

The palm flora of Vietnam is rich and peculiar, but still far from being well known. This is particularly true for limestone areas of the north, which hold important centers of ancient geographically very restricted plant endemism. The recently described *Trachycarpus geminisectus* Spanner, Gibbons, V.D. Nguyen & T.P. Anh (Gibbons et al. 2003) is an example of such local endemism. Another unusual palm was discovered recently in the limestone lowlands in the center of northern Vietnam. It is described here as new to science.

Rhapis vidalii Aver., H. T. Nguyen & L. K. Phan, **sp. nov.**, habitu subherbaceo eleganti, inflorescentia pauciramosa pendula filiformi, nec non floribus pedicellatis pendulis componente incrassato lignificato, cui ex parte axis floralis inter calycem et corollam locata formatus est. Typus: VIETNAM. N.Vietnam, Hoa Binh prov., Mai Chau distr., Van Mai municipality, Highway 7, 15 km post. Primary lowland, very dry broad-leaved forest on shale at lower elevation to rocky, karstic limestone outcrops with deep fissures, between points 20°35'26"N 105°02'00"E and 20°34'39"N 105°02'23"E at elev. about 300–350 m.

Sympodial palm with single stem up to 1.5 m tall. Fruits white, fleshy. Among limestone rocky outcrops. Locally abundant. 12.12.2002, D. Harder, N.T. Hiep, L. Averyanov et al., DKH 8123. (holotypus HN; isotypus LE).

Sub-herbaceous undershrub with slender erect or slightly flexuous reed-like stems arranged commonly in loose groups with 3–6(10) individual growths of varying height. Stem very slender, unbranched, (0.3)0.5–1.5(2) m tall, 3–5 mm wide, with internodes 5–8(10) mm, covered in upper part with old leaf sheaths, terminated by a crown of 5–8(10) leaves, old stems bare in basal portion. Leaf sheaths narrow, 4–6 cm long, 4–6 mm wide, clasping and densely enveloping stem, their margins surrounding stem with a net of numerous flexuous anastomosing light yellowish-brown thin soft fibers; ligule broad, 1–2 cm long, light dull yellowish-brown, thin, papyraceous, early disintegrating into thin soft fibers. Petiole narrow, very slender, 15–20 cm long, about 1 mm broad, slightly curved at the base, ± straight toward the lamina, smooth along the margin, slightly flattened. Lamina suborbicular to fan-shaped (when young) in

2 (left). Steep rocky slopes of remnant ridges and hills composed with marble-like crystalline highly eroded limestone at elevations 300–700 m a.s.l. is home of *Rhapis vidalii*. 3 (right). Primary evergreen broad-leaved closed lowland dry warm-loving forests on limestone still support large populations of *Rhapis vidalii*.



outline, 20–30 cm across, palmately segmented from near the base into 6–8(10) segments, each segment linear to narrowly lanceolate, grass-like, 12–18(20) cm long, (2)3–5(6) mm wide, sparsely finely denticulate along the margins, commonly with 2 prominent longitudinal veins, longitudinally folded, sometimes slightly narrowing to the apex, irregularly toothed, with 2–3 unequal, short acute apical lobes; adaxial hastula semicircular or broad half-elliptic, erect, hairy on young leaves with numerous light yellowish-gray to dull yellow-brown soft, thin caducous hairs, on old leaves glabrous. Inflorescence 1(2), interfoliar, near the apex of the stem, sparsely and laxly branched, pendulous 20–30 cm long, with light dull brownish narrowly lanceolate smooth, glabrous basal bract 6–12(14) cm long, 3–4(6) mm wide; peduncle 6–12(14) cm long, 0.6–1 mm wide with 1–2 narrowly lanceolate bracts, 2–6 cm long, 1.5–2.5 mm wide; rachis very narrow, in apical portion filiform, 0.3–0.7 mm wide, flexuous, with (1)2–6(10) rachillae, each with filiform yellowish bracts at the base, 4–7 mm long, 0.2–0.3 mm wide; rachillae 3–8(10), flexuous, each with 1–14 distant, shortly pedicellate flowers; pedicels (0.6)0.8–1.4(1.6) mm long, 0.2–0.3 mm wide, at the base with filiform, narrowly triangular acuminate bract 1–1.5 mm long, 0.1–0.2 mm wide, at the apex bearing flower, jointed with thick articulation. Flowers unisexual, solitary, spirally arranged and 3–10 mm distant on rachillae, staminate and pistillate superficially similar; flower axis between attachment of sepals and petals developed into prominent thick, woody, deep green, cylindrical stalk, narrowing to the base, 5.5–7 mm long, about 1–1.6 mm wide at the middle; staminate flower with calyx campanulate, glabrous, dull light yellowish-brown, papyraceous, tubular in basal two thirds 1.2–1.4 mm long, 0.5–0.7 mm wide, at the apex with 3 free, broadly triangular, lobes, 0.5–0.7 mm long, 0.7–0.8 mm wide at the base, slightly incurved, acute to acuminate, outside sometimes indistinctly keeled; corolla broadly campanulate, petals 3, glabrous, dull yellowish-orange with green tips, scale-like, broadly triangular to semicircular, 1.4–1.6 mm long, 1.2–1.6 mm wide at the base, incurved, apiculate, outside slightly keeled; stamens 6, in two whorls, 3 stamens of outer whorl subsessile with very short filaments adnate to middle part of corolla cup, 3 stamens of inner whorl with thick, finely papillose filaments 1–1.2 mm long, 0.2–0.3 mm thick, adnate to the base of corolla cup, anthers oblong reniform, 0.4–0.5 mm long, 0.2–0.3 mm broad, dehiscent

