

VANDA SECTION DACTYLOLOBATAE:

A SUMMARY, TWO NEW SPECIES, AND A KEY TO IDENTIFICATION

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THE SPECIES OF *VANDA* belonging to the section *Dactylobatae* W. Suarez & J. Cootes (Suarez & Cootes 2007) have long caused confusion to both taxonomists and horticulturalists. The section is geographically widespread, ranging from Kalimantan in Borneo, through the Indonesian and Philippine archipelagos, and south to New Guinea. One species, *Vanda scandens* Holttum is so distinct vegetatively that one would be hard put to confuse it with any other species (although it has been!). The remaining six species, *Vanda celebica* Rolfe, *Vanda frankieana* Metusala & P. O'Byrne, *Vanda gibbsiae* Rolfe, *Vanda hastifera* Rchb. f., *Vanda lindenii* Rchb. f., *Vanda saxatilis* J. J. Sm. and two new species, are so superficially similar that they have been repeatedly confused. Here we seek to define the differences between these distinct and geographically isolated species and provide a key to their identification. The two undescribed species are also described here.

Vandas of the section *Dactylobatae* are characterized by a lip that is more or less as thick as it is broad. In addition, the lip of species from the section has very distinctive lobules as appendages to the midlobe; these appendages may be either glabrous or hirsute. The columns of the species are cylindrical without the basal thickening characteristic of species from the section *Deltoglossae*, which occupy much of the same geographical range as those from section *Dactylobatae*. Because of the cylindrical columns and flared bases of the midlobes of *Vanda javierae* D. Tiu and *Vanda roeblingiana* Rolfe, Christenson placed these two species in the same section as species with midlobe lobules, section *Hastiferae* (Christenson 1994). Higgins and Motes (2012), recognizing this mistake, removed these two species and placed them with their newly described *Vanda barnesii* in a separate section, section *Roeblingianae* Motes & W. E. Higgins.

Unfortunately this name is an illegitimate, superfluous name owing to the fact that the sectional epithet *Hastiferae* is attached to the species *Vanda roeblingiana*, which Christenson had used to typify his section *Hastiferae*. If Christenson had typified section *Hastiferae* on *V. hastifera*, then no change in sectional names would have been necessary for the section with midlobe lobules, and Motes and Higgins could have erected section *Roeblingianae*, typified on *V. roeblingiana*. But because it contained *V. roeblingiana*, the new section would have to be named *Vanda* section *Hastiferae*, even though the species *V. hastifera* remains back in section *Dactylobatae*, if it were not for one extra twist.

In 1853, Lindley erected five sections in the genus *Vanda*, one of which was section *Lamellaria*. As it was not required at the time, Lindley did not explicitly typ-

ify his sections on a specific species. It may have subsequently been widely assumed that the type species for section *Lamellaria* was the species with the similar epithet, *Vanda lamellata* Lindl., but it appears that it was only in 1994 that Christenson himself "inadvertently" typified Lindley's section on *V. lamellata* in his paper which erected section *Hastiferae*. Christenson merely needed to list the sections, with authors, and state "type = *Vanda lamellata*" to effectively typify section *Lamellaria* with *V. lamellata*. Therefore, this section, distinguished from section *Dactylobatae* by the species having lips with flat midlobes, which are flared at the base and lack side lobules, should correctly be named section *Lamellaria* Lindl. All species in the section have cylindrical columns. Recent molecular studies have confirmed that *V. lamellata* and *V. sanderiana* are in this same section *Lamellaria* (Gardiner et al. 2013).

As Christenson used *V. roeblingiana* to typify his earlier concept of section *Hastiferae*, rather than *V. hastifera*, the exclusion of *V. roeblingiana* from the section renders the epithet *Hastiferae* unavailable, but allows us to use the available sectional epithet *Dactylobatae* W. Suarez and J. Cootes (Suarez & Cootes 2007), which is typified on the species *V. lindenii*. Suarez and Cootes placed the species *V. lindenii* and *V. scandens* in their new section *Dactylobatae*, and here we add the remaining species from Christenson's section *Hastiferae* that do not fit into section *Lamellaria*.

