Nordic Journal of Botany 31: 001–009, 2013
doi: 10.1111/j.1756-1051.2013.00273.x,

Subject Editor: John Parnell. Accepted 5 May 2013

Aspidistra albopurpurea, *A. khangii*, *A. lubae* and *A. stellata* spp. nov. (Asparagaceae, Convallariaceae s.s.) from Indochina

Leonid V. Averyanov and H.-J. Tillich

Leonid V. Averyanov (av_leonid@mail.ru), Komarov Botanical Inst. of the Russian Academy of Science, Prof. Popov str., 2, RU-197376 St Petersburg, Russia. – H.-J. Tillich, Ludwig-Maximilians-Univ., Inst. of Systematic Botany, Menzingerstr. 67, DE-80638 Munich, Germany.

Aspidistra albopurpurea, *A. khangii*, *A. lubae* and *A. stellata* discovered recently are described and illustrated as species new to science. All novelties are local endemics of northern Vietnam and southeastern Laos. *Aspidistra albopurpurea* is unique in the genus with a white/red stigma in striking contrast to the large milk-white tube base. *Aspidistra stellata* belongs to a group of species with extraordinary long and narrow lineate perigone lobes. *Aspidistra khangii* and *A. lubae* belong to a small group of species having erect, vertical shoots. The first species is easily distinguished by its stout stem, down-curved peduncle and obpyramidal, container-shaped perianth. *Aspidistra lubae* has characteristic horizontal, peduncles and urceolate flowers. Besides the type variety, *A. lubae* includes var. *lancifolia,* which differs in its erect, lanceolate, immaculate, shortly petiolate leaves. Both varieties of *A. lubae* were found growing, often intermixed, in the same locality in very similar ecological conditions.

Aspidistra Ker Gawl. is the largest genus of Asparagaceae Juss. (Convallariaceae Horan. s.s.) with 116 presently known species (Tillich 2008, unpubl.). Outstanding species diversity of the genus was for a long time overlooked, because most species form their flowers at ground level, often more or less hidden in leaf litter. These plants were poorly represented in herbaria and in cultivation. Since 1980, due to the expansion of botanical field work and the introduction of newly collected plants into cultivation, species number began to grow rapidly, especially in China. For a long time the knowledge of *Aspidistra* in the countries of Indochina lagged behind the general progress. Meanwhile, due to recent field research activity by a number of scientists the number of *Aspidistra* species in Vietnam has raised from 3 to about 50 in one decade. The unexpected diversity in flower structure makes this genus one of the most interesting among monocots, and this forces further field research. Many more members of this fascinating genus can be expected in the future.

Recent field explorations in eastern Indochina have clearly designated mountain areas of Vietnam and Laos as an area of intensive formation of a series of neglected endemic species with very limited distribution. More than 15 new species and varieties of the genus have been discovered here during the last few years (Brauchler and Ngoc 2005, Tillich 2005, 2006, 2008, Tillich et al. 2007, Tillich and Averyanov 2008, 2012, Averyanov and Tillich 2012, 2013, Tillich and Leong-Škorničková 2013) and succeeding expeditions bring more and more new discoveries. Four more novelties discovered recently in northern Vietnam and in southeastern Laos are described and illustrated below.

Aspidistra albopurpurea Aver. et Tillich sp. nov. (Fig. 1, 5A)

Type: Vietnam, Cao Bang Prov., Trung Khanh Distr., Ngoc Khe Municipality, Pac Nga village, around point 22°54′59″N, 106°31′44″E, 800–850 m a.s.l., remnants of primary evergreen broad-leaved forest along tops of rocky ridges and mesae composed with light gray solid marble-like highly eroded crystalline limestone, 10 Jun 2004, L. Averyanov, P. K. Loc, P. V. The, N. T. Vinh, HAL 5579 (holotype: HN, isotypes: LE, MO).

Etymology

The species name refers to the contrasting coloration of the white tube and the dark purple perigone lobes.

Description

Rhizome creeping, plagiotropic, sparsely branching, 3–4(6) cm long, densely nodal, covered by fibrous bract remains, with many brownish roots. Cataphylls convolute, cuneate, as young white at the base, greenish toward apex, speckled with purple, later becoming dull light brownish, to 12(14) cm long, early splitting into irregular fibres, enveloping petiole by fibrous-papyraceous remains. Leaves 2–3 (4), densely arising from rhizome apex, petiolate. Petiole stiff, erect, straight or hardly inclined, (15)20–25(30) cm long. Leaf blade ascending to arching, elliptic, shortly attenuate at base and at apex, (10)12–14(16) cm long, (2.5)3.0–4.0(4.5) cm wide, more or less straight along margin, dark green, with strong, prominent midvein and insignificant, secondary

