Orchids of Bhutan

The Genus *Vanda*

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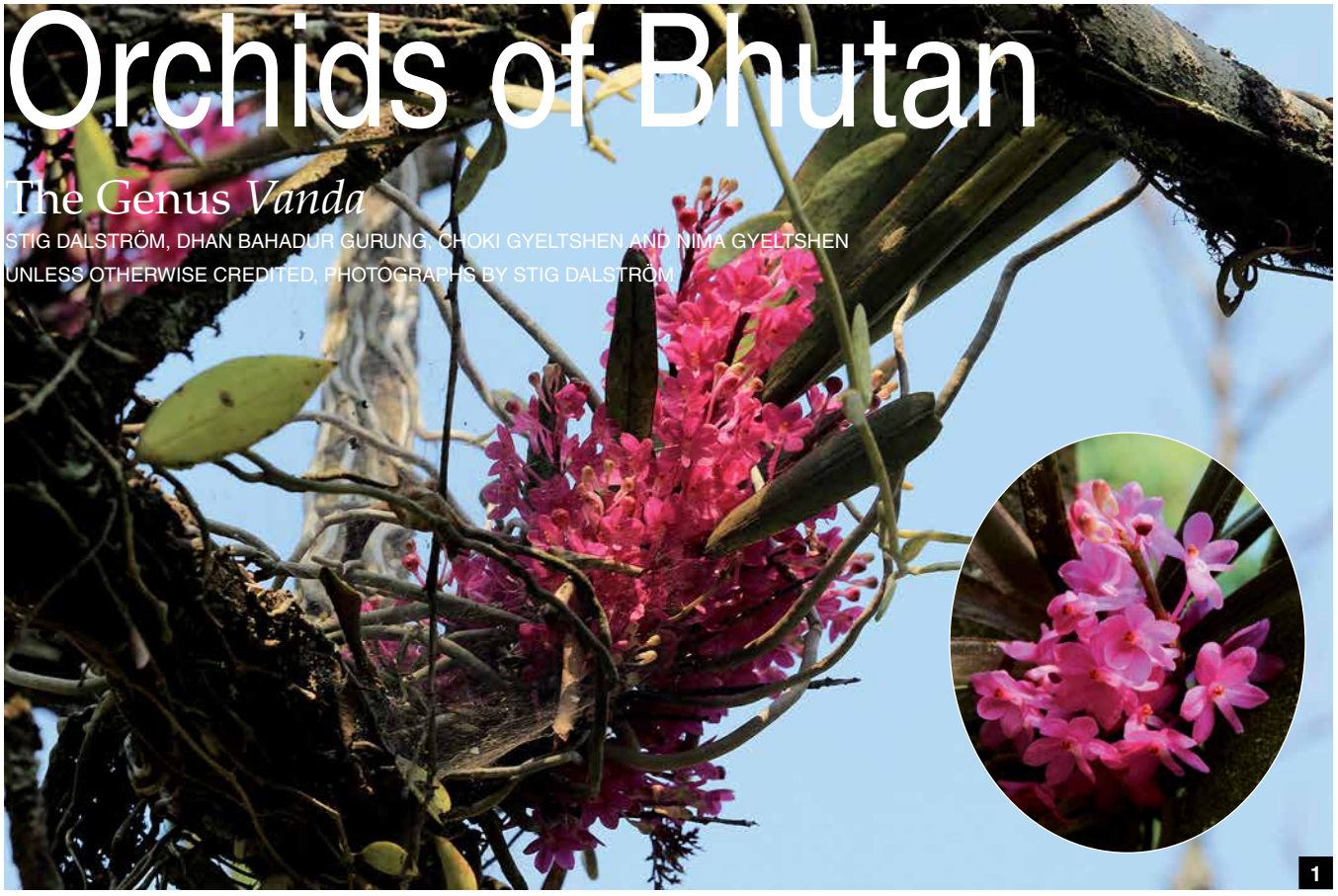

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THE GENUS *VANDA* Jones ex R.Br., in Bhutan is currently represented by a handful of what must be considered as "disputed" species where the status of all taxa have been questioned in both past and present by various authors for various reasons. The generic name *Vanda* was proposed in 1795 by William Jones in *Asiatic Researches* but it was not linked to a specific epithet. Robert Brown (1820) formally established the genus in the *Botanical Register* when he described *Vanda roxburghii*, the plant from East Bengal that Jones originally had in mind (Pearce and Cribb 2002). The actual name "Vanda" is from Sanskrit and refers to certain parasitic mistletoes (Loranthaceae) and some orchids, including *Vanda roxburghii*, of similar habit (Pearce and Cribb 2002). Up to 2012, some 50 species were added to the genus, which is distributed from Sri Lanka and India in the west to China, the Malay Archipelago, the Philippines, Australia, New Guinea and the Solomon Island in the southeast. Leslie Garay (1986) removed *Vanda alpina* and *Vanda griffithii* to establish the genus *Trudelia* together with a new species; *Trudelia chlorosantha* Garay. He had received photos of what he considered to represent three different species from the Swiss photographer Niklaus Trudel, who apparently collected all three specimens in southwest Bhutan. Garay did not include *Vanda cristata* Lindl. or *Vanda pumila* Hook. f., due to a lack of information, but Senghas (1988a) added those species to *Trudelia*. Later, Christenson (1992) moved them all back into *Vanda* again. Recent molecular analysis demonstrates that *Trudelia* is embedded in the main bulk of *Vanda* species and cannot be accepted as a separate genus according to modern nomenclatural rules (Gardiner 2012). The same molecular analysis also demonstrated that many other species in previously distinct genera also could be transferred to *Vanda*, which was executed by Gardiner (2012). Although the transfer of all species of genus *Ascocentrum* Schltr. to *Vanda* may seem acceptable based on similarities in vegetative plant morphology, such as conduplicate (folded) leaves, the species *Vanda* (*Ascocentrum*) *himalaicum* (Deb, Sengupta & Malick) L.M.Gardiner, in contrast, differs significantly in general morphology from all the others in the genus by having pendent rattail leaves. We therefore suspect that this orchid may not have been DNA sequenced at all due to its rarity, and transferred based on "nomenclatural features" only, which is risky and can be highly misleading. We suggest that, in future botanical treatments and transfers, a note is added for each species as a standard procedure, describing whether it has been DNA sequenced or not.

Vanda ampullacea (Roxb.) L.M.Gardiner is one of the recent additions to the genus, which was transferred by Gardiner from *Ascocentrum* based on molecular analysis. It grows epiphytically and usually very exposed to bright light along the seasonally (June through September) very hot and humid southern border with India. This species has a "mottled" nomenclatural history like so many other orchids. It was originally described as *Aerides ampullacea* by Roxburgh (1832). It was transferred to *Saccolabium* Blume by Lindley (1838). Kuntze (1891) moved it to *Gastrochilus* D.Don, and Schlechter (1913) moved it to *Ascocentrum*. We can only hope that the current nomenclatural position in *Vanda* will remain for a while so we all have a chance to learn its new "home." The pollinator of *V. ampullacea* is unknown to us but the flower morphology with a deep and nectar-filled spur (Gardiner, 2012) and the rosy color suggest bee or butterfly pollination. This species flowers from March to May.

Vanda bicolor Griff. is an attractive and

relatively common epiphytic orchid that is often considered endemic to Bhutan. No doubt, however, it occurs in some of the neighboring states of India, particularly the State of Assam, since it has been observed very close to the border. The taxonomic status of *V. bicolor* has also been considered as "doubtfully distinct" from *Vanda tessellata* (Roxb.) Loddiges, by Motes (1997). Pearce and Cribb (2002) on the other hand treat *Vanda bicolor* as distinct, based on a different coloration of the flower, and rounded lateral lobes of the lip versus triangular acute lobes in *V. tessellata*. We agree with Pearce and Cribb and accept this differentiation, but it should also be noted that the color of at least the sepals and petals in both species vary and should not be considered as a reliable feature of distinction. *Vanda bicolor* was originally described as a *Vanda* and is the only Bhutanese species in the genus that is relatively unaffected by taxonomic disagreements. *Vanda bicolor* flowers from February through May in Bhutan and, though no active pollination of this species has been observed by us in the field, visits by large bees are frequent on plants in cultivation.

Vanda cristata Wall. ex Lindl. is probably the most common and widespread *Vanda* in Bhutan. It can be found in many different types of habitats, from rather hot lowland areas to surprisingly cool mountain forests. This species, together with *V. griffithii* Lindl. can also be found in shadier locations than the other species in the genus, with the exception of the questionable *V. himalaica*. This ecological preference, or perhaps "tolerance" is a better choice of words, may be the result of adaptation to beetle pollination (cantarophilly). The quite variable and rather peculiar looking flowers with large, fleshy and blackish-purple lip lamina may appear strange and even unattractive to us at first. Both the odd shape and the coloration may function as an attractor to a certain species of an unidentified beetle, which was observed and photographed while successfully pollinating flowers of *V. cristata* in cultivation at the Royal Botanical Garden in Serbithang, Thimphu. What appears to be the same species of beetle also visited flowers of *V. griffithii* and effectively removed the pollinarium. The placement of the pollinarium differed though, with *V. cristata* placing the pollinia package near the scutellum (the "mid back") while *V. griffithii* placed the pollinia package on the frons (the "head") of the beetle. Whether a successful pollination of *V. griffithii* also took place in the photographed specimen was unfortunately not recorded. The big mystery behind these observations, however, is how the beetles could find the cultivated flowers in the first place since no natural *Vanda* habitat exists anywhere near where the plants are kept. Beetle pollination of *V. cristata* correlates with an observation by Pradhan (1983). *Vanda cristata* flowers in April through June.

Vanda griffithii Lindl. is named for William Griffith who traveled extensively in the Himalayan region in the early 19th century and made many original scientific collections of plants in Bhutan. Griffith


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[1] *Vanda ampullacea* growing in habitat and a closeup (inset) picture of the flowers.
[2] *Vanda bicolor* growing in habitat along with a closeup (inset) taken in situ along with a likely pollinator. Dalström
[3] *Vanda cristata* growing in habitat along with a closeup (inset) showing the flowers.

later became Superintendent of the Calcutta (today called Kolkata) Botanic Garden (Pearce and Cribb 2002). The *Vanda* that is named for this distinguished botanist is the subject of some taxonomic controversy, however. Traditionally, three very similar, but considered distinct species, have been described (*Vanda alpina* Lindl., *Vanda chlorosantha* (Garay) E.A.Christenson and *V. griffithii*) that occur sympatrically (growing together) in Bhutan, or at least in the same southwest region (Garay 1986). The specific distinction between *V. alpina*, *V. chlorosantha* and *V. griffithii* according to Garay is mostly based on the lip shape, and particularly the apex with its fleshy ventral hump. *Vanda chlorosantha*, however, appears to be distinguished mainly by a lack of anthocyanin (purple pigment) since no particular morphological distinction can be observed. Through field observations by the authors of this paper, and in particular the second author (Gurung) who has extensive experience with orchids in Bhutan, the natural variations in size, shape and coloration of the flowers of this group are such that consistent specific distinctions hardly can be made. We therefore favor treating *V. alpina*, *V. chlorosantha* and *V. griffithii* as representatives of the same variable species, in partial agreement with Joseph Hooker, in the orchid part of his *Flora of British India* in 1890 (Garay 1986). Since *V. griffithii* was described first, this name has nomenclatural priority and the two others represent synonyms. Although Hooker's opinion was based on a lack of additional collections of *V. griffithii*, and therefore considered it a synonym of *V. alpina*, the conclusion is the same. Plants of *V. griffithii* flower from March to July but probably at other times of the year as well. A plant that lacked anthocyanin, similar to the type of *V. chlorosantha*, flowered in September.

Vanda himalaica (Deb, Gupta & Malick) L.M.Gardiner is another peculiar species that really does not seem to fit well in the current taxonomic position. The first scientific description of this species as *Saccolabium himalaicum* was made by the team of Deb, Sengupta and Malick (1968). It is based on a collection from "upper Burma" (Myanmar), Sima, by Shalik Mokin (No. 13). What appears to be the same species from Yunnan in China was then described as *Holcoglossum junceum* by Tsi (1982). This time, it is based on a collection from an unknown location by M. K. Li (No. 1798) in 1939. Christenson (1987) transferred *Saccolabium himalaicum* to *Ascocentrum* in a revision of *Holcoglossum*, but the following year, both


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Averyanov (1988) and Senghas (1988b) independently transferred *Saccolabium himalaicum* to *Holcoglossum* instead. The taxonomic controversy over this species is probably due to the combination of morphological features. The color and appearance of the flowers do not really resemble any others in *Holcoglossum*, but has a certain superficial resemblance to particularly *Vanda* (*Ascocentrum*) *ampullacea*. The plant habit of strict pendent and terete leaves, however, makes the position in *Vanda* or *Ascocentrum* seem like a "thumb in the eye." The placement of this odd species in *Holcoglossum* on the other hand seems more likely, based on the plant habit and also the basic flower morphology. The rather unique plant habit, with strictly pendent rattail leaves, readily separates *Vanda himalaica* from all other Sarcanthinae species that are known from Bhutan, where it flowers in October

[4] *Vanda griffithii* showing typical habitat along with a closeup (inset) showing flowers from two plants growing side by side.habitat.

[5] *Vanda griffithii*, without anthocyanin and similar to "*Vanda chlorosantha*."

[6] *Vanda griffithii* being visited by a beetle carrying pollinia from another *V. griffithii*

[7] *Vanda* (*Holcoglossum*) *himalaica* displaying habitat typical for the species and a closeup (inset) of the flowers of the species. Note the elongated nectary of this species.

[8] *Vanda testacea* flowering in habitat; typical for the species and a closeup (inset) of the flowers.

through November.

Plants named *Vanda testacea* (Lindl.) Rchb.f. in various literatures are small and rather insignificant in habit, with yellow flowers and bluish-purple specks on the lip in various amounts. And yet, this taxon is the source of some impressive taxonomic confusion. The main problem is that there are two rather similar but yet morphologically different taxa that hide under the name *Vanda testacea*. They differ slightly in color, size and shape of the flowers, and probably in geographical distribution as well. The basic difference can be seen in the structure of the lip, particularly the spur, which is rather short, broad and straight in the larger form from Bhutan and Sikkim, but being longer, narrower and curved forward in plants from Sri Lanka, main parts of India, Myanmar and Thailand. The larger-flowered form also has a well developed bilobed callus hump on the lip near the entrance of the spur, which appears to be less developed in the smaller flower. The sepals and petals also appear paler yellow in the Bhutanese (Himalayan) form, but this observation can also be due to a lack of experience with the smaller form by the authors. Since there are several specific names published under both *Aerides* Loureiro, and later *Vanda* that currently are lumped together as *Vanda testacea*, we need to analyze the types of each of these names in order to straighten out the convoluted taxonomic history. This entangled story is well illustrated by Reichenbach's comments in his transfer of *Aerides testaceum* Lindl. to *Vanda testacea* (Reichenbach 1877):

> "One might be doubtful as to the oldest name, since *A. testaceum* and *wightianum* were published with descriptions at the same time. One might say that *Aerides wightianum*, being a Wallichian name, had the priority. My opinion is that Wallich's Catalogue gives no authority for priority, for the names there given have not won sanction by an accompanying description. Let us add that there is already a *Vanda wightii*, and that *A. testaceum* comes before *A. wightianum* in Dr. Lindley's book. Those who keep the oldest name given in the genus may write *Vanda parviflora*. This question is a very difficult one. (166)"

The first time the name "testacea" (which refers to the yellow color of the flower) is used was when Lindley described *Aerides testaceum* based on a plant collected by Macrae in Sri Lanka

(Lindley 1833). In the original description Lindley writes: "*Hab. in Zeylona* [Ceylon], *supra arbores*, Macrae" (238). The spur of the flower is described as "*calcare conico incurvo*." In other words, a conical and curved spur! Lindley's type specimen is not seen by us, but another Macrae collection of this species from "Ceylon" (today called Sri Lanka) in 1829 and with the number "49" is deposited in the herbarium of the Museum of Natural History in Vienna (W), on sheet 38816. The spur of the flower is rather long, slender and curved forward, and correlates with Lindley's original description of *Aerides testaceum*. There is also a single flower on sheet 38817, which seems to come from Lindley's type specimen despite a lack of information other than "*Aerid. testaceum* Ldl!" This flower also displays a slender and curved

spur similar to the other Macrae specimen on sheet 38816 (W).

Immediately following the original description of *Aerides testaceum* is the description of *Aerides wightianum*, as Reichenbach pointed out. Lindley writes: "*Habit. In India Orientali, prope Madras*, Wight." The Indian city of Madras (today called Chennai) is also very near Ceylon. The spur of the flower is described as "*calcare brevi conico*," which translated says "a broad and conical spur!" There are three drawings attached on a sheet in the herbarium in Vienna (W, from here on referred to as the "three-drawing" sheet) that show flowers of this species. The left drawing is labeled "L," and then "7320 *Aerides wightianum* Hb W. Wall" (referring to Wallich's herbarium and catalogue, no. 7320, which is mentioned in the original description of *Aerides wightianum*). The middle drawing is labeled "L" and *Aerides wightianum* while the right drawing is labeled "L" and *Vda parviflora* = *A. wight*." All three drawings display a flower with a short conical spur, just like in flowers from Bhutan. The middle and the right drawings are copies of (Lindley's?) drawings that can be seen on herbarium sheets at Kew. The problem is that the drawings do not correlate accurately with the flowers from which they apparently were drawn regarding the shape of the spur. Perhaps this was overlooked as a critical feature? After analyzing a flower of the type specimen of *Aerides wightianum* at Kew (K001118001), it is clear that the spur is both long and narrow, and curved, thus similar to the spur of *Aerides testaceum*. Since both collections originate from the same general area (southeastern India and Sri Lanka), the morphological similarities in the spur shape support the conclusion that they represent the same species.

Lindley described *Vanda parviflora* based on a specimen he received from the English nurseryman Loddiges (No. 1567), who apparently had obtained it as a "native of Bombay" (Lindley 1844). The spur of the flower of *V. parviflora* is described as "*calcare angusto obtuso*," which refers to a narrow and obtuse spur. The type specimen is mounted on a small sheet at Kew, which in turn is mounted on a larger sheet K000895723, and consists of a single inflorescence with a flower and two buds. A mounted envelope contains an additional flower and one bud. There are also two colored drawings, one with a lateral view of the lip, and one that shows the lip lamina from above. These drawings were apparently copied by Reichenbach and represent the right drawing on the


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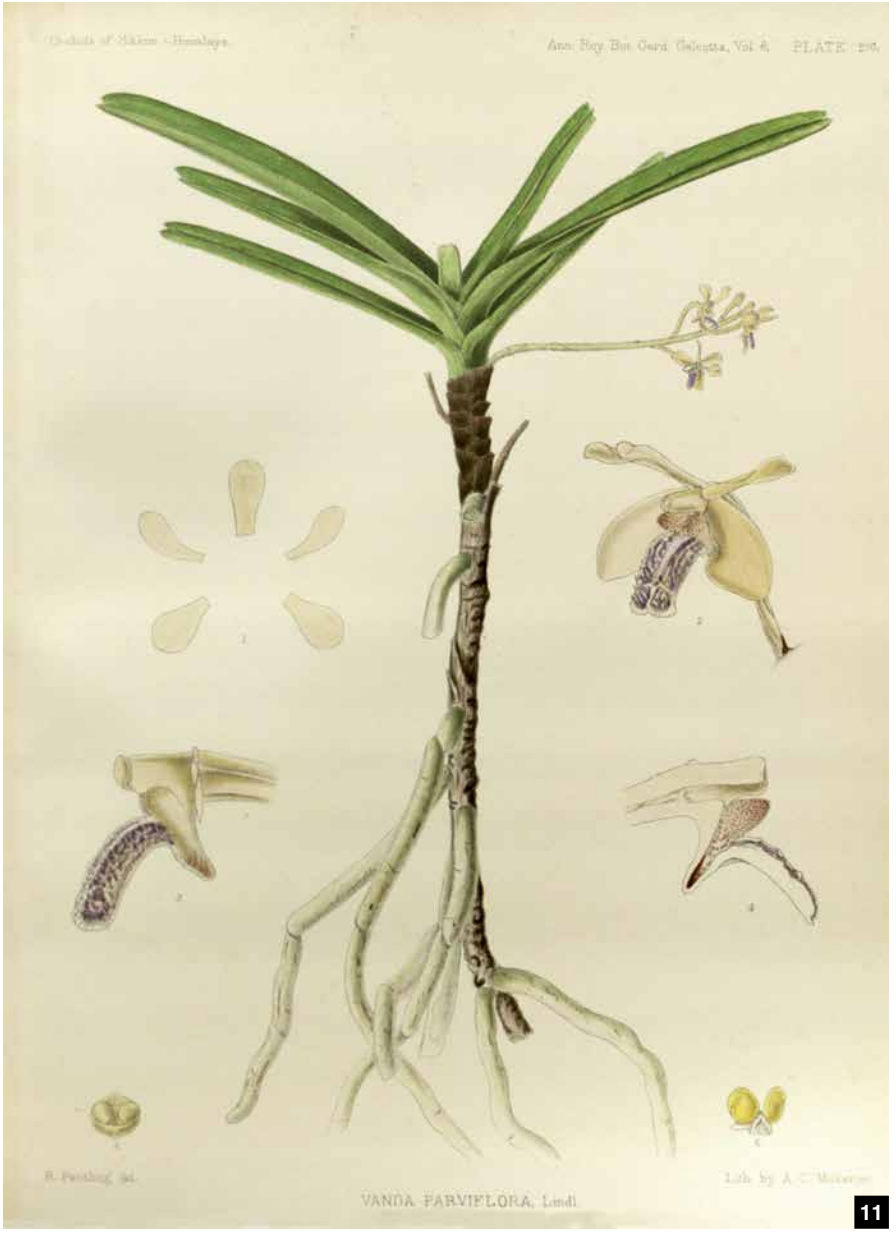

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[9] *Vanda testacea* flower grown by Tommy Ljunggren.

[10] Side-by-side comparison of *Vanda testacea* from Bhutan (left) and the typical form of *Vanda testacea* (right), grown by Tommy Ljunggren.

[11] Botanical illustration of *Vanda testacea*, as "*Vanda parviflora*", plate from *Annals of the Royal Botanic Garden, Calcutta.*

three-drawing sheet in the herbarium in Vienna (W), and show a short and straight spur, similar to flowers from Bhutan. The dried flower on which the drawing is based, however, reveals a curved spur. There is a different *Vanda* specimen of what appears to be the same species mounted on the same (large) sheet at Kew. This specimen is from the J.D. Hooker herbarium (No. 183) and has the information "Concan, W. Law." Concan is situated on the west coast of India and correlates geographically with the type locality of *V. parviflora* from Bombay (today called Mumbai). There is a simple ink (?) drawing of the flower, which also was copied by Reichenbach and represents the middle flower on the three-drawing sheet in Vienna (W). Again, the drawing shows a straight spur while the actual flowers reveal a curved spur. It appears that Lindley identified this latter specimen as *Aerides wightianum* because the name is written in his handwriting in the lower right corner. But this specimen is not the type of *Aerides wightianum*, which was collected by Wight near Madras on the east coast of India.

It can be questioned here whether *Vanda parviflora* really was collected near Bombay or simply shipped from the port there. Commercial growers and importers sometime had the habit of hiding the true origins of their plants, to taxonomists' great dismay. What supports Bombay (western India) as the origin of *Vanda parviflora* though is a collection by Wight at Coimbatore in the southwestern part of India, of the curved spur form of this "species" (W, sheet 38813). Lindley (1853) then sunk his *Vanda parviflora* into synonymy with his *Aerides wightianum*, and later broadened his mind and sunk both *Aerides testaceum* and *Vanda parviflora* into synonymy with *Aerides wightianum* (Lindley 1859). Our conclusion is that Lindley first recognized a difference between *Aerides testaceum* and *Aerides wightianum*, and possibly also *V. parviflora*, but later, gradually, decided that they were all the same. Reichenbach (1877) agreed with Lindley's ultimate transfers but reasoned that the correct name should be *Vanda testacea*, which he believed had nomenclatural priority. Reichenbach based his opinion on multiple specimens that he received from the English nurseryman Bull, among others. If we analyze some of these specimens and the drawings thereof, however, we can see that two different spur shapes are represented. A specimen from Day on sheet 38822 (W) has a narrow and curved spur similar to the type of *Vanda testacea*, while a specimen from Bull on sheet 38812 (W), which Reichenbach refers to in his publication of *Vanda testacea* (Reichenbach 1877) has a shorter, broader and straighter spur, similar to the Himalayan plants. We therefore suspect that there exist two geographically separated and morphologically slightly different "forms" of this species. The type form with a narrow and curved spur has been described several times and is geographically widespread over much of southeast Asia, while the form with a shorter and straight spur appears to be limited to the Himalayan region.

King and Pantling (1896) use the name *Vanda parviflora* for the Himalayan species in their treatment of the orchids of Sikkim, Himalaya. This amazing publication features a fine illustration of this species, which correlates with what occurs in Bhutan.

Plants of *Vanda* in general, and the species from Bhutan in particular, should be treated as extreme epiphytes with no or very airy medium to grow in. They are best mounted in open wooden baskets or on sturdy branches since the thick roots enjoy spreading out and point in all directions. Vandas from the Himalayan region go through a very wet and hot monsoon season with copious watering from June to September, while enduring a rather long, dry and cooler winter season from November to April. The humidity can still be high though, particularly during night and early morning. October and May can be described as "intermediate" months with a slowly decreasing and increasing amount of watering, respectively. For more information regarding cultivation see Motes (1997).

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