

## NEW SPECIES OF *FESTUCA* L. (GRAMINEAE) OF MALESIA

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### SUMMARY

Three new species of *Festuca* L. (Gramineae) from Malesia are described. A key and collector's list to all Malesian species are provided.

### INTRODUCTION

*Festuca* L. (Gramineae) is a genus of more than 450 species in the temperate regions and tropical mountains. Presently there are eleven species known for Malesia of which three are described as new below.

According to Alexeev (1977) the Malesian species belong to two subgenera. One is *Festuca* subg. *Subulatae* (Tzvel.) E.B. Alexeev represented by the rather widespread *F. leptopogon* Stapf and its N Sumatran satellite *F. sumatrana* Jansen. St.-Yves (1925, 1928, 1934, 1936) regarded this species as part of the Siberian/American *F. subulata* Trin. complex, with two varieties in America, and a var. *hochreutineri* St.-Yves in Java as an intermediate between the Asian varieties *leptopogon* and *japonica* Hack. (= *F. extremiorientalis* Ohwi). With the exception of var. *hochreutineri*, which cannot be distinguished, all these are regarded as distinct species in present literature. From its distribution and that of its alliance it seems obvious that it is an Asian species. In its present circumscription it occurs from Sikkim to Yunnan and Taiwan (as *F. takasagoensis* Ohwi), in Malesia in Sumatra, Java, Celebes, the Philippines, and Timor between 1600 and 2000 m altitude.

The other subgenus is *Festuca* subg. *Festuca*. St.-Yves (1927: 78; 1928: 412, invoking the Wegener theory of continental drift!; 1929) included some African taxa as varieties in *F. nubigena* Jungh. s.l.: var. *caprina* (Nees) St.-Yves (*F. caprina* Nees) and var. *longearistata* St.-Yves (*F. caprina* var. *macra* Stapf) from the Cape, and var. *macrophylla* (A. Rich.) St.-Yves (*F. macrophylla* Hochst. ex A. Rich.) from Ethiopia. Clayton (1970) considered *F. caprina* and *F. macrophylla* as distinct species with *F. nubigena* as part of this African complex. *Festuca nubigena* proper occurs in Java and Sumba between 2130–3400 m altitude.

St.-Yves (1927, 1928) already pointed out affinities with the European *Festuca amethystina* L. in which he was followed by Markgraf-Dannenberg (1973), who,

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moreover, found similarities to the Asian *F. jacutica* Drob., *F. kansuensis* Markgr.-Dann., and *F. kashmiriensis* Stapf of the subsection *Exaratae* St.-Yves (1922; 1929: 78).

Although they have been confused with it, the equally subalpine species from Ceram and New Guinea, e.g. *F. serana* Markgr.-Dann. and *F. crispatopilosa* Bor, *F. jansenii* Markgr.-Dann., *F. markgrafiae* Veldkamp, and *F. parvipaleata* Jansen, do not stand in a really near connection to it.

*Festuca jansenii* and *F. serana* appear to be close because of the infolded margins of the sheaths and subglabrous ovaries. In overall similarity, however, *F. papuana* is very similar and more collections from Ceram may show that the taxon is not tenable.

It is curious to note that no *Festuca* has so far been discovered on Mt Kinabalu (Borneo), where most of the temperate grass genera found in Malesia usually have representatives.