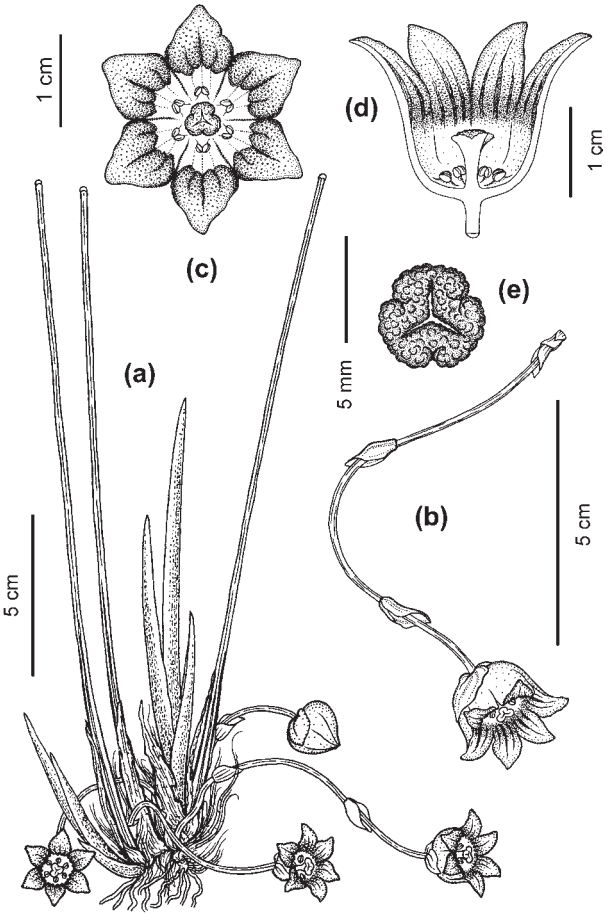


Figure 1. *Aspidistra albopurpurea* sp. nov. (a) base of flowering plant, (b) peduncle and flower, (c) flower, frontal view, (d) flower, sagittal section, (e) stigma in upper view. All drawn from the type, L. Averyanov, P. K. Loc, P. V. The, N. T. Vinh, HAL 5579 by L. Averyanov.

veins. Flowers solitary, arising from the rhizome near apex, pedunculate. Peduncle arising horizontally, arching or flexuose, white to pink or light purplish, terete, (3)4–8(10) cm long, 2.0–2.5 mm in diameter, with (3)4–5(6) sterile bracts; bracts broadly ovate, concave, thin, white, speckled with purple, obtuse to acute, 0.5–1.5 cm long, and 4–10 mm wide. Floral bract 1, white, speckled with purple, broadly triangular-ovate, concave, 1.0–1.5 cm long and wide, more or less densely adpressed to perigone from below. Flowers horizontally placed. Perigone tube widely bowl-shaped, white on both surfaces, with scattered red dots outside, 0.8–1.0 cm long, 1.4–1.6 cm in diameter, with 6 lobes. Lobes subequal, triangular, fleshy, flat, obtuse to blunt at apex, shallowly verruculose, slightly recurved, 3-grooved, 6–10 mm long, 5–7(8) mm wide at base, adaxially black–purple at base, white at apex, abaxially white, heavily spotted with light purple. Stamens 6, subsessile or on very short filaments, inserted at the bottom of perigone; anthers bean-shaped, 2.0–2.5 mm long, 0.8–1.0 mm wide; pollen sacs introrse; pollen light yellow. Pistil desk-shaped, peltate; ovary inconspicuous; style stout, white, cylindrical, (4)5–6(7) mm tall, 1.5–2.0 mm in diameter; stigma fleshy, discoid-peltate, white, purple along margin (thus forming a striking contrast to the milk-white tube base), 4–5 mm in diameter, 3-lobed, with semicircular lobes, its upper surface verrucose.

Distribution

Northern Vietnam (Cao Bang province, Trung Khanh district). Endemic to northern Vietnam.

Ecology

Primary broad-leaved evergreen forests on outcrops of limestone, commonly found on shady slopes as a terrestrial or lithophytic herb, at 800–850 m a.s.l. Flowering in May–June. Locally very common (LC).

Note

Aspidistra albopurpurea is unique with its relatively small, red margined stigma in striking contrast to the large milk-white tube base.

Aspidistra khangii Aver. et Tillich sp. nov. (Fig. 2, 5B–D)

Type: Laos, Attapeu Prov., Saysettha Distr., Dong Am Pham National Protected Area, to the east of Paosamphanmixay village, around point 14°48′24.8″N, 107°24′23.2″E, primary broad-leaved evergreen forest at ca 900 m a.s.l., 28 Feb 2013, L. Averyanov, N. T. Hiep, N. S. Khang, P. V. The, K. Inkhavilay, S. Lorphengsy, LA-VN 104 (holotype: LE, isotypes: HNL, Herb. of the National Univ. of Laos, Vientiane, Herb. of the Center for Plant Conservation, Hanoi).