longitudinally along lateral margin; pistillode with 3 completely separate carpelodes, placed close to each other at the center of corolla bottom, each carpelode small, bottle-shaped, slightly oblique, about 0.2 mm long and 0.05–0.07 mm wide in basal part, each with only one abortive ovule. Pistillate flower not seen. Fruit spherical or broadly obovoid, white (from three carpels in each individual flower normally only one developing) 7–9 mm across, with one large seed; epicarp pure white, thin, glabrous and smooth, glossy, skin-like; mesocarp fleshy and juicy with few soft fibers; endocarp thin woody, deep brown, densely adpressed to the seed. Seed spherical, with narrow longitudinal lateral cavity (from adaxial side); endosperm of stony, pure white to light yellow, of marble texture. Fig. 1, 4, 5, 7–9.

DISTRIBUTION. Species endemic to north-eastern part of North Indochinese floristic province (Averyanov et al. 2003a, b). **Vietnam:** Hoa Binh prov. (Mai Chau district), Thanh Hoa prov. (Ba Thuoc and Quan Hoa districts). Fig. 6.

ETYMOLOGY. Species named after Prof. Jules E. Vidal, outstanding botanist and explorer of Indochinese flora.

NOTES. The species differs from all known species of *Rhapis* L.f. (Hastings 2003) in the extreme development of the stalk-like base of the corolla, formed by the fusion of the corolla to the receptacle. This type of pedicelliform corolla is known in other species of the genus such as *Rh. micrantha* (Beccari 1931, Dransfield pers. com.) but is nowhere so strongly developed as in this new species. After anthesis the cylindrical or narrowly conical deep green stalk-like corolla base becomes larger and bears on its widened apex a spherical, broadly obovoid or broadly ellipsoid drupe and 1–2 aborted carpels, which later degenerate. Eventually the solitary, juicy, milky-white fruit terminates the thick woody deep green stalk, having some superficial resemblance with the fleshy seeds of *Podocarpus* (Podocarpaceae).

FLOWERING PERIOD. Flowers and ripe fruits were observed in December.

