A taxonomic revision of the genus *Eragrostis* in Thailand

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ABSTRACT: A taxonomic account of *Eragrostis* in Thailand is provided, in which 23 species are recognized. An artificial key to species and species descriptions is provided along with distributional and ecological data for all taxa. The taxonomic status of several Thai *Eragrostis* taxa is updated. Four species: *E. alopecuroides*, *E. malayana*, *E. spartinoides*, and *E. zeylanica* are reduced to synonymies of *E. ciliata*, *E. montana*, *E. brownii*, and *E. brownii*, respectively, and three species, *E. ciliaris*, *E. cylindrica*, and *E. tef*, are reported to occur in Thailand for the first time.

KEYWORDS: Eragrostideae, love grass, Poaceae

INTRODUCTION

*Eragrostis* belongs to the family Poaceae, tribe Eragrostideae\(^1\). It is recognized as the largest genus within the subfamily Chloridoideae\(^2\) with ca. 420 species\(^3\). It is widely distributed in tropical to temperate regions of the world and is found in open habitats and sometimes forests from sea level to high altitudes\(^2,4,5\). *Eragrostis* was first published by Wolf in 1776\(^6\) in “Genera Plantarum” while the type of the generic name was designated by Ross\(^7\) based on *E. minor* Host. The origin of the name is ambiguous since there is no evidence concerning the generic name when it was first described. However, “eros” is Greek for “loving in an erotic sense” and *Agrostis* is a common genus that superficially resembles some *Eragrostis* species.

The previous taxonomic treatment of *Eragrostis* in Thailand recognized 35 species\(^8\) but it was confined to only a species list with some synonymies, without providing a thorough taxonomic treatment. The present paper provides a comprehensive taxonomic account of Thai *Eragrostis* for the Flora of Thailand project including an artificial key to species, updated nomenclature, important synonymies, distribution data, ecological information, vernacular names, and notes for each species.

MATERIALS AND METHODS

The treatment in this study was based on newly collected material from the first author’s field work and herbarium specimens housed in the following herbaria: AAU, BK, BKF, BM, C, CMU, E, G, K, KKU, L, LINN, QBG, and TCD (Herbarium abbreviations following Ref. 9). A large number of mature samples were used to provide species descriptions and key construction. Ecological and distributional data were collected for each species during the field work, and were recorded from the label information of existing vouchers. Measurements were taken using a stereo microscope (Nikon SMZ645) after softening by warm water. Synonyms given were based on close examination of accepted names and synonymy lists in the taxonomic literature of Thailand and neighbouring regions.

RESULTS AND DISCUSSION

Taxonomic treatment


Annual or perennial, sometimes rhizomatous, tufted. **Culms** erect or geniculately ascending, slightly compressed or terete. **Leaf-sheaths** loose, coriaceous to membranous. **Auricles** glabrous or hairy. **Ligules** membranous or a fringe of long hairs. **Collars** glabrous or a row of long hairs, sometimes glandular. **Leaf-blades** apex acute to acuminate or attenuate. **Panicles** open or contracted or spiciform. **Spikelets** laterally (all of ours) or dorsally compressed to terete, with many florets, the upper sterile or reduced; breaking up in various ways; rachilla disarticulating or persistent. **Lower glumes** 1-nerved, 1-keeled. **Upper glumes** 1-3-nerved, 1-keeled. **Florets** bisexual.


Perennial, blue-green, glaucous. Culms 30–150 cm tall, erect or geniculately ascending. Leaf-sheaths 30–50 cm long, coriaceous with membranous margins, glabrous. Auricles bearded with hairs. Ligules ciliate membranous. Collars glabrous. Leaf-blades 10–25 cm by 5–8 mm, upper surface scabrous, lower surface glabrous. Panicles open, oblong or ovate, 30–50 by 8–10 cm, branches glabrous. Spikelets 8–10 by 1–1.8 mm, with 8–20 fertile florets, lanceolate-oblong; florets falling from the base of spikelet upwards; rachilla persistent. Lower glumes 1–1.5 mm long, caducous, ovate to lanceolate, keel scabrous, apex acute. Upper glumes 1.5–1.8 mm long, caducous, lanceolate, 1-nerved, keel scabrous, apex acute. Lemmas 2–2.5 mm long, caducous, oblong-elliptic, apex acute to subacute. Paleas 1.8–2 mm long, caducous, keels scaberulous, apex acute to obtuse. Stamens 3; anthers ca. 0.7 mm long. Caryopses 0.4–0.6 mm long, ellipsoid, terete, pericarp striate and reticulate, reddish brown.

Distribution.— North and South America, Europe, Africa, Asia, Australasia, and Pacific.

Ecology.— Common in mixed deciduous forest, often in swampy grassland.

Vernacular.— Ya krok khiao.

Notes.— This species is easily recognized by its blue-green and glaucous appearance. Veldkamp accepted *E. luzoniensis* as a species but the isotypes of this species housed in the BM and E matched well with *P. atrovirens* and the name *E. atrovirens* has priority.


Table 1 Key to the species.