Etymology

The species is named after its discoverer, the excellent Vietnamese botanist Nguyen Sinh Khang.

Description

Shoot erect, stout, unbraned, 6–10(12) cm tall, 1–2 cm in diameter, densely nodal, with many thick, rigid, spirally arranged, semi-woody, straight to slightly curved prop roots, 5–12 cm long before entering the soil and then freely branching. Cataphylls convolute, linear to lanceolate, as young greenish–brown, later becoming gray to light gray–brown, papyraceous, to 30 cm long, early splitting into fibrous remains. Leaves densely crowded, petiolate. Petiole stiff, erect, straight, (20)25–40(45) cm long, (3)4–7(8) mm in diameter. Leaf blade erect to arching, narrowly elliptic to lanceolate, attenuate at base and at apex, (45)50–60(70) cm long, 2–6(7) cm wide, straight to slightly wavy along margin, uniform green above and below, with prominent midvein on lower surface and insignificant, secondary veins. Flowers solitary, arising from the apical part of the shoot, pedunculate. Peduncle arising horizontally, dark green, indistinctly marked with dirty purple–brown marks, (3)4–6(8) cm long, 2–4(5) mm in diameter, with 2(3) sterile bracts at base; bracts ovate to broadly ovate, coriaceous, obtuse, 5–8 mm long, 0.3–0.6 mm wide. Floral bracts 3, broadly triangular-ovate, concave, (0.6)1.0–1.8(2.0) cm long, 0.5–0.8(1.0) cm wide, densely adpressed to perigone from below. Perigone shortly obpyramidal, container-like, verruculose outside, finely rough inside, down faced, 3–4 cm in diameter, 1–2 cm long, with 6 incurved half-united lobes forming a star-like perianth opening, 1.5–1.8 cm in diameter. Lobes subequal,

