

## Short Communication: Two new species and new record of *Psydrax* Gaertn. (Rubiaceae: Vanguerieae) in Borneo

RIDHA MAHYUNI<sup>1,2,\*</sup>, TATIK CHIKMAWATI<sup>3</sup>, NUNIK SRI ARIYANTI<sup>3</sup>

<sup>1</sup>Plant Biology Graduate Program, Department of Biology, Faculty of Mathematics and Natural Sciences, Institut Pertanian Bogor. Jl. Raya Dramaga, Kampus IPB Dramaga, Bogor 16680, West Java, Indonesia

<sup>2</sup>Herbarium Bogoriense, Botany Division, Research Center for Biology, Indonesian Institute of Sciences. Cibinong Science Center, Jl. Raya Jakarta-Bogor Km. 46, Cibinong, Bogor 16911, West Java, Indonesia. Tel.: +62-21-87907604; 87907636, Fax.: +62-21-87907612 \*email: ridhamahyuni@gmail.com

<sup>3</sup>Department of Biology, Faculty of Mathematics and Natural Sciences, Institut Pertanian Bogor. Jl. Raya Dramaga, Kampus IPB Dramaga, Bogor 16680, West Java, Indonesia

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**Abstract.** Mahyuni R, Chikmawati T, Ariyanti NS. 2019. Short Communication: Two new species and new record of *Psydrax* Gaertn. (Rubiaceae: Vanguerieae) in Borneo. *Biodiversitas* 20: 2011-2015. *Psydrax sabahensis* Mahyuni and *P. wongii* Mahyuni are two new species endemic to Borneo proposed in this present study with descriptions, illustrations and map of distribution provided. *Psydrax sabahensis* has blades ovate to elliptic, with angle 60° to the midrib, tertiary venation conspicuous on both side, petiole length 10-13 mm long, inflorescence sub-umbellate and pedicels 23-27 mm long. *Psydrax wongii* has blade elliptic, with angle 45° to midrib, apex acuminate to caudate, secondary veins 3-4 pairs, tertiary venation inconspicuous on upper side and slightly wrinkled on lower surface. The presence of *P. maingayi* (Hook.f.) Bridson in Borneo, previously thought to be a Malay Peninsula endemic species, is also confirmed as a new record.

**Keywords:** Brunei Darussalam, Kalimantan, plant, Sabah, Sarawak

### INTRODUCTION

The first modern survey of *Psydrax* (Rubiaceae) in Borneo appears to be the checklist of seven species identified only by numbers ("sp 1 to 7") in Coode *et al.* (1996). Mahyuni *et al.* (2018) continued the study and published a new combination, *P. sumatranus* Wong & Mahyuni (2018) based on *Canthium sumatranum* Miq. Moreover also proposed two new combinations, *P. approximatus* (Korth.) Mahyuni & K.M. Wong and *P. lucidulus* (Miq.) Mahyuni & K.M. Wong, based on *C. approximatum* Korth and *Vangueria lucidula* Miq., respectively, both also occurring in Borneo.

This study is part of an on-going project revising the genus *Psydrax* in Borneo. Two new species are proposed here, namely *P. sabahensis* Mahyuni and *P. wongii* Mahyuni with description and illustrations provided. Their known distribution covers Sabah and Sarawak (Malaysia), and Brunei Darussalam. *Psydrax maingayi* was previously known only from the Malay Peninsula (Bridson, 1985; Wong 1989), but is here recorded for Borneo, i.e. East Kalimantan, Brunei Darussalam, and Sabah.

### MATERIALS AND METHODS

Morphological observations and description included both, vegetative characteristics as well as flowers and fruits, using herbarium specimens. The collections of the

Bogoriense (BO), Forest Research Institute of Malaysia (KEP), Sarawak Forest Department (SAR) and Singapore Botanic Gardens (SING) herbaria were consulted. The descriptions and all measurements provided are from herbarium specimens.