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
<th>Species</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Spikelet breaking up below glumes and falling as a whole spikelet, palea with winged keels, spikelet broadly elliptic to ovate, 3–4 mm wide</td>
<td>18. <em>E. superba</em></td>
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<tr>
<td>1.</td>
<td>Spikelet breaking up above glumes in various ways and not falling as a whole</td>
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<td>2.</td>
<td>Florets falling entire from the top of spikelet downwards</td>
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<td>3.</td>
<td>Palea keels ciliate, hairs 0.2–0.5 mm long</td>
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<td>4.</td>
<td>Panicle oblong; the lowermost branch, 2–2.5 cm long</td>
<td>12. <em>E. japonica</em></td>
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<td>4.</td>
<td>Panicle ovate; the lowermost branch longest, 6–8 cm long</td>
<td>10. <em>E. diplachnoides</em></td>
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<td>3.</td>
<td>Palea keels with tubercle-based hairs, hairs 1–1.3 mm long</td>
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<td>5.</td>
<td>Pericarp rugulose; panicle open, 2–8 cm wide</td>
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<td>6.</td>
<td>Culm with sticky glandular patches below nodes</td>
<td>23. <em>E. viscosa</em></td>
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<tr>
<td>6.</td>
<td>Culm glabrous or scaberulous below nodes</td>
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<tr>
<td>7.</td>
<td>Spikelet lanceolate to oblong, 2–4 mm long</td>
<td>17. <em>E. riparia</em></td>
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<td>7.</td>
<td>Spikelet ovate to ovate-oblout, delicate, 1.5–2 mm long</td>
<td>20. <em>E. tenella</em></td>
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<td>5.</td>
<td>Pericarp finely striate; panicle spiciform or contracted, 1–2 cm wide</td>
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<td>8.</td>
<td>Inflorescence axis plumose</td>
<td>7. <em>E. ciliata</em></td>
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<tr>
<td>8.</td>
<td>Inflorescence axis glabrous or scabrous</td>
<td>6. <em>E. ciliaris</em></td>
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<tr>
<td>2.</td>
<td>Florets falling from the base of spikelet upwards</td>
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<td>9.</td>
<td>Caryopsis trigonous to reniform</td>
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<td>10.</td>
<td>Glumes subequal</td>
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<tr>
<td>11.</td>
<td>Lemma caducous; spikelet dark purple</td>
<td>14. <em>E. nigra</em></td>
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<td>11.</td>
<td>Lemma tardily breaking up; spikelet green</td>
<td>19. <em>E. tef</em></td>
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<tr>
<td>10.</td>
<td>Glumes unequal, lower glume obviously smaller than the upper</td>
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<tr>
<td>12.</td>
<td>Spikelet 3–4 by 0.5–0.8 mm; annuals; anther ca. 0.1 mm long</td>
<td>16. <em>E. pilosa</em></td>
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<td>12.</td>
<td>Spikelet 6–10 by 1–1.5 mm; perennials; anther ca. 0.5 mm long</td>
<td>21. <em>E. tenuifolia</em></td>
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<td>9.</td>
<td>Caryopsis ellipsoid or orbicular</td>
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<td>13.</td>
<td>Lemma and palea falling together or sometimes the palea falling after the lemma</td>
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<td>14.</td>
<td>Spikelet 1–1.8 mm wide, lanceolate-oblout, oblong or elliptic</td>
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<td>15.</td>
<td>Stamens 3</td>
<td></td>
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<tr>
<td>16.</td>
<td>Spikelet 8–10 mm long; plant blue-green and glaucous</td>
<td>1. <em>E. atrovirens</em></td>
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<td>16.</td>
<td>Spikelet 3–8 mm long with long pedicel; plant green</td>
<td>3. <em>E. burmanica</em></td>
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<td>15.</td>
<td>Stamens 2</td>
<td>11. <em>E. gangetica</em></td>
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<td>14.</td>
<td>Spikelet 2–4 mm wide, ovate or elliptic</td>
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<td>17.</td>
<td>Collar glabrous; spikelet normally pinkish</td>
<td>22. <em>E. unioloides</em></td>
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<td>17.</td>
<td>Collar sparsely or densely pilose; spikelet pale brown sometimes tinged with blackish patches; plant with compacted dead sheaths at the base of culm</td>
<td>4. <em>E. capensis</em></td>
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<td>13.</td>
<td>Lemma falling with caryopsis, palea persistent</td>
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<td>18.</td>
<td>Plant with crateriform glands</td>
<td>5. <em>E. ciliarinensis</em></td>
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<tr>
<td>18.</td>
<td>Plant without crateriform glands</td>
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<td>19.</td>
<td>Rachilla eventually breaking up from the top of spikelet downwards</td>
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<td>20.</td>
<td>Anther 0.4–0.6 mm long; perennials</td>
<td>2. <em>E. brownii</em></td>
</tr>
<tr>
<td>20.</td>
<td>Anther 0.1–0.2 mm long; annuals</td>
<td>8. <em>E. cumingii</em></td>
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<tr>
<td>19.</td>
<td>Rachilla persistent</td>
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<tr>
<td>21.</td>
<td>Palea with slightly winged keels; caryopsis sub-globose</td>
<td>9. <em>E. cylindrica</em></td>
</tr>
<tr>
<td>21.</td>
<td>Palea keels without wing; caryopsis ellipsoid or orbicular</td>
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<tr>
<td>22.</td>
<td>Caryopsis ellipsoid, terete</td>
<td>13. <em>E. montana</em></td>
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<tr>
<td>22.</td>
<td>Caryopsis orbicular, slightly laterally compressed</td>
<td>15. <em>E. nutans</em></td>
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</tbody>
</table>


Perennial. *Culms* 20–45 cm tall, erect to geniculately ascending. *Leaf-sheaths* 2–4 cm long, margins with tubercle-based hairs. *Auricles* bearded with long hairs. *Ligules* a fringe of hairs. *Collars* with a row of long hairs. *Leaf-blades* 5–15 cm by 2–4 mm, both surfaces with sparse tubercle-based hairs. *Panicles*...
open, clustered or spiciform, ovate to oblong, 15–30 by 1–5 cm, bearded in axils. Spikelets 4–15 by 0.8–1.5 mm, with 10–60 fertile florets, oblong; florets falling from the base of spikelet upwards, but rachilla ultimately breaking up from the top downwards; rachilla straight. *L. glumes* 1.2–1.6 mm long, caducous, lanceolate, keel scabrous, apex acuminate. *Upper glumes* 1.5–1.8 mm long, caducous, lanceolate, 1-nerved, keel scabrous, apex acuminate. *Lemmas* 2.7–3 mm long, caducous, ovate, scaberulous, membranous, apex acuminate. *Paleas* 2–2.2 mm long, persistent, keels ciliate, apex obtuse. *Stamens* 3; anthers 0.4–0.6 mm long. *Caryopses* 0.4–0.6 mm long, orbicular, slightly laterally compressed, pericarp finely reticulate, brown.