#### KEY TO THE TAXA

N. B.: 'Lemma', 'awn', 'palea', 'anther' refer to those of the first (lowermost) floret.

- 1a. Lower glume 0.25–0.33 times as long as the first lemma . . . . . 2
- b. Lower glume 0.35–1 times as long as the first lemma . . . . . 3
- 2a. Blades flat, flaccid (convolute in the innovations), (2–)3–8 mm wide. Panicle drooping, 15–30 cm long, lowest longest branch 10–15 cm long, many-spikeled. Lowest longest branch of the panicle 10–15 cm long. Lower glume up to 0.25 times as long as the first lemma. Upper glumes 2.25–4.25 mm long. Awn 9–11 mm long, 1.3–1.4 times as long as the lemma. — W Malesia, Philippines . . . . . *F. leptopogon*
- b. Blades setaceous, rather stiff, 0.6–1.35 mm wide. Panicle erect, 6–8 cm long, lowest longest branch 3–4 cm long, c. 3-spikeled. Lower glume c. 0.33 times as long as the first lemma. Upper glumes 4.75–7 mm long. Awn 3–6 mm long, 0.7–0.75 times as long as lemma. — Sumatra . . . . . *F. sumatrana*
- 3a. Anthers 1–2.75 mm long, 0.15–0.5 times as long as the palea. — Ceram, New Guinea . . . . . 4
- b. Anthers 3.5–4.5 mm long, 0.5–0.65 times as long as the palea. — Peduncle under the panicle puberulous. Branches of the inflorescence scaberulous. Sumatra, Java, Lombok . . . . . *F. nubigena*
- 4a. Peduncle under and branches of the inflorescence smooth to scaberulous . . . . . 5
- b. Peduncle under and branches of the inflorescence puberulous to crispy pubescent. — New Guinea . . . . . 9
- 5a. Spikelets 2–5-flowered. Lower glumes 2.5–6.5 mm long, 0.35–0.8 times as long as the first lemma. Awn 0.8–6 mm long . . . . . 6
- b. Spikelets 1- (or 2-)flowered. Lower glumes 6.5–7 mm long, 0.85–0.9 times as long as the first lemma. Awn 6.5–7.5 mm long. — Anthers 0.3–0.33 times as long as the palea. Papua New Guinea (Central Prov.) . . . . . *F. marcopetri*
- 6a. Young blades outside glabrous. Panicle axis glabrous or scaberulous, branches scaberulous. First lemma glabrous or scaberulous. Palea 0.8–1 times as long as the lemma . . . . . 7

- b. Young blades outside patently puberulous. Panicle axis and branches finely setulose. Palea 0.67–0.8(–1) times as long as the lemma. First lemma finely setulose. — New Guinea (Wilhelmina to Rawlinson Range) . . . *F. parvipaleata*
- 7a. Panicle erect, axis scaberulous. Upper glumes 3.1–6.5 mm long. Lowest rhachilla joint smooth. First lemma 4.5–8.1 mm long. Anthers 0.2–0.5 times as long as the palea . . . . . 8
- b. Panicle drooping, axis smooth. Upper glumes 6.3–9.5 mm long. Lowest rhachilla joint finely setulose. First lemma 8–10.5 mm long. Anthers 0.15–0.2 times as long as the palea. — Blades 0.25–0.65 mm wide. Awn 1.6–4.5 mm long. New Guinea . . . . . *F. markgrafiae*
- 8a. Blades 0.45–0.8 mm wide. Lowest, longest branch of panicle 2–5 cm long. Awn 0.85–3 mm long. — New Guinea . . . . . *F. papuana*
- b. Blades 0.25–0.4 mm wide. Lowest, longest branch of panicle 0.75–2 cm long. Awn 3–6 mm long. — Ceram . . . . . *F. serana*
- 9a. Panicles erect, axes, branches, and spikelets shortly to crispy pilose. Spikelets 1–3-flowered. Lowest rhachilla joint puberulous. Awn 3.2–9 mm long, 0.3–1.4 times as long as the first lemma . . . . . 10
- b. Panicles drooping, axes, branches, and spikelets densely, finely setulose. Spikelets 4–8-flowered. Lowest rhachilla joint finely setulose. Awn 1.75–4 mm long, 0.2–0.5 times as long as the first lemma. — Carstensz to Star Mts . . . . . *F. jansentii*
- 10a. Blades 0.7–1.5 mm wide. Inflorescence with crispy pilose axes, branches, and spikelets. Anthers 0.3–0.4 times as long as the palea . . . . *F. crispato-pilosa*
- b. Blades 0.4–0.85 mm wide. Inflorescence with densely, shortly pilose axes, branches, and spikelets. Anthers 0.2–0.33 times as long as the palea. — Morobe, Central Prov. . . . . *F. monantha*

***Festuca marcopetri* Veldkamp, *spec. nov.***

*Ancistragrostis* sp.: Coode & P.F. Stevens, Proc. P.N.G. Sc. Soc. 23 (1972) 24.

Folia glabra, pedunculus infra inflorescentiam glaber, panícula erecta, axis ramisque setulosis, gluma inferior 6.5–7 mm longa lemmate primo 0.85–0.9-plo longior, palea inferior lemmate aequalis ad paulo longior, antherae 2–2.5 mm longae palea 0.3–0.33-plo longiores. — Typus: NGF 46318 (Coode & Stevens) (L holo; A, BISH, BO, BRI, CANB, K, LAE, SING), Papua New Guinea, Central Prov., Mt Scratchley, 3350 m, 7 May 1971.

