

The genus *Pseudoraphis* (Poaceae) in Thailand

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ABSTRACT

A taxonomic study of the genus *Pseudoraphis* in Thailand was conducted. Four species, *P. balansae*, *P. brunoniana*, *P. minuta* and *P. spinescens* are reported. This genus is distributed in the Northern, Eastern, Central, South-Eastern, and Peninsular floristic regions of Thailand. All the species are aquatic or semi-aquatic, found in swampy places, marshes, lakes, paddy fields, ditches, moats and on sandy soils from sea level to 300 m. Morphological descriptions, distribution data, and ecological information are provided. All species are illustrated and a key to the species, based on morphological characters, is provided.

KEYWORDS: Gramineae, grasses, key to the species, revision, taxonomy.

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INTRODUCTION

The genus *Pseudoraphis* Griff. ex Pilg. belongs to the subtribe Cenchrinae, tribe Paniceae, subfamily Panicoideae of the family Poaceae (Soreng *et al.*, 2017). It comprises about seven species distributed in tropical and subtropical Asia to Australia (Simon *et al.*, 2011; POWO, 2019). The genus *Pseudoraphis* is recognized by a bristle at the tip of racemes (Bor, 1960; Clayton & Renvoize, 1986; Chen & Phillips, 2006). The name of this genus from the Greek words, ‘*pseudes*’ which means ‘false’ and ‘*rhaphis* or *rhaphidos*’ means ‘a needle’, referring to the needle-like bristle at the tip of racemes (Quattrocchi, 2006).

There are many previous studies of grasses in Thailand (Chaisongkram *et al.*, 2013; Teerawatananon *et al.*, 2014; Boonsuk *et al.*, 2016). However, identifications often rely on literature from neighbouring countries (Bor, 1960; Gilliland, 1971; Chen & Phillips, 2006), and this is the case for *Pseudoraphis*, which has never been revised before for Thailand. The taxonomic treatments presented here will contribute to the Flora of Thailand project.

MATERIALS AND METHODS

The study was based on herbarium specimens from the following herbaria: BK, BKF, BM, C, CMUB, K and QBG, including digital specimen images from MO. Additional specimens were collected on recent field surveys made throughout Thailand. Plant morphological characters, ecological data, and flowering and fruiting periods were also recorded. Most of the grass specimens collected from fieldwork are deposited at BK and BKF. The identifications were established using morphological characters observed using a stereo microscope and the available taxonomic literatures of Thailand and neighbouring regions.

TAXONOMIC TREATMENT

Pseudoraphis Griff. ex Pilg., Notizbl. Bot. Gart. Berlin-Dahlem 10: 210. 1928; Bor, Grasses Burma, Ceyl. Ind. & Pakist.: 352. 1960; Backer & Bakh.f., Fl. Java 3: 574. 1968; Gilliland, Revis. Fl. Malaya 3: 160. 1971; Clayton & Renvoize, Gen. Gram.: 302. 1986; S.L.Chen & S.M.Phillips in C.Y.Wu,

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P.H.Raven & D.Y.Hong, Fl. China 22: 547. 2006. Type species: *Pseudoraphis brunoniana* (Griff.) Pilg.

Perennial, mat-forming. *Culms* decumbent or prostrate, stolons present or absent; nodes glabrous or pubescent. *Leaf sheaths* compressed. *Ligules* membranous or ciliolate membranous. *Leaf blades* linear or linear-lanceolate. *Inflorescence* a panicle of racemes, each raceme bearing 1-several spikelets; the tip of raceme extending to a bristle, bristle slender and persisting on the raceme axis after the spikelet fall; peduncle slightly flattened. *Spikelets* solitary,

short pedicelled, lanceolate, dorsally compressed. *Lower glume* small, membranous, nerveless. *Upper glume* chartaceous, longer than lower glume. *Florets* 2. *Lower floret* male; lemma subacute, acute, acuminate or caudate; palea hyaline. *Upper floret* bisexual, shorter than lower floret, apex acute, glabrous. *Stamens* 2 or 3. *Ovary* oblong; styles 2; stigma plumose. *Caryopsis* ellipsoid or ovoid.

Four species are presented in Thailand. (Two species, *Pseudoraphis balansae* Henrard and *P. minuta* (Mez) Pilg., were not found during the present field surveys.)

KEY TO THE SPECIES

1. Spikelets 12 or less; upper glume apex acute; lower lemma 11 or 13-nerved; upper glume slightly shorter than or as long as lower lemma; nodes glabrous; ligule membranous **1. *P. balansae***
1. Spikelets more than 12; upper glume apex acuminate, long acuminate or caudate; lower lemma 5, 7 or 9-nerved; upper glume longer than lower lemma; nodes pubescent; ligule ciliolate membranous
 2. Spikelets more than 4 mm long; lower lemma apex acuminate, 7 or 9-nerved
 3. Spikelets on lowest raceme 4 or less; bristle usually longer than terminal spikelet at least 1.4 times; spikelet usually more than 7 mm long; anthers 2–2.3 mm long **2. *P. brunoniana***
 3. Spikelets on lowest raceme more than 4; bristle usually as long as or slightly longer than terminal spikelet; spikelet usually less than 7 mm long; anthers 1–1.8 mm long **4. *P. spinescens***
 2. Spikelets 2.5–3.8(–4) mm long; lower lemma apex acute or subacute, 5 or 7-obscure-nerved **3. *P. minuta***

1. *Pseudoraphis balansae* Henrard, Blumea, Suppl. 1: 230. 1937; S.L.Chen & S.M.Phillips in C.Y.Wu, P.H.Raven & D.Y.Hong, Fl. China 22: 548. 2006. Type: Vietnam, Annam, Tourane, 25 Nov. 1886, *Balansa s.n.* (lectotype L, designated by Phillips & Chen (2003: 469); isolectotype K [K000290578!]). Figs. 1 & 5A.