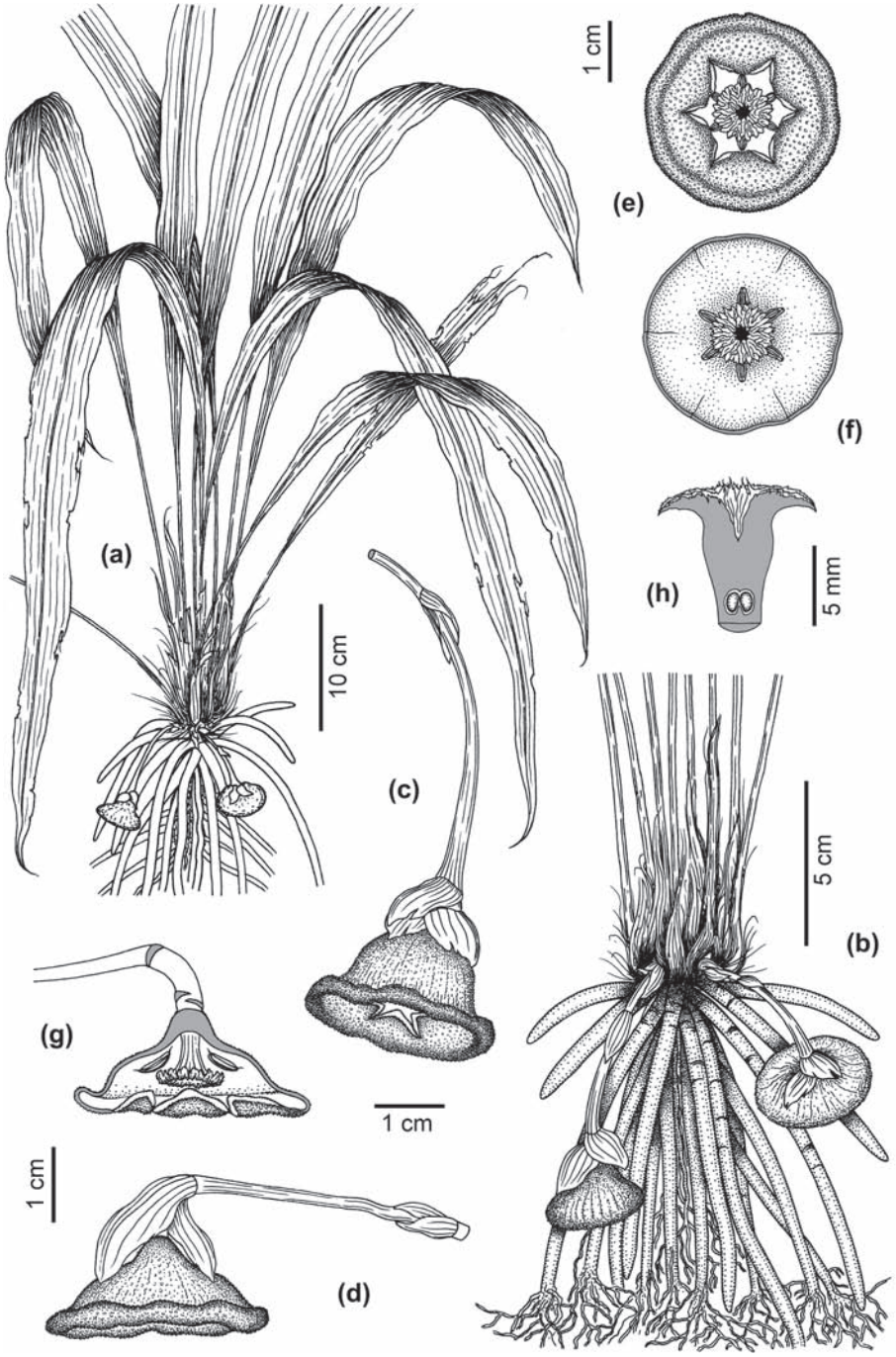


Figure 2. *Aspidistra khangii*: (a) flowering plant, (b) shoot with flowers, (c)–(d) flowers, side and half side views, (e) flower, frontal view, (f) flower with removed upper half of perianth, frontal view, (g) flower, sagittal section, side view, (h) stigma, sagittal section, side view. All drawn from the type, L. Averyanov, N. T. Hiep, N. S. Khang, P. V. The, K. Inkhavilay, S. Lorphengsy, LA-VN 104 by L. Averyanov.

broadly triangular, flat, straight or apically adaxially curved, with slightly revolute scarious margin, blunt to roundish at apex, 2–3 mm long, 7–9(10) mm wide at base. Stamens 6, sessile, inserted at basal, urceolate part of perigone; anthers ellipsoid, 4–5 mm long, 1.2 mm wide; pollen sacs introrse; pollen whitish. Pistil desk-shaped, peltate; ovary inconspicuous, cylindrical; style stout, cylindrical to clavate, 6–7(8) mm tall, 4–5 mm in diameter; stigma fleshy, entire, discoid-peltate, (0.8)1.0(1.2) cm in diameter, with numerous, dense, radial, irregularly denticulate ridges, forming at center a deep cavity. Unripe fruit globular, dirty green, rough, 4-seeded.

Distribution

Southeastern Laos (Attapeu province, Saysettha district). Endemic to southeastern Laos, but may also be found in mountain areas of central Vietnam, allied to the Laos–Vietnamese border.

Ecology

Primary broad-leaved evergreen forests on mountains composed of shale, in shady places, particularly along ridge edges, 850–950 m a.s.l. Flowering in November–January. Common to abundant (LC).

Similar species

Aspidistra khangii and *A. lubae* (below) belong to a small well-defined group of species (*A. erecta* Yan Liu et C. I. Peng, *A. lateralis* Tillich, *A. locii* Arnautov et Bogner, *A. nikolaii* Aver. et Tillich) having erect shoots. *Aspidista khongii* is easily distinguished by the erect stout stem, down-curved peduncles, and obpyramidal, container-like perigones with 6 lobes protruding inward and forming a star-shaped opening at the flat apex. Morphologically, the species forms a link between *Aspidistra* species with urceolate flowers and *A. locii* with fig-like perigone, offering a minute entrance for pollinators.

Aspidistra lubae Aver. et Tillich sp. nov. (Fig. 3, 5E–J)

Type: Vietnam, Hoa Binh Prov., Lac Son Distr., Tu Do Municipality, Mon village, around point 20°25′29″N,