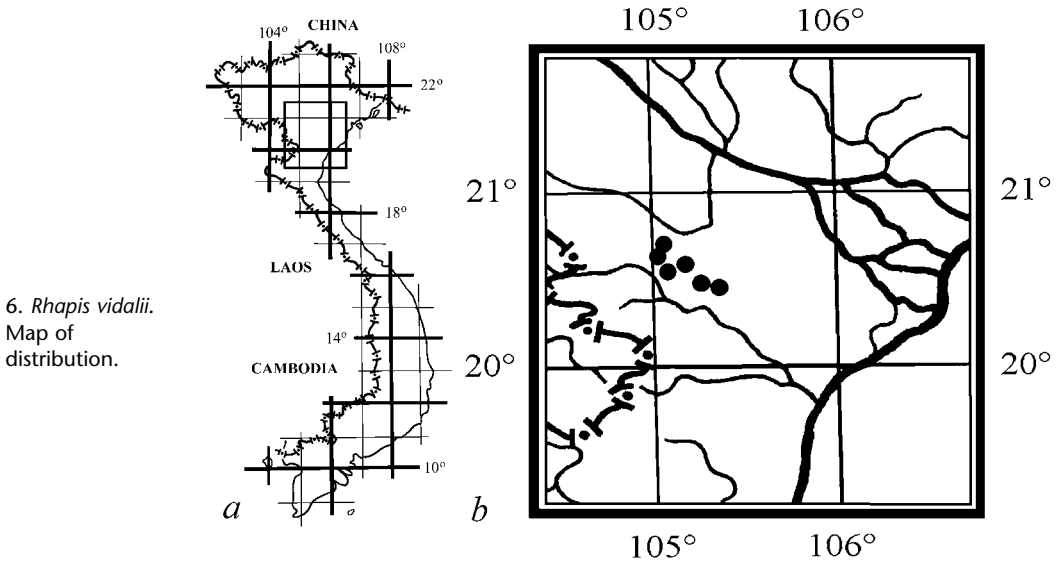
ECOLOGY. Terrestrial semi-woody undershrub 0.5–1.5(2) m tall. Primary and secondary evergreen closed seasonal broad-leaved lowland and submontane rather dry forests on steep rocky slopes of remnant ridges and hills composed of marble-like crystalline, highly eroded limestone at elevations 300–700(800) m a.s.l. Fig. 2 & 3.

RELATED SPECIES. In flower structure, the species most resembles *Rh. micrantha* but vegetatively it is very distinctive.

DIAGNOSTIC FEATURES. From all other species of the genus it differs in slender sub-herbaceous habit, filiform pendulous few branched inflorescence and pendulous pedicellate flowers with thick woody stalk-like corolla base developing from flower axis between calyx and corolla.

Specimens examined: VIETNAM. N. Vietnam, Hoa Binh prov., Mai Chau distr., Van Mai municipality, Highway 7, 15 km post. Primary lowland, very dry broad-leaved forest on shale at lower elevation to rocky, karstic limestone outcrops with deep fissures, between points 20°35'26"N 105°02'00"E and 20°34'39"N 105°02'23"E at elev. about 300–350 m. Sympodial palm with single stem up to 1.5 m tall. Fruits white, fleshy. Among limestone rocky outcrops. Locally abundant. 12

December 2002, D. Harder, N.T. Hiep, L. Averyanov et al., DKH 8123. (holotype HN; isotype LE); along road between Van Mai and Thanh Hoa, approximately 2 km SW of Van Mai village around point 20°34'17"N 105°01'58"E at elev. 600–650m. Disturbed secondary and remnants of primary rather dry broad-leaved forest on upper ridge slopes on limestone and shale soils with large, anciently eroded marble-like crystalline limestone. Palm up to 2 m tall, forming small clumps, flowering and fruiting in light gaps in the canopy. Leaves deep green, buds green, flowers dull yellow-orange, green at tip. Locally abundant. 13 December 2002, D. Harder, N.T. Hiep, L. Averyanov et al., DKH 8188. Thanh Hoa prov., Ba Thuoc distr., Co Lung municipality, territory of Pu Luong protected area, near Pu Luong village, 20°27'01"N, 105°11'03"E. Primary very dry evergreen broad-leaved forest with *Burretiodendron hsienmu* along tops of remnant karst limestone ridge at elev. 500–550 m a.s.l.



Palm 0.5–1 m hg on rocky steep slope. Locally common. 13 April 2001, N.T. Hiep, L. Averyanov, N.T. Vinh, D.T. Doan, HAL 929; Khuyn village, around point 20°26'31"N 105°14'55"E. Primary evergreen seasonal broad-leaved lowland forest on slopes of crystalline marble-like highly eroded limestone ridge at elev. 300–400 m. Small shrub-like palm 0.5–1.2 m tall. Occasional. 18 September 2003, L. Averyanov, D.T. Doan, J. Regalado, N.T. Vinh, HAL 3075. Quan Hoa Distr., Phu Le Municipality, Hang village, around point 20°31'33"N, 105°05'06"E. Secondary and primary closed evergreen seasonal broad-leaved lowland forest on steep slopes of rocky ridge composed with crystalline marble-like highly eroded limestone at elev. 350–450 m. Palm 1–1.5 m tall on steep slope. Not common. 29 September 2003, L. Averyanov, P.K. Loc, D.T. Doan, N.T. Vinh, HAL 3559. Around point 20°32'29"N, 105°04'32"E. Primary closed evergreen seasonal broad-leaved submontane forest on very steep slopes and cliffs of rocky ridge composed with crystalline marble-like highly eroded limestone at elev. 700–800 m. Palm up to 1.5 m tall. Very common. Co-dominant of herb forest stratum, 4 October 2003, L. Averyanov, P.K. Loc, D.T. Doan, N.T. Vinh, HAL 3899.