— *Pseudoraphis longipaleacea* Chia, Fl. Hainan. 4: 442, 540, f. 1232. 1977. Type: China, Hainan I.: Dongfang, 12 Sept. 1936, *Liou 27870* (holotype, SCBI).

Perennial, aquatic herb. *Culms* decumbent or prostrate, stoloniferous, 25–30 cm high; nodes glabrous; internodes subterete, 2–3.2 cm long, 1–1.3 mm in diam., glabrous. *Leaf sheaths* 2.3–2.8 cm long, margins entire, glabrous. *Ligules* membranous, 1–1.2 mm long. *Collar* glabrous. *Leaf blades* linear, 3–6 × 0.25–0.4 cm, apex acute or subacute, base rounded, margins scabrous, chartaceous, glabrous on both surfaces. *Inflorescence* a panicle of racemes, 5–7.5 × 0.3–0.5 cm (including the peduncle); central axis 2–3 cm long, scabrous; peduncle slightly flattened, 2.5–3.6 cm long, scabrous; 10–12 reduced racemes along the central axis, each raceme bearing

1 spikelet, bristle at the tip of raceme 1–1.6 cm long, longer than the spikelet, slightly angular, scabrous. *Spikelets* solitary, dorsally compressed, lanceolate, 4–5.3 × ca 1 mm, subsessile. *Lower glume* broadly ovate, 0.6–0.8 × ca 1 mm, apex obtuse or truncate, margins entire, membranous, glabrous, nerveless. *Upper glume* lanceolate, 4.2–5 × ca 1 mm, apex acute, margins entire, chartaceous, glabrous, 7-nerved. *Florets* 2. *Lower floret* male; lemma lanceolate, 4.2–5.2 × ca 1 mm, apex acute, margins entire, chartaceous, glabrous, 11 or 13-nerved; palea lanceolate, 4–5 × ca 0.8 mm, apex acuminate, margins entire, membranous, glabrous, 2-nerved. *Upper floret* bisexual; lemma narrow elliptic, 2–2.5 × 0.5–0.7 mm, apex acute, margins entire, cartilaginous, glabrous, nerveless; palea narrow elliptic, 2–2.5 × 0.5–0.7 mm, apex acute, margins entire, cartilaginous, glabrous, nerveless. *Lodicules* not seen. *Stamens* 3; filaments ca 0.5 mm long; anthers yellow, 1.5–2.4 mm long. *Ovary* narrow elliptic, ca 0.8 × 0.2 mm; styles 2; stigma plumose. *Caryopsis* not seen.

Thailand.— SOUTH-EASTERN: Rayong [Klaeng, Thung Khwai Kin, 29 June 2009, *Wessumrit & Norsangsi 239 (QBG)*]; Chanthaburi [Makham, 14 June 1963, *Larsen 10103 (BKF, C, K)*].

