Valiha and *Cathariostachys*, two new bamboo genera (*Gramineae-Bambusoideae*) from Madagascar

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Summary. Two new bamboo genera, *Valiha* and *Cathariostachys*, are described from Madagascar. *Valiha* consists of two species: *V. diffusa* S. Dransf. and *V. perrieri* (A. Camus) S. Dransf., the latter transferred from *Ochlandra*. *Cathariostachys* comprises two species: *C. capitata* (Kunth) S. Dransf., transferred from *Nastus*, and *C. madagascariensis* (A. Camus) S. Dransf., transferred from *Cephalostachyum*. Their affinities with other genera are discussed.

INTRODUCTION

In working on revisions of the genera *Nastus* Juss. and *Schizostachyum* Nees (*Gramineae-Bambusoideae*) from Malesia, I became aware that I would have to reassess the limits of these two genera by examining representative species from other regions and genera. *Nastus* was first described in 1789 and its type species, *N. borbonicus* J. F. Gmel. in 1796, and has about ten species endemic in Madagascar (Camus 1925a, 1937, 1947, 1951, 1957). In 1956 Holttum transferred *Chloothamnus* Büse (from Java and Sumatra) and *Oreiostachys* Gamble (from New Guinea) to *Nastus*. The genus *Schizostachyum* was described in 1829, with one species *S. blumei* Nees ("blumii"). Since then many species have been described. The genus is found from South China, throughout Malesia to the Pacific Islands. In 1958 Holttum implicitly included three genera, *Cephalostachyum* Munro, *Teinostachyum* Munro and *Neohouzeoua* A. Camus, in *Schizostachyum* without making new combinations. *Cephalostachyum* is distributed in mainland Asia (Gamble 1896) and Madagascar (Camus 1925b); *Teinostachyum* and *Neohouzeoua* are mostly found in mainland Asia (Gamble 1896; E. G. Camus & A. Camus 1921), and are not discussed further in this paper. When I began examining *Cephalostachyum*, I found that the species from Madagascar were anomalous, and appeared not to be congeneric with the Asian species. However, the herbarium specimens from Madagascar were fragmentary and inadequate for making critical judgements. I asked for advice about these species from the late Dr. T. R. Soderstrom from the Smithsonian Institution, USA, who planned to work on the bamboos of Madagascar. Tragically, he died in 1987 before he could start working on a revision. However, just before he died he managed to leave a message, encouraging me to continue work on Madagascar bamboos. This I have attemped to do.

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The woody bamboos of Madagascar are poorly known, yet a better understanding of them seems crucial to the construction of bamboo phylogenies. The problems of working on the bamboos of Madagascar are that the specimens are frequently incomplete, mostly consisting of flowering branches, and lacking crucial vegetative features, and most have been described in Asiatic genera. It is now widely understood that bamboo taxonomic research requires complete specimens, and for this fieldwork is essential. In 1988 I had the opportunity to join a team from Kew (led by John Dransfield) to do fieldwork in Madagascar. Since then I have joined several Kew expeditions to various parts of Madagascar with the aim of refinding and recollecting bamboo species described by A. Camus (1925 – 1957) based on collections made by earlier botanists, such as Perrier de la Bâthie.

On my first trip to Madagascar I found that the most frequent erect bamboo in the East Coast region, commonly identified as *Ochlandra capitata* (Kunth) E. G. Camus (syn. *Nastus capitatus* Kunth), turns out to be undescribed. What started as a simple exercise in naming a common bamboo has developed into a full-blown reassessment of generic limits. I have discovered that Asiatic generic names have been applied to several highly distinctive endemic Madagascar genera which are probably unrelated to the Asiatic taxa. I have recently provided revisions of *Hickelia* A. Camus, including *Pseudocoix* A. Camus (Dransfield 1994), and of *Decaryochloa* A. Camus (Dransfield 1997). In this third paper on Madagascar bamboos I describe two new genera to accommodate the bamboo previously known as *Ochlandra capitata* and two bamboos previously included in the otherwise Asiatic genus *Cephalostachyum*.

Nomenclatural history

In 1829 Kunth described and published a new species, *Nastus capitatus*, from Madagascar, based on a specimen collected by du Petit-Thouars (without number). As with other plants Kunth described, *N. capitatus* is also illustrated in colour (Kunth 1829: tab. 75) (Fig. 1). Everything written in the text matches the illustration, except for one detail: the sheath of the leaf-blade in the illustration does not show the auricle described in the text. Steudel (1855) followed Kunth's description.

Munro (1868) transferred *N. capitatus* Kunth to the genus *Beesha* as *B. capitata*, together with other two species, *B. rheedei* (Kunth) Munro from India, and *B. stridula* (Thwaites) Munro from Sri Lanka. He cited four specimens under *B. capitata: du Petit-Thouars* s.n., *Perville* 1978 from Nosi-be, *Chapelier* s.n. from the east coast, and *Boivin* 1978-2 from Nossi Camba (Nosy Komba). There are duplicates of the last two specimens at Kew, bearing Munro's handwritten annotations which are characteristically almost impossible to read. Throughout his monograph Munro presented two kinds of description of each species; the first is more-or-less a diagnosis, while the second part is a complete description. The diagnosis of *B. capitata* reads "spiculis fertilibus apice ramulorum capitato-congestis, sterilibus multo minoribus interrupte subpaniculato-spiculis etc." This suggests that the description is based partly on Boivin's specimen (K), which consists of a culm node with several leafy branches; each branch is terminated by a short inflorescence (or flowering branch), consisting of groups of slender spikelets, arranged at intervals along the inflorescence axis. Boivin's specimen is definitely not conspecific with

FIG. 1. Illustrations of *Nastus capitatus* Kunth (from Kunth 1829).

Kunth's *Nastus capitatus*. The full description states "spiculae fertiles in capitulum solitarium, terminale congestae", which matches Kunth's description. It also says "spicula fertilis....., setulis nigris obsita" as described by Kunth, but such an indumentum is absent in the specimens collected by Boivin and Chapelier. Munro commented that he had examined the specimens deposited in Paris, but did not mention the illustrations in Kunth's publication at all. It is not clear why Munro included the specimens of Boivin and Chapelier in his *Beesha capitata*, even though they are markedly different from Kunth's drawings. In fact, *Beesha* in Munro's sense is a superfluous name for *Ochlandra* Thwaites published in 1864 (see Bentham in Bentham & Hooker 1883, p. 1215). E. G. Camus (1913) transferred the species back to *Ochlandra*, and under *Ochlandra capitata* he cited almost everything Munro had written, including the specimens. Several flowering specimens collected by Perrier de la Bâthie (1909 & 1920), similar to Boivin's specimens, were also identified as *Ochlandra capitata*, presumably by A. Camus.

In early 1990, a herbarium sheet marked as having been collected by du Petit-Thouars was sent to me on loan from Paris, in answer to my request for the type specimen of *Nastus capitatus* Kunth. It bears a name *Nastus* on a label with a mark of "Herbarium Richard", and has three flowering branches of three different taxa mounted on one sheet. One of them (on the right) is a flowering branch of *Bambusa vulgaris* Schrad. ex Wendl. The middle one is annotated, on a label without signature, as the type of *Ochlandra capitata* E. G. Camus. This flowering branch in the middle resembles Boivin's and Chapelier's specimens. The third flowering branch (on the left) resembles the drawings of *Nastus capitatus* in Kunth (1829). I am not sure whether Kunth actually examined this sheet when describing the species. While examining bamboo specimens in the Paris Herbarium 1993, I found a sheet with two flowering branches resembling the drawing of *N. capitatus* Kunth; on it there is a label with a handwritten annotation "Nastus capitatus (Kunth scripsit)". I hereby lectotypify *Nastus capitatus* Kunth by this specimen, which I believe to have been collected by du Petit-Thouars (Fig. 2).

In 1988 and 1989 I collected flowering bamboos from Antalavia, Masoala Peninsula, Madagascar, which I identified as *Cephalostachyum peclardii* A. Camus. After a careful examination of these bamboos, I am sure that the type of *C. peclardii* and the bamboo from Antalavia resemble the drawing of *Nastus capitatus* Kunth and the specimen I have selected as lectotype of *N. capitatus*, and that the species are conspecific. Therefore *C. peclardii* A. Camus is a synonym of *Nastus capitatus* Kunth. However, *Nastus capitatus* does not belong either to *Nastus* Juss. or to *Cephalostachyum* Munro, or to any known genus. I hereby propose the generic name *Cathariostachys* for this bamboo.

It is clear that the bamboo, collected by Boivin and by Chapelier and also represented by the middle specimen on the Paris sheet, has never been named. In 1989 I collected flowering specimens of an erect bamboo, found commonly in Marojejy, which matches Boivin's and Chapelier's specimens. During my fieldwork to various parts of the east coast I found and collected a common (but sterile) erect bamboo, which vegetatively matches the one I collected in Marojejy. The bamboo collected by Boivin, Chapelier, Perrier de la Bâthie, supposedly by du Petit-Thouars, and myself, in fact belongs neither to *Nastus* or *Ochlandra*, nor to any

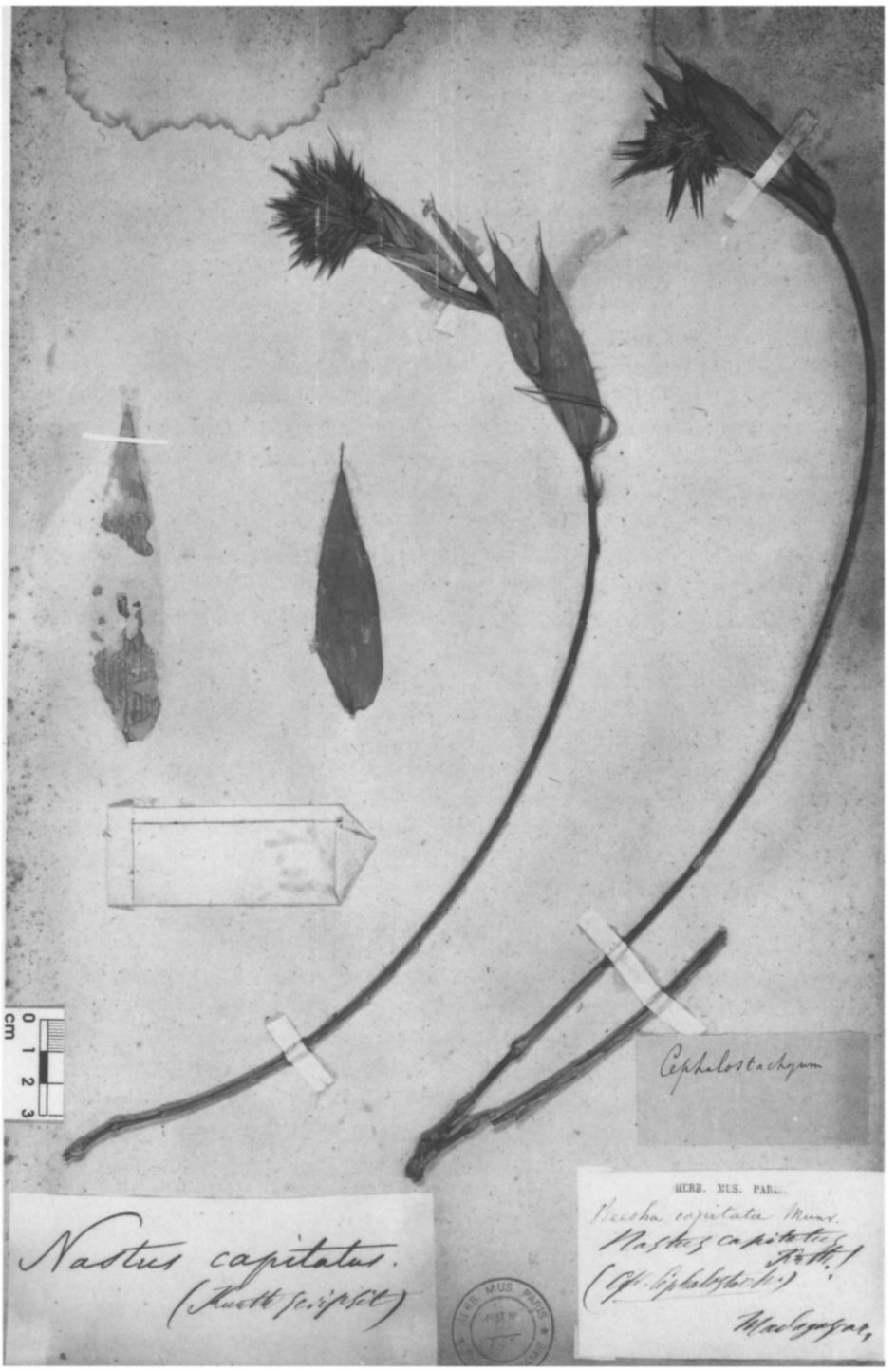


FIG. 2. Type of *Nastus capitatus* Kunth (*Cathariostachys capitata* (Kunth) S. Dransf.).

other known genus. I here propose *Valiha* as the generic name, with *Valiha diffusa* as the type species.

Valiha and *Cathariostachys* are probably only distantly related. Although both genera have determinate inflorescences, the details of inflorescence structure are different. In *Valiha* the inflorescence is not much branched, interrupted paniculate, and possesses prophylls, and the fruit has a pericarp easily separated from the seed, whereas in *Cathariostachys* the inflorescence is very much branched with a very short axis and a rachis forming a head, and usually has no prophylls; the fruit has a thinner pericarp not easily removed from the seed.

VALIHA

Valiha *S. Dransf.* genus Graminearum-Bambusoidearum novum rhizomatibus sympodialibus longicollibus; culmus erectus, cavus parietibus tenuibus; rami ad quoque nodum numerosi, ramo medio dominanti, infra cristam supranodalem inserti area ubi cicatrix vaginae deorsum curvata est. Inflorescentia determinata, axe segmentato bracteis prophyllisque praesentibus. Spicula juventute plus minusve cylindricalis, maturitate plus minusve complanata effusa; spiculi 4 – 6 glumis transitionalibus, 1 flosculo fertile, extentione rachillae 1 flosculo imperfecto; lodiculae 3; antherae apicibis obtusae minute mucronatae. Fructus pericarpio relative crasso semine facile separabile. Typus: *V. diffusa* S. Dransf.

Sympodial bamboos; rhizomes with long necks. Culms erect, with arching tips, medium to relatively large, with moderately thin walls. Branch bud one at each node, borne below the supranodal ridge where the sheath scar curves downwards, primary branch dominant, elongating, surrounded by small secondary branches bearing leaf blades. Inflorescences terminating leafy branches, determinate, axis segmented, bracts or sheaths and prophylls present, bearing several spikelets, of which the terminal one matures first followed by the rest, thus maturation of the spikelets not simultaneous. Spikelets cylindrical when young, becoming diffuse or open in maturity, consisting of 4 – 6 transitional glumes, one fertile floret and a much reduced rachilla extension; glumes chartaceous, with many nerves, lemma resembling uppermost glume, palea chartaceous, 2-keeled, deeply sulcate abaxially; stamens 6, filaments free; lodicules 3; ovary oblong, 3 stigmas. Caryopsis ovoid, with relatively thick chartaceous pericarp, easily removed from the seed; seed with well-developed endosperm, and a small embryo situated at the base.

Valiha has several interesting features. In most cases the slender necks of the rhizomes elongate considerably, in *V. diffusa* reaching 2 m long. In this situation the distance between the culms is also 2 m, and in mixed forest, such as on Marojejy, individual culms can be found growing scattered in between other forest trees. The rhizome system in this genus resembles that of *Melocanna baccifera* (Roxb.) Kurz, a bamboo native to India, Bangladesh and Myanmar, or of *Guadua angustifolia* Kunth, native to northeastern South America.

The inflorescence, consisting of several spikelets, is basically determinate, but the spikelets do not mature simultaneously. The axis is segmented, and is terminated by a spikelet. At an early stage the rachis internodes are very short and

slightly pubescent, elongating one by one starting from the top basipetally, so that the topmost spikelets mature first. There are three to four branches at each node, each subtended by a sheath or bract, and possessing a prophyll at the base. Each branch bears groups of spikelets scattered along the axis. Young spikelets are more-or-less cylindrical, and superficially resemble the mature spikelets of *Ochlandra stridula* Thwaites from Sri Lanka. At maturity they are open or diffuse, and slightly laterally flattened.

The lateral branches are situated below the supranodal ridge, at the point where the sheath scar curves downwards, so that they appear to emerge below the nodes (Fig. 3C – E). This character can also be found in two other genera from Madagascar, *Hickelia* A. Camus (Dransfield 1994) and in the monotypic genus *Decaryochloa* A. Camus (Dransfield 1997).

The genus can be differentiated from *Ochlandra* by its determinate inflorescence, the chartaceous pericarp of the fruit, and the position of the lateral branches of the main culm. In *Ochlandra* the inflorescence is indeterminate and has pseudospikelets which are arranged crowded in groups at each node of the inflorescence axis (the pseudospikelet consists of a prophyll at the base, two or more bracts each bearing a bud, and a proper spikelet; each bud will eventually develop into another pseudospikelet; see McClure 1934). In *Ochlandra*, the sheath scar of the culm node is level or symmetrical, so that the lateral branches appear to emerge above the node as in most bamboos. Moreover, the pericarp of the fruit is hard and very thick, traversed by vascular bundles, with its ground tissue containing numerous starch grains (Rudall & Dransfield 1989), (Table 2).

The type species of the genus *Nastus*, *N. borbonicus* J. F. Gmel. from Réunion, is an erect bamboo possessing a sympodial rhizome with relatively long necks. The species described from Madagascar (Camus 1925 – 1951) are climbing bamboos also possessing sympodial rhizomes but with very short necks. The inflorescences are racemose or paniculate, determinate, the axis is not segmented, prophylls are absent, and the young and mature spikelets are laterally flattened. In this paper, *Valiha* is compared with *N. borbonicus*, because both have erect culms and rhizomes with long necks. *Valiha* can be differentiated from *Nastus* mainly by having a clearly segmented axis with prophylls, cylindrical longer young spikelets and slender ovary (Tables 1 & 2).

The genus consists of two species, *V. diffusa* and *V. perrieri*.

KEY TO THE SPECIES OF *VALIHA*

Transitional glumes and lemma with long hairs along the margins and near the apex . . . . . **2. V. perrieri**

Transitional glumes and lemma without long hairs along the margins, occasionally with scattered white hairs on the back . . . . . **1. V. diffusa**

1. Valiha diffusa *S. Dransf.* **sp. nov**. *V. perrieri* affinis, sed glumis transitionalibus, lemmatibus, paleisque glabris vel dorsaliter sparse hirsutis differt. Typus: *Perrier de la Bâthie* 11285 (holotypus P, isotypus K).

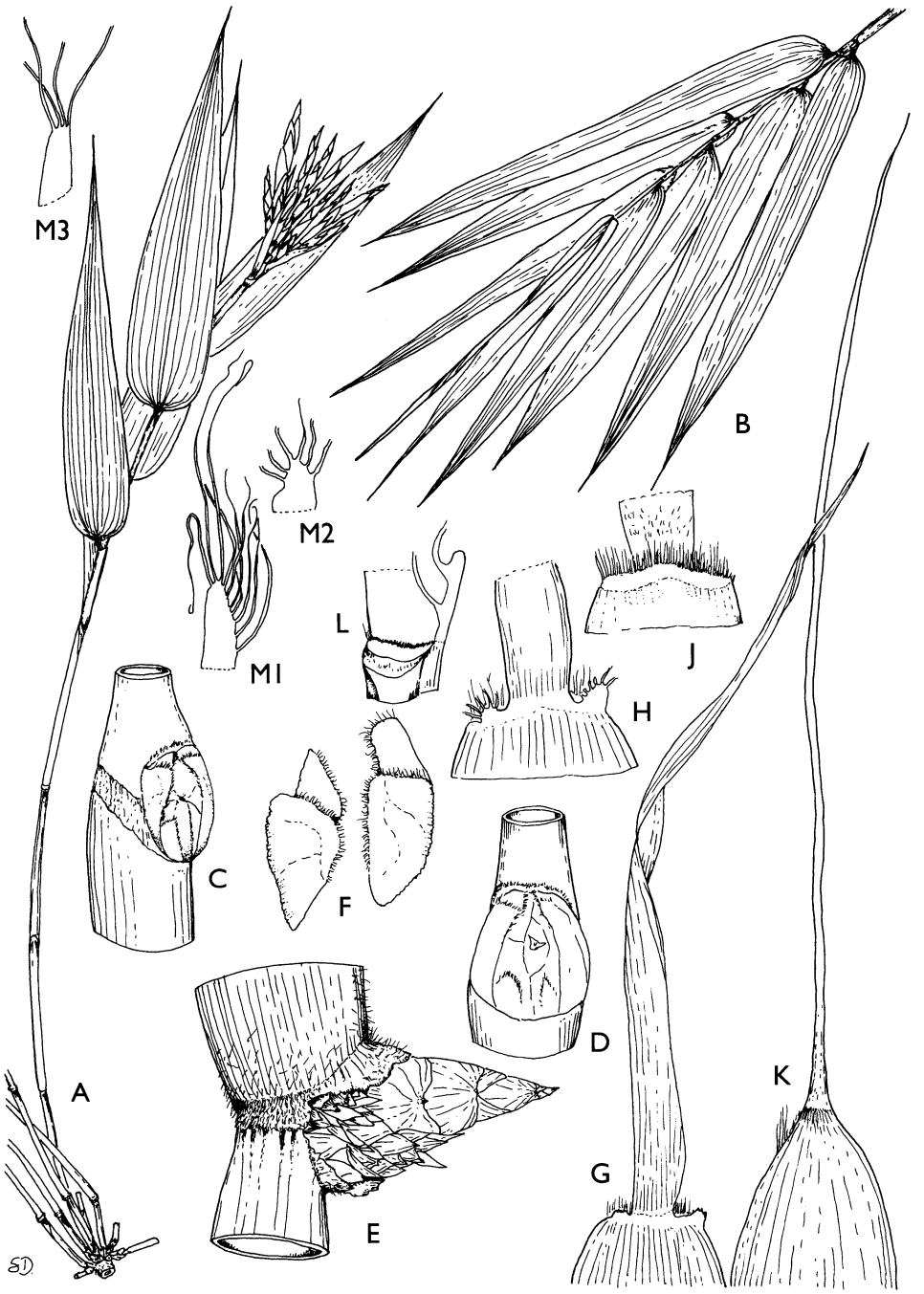
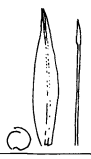
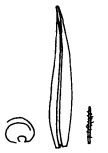
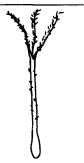
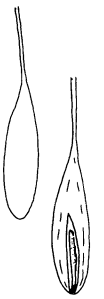
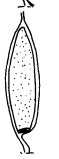


FIG. 3. *Valiha diffusa*. **A** flowering branch with young inflorescence × 1; **B** leafy branch (not bearing inflorescence) × 1; **C** branch bud (side view) and **D** (front view) × 5 1/2; **E** branches × 2; **F** prophyll of branch bud × 7 3/4; **G** culm sheath with blade × 4 1/2; **H** auricles of culm sheath × 6 1/3; **J** ligule of culm sheath × 6 1/3; **K** culm leaf of young shooth × 4 1/2; **L** ligule and auricle of leaf-blade × 15; **M 1,2,3** various types of auricles of leaf-blades × 11. **A** & **M** from the type, **B** & **L** from *Dransfield* SD1345, **C** & **D, F – J** from *Dransfield* SD913, **E** & **K** from *Dransfield* SD1347. Drawn by the author.

TABLE 1. A comparison of *Schizostachyum* Nees, *Cephalostachyum* Munro, *Ochlandra* Thwaites, *Nastus* Juss., *Cathariostachys* and *Valiha*.

	Schizostachyum (Malesian spp.)	**Cephalostachyum** (Asiatic spp.)	**Ochlandra**	**Nastus** (except climbing spp.)	**Cathariostachys**	**Valiha**
Habit of culms	erect with arching tips	erect or arching	erect with drooping tips	erect	erect with drooping or leaning tips	erect with arching tips
Rhizomes	compact sympodium, with very short necks	compact sympodium, with very short necks	compact sympodium, with very short necks	compact sympodium, or with relatively long necks	diffuse sympodium with long necks	diffuse sympodium with long necks
Branches	many, same size, above the level sheath scar	many, same size, above the symmetrical or level sheath scar	several to many, same size, above the symmetrical or level sheath scar	many, same size, usually above the symmetrical or level sheath scar	several, middle one dominant, above and inside the curved sheath scar	many, middle one dominant, above and inside the curved sheath scar
Inflorescence	indeterminate, axis segmented, rachis moderately long	indeterminate, axis segmented, rachis short	indeterminate, axis segmented, rachis moderately long	determinate, axis not segmented	determinate, axis segmented, rachis very short	determinate, axis segmented, rachis moderately long
Sheaths/bracts (in inflorescences)	present	present	present	not present	usually present	present
Prophylls (in inflorescences)	present, symmetrical	present, asymmetrical	present	absent	usually absent	usually present, asymmetrical
Glumes	none	2	2	5(6)	3 – 5	5
Rachilla extension	present, prominent	usually absent, or much reduced	usually absent, or much reduced	present, prominent	present, much reduced	present, much reduced
Fruit/caryopsis	with relatively thin pericarp, separated from seed, endosperm well-developed	with relatively thin pericarp, not separated from seed, endosperm well-developed	with thick fleshy pericarp, separated from seed, endosperm much reduced	not available	with thin pericarp, not easily separated from seed, endosperm well-developed	with relatively thick pericarp, separated from seed except along hilum, endosperm relatively well-developed

TABLE 2. A comparison of spikelets and parts of florets of *Schizostachyum* Nees, *Cephalostachyum* Munro, *Ochlandra* Thwaites, *Nastus* Juss., *Cathariostachys* and *Valiha*.

	Schizostachyum (Malesian spp.)	**Cephalostachyum** (Asiatic spp.)	**Ochlandra**	**Nastus** (except climbing spp.)	**Cathariostachys**	**Valeha**
Palea and rachilla extension						
Ovary (styles and stigmas)						
Fruits				not available		
(diagram of longitudinal section)						
(diagram of cross section)						
Spikelets (young and mature)						

NOTES. Species and specimens examined: *Schizostachyum zollingeri* Steud. (*Wong* FRI32102); *Cephalostachyum capitatum* Munro (*King* s.n. 1878); *Ochlandra stridula* Thwaites (*Dransfield* SD851); *Nastus borbonicus* Gmel. (*Billet & Jadin* 895); *Cathariostachys capitata* and *Valeha diffusa* see figs. 4 & 5.

Erect sympodial bamboo; rhizomes with long necks, distance between culms 0.5 – 2(– 5) m, culms about (6 –)10 m tall with arching tips, diameter (1.5) 6 – 10 cm, internodes 40 – 60 cm long, walls 2 – 3 mm thick, light to dark green, when young covered with pale to dark brown hairs especially below nodes, becoming glabrous with white powdery rings below and above the nodes. Branches extravaginal, borne below the supranodal ridge where the sheath scar curves downward; the primary branch dominant, ramifying at its base to several orders with most of these branches rebranching distally to several orders, resulting in many small branches; the primary branch also elongating considerably, bearing many small branches at each node.

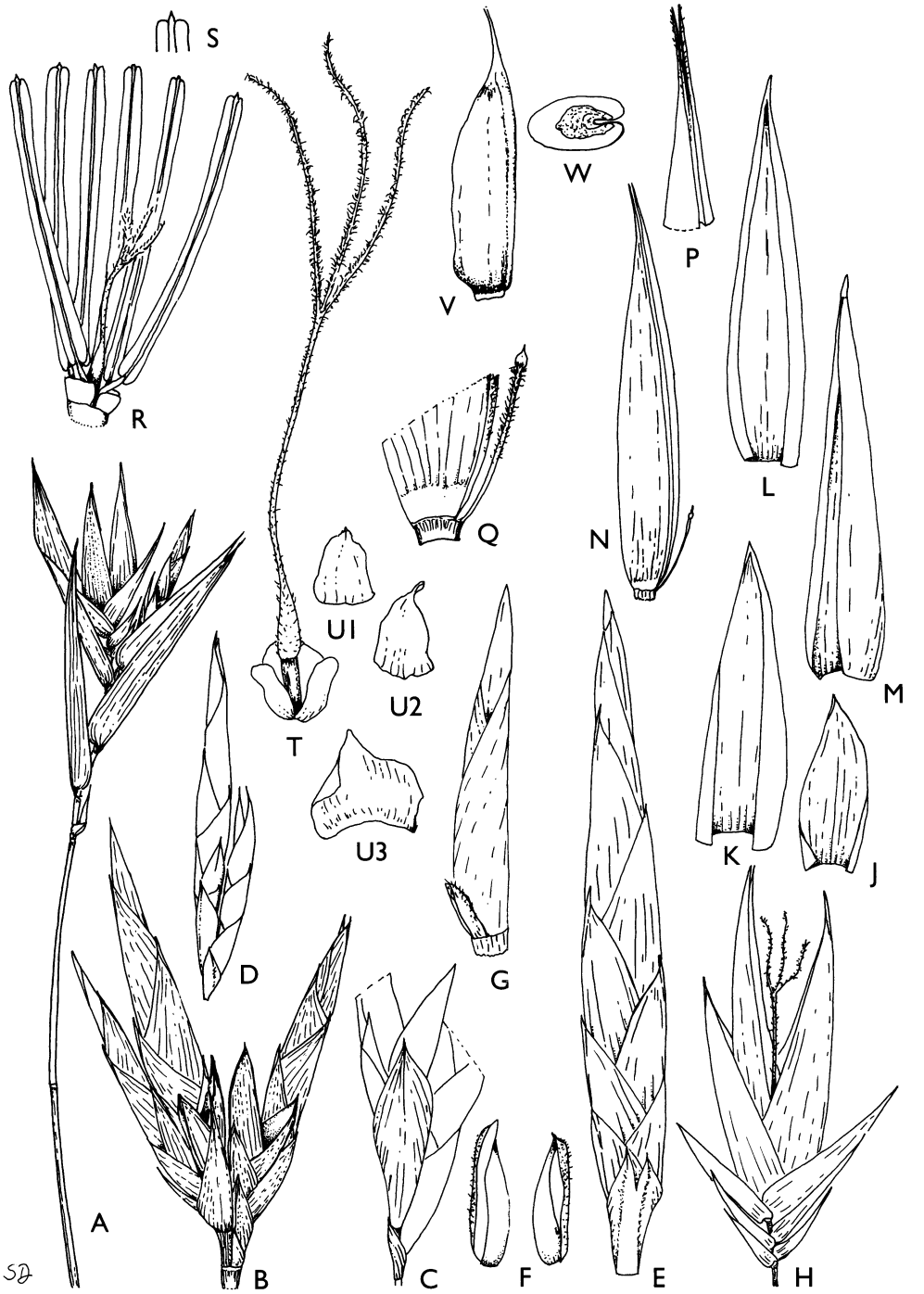
Young shoots light green with dark brown hairs. Sheaths of culm leaves broadly ovate or triangular, tapering to the tips, 16 – 20 cm long, 15 – 21 cm wide at the base, about 2 mm wide at the junction with the blade, densely hairy when young especially at the base, hairs dark brown; blades linear, somewhat erect, about 5 cm long, with scattered dark brown hairs, especially near the base; ligule laciniate with long bristles. Leafy branches 20 – 30 cm long, slightly geniculate. Leaf-blades lanceolate to ovate-lanceolate, 6 – 8 × 1.1 – 1.4 cm, glabrous or with scattered white hairs; sheath glabrous; auricles not seen; ligule laciniate. Inflorescences terminating leafy branches, rarely borne on leafless branches, 3 – 6 cm long, determinate, axis clearly segmented, internodes slightly cylindrical or flattened on one side, hairy (especially in the upper part) to glabrescent, 2 – 4 mm long when young, up to 10 mm long at maturity (below mature spikelets), bearing several spikelets of different age or state, the upper one maturing first, followed by the rest basipetally, buds not found, except a vestigial one below the youngest spikelet; subtending sheaths or bracts with or without modified blades, glabrous; prophylls not split (at the upper nodes) or split (at the lower nodes), unsplit ones 4 – 4.5 mm long, with deep cleft in the middle, keels ciliolate, split ones consisting of 2 unequal parts, about 3 mm long, keels ciliolate. Spikelets more or less cylindrical when young, pale green, spreading and slightly flattened at maturity, 1.2 – 3.5 cm long, consisting of 5 – 6 glumes, and one floret, rachilla extension hairy, about 3 mm long or very much reduced and often absent, rachilla internodes 1 – 2 mm long, cylindrical or flattened on one side, glabrous; lower glume about 9 – 2 mm, usually glabrous, acuminate, 15-nerved, second glume 9 – 11 × 2 – 3 mm, with pointed tip, glabrous, 17-nerved; other glumes 15 – 20 × 6 – 8 mm, with pointed tips, glabrous, but occasionally with scattered white hairs on the back, 23 – 27-nerved; lemmas 18 – 26 × 8 – 12 mm, with pointed tips, glabrous, often with scattered white hairs on the back, especially near the apex, 29 – 41-nerved; palea 14 – 24 × 4 – 8 mm, 2-keeled, sulcate on the back, with long bifid tips, 8 – 11 nerves at each side of the groove; lodicules 3, 1 – 3 mm long, with blunt tip in young florets, becoming broadly ovate with acuminate tips in mature florets, membrano-chartaceous; stamens 6, about 15 mm long, anthers with pointed tips, filaments free; ovary slender, style about 15 mm long, hairy, stigmas 3, plumose. Fruit oblong, flattened when dry, about 1 cm long, smooth, pericarp chartaceous, easily removed or separated from the seed, seed coat easily detached, seed oblong, embryo basal. Figs. 3 & 4.

DISTRIBUTION. Madagascar.

HABITAT. Originally in primary forest up to 700 m altitude, but becoming widespread and found on open hills or valleys, growing together with *Ravenala madagascariensis*.

LOCAL NAME. "Vologazy" (meaning Madagascar bamboo); Volo (*sensu* Perrier de la Bâthie).

SPECIMENS EXAMINED. Nossi-be (Nosy-be), fl., 1848, *Boivin* 1978 (P) (Munro (1868) incorrectly cited " Nossi-be, *Perville*, no. 1978"); Nossi Camba (Komba), fl., 1850, *Boivin* 1978/2 (K, P); Sambirano, fl., 1909, *Perrier de la Bâthie* 11268 (P); massif of Manongarivo, fl., 1909, *Perrier de la Bâthie* 11285 (K, P) (K specimen lacks this number, but bears no. 159, a number also found in P specimens); Antsiranana, Marojejy, 200 – 500 m, fl., 24 Nov. 1989, *Dransfield et al.* SD1065 (K, P, TAN);



Mananara, 300 m, prob. in 1920 (coll. *Peclard*), fl., *Perrier de la Bâthie* 12883 (P); Toamasina (Tamatave), 30 m, st., 31 Oct. 1994, *Dransfield et al.* SD1338 (K, P, TAN); Ampasimanolotra (Brickaville), 50 m, st., 8 March 1988, *Dransfield et al.* SD913 (K, P, TAN); Fianarantsoa, Ifanadiana, below Mt Vatovavy, 150 m, st., 4 Nov. 1994, *Dransfield et al.* SD1345 (ISC, K, P, TAN. US); l.c., 10 km E of Ifanadiana, st. (young shoots only), 6 Nov. 1994, *Dransfield et al.* SD1347 (K); Central Madagascar, fl., Dec. 1883, *Baron* 2591 (K); no locality, *Perville* s.n. (P).

USES. This bamboo is the most widely used native bamboo in Madagascar. I was told that in the past the culms were used for making a musical instrument, the tube zither called "Valiha", the name adopted here for the generic name of this bamboo. Nowadays, "Valiha" is made of other species of bamboo with longer internodes (I am unable to identify this bamboo; it may be a species of *Gigantochloa* Munro, which I did not collect, but saw growing in a village near Maroantsetra). The culms are used for the construction of walls and roofs; they are split on one side and flattened, then woven into large panels. Other uses are for carrying and storing water, fences and other light construction.

The completion of this paper has been delayed for many years because I wanted to find and collect a good complete flowering specimen to serve as the type. Unfortunately I have found flowering culms only once, on Marojejy, material that I feel is not good enough. I have thus been forced to choose an old incomplete collection instead. The vegetative parts are described based on SD913 and SD1345.

This species is variable, especially in the height and diameter of the culms. In Marojejy and in Fianarantsoa (Ifanadiana) they can be about 10 m tall with a diameter of 7 – 10 cm, whereas in degraded areas around Toamasina they are not more than 6 m tall with a diameter of 1.5 cm. It is possible that local people collect the culms almost continuously for their everyday use, and the rhizomes are only able to produce new smaller culms (a common situation in tropical sympodial bamboos when harvesting of the culms is excessive). The leaf-blades also vary in shape, length and width. In leafy branches that do not bear inflorescences, the blades are more or less lanceolate, whereas in flowering leafy branches they are more or less ovate-lanceolate (Fig. 3 A & B). On open hilly ground below Mt Vatovavy, east of Ifanadiana, dense stands (often mixed with *Ravenala*) of *V. diffusa* can be found, and the two types of leave-blades can be seen. First I thought the bamboo had started to flower, because in some of the culms it showed leafy branches with ovate-lanceolate blades and with swollen tips. In fact in the tips of these leafy branches there were insect larvae, and these galls resemble flowering branch buds.

FIG. 4. Inflorescence and spikelet of *Valiha diffusa*. **A** flowering branch with much developed inflorescence (showing uppermost open spikelet) × 1; **B** lowermost branch of inflorescence with three young spikelets, and remains of two fallen spikelets × 3; **C** lower part of a lateral branch of inflorescence showing sheath and part of prophyll × 6 1/3; **D** young lateral branch of inflorescence × 3; **E** a lateral branch with one young spikelet and a prophyll × 6 1/3; **F** split prophyll × 7 3/4; **G** very young lateral branch showing uppermost spikelet with a vestigial spikelet at the base × 13 1/3; **H** mature spikelet (anthers have fallen) × 2 1/4; **J, K & L** 3 of the glumes × 6 1/3; **M** lemma × 6 1/3; **N** palea with a rachilla extension × 6 1/3; **P** apex of palea × 6 1/3; **Q** rachilla extension × 6 1/3; **R** lodicules, stamens and ovary in young floret × 10 1/2; **S** apex of anther × 23; **T** lodicules and ovary in much developed floret (filaments and anthers have fallen) × 3; **U** lodicules in mature floret × 9 3/4; **V** fruit × 3; **W** cross section of fruit × 3. **A, H, U & W** from *Boivin* 1978/2, **B – G, J – M, R – T** from *Dransfield* SD1065, **N – Q** from *Perrier de la Bâthie* 11285. Drawn by the author.

The blades of the culm leaves can be small and short, or long and narrow. This can be seen in the plants in Fianarantsoa.

This species was introduced to Taiwan in 1972, and planted in arboreta at Chiayi and Kaohsiung, under the name *Ochlandra capitata* (Kunth) E. G. Camus (Anon. 1980).

2. **Valiha perrieri** (*A. Camus*) *S. Dransf.* **comb. nov.**

Ochlandra perrieri A. Camus, Bull. Soc. Bot. France 82: 310 (1935). Type: *Perrier de la Bâthie* 11283 (P, holotype; K, isotype).

Slender bamboo (*fide* Perrier de la Bâthie); culm with thin walls. Leafy branches bearing inflorescences 25 – 34 cm long. Leaf-blades of non-flowering branch not seen, those of flowering branches 4.5 – 7 × 9 – 15 mm, with long tips, glabrous; sheaths glabrous, often hairy along the margins, auricles not observed (all having fallen); ligule very short. Inflorescence 2.5 – 3.5 cm long, concealed in uppermost leaf-blades, internodes of axis pubescent. Spikelets up to 2.5 cm long, disarticulating below the second upper glume; lowermost glume 4 mm long, with scattered pale hairs on the back, and pointed apex, 9-nerved; second glume 4 mm long, apex 1 mm long, glabrous or with scattered hairs on the back, 11-nerved; third glume 5 mm long, apex 1 mm long, margins with long pale hairs, 13-nerved; fourth glume 6 mm long, apex just over 1 mm long, with long pale hairs near the apex, margins with long pale hairs, 15-nerved; fifth glume 8 mm long, apex 2 mm long, with long pale hairs along the margins and near the apex, 15-nerved; uppermost glume 10 mm long, apex 4 mm long, with pale hairs along the margins and near the apex, 19-nerved; lemma 18 mm, apex 5 mm, with pale long hairs along the margins and near the apex, 21-nerved; palea 18 mm long, with two tips 3 mm long; rachilla extension very short or not present; lodicules membranous, 1 mm long; ovary ovoid, with long style, 3 stigmas. Very young fruit slender, glabrous.

DISTRIBUTION. Madagascar; known only from the type.

HABITAT. In forest.

SPECIMEN EXAMINED. Andrafianamena, fl., Sept. 1909, *Perrier de la Bâthie* 11283 (K, P).

Mlle Camus mentioned that Perrier de la Bâthie observed that this species is found in the western part of the island, whereas *V. diffusa* (identified by her as *Ochlandra capitata*) is found in the east. *V. perrieri* has never been collected again.

CATHARIOSTACHYS

Cathariostachys *S. Dransf.* **gen. nov**. inflorescentia capituliformi *Cephalostachyo* Munro simile, sed inflorescentia determinata, spiculo 5 glumas transitionales ferenti, lodiculis carentibus, ovario ovoideo, stylo solido, fructu stipitato pericarpio tenue semine non facile separabile, rhizomate longicolli, ramis culmi infra cristam supranodalem insertis area ubi cicatrix vaginae deorsum curvata est, differt. Typus: *C. capitata* (Kunth) S. Dransf.

Sympodial, erect bamboo, rhizomes with relatively long slender necks. Culms of medium size, hollow, with moderately thin walls, and long arching tips. Branch bud single at each node, borne below the supranodal ridge where the sheath scar curves downwards, branches several to many with primary branch dominant, elongating and scrambling over nearby trees or vegetation, each of the primary branch nodes also bearing many leafy branches. Young shoots usually covered by black hairs, with stiff pointed blades of culm leaves. Culm leaves not easily detached from the culm, coriaceous, becoming stramineous; culm sheath comprising two parts, the sheath proper, and the base which is rugose and conceals the branch bud. Leafy branches varying in length and bearing from several to many leaf-blades; leaf-blades varying in size, usually glabrous, with very long fine tips, covered by light brown to black, short stiff hairs. Inflorescences determinate, contracted-paniculate, capitate or subcapitate, terminating leafy branches, with main axis not clearly segmented, spikelets maturing from the apex basipetally, bracts or subtending sheaths present, prophylls usually absent, or when present usually split. Spikelets laterally flattened, consisting of 5 (or 3) glumes, a fertile floret, and a vestigial rachilla extension, rachis internodes very short; glumes with long pointed tips, lemma resembling uppermost glume, palea with deep groove on the back; ovary with long style and 3 stigmas; stamens six, filaments free; lodicules not present. Fruit cylindrical, a typical grass caryopsis, but with a stalk, consisting of a thin pericarp, an endosperm, and a small embryo at the base.

The inflorescence in *Cathariostachys* is most unusual and resembles that of *Athroostachys* Benth. from Brazil (McClure 1973); it is determinate, paniculate, with a contracted main axis and very short lateral branches, forming a capitulum; each branch is subtended by a bract or sheath; prophylls are rarely present. Each of these lateral branches also bears very short branches, arranged distichously along a very short axis, with a spikelet terminating it. The axis is so short that the whole branch forms a fan, sitting on the main axis. The inflorescence, therefore, consists of these neatly arranged fan-like branches, to which the generic name alludes (*catharios*: neatly arranged, *stachys*: spike).

Because the rhizomes have long slender necks, the culms of *Cathariostachys* species are found growing singly and scattered in the forest. As in *Valiha*, the culms do not form a clump, although occasionally three to four culms grow next to each other.

The genus consists of two closely related species, *C. capitata* (Kunth) S. Dransf. and *C. madagascariensis* (A. Camus) S. Dransf. *C. capitata* is found mainly along the east coast, extending to northeast regions, whereas *C. madagascariensis* is commonly found in the central (Analamazaotra and around Moramanga, east of Antananarivo, the capital), and in the southeast regions (in Parc de National Ranomafana and around Ifanadiana).

Cathariostachys is not related to *Cephalostachyum* Munro; the inflorescence of the latter is indeterminate, pseudospikelets and prophylls are present, and the spikelet has 2 glumes; moreover, the sheath scars of the culm nodes are horizontal or level so that the lateral branches of the culm appear to emerge above the nodes as in most bamboos (Tables 1 & 2). The genus *Cephalostachyum* was described by Munro

in 1868, and comprises five species. Munro's description of the genus was principally extracted from Griffith's description and drawings of a bamboo named as *Schizostachium* (Griffith 1851a & b). When describing new taxa Munro (1868) never mentioned or indicated type species or type specimens, but he usually mentioned that the descriptions are based on certain species or certain specimens. In such cases the species or specimens can be regarded as the types. In the case of *Cephalostachyum*, I lectotypify the genus by *C. capitatum* Munro. Three of the species Munro described, *C. capitatum*, *C. pallidum* and *C. latifolium*, are closely related, and are found at high altitude in Bhutan, eastern India and northern Myanmar; *C. chapelieri* is described from Madagascar, and *C. pergracile* is found at lower altitudes in Myanmar and Thailand towards Vietnam. The inflorescence in *Cephalostachyum* is capitate and terminates a leafy branch, or is a long flowering branch with spikelets arranged in a fascicle, crowded at each node, as in *C. pergracile*. Munro interpreted the inflorescence as having fertile spikelets and imperfect (sterile) spikelets. In fact Griffith (1851b) mentioned that "the spiculae are originally simple, becoming compound only by the axils of the paleae bearing additional ones.... the normal form is to have one terminal spicule, which by the continued development of lateral flower-buds, assumes the subsequent anomalous structure". In my opinion, Griffith's description is thus equivalent to a pseudospikelet, a term proposed by McClure 1934, so that the inflorescence of *Cephalostachyum* is indeterminate.

In describing new species of *Cephalostachyum* from Madagascar (i.e. *C. perrieri*, *C viguieri*, *C. peclardii* and *C. madagascariensis*), Camus (1925b) adopted Munro's interpretation of the inflorescences, i.e. having fertile and sterile (imperfect) spikelets.

In his treatment of *Cephalostachyum* Gamble (1896) followed Munro's classification of the genus, and added *C. virgatum* (Munro) Kurz, which was transferred by Kurz (1877) from *Melocanna virgata* Munro, described from Myanmar. The inflorescence of *C. virgatum* is in fact different from that of typical *Cephalostachyum*, and in my opinion this species should be excluded from the genus (a critical study on the structure of the inflorescence is needed). Based on Gamble's scheme of the genus, with special reference to *C. virgatum*, Holttum (1958) implicitly proposed inclusion of *Cephalostachyum* in the genus *Schizostachyum* Nees, without mentioning the typical structure of the *Cephalostachyum* inflorescence, and the species from Madagascar. Holttum's interpretation was then adopted by Clayton & Renvoize (1986) without modification. Soderstrom & Ellis (1987) also follow Holttum's scheme, but pointed out that the species from Madagascar should be excluded from the genus, because they are anatomically different. Based on the inflorescence structure, two of the Madagascar species, *C. madagascariensis* and *C. peclardii*, are here excluded from *Cephalostachyum* and are transferred to the new genus *Cathariostachys*. They are erect bamboos possessing sympodial rhizomes with long necks. The other three species, *C. perrieri*, *C. viguieri* and *C. chapelieri*, climbing bamboos possessing sympodial rhizomes with very short necks, are currently under study, and will eventually also be excluded from the genus. A critical study on Asiatic *C. pergracile* is needed in order to assess whether it belongs to the genus *Cephalostachyum*.

Cathariostachys shares with *Valiha* S. Dransf. the long slender necks of the rhizomes, the determinate inflorescence with a segmented axis and the presence of bracts or

sheaths, several transitional glumes in the spikelet, and one-flowered spikelets. Moreover, in these genera the branches are borne below the supranodal ridge, at the point where the sheath scar curves downwards. The position of the branches on the culm, i.e., at the point where the sheath scar curves downwards, is a characteristic of the majority of native bamboos in Madagascar (Dransfield 1994, 1997, and pers. obs.), although it also occurs in other bamboo species, such as *Nastus productus* (Pilg.) Holtt. from New Guinea (pers. obs.), and the species of *Chusquea* sect. *Longifoliae* L. G. Clark (Clark 1989), and *Chusquea* subgen. *Rettbergia* (McClure 1966).

Based on the structure of the inflorescences and the spikelets, it is clear that *Valiha*, *Cathariostachys*, *Hickelia* A. Camus (Dransfield 1994) and *Decaryochloa* A. Camus (Dransfield 1997) are related to one another, and could be excluded from the subtribe *Nastineae* Soderstr. & R. P. Ellis. However, as I mentioned in my papers on the genus *Hickelia* (1994) and the genus *Decaryochloa* (1997), it seems wise to defer a subtribal placement until all genera in *Nastineae* are critically revised.

Key to the species of *Cathariostachys*

Spikelets more than 2 cm long; auricles of leaf-blades very prominent, with long bristles, easily shed . . . . . **2. C. madagascariensis**

Spikelets not more than 2 cm long, usually 1.5 – 1.7 cm; auricles of leaf-blades less prominent, with long bristles . . . . . **1. C. capitata**

It is very difficult to differentiate these two species, and they may in reality form one highly variable species. In this paper, however, they are regarded as distinct.

1. **Cathariostachys capitata** (*Kunth*) *S. Dransf.* **comb. nov.**

Nastus capitatus Kunth, Gram. 1: 325, t. 75 (1829). Lectotype: *du Petit-Thouars* s.n. (P).
Beesha capitata (Kunth) Munro, Trans. Linn. Soc. London 26: 145 (1868), *pro parte.*
Cephalostachyum peclardii A. Camus, Bull. Soc. Bot. France 72: 87 (1925). Lectotype: *Perrier de la Bâthie* 28881 (coll. Peclard) (P; isolectotype K).

Necks of the rhizomes 2 – 4 m long. Culms erect with drooping upper parts, slightly zig-zag, about 7 – 12 m tall, internodes 50 – 60 cm long (often containing water), 4 – 5 cm in diameter, with thin walls, covered with black hairs especially below nodes when young, glabrous and smooth at maturity. Young shoots usually green, with scattered dark brown to black hairs. Branches few to many at each node, with middle branch often dominant and elongating, sheaths of young branches often covered with black hairs. Leafy branches 17 – 50 cm long, bearing 7 – 21 leaf-blades. Leaf-blades lanceolate, 4 – 22 × 1.1 – 2.5 cm, apex 6 – 12 mm long, base asymmetrical, one side broadly cuneate, the other attenuate, usually glabrous except at the base with scattered, stiff short black hairs on both surfaces, blades of the flowering branches lanceolate to ovate-lanceolate, 3.5 – 8.5 × 1.2 – 2.0 cm, apex 10 – 12 mm long, base symmetrical, rounded, glabrous, except at the base with brown hairs on both surfaces; sheaths on leafy branches glabrous, those on flowering branches with brown hairs near the apex; ligules entire, about 1 mm long;

auricles on the leafy branches very short, with 12 mm long bristles, sometimes absent, those of the flowering branches 2 – 3 mm long, with 10 – 12 mm long bristles. Inflorescences 1.5 – 3 cm long, 1.5 – 3 cm diameter, spikelets in young inflorescence arranged in a compact capitulum, in older ones the spikelets spreading forming an open capitulum, spikelets easily shed, usually disarticulating below the uppermost transitional glume, axis glabrous, sheaths or bracts 2.5 – 4 mm long, pubescent on the back, hairy along the margins. Spikelets slightly cylindrical when young, laterally flattened in maturity, 13 – 20 mm long, rachis internodes very short, upper part minutely pubescent; transitional glumes 5, lowermost glumes 3 – 4 mm long, with pointed tips, glabrescent to hairy especially near the margins and apex, 3 – 5-nerved, others 5 – 7 × 1.5 – 2.5 mm wide, 7-nerved, apex with long pointed tips, with scattered stiff light brown to black hairs on the back (especially towards the apex) and along the margins; lemmas 7 – 11 × 3 mm, apex about 2 mm long, 13 –15-nerved, with scattered brown to black hairs on the back, especially near the apex; paleas 14 – 16 × about 3 mm, 4-nerved at each side of the groove, with scattered light brown to black hairs on the back especially near the apex; rachilla extension slender, about 2 mm long, hairy; stamens 6, 2 or 3 shorter than the other, with obtuse apex; ovary slender, style solid, hairy. Fruits oblong, about 7 mm long, 2 mm diameter, stalk 1 – 1.5 mm long, hilum prominent, pericarp relatively thin, not easily removed from the seed coat, both easily removed from the endosperm, endosperm with flat base bearing a flat embryo. Fig. 5.

DISTRIBUTION. Endemic in Madagascar; in east coast areas.

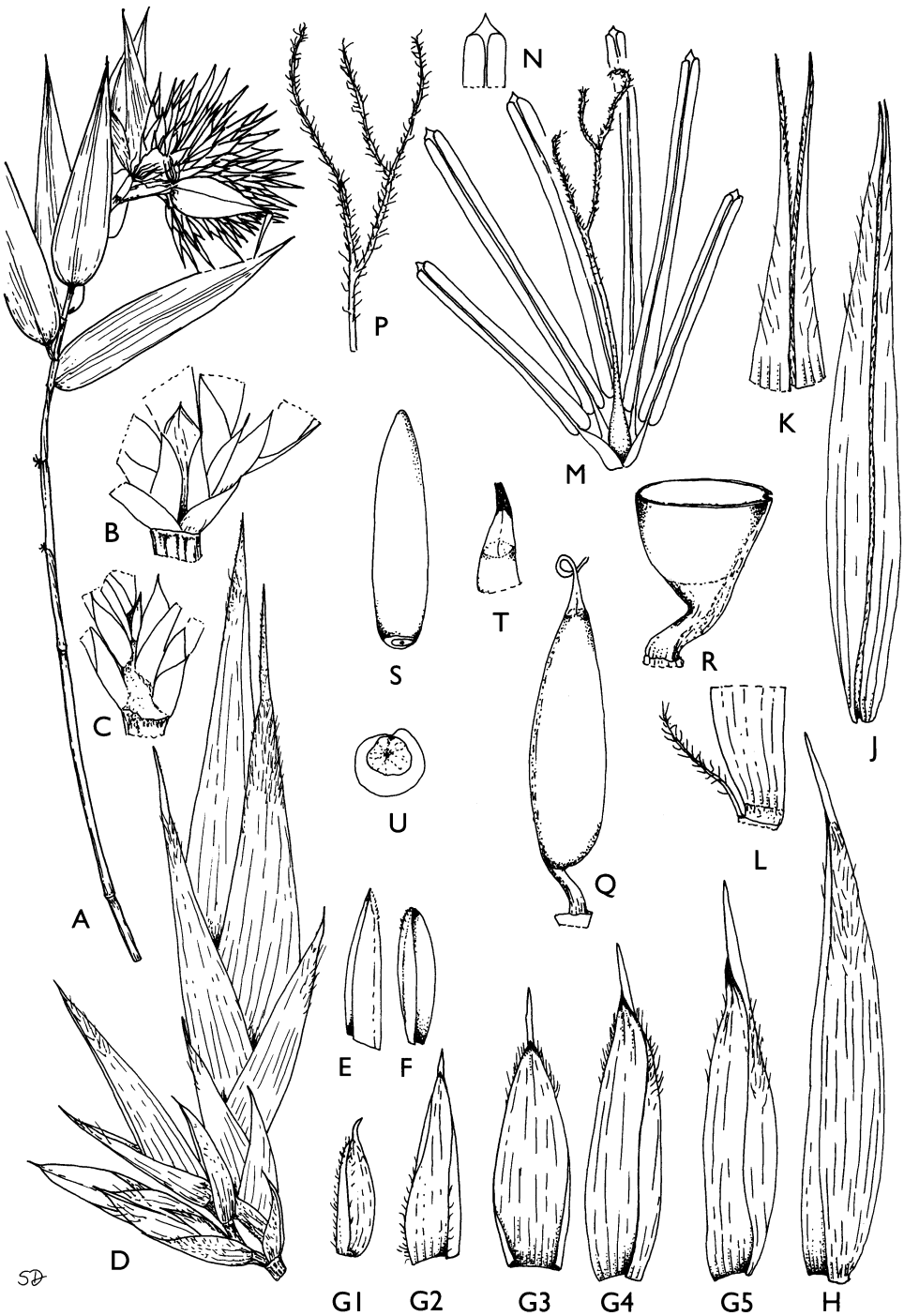
HABITAT. Lowland to hill primary forest, but surviving in disturbed forest, forest margins, or open ground; 5 – 700 m altitude.

LOCAL NAMES. Volo, Volosar ona, Volosy, Volozatsy.

SPECIMENS EXAMINED. Masoala Peninsula, Antalavia, near Ambanizana, 5 m, fl., 20 Feb. 1988, *Dransfield et al.* SD875 (K, MO, P, TAN); st., 25 Feb. 1988, *Dransfield et al.* SD883 (K, MO, TAN, US); 200 m, fl., 17 Nov. 1989, *Dransfield et al.* SD1063 (BO, ISC, K, MO, P, TAN, US); fl., 18 Nov. 1989, *Dransfield et al.* SD1064 (BO, ISC, K, MO, P, TAN, US). Mananara, 700 m, fl., 1920, *Perrier de la Bâthie* (coll. by Peclard) 12881 (K, P), 12882 (P) & 13054 (P); Antanambe Biosphere Reserve, Ambolokely, 235 m, st., 13 April 1992, *Dransfield et al.* 1286 (K, P, TAN); st., 25 Oct. 1994, *Dransfield et al.* 1334 (ISC, K, P, TAN, US). Soanierana-Ambedra, 200 m, fl., 8 Dec. 1938, *Lam & Meeuse* 5799 (K, L); Fandrangato, fl., *Peclard* s.n. (K). Farafangana, Vondrozo, fl., 5 Sept. 1926, *Decary* 5187 (P); fl., 11 Sept. 1926, *Decary* 5210 (P); fl., 17 Sept. 1926, *Decary* 5332 (P); fl., 2 Oct. 1926, *Decary* 5537 (P). Varahina, fl., 19 Oct. 1937, *Boiteau* 2751 (P, TAN). Sine loc., fl., *Baron* 5575 & 5668 (K, P).

USES. Local people use this bamboo for making flutes or "sudim".

FIG. 5. *Cathariostachys capitata*. **A** flowering branch × 1; **B** (front view) & **C** (inside view) lateral branch showing secondary branches along the branch axis × 6 1/3; **D** lateral branch with complete spikelet and the remains (glumes) of two fallen upper spikelets × 9; **E** & **F** prophylls (when present) × 6 1/3; **G1 – G5** transitional glumes × 13 1/3; **H** lemma × 13 1/3; **J** palea × 11; **K** tip of palea × 15; **L** rachilla extension × 13 1/3; **M** ovary and stamens (two shorter than the others) × 19; **N** tip of anther × 23 1/2; **P** stigmas × 23 1/2; **Q** fruit with stalk × 7 3/4; **R** lower part of fruit showing extension of hilum and pericarp × 16 1/2; **S** seed with endosperm and embryo at the bottom × 7 3/4; **T** tip of fruit showing base of solid style × 11; **U** embryo (viewed from under the seed) × 16 1/2. All from *Dransfield* SD1064. Drawn by the author.



The inflorescences in Kunth's illustration resemble those of *Perrier de la Bâthie* 12881, and do not match those of other specimens cited above. In fact the former are young inflorescences; they become open capitula at maturity, as can be seen in *Lam & Meeuse* 5799, in which both forms are found in one portion of an elongated branch.

In describing *Cephalostachyum peclardii*, Camus (1925b) cited Perrier de la Bâthie's field notes that the bamboo was a slender climber. In fact it is an erect bamboo, with elongated branches which often scramble over nearby vegetation or trees. These branches, which bear flowers, resemble other climbing bamboos found growing together in the same forest or habitat.

The position of the embryo in the fruit (Fig. 5Q – U) has not been observed in other grasses and bamboos. The fruits or caryopses in the grasses and most bamboos are sessile or without a stalk, and in *Cathariostachys* they have a stalk, or an extension of the pericarp which sticks firmly at the base of the floret. Kunth (1829) seemed to notice this character as it is shown in the illustrations. The embryo is loose, and seems to be attached to the endosperm only at the point by the hilum. The scutellum is very thin. A further study of the detailed structure of the fruit will be carried out soon.

2. Cathariostachys madagascariensis (*A. Camus*) *S. Dransf.* **comb. nov.**

Cephalostachyum madagascariensis A. Camus, Bull. Soc. Bot. France 72: 88. 1925. Lectotype, selected here: *Perrier de la Bâthie* 10917 (P; isolectotype K).

Culms 10 – 15(– 22) m tall, erect with arching upper part, then drooping or leaning on nearby trees or vegetation, 5 – 8(– 12) cm diam., internodes 40 – 60 cm long, glabrous or often with scattered black hairs, whitish below nodes or somewhat covered with fine golden brown hairs. Young shoots pale to purplish green, covered with sharp, stiff brown to black hairs. Sheaths of culm leaves stiff, becoming stramineous, covered with brown to black hairs, 17 – 21 cm long, 8 – 18 cm wide at the base, 3 – 8 cm at the top, apex horizontal or slightly curved at the junction with the blade; blades erect or deflexed, triangular to ovate-lanceolate, acuminate or tapering to long tips, 7 – 18 cm long, 2.5 – 6 cm wide at the base, densely dark brown-hairy especially near the adaxial base; ligule entire, 1 mm long; auricles about 5 mm long, with curly bristles. Leafy branches up to 1 m long, with up to 50 blades. Leaf-blades lanceolate, 9 – 26 × 1.5 – 4 cm wide, apex about 14 mm long, glabrous, except near the base abaxially covered with light brown hairs, base symmetrical, truncate, or rarely asymmetrical (*Dransfield* SD1344, from Ranomafana), with one side truncate and the other broadly cuneate, leaf-blades on flowering branches broadly lanceolate to ovate-lanceolate (near to or below the inflorescences), 4 – 11 × 11 – 22 cm wide, glabrous, except near the base with short hairs abaxially; ligule very short; sheaths glabrous, or with brown hairs in the upper part; auricles 3 mm long, easily shed, with curly bristles. Inflorescences 2.5 – 3 cm long, 2 – 4 cm diameter. Spikelets 20 – 22 mm long (mature spikelets), rachis internodes about 1 mm long, finely pubescent, lowermost glumes 3 mm long, 7-nerved, others 7 – 11 × 2 – 3 mm wide, 11 – 13-nerved, glabrous or with scattered black hairs on the back, with long pointed tips; lemmas 12 – 13 × about 4 mm, with

long pointed tips, 2 – 3 mm long, 13 – 15-nerved, glabrescent or covered with black hairs towards the upper part; paleas 17 – 20 × 4 – 5 mm wide, grooves covered with black hairs, 7 – 8-nerved at each side of the groove, glabrescent or with scattered black hairs near the apex; rachilla extension about 1 mm long.

DISTRIBUTION. Endemic in Madagascar, mostly in the interior.

HABITAT. Lower montane forest, and on forest margins or in very much disturbed forest or open ground; altitude 800 – 1000 m.

LOCAL NAMES. In Andasibe: Voloto and Volobe (*fide* Perrier de la Bâthie), Volotsangana (*fide* Phillipson); in Ranomafana: Volosy (*fide* Dan Turk).

SPECIMENS EXAMINED. Analamazoatra, fl., Feb. 1912, *Perrier de la Bâthie* 10842 & 10848 (P); 800 m, fl., *Perrier de la Bâthie* 10917 (K, P); *Perrier de la Bâthie* 51 (K, P); 1000 m, st., 5 March 1988, *Dransfield et al.* SD899 (K, MO, P, TAN, US); st., 14 Dec. 1989, *Dransfield et al.* SD1118 (K, MO, P); 900 m, st., 12 Nov. 1994, *Dransfield et al.* SD1356 (ISC, K, P, TAN, US); east of Moramanga, 1000 m, fl., 3 April 1987, *Phillipson* 1621 (K, MO). Fianarantsoa, Ranomafana National Park, 900 m, st., 4 Nov. 1994, *Dransfield et al.* SD1344 (ISC, K, P, TAN); 950 m, fl., 16 March 1993, *Turk et al.* 325 (K, MO, P, TAN).

USES. Internodes are used as water containers.

In the key to the species, Camus (1925b) differentiated *Cephalostachyum peclardii* and *C. madagascariensis* on the length of the paleas and the shape of the inflorescences. In *C. peclardii* the palea is much longer than the glumes and the inflorescence is subspherical, whereas in *C. madagascariensis* the palea is not much longer than the glume and the inflorescence is hemispherical. These differences are not easy to appreciate, because in mature spikelets of both species the paleas are longer than the glumes and lemmas, and the inflorescences also change in shape with age. As mentioned earlier, it is not easy to differentiate the two species, and they may be conspecific.

Perrier de la Bâthie noted (Camus 1925b) that this species is intermediate between *Ochlandra capitata* E. G. Camus (*Nastus capitatus* Kunth, *Beesha capitata* Munro), and the climbing bamboos (i.e. the culms have a large diameter, and the long upper part and branches climb). Moreover he noted that in this species the flower-bearing culms die after flowering, whereas those without flowers continue to live; this species has rhizomes with long slender necks and long branches. This characteristic condition is also noted in recent collections (*Phillipson* 1621, and *Dan Turk* 325, pers. comm.), and also in *C. capitata* (*Cephalostachyum peclardii*) found in Masoala Peninsula (pers. obs.).

I was told that young shoots and young leaf-blades of leafy branches (*Dransfield* SD1344) are eaten by *Hapalemur* spp., found only in Ranomafana. Dan Turk (*Dan Turk* 325) recorded that the lemurs also eat the culms. Some years ago I was asked to identify an internode (about 50 cm long) of culm of this bamboo from Ranomafana National Park, and was told that lemurs had eaten the culms. I have not myself seen lemurs eating any parts of this bamboo. Young leaf-blades are tender, and usually glabrous. As in many bamboos, the edible part of the young shoot is enclosed in culm-sheaths covered in irritant hairs. In order to obtain the soft, edible part, the culm-sheaths need to be removed. It would be interesting to learn how the lemurs

remove the sheaths. I have seen a picture of a lemur eating a piece of culm but I am not sure whether this piece is from a young or old culm. The mature culm is hard, and has relatively thick walls, and at this stage I suspect it would be inedible.

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