NOTES. *Rhapis vidalii* was discovered for the first time by Dr. N.T. Hiep and Prof. Leonid Averyanov in April 2001 during a reconnaissance expedition as part of the exploration program of the American Orchid Society and Basic Research program in Life Sciences of

Vietnam aimed at the investigation and inventory of orchids and conifers in remote areas of the country. This surprising palm was collected at first in low rocky hills just near Pu Luong village in the newly established Pu Luong protected area situated in Ba Thuoc district of Thanh Hoa Province. It was mentioned in field book as "*Rhapis cyperifolia*, sp. nov." for its superficial resemblance with some large species of *Cyperus*. The very unusual semi-woody sedge-like habit of the palm left no doubt that it was new to science. However, all specimens collected at this time were sterile or with very young flower buds, insufficient for correct description.

A year later the plant was found in neighboring Hoa Binh province in Mai Chau district during collaborative expedition of U.S.A. National Geographic Society and U.S.A. National Science Foundation. In this area the new palm was observed as a common plant of forest understory. Collections that were made in December 2002 included both flowering and fruiting samples, as well as ripe fruits and seeds. These perfect collections were chosen as type material for description of the species.

Next autumn, during September – October 2003, studies of *Rhapis vidalii* were continued as a part of botanical survey in Pu Luong nature reserve supported by Vietnam Program of Fauna and Flora International. In a number of localities of limestone hills and low ridges this small elegant palm was observed as a common species, sometimes appearing as important co-dominant in herbaceous forest

stratum. Detailed studies of natural conditions, taxonomic composition and vegetation structure in habitats of *Rh. vidalii* will bring better understanding of the nature of this unique Vietnamese endemic with a very restricted distribution.

Wide-ranging field studies outlined the range of *Rhapis vidalii* as a very small area situated in north-eastern part of North Indochinese floristic Province of Indochinese floristic Region of Indomalaysian Subkingdom of Paleotropic Realm (Averyanov et al. 2003a, b). This area lies along the border of Hoa Binh and Thanh Hoa administrative provinces of northern Vietnam and spreads from north-west to south-east as a narrow area not exceeding 50 km long and less than 15 km wide (Fig. 6). This is clear example of very strict calcium dependent plant endemism in the flora of Vietnam. In the case of *Rh. vidalii* it is associated with highly eroded rocky low limestone ridge systems, which run from Moc Chau plateau in a south-east direction ending to the SE of Cuc Phuong national park.

The limestone formations in the area of *Rh. vidalii* are represented by low highly eroded remnant hills and rocky ridges 900–1000 m a.s.l. (Figs. 2 & 3). They are composed of solid crystalline highly eroded marble-like mainly white or light gray limestone thought to be of

Palaeozoic age (Dovzikov et al. 1965a, b). Steep slopes of remnant mesas and low ridges covered with primary vegetation support habitats of many rare species, including *Rh. vidalii* (Figs. 2 & 3).

A monsoon tropical climate with a cool winter and summer rains is typical for the area of *Rhapis vidalii* distribution (Nguyen Khanh Van et al. 2000). Dry winters with a drought period of 2–5 months, extending from December to February or March and wet summers with the peak rainfall in July and August are regularly observed here. Humidity approaches the average found in lowlands of northern Indochina. Nearest climate stations (Kim Boi and Moc Chau) record a mean annual rainfall of 2255.6 and 1559.9 mm at elevations 100 and 958 m above sea level respectively. Temperature regimes have a strong seasonality. Winter conditions with cool temperatures extend from November to April, with common temperatures 12°–18°C (with absolute minima at elevation 100 m 2.1°C and at elevation 958 m –1.5°C). Persistent misty drizzling rains, so called *craschen*, are very typical in the area from early February until the end of March. Summers are hot and humid, with common temperatures 22°–28°C and absolute maxima 35° and 40.5°C. Reported mean annual temperatures are 18.5° and 22.8°C.