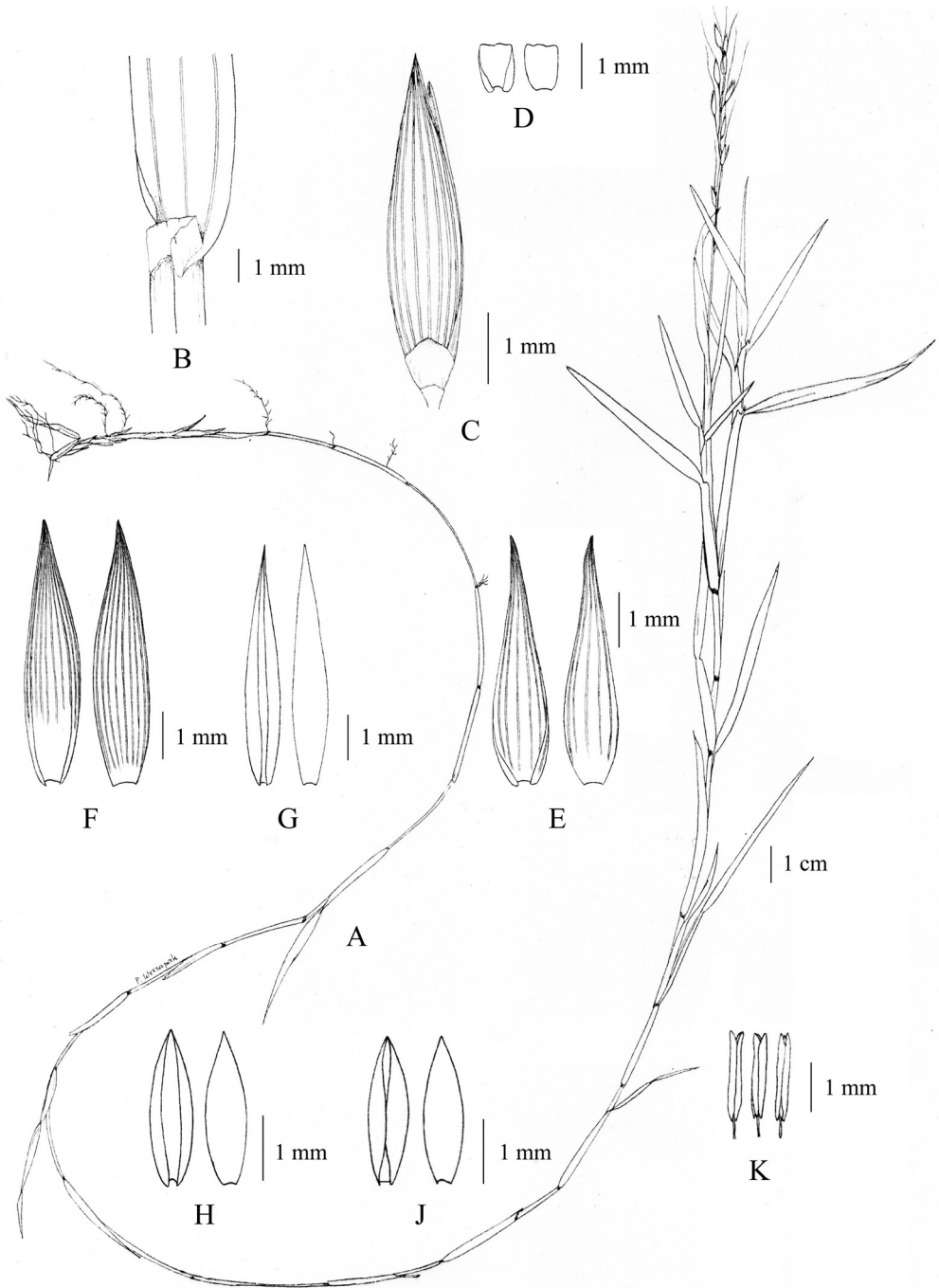


Figure 1. *Pseudoraphis balansae* Henrard: A. habit; B. ligule; C. spikelet; D. lower glumes; E. upper glumes; F. lower lemmas; G. lower paleas; H. upper lemmas; J. upper paleas; K. stamens. Drawn from *Larsen 10103* (K) by Paweena Wessapak.

Distribution.— China (Hainan), Vietnam.

Ecology.— Growing in swampy areas and waterholes, at 0–50 m alt. Flowering and fruiting: June.

Vernacular.— Ya krok cho diao (หญ้าโครกชอเตี้ย) (suggested here).

Proposed IUCN conservation status.— This species is only recorded from three countries (China, Vietnam, and Thailand). In Thailand, this species is recorded from two localities in the South-Eastern region and is only known from herbarium specimens. The size of the population is unknown. Therefore, this species must be assessed Data Deficient (DD).

Notes.— Phillips & Chen (2003) mentioned that leaf blades of this species have a short, subacute or obtuse apex but we have not seen this character in Thai specimen from Rayong. *Pseudoraphis balansae* resembles *P. paradoxa* (R.Br.) Pilg., an Australian species in which the inflorescence also has 10–12 spikelets but differs in the shorter spikelets, 8–10 mm long, the upper glumes with an acuminate apex and 1–2 spikelets per raceme.

2. *Pseudoraphis brunoniana* (Wall. & Griff.) Pilg., Notizbl. Bot. Gart. Berlin-Dahlem 10: 209, 210. 1928; Bor, Grasses Burma, Ceyl. Ind. & Pakist.: 353. 1960; S.L.Chen & S.M.Phillips in C.Y.Wu, P.H.Raven & D.Y.Hong, Fl. China 22: 547. 2006.— *Panicum brunonianum* Wall. & Griff., J. Asiat. Soc. Bengal 5: 574. 1836.— *Chamaeraphis spinescens* (R.Br.) Poir. var. *brunoniana* (Wall. & Griff.) Hook.f., Fl. Brit. Ind. 7: 62. 1896.— *C. brunoniana* (Wall. & Griff.) A.Camus in Lecomte, Fl. Indo-Chine 7: 479. 1922. Type: Bangladesh (“Bengal”), Goalnugar, “Hab. In aquis leniter currentibus profundis plagarum Bheels dictarum prope Goalna.”, 28 Sept. 1835, *Griffith 6559* (holotype **L**; isotypes **L**, **MO** [3051643], photo seen). Figs. 2 & 5B.

Perennial, aquatic herb. *Culms* decumbent or prostrate, geniculate ascending, stoloniferous, 20–30 cm high; nodes pubescent; internodes slightly flattened, 2–10 cm long, 1–2 mm in diam., glabrous. *Leaf sheaths* 4–8 cm long, margins entire, glabrous. *Ligules* ciliolate membranous, 0.8–1.2 mm long. *Collar* glabrous. *Leaf blades* linear, 2–7 × 0.1–0.25 cm, apex acute, base rounded, margins scabrous,

chartaceous, upper surface scabrous and pilose, lower surface glabrous. *Inflorescence* a panicle of racemes, 11–21 × 1–6 cm (including the peduncle); central axis angular, 5–11 cm long, scabrous; peduncle slightly flattened, 3–12 cm long, glabrous; 10–22 racemes along a central axis, lowest racemes 2–5 cm long (including terminal bristle) bearing 1–3(–4) spikelets; rachis angular, scabrous, bristle at the tip of raceme 1–2.6 cm long, usually longer than terminal spikelet, sometimes up to 2 times. *Spikelets* solitary, dorsally compressed, lanceolate, 7–10 × 0.8–1 mm; pedicel 0.4–0.6 mm long, scabrous. *Lower glume* broadly ovate, 1–1.2 × 0.8–1 mm, apex rounded, obtuse or truncate, margins entire, membranous, glabrous, nerveless. *Upper glume* lanceolate, 7–10 × 0.8–1 mm, apex acuminate or long acuminate, chartaceous, glabrous with scabrous near margins, 13 or 15 (–17)-nerved. *Florets* 2. *Lower floret* male; lemma lanceolate, 6–7 × ca 1 mm, apex acuminate, chartaceous, glabrous, 9-nerved; palea elliptic, 2–4 × 0.6–1 mm, apex obtuse or acute, margins entire, hyaline, glabrous, 2-nerved or nerveless. *Upper floret* bisexual; lemma oblong-lanceolate, 2–2.8 × 0.3–0.5 mm, apex acute, margins entire, cartilaginous, glabrous, nerveless; palea oblong-lanceolate, 2–2.6 × 0.3–0.5 mm, apex acute, margins entire, cartilaginous, glabrous, nerveless. *Lodicules* 2, truncate, 0.2–0.3 mm long. *Stamens* 3; filaments 0.5–1 mm long; anthers yellow or brown, 2–2.3 mm long. *Ovary* oblanceolate, 0.5–0.6 × ca 0.3 mm; styles 2; stigma ca 2 mm long, plumose. *Caryopsis* not seen.