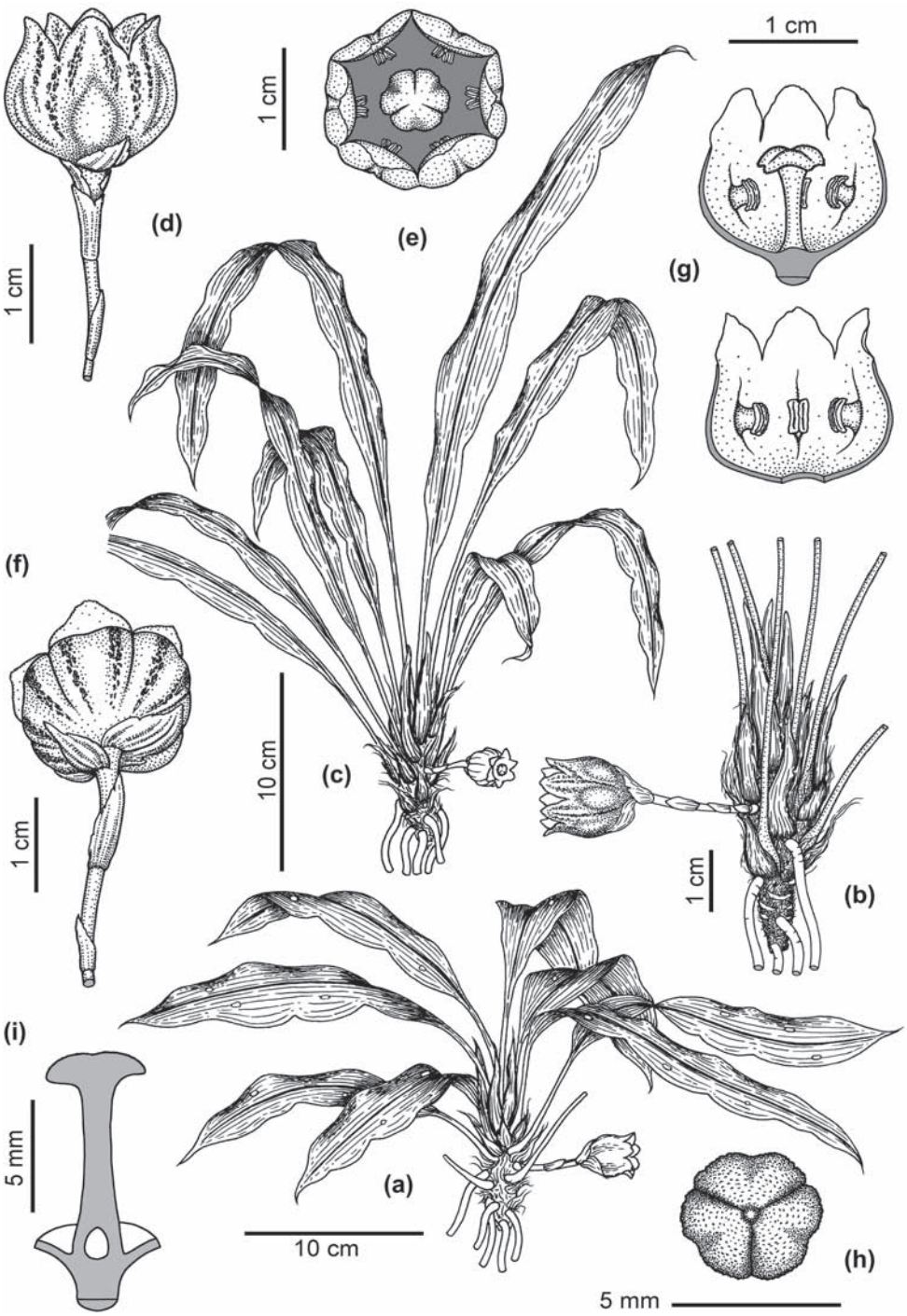


Figure 3. *Aspidistra lubae* var. *lubae* (a) flowering plant, (b) shoot with flower, (d) peduncle and flower, side view, (e) flower, frontal view, (f) peduncle and flower, view from behind, (g) flower sagittal section, (h) stigma, frontal view, (i) stigma and ovary, sagittal section. All drawn from the type, L. Averyanov, T. Maisak, L. Osinovetz et al., CPC 1566a/no. 4. *Aspidistra lubae* var. *lancifolia* (c) flowering plant. Drawn from the type, L. Averyanov, T. Maisak, L. Osinovetz et al., CPC 1566a/no. 1 by L. Averyanov.

105°19′36″E. Collected from cultivated plant Dec 2012, L. Averyanov, T. Maisak, L. Osinovetz, CPC 1566a/no. 4 (holotype: LE).

Etymology

The species is named after Luba Osinovetz, horticulturalist at the Komarov Botanical Inst., who has grown well-flowering, mature plants from negligible pieces of rhizomes.

