang Mai; NORTH-EASTERN: Loei, Udon Thani, Khon Kaen; EASTERN: Chaiphaphum, Nakhon Ratchasima, Surin, Roi Et; SOUTH-WESTERN: Prachuap Khiri Khan; SOUTH-EASTERN: Rayong.

Distribution.- China (type), Malaysia, Philippines.

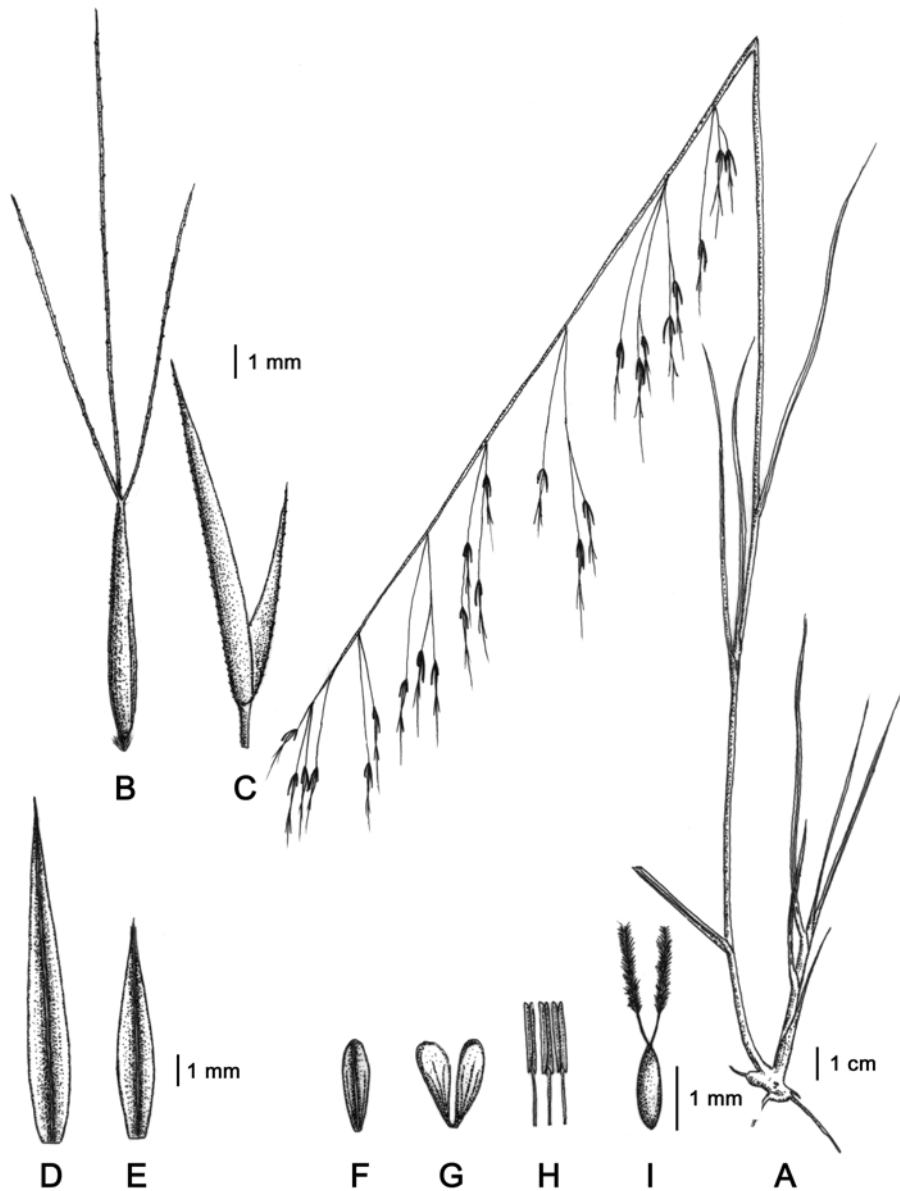


FIGURE 3. *Aristida chinensis*: A. habit; B. floret; C. lower and upper glumes; D. lower glume; E. upper glume; F. palea; G. lodicules; H. anthers; I. ovary.

Ecology.- Common in open area.

Vernacular.- Ya hoo sua.

Specimens examined.- *W. Chaisongkram* 5 (KKU); *C. Chermisrivatana* 1715 (BK); *A.F.G. Kerr* 13500 (BK); *Y. Paisooksantivatana* 1199-82 (BK); *Y. Paisooksantivatana & S. Sutheesorn* 977-82 (BK); *Pradit* 674 (BK); *Sakol* 302 (BK); *T. Smitinand* 3064 (BKF) & 4887 (BKF); *T. Smitinand & Abbe* 6180 (BKF).