**Distribution.**—Europe, Asia, Australasia, and Pacific.

**Ecology.**—Common in dry deciduous forest and on open sandy soil.

**Vernacular.**—Ya wai.

**Notes.**—*E. brownii* is a variable species, especially in the size and the shape of its inflorescence. It has been confused with the annual species, *E. cumingii* Veldkamp, but it differs by having bigger anthers, *E. subsecunda* (Lam.) E. Fourn. and *E. spartinoides* (R.Br.) Steud., especially in the size and the shape of its inflorescence.

**Distribution.**—Myanmar and Thailand.

**Ecology.**—Common in open areas and on sandy soils.

**Vernacular.**—Ya krok.

**Notes.**—This species is characterized by its lax panicle with long pedicels.

**Specimens examined.**—*Phitsanulok: Thung Salaeng Luang National Park, 700 m, 21 July 1966, K. Larsen, T. Smitinand & E. Warncke 671 (KKU).* *Phetchabun: Nam Nao National Park, 24 August 2006, W. Chaisongkram 91 (KKU).* *Chaiyaphum: Thung Kamang, 850 m, 2 June 1974, R. Geesink, T. Thein Lwin 582 (KKU).* *Surat Thani: Kanchanadit, 1.5 m, 1 August 1927, A.F.G. Kerr 13060 (BM, K).*

3. **E. burmanica** Bor, Kew Bull.: 166 (1951). Type: Myanmar, Prome District, fields, 20 Jul 1948, *U. Thein Lwin 582* (holotype K!). **Fig. 1c.**

Perennial. Culms 20–40 cm tall, erect or slightly geniculate. Leaf-sheaths 4–7 cm long, chartaceous to membranous. Auricles bearded with long hairs. Ligule a fringe of hairs. Collars glabrous. Leaf-blades 7–15 cm by 3–6 mm, upper surface sparsely hairy, lower surface glabrous. Panicles lax with long pedicels, 20–35 by 8–12 cm, pedicels compressed or triquetrous. Spikelets 3–8 by 1–1.5 mm, with 5–15 fertile florets, elliptic; florets falling from the base of spikelet upwards; rachilla persistent. *L. glumes* 0.8–1 mm long, caducous, lanceolate to elliptic, keel scabrous, apex acuminate. *Upper glumes* 1.2–1.5 mm long, caducous, lanceolate, 1-nerved, keel scabrous, apex acuminate. *Lemmas* 1.4 mm long, caducous, ovate, scaberulous, membranous, apex acute to acuminate. *Paleas* 0.9–1.2 mm long, caducous, keels scaberulous, apex acute. *Stamens* 3; anthers ca. 0.4 mm long. *Caryopses* 0.4–0.5 mm long, ellipsoid, terete, pericarp finely reticulate, reddish brown.

**Distribution.**—Myanmar and Thailand.

**Ecology.**—Common in open areas and on sandy soils.

**Vernacular.**—Ya wai.

**Notes.**—This species is characterized by its lax panicle with long pedicels.


Perennial. Rhizomes short, base of culm with compacted dead sheaths. Culms 30–60 cm tall, erect or decumbent. Leaf-sheaths 7–10 cm long, margins and the lower surface pilose. Auricles pilose. Ligule a fringe of short hairs. Collars sparsely or densely pilose. Leaf-blades 10–25 cm by 2–3 mm, both surfaces pilose. Panicles open, ovate to elliptic, 20–40 by 3–5 cm, branches glabrous. Spikelets 7–12 by 2–4 mm, with 8–14 fertile florets, ovate; florets tardily falling from the base of spikelet upwards, median groove prominent; rachilla persistent. *L. glumes* 1.8–2 mm...
long, tardily falling, lanceolate to elliptic, nerve with prominent ridge, keel scabrous, apex acute. Upper glumes 2–2.5 mm long, tardily falling, lanceolate to elliptic, 1-nerved with prominent ridge, keel scabrous, apex acute. Lemmas 3–4.2 mm long, caducous, ovate to elliptic, scabrous, chartaceous, apex acute. Paleas 3–3.5 mm long, tardily falling down, keel fimbriate, apex obtuse. Stamens 3; anthers 1.3–1.5 mm long. Caryopses 0.3–0.5 mm long, ellipsoid, terete, pericarp reticulate, dark brown.

Distribution.—Africa and Thailand.

Ecology.—In open pine forest and savannah (especially after fire).

Vernacular.—Yak on hep.

Notes.—This species is very similar in appearance to *E. superba* but differs by the absence of a wing on the palea keels and the spikelets do not disarticulate as a unit. It seems to be a rather rare species in Thailand since all collections originate from a single locality in pine forest near Mak Duk cliff at Phu Kradueng National Park, Loei Province.

Specimens examined.—Loei: Phu Kradueng National Park, 1300 m, 14 May 1951, T. Smitinand 13 (BKF, C, E); 26 March 2006, Th. Sørensen, K. Larsen & B. Hansen 4423 (BKF, C, E); 18 March 1958, Th. Sørensen, K. Larsen & B. Hansen 2244 (BKF); 14 May 1951, T. Smitinand 14 (designated by Hitchcock 1908); 21681 (AAU). Chiang Mai: Doi Suthep National Park, 1100 m, 25 July 1958, Th. Sørensen, K. Larsen & B. Hansen 4423 (BKF, C).