### RESULTS AND DISCUSSION

The numbers of species of *Psydrax* have been reported by Coode *et al.* (1996), three of them are new combination. Meanwhile, the other species are not yet known. Both of these taxa were compared with four species from Borneo; *P. sumatranus*, *P. maingayi*, *P. lucidulus* and *P. approximatus* and founded some characters distinguished of them. A comparison morphological characteristics of these species is provided with fourteen characters chosen in Table 1.

From Table 1. It can appear that these taxa can be distinguished by the value characters like texture of blades, apex shape, tertiary venation on both of leaf surface, peduncle length, inflorescence form, length of corolla tube and corolla lobe. *Psydrax wongii* has unique character of tertiary venation on abaxial leaf surface (wrinkled) and it can not find to the other species. For *P. sabahensis* and *P. maingayi* can hardly be distinguished by hairiness on blade, tertiary venation on abaxial and adaxial leaf surface, length of peduncle and number of flower per inflorescence.

**Table 1.** Morphological comparison of *Psydrax approximatus*, *P. lucidulus*, *P. sumatranus*, *P. sabahensis*, *P. wongii* and *P. maingayi*

Characters	<i>Psydrax sumatranus</i>	<i>Psydrax lucidulus</i>	<i>Psydrax approximatus</i>	<i>Psydrax sabahensis</i>	<i>Psydrax wongii</i>	<i>Psydrax maingayi</i>
<b>Leaf</b>						
Petiole length (mm)	(3-)6-10	3-6 (-10)	4-7 (-13)	10-13	6-9	10-15
Size of blade (cm)	5-15× 2.3-6.2 (-7.5)	3.4-8 (-10.5)×1.2-2.6 (-4.7)	5-8.5 (-10)× 3.5-5.5	(2.7-)8-16 × (4.3-)6-7.7	(2-)4-10 (-11.5) × (-1)1.5-3.5	(8-)14-20× (3-)4-11
Hairiness on blades	glabrous	glabrous	glabrous	glabrous	glabrous	velvety hairy
Leaf texture	coriaceous	chartaceous	subcoriaceous	coriaceous	coriaceous	coriaceous
Apex	acute to acuminate	apiculate with blunt tip	apiculate	acute to short cuspidate	acuminate to caudate	acuminate
Tertiary venation on adaxial leaf surface	inconspicuous	inconspicuous	inconspicuous	conspicuous	inconspicuous	inconspicuous
Tertiary venation on abaxial leaf surface	inconspicuous	inconspicuous	inconspicuous	conspicuous	slightly raised (wrinkled)	slightly raised
Surface on adaxial leaf surface	shagreen	smooth	smooth	smooth	smooth	shagreen
Petiole length (mm)	(3-)6-10	3-6 (-10)	4-7 (-13)	10-13	6-9	10-15
<b>Inflorescence</b>						
Peduncle length (mm)	0-3	2-4 (-5)	2-2.5	c. 2	c. 3	10-13
Inflorescence form	cyme	cyme	cyme	sub-umbellate	sub-umbellate	cyme
Number of flowers per inflorescence	20-30	7-22	20-40	≤ 20	15-20	50-60
Corolla tube length (mm)	c. 3	c. 1	2-2.5 (3)	2-3	c. 3	2.5-3
Corolla lobe length (mm)	c. 2.5	c. 1.5	1.5-2.5	3-4	c. 3	2.5-3

### Taxonomy

#### *Psydrax sabahensis* Mahyuni, spec. nov. (Figure 1)

**Diagnosis:** *Psydrax sabahensis* is similar to *P. maingayi* due blade ovate to elliptic and coriaceous. It differs from *P. maingayi* the glabrous leaves, sub-umbellate inflorescence, length of peduncle (c. 2 mm long), and numbers of flowers about 20 per inflorescences. *Psydrax maingayi* has velvety hairs on leaf, cyme inflorescences, length of peduncle more than 10 mm long, number of flowers 50-60 in inflorescences.