Aristida culionensis Pilg. ex Perkins

Figure 4

Aristida culionensis Pilg. ex Perkins, *Fragm. Fl. Philip.* 1: 145. 1904; Merr, *Philip. Journ. Sci.* 1. Suppl.: 372. 1906; Gilliland in Burkill, *Fl. Malaya* 3: 111. 1971.

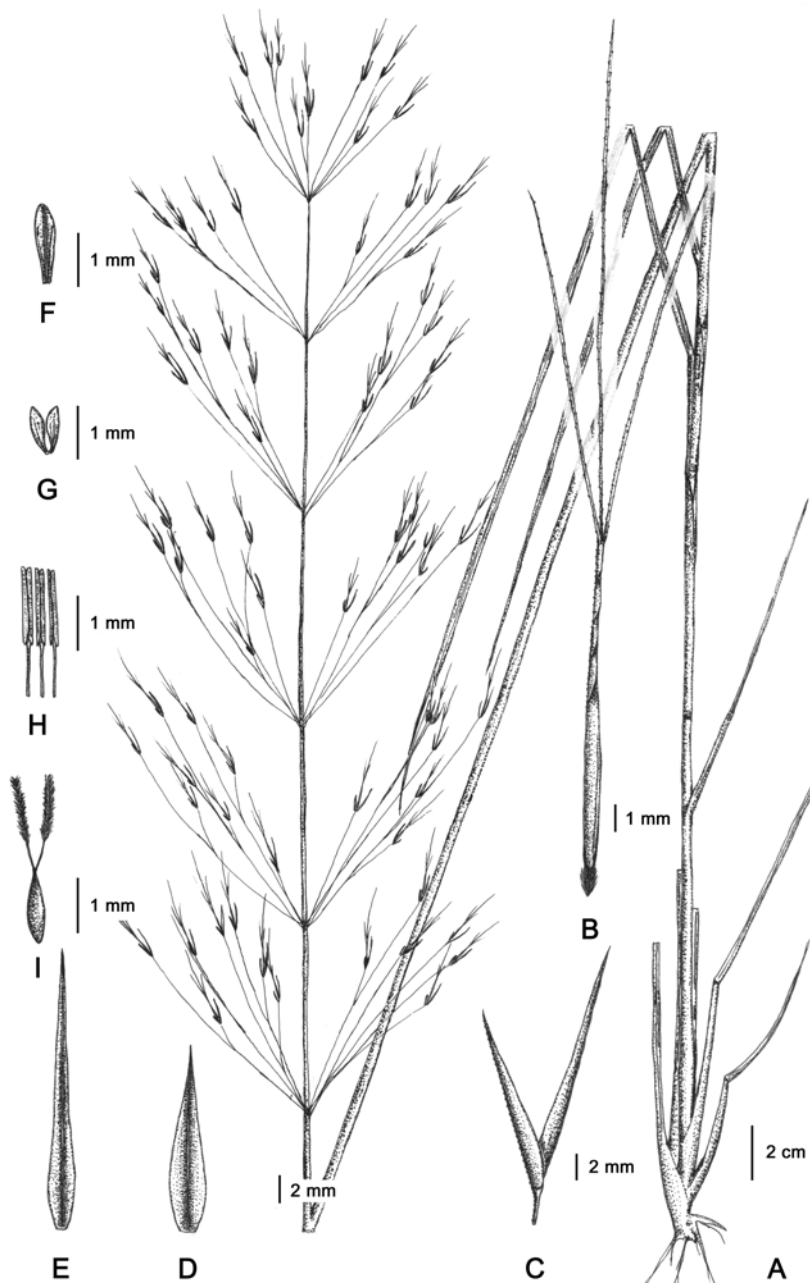


FIGURE 4. *Aristida culionensis*: A. habit; B. floret; C. lower and upper glumes; D. lower glume; E. upper glume; F. palea; G. lodicules; H. anthers; I. ovary.