Annual. Culms 5–10 cm tall, geniculately ascending. Leaf-sheaths 2–3 cm long, with tubercle-based hairs, margins ciliate. Auricles bearded with long hairs. Ligules a fringe of long hairs. Collins glabrous. Leaf-blades 3–5 cm by 1–2 mm, both surfaces scabrous. Panicles spiciform to contracted, oblong, 12–14 by 1.5–2 cm, branches glabrous in axis. Spikelets 3–4 by 1.5–2 mm, with 6–10 fertile florets, ovate to oblorg; florets falling entirely from the top of spikelet downwards; rachilla fragile. L. glumes 1.3–1.5 mm long, persistent, lanceolate to ovate, keel scabrous, margins ciliolate, apex acuminately. Upper glumes 1.8–2 mm long, persistent, ovate to elliptic, 1-nerved, keel scabrous, apex acuminate. Lemmas 1.6–1.8 mm long, elliptic to ovate, scaberulous, membranous, apex obtuse to apiculate. Paleas 1.3–1.5 mm long, keel with tubercle-based hairs, apex obtuse. Stamens 2; anthers ca. 0.2 mm long. Caryopses 0.3–0.4 mm long, ellipsoid, terete, pericarp finely striate, dark brown.

Distribution.—North and South America, Africa, Asia, Australia, and Pacific.

Ecology.—Naturalised in Queen Sirikit Botanical Garden.

Vernacular.—Ya khai hep yai.

Notes.—This is the first report of this species in Thailand. All specimens previously collected from Thailand were misidentified as *E. ciliata* which has a very similar appearance, but the latter has a hairy inflorescence axis.

Specimens examined.—Chiang Mai: Queen Sirikit Botanical Garden, 800 m, 24 May 1999, H. Hemadhulin 71 (QBG, E); East of nursery of Queen Sirikit Botanical Garden, 7 October 2001, S. Laegaard 21681 (AAU).

Perennial. *Culms* 15–70 cm tall, erect or geniculate. *Leaf-sheaths* 2–7 cm long, margins with tubercle-based hairs. *Auricles* bearded with long hairs. *Ligules* a fringe of long hairs. *Collars* hairy. *Leaf-blades* 10–15 cm by 1–2 mm, both surfaces with tubercle-based hairs. *Panicles* spiciform, cylindrical or oblong, plumose, 2–8 by 1–1.5 cm, branches bearded in axils, axis hairy. *Spikelets* 5–7 by 1–1.5 mm, with 7–8 fertile florets, ovate; florets falling entire from the top of spikelet downwards; rachilla fragile. *L. glumes* 1.5–2.3 mm long, persistent, lanceolate, 1-nerved, 1-keeled, keel scabrous, apex acuminate. *Upper glumes* 2–2.5 mm long, persistent, lanceolate, 1-nerved, 1-keeled, 1-keeled, keel scabrous, apex acuminate. *Lemmas* 2.5–3 mm long, elliptic or oblong, scaberulous, membranous, apex apiculate. *Paleas* 1.3–2 mm long, keel with tubercle-based hairs, apex acute. *Stamens* 2; anthers ca. 0.25 mm long. *Caryopses* 0.4–0.5 mm long, orbicular, slightly laterally compressed, finely striate, dark brown.

Distribution.— Temperate and tropical Asia.

Ecology.— Common on sandy soil, sometimes on the beach.

Vernacular.— Ya khai hao.

Notes.— The distinctive characters of *E. ciliata* are its spiciform panicle and the inflorescence axis with long hairs.


Annual. *Culms* 15–40 cm tall, erect or geniculate. *Leaf-sheaths* 5–10 cm long, glabrous. *Auricles* bearded with long hairs. *Ligule* a fringe of hairs. *Collars* glabrous. *Leaf-blades* 5–15 cm by 2–3 mm, both surfaces with sparsely tubercle-based hairs. *Panicles* open, narrowly ovate to lanceolate, 15–30 by 6–8 cm, branches contracted or dense, bearded in axils. *Spikelets* 4–15 by 1–1.5 mm, with 14–20 fertile florets, oblong; florets falling from the base of spikelet upwards, but rachilla fragile or ultimately breaking up from the top downwards; rachilla straight. *L. glumes* 1–1.3 mm long, caducous, lanceolate, keel scabrous, apex acuminate. *Upper glumes* 1–1.5 mm long, caducous, lanceolate to narrowly ovate, 1-nerved, keel scabrous, apex acuminate. *Lemmas* 1.6–2 mm long, caducous, elliptic to ovate, scaberulous to glabrous, membranous, apex acute to acuminate. *Paleas* 1–1.2 mm long, persistent, keel ciliata, apex acute. *Stamens* 3; anthers 0.1–0.2 mm long. *Caryopses* 0.3–0.5 mm long, ovoid or orbicular, slightly laterally compressed, pericarp finely reticulate, reddish brown.

Distribution.— America, Asia, and Australasia.

Ecology.— Common in open areas and on sandy soils.

Vernacular.— *Ya Philippines*.

Notes.— This species is very similar in appearance to *E. brownii*. See also the note under *E. brownii*.


Perennial. *Culms* 20–40 cm tall, geniculately ascending. *Leaf-sheaths* 2–4 cm long, margins glabrous to densely hairy. *Auricles* bearded with long hairs. *Ligules* a fringe of hairs. *Collars* with a row of long hairs. *Leaf-blades* 3–10 cm by 4–7 mm, both surfaces scaberulous. *Panicles* spiciform panicle, cylindrical, 15–25 by 1.5–2 cm. *Spikelets* 5–6.5 by 1–1.5 mm, with 6–13 fertile florets, oblong; florets falling from the base of spikelet upwards; rachilla straight, persistent. *L. glumes* 1.2–1.4 mm long, caducous, ovate, keel scabrous, apex acute. *Upper glumes* 2–2.2 mm long, caducous, lanceolate to elliptic, 1-nerved, keel scabrous, apex acute or apiculate. *Lemmas* 2.2–2.5 mm long, caducous, ovate to elliptic, scaberulous, membranous, apex apiculate. *Paleas* 2–2.2 mm long, persistent, keels ciliolate to ciliate, slightly winged, apex obtuse. *Stamens* 3; anthers 0.4–0.5 mm long. *Caryopses* 0.3–0.4 mm long, sub-globose, pericarp striate to reticulate, brown.