Culms 30–45 cm high, peduncles glabrous below the panicle. Blades setaceous, 14–15 cm by 0.6–0.85 mm diam., outside glabrous. Panicles erect, c. 8 cm long, branches setulose on the edges, lowest longest one 2.5–4 cm long, 4–6-spikeled. Spikelets 1- (or 2-)flowered, up to 8–8.5 mm long (excl. awns). Lower glumes 6.5–7 mm long, 0.85–0.9 times as long as the first lemma; upper glumes 7.2–7.8 mm long. Rhachilla setulose. First lemma 7.25–8 mm long, slightly scaberulous in the upper half, awn 6.5–7.5 mm long, 0.87–0.93 times as long as the lemma. First palea equal to slightly longer than the body of the lemma. Anthers 2–2.5 mm long anthers, 0.3–0.33 times as long as the palea.

Distribution — Papua New Guinea, Central Prov. (Mt Scratchley).

Habitat — Damp tussock grassland, 3350 m altitude.

Anatomy — Nerves 5–7, costae 5–7, sclerenchymatous bundles thick to very thick, nearly all contiguous with the nerves, the marginals not expanded inwards, caps absent. Hereby it is similar to that of *F. monantha*.

Collector's notes — Tussocks to 23 cm diam. Spikelets purplish and green. The remarks about hooked awns, number and sexuality of the spikelets made by Coode & Stevens (1972) must be due to some confusion.

Eponymy — Named after Mark J.E. Coode and Peter F. Stevens, first collectors of this species.

### *Festuca markgrafiae* Veldkamp, *spec. nov.*

*Brachypodium sylvaticum* (Huds.) Beauv. var. *luzoniense* auct., non Hara: R.J. Johns & P.F. Stevens, Bot. Bull., Lae 6 (1971) 10; Coode & P.F. Stevens, Proc. P.N.G. Sc. Soc. 23 (1972) 24.

*Festuca nubigena* auct., non Jungh.: Hitchc., Brittonia 2 (1936) 107, p.p.; Jansen, Acta Bot. Neerl. 2 (1953) 368, p.p.

*Festuca paucispicula* Markgr.-Dann., in sched. (see note).

Folia setacea satis rigida 0.25–0.65 mm diam. glabra, pedunculus infra paniculam glaber, panicula cernua 5–14 cm longa, axis glaber, rami scaberuli, glumae inferiores 3.5–6.5 mm longae lemmate primo 0.35–0.6-plo longiores, glumae superiores 6.3–9.5 mm longae, lemma primum 8–10.5 mm longum scabrum, arista 1.6–4.5 mm longum lemmate primo 0.12–0.57-plo longior, internodium infimum setulosum, antherae 1.1–1.6 mm longae palea prima 0.15–0.2-plo longiores. — Typus: *Brass 4204* (US holo), Papua New Guinea, Central Prov., Albert Edward, 3680 m, May/July 1933.

Culms 30–70 cm high, glabrous. Blades setaceous, 6–19 cm by 0.25–0.65 mm diam., outside glabrous. Panicles drooping, 5–14 cm long, axes smooth, branches sparsely scaberulous on the edges, lowest longest one 1.5–7 cm long, 1–6-spikeled. Spikelets 2–4-flowered, 8–11.5 mm long (excl. awns). Lower glumes 3.5–6.5 mm long, 0.35–0.6 times as long as the first lemma; upper glumes 6.3–9.5 mm long. Lowest rhachilla joint sparsely setulose. First lemma 8–10.5 mm long, minutely scaberulous; awn 1.6–4.5 mm long, 0.12–0.57 times as long as the lemma, about straight. First palea (0.7–)0.8–1 times as long as the lemma. Anthers 1–1.6 mm long, 0.15–0.2 times as long as the palea.

Distribution — New Guinea: Irian Jaya (Wilhelmina); Papua New Guinea: W Sepik (Star Mts), Chimbu (Wilhelm), Eastern Highlands (Piora), Central (Albert Edward, Strong, Yule), Milne Bay Prov. (Suckling).

Habitat — Subalpine forest glades, moist to wet areas in short-grasslands or short-herb fields, 3100–3680 m altitude.