Vanda hastifera was described by Reichenbach filius in 1876. Endemic to Borneo, it grows as an epiphyte in mangrove and lowland forests. *Vanda hastifera* bears four to six dark yellow flowers distinctly marked with vivid red spots on a lax inflorescence. Its hirsute lobules and nearly flat lip with only a moderately upturned apex distinguish it from the closely related Bornean species, *V. gibbsiae*.

Also from Borneo, *V. gibbsiae*, described by Rolfe in 1914, was reduced by Cribb to a variety of *V. hastifera* in 1993 (Wood et al. 1993). This species occupies a distinct and different habitat from *V. hastifera*, the foothills of Mt. Kinabalu. The vegetative architecture of *V. gibbsiae* is also very different from *V. hastifera*, whose coarse thick-set leaves are immediately recognizable in herbarium specimens, whereas *V. gibbsiae* has more elongated stems and longer, narrower leaves. Unlike the boldly spotted flowers of *V. hastifera*, those of *V. gibbsiae* are pale yellow, finely spotted with reddish brown at the bases of the tepals with the spotting coalescing into solid color at their apices. Further, the apex of midlobe of the lip in *V. gibbsiae* is prominently upturned. The broad, trapezoidal side lobes of *V. gibbsiae* are very different from the smaller, pointed side lobes of *V. hastifera*. Finally, the lobules of *V. gibbsiae* are distinctly glabrous.



Vanda celebica



Vanda furva

These abundant differences, morphological and ecological, lead us to conclude that *V. gibbsiae* is a distinct species rather than a variety of *V. hastifera*.

Like the previous two species, *Vanda scandens*, described by Holttum in 1950, is also endemic to the island of Borneo. The specific epithet refers to the climbing habit of the plant. *Vanda scandens* has the longest internodes of any species in the genus and is easily recognized by this character alone, and although one might mistake it for a species of *Arachnis* or tall growing *Trichoglottis*, no other *Vanda* species approaches its tall, rangy habit. Its mustard-yellow flowers spotted with brown are carried close to the stem on exceptionally short inflorescences, a characteristic unique within the genus. Despite these unique features, the yellow flowers marked with brown have led *V. scandens* to be confused in the horticultural literature with a Philippine species from the island of Mindanao, discussed later in this paper and described as a new species, *V. mindanaoensis*.

The final species from Borneo is the recently described *Vanda frankieana* Metusala & P. O'Byrne (Metusala & O'Byrne 2012). The yellow flowers, spotted with red, resemble superficially *V. hastifera*, however *V. frankieana* is readily distinguished from *V. hastifera* by its lip with a flat, triangular midlobe and glabrous lobules, and tepals with very clearly defined, sparse but large red spots.

Vanda celebica is found on the island of Sulawesi, to the east of Borneo, and was described in 1899 by Rolfe. Arguably the most attractive species of the section, it may prove the most useful in hybridizing. The pale greenish yellow sepals and petals lightly mottled with reddish brown provide a lovely contrast to the almost solid blood-red lip. Unfortunately, *V. celebica* is currently virtually unknown in cultivation.

Vanda lindenii was described by Reichenbach *filius* in 1886 from specimens collected in New Guinea. The yellow flowers mottled with red brown have a distinct red apex to the lip. Like *V. celebica*, the lip of *V. lindenii* has glabrous lobules that readily distinguish it from *V. saxatilis*, with which it has been confused (Motes & Roberts 2008, where *V. saxatilis* was misidentified as *V. furva*).

Vanda furva (L.) Lindl. was originally described by



Vanda furva



Vanda furva: lip

Rumphius in his posthumously published *Herbarium Amboinensis* from the southern Moluccas, on the island of Ambon (Rumphius 1741). The name was published by Linnaeus as *Epidendrum furvum* in 1763, and transferred to *Vanda* by Lindley in 1833. Most observers of Rumphius's drawing and detailed description of *V. furva* (as "*Angraecum octavum sive Furvum*") have agreed that it is a species of *Vanda* belonging to section *Dactylobatae* (De Wit 1977; Motes & Roberts 2008; Metusala & O'Byrne 2012). Unfortunately all of these commenta-



Vanda saxatilis

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Vanda saxatilis: frontal view

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Vanda saxatilis: side view

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tors were mistaken. In recent field work, Motes has re-discovered Rumphius's *V. furva* on the nearby island of Seram. *Vanda furva* is a *Deltoglossae* section species with the characteristic thickening of the base of the column but with an unusual lip that is doubled on itself horizontally to yield the shape which Rumphius described "like a tooth, pale yellow" (Rumphius 2003). This unusual lip shape is deceptively similar to the thick lips of section *Dactylobotae* but lacks the lobules which characterize that section.