Distribution.— China, Taiwan, Thailand and Japan.

Ecology.— Small tufts in open areas.
Vernacular.— Ya krabok.

Notes.— This species is recognized by its spiciform panicle and the palea which has slightly winged keels.


10. *E. diplachnoides* Steud., Syn. Pl. Glumac. 1: 268 (1854). Type: Sudan, Kotschy 346 (holotype UPS; isotypes BM!, G!-3 sheets, L). Fig. 1f.

Perennial, with short rhizomes. Culms 50–100 cm tall, erect or slightly geniculate. Leaf-sheaths 20–30 cm long, margins glabrous. Auricles glabrous. Ligules a fringe of hairs. Collars glabrous. Leaf-blades 10–25 cm by 3–5 mm, both surfaces scabrous. Panicles open, lanceolate, 30–50 by 12–16 cm, branches sub-digitate with the lowermost branch longest, the lowermost branch 6–8 cm long. Spikelets 2–3 by 1–1.5 mm, with 4–6 fertile florets, elliptic; florets falling entire from the top of spikelet downwards; rachilla fragile. L. glumes 0.4–0.5 mm long, persistent, ovate, keel glabrous to scabrous, apex acute. Upper glumes 0.6–0.7 mm long, persistent, broadly ovate, 1-nerved, keel glabrous, apex acute. Lemmas 0.8–1 mm long, broadly ovate, glabrous, membranous, apex acute. Paleas 0.8–0.9 mm long, keels ciliate, apex acute. Stamens 2; anthers 0.2–0.3 mm long. Caryopses 0.4–0.6 mm long, orbicular, slightly laterally compressed, pericarp striate and reticulate, dark brown.

**Distribution.**— Tropical and subtropical Africa and Asia.

Ecology.— Common in swampy areas or paddy fields.

Vernacular.— Ya krok lek.

Notes.— This species is distinctive sub-digitate branches of which the lowest one is the longest. It is easily confused with *E. japonica*, a species with an oblong panicle.


Annual. Culms 40–80 cm tall, geniculately ascending. Leaf-sheaths 5–10 cm long, glabrous. Auricles bearded with hairs. Ligules ciliolate membranous. Collars glabrous. Leaf-blades 10–25 cm by 5–8 mm, upper surface sparsely hairy. Panicles open, 15–30 by 6–8 cm. Spikelets 6–12 by 1–1.5 mm, with 15–26 fertile florets, oblong; florets falling from the base of spikelet upwards, often pale green; rachilla persistent. L. glumes 1–1.2 mm long, caducous, lanceolate, keel scabrous, apex acute. Upper glumes 1.5–1.8 mm long, caducous, elliptic to ovate, 1-nerved, keel scabrous to scabrous, apex acute. Lemmas 1.3–1.8 mm long, caducous, elliptic, glabrous, membranous, apex acute. Paleas 1–1.2 mm long, tardily falling, keels scabrous, apex acute to obtuse. Stamens 2; anthers 0.2–0.3 mm long. Caryopses 0.4–0.6 mm long, orbicular, slightly laterally compressed, pericarp striate and reticulate, dark brown.

**Distribution.**— North and South America, Africa and Tropical Asia.

Ecology.— On sandy soils and at roadsides.

Vernacular.— Ya krabok.

Notes.— The appearance of this species is similar to *E. atrovirens* but it is normally smaller and its palea ultimately disarticulates. It was treated by Stapf 15 of *E. stenophylla* which matches the type of *P. gangetica* housed in BM, but the name *E. gangetica* has priority. Veldkamp 10 noted that *E. gangetica* is very similar to *E. nutans*, a perennial species with three stamens.


Annual. Culms 40–70 cm tall, erect. Leaf-sheaths 10–30 cm long, margins glabrous. Auricles glabrous. Ligules frimbriate membranous. Collars glabrous. Leaf-blades 10–20 cm by 2–4 mm, both surfaces scabrous. Panicles contracted to open, oblong, 30–50 by 4–5 cm, branches whorled, the lowermost branch 2–2.5 cm long, axis scabrous. Spikelets 1–3 by 0.8–1 mm, with 4–6 fertile florets, ovate; florets falling entire from the top of spikelet downwards; rachilla fragile. L. glumes 0.6–0.8 mm long, persistent, ovate to lanceolate, keel scabrous to scaberulous, apex acute. Upper glumes 0.8–1 mm long, persistent, broadly ovate, 1-nerved, keel scabrous, apex acute. Lemmas 0.5–0.7 mm long, broadly ovate, scabulous, membranous, apex obtuse. Paleas 0.4–0.6 mm long, keels ciliate, apex obtuse. Stamens 2; anthers ca. 0.2 mm long. Caryopses 0.2–0.3 mm long, ellipsoid, terete, pericarp rugulose, dark brown.

Distribution.— America, Europe, Africa, and Asia.

Ecology.— Tufted, common in paddy fields and on muddy ground.

Vernacular.— Ya khai pu lek.

Notes.— This species is distinct from other species by virtue of its whorled or sub-digitate panicles and oblong inflorescences.


Perennial. Culms 15–40 cm tall, erect, glabrous. Leaf-sheaths 2–4 cm long, margins and adjacent zones with tubercle-based hairs. Auricles bearded with long hairs. Ligule a fringe of hairs. Collars with a row of long hairs. Leaf-blades 5–15 cm by 3–6 mm, upper surface sparsely hairy, lower surface glabrous. Panicles open, 20–30 by 6–8 cm, peduncle and axis glabrous, branches glabrous. Spikelets 4–6 by 1.5–2 mm, with 4–6 (-7) fertile florets, ovate, dark purple; florets falling from the base of spikelet upwards; rachilla zig-zag, persistent. L. glumes 1.2–1.5 mm long, caducous, lanceolate, keel glabrous, apex acumi-
nate. Upper glumes 1.8–2.2 mm long, caducous, lanceolate, 1-nerved, keel scabrous, apex acuminate. Lemmas 1.6–2.0 mm long, caducous, ovate to elliptic, scaberulous, membranous and hyaline near the apex, apex obtuse to acute. Paleas 1.5–1.7 mm long, persistent, keels glabrous, apex bidentate. Stamens 3; anthers ca. 0.6 mm long. Caryopses 0.5–0.6 mm long, trigonous to reniform, pericarp striate and reticulate, dark brown.