Perennial grass, tufted loose with rhizome. *Culm* unbranched, 70-150 cm high; node and internode glabrous, smooth. *Leaf-sheath* tough, 5-20 cm by 5-10 mm, shorter or longer than internode; adaxial smooth; abaxial smooth, glabrous. *Ligule* a fringe of short hairs. *Collar*

and *auricle* hairy. *Blade* tough, 40-80 cm by 2.5-6 mm; adaxial striate, hispid; abaxial smooth, glabrous, involute, margins with prickles, nerved inconspicuous. *Inflorescence* a loosely spreading panicle, pseudo-whorled, erect, terminal, 60-160 by 15-20 cm; rachis

terete, 30-65 cm long, scabrous; peduncle terete. *Spikelet* lanceolate; pedicel terete, scabrous, bi- or poly-partite. *Lower glume* 0.5-1.5 cm long, 1-nerved, scaberulous on the vein, acuminate or slightly mucronate, lanceolate, involute, brownish sometimes tinged with purple dots. *Upper glume* 0.8-1.8 cm long, 1-nerved, glabrous, acuminate or mucronate, lanceolate, involute, pale brown. *Lemma* 1-1.5 cm long, longer than the lower and the upper glume, involute, smooth, slightly scabrous on the vein, brownish, twisted, inarticulate; awn scabrous; central awn 2-5 cm long, erect; lateral awns 1.5-4.5 cm long. *Callus* 0.3-0.5 mm long, hirsute. *Palea* tough, obtuse, 1.5-2.5 by 0.2-0.4 mm. *Lodicules* hyaline, 0.8-1.5 by 0.1-0.2 mm, elliptic. *Anthers* yellowish to brownish, 1.5-2.5 mm long. *Ovary* elliptic, 1-2 mm long. *Caryopsis* fusiform, 0.5-1 cm long (Fig.4).

Thailand.- EASTERN: Roi Et, Ubon Ratchathani; PENINSULAR: Krabi, Trang, Satun, Songkhla.

Distribution.- China, Philippines (type).

Ecology.- Common in dry dipterocarp forest.

Vernacular.- Ya hang sue.

Specimens examined.- *W. Chaisongkram* 7 (KKU); *M. Greijmas* 215 (BKF); *A.F.G. Kerr* 13577 (BK), *J.F. Maxwell* 84-442 (BKF); *E.D. Merrill* 5/5 (SING); *C. Niyomdhom* 1241 (BKF); *Y. Paisooksantivatana & S. Suthesorn* 1162-82 (BK); *T. Smitinand* 4149 (BKF), 6128 (BKF) & 10502 (BKF).

Aristida cumingiana Trin. and Rupr.

Figure 5

Aristida cumingiana Trin. and Rupr., Mem. Acad. St. Petersburg. 6(7): 141. 1842; Veldkamp, Blumea 37: 227. 1992. *Aristida trichodes* (Nees) Walpers, Ann. Bot. Syst. 3: 753. 1853. *Chaetaria trichodes* Nees ex Lindl., Kew. J. Bot. 2: 101. 1850.

Plant annual, tufted, loose. *Culm* branched, 4-30 cm high; node smooth, glabrous and internode scabrous. *Leaf-sheath* tough, 0.5-2

cm by 2-2.5 mm, shorter or longer than internode; adaxial smooth; abaxial smooth, scabrous. *Ligule* a fringe of short hairs. *Collar* glabrous. *Auricle* with short hairs. *Blade* thin, 2-10 cm by 1-1.5 mm; adaxial striate, hispid; abaxial striate, scabrous, complicate, margins with prickles, 3-nerved. *Inflorescence* a loosely spreading panicle, erect, terminal and axillary, 10-30 by 5-8 cm; rachis angular, 6-15 cm long; peduncle terete. *Spikelet* lanceolate to narrowly ovate; pedicel angular, scabrous, bi- or tri-partite. *Lower glume* 0.2-0.3 cm long, 1-nerved, scaberulous on the vein, mucronate, lanceolate, involute, pale purple. *Upper glume* 0.3-0.4 cm long, 1-nerved, scaberulous on the upper part of vein, acuminate, lanceolate, involute, pale purple. *Lemma* 1-1.5 mm long, shorter than the lower and the upper glume, involute, smooth, scaberulous on the upper part of the vein, brownish, untwisted, inarticulate; awn scabrous; central awn 0.5-1 cm long, erect; lateral awns 0.2-0.5 cm long. *Callus* 0.1-0.2 mm long, hirsute. *Palea* tough, obtuse, 0.1-0.5 by 0.1-0.3 mm. *Lodicules* hyaline, 0.2-0.6 by 0.1-0.2 mm, elliptic. *Anthers* yellow, 0.4-0.8 mm long. *Ovary* elliptic, 0.2-0.4 mm long. *Caryopsis* narrowly lanceolate, 0.5-0.7 mm long (Fig. 5).

Thailand.- NORTHERN: Mae Hong Son, Chiang Mai, Tak, Sukhothai; NORTH-EASTERN: Udon Thani, Nong Khai, Sakon Nakhon, Nakhon Phanom; EASTERN: Ubon Ratchathani.