**Type:** Borneo, Sabah, Lahad datu, Mt. Silam, 11 August 1984, Aban et al. 67520 (holo: KEP; iso: SAN) (Figure 1).

**Description:** Small to medium tree to 15 m tall, bark smooth and fissured. *Stipules* ovate 2-2.5 mm long and keeled apical acuminate 1-2 mm long. *Leaves:* blades ovate to elliptic, (2.7-)8-16 × (4.3-)6-7.7 cm, apex acute to short cuspidate, base cuneate, margin plane, secondary veins 5-6 pairs, midrib flat on both side, secondary vein flat on upper surfaces, slightly raised on lower surfaces, tertiary veins slightly conspicuous on upper surface, with angle 60° to the midrib coriaceous, both surfaces smooth, glabrous; petioles 10-13 mm long. *Inflorescences* with peduncle sessile to subsessile (c. 2 mm long), sparsely scabrid, congest, sub-umbellate, number of flowers 20 per inflorescence. *Flowers* with pedicel 9-10 mm long, densely scabrid, calyx and hypanthium 2-3 mm long, including 5 triangular lobes, sparsely hairy all over; corolla tube 2-3 mm long, lobes 3-4 mm long; inner surface densely minute-hairy, throat with dense erect hairs; filaments c. 1 mm long, anthers 1-1.5 mm long, the whole reflexed and exerted; style 9-10 mm long, stigma 0.8-1 mm long. *Fruits* broadly ellipsoid, bilobed, 3-6 × 4-9 mm; pedicels 23-27 mm long. Pyrene ellipsoid, slightly rugose.

**Additional specimens examined:** Malaysia: Sarawak: Pelagus, Kapit, 14 July 1979, Bernard S. 40674 (SAR). Sabah: Tongod, 3 January 2004, J.B. Sugau et al. SAN 142193 (KEP, SAN); Sandakan, 23 July 1972, Leopold & Amin SAN 75359 (SAN).

**Etymology:** The epithet of *sabahensis* is named in reference to the type locality of this species.

**Distribution:** Endemic to Borneo (Sabah and Sarawak). (Figure 2)

**Phenology:** Flowering in August. Fruiting from January to July.

**Conservation status:** There is no information about this species in the field. Its distribution in Sabah, Sarawak (only from 4 location) suggests that it is rare. Given the widespread landscape changes in these parts of Borneo. Based on the categories of the IUCN (2001) that species is EN A1c.

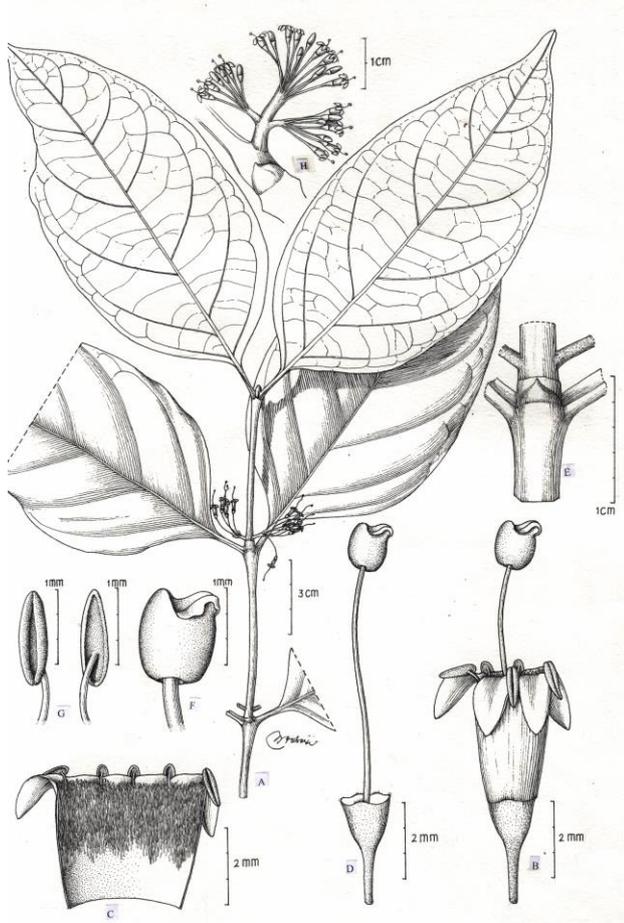
#### *Psydrax wongii* Mahyuni, spec. nov. (Figure 3).