Thailand.— EASTERN: Buriram [Pra Khon Chai, 21 Oct. 2017, *Wessapak 412, 413, 414* (**BK, BKF**)]; Yasothon [Mueang Yasothon, the route to Ban Kueang Kham, km 198, 31 July 2002, *Norsaengsri 2022* (**QBG**)]; CENTRAL: Bangkok [Bang Khen, 22 July 1953, *Suvatabundhu 431* (**BK**)]; SOUTH-EASTERN: Prachin Buri [12 Nov. 1967, *Sutheesorn 84* (**BK**)]; Chanthaburi [Makham, 50 m alt., 14 June 1963, *Larsen 10100* (**BKF, C, K**)]; Trat [Mueang Trat, Huai Raeng, 21 June 1952, *Smitinand 1406* (**BKF**)]; PENINSULAR: Songkhla [below 50 m alt., 8 Apr. 1928, *Kerr 15120* (**BK, BM, K**)].

Distribution.— India, Bangladesh, Sri Lanka, Myanmar, Southeast China, Taiwan, Japan, Vietnam, Philippines.

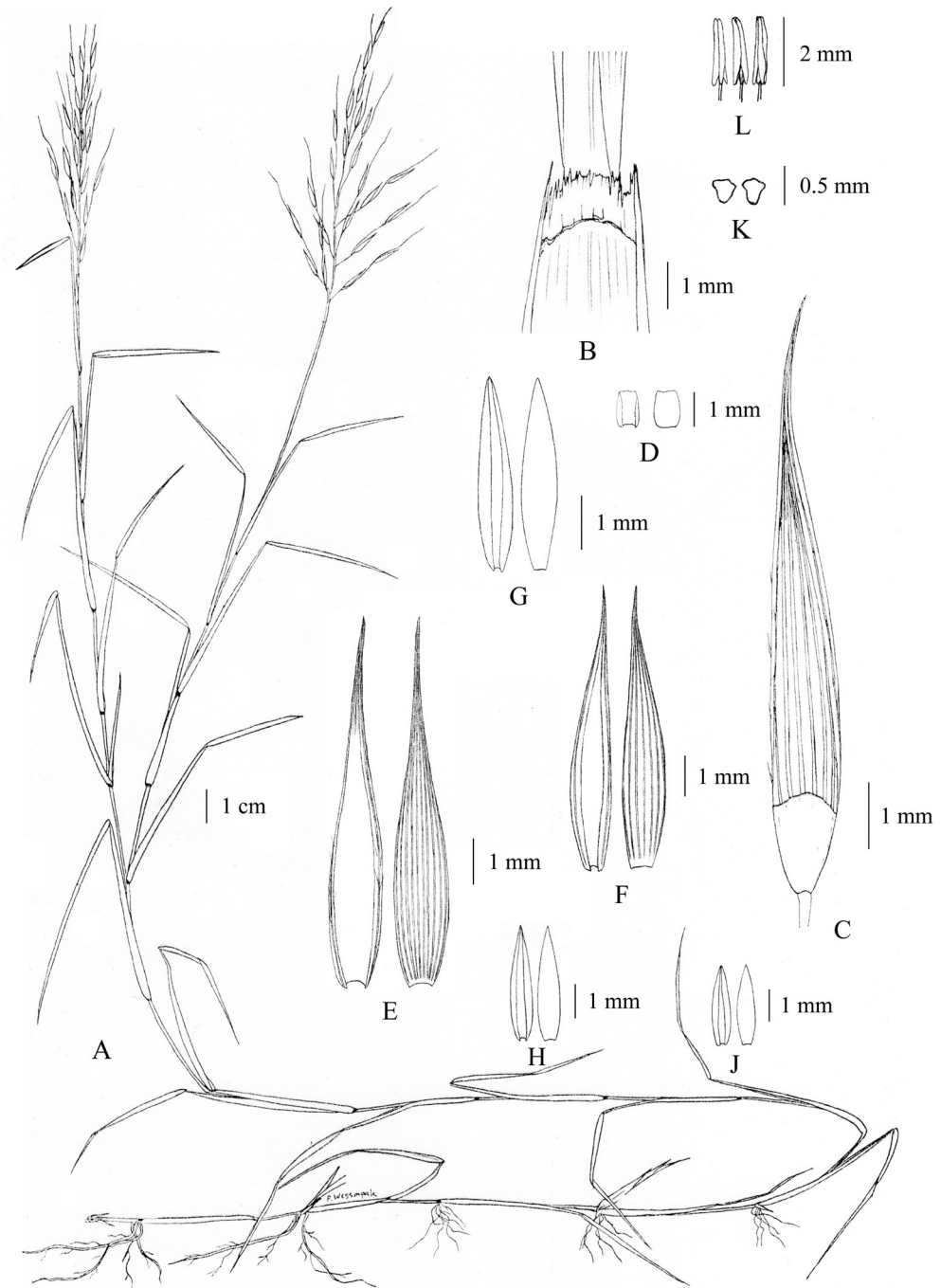


Figure 2. *Pseudoraphis brunoniana* (Wall. & Griff.) Pilg.: A. habit; B. ligule; C. spikelet; D. lower glumes; E. upper glumes; F. lower lemmas; G. lower paleas; H. upper lemmas; J. upper paleas; K. lodicules; L. stamens. Drawn from *Wessapak 412* (BK) by Paweena Wessapak.

Ecology.— Growing in swampy places, marshes, lakes, paddy fields and ditches, at 0–150 m alt. Flowering and fruiting: June–November.

Vernacular.— Ya krok khao (หญ้าโครกขาว) (Trat).

Proposed IUCN conservation status.— The localities for this species are in four floristic regions of Thailand: Eastern, Central, South-Eastern, and Peninsular. This species usually occurs in large population in swampy areas. Furthermore, it is widespread and occurs in several countries and is therefore assessed as of Least Concern (LC).