Description

Shoot erect and unbranched (at least in young plants), 3–6 cm tall, 5–6 mm in diameter, densely nodal, with few thick, rigid, semi-woody, straight prop roots. Cataphylls convolute, triangular cuneate, as young dull reddish–brown, later becoming light yellowish, papyraceous, to 5 cm long, early splitting into fibrous remains. Leaves densely crowded, petiolate. Petiole stiff, erect, straight or inclined, (4)5–10 cm long. Leaf blade arching to almost horizontal, elliptic to narrowly elliptic, attenuate at base and at apex, (12)14–18(20) cm long, (2.0)2.5–4.5(5.0) cm wide, irregularly undulate along margin, dark green above and below, with small, sparse yellowish spots, with prominent midvein on lower surface and insignificant, hardly visible secondary veins. Flowers solitary, arising from apical part of shoot, pedunculate. Peduncle arising horizontally, green, speckled with purple–brown, (1.5)2.0–2.5 cm long, 1.5–2.0 mm in diameter, with 2–3 sterile bracts; bracts oblong ovate, concave, rather thin, papyraceous, light green, speckled with purple-brown markings, obtuse, (2)4–10 mm long, 2–4 mm wide. Floral bracts 2(3), light green, speckled and indistinctly striped with purple-brown markings, broadly triangular-ovate, concave, 8–10 mm long, 5–8 mm wide, densely crowded at apex of peduncle and densely adpressed to perigone from below. Perigone urceolate, horizontally placed, 1.4–1.8 cm long and wide, with 6 short lobes, very light green (to almost white or yellowish), speckled and indistinctly striped with purple-brown markings outside, very dark purple–violet to almost black inside. Lobes subequal, triangular, flat, with slightly revolute margin, obtuse to blunt at apex, fleshy, rather smooth, straight or slightly recurved, 5–7 mm long, 6–8 mm wide at base. Stamens 6, filamentous, inserted at the middle of perigone; filaments white, laterally flattened, 1.5 mm tall; anthers bean-shaped, 2.5–3.0 mm long, 1.0–1.2 mm wide; pollen sacs introrse; pollen white to light yellowish. Pistil desk-shaped, peltate; ovary inconspicuous; style stout, dirty purple–violet to almost black, cylindrical, 7–8 mm tall, 1–2 mm in diameter; stigma fleshy, discoid-peltate, white to light yellowish, very shallowly 3 lobed, with slightly emarginate lobes, (3.5)4.0–5.0 mm in diameter, upper surface of stigma papillose.

Distribution

Northern Vietnam (Hoa Binh province, Lac Son district). Endemic to northern Vietnam.

Ecology

Primary evergreen broad-leaved forests on limestone outcrops, in shady, humid places on soils rich in humus, at 500–700 m a.s.l. Not rare (LC). Flowered under cultivation in December.

Similar species

Aspidistra lubae and *A. khangii* belong to a group of species having erect shoots. It is easily distinguished by its short stem, horizontal peduncle and urceolate flower.

Besides the type variety *A. lubae* var. *lubae* (Fig. 3a–b, 3d–i, 5e–j) the species includes *A. lubae* var. *lancifolia* that differs in its long, erect or arching, lanceolate, immaculate, shortly petiolate leaves. This variety is described below.

A. lubae var. *lancifolia* Aver. et Tillich var. nov. (Fig. 3c)

Type: Vietnam, Hoa Binh Prov., Lac Son Distr., Tu Do Municipality, Mon village, around point 20°25′29”N, 105°19′36″E. Collected from cultivated plants at Jan 2013, L. Averyanov, T. Maisak, L. Osinovetz, CPC 1566a/no. 1” (holotype: LE).

Etymology

The varietal name refers to the lanceolate shape of the leaf blade.

Description

Leaves shortly petiolate to subsessile. Petiole stiff, erect, straight, 2–5(6) cm long. Leaf blade erect or distally arching, lanceolate, attenuate at base and at apex, 20–35 cm long, 1.5–3.0(4.0) cm wide, broadly irregularly undulate along margin, uniformly grass green above and below. In other morphological characters similar to the type variety.

Distribution

Northern Vietnam (Hoa Binh province, Lac Son district). Endemic to northern Vietnam.

Ecology

Primary evergreen broad-leaved forests on limestone outcrops, in shady, humid places on soils rich in humus. at 500–700 m a.s.l. Not rare (LC). Flowered under cultivation in January.

Note

Both varieties were collected in the same locality growing under very similar ecological conditions, occasionally intermixed. In the key for known *Aspidistra* species with erect stem, adopted partially from Liu et al. (2011) the newly described species and its varieties should be placed as follows:

Key to *Aspidistra* species with erect stems

1. Peduncle (3)4–8 cm long or longer; perigone pendulous, tepals connate and thus forming a reduced perigone opening 2
   – Peduncle 3 cm long or shorter; perigone horizontal, campanulate or urceolate, widely open 3
2. Tepals completely connate, leaving a tiny apical circular opening 1.0–1.5 mm in diameter (Vietnam, Quang Nam) ..... *A. locii*
   – Tepals not completely connate, leaving a star shaped, 6-lobed apical opening 1.5–1.8 cm in diameter (Laos, Attapeu) ..... *A. khangii*