Because of the confusion caused by *Vanda furva*'s unusual lip shape, it was assumed that the other *Vanda* species (clearly a section *Dactylobotatae* plant) from the South Moluccas, which J. J. Smith had described as *V. saxatilis*, was synonymous with *V. furva*. As a result of Motes's explorations in Seram which re-discovered Rumphius's *V. furva*, we know that this is not accurate. Motes also found complete specimens of *V. saxatilis* which match Rumphius's drawings and J. J. Smith's description of the species. The two species are easily distinguished by their plant architecture alone. *Vanda furva* is a larger plant with broad leaves. *Vanda saxatilis* is smaller with much more narrow leaves. The flower illustrated in *Renziana* (Gardiner & Cribb 2013) and labeled as *V. furva* is therefore actually *V. saxatilis* J. J. Smith.

Smith also discovered and illustrated a plant from Bacan, North Moluccas, and identified it as *Vanda hastifera*. The dissected flower displays the prominently upturned apex of the lip midlobe that characterizes *V. hastifera* but it clearly differs from Reichenbach's Kalimantan species. The long, narrow tubular spur of the Bacan plant is distinct from *V. hastifera*'s shallow spur. The Bacan plant has a spur perpendicular to the midlobe, as opposed to that of *V. hastifera* where the spur lies on the same plane as the midlobe. The long, thin lobules of the Bacan plant are curved slightly forward while *V. hastifera* has short, triangular lobules set perpendicular to the midlobe. On a recent trip to the island of Bacan, the first author of this paper rediscovered the entity that J. J. Smith considered to be *V. hastifera* and it is described here as a distinct new species, *V. aliciae*.

Mindanao plants of a *Vanda* species from section *Dactylobotatae* have appeared in the horticultural trade for more than two decades and these were first identified as *V. scandens*. A plant identified as such was presented for American Orchid Society (AOS) judging in 1988, and a specimen sent to the Marie Selby Botanical Garden for verification was identified as *V. hastifera*. Subsequent research by Christenson and Motes led them to believe (erroneously) that these plants were *V. lindenii* (Motes 1997), and a plant with this appellation was awarded by the AOS in 1994. Further research by two of the authors here led us to assume that *V. lindenii* and *V. saxatilis* (then thought to be *V. furva* Lindl.) were synonymous (Motes & Roberts, 2008). Further examination of the material from New Guinea (*V. lindenii*), Moluccas (*V. saxatilis*), and Mindanao (*V. mindanaoensis*,

described here) leads us to the conclusion that each of these three taxa is a separate species and all are island endemics. *Vanda mindanaoensis* with its lip with long, recurved, hirsute lobules is easily distinguished from *V. lindenii* with glabrous lobules and *V. saxatilis* with flat, oblong lobules. The Mindanao species is described here as *V. mindanaoensis*.

In summary, the species of section *Dactylobatae* are sufficiently similar to have been easily confused, but it should now be possible to more accurately identify those species that have been described to date based on the information and key provided here. All the species are either island endemics or from closely proximate island groups. Other taxa in this section are very likely to be encountered in the other islands of the widespread Indonesian and Philippine archipelagos. Future taxonomists should be cautious when identifying material of section *Dactylobatae* that come to light from different locales.

Vanda alicae Motes, L. M. Gardiner & D. L. Roberts sp. nov. Type: Motes 1, cult., December 2013 (holotype FTG!)

Diagnosis: Affinity to *Vanda saxatilis* J. J. Smith and *Vanda lindenii* Rchb. f. but distinguished from *V. saxatilis* by its labellum with curved lobules, and from *V. lindenii* by its hirsute lobules.