Distribution.—Tropical and Temperate Asia.

Ecology.—Common along roadsides.

Vernacular.—Ya khai mang da.

Notes.—This species is recognized by its dark purple and strongly imbricate spikelets.

Specimens examined.—Chiang Mai: Doi Khun Huai Pong, 1800 m, 5 March 1968, B. Hansen & T. Chaisongkram 141 (KKU).


Perennial. Culms 25–40 cm tall, geniculately ascending. Leaf-sheaths 2–5 cm long, margins glabrous. Auricles glabrous to sparsely hairy. Ligules a fringe of hairs. Collars glabrous. Leaf-blades 7–12 cm by 5–10 mm, lanceolate to oblong, upper surface hairy, lower surface scaberulous. Panicles contracted, oblong to narrowly elliptic, 15–20 of 3–4 cm. Spikelets 5–20 by 2–2.5 mm, with 6–25 fertile florets, oblong; florets falling from the base of spikelet upwards; rachilla straight, persistent. L. glumes 1.5–1.8 mm long, caducous, lanceolate, keel scabrous, apex acute. Upper glumes 1.8–2 mm long, caducous, elliptic, 1-nerved, keel scabrous, apex acute. Lemmas 2–2.2 mm long, caducous, elliptic, scaberulous, membranous, apex acute to acuminate. Paleas 1.5–1.8 mm long, persistent, keels ciliolate, apex bidentate. Stamens 3; anthers ca. 0.1 mm long. Caryopses 0.3–0.5 mm long, reniform, terete, pericarp smooth to finely reticulate, dark brown.

Distribution.—America, Europe, Africa, Asia, Australia, and Pacific.

Ecology.—Common along roadsides.

Vernacular.—Ya ko.

Notes.—This species has narrow spikelets and it is very similar to E. tenuifolia in the shape of its spikelets (but its spikelets are smaller).

Specimens examined.—Chiang Mai: Chom Thong, Ban Huai Nam Kow, Yahng Krahm subdistrict, 350 m, 3 October 1991, J.F. Maxwell 91-838 (E, L).


Nakhon Si Thammarat: Ko Chum Thung, 50 m, 30 January 1928, A.F.G. Kerr 14349 (BM, K, TCD).


Annual. Culms 8–30 cm tall, erect or geniculate. Leaf-sheaths 1–3 cm long, margins glabrous. Auricles bearded with long hairs. Ligules a fringe of hairs. Collars glabrous. Leaf-blades 2–15 cm by 2–3 mm, upper surface scabrous, lower surface striate. Panicles open to contracted, lanceolate to ovate, 3–25 of 5–7 cm, branches flexuous, bearded in axils or glabrous, sub-digitate at lower nodes. Spikelets 3–4 by 0.5–0.8 mm, with 3–9 fertile florets, ovate to narrowly lanceolate; florets falling from the base of spikelet upwards; rachilla zig-zag, persistent. L. glumes 0.5–0.8 mm long, caducous, narrowly lanceolate, keel obscure, apex apiculate. Upper glumes 1–1.5 mm long, caducous, lanceolate, 1-nerved, keel scaberulous, apex acuminate. Lemmas 1.2–1.5 mm long, caducous, ovate to elliptic, scaberulous, membranous, apex acute. Paleas tardily falling, 1.1–1.3 mm long, keels scaberulous. Stamens 3; anthers ca. 0.1 mm long. Caryopses 0.3–0.5 mm long, reniform, terete, pericarp smooth to finely reticulate, dark brown.

Distribution.—Tropical and Temperate Asia.

Ecology.—Common along roadsides.

Vernacular.—Ya khai mang da.

Notes.—This species is recognized by its very long oblong spikelets and contracted panicles.


with compact branches, ovate to lanceolate, 4–8 by 2–2.5 cm, branches bearded in axils. Spikelets 2–4 by 1–1.5 mm, with 5–10 fertile florets, lanceolate to oblanceolate; florets falling entire from the top of spikelet downwards; rachilla fragile. L. glumes 0.8–1.5 mm long, ultimately falling, ovate to lanceolate, keel scabrous, apex acute. Upper glumes 1.2–1.5 mm long, ultimately falling, lanceolate to ovate, 1-nerved, keel scabrous, apex acute. Lemmas 1.3–1.5 mm long, ovate to elliptic, scaberulous, membranous, apex obtuse to acute. Paleas 1.2–1.5 mm long, keel with tubercle-based hairs, apex obtuse. Stamens 3; anthers ca. 0.4 mm long. Caryopses 0.3–0.4 mm long, ellipsoid, terete, pericarp rugulose, dark brown.

Distribution.—Tropical Asia.

Ecology.—Common in open areas on a range of soil types.

Vernacular.—Ya khai hao.

Notes.—E. riparia is very similar to E. tenella but differs by having open panicle and compact branches.


Perennial, Culms 40–60 cm tall, geniculate. Leaf-sheaths 5–8 cm long, loose, margins glabrous. Auricles bearded with long hairs. Ligules a fringe of hairs. Collars glabrous. Leaf-blades 10–30 cm by 4–8 mm, upper surface hairy, lower surface glabrous. Panicles loose, irregular, 10–20 cm by 2–3 cm, branches glabrous or bearded in axils. Spikelets 7–12 by 3–4(–5) mm, with 4–12 fertile florets, broadly elliptic to ovate, breaking up below the glumes and fallen down as a whole. L. glumes 2.5–3 mm long, persistent, ovate, keel scabrous, apex obtuse. Upper glumes 3–4 mm long, persistent, ovate, 1-nerved, keel scabrous, apex obtuse. Lemmas 3–5 mm long, lanceolate to ovate, scaberulous, membranous, apex obtuse. Paleas 2–4.5 mm long, keel winged, ciliate on wings, margins glabrous, apex obtuse. Stamens 3; anthers 1.6–1.8 mm long. Caryopses 0.5–0.7 mm long, reniform, terete, pericarp reticulate, brown.