Anatomy — Blades 3–5-nerved, larger nerves contiguous with the sclerenchymatous bundles, the smaller free, costae 3–5, sulci 2–4, bulliform cells and caps absent.

Collector's notes — Culms, inflorescences tinged with purple. Panicles pendulous.

Eponymy — Mrs. Markgraf-Dannenberg had labeled the material of this species *F. paucispicula* Markgr.-Dann., a combination meanwhile made by Fuente García & Sánchez-Mata (1986) for a Spanish taxon of the *F. trichophylla* (Gaudin) K. Richter group. I have taken the liberty to change the epithet in honour of Mrs. Markgraf. — (JFV).

***Festuca serana* Markgr.-Dann., *spec. nov.****Festuca* sp.: Steen., Bull. Jard. Bot. Buitenzorg III, 13 (1934) 214.

Folia 0.25–0.4 mm diam. glabra, pedunculus infra paniculam glaber, axis ramulique scaberuli, ramus inferior 1- vel 2- spiculatus, gluma inferior 2.5–6.5 mm longa lemmate inferiore 0.4–0.8-plo longa, gluma superior 4.5–6.2 mm longa, rachillae lemma inferius 5.6–8.1 mm longa, arista 3–6 mm longa gracilis flexuosa, palea inferior lemmate subequali, internodium infimum glabrum vel sparse setulosum, antherae 1.8–2.5 mm longae palea prima 0.25–0.4-plo longiores. — Typus: *Stresemann 255* (L holo; BO), Ceram, G. Binaya, 2750–3000 m, August 1911.

Culms 9–27 cm high, glabrous below the panicle. Blades setaceous, 2.5–9 cm by 0.25–0.4(–0.6) mm diam., smooth. Peduncle glabrous under the panicle. Panicles erect, 2.5–6.5 cm long, branches scaberulous, lowest longest one 0.75–2 cm long, 1- or 2-spiked. Spikelets 3- or 4-flowered, 6.75–9 mm long (excl. awns). Lower glumes 2.9–6.5 mm long, 0.4–0.8 times as long as the first lemma; upper glumes 4.5–6.2 mm long. Lowest rachilla joint smooth or with a few spicules. First lemma 5.6–8.1 mm long, smooth to minutely scaberulous in the upper part; awn 3–6 mm long, 0.4–1 times as long as the lemma, slightly flexuous. First palea subequal to the lemma. Anthers 1.8–2.5 mm long, 0.25–0.4 times as long as the palea.

Distribution — Ceram (Binaya).

Habitat — Subalpine grasslands on limestone, 2750–3000 m altitude.

Anatomy — Blades in transverse section usually inequilateral, nerves 4 or 5, costae 3, half the height of the blade, sclerenchyma bundles 7, small, free from the nerves.

Collector's notes — The most common grass in the subalpine meadows, especially on the ridge.

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## INDEX TO COLLECTORS

(T) = type; (n.v.): collection not seen.

*Festuca*

crp = *crispato-pilosa* Bor  
 jan = *jansenii* Markgr.-Dann.  
 lep = *leptopogon* Stapf  
 mar = *marcopetri* Veldkamp  
 mon = *monantha* Stapf

mrk = *markgrafiae* Veldkamp  
 nub = *nubigena* Jungh.  
 pap = *papuana* Stapf  
 par = *parvipaleata* Jansen  
 ser = *serana* Markgr.-Dann.  
 sum = *sumatrana* Jansen

- Afriastini 263: nub — ANU 2413 (Flenley): crp; 5012 (Walker): crp; 5167 (id.): pap; 5249 (id.): pap; 7203 (McVean & Wade): pap; 7241 (id.) p.p.: crp; 7245 (id.): pap; 7406: (pap, n.v.); 7655 (Wade): pap; 7761 (Wade & McVean): jan; 10977 (Hope): crp; 13059 (Wade): crp; 15132 (J.M.B. Smith): pap; 15156 (id.): crp; 15379 (id.): crp; 15452 (id.): mrk — Arens s.n. 1/7/1912: nub — Arens & Wurth s.n. 22/4/1916: nub.
- Backer s.n. 7/6/1929: nub; 9740: nub; 21589-bis: lep; 25256-bis: lep; 25328: lep; 30312: lep; 36013: nub; 37210: nub; 37541: nub — Backer & Skottsberg s.n. 8/9/1929: nub — van Balgooy 466: pap; 619: crp; 641: mrk; 992: mrk — Beumée A-646-a: nub; A-661: nub — Brass 4204: mrk (T); 4206: pap; 4572: mrk; 9128: jan; 9325: crp; 9547: crp; 29951: crp; 30013 (van Deusen & Collins): pap — Brass & Meijer Drees 9128: jan; 9715 (T): jan (T); 9747: crp; 9823: jan; 9824: jan; 9845: par; 9976: crp (T); 10061: par (T); 10066: crp; 10070: par (T); 10071: par — van Breemen s.n. 30/12/1925: lep — BS 40326 (Ramos & Edaño): lep — Buwalda 8147: nub.
- Clason s.n. 31/8/1936: nub — Clemens 6107: pap; 7434: pap; 9417-a: crp; 9555-A: mon; 9919: pap; 9953: mon; 41403-a: par — Coert 34-95: nub — Cooper 13: jan; 17: jan — Craven 2696: pap; 2699: mon; 3053: mon; 3105: crp.
- Docters van Leeuwen-Reijnvaan 8192: nub; 8747: nub; 12243: nub; 13369: nub.
- Elbert 1099: nub; 1350: nub; 1365: nub; 2238: nub — Engler 5145: nub — Eyma 2260: (ser, n.v.).
- Gisius 14: lep; 151: nub.
- Hartley 11303: crp — Hochreutiner 395: lep (T) — Hoogland 9970: crp (T) — Hoogland & Pullen 5545: crp; 5767: pap — Hoogland & Schodde 7040: crp — Hopkins 873: pap.
- Jeswiet s.n. 7/1918: nub; 8/7/1929: nub.
- Kalkman 5142: par — Koorders 43537, 43548, 43781, 43782, 43859, 48014: all nub.
- LAE 54457 (Stevens & Veldkamp): mrk; 55989 (Stevens & Forman): crp; 55990 (id.): pap; 56836 (Kerenga & Garki): pap; 61359 (Croft et al.): mon; 61407 (Croft & Hope): mon; 61437 (id.): crp; 65920 (id.): mrk; 67403 (Barker & Umba): mrk; 67414 (id.): jan; 68066 (Croft & Hope): jan; 68090 (id.): par; 68415 (Croft & Lelean): pap — Lörzing 615: nub.
- Mangen 547: crp; 591: jan; 700: crp; 708: crp; 715: jan; 718: crp; 950: crp; 978: crp; 989: crp; 1071: crp; 1105: jan; 1108: crp; 1127: jan; 1224: par; 1249: crp.
- NGF 8972 (Womersley): pap; 16573 (Henty & Carlquist): mrk; 16604 (id.): pap; 20010 (van Royen): pap; 20016-A (id.): crp; 40231 (Coode et al.): pap; 46238 (Coode & Stevens): mrk; 46244 (id.): pap; 46318 (id.): mar (T).
- Paijmans 1161: crp; 1229: crp; 1244: crp — Posthumus 4089: nub — Pullen 339: pap; 2868: crp; 5095: par — van der Pijl 569: lep; 767-c: lep.
- Rant s.n. 9/4/1927: nub — Raynal 17337: (pap) — Robbins 318: crp; 3319-a: crp — van Royen 11629: pap.
- Schiffner 1494: lep — Schodde 1774: crp — van Slooten 2681: lep — J.M.B. Smith 640: lep — van Steenis 4068: nub; 4818: nub; 4931: lep; 6789: lep; 7043: nub; 7257: lep; 9629: sum (T); 10932: nub; 10934: lep; 10946: nub; 11678: nub; 11872: lep; 11894-a: nub; 11937: lep; 12110: lep; 12166: lep; 18416: lep; 18454: lep; 18461: lep; 18469: lep — Stresemann 255: ser (T).
- Toxopeus 13: lep.
- Veldkamp 6227: jan; 6438: jan; 6448: mrk; 6488: par; 6508: jan; 6521: mrk; 6633: crp — Veldkamp & Stevens 5665: pap; 5758: pap; 5848: mrk — Veldkamp & Vinas 7457: par — Veldkamp & Wiakabu 7691: par — Voogd 2625: nub.
- Wirio 52: lep — Wissel 22: jan; 23: jan — Wurth s.n. 7/9/1907: nub; 4/10/1917: nub.
- Zollinger 575-z = Zollinger 3967: nub.