Plant monopodial epiphyte, 30 cm or more tall, 20-25 cm wide, stem 1.5 cm broad, **Leaves** glabrous, waxy, sessile, distichous, linear, lingulate, recurved, narrow, 18 x 2.2 cm, shallowly channeled, margins entire, apex unequally praemorse. **Inflorescence** a lateral, cylindrical, proterraceme, 6-9 flowers, 10-15 cm. **Flower** light cinnamon red-brown with clear yellow, undulate margins, 5.5 cm vertically, 5.0 cm horizontally. **Dorsal sepal** clawed, spatulate, cinnamon red with faint striping, margins clear yellow, undulate, 2.6-1.1 cm. **Lateral sepals** clawed, spatulate, cinnamon red with faint tessellations, margins pale yellow, undulate, 2.5-1.3 cm. **Petals** clawed, spatulate, slightly reflexed, barred light cinnamon red with faint spotting near base, margins pale yellow, undulate, 2.5-1.1 cm. **Labellum** white marked with red purple and pale cinnamon red, 3 lobed, attached to a short column foot. **Midlobe** white with four thin red purple longitudinal stripes, 1.4 cm long, 1.3 cm broad at lobules, 0.3 cm broad at middle and 0.5 cm broad at apex, apex thickened with two vertical calli and a pale cinnamon red dorsal chin, midlobe adorned with two short, curved, hirsute lobules, 0.3-0.1 cm, mid-section of midlobe in front of lobules also pubescent at margins. **Side lobes** rhomboid, white externally, faintly striped red purple internally. **Spur** white with distal half pale cinnamon red, long, narrow, tubular, held at 90° angle to lip, recurving slightly downward at distal end, two small white calli at entrance. **Column** white with cinnamon red base, cylindrical, thickened at apex 0.8-0.4 cm.



Vanda alicae



Vanda alicae: side view



Vanda alicae: leaf tip



Drawing of *Vanda mindanaoensis*



Vanda mindanaoensis

stigma 0.3-0.2 cm, anther cap white 0.3-0.2 cm. **Pollinia** 2, spherical, stiped, 0.2-0.1 cm. **Capsule** 9 cm in length.

Distribution: Bacan Island, North Moluccas (also reported from Halmahera, Motes personal observation 2013)

Conservation status: Data deficient.

Etymology: Named for Alice Motes, the first author's daughter.

Vanda mindanaoensis Motes, L. M. Gardiner & D. L. Roberts sp. nov. Type: Motes 2, cult., May 2012 (holotype FTG!)

Diagnosis: Affinity to *Vanda lindenii* Rchb. f. but differs in having a labellum with hirsute, curved lobules and red side lobes.

Plant monopodial epiphyte, 25-100 cm tall, 25-35 cm wide. **Leaves** glabrous, waxy, sessile, distichous, linear, 12-17 x 2.5-3.0 cm, apex praemorse. **Inflorescence** an axillary, cylindrical raceme, loosely 6-10 flowered, 15-18 cm. **Flower** pale yellow, overlaid with red-brown tessellation and spots, 5.4-5.6 cm vertically, 5.9-6.2 cm horizontally. **Dorsal sepal** hooded, narrowly spatulate, yellow, tessellated red brown distally, spotted red brown basally, margins clear yellow, 2.8 x 1.7 cm. **Lateral sepals** yellow, heavily overlaid with red brown tessellations, margins clear yellow, 2.9 x 2.0 cm. **Petals** clawed, spatulate, obtuse, entire, yellow, tessellated and spotted with red-brown, margins clear yellow, 2.9 x 1.7 cm. **Labellum** white marked with red, three lobed. **Midlobe** white, striped with red, straight, narrow, thick, 2.0 x 1.1 cm, with two white calli at apex, adorned with white, forwardly recurved, hirsute lobules. **Sidelobes** trapezoid, blunt, white exteriorly, red interiorly, 1.2 x 1.1 cm. **Spur** cylindrical, slightly flattened, 0.9 cm long. **Column** white, shaded red-brown at base, cylindrical, beaked. **Anther cap** white, 1.1 x 0.9 cm. **Pollinia** two, spherical stiped.