Distribution.—North and South America, Europe, Africa, Asia, Australasia, and Pacific.

Ecology.—Introduced from India for fodder as a pasture species.

Vernacular.—Ya yung ram phan.

Notes.—The species can be easily recognized by its rather large spikelets that are up to 5 mm wide and its strongly imbricate florets. Moreover, the wings on palea keels are prominently seen in lateral view.

Specimens examined.—Nakhon Ratchasima: Pak Chong, April 1969, S.N. (BKF).


Perennial, rhizomes short. Culms 20–60 cm tall, erect or geniculate. Leaf-sheaths 3–10 cm long, margins glabrous. Auricles bearded with long hairs. Ligules a fringe of hairs. Collars glabrous. Leaf-blades 10–20 cm by 2–4 mm, both surfaces scabrous. Panicles open, lanceolate to ovate, 25–40 by 3–6 cm, branches flexuous, bearded in axils or glabrous, whorled at lower nodes. Spikelets 5–8 by 1–1.2 mm, with 4–6 fertile florets, lanceolate, green; florets tardily falling from the base of spikelet upwards; rachilla zig-zag, persistent. L. glumes 1.5–1.8 mm long, tardily falling, lanceolate, keel scabrous, apex acuminate. Upper glumes 2–2.5 mm long, tardily falling, lanceolate, 1-nerved, keel scabrous, apex acuminate. Lemmas 2.2–2.7 mm long, tardily falling, elliptic to lanceolate, scabrous, slightly membranous to scarious, apex acute. Paleas 1.8–2 mm long, persistent, keels scaberulous, apex acute. Stamens 3; anthers 0.3–0.4 mm long. Caryopses 0.9–1 mm long, reniform, terete, pericarp finely striate and reticulate, dark brown.

Distribution.—North and South America, Europe, Africa, Asia, Australasia, and Pacific.

Ecology.—Cultivated species.

Vernacular.—Ya teff.

Notes.—E. tef is a staple cereal in Africa. It was introduced to Thailand in 1929. The label note from the only specimen collected from Thailand indicates that it was “introduced two years ago”.

Specimens examined.—Nakhon Ratchasima: Pak Chong, 1–200 m, 18 May 1931, A.F.G. Kerr s.n. (BM).

Small annual. **Culms** 10–30 cm tall, erect or geniculate, slightly compressed or terete. **Leaf-sheaths** 5–15 cm long, glabrous or hairy near the blade, margins with tubercle-based hairs. **Auricles** bearded with long hairs. **Ligules** a fringe of long hairs. **Collars** with a row of long hairs. **Leaf-blades** 7–15 cm by 8–12 mm, upper surface scabrous, lower surface glabrous. **Panicles** open, lanceolate to ovate, 7–20 by 3–8 cm, axis scabrous, branches with long hairs in axils, branchlet and pedicel glandular. **Spikelets** 1.5–2 by 0.8–1 mm, with 4–7 fertile florets, delicate, ovate to ovate-oblong; florets falling entire from the base of spikelet upwards; rachilla zig-zag, persistent. **Lemmas** 1.5–2 mm long, broadly ovate or oblong, scaberulous, membranous, apex mucronulate, acute or muticus. **Paleas** 0.8–0.9 mm long, keels with tubercle-based hairs, apex obtuse. **Anthers** ca. 0.2 mm long, persistent, narrowly lanceolate, keel scaberulous, apex acute. **Upper glumes** 0.5–0.7 mm long, persistent, elliptic, 1-nerved, keel scaberulous, apex acute. **Lemmata** 1.5–2 mm long, broadly ovate or oblong, scaberulous, membranous, apex mucronulate, acute or muticus. **Paleas** 0.8–0.9 mm long, keels with tubercle-based hairs, apex obtuse. **Stamens** 3; **anthers** ca. 0.2 mm long. **Caryopses** 0.3–0.4 mm long, ellipsoid, terete, pericarp finely rugulose, brown.

**Distribution.**—North and South America, Africa, Asia, Australasia, and Pacific.

**Ecology.**—In open areas at 600–2560 m. **Vernacular.**—Ya khai hep lek.

**Notes.**—*E. tenella* is one of the commonest grasses in Thailand and can be recognized by its delicate spikelets that are often pinkish, and by the presence of tubercle-based hairs on its palea keels. Following Jansen, who discussed the names *E. amabilis* and *E. tenella*, we have accepted the name *E. tenella* since it was chosen by Stapf who first united.


**Perennial.** **Culms** 30–70 cm tall, erect or geniculate, slightly compressed, lateral branches lacking. **Leaf-sheaths** 5–15 cm long, coriaceous to membranous, margins with tubercle-based hairs. **Auricles** bearded with long hairs. **Ligules** a fringe of long hairs. **Collars** glabrous. **Leaf-blades** 10–25 cm by 2–3 mm, upper surface scabrous, lower surface glabrous. **Panicles** open, lanceolate to ovate, 20–40 by 8–10 cm, branches bearded in axils. **Spikelets** 6–10 by 1–1.5 mm, with 8–15 fertile florets lanceolate; florets falling from the base of spikelet upwards; rachilla zig-zag, persistent. **L. glumes** 0.5–0.8 mm long, caducous sometimes tardily falling, narrowly ovate, keel scaberulous, apex acute. **Upper glumes** 2–2.5 mm long, caducous sometimes tardily falling, ovate to lanceolate, 1-nerved, keel scaberulous, apex acute. **Lemmata** 2–2.5 mm long, caducous sometimes tardily falling, ovate to lanceolate, 1-nerved, keel scaberulous, apex acute. **Paleas** 1–2 mm long, persistent, keel ciliolate, apex bidentate. **Stamens** 2–3; **anthers** ca. 0.5 mm long. **Caryopses** 0.5–0.6 mm long, trigonous, pericarp finely reticulate, reddish brown, adhered to palea.

**Distribution.**—North and South America, Europe, Africa, Asia, Australasia, and Pacific.

**Ecology.**—In open areas at 600–2560 m. **Vernacular.**—Ya khamao.

**Notes.**—This species commonly exhibits dark green spikelets and is similar to *E. nigra* but differs by having more narrowly lanceolate spikelets and caryopses that adhere to the palea after lemma shedding.


22. **E. unioloides** (Retz.) Nees ex Steud., Syn. Pl. Glumac. 1: 264 (1854). **P. unioloides** Retz., Observ. Bot. 5: 19 (1788). Type: India, 1776, Köenig s.n. (holotype LD, picture K!, fragment K!, isotypes BM!, K). **Fig. 1l.**

**Annual or perennial, sometimes rhizomatous.** **Culms** 10–50 cm tall, erect or geniculate, internodes glabrous, sometimes rooted at lower nodes. **Leaf-sheaths** 2–5 cm long, margins hyaline, glabrous. **Au-
icles bearded with long hairs. **Ligules** a fringe of hairs. **Leaf-blades** 5–20 cm by 1–8 mm, upper surface sparsely hairy, lower surface striate. **Panicles** open, ovate, obovate to elliptic, 5–35 by 6–8 cm, branches glabrous. **Spikelets** 5–12 by 2.5–4 (-5) mm, normally pinkish, with 3–30 fertile florets, ovate; florets falling from the base of spikelet upwards; rachilla persistent. **L. glumes** 1.8–2.3 mm long, caducous, narrowly lanceolate, keel scaberulous, apex acuminate. **Upper glumes** 2–2.4 mm long, caducous, lanceolate, 1-nerved, keel scaberulous, apex acuminate. **Lemmas** 1.5–2.5 mm long, caducous, ovate, scaberulous to scabrous, membranous, apex acute. **Paleas** 1.5–2.2 mm long, caducous, keels ciliolate, apex bidentate. **Stamens** 3; anthers ca. 0.3 mm long. **Caryopses** 0.5–0.6 mm long, orbicular, laterally compressed, pericarp reticulate, dark brown.

Distribution.—North and South America, Africa, Asia, and Australasia.

Ecology.—Common on sandy soil and in open area in dipterocarp forest, often found on wet soils.

Vernacular.—Ya krok.

Notes.—This species is recognized by its broadly elliptic or slightly ovate spikelets. The spikelet width is up to 5 mm and they are commonly pinkish.


Annual. **Culms** 20–45 cm tall, erect or geniculate, with sticky glandular patches below the nodes. **Leaf-sheaths** 3–6 cm long, glabrous or sparsely hairy. ** Auricles** glabrous. **Ligule** a fringe of hairs. **Collars** hairy. **Leaf-blades** 6–20 cm by 3–8 mm, both surfaces glabrous. **Panicles** open, obovate to ovate, 15–25 by 5–8 cm, glabrous or pilose in axils, branchlet and pedicel with pale brown glands. **Spikelets** 2.5–4.5 by 0.8–1 mm, with 3–10 fertile florets, oblong to ovate; florets falling entire from the top of spikelet downwards; rachilla fragile. **L. glumes** 0.6–0.8 mm long, persistent, ovate, keel scaberulous, apex acute. **Upper glumes** 0.7–0.9 mm long, persistent, ovate, 1-nerved, keel scaberulous, apex acute. **Lemmas** 1.1–1.3 mm long, elliptic, scaberulous, membranous, apex obtuse. **Paleas** 0.9–1.2 mm long, keels with tubercle-based hairs, apex truncate. **Stamens** 3; anthers ca. 0.2 mm long. **Caryopses** 0.4–0.5 mm long, ellipsoid, terete, pericarp finely rugulose, reddish brown.

Distribution.—North and South America, Africa, and Asia.

Ecology.—In open and dry grassland.

Vernacular.—Ya kho niao.

Notes.—This species is very similar to *E. tenella* but differs by having sticky glandular patches below the culm nodes. Veldkamp treated this name under *E. amabilis* which is placed here as a synonymy of *E. tenella*.


**CONCLUSIONS**

This paper provides an updated taxonomic account of *Eragrostis* in Thailand. A total of 23 species are recognized in Thailand including two species which are introduced, *E. superba* and *E. tef*. The majority of species occur widely in open areas and on sandy soils from low altitudes up to 2500 m, except *E. capensis* that is strictly distributed in Phu Kradueng National Park, Loei Province. Twelve species which were previously mentioned to exist in Thailand: *E. chloromeles*, *E. curvula*, *E. elongata*, *E. inamoena*, *E. kerrii*, *E. macilenta*, *E. minor*, *E. multicaulis*, *E. pubescens*, *E. subsecunda*, and *E. udawensis* were excluded. There is no specimen under these names deposited in any herbarium in Thailand or overseas. They might be wrong determinations. Comments on some nomenclatural decisions are given in the notes under each species description. The identification key constructed for Thai *Eragrostis* was based mainly on the spikelet disarticulation and the shape of the Caryopses, and it can be divided into 4 informal groups: the disarticulation occurring below the glumes, the disarticulation occurring from the top of the spikelet downwards, the disarticulation occurring from the base of the spikelet upwards and trigonous to reniform Caryopses, and the disarticulation occurring from the base of the spikelet upwards and elliptoid or orbic-
ular caryopsis. However, these characters, although useful for key construction, are artificial and should be used carefully for phylogenetic interpretation at infrageneric level.

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