

***Boesenbergia basispicata* (Zingiberaceae), a new record for Peninsular Malaysia**

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ABSTRACT. *Boesenbergia basispicata* K.Larsen ex Sirirugsa was recently discovered from a limestone hill in Perak, Peninsular Malaysia. This brings the total number of *Boesenbergia* species in Peninsular Malaysia to 12. A description, colour plates and notes on this species are provided.

Keywords. Limestone, Peninsular Thailand, Perak

Introduction

Boesenbergia Kuntze is a genus of gingers found in tropical Asia. The genus consists of about 80 species ranging from India to China and Southeast Asia (Larsen et al., 1998; Saensouk & Larsen, 2002; Mood et al., 2014). Holttum (1950) published the first comprehensive treatment of the genus in Peninsular Malaysia in which he recognised eight species, namely *Boesenbergia clivalis* (Ridl.) Schltr., *B. curtisii* (Baker) Schltr., *B. flava* Holttum, *B. longipes* (King & Prain ex Ridl.) Schltr., *B. plicata* (Ridl.) Holttum, *B. prainiana* (King ex Baker) Schltr., *B. pulcherrima* (Wall.) Kuntze and *B. rotunda* (L.) Mansf. Among these, *Boesenbergia rotunda* is not considered to be native as only cultivated plants were sighted. Since then, there was no taxonomic work on the genus in Peninsular Malaysia until Lim (2008) named a new species, *Boesenbergia kenali* C.K.Lim, from Kelantan. He also provided a checklist for Peninsular Malaysian *Boesenbergia* in which 11 species were listed. The species newly added to the list included *Boesenbergia lurida* (Ridl.) Loes., which was resurrected from synonymy of *B. plicata* (Ridl.) Holttum, and the rediscovery of *B. minor* (Bak.) Schltr. Recently, a Thai species, *Boesenbergia basispicata* K.Larsen ex Sirirugsa, was discovered in northern Peninsular Malaysia, adding another species to the list.

Boesenbergia basispicata K.Larsen ex Sirirugsa, *Nordic J. Bot.* 7: 423 (1987); Sirirugsa, *Nat. Hist. Bull. Siam Soc.* 40: 67 (1992). – TYPE: Thailand, Nakhon Si Thammarat, Kao Luang, in evergreen forest, 300 m, 2 May 1926, *Kerr 15575* (holotype K; isotypes BK, BM). (Fig. 1)

Rhizomatous evergreen herb c. 50 cm tall, 1–(2) leafy shoots per clump. **Rhizome** short, not branched, 8–10 mm in diam., light yellow internally, roots tuberous. **Leafy shoot** composed of 3–4 leaves, arranged distichously, with no obvious pseudostem; **bladeless sheath** 1–2, to 11 cm long, mottled with red, soon decaying; **leaf sheath** 11.5–15 cm, longitudinally ridged, green mottled sparsely with red, margin thin and broad; **ligule** thin, bilobed, lobes triangular, c. 2 mm long; **petiole** 11.5–15 cm long, deeply channelled; **lamina** ovate to narrowly ovate, largest 25–28 × 10.3–13.5 cm, adaxially green, main veins slightly raised (not plicate), abaxially pale green, tinged red on old leaves, apex acute to attenuate, base oblique and subcordate. **Inflorescence** radical, 7.5–9 cm long, mottled with red; **peduncle** 1–3 cm long, covered with sheathing bract; **spike** conical, 6.5–8 cm long, composed of 10–11 distichously arranged overlapping fertile bracts (lowermost bract sterile); **fertile bracts** 22–28 × c. 10 mm, elliptic, boat-shaped, glabrous, apex acute, margin incurved, each bract supporting single flower; **bracteole** 17–20 mm long, shorter than bract, cylindrical, open to the base, glabrous, apex acute. **Flower** 4–5 cm long, white except the variegation on labellum; **calyx** c. 5 mm long, tubular, glabrous, apex truncate, sometimes with a slight incision; **floral tube** 30–35 mm long, slender, c. 1 mm in diam. at base, widening to 2 mm distally, glabrous externally and internally; **corolla lobes** c. 13 × 4–6 mm, elliptic, membranous, apex obtuse, margin incurved but not overlapping, dorsal lobe with hooded apex; **androecial tube** c. 1 cm long, sparsely hairy internally; **labellum** c. 18 × 17 mm, saccate, suborbicular, abaxially sparsely hairy, white, centrally yellow mottled with red, the yellow extending as 2 bands to apical, ending c. 5 mm before touching the apex, apical area chilli-red, slight pinkish tinge on both sides, apex wrinkled and deflexed, margin entire; **lateral staminodes** c. 10 × 5 mm, broadly elliptic, sparsely hairy abaxially, apex broadly acute. **Stamen** c. 7 mm long, with sparse glandular hairs abaxially; **filament** c. 2 mm long; **anther** c. 6 mm long, without anther-crest, anther thecae dehiscing longitudinally. **Ovary** obovoid, c. 3 mm long, glabrous, unilocular, free-basal placentation in mature flowers; **style** c. 46 mm long, filiform, glabrous, stigma less than 0.5 mm long, club-shaped, glabrous, ostiole transverse, without cilia, face upwards; **epigynous glands** 2, c. 5 mm long, filiform. **Fruit** c. 10 × 5 mm, ellipsoid, glabrous, wall thin and translucent (dehiscence not observed); **seeds** ellipsoid, c. 7 × 2 mm, arillate, aril white, laciniate.

Additional specimens examined: PENINSULAR MALAYSIA: **Perak:** Hulu Perak, Belukar Semang Forest Reserve, Bukit Telor Ayam 1, limestone hill area, 15 Nov 2011, *Mohd. Hairul et al.* FRI 72405 (KEP); Tanah Hitam, limestone hill next to Rahman Plantation, 372 m altitude, 5°35.80' N 101°00.09' E, 17 Jul 2012, *Sam* FRI 68937 (KEP).

Habitat and ecology. Herbaceous vegetation on karst limestone substrate, surrounded by regenerating lowland evergreen rainforest. The plants were found on two small limestone outcrops covered with thick vegetation. They were seen growing in the crevices and ledges on the outcrop, about 10 m above the ground. These narrow pockets contained thick humus supporting the growth of herbaceous plants such as *Boesenbergia basispicata*, aroids (*Arisaema fimbriatum* Mast.), gesneriads (*Damrongia*

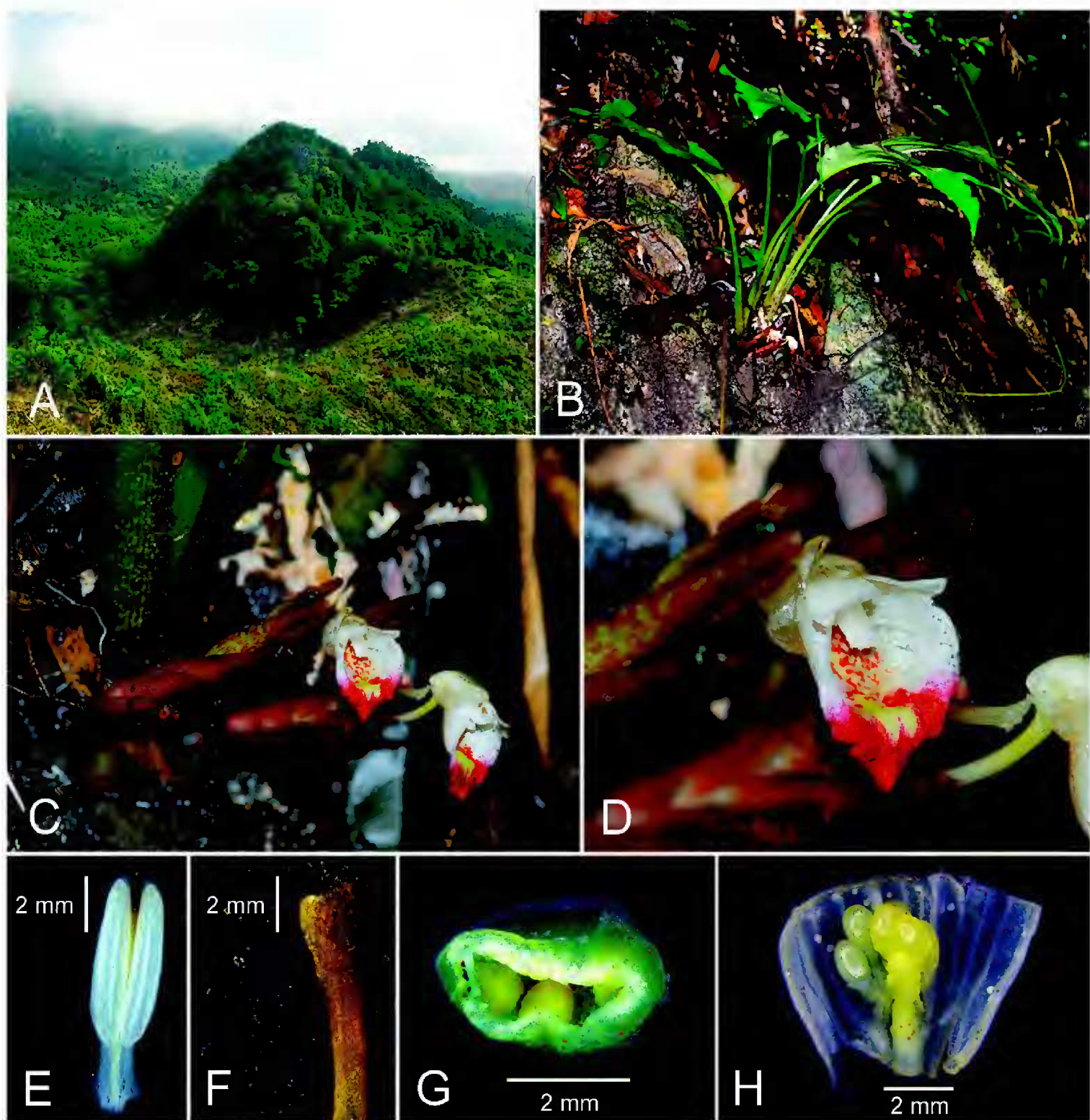


Fig. 1. *Boesenbergia basispicata* K.Larsen ex Sirirugsa. **A.** The limestone outcrop where the plants were found, adjacent land has been cleared for planting rubber trees. **B.** Plant clinging onto the limestone cliff face. **C.** Radical inflorescences. **D.** Flower. **E.** The dehisced anther thecae. **F.** Stigma. **G.** The cross section of ovary. **H.** Free-basal placentation. (Photos: Y.Y. Sam)

lacunosa (Hook.f.) D.J.Middleton & A.Weber, *Epithema saxatile* Blume, *Microchirita rupestris* (Ridl.) A.Weber & Rafidah, *Paraboea verticillata* (Ridl.) B.L.Burt), ferns and lycophytes (*Adiantum malesianum* Ghatak, *Pyrrosia penangiana* Holttum, *Selaginella frondosa* Warb.). This is the first report of *Boesenbergia basispicata* growing on a limestone substrate. In Southern Thailand, the plants are often found on damp slopes (Sirirugsa, 1992) and also near streams on sandstone with thick leaf litter (Mood, pers. comm.) in lowland evergreen forest.

The population of *Boesenbergia basispicata* at Belukar Semang Forest Reserve is potentially threatened by disturbance. Firstly, the Forest Reserve may suffer from encroachment through illegal land clearance, since it is now adjacent to a rubber plantation and thereby more accessible. Secondly, the land clearance for the adjoining rubber plantation has adversely affected the environment as the humidity and temperature have become less favourable to understorey plants like *Boesenbergia basispicata*.

Distribution. Peninsular Thailand and Peninsular Malaysia.

Notes. *Boesenbergia basispicata* was first discovered in Nakhon Si Thammarat and Trang Provinces, Peninsular Thailand (Sirirugsa, 1987) and later in the southernmost province of Narathiwat (Sirirugsa, 1992). It is one of only around eight species of *Boesenbergia* with an inflorescence emerging directly from the rhizome; most species produce a terminal inflorescence. In Peninsular Malaysia, *Boesenbergia basispicata* is the first species recorded with a radical inflorescence and this makes it easy to distinguish from the other species with a terminal inflorescences, especially from the otherwise similar *B. prainiana*.

In general, the plants at Belukar Semang Forest Reserve fit Sirirugsa's descriptions but differ in the ovate to narrowly ovate laminas with subcordate bases, whereas the Thai plants have oblong laminas with obtuse or cuneate to decurrent bases, the broader laminas (10.3–13.5 vs 4–9.5 cm), longer peduncles (1–3 vs 0.5 cm) and floral tubes (30–35 vs 25 mm) and smaller fruits (c. 10 × 5 mm vs c. 7 × 2 mm). A reviewer also noted that pseudostems have been observed in Thai populations. Another marked difference observed in the Peninsular Malaysian plant is its unilocular ovary with free-basal placentation in contrast to the incompletely trilocular ovary in Siriruga's account.

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