3. Stem erect, 3–6 cm tall, densely covered by imbricate scales; perigone urceolate …… 4
– Stem ascending to erect, naked or sub-naked, covered by imbricate scales only at apex; perigone funnel shaped or campanulate …… 5
4. Leaves petiolate; petiole 4–10 cm long; leaf blade arching to almost horizontal, elliptic to narrowly elliptic, 12–20 cm long, (2.0)2.5–4.5(5.0) cm wide, with small sparse yellowish spots (Vietnam, Hoa Binh) …… *A. lubae* var. *lubae*
– Leaves shortly petiolate to subsessile; petiole 2–6 cm long; leaf blade erect or distally arching, lanceolate, 20–35 cm long, 1.5–4.0(4.0) cm wide, uniformly green (Vietnam, Hoa Binh) …… *A. lubae* var. *lancifolia*
5. Stem semi-woody, to 120 cm tall; perigone 6–9 cm across; pistil shortly obconic (Vietnam, Thua Thien-Hue) …… *A. nikolaii*
– Stem herbaceous, to 100 cm tall; perigone 1–3 cm across; pistil mushroom-shaped …… 6
6. Stem to 50 cm tall; perigone widely funnel shaped, 2.5–3.0 cm across; pistil lower than perianth tube; style straight; stigma flat, cream-white (Vietnam, Thua Thien-Hue) …… *A. lateralis*
– Stem to 100 cm tall; perigone campanulate, 1–1.5 cm across; pistil exceeding perianth tube; style curved; stigma hemispherical, red (China, Guangxi) …… *A. erecta*

Aspidistra stellata Aver. et Tillich sp. nov. (Fig. 4, 5K, L)

Type: Vietnam, Tuyen Quang prov., Na Hang distr., Xuan Tam municipality, near Ban Cai village, 22°29′18″N, 105°19′47″E, primary broad-leaved evergreen dry forest on very steep slopes of highly eroded remnant limestone ridge