**Diagnosis:** *Psydrax wongii* is similar to *P. lucidulus* due blades elliptic, inconspicuous tertiary veins on upper side and glossy. However, it differ from *P. wongii* by the coriaceous leaves, 3-4 secondary veins, wrinkled on lower of leaf surface and sub-umbellate in inflorescence. *Psydrax lucidulus* has chartaceous leaves, 5-6 secondary tertiary, flat on lower leaf surface and congested, cyme inflorescence.

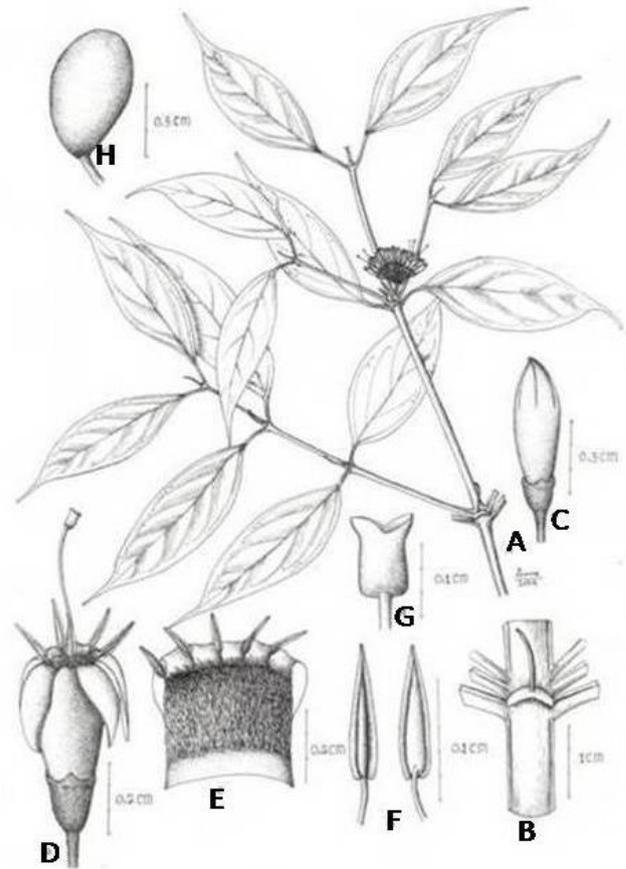
**Type:** Borneo, Sarawak, Kuching, 4 October 1957, E.F. Brunig S 9523 (holo: SING; iso: SAR)

**Description:** Shrub to small tree to 10 m tall; bark smooth to slightly fissured. *Stipules* with a broad triangular base, 2-8 mm long and keeled apical cuspidate, 1-2 mm long. *Leaves:* blades elliptic, (2-)4-10 (-11.5) × (-1)1.5-3.5 cm, apex acuminate to caudate, base cuneate, margin plane, secondary veins 3-4 pairs, flat on both sides, tertiary veins inconspicuous on upper side, slightly wrinkled on lower surface, entire of midrib, with angle to midrib 45°, glossy on upper surface; coriaceous, glabrous; petioles 6-9 mm long. *Inflorescences* with peduncle sessile to sub sessile (c. 3 mm long), congest, sub-umbellate sparsely scabrid, number of flowers 15-20 per inflorescence. *Flowers* with pedicel densely scabrid, 2-5 mm long, calyx and hypanthium 1-1.5 mm long, including 5 triangular lobes, sparsely hairy all over; corolla tube c. 3 mm long, lobes c. 3 mm long; inner surface densely minute-hairy, throat with dense exerted erect hairy; filaments 1 mm long, anthers 1-1.5 mm long, the whole reflexed and exerted; style 6-8 mm long, exerted, stigma c. 1 mm long. *Fruits* globose to obovoid, not bilobed, 4-7 × 3-5 mm; pedicels 6-8 mm long. Pyrene ellipsoid, slightly rugose.

