Taiwania 71(4): 675–679, **2026**
DOI: 10.6165/tai.2026.71.675

Plagiostachys andalasensis (Zingiberaceae): a new species from West Sumatra, Indonesia

Nurainas NURAINAS[1,2,*], Atthoriq FAUZAN[1], Rahmat S. AIPAMA[1], Witri ZULASPITA[2], Thoriq A. FEBRIAMANSYAH[2], Ahmad TAUFIQ[1]

1. *Department of Biology, Faculty of Mathematics and Natural Sciences, Universitas Andalas, Padang 25163, Indonesia.* ***2.*** *Herbarium Universitas Andalas (ANDA), Faculty of Mathematics and Natural Sciences, Universitas Andalas, Limau Manis, Padang 25163, West Sumatra, Indonesia. [*]Corresponding author's email: nurainas@sci.unand.ac.id*

(Manuscript received 7 March 2026; Accepted 12 August 2026; Online published 5 September 2026)

ABSTRACT: *Plagiostachys andalasensis* Nurainas, Fauzan & Zulaspita, a new species of Zingiberaceae from the Barisan Range, West Sumatra, Indonesia, is described and illustrated. This species is described based on morphological observations of specimens collected from the Universitas Andalas Educational and Biological Research Forest, Padang, West Sumatra, Indonesia. Morphologically, the species is characterised by a non-mucilaginous inflorescence and is most similar to *P. parva*, sharing a small stature, creeping rhizomes, and an unbranched inflorescence with an obconical spike. It is distinguished by its reddish-brown young leaves, longer petioles (4–7.5 cm), narrowly oblong green petals, and a yellow-orange labellum with central red spots and branched red lines extending towards the margin. A detailed morphological description, distribution, habitat information, pollen micromorphology, preliminary conservation assessment, photographic plates, and illustrations are provided.

KEY WORDS: Barisan range, endemic species, *Plagiostachys sumatrensis, Plagiostachys parva*, pollen morphology, tropical forest.

INTRODUCTION

The genus *Plagiostachys* Ridl. belongs to the ginger family, Zingiberaceae. The genus comprises a moderate number of species, all of which occur in natural habitats, and none are currently known to be cultivated. The genus is distinguished by its lateral inflorescences, which emerge through the leaf sheaths and may occur near the ground, along the middle portion of the leafy shoot, or towards its apex (Holttum, 1950; Smith, 1985). Currently, 31 species are recognised, with Borneo considered the centre of diversity. The natural distribution of the genus extends from China and the Nicobar Islands to Southeast Malesia (Julius *et al.,* 2007, 2008; POWO, 2025).

Taxonomic studies on the diversity and distribution of *Plagiostachys* in Sumatra remain limited. *Plagiostachys sumatrensis* Ridl. is currently the only species considered endemic to Sumatra (Newman *et al*., 2004). Ridley described the species based on a specimen collected in 1924 by Kloss (collection number *10584*) from Siberut Island, part of the Mentawai Archipelago, West Sumatra. Although additional species are suspected to occur in Sumatra based on herbarium specimens deposited at Herbarium Universitas Andalas (ANDA), however, complete reproductive material is still required for accurate taxonomic descriptions.

During an inventory of *Plagiostachys* in West Sumatra, several herbarium specimens preserved at Herbarium Universitas Andalas (ANDA) appeared distinct due to their smaller stature; however, these specimens lacked sufficiently developed reproductive structures for detailed examination. Subsequent field surveys were conducted at the same locality, the Universitas Andalas Educational and Biological Research Forest (HPPB), Padang, West Sumatra. During field explorations in June and November 2025, fresh material bearing well-developed inflorescences and infructescences was collected, allowing a clearer assessment of the morphological boundaries of this species.