Notes.— This species was sometimes misidentified as the most widespread species, *Pseudoraphis spinescens* (R.Br.) Vickery, because of the similarity in the inflorescence. The difference between these two species is in the number of spikelets on the lowest raceme and the length of bristle (Fig. 6).

3. *Pseudoraphis minuta* (Mez) Pilg., Notizbl. Bot. Gart. Berlin-Dahlem 10: 210. 1928; Bor, Grasses Burma, Ceyl. Ind. & Pakist.: 353. 1960.— *Chamaeraphis minuta* Mez, Notizbl. Bot. Gart. Berlin-Dahlem 7: 48 1917; A. Camus in Lecomte, Fl. Indo-Chine 7: 480. 1922. Type: Indo-China, Tonkin, Hanoi, *Balansa 1592* (lectotype **BRI, designated by Simon (2010: 214); isolectotypes **K** [K000290333!], **L**, **P**, **US**). Figs. 3 & 5C.**

— *Pseudoraphis minuta* (Mez) Pilg. var. *laevis* B.K. Simon, *Austrobaileya* 8: 214. 2010. Type: Northern Territory, Darwin & Gulf: Goromuru River floodplain, 24 May 1992, *Cowie 2838* (holotype **BRI**).

Perennial, aquatic or semi-aquatic herb. *Culms* decumbent or prostrate, geniculate ascending, stoloniferous, 20–40 cm high; nodes pubescent; internodes subterete, 2.5–9 cm long, 1.2–2 mm in diam., glabrous. *Leaf sheaths* 2.4–4.5 cm long, margins entire and membranous, glabrous. *Ligules* ciliolate membranous, ca 1 mm long. Collar glabrous. *Leaf blades* linear, 3–5.5 × 0.2–0.5 cm, apex acute or obtuse, base rounded, margins scabrous, chartaceous, glabrous on both surfaces. *Inflorescence* a panicle of racemes, 9–17 × 1.8–3.5 cm (including the peduncle); central axis angular, 5.5–7 cm long, glabrous; peduncle slightly flattened, 5–10 cm long, glabrous; 18–30 racemes along a central axis, lowest

racemes 2–3 cm long (including terminal bristle) bearing 6–9 spikelets; rachis angular, scabrous, bristle at the tip of raceme 3–4 mm long, slightly shorter than or as long as terminal spikelet. *Spikelets* solitary, dorsally compressed, lanceolate, 2.5–3.8(–4) × 0.6–0.8 mm; pedicel 0.3–0.5 mm long or sessile. *Lower glume* broadly ovate, 0.2–0.3 × 0.3–0.4 mm, apex obtuse or truncate, margins entire, membranous, glabrous, nerveless. *Upper glume* lanceolate, 3–4 × 0.6–0.8 mm, apex acuminate, long acuminate or caudate, margins entire, chartaceous, glabrous with tubercle-based hairs or scabrous near margins, 7-nerved. *Florets* 2. *Lower floret* male; lemma elliptic-lanceolate, 2.1–2.2 × ca 0.6 mm, apex acute or subacute, margins entire, chartaceous, glabrous, 5 or 7-obscure-nerved; palea lanceolate, ca 2 × 0.5 mm, apex acute, margins entire, membranous or hyaline, glabrous, nerveless or 2-obscure-nerved. *Upper floret* bisexual; lemma narrow-elliptic, ca 1.2 × 0.3 mm, apex acute or obtuse, margins entire, cartilaginous, glabrous, nerveless; palea narrow-elliptic, ca 1.2 × 0.3 mm, apex acute or obtuse, margins entire, cartilaginous, glabrous, nerveless. *Lodicules* 2, obtuse, ca 0.2 mm long. *Stamens* 3; anthers purple, ca 1.6 mm long. *Ovary* narrow elliptic, ca 0.5 × 0.2 mm; styles 2; stigma plumose. *Caryopsis* not seen.

Thailand.— NORTHERN: Chiang Mai [ca 300 m alt., 15 Aug. 1911, *Kerr 1959* (**BM**, **K**)]; EASTERN: Yasothon [Mueang Yasothon, 31 July 2002, *Norsaengsri 2021* (**QBG**)].

Distribution.— India, Bangladesh, Myanmar, Vietnam, Australia (Northern Territory, Queensland).

Ecology.— Sandy soils and floating in moats, at ca 300 m alt. Flowering and fruiting: July–August.

Vernacular.— Ya krok khao dok lek (หญ้าโครกขาวดอกเล็ก) (General).

Proposed IUCN conservation status.— In Thailand, this species is recorded in two localities (Chiang Mai and Yasothon) although only known from the herbarium specimens. There is no data on population size and for this reason this species is assessed as Data Deficient (DD).

Notes.— Inflorescence characters of the species are variable. Some specimens from India (*Clarke 38012* and *Mooney 3031*) have a slightly shorter

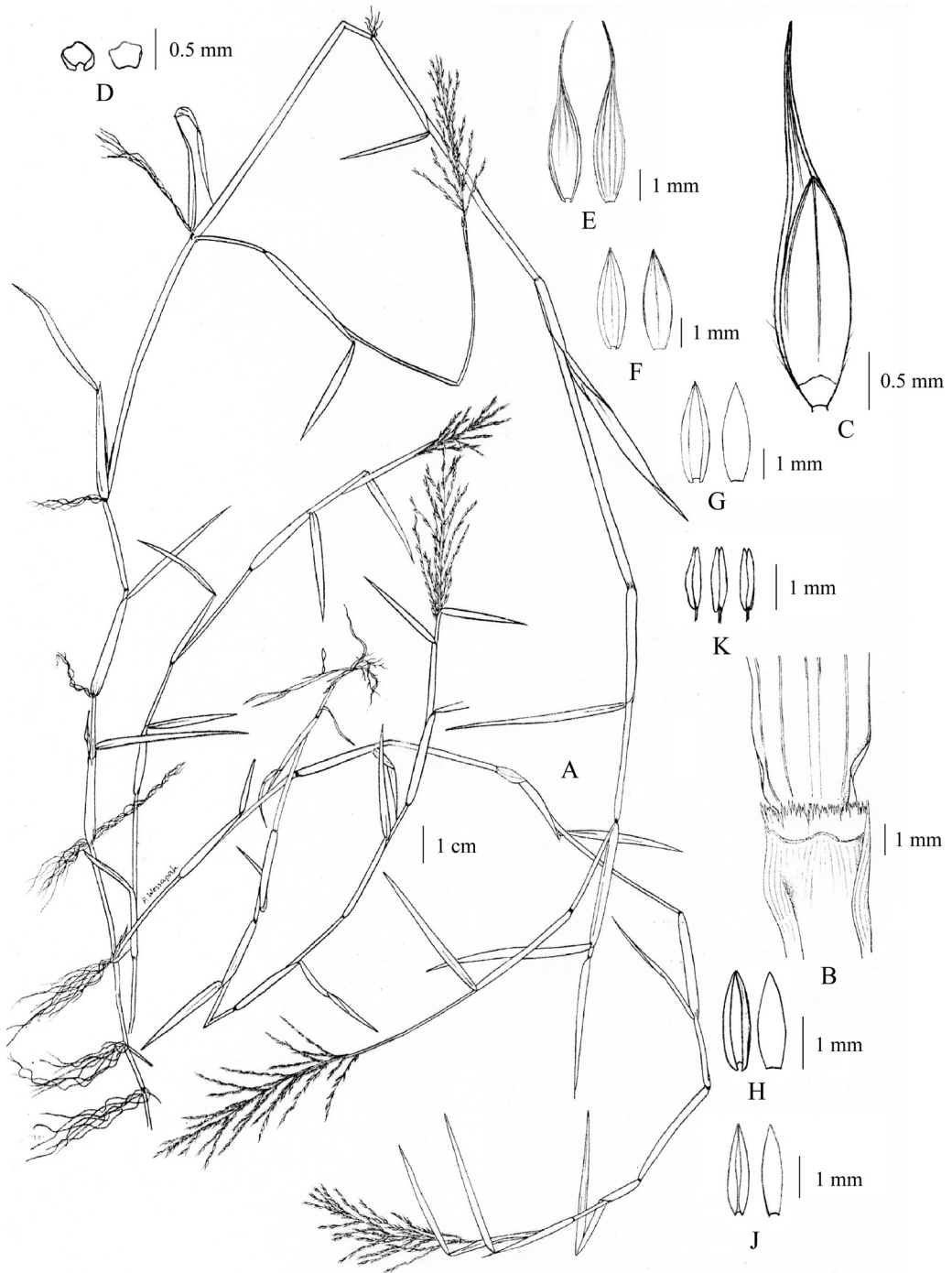


Figure 3. *Pseudoraphis minuta* (Mez) Pilg.: A. habit; B. ligule; C. spikelet; D. lower glumes; E. upper glumes; F. lower lemmas; G. lower paleas; H. upper lemmas; J. upper paleas; K. stamens. Drawn from Kerr 1959 (K) by Paweena Wessapak.

central axis and racemes with dense spikelets which resembles the Thai specimen from Yasothon (*Norsaengsri 2021*). This is consistent with Bor (1960) who suggested the congested inflorescence is the character for this species. The specimens from Myanmar and Vietnam have the ovate-lanceolate inflorescence with long central axis and racemes that resemble the Thai specimens from Chiang Mai (*Kerr 1959*). The specimens examined from Thailand have a lower lemma distinctly 5-nerved, sometimes obscurely 7-nerved.

4. *Pseudoraphis spinescens* (R.Br.) Vickery, Proc. Roy. Soc. Queensland 62: 69. 1952; Bor, Grasses Burma, Ceyl. Ind. & Pakist.: 353. 1960; Backer & Bakh.f., Fl. Java 3: 574. 1968; Gilliland, Revis. Fl. Malaya 3: 160. 1971.—*Panicum spinescens* R.Br., Prodr. Fl. Nov. Holland.: 193. 1810.—*Chamaeraphis spinescens* (R.Br.) Poir., Encycl., Suppl. 2: 189. 1811; Benth., Fl. Austral. 7: 498. 1878. Type: Australia, near Port Jackson, *Brown 6126* (holotype **BM!**; isotype **K!**). Figs. 4 & 5D.

—*Panicum abortivum* R.Br., Prodr. Fl. Nov. Holland.: 193. 1810.—*Pseudoraphis abortiva* (R.Br.) Pilg., Notizbl. Bot. Gart. Berlin 10: 210. 1928. Type: Australia, *R. Brown s.n.* (holotype **BM!**; isotype **K!**).

Perennial, aquatic herb. *Culms* decumbent or prostrate, geniculate ascending, stoloniferous, 20–30 cm high; nodes pubescent, rarely glabrous; internodes slightly flattened, 2–8.5 cm long, 1–2 mm in diam., glabrous. *Leaf sheaths* 2.5–10 cm long, margins entire, glabrous. *Ligules* ciliolate membranous, 0.8–1 mm long. *Collar* glabrous. *Leaf blades* linear, 2–10 × 0.1–0.5 cm, apex acute, base rounded, margins scabrous, chartaceous, upper surface scabrous and pilose, lower surface glabrous. *Inflorescence* a panicle of racemes, 13–44 × 3–8 cm (including the peduncle); central axis angular, 7–13 cm long, scabrous; peduncle slightly flattened, 5–32 cm long, glabrous; 16–32 racemes along central axis, lowest racemes (2.5–)3–6.5(–7.5) cm long (including terminal bristle) bearing 5–9(–10) spikelets, rachis angular, scabrous, bristle at the tip of raceme 0.4–1(–1.2) cm long, usually as long as or slightly longer than terminal spikelet. *Spikelets* solitary, dorsally compressed, lanceolate, 4–7(–8) × 0.8–1.2 mm; pedicel 0.4–0.6 mm long, scabrous. *Lower glume* broadly ovate, 0.4–1 × 0.4–0.8 mm, apex obtuse or