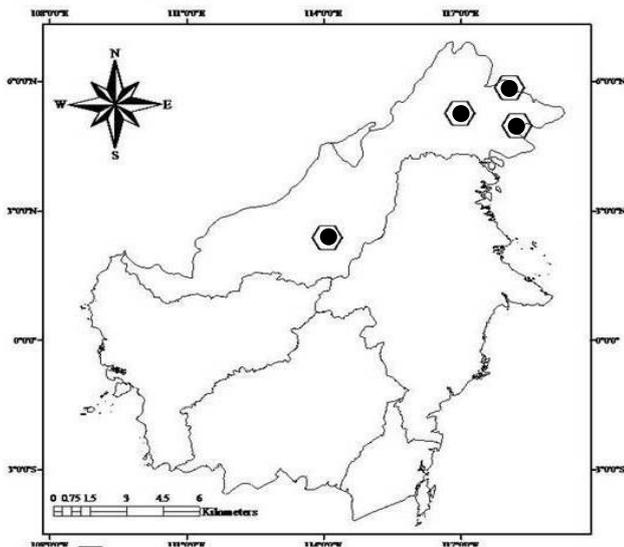
**Additional specimens examined:** Brunei Darussalam: Tutong: 28 November 1956, J.A.R. Anderson S 4143 (SAR); Telesai, Pasir Putih, 4°45'N, 114° 37'E, 8 April 1995, Salleh Ismail, Ibrahim Abdullah & Talip Malang BRUN 16595 (SING); 4°25'N, 114° 50', 9 May 1952, R.J.Johns 7590 (SING); Pasir Puteh, 10 km, SW of Tutong; north of highway, 4°45'N, 114°36'E, 17 March 1991, M.J.S. Sands & R.J.Johns 5431 (KEP, SAR); Tutong-Seria Road, at Simpang Tanjong Maya, 12 June 1993, Maung Soe Paing et al. BRUN 15548 (L, SAR, SING); Barakas Forest Reserve, 11 June 1997, I.M. Said et al. BRUN 18477 (SING); Pasir Putih, between Sungai Liang and Tutong, 20 April 1990, M.J.E. Coode et al. 6871 (KEP, SAR, SING). MALAYSIA. Sarawak: Telok Pandan, Bako N.P, 2 June 1963, Paul Chai & Ilias S 17299 (BO, SING); Bau limestone hills, Tai Tan, 13 October 1977, P.J. Martin S 38677 (KEP, SAN, SAR); Bukit Bisai, Padawan, 38 miles from Kuching, 3 March 1969, Erwin & Paul S. 27451 (BO, KEP, SAN, SAR, SING); Miri, Lambir National Park, Bukit Lambir, 5 November 1983, leg S 47259 (KEP); Bukit Tai Ton, 12 December 1975, P.F. Stevens et al. 198 (KEP, SAR); Lawas, Bumbung Ramah, Jul 1958, E.F. Brunig S 4410 (SAR); Bidi, Bau, 7 August 1964, J.A.R. Anderson S 20251 (SAR); G. Majar, Tebakang, 1st Division, 28 June 1983, Yii & Othman S 46288 (SAR); 28 November 1955, Brunig S 6755 (SAR), Bako National Park, Teluk Pandan path, 4 May 1959, J. Carrick & I.C. Enoch JC 479 (SAR); Gunong Santubong east, 18 May 1961, H.J. Bujang 13697 (SAR); E.F. Brunig S 2492 (SING); Kuching, Setunggang, Lundu district, 3 August 1996, Lai, Rantai et al. S. 54483 (KEP); Belaga 7<sup>th</sup> Division, Ulu. Sg. Kayan, Dulit Range, 18 October 1982, Dyg. Awa & P.C. Yii S. 46872 (SAR).