7. In the limit of its distribution *Rhapis vidalii* is a common understory palm of the forest floor.





8. *Rhapis vidalii*. Young fruits deriving from three free carpels.

Primary vegetation in habitats of *Rhapis vidalii* are classified as closed evergreen seasonal tropical broad-leaved lowland, sometimes also submontane limestone forests (Averyanov et al. 2003a, b).

Tree dominants of the first forest stratum here reach 35–45 m tall and 60–110 cm in diameter with projected cover reaching 50–80% (Fig. 2, 3). Most common species here are *Allospondias lakonensis*, *Anogeissus acuminata*, *Burretiodendron hsienmu*, *Pometia pinnata*, *Dimocarpus longan*, *Dracontomelon duperreanum*, *Heritiera macrophylla*, *Millettia ichthyochtona*, as well as some species of such genera as *Aglaiia*, *Diospyros*, *Ficus*, *Garcinia*, *Horsfieldia* and *Sterculia*. Some trees of this group, such as *Anogeissus acuminata*, *Heritiera macrophylla* and species of *Ficus* may reach heights of 50–55 m with trunks up to 2 m in diameter. Often these giant trees have plank buttress roots up to 3 m tall and 2.5 m long at the ground. They often appear as emergent trees in continuous matrix of the canopy of the first forest stratum.

Trees of the second forest stratum in habitats of *Rhapis vidalii* grow commonly 15–20 m high. The structure of this stratum may be simple including mono-dominant stands of *Streblus macrophyllus*, as observed on very steep and dry slopes (particularly south-facing). However, on more humid slopes species composition of this stratum is rich and comprises numerous tree species. Diameter of tree trunks in this stratum usually varies from 25–40 cm. Usual projected cover is 20–40%. Most common trees here are immature samples of species of first canopy stratum. Additionally there are other species that form natural integral elements of this stratum. Among them are *Castanopsis indica*, *Deutzianthus tonkinensis*, *Nageia wallichiana*, species of *Alstonia*, *Antidesma*, *Cinnamomum*, *Garcinia*, *Polyalthia*, *Pterospermum*, *Syzygium*, *Vitex* and numerous warm loving representatives of such families as Euphorbiaceae, Fabaceae, Lauraceae, Meliaceae, Rubiaceae, Sapindaceae and Theaceae.

The height of the third forest stratum is usually 5–15 m with trees 10–25 cm diameter and projected cover 30–45%. *Streblus macrophyllus* is the most common co-dominant here. Other common associates in this stratum were trees such as *Celtis cinnamomea*, *Lagerstroemia balansae*, *Streblus tonkinensis*, as well as representatives of *Ailanthus*, *Archidendron*, *Camellia*, *Cinnamomum*, *Eurya*, *Litsea*, *Psychotria*, *Pterospermum*, *Schefflera*, *Syzygium*, *Zanthoxylum* and numerous species of Annonaceae, Bignoniaceae, Euphorbiaceae, Lauraceae, Rubiaceae and Theaceae. Large palms, such as *Arenga westerhoutii*, *Caryota bacsonensis* and *C. mitis*, are occasionally common in this stratum.

In the habitats of *Rhapis vidalii* numerous shrubs form a distinct fourth forest stratum 1.5–5 m tall. Projected cover of this stratum commonly varies from 10–30%. However, in some cases it may reach 60–80%. Most common dominant species here are saplings of trees and palms of the highest forest strata. Other species occurring here are genuine shrubs and small trees specific to forest

understory including *Brassaiopsis phanrangensis*, *Caryota sympetala*, *Dendrocnide urentissima*, *Diospyros mollifolia*, *Flacourtia ramonchi*, *Leea indica*, *Polygala arillata*, *Silvianthus tonkinensis* and members of such genera as *Ardisia*, *Callicarpa*, *Camellia*, *Canthium*, *Clerodendrum*, *Euonymus*, *Eurya*, *Helicia*, *Illicium*, *Ixora*, *Jasminum*, *Myrsine*, *Pandanus*, *Phyllanthus*, *Psychotria*, *Sapium*, *Schefflera*, *Strychnos*, *Trevesia* and *Wrightia*.

The density of herbaceous cover in the limestone forest directly depends on humidity. It commonly develops projected cover up to 100% on wet slopes of shady valleys and may be hardly pronounced on dry steep south-facing slopes, where herb cover may be less than 1%. Indigenous herbs are most common dominants here. Among them are *Aglaonema* sp., *Alocasia macrorrhiza*, *Alpinia* sp., *Amischotolype hispida*, *Amomum* sp., *Amorphophallus* sp., *Ardisia* sp., *Aspidistra* sp., *Asystasia* sp., *Begonia balanseana*, *Begonia* sp., *Costus speciosus*, *C. tonkinensis*, *Curculigo* sp., *Cyrtococcum patens*, *Distichochlamys* sp., *Elatostema* sp., *Geophila repens*, *Hedychium*

9. *Rhapis vidalii*. Ripe fruits are long-lasting, pure white, pendulous drupes.



forrestii, *Hedyotis* sp., *Impatiens eberhardtii*, *I. claviger*, *I. albo-rosea*, *Impatiens* sp., *Mycetia balansae*, *Mycetia* sp., *Ophiopogon* sp., *Ophiorhiza* sp., *Peliosanthes teta*, *Pellionia* sp., *Pilea* sp., *Pollia* sp., *Stachyphrynium placentarium*, *Stuednera colocasiaefolia*, and *Strobilanthes* sp. In this herbaceous layer many species of ferns and their allies are also very common, such as *Adiantum philippense*, *Asplenium unilaterale*, *Cyclosorus* sp., *Diplazium* sp., *Polystichum* sp., *Pteris ensiformis*, *Pteris* sp., *Selaginella* sp., *Tectaria decurrens*, *Tectaria* sp. and *Thelypteris* sp. Many other rare species of herbs and undershrubs are associated with this stratum. Among them, many terrestrial and lithophytic orchids such as *Calanthe alismifolia*, *C. argenteo-striata*, *Corymborkis veratrifolia*, *Goodyera fumata*, *Habenaria ciliolaris*, *Habenaria medioflexa*, *Nervilia aragoana*, *N. plicata*, *Phaius mishmensis* and *Tropidia angulosa*.

Epiphytes in habitats of *Rhapis vidalii* are rather common. They often form large colonies in canopies of large trees and give a characteristic appearance to the forest. Tree stem and branch cover of epiphytic bryophytes and lichens regularly reaches here 80–100%. Among vascular plants orchids and ferns are most common epiphytic species. Most common orchids here are *Biermannia calcarata*, *Bulbophyllum guttulatum*, *B. xylophyllum*, *Bulbophyllum* sp., *Callostylis rigida*, *Cleisostoma fuersteinbergianum*, *C. melanorachis*, *C. striatum*, *Dendrobium aduncum*, *D. chrysanthum*, *D. dentatum*, *D. lindleyi*, *D. salaccense*, *D. spatella*, *Dendrobium* sp., *Eria globulifera*, *Eria* sp., *Flickingeria* sp., *Kingidium deliciosum*, *Luisia* sp., *Pelatantheria insectifera* and *Trichotosia pulvinata*. Among ferns and their allies regularly observed were species such as *Aglaoomorpha coronans*, *Arthropteris* sp., *Asplenium nidus*, *Asplenium* sp., *Davallia* sp., *Lycopodium* sp., *Polypodium* sp., *Psilotum nudum*, *Pyrrosia lanceolata*, *Pyrrosia lingua*, *Pyrrosia* sp. and *Vittaria* sp.

Numerous rocky outcrops of parent limestone rocks are very typical on steep slopes in habitats of *Rhapis vidalii*. Density of lithophytes varies from 5–10% of projected cover on steep, dry, south-facing slopes to 100% on wet, shady slopes of narrow valleys and canyons. Lithophytic bryophytes and lichens are dominant in all studied habitats often forming cover up to 100% of rock surface. Among flowering plants and ferns in lithophytic communities commonly observed were such species as *Adiantum philippense*, *Aglaonema* sp., *Amorphophallus* sp., *Antrophyum*

callifolium, *Antrophyum* sp., *Arisaema* sp., *Aspidistra* sp., *Asplenium anthrophioides*, *A. prolongatum*, *A. saxicola*, *A. thunbergii*, *Asplenium* sp., *Begonia cucphuongensis*, *Calanthe argenteo-striata*, *Chirita hamosa*, *Chirita* sp., *Cleisostoma rostratum*, *Davallia* sp., *Disporum* sp., *Drynaria bonii*, *Elatostema* sp., *Goodyera hispida*, *Hedyotis* sp., *Lepisorus* sp., *Liparis averyanoviana*, *L. cordifolia*, *L. distans*, *L. latilabris*, *L. stricklandiana*, *Liparis* sp., *Malaxis acuminata*, *Nephrolepis cordifolia*, *Odontochilus elwesii*, *Paphiopedilum hirsutissimum*, *Pilea* sp., *Polygonatum odoratum*, *Polystichum* sp., *Procris* sp., *Pyrrosia lanceolata*, *P. lingua* and *Pyrrosia* sp.

Many kinds of lianas form an integral component of the forest in habitats of *Rhapis vidalii*. They belong to three groups – woody vines, herbaceous vines and creeping vine epiphytes. The most common woody vines here are species of genera such as *Acacia*, *Actinidia*, *Albizia*, *Alyxia*, *Ampelopsis*, *Bauhinia*, *Caesalpinia*, *Celastrus*, *Dalbergia*, *Embelia*, *Entada*, *Jasminum*, *Luvunga*, *Smilax*, *Stauntonia*, *Strychnos*, *Tetrastigma* and *Ventilago*. Some of them grow to 40–45 m long and have sometimes flat undulating stems up to 40 cm wide. Herbaceous vines are usually much shorter and more typical in open precipitous habitats. They belong to such genera as *Cardiopteris*, *Ceropegia*, *Dioscorea*, *Merremia*, *Mucuna*, *Paederia*, *Thunbergia* and *Trichosanthes*. In more humid places are very typical creeping epiphytic vines like *Epipremnum* sp., *Piper* sp., *Pothos grandis*, *Pothos* sp., *Rhaphidophora decursiva* and *Scindapsus* sp. Some species of this group have relatively short stems and commonly occur in canopies of large trees. Among them are *Callostylis rigida* and species of *Aeschynanthus*, *Dischidia* and *Hoya*.

Plants of specific life forms like giant strangler lianas (*Ficus sarmentosa*, *Ficus* sp.), climbing trees (*Poikilospermum suaveolens*), numerous canopy semi parasites (*Viscum ovalifolium*, *Loranthus* sp.) and achlorophyllous ground root parasites (*Balanophora fungosa*, *B. laxiflora* and *Balanophora* sp.) are very typical for warm-loving, lowland limestone flora in the area of *Rhapis vidalii*.

Soils here consist of gray-brown, brown, light brown to red-brown (on low elevations, particularly on steep slopes) clayey, friable well structured layer, 8–10 cm. It covers a highly weathered limestone gravel horizon overlying parental rocks of crystalline, solid, marble-like, highly eroded, whitish or yellowish to light

gray limestone. Due to good drainage the ground does not hold much water, even during torrential summer rains. Leaf litter layer varies from 0 to 10 cm thick and may reach 35–50 cm in crevices, depressions and deep karst pockets.

Rhapis vidalii grows in its natural habitat as a terrestrial or lithophytic subherbaceous undershrub on steep shady slopes in an elevation belt at 300–700 m a.s.l. It may commonly be seen as scattered loose groups of few clumps (Fig. 1). The species finds its ecological optimum under deep shade of intact primary forest, where it sometimes forms large colonies with thousands of individual groups. In some studied model plots (chosen for the description of vegetation) this species reach 40–50% of coverage in the forest understory and appeared as main co-dominant in the herbaceous forest stratum (Fig. 7). Regularly adult stems have a height of 1–1.5 m, rarely reaching 1.8–2 m tall.

Very few fertile samples of *Rhapis vidalii* were observed in the field during 2001–2003. They rate less than 0.1% of all observed adult trunks. Flowering or fruiting plants were commonly observed in areas with relatively more light, particularly on very steep rocky slopes, near vertical cliffs, near to light gaps formed by large fallen trees.

Full flowering and ripe fruits were observed in nature during December. This demonstrates that maturation of fruits needs a whole year. Germination of ripe seeds collected in nature approaches 100%. Seedlings in cultivation grow quite well, but very slowly. We estimated that the largest stems found in nature may be 20–25 years old.

Rhapis vidalii has a very distinctive appearance with its elegant stems terminated by lax crowns of 6–10 deep green, graceful leaves palmately dissected into linear segments. Small plants superficially resemble young plants of *Cyperus papyrus*, but are more compact, darker and rigid. Older plants appear as miniature, pretty, almost toy-like palm with attractive milky white, long-lasting, pendulous fruits. There is no doubt that this newly discovered palm has outstanding horticultural potential, particularly for miniature rocky gardens of Japanese style.

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