Distribution.- China, India, Myanmar, Philippines (type).

Ecology.- Common in open wet area.

Vernacular.- Ya khon kratai (Trang); Ya lueat (Loei).

Specimens examined.- *Adisai* 146 (BK); *D. Bunpheng* 599 (BKF); *W. Chaisongkram* 9 (KKU); *C. Chermisrivatana* 235 (BK); *M.S. Clemens* 17658 (SING); *F.W. Foxworthy* 38866 (SING); *Kasem* 237 (BK); *A.F.G. Kerr* 17618 (BK) & 19853 (BK); *R.C. Mcgregor* 2-107 (SING); *M. Norsangsri* 583 (QBG) & 950 (QBG); *Y. Paisooksantivatana & P. Sangkhachand* 2199-87 (BK); *Pradit* 708 (BK); *Put* 4528 (BK); *M. Ramos* 2-107 (SING); *Sakol*

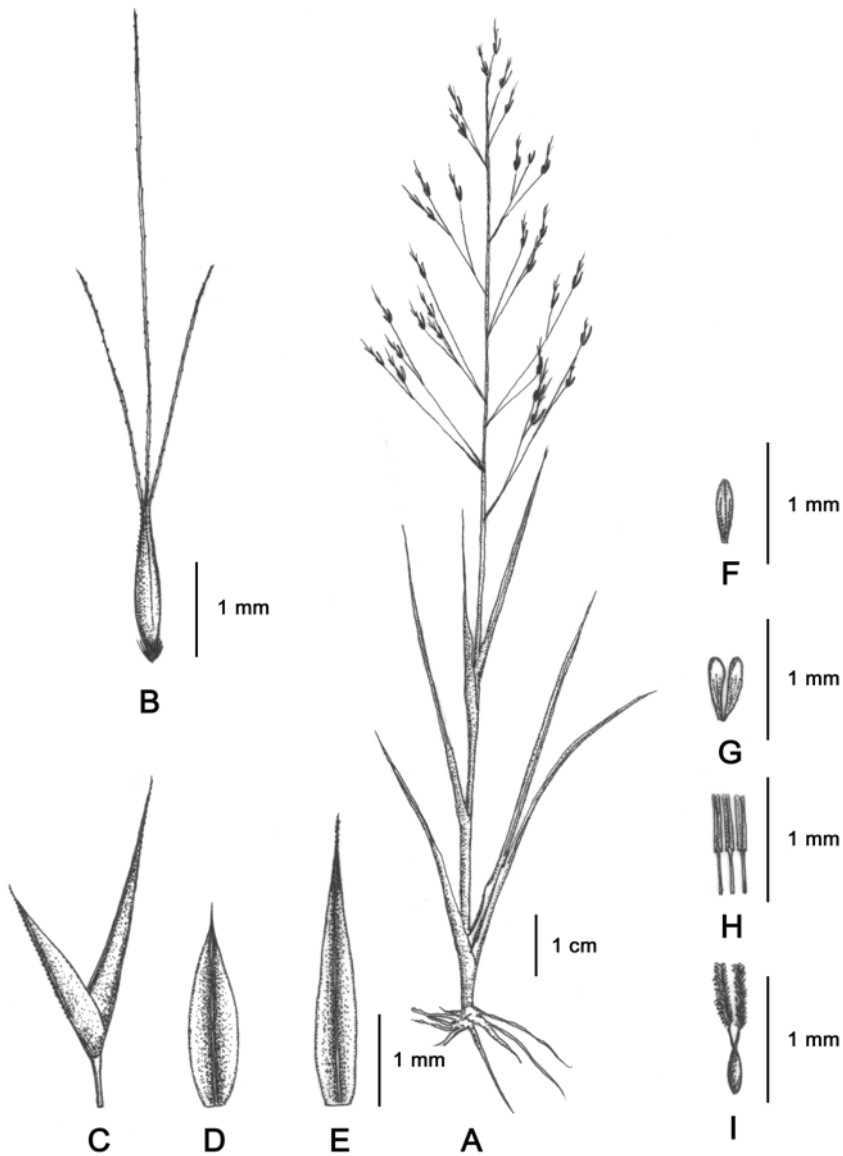


FIGURE 5. *Aristida cumingiana*: A. habit; B. floret; C. lower and upper glumes; D. lower glume; E. upper glume; F. palea; G. lodicules; H. anthers; I. ovary.

152 (BK); *P. Suksathan* 1966 (QBG) & 2052 (QBG); *TDBS* 6235 (BKF); *C.F. van Beusekom* & *C. Phengklai* 2484 (SING).

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