Vanda mindanaoensis

Key to *Vanda* section *Dactylobatae*

- 1a. Flower spike less than 5 cm..... *V. scandens*
- 1b. Flower spike more than 5 cm
 - 2a. Flowers with petals and sepals marked with clear spots
 - 3a. Lip apex flat *V. frankieana*
 - 3b. Lip apex distinctly raised
 - 4a. Leaves broad, thick, lip with sidelobes pointed, midlobe apex slightly raised *V. hastifera*
 - 4b. Leaves narrow, thin, lip with sidelobes elliptical, midlobe apex distinctly upturned *V. gibbsiae*
 - 2b. Flowers with petals and sepals mottled or barred
 - 5a. Lip with lobules hirsute/pubescent
 - 6a. Lip with lobules short, straight..... *V. saxatilis*
 - 6b. Lip with lobules long or curved
 - 7a. Lip with lobules long, recurved..... *V. mindanaoensis*
 - 7b. Lip with lobules short, curved forward *V. aliciae*
 - 5b. Lip with lobules glabrous
 - 8a. Lip apex with two vertical calli, lip heavily striped or solid red *V. celebica*
 - 8b. Lip apex with low calli, lobules marked with red *V. lindenii*

Distribution: Reported from southern Mindanao, sea level to 500m (Cootes 2011).

Conservation status: Data deficient.

Etymology: Named after the island on which it was discovered (Mindanao).

Clarification of sectional names and delimitations:

Nomenclatural note: the sectional epithets *Dactylobatae*, *Deltoglossae*, *Hastiferae*, and *Roeblingianae* were originally published as *Dactylobata*, *Deltoglossa*, *Hastifera*, and *Roeblingiana* by their respective authors but as these epithets are adjectival, the endings should be plural and agree with the generic name *Vanda* (Art. 21.2 and 32.2, McNeill et al. 2012). This is a correctable error which requires no formal nomenclatural action. Lindley treated *Lamellaria* as a noun, rather than as an adjective, and therefore the original sectional epithet is correct.

***Vanda* section *Dactylobatae* W. Suarez & Cootes, Philipp. Orchid Rev. 15(2): 16 (2007).**

Type species: *Vanda lindenii* Rchb. f.

Species in section:

- Vanda aliciae* Motes, L. M. Gardiner & D. L. Roberts, sp. nov.
- Vanda celebica* Rolfe, Bull. Misc. Inform. Kew 1899: 131 (1899).
- Vanda frankieana* Metusala & P. O'Byrne, Malesian Orchid J. 9: 24 (2012 publ. 2011).
- Vanda gibbsiae* Rolfe, J. Linn. Soc., Bot. 42: 158 (1914).
- Vanda hastifera* Rchb. f., Linnaea 41: 30 (1876).
- Vanda lindenii* Rchb. f., Gard. Chron., n.s., 26: 70 (1886).

Vanda mindanaoensis Motes, L. M. Gardiner & D. L. Roberts, sp. nov.

Vanda saxatilis J. J. Sm., Bull. Jard. Bot. Buitenzorg, sér. 3, 8: 66 (1926).

Vanda scandens Holttum, Sarawak Mus. J. 5: 389 (1950).

***Vanda* section *Lamellaria* Lindl., Fol. Orch. 4: 1 (1853).**

Type species: *Vanda lamellata* Lindl. - typified by Christenson, Proc. 14th World Orchid Conf.: 209 (1994)

Heterotypic synonyms:

Vanda section *Hastiferae* Christenson, Proc. 14th World Orchid Conf.: 211 (1994), type species: *Vanda roeblingiana* Rolfe

Vanda section *Roeblingiana* Motes & W.E. Higgins, Orchid Digest 76(4): 241 (2012), nom. illeg., nom. supfl., type species: *Vanda roeblingiana* Rolfe

Species in section:

- Vanda barnesii* W. E. Higgins & Motes, Orchid Digest 76: 241 (2012).
- Vanda javierae* D. Tiu ex Fessel & Lückel, Orchidee (Hamburg) 41: 146 (1990).
- Vanda lamellata* Lindl., Edwards's Bot. Reg. 24(Misc.): 66 (1838).
- Vanda roeblingiana* Rolfe, Bull. Misc. Inform. Kew 1894: 365 (1894)
- Vanda sanderiana* (Rchb. f.) Rchb. f. Gard. Chron. (1882) t.588

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