Following detailed morphological examination, literature review and comparison with existing taxonomic keys (Kloss, 1926; Holttum, 1950; Cowley, 1999; Julius *et al.*, 2007), the specimens could not be matched with any previously described taxon, particularly those reported from Sumatra. However, it shares several morphological similarities with *P. parva* from Borneo, including rhizome spread, plant height, and spike morphology. Therefore, the species is here formally described as new to science.

Pollen micromorphological characters were also examined because a recent study of five *Plagiostachys* species from West Sumatra demonstrated that pollen shape and exine ornamentation provide useful taxonomic characters for genus-level classification within Zingiberaceae (Nurhasanah *et al*., 2026). Previously, spheroidal pollen with echinate-type exine ornamentation was reported for the genus *Plagiostachys* by Zou *et al*. (2022).

MATERIALS AND METHODS

Morphological study: Morphological observations and measurements were conducted using fresh material, alcohol-preserved specimens, dried herbarium specimens,

and field photographs. Digital images of the type specimen of *Plagiostachys sumatrensis* were obtained from the Singapore Herbarium (SING), while comparative materials from neighboring countries were accessed through GBIF (https://www.gbif.org) and Zingiberaceae Resource Center (http://padme.rbge.org.uk/ZRC) (GBIF, 2025; Newman, 2005). Morphological characters were compared with the original species descriptions and available type material of *P. sumatrensis* (*Kloss 1926*) and *P. parva* (*Beaman J.H. 7664 & 10932*). Detailed examinations of morphological characters were conducted using a stereomicroscope at magnifications of up to 40×. Images were captured using an Optilab Advance digital microscope camera. Morphological terminology follows Beentje and Williamson (2016).

Pollen study: Scanning electron microscopy (SEM) was used to examine pollen micromorphological characters. Pollen grains were collected from the anthers of fresh flowers. Pollen sample preparation followed the methods described by Huang *et al*. (2023) and Kajornjit *et al*. (2018). The samples were sputter-coated with gold for 3–5 min using a LUXORAu SEM coater (CT-2201-0170 series). The coated samples were examined using a Thermo Fisher Scientific Phenom P-Series scanning electron microscope.

Conservation assessment: The conservation status was assessed following the criteria and guidelines of the IUCN Standards and Petitions Committee (IUCN, 2024). The Extent of Occurrence (EOO) and Area of Occupancy (AOO) could not be reliably estimated because only a limited number of occurrence records were available. Therefore, the assessment relied primarily on the number of mature individuals and known threats.

TAXONOMIC TREATMENT

Plagiostachys andalasensis Nurainas, Fauzan & Zulaspita, ***sp. nov.*** **Fig. 1**

Type: INDONESIA. Sumatra: West Sumatra Province, Padang, Universitas Andalas Educational and Biological Research Forest, 0°54'20.50"S, 100°28'6.95"E, 200 m elev., 15 October 2025, *Nurainas 4371* (holotype: ANDA; isotype: SING, TAI).

Diagnosis: *Plagiostachys andalasensis* is characterised by a non-mucilaginous inflorescence and is most similar to *P. parva*. Both species share creeping rhizomes (with adjacent shoot separated by up to 10 cm): a small stature (up to 1 m tall): and an unbranched inflorescence with an obconical spike, three-toothed bracteole, and oblong-pyriform fruits. It differs from P. parva in having reddish-brown young leaves (vs. green): longer petioles (4–7.5 cm vs. 0.6–4.5 cm): narrowly oblong green petals (vs. ovate dorsal and elliptic lateral petals, pale to dark-red apices): and a yellow-orange labellum with central red spots and branched red lines extending toward the margins (vs. orange-red with darker red veins).