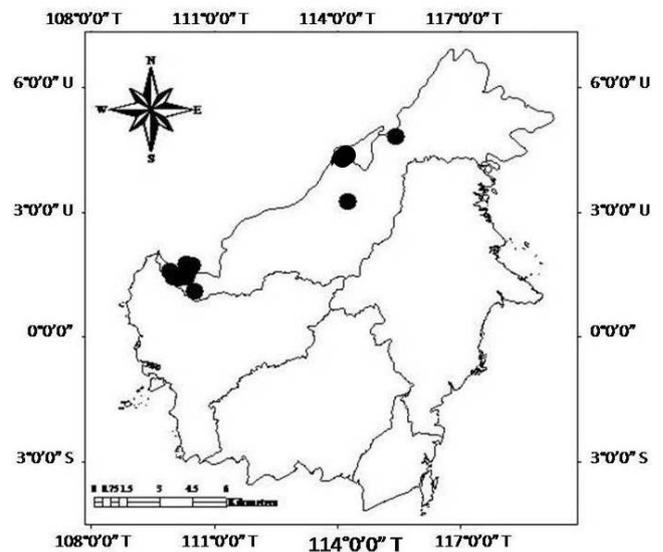
**Figure 1.** *Psydrax sabahensis*. A. Branch with open flowers; B. Flower, C. Open corolla, D. Hypanthium, style and stigma, E. Detail showing the quadrangular branch shape, F. Stigma, G. Anther in ventral and dorsal view, H. Inflorescence (SAN 67520). Line drawing by Subari



**Figure 3.** *Psydrax wongii*. A. Branch with open flowers, B. Stipule, C. Floral bud, D. Flower, E. Open corolla tube, F. Anthers in dorsal and ventral view, G. Stigma, H. Fruit (S 9523). Line drawing by Anne Kusumawati.



**Figure 2.** Map of distribution of *P. sabahensis* in Borneo



**Figure 4.** Map of distribution of *P. wongii* in Borneo

*Distribution and habitat:* Endemic of Borneo (Brunei Darussalam and Sarawak). Dipterocarp, heat forest to Casuarina to Limestone. (Figure 3).

*Etymology:* This species name honor Dr. Khoon Meng Wong, due relevant contribution to Rubiaceae study. He has initiated study of the genus *Psydrax* in Malesia (especially *Psydrax* in the Malay Peninsula) in 1989.

*Local name:* kayu-rempak, gusah babi or tulang ular.

*Phenology:* Flowering from March to October. Fruiting from June to December.

*Conservation status:* *Psydrax wongii* had restricted distribution. Although, the distribution includes protected areas. It has to be considered the there has been widespread forest conversion in much of the range. Based on the categories IUCN (2001), that this species indicated Vulnerable A2c.

#### New record of *P. maingayi* in Borneo

Previously, Bridson (1985) and Wong (1989) documented *P. maingayi* (Hook.f) Bridson only for the Malay Peninsula. However, collections of that species from Borneo now are confirmed. *Psydrax maingayi* has special morphological characters: velvety hairy lower leaf surface, broadly triangular stipules with a pronounced keel or apical lobe, and much-branched lax cymes each 50-60 flowers per inflorescence. In Borneo, it has been documented for East Kalimantan (Indonesia), Bukit Gerugang (Sarawak), Ranau (Sabah) and Tutong (Brunei Darussalam).

*Additional specimens examined:* Indonesia: Central Kalimantan: Barito Ulu, 12 June 1990, *Kade Sidiyasa PBU447* (BO), 18 June 1990, *C.E. Risdale PBU73* (BO), East Kalimantan, Kutai, 27 September 1955, *F.H. Endert 3637* (BO). MALAYSIA: Sarawak: Bukit Gerugang, 22 March 1998, *Enjah A et al., S 77826* (SAR). Sabah, Ranau, 22 September 1971, *Leopold, Gary and Dewol SAN 74390* (SAR).

In conclusion, examining specimens from Borneo will be continue. Especially tracing taxa that have been reported

from Brunei Darussalam. These six species of *Psydrax* of Borneo (*P. sumatranus*, *P. lucidulus*, *P. approximatus*, *P. maingayi*, *P. sabahensis* and *P. wongii*) will be a comparison for the other taxa are later examined.

#### ACKNOWLEDGEMENTS

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