truncate, margins entire, membranous, glabrous, nerveless. *Upper glume* lanceolate, 4–7(–8) × 0.8–1.2 mm, apex long acuminate or caudate, chartaceous, glabrous with tubercle-based hairs or scabrous near margins, 11 or 13(–15)-nerved. *Florets 2*. *Lower floret* male; lemma lanceolate, 3–5 × 0.6–1 mm, apex acuminate, chartaceous, glabrous, sometimes scabrous near tip, 7-nerved; palea elliptic, 2–3 × 0.4–0.8 mm, apex obtuse or acute, margins entire, hyaline, glabrous, nerveless. *Upper floret* bisexual; lemma elliptic-oblong or lanceolate, 1.2–2 × 0.3–0.6 mm, apex acute, margins entire, cartilaginous, glabrous, nerveless; palea elliptic-oblong or lanceolate, 1.2–2 × 0.3–0.6 mm, apex acute, margins entire, cartilaginous, glabrous, nerveless. *Lodicules 2*, truncate, 0.2–0.3 mm long. *Stamens 3*; filaments 0.5–1 mm long; anthers brown or purple, 1–1.8 mm long. *Ovary* oblanceolate or oblong, 0.3–0.8 × 0.1–0.2 mm; styles 2; stigma 1–1.8 mm long, plumose. *Caryopsis* obovoid or ellipsoid, 1–1.6 × 0.3–0.6 mm.

Thailand.—NORTHERN: Nakhon Sawan [Beung Boraphet, Nok Nam Park, Phra Non Subdistrict, 24 Jan. 2005, *Maxwell 05-70* (**CMUB**), Beung Boraphet, 100 m alt., 30 Aug. 1999, *Norsaengsri 874* (**QBG**), 26 Nov. 1987, *Vacharee 824* (**BK**)]; NORTH-EASTERN: Udon Thani [about 3,300 m N of Udon Thani city, along highway 2, 13 July 1976, *Heckman G-25* (**K**)]; EASTERN: Surin [Prasat, 21 Oct. 2017, *Wessapak 415* (**BK, BKF**)]; CENTRAL: Suphan Buri [Bang Pla Ma, 17 Sept. 2017, *Wessapak 398* (**BK, BKF**)]; Phra Nakhon Si Ayutthaya [Sena, below 10 m alt., 23 Sept. 1930, *Kerr 19711* (**BK, K**); Bang Sai, 17 Sept. 2017, *Wessapak 395, 396, 397* (**BK, BKF**)]; SOUTH-EASTERN: Chanthaburi [Makham, 50 m alt., 8 June 1960, *Smitinand & St. John 6854* (**BKF, K**)].

Distribution.—India, Bangladesh, Sri Lanka, Maldives, Myanmar, Malaya, Indonesia (Java, Sulawesi, New Guinea), Philippines, Australia.

Ecology.—Growing in swampy places, marshes, lakes, paddy fields, and ditches, at 0–200 m alt. Flowering and fruiting: June–January.

Vernacular.—Ya phraek nam (หญ้าพรอคน้ำ) (Bangkok).

Proposed IUCN conservation status.—This is a very widespread species. It usually occurs in large populations from almost all floristic regions of Thailand and its habitats have no major threats.

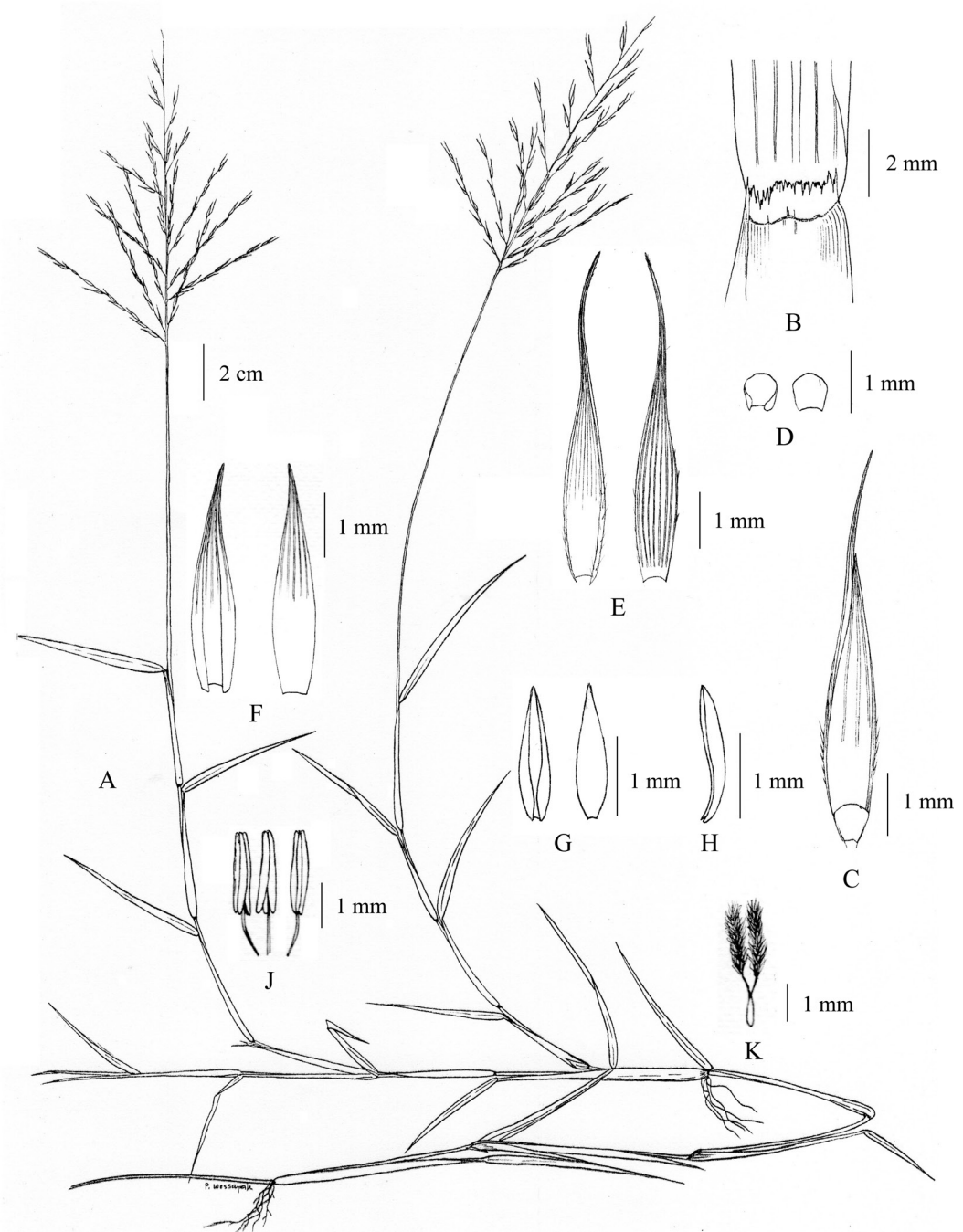


Figure 4. *Pseudoraphis spinescens* (R.Br.) Vickery: A. habit; B. ligule; C. spikelet; D. lower glumes; E. upper glumes; F. lower lemmas; G. lower paleas; H. upper lemma; J. stamens; K. pistil. Drawn from Wessapak 396 (BK) by Paweena Wessapak.



Figure 5. The comparison of spikelets: A. *Pseudoraphis balansae* Henrard; B. *P. brunoniana* (Wall. & Griff.) Pilg.; C. *P. minuta* (Mez) Pilg.; D. *P. spinescens* (R.Br.) Vickery.

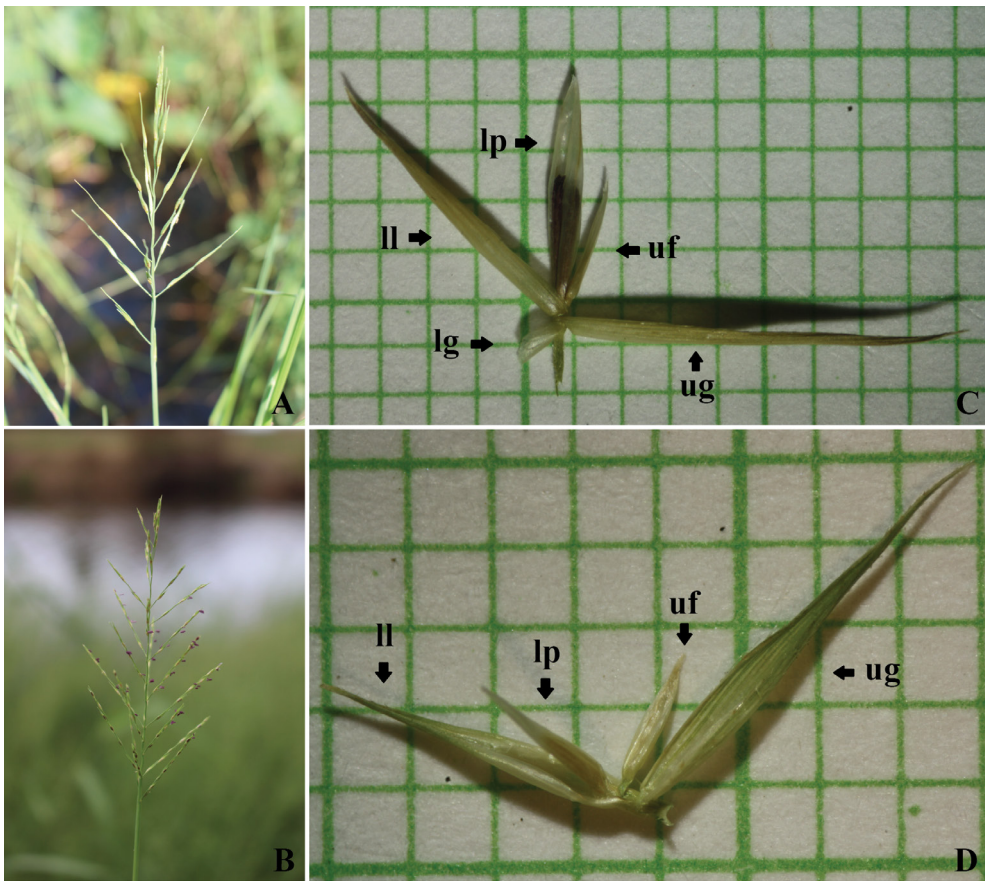


Figure 6. The comparison of some characters: A.-B. inflorescence; C.-D. spikelet; A. & C. *Pseudoraphis brunoniana* (Wall. & Griff.) Pilg.; B. & D. *P. spinescens* (R.Br.) Vickery. [lg = lower glume, ug = upper glume, ll = lower lemma, lp = lower palea, uf = upper floret]

The species also occurs in several countries and therefore, it should be considered as of Least Concern (LC).

Notes.— This species is the most common species of the genus in Thailand. The specific epithet “*spinescens*” from Greek word, “*spinesco*” meaning “become thorny”, refers to the pungent terminal raceme (Simon *et al.*, 2011) which is also the distinguishing character of this genus.

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