Description: Perennial herbs. Rhizome creeping, 7–10 cm between shoot. **Leafy shoot** 45–120 cm tall, bearing 4–9 leaves per shoot; petiole 4–7.5 cm long, green, glabrous to puberulous; lamina 20–38 cm long, 6.5–8.5 cm wide, narrowly oblong, base asymmetric cordate, apex long caudate, acumen 2–4 cm long, entire undulate, green above and green and reddish toward to margin beneath, glabrous; ligule 1–5 mm long, bilobed, apex obtuse, ciliate, yellowish-green, young leaves reddish-brown, pubescent to tomentose; sheath striate, glabrous. **Inflorescence** borne 30–52 cm above ground level, unbranched, spike obconical, 2.5–3 cm long, non-mucilaginous; bracts 4–5 sheets, 3–3.5 cm long and 0.8–1 cm wide, margins entire translucent; bracteoles narrowly-oblong, 2–5 mm long, apical-mucronate, partially decaying, yellowish green, translucent margin, tomentose to sericeus. **Flowers** 2 cm long; calyx tubular, trilobed, 6–12 mm long, 1–4 mm wide, green lower and partially decaying, pubescent; corolla tube 7–8 mm long, yellowish green, pubescent; dorsal petal narrowly oblong, hooded, 8–12 mm long, 1–4 mm wide, green, involute translucent margin, pubescent outside and glabrous inside; lateral petals narrowly oblong, hooded, 7–10 mm long, 2–4 mm wide, pubescent outside and glabrous inside, entire translucent margin; labellum elliptic, 12–13 mm long, 8–9 mm wide, apex rounded revolute, margin entire-revolute, yellow-orange with red-spotted in the centre and horizontal red branched line toward edges, glabrous; lateral staminodes linear, curved outwards, 1–2 mm long, yellowish-orange with red line; anthers oblong, 4–5 mm long, 2–2.5 mm wide, scabrid, white on the abaxial surface and reddish brown on the adaxial surface; pollen monad, prolate-spheroidal, echinate, anther crest small, ca. 1 mm height, 1.5–2 mm wide, retuse, yellowish-brown; filament narrow, 5–6 mm long, scabrid; style free on the corolla tube above the epigenous gland, filiform, 10–12 mm long, white, glabrous sparsely sericeus; stigma infundibuliform, 1–2 mm, scabrid, cream, with an erect ostiole opening; epigenous glands subulate, 2 covering style, 1–2 mm, cream; ovary ovoid, 3–4 mm long, ca.3 mm diam., sericeus, cream. **Capsule** oblong-pyriform, 15–20 mm long, 16–30 mm diameter, apex flat depressed with short calyx base, puberulous, green when young.

Distribution and habitat: *Plagiostachys andalasensis* is currently known from the Universitas Andalas Educational and Biological Research Forest (HPPB): Barisan Range forest near Padang city (Figure 2). It grows along a small river in a shaded environment at 229 m elevation.

Phenology: Flowering and fruiting occur from April to November.

Etymology: The specific epithet *andalasensis* refers to Universitas Andalas, within whose research forest the type locality is situated.

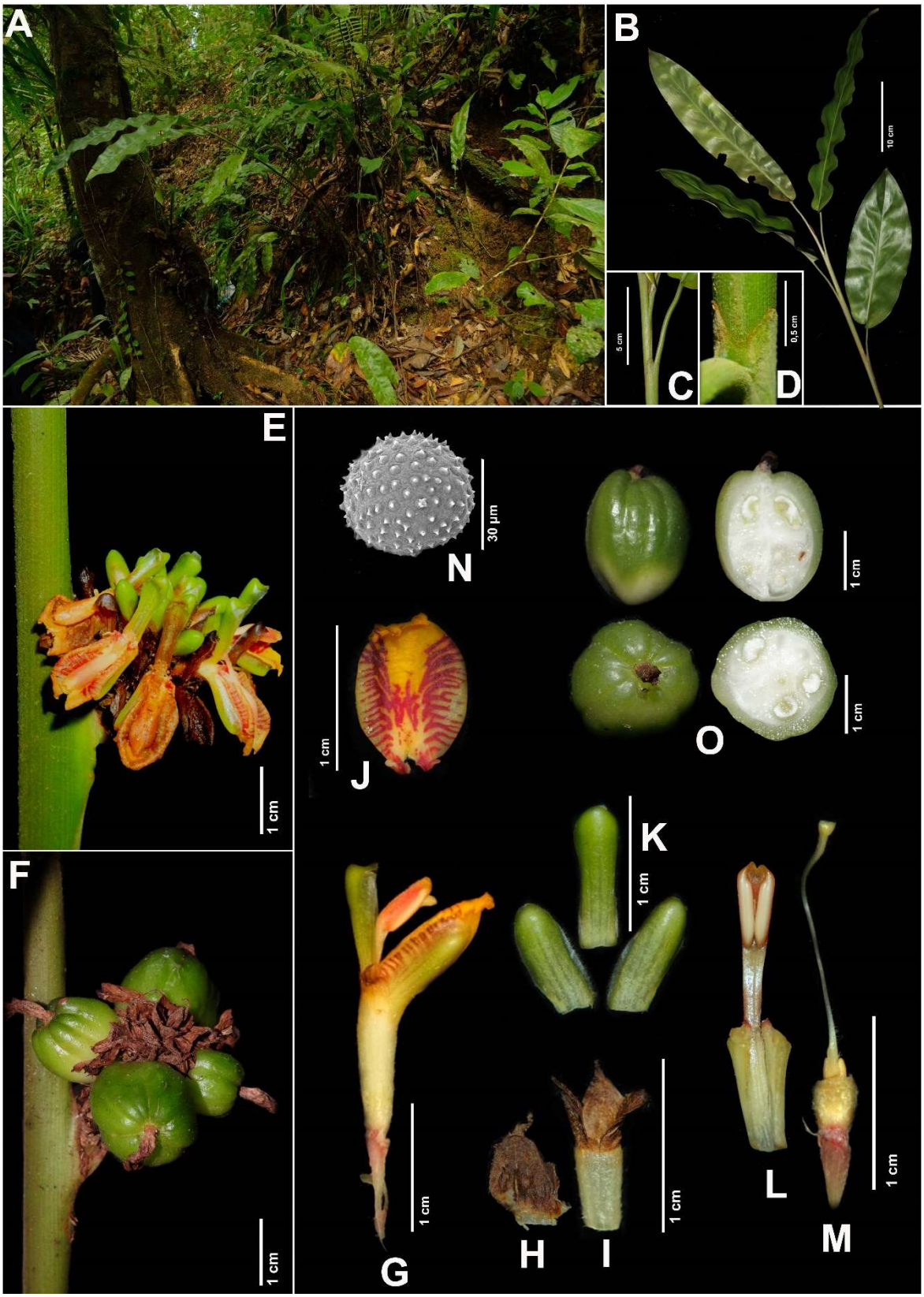

Fig. 1. ***Plagiostachys andalasensis*** Nurainas, Fauzan & Zulaspita. **A.** Habit. **B.** Lamina with an entire, undulate margin. **C.** Petiole. **D.** Ligule. **E.** Inflorescence. **F.** Infructescence. **G.** Flower. **H.** Bracteole. **I.** Calyx. **J.** Labellum. **K.** Corolla lobe. **L.** Stamen. **M.** Ovary and style. **N.** Pollen. **O.** Fruit. Photographs by T.A. Febriamansyah.

Table 1. Comparative morphology between ***Plagiostachys andalasensis, P. sumatrensis,*** and ***P. parva*.**

Character	*P. andalasensis*	*P. sumatrensis*	*P. parva*
Habit	Creeping 7–10 cm between shoot	tufted to short creeping	Creeping into 10 cm between shoot
Plant height	45–120 cm	1–3 m	60 cm
Petiole longth	4–7.5 cm	2–3 cm	0.6–4.5 cm
Lamina	narrowly oblong; green above and green with reddish toward to margin beneath, young leaves reddish-brown; asymmetric, cordate; undulate, entire	oblong; dull greenish yellow above and green beneath; attenuate to asymmetric-attenuate; ciliate	broadly ovate to oblong; green-bullate above and purple beneath; asymmetric, cordate, truncate or cuneate; crenate, ciliate.
Inflorescence	30–52 cm from base; unbranched; spike obconical	10–80 cm from base; 1–3 branches; oblong obtuse spike	1–3 (5) cm from base; unbranched; obconical spike
Bracteole	narrowly-oblong; yellowish green; mucronate, partially decaying	upper part soon decaying and leaving only veins; buff to amber; fringed	tubular at base free above for 3 mm; drying; free above
Calyx	tubular; 3-toothed, partially decaying; pubescent	tubular; fringed, partially decaying; tomentose outside, glabrous inside,	tubular, later splitting; dentate
Corolla tube	pubescent	glabrous	Pubescent.
Petal	narrowly oblong; green	ovate at dorsal and elliptic lateral; greenish-yellow	ovate at dorsal and elliptic lateral; pale to dark red at the tip
Labellum	Elliptic; yellow-orange with red-spotted in the centre and horizontal red branched line toward edges; rounded revolute	unguiculate; bright yellow; retuse, curved downwards	narrowed abruptly below into a claw; orange-red, with darker red veins; rounded with bilobed apex
Staminodes	Linear, curved outwards	subulate, curved outwards	spathulate
Stigma	infundibuliform.	clavate	cuneiform
Capsule	oblong-pyriform; 1.6–3 × 1.5–2 cm	oblate or ellipsoid; 0.5–1 × 0.8 –1 cm	oblong-pyriform; 1–1.5 × 0.8 cm

Provisional conservation status: *Plagiostachys andalasensis* is currently known from two small populations in Padang, West Sumatra: one in the Universitas Andalas Educational and Biological Research Forest (HPPB) and the other at Bukit Pinang-pinang. The total population is estimated to comprise fewer than ten mature individuals. At Bukit Pinang-pinang, individuals were recorded at the margin of community farmland, where habitat disturbance associated with shifting cultivation may threaten the population. Given its extremely small estimated population size, the species is provisionally assessed as Critically Endangered under criterion D (CR D), following the IUCN Red List Categories and Criteria and the guidelines of the IUCN Standards and Petitions Committee (2024).

Other specimens examined (paratypes): Indonesia: West Sumatra, Padang, Universitas Andalas Educational and Biological Research Forest (HPPB): 16 June 2025, Fauzan *et al.* AF-05 (ANDA0052880–0052884); Bukit Pinang-pinang, 26 April 2016, Elsa Okta Chalika *et al.* ElPP1 03_Pl (ANDA0043982–0043985).

Note: Morphological evidence clearly distinguishes *Plagiostachys andalasensis* from *P. sumatrensis*, the only species previously recorded from Sumatra (Table 1). *Plagiostachys andalasensis* differs from *P. sumatrensis* in having creeping rhizomes, with adjacent shoots separated by up to 10 cm (vs. rhizomes tufted or clumped): a smaller stature, up to 1.2 m tall (vs. 2–3 m tall); longer petioles, 4–7.5 cm long (vs. 2–3 cm long); an unbranched inflorescence with an obconical spike (vs. a branched inflorescence with oblong-obtuse spikes): a 3-toothed calyx (vs. fringed calyx): green petals (vs. yellow petals): an elliptic, yellow-orange labellum with red marking (vs. an unguiculate, bright yellow labellum): and larger oblong-pyriform fruits, 1.6–3 × 1.5–2 cm (vs. oblate or ellipsoid fruits, 0.5–1 × 0.8–1 cm).

Plagiostachys andalasensis most closely resembles *P. parva* in having creeping rhizomes, with adjacent shoots separated by up to 10 cm, a relatively small stature, an unbranched inflorescence with an obconical spike, 3-toothed bracteoles, and oblong-pyriform fruits. It differs, however, in having reddish-brown young leaves (vs. green): longer petioles 4–7.5 cm long (vs. 0.6–4.5 cm long): and narrowly oblong green petals (vs. an ovate dorsal and elliptic lateral petals, that are pale to dark red at the apices). The labellum of *P. andalasensis* is yellow-orange, with central red spots and branched red lines extending horizontally toward the margins, whereas that of *P. parva* is orange-red with darker red veins.

The pollen grains of *Plagiostachys andalasensis* occur as monads and are apolar and inaperturate, with echinate exine ornamentation. Under scanning electron microscopy, the pollen grains appear prolate-spheroidal. Pollen grains in Zingiberaceae are generally apolar, thin-walled and inaperturate (Erdtman, 1957; Theilade *et al.*, 1993; Shi *et al.*, 2011; Zou *et al.*, 2022). Previous studies have shown that pollen micromorphological characters, particularly exine ornamentation, are taxonomically informative within Zingiberaceae and may contribute to the delimitation of genera such as *Zingiber*, *Hornstedtia*, *Alpinia*, and *Kaempferia* (Rinaldi *et al*., 2024).

ACKNOWLEDGMENTS

The study was supported by the University Research Grant in 2025 (Grant No. 05/RD-BATCH II/RKAT-UNAND/FMIPA/1613/2025). We thank the Laboratory of Life Sciences, Engineering, and Technology, Universitas Airlangga for assistance with SEM imaging of pollen samples. We also express our sincere gratitude to the members of Herbarium Universitas Andalas (ANDA) for their valuable support in map preparation, image processing, and field survey, with special thanks to Nurhasnah.

LITERATURE CITED

Beentje, H., Williamson, J. 2016 The Kew plant glossary : an illustrated dictionary of plant terms. Kew Pub., Royal Botanic Gardens, Kew ; Distributed in North America by the University of Chicago Press.

Cowley, J. 1999 Two new species of *Plagiostachys* (Zingiberaceae) from Borneo. Kew Bull. **54(1)**: 139–146.

Erdtman, G. 1957 Pollen and Spore Morphology/ Plant Taxonomy. Almqvist & Wiksell, Stockholm.

GBIF 2025 GBIF Backbone Taxonomy: *Plagiostachys*. Global Biodiversity Information Facility. https://www.gbif.org/species/2758962

Holttum, R.E. 1950 The Zingiberaceae of the Malay Peninsula. Gard. Bull. Singapore **13**: 1–249.

Huang, X., Wu, R., Xiong, Z., Ma, Z. 2023 Pollen morphology of Clerodendrum L. (Lamiaceae) from China and its systematic implications. PhytoKeys **235**: 53–68.

IUCN 2024 Guidelines for Using the IUCN Red List Categories and Criteria, ver. 16. IUCN Standards and Petitions Committee, 16(March): 1–122.

Julius, A., Suleiman, M., Takano, A. 2007 Five New Species of *Plagiostachys* (Zingiberaceae) from Borneo. Acta Phytotax. Geobot. **58(1)**: 1–17.

Julius, A., Suleiman, M., Takano, A. 2008 Preliminary molecular phylogeny of Bornean *Plagiostachys* (Zingiberaceae) based on DNA sequence data of internal transcribed spacer (ITS). Research Article Journal Of Tropical Biology And Conservation **4(1)**: 67–80.

Kajornjit, P., Saensouk, S., Saensouk, P. 2018 Pollen morphology and leaf anatomy of genus Globba in Thailand. Sci. Asia **44(3)**: 146–161.

Kloss, C.B. 1926 Spolia Mentawiensia. Bull. Misc. Inform. Kew **1926(2)**: 56–94.

Newman, M. 2005 Zingiberaceae Resource Centre. Royal Botanic Garden Edinburgh. https://padme.rbge.org.uk/ZRC/

Newman, M., Lhuillier, A., Poulsen, A. D. 2004 Checklist of the Zingiberaceae of Malesia. Blumea **16(Suppl)**: 1–166.

POWO 2025 April 1. Plants of the World Online. Royal Botanic Gardens, Kew. https://powo.science.kew.org/

Rinaldi, A. Z. S., Nurainas, N., Syamsuardi, S. 2024 Morphology and palynology of the genus *Kaempferia* L. (Kencur) From West Sumatra. Floribunda **7(5)**: 202–210.

Shi, L.C., Zhang, J., Han, J.P., Song, J.Y., Yao, H., Zhu, Y.J., Li, J.C., Wang, Z.Z., Xiao, W., Lin, Y.L., Xie, C.X., Qian, Z.Z., Chen, S.L. 2011 Testing the potential of proposed DNA barcodes for species identification of Zingiberaceae. J. Syst. Evol. **49(3)**: 261–266.

Theilade, I., Mærsk-Møller, M. L., Theilade, J., Larsen, K. 1993 Pollen morphology and structure of *Zingiber* (Zingiberaceae). Grana **32(6)**: 338–342.

Zou, P., Newman, M., Liao, J.P. 2022 Systematics of Zingiberaceae. Grana **61(6)**: 448–470.

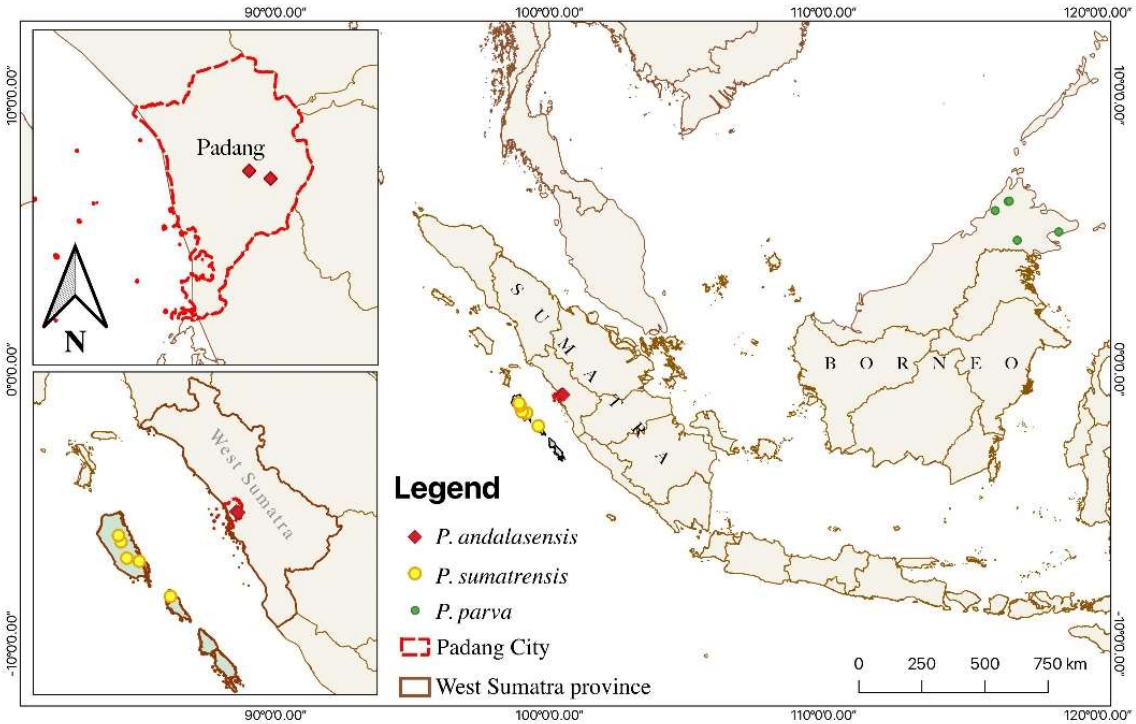

Fig. 2. Map showing the distribution of ***Plagiostachys andalasensis***, ***P. sumatrensis***, and ***P. parva***.