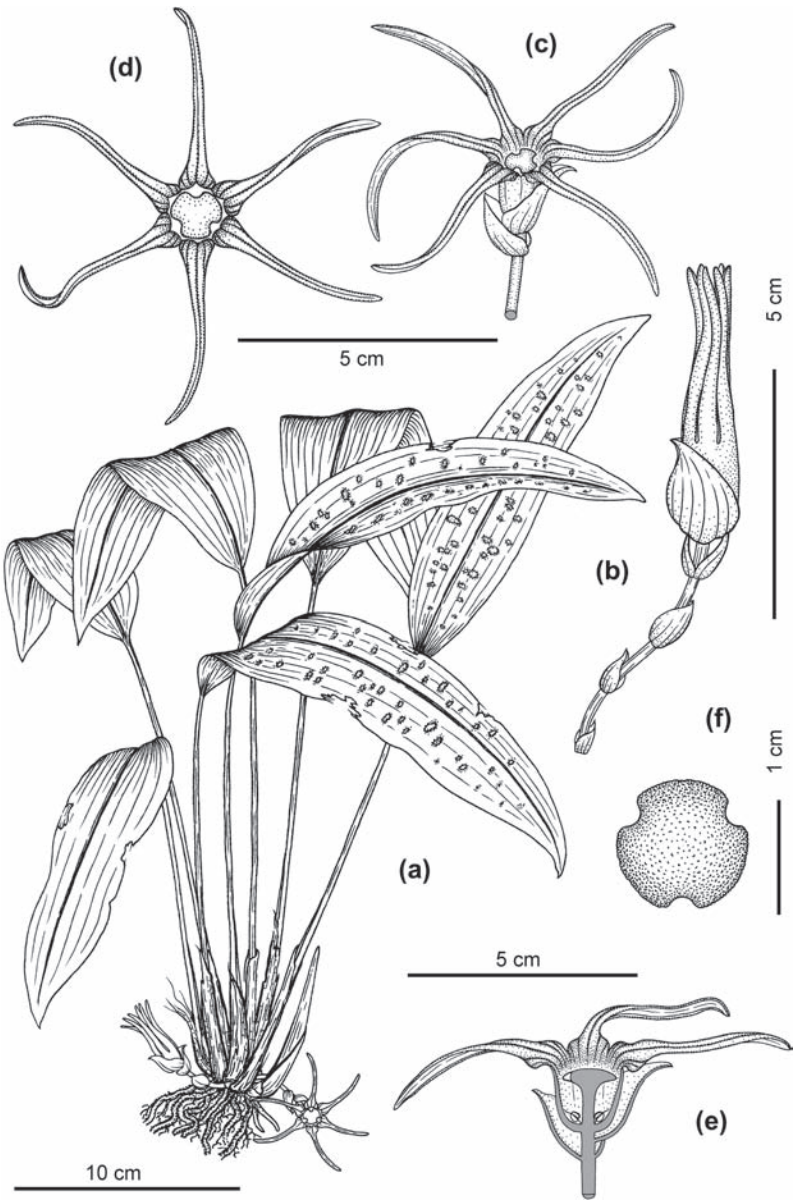
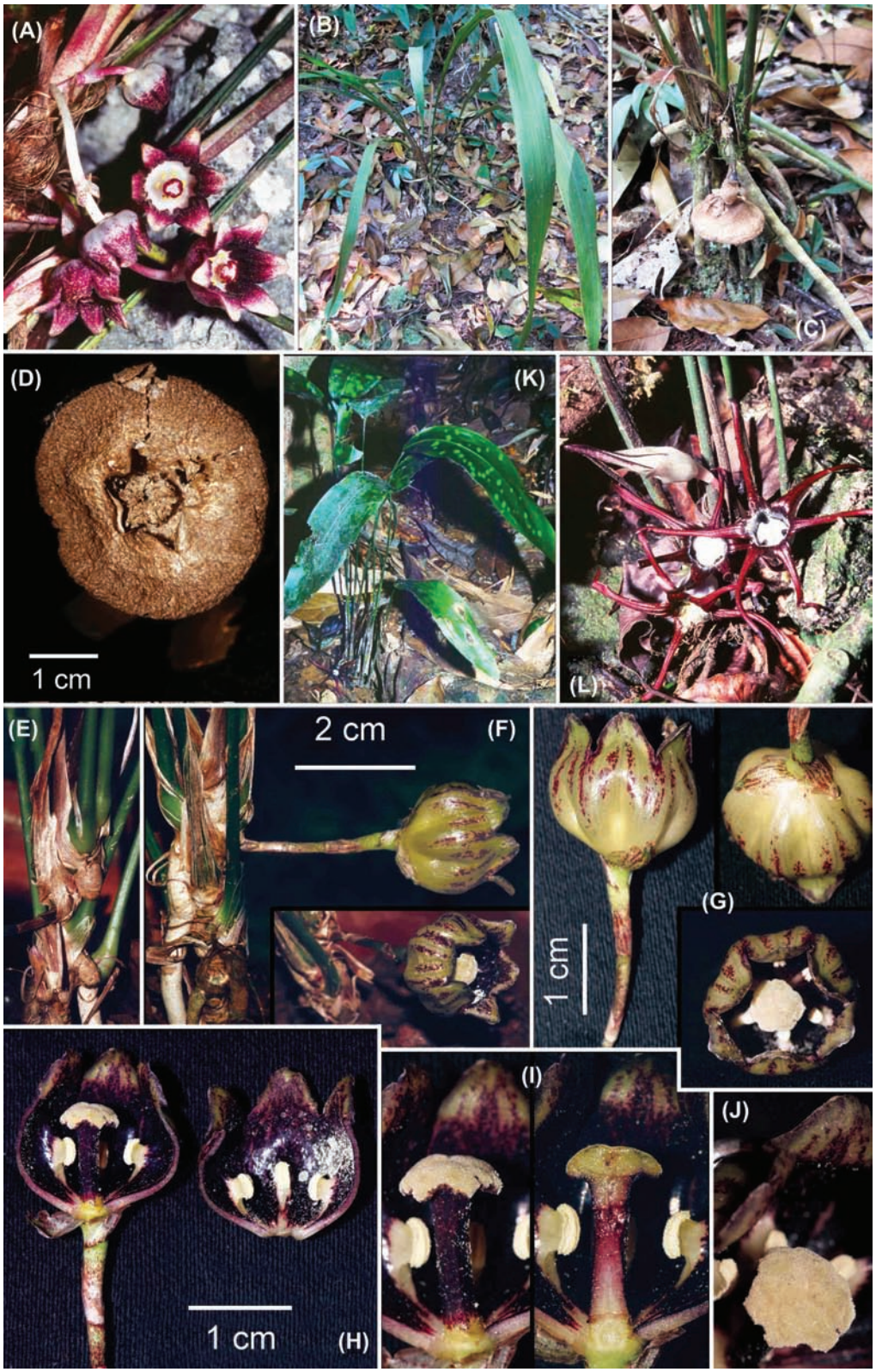


Figure 4. *Aspidistra stellata* sp. nov. (a) flowering plant, (b) peduncle and flower bud, (c)–(d) flower, frontal and half side views, (e) flower, sagittal section, (f) stigma, frontal view. All drawn from the type, P. K. Loc, N. X. Tam, L. Averyanov, HAL 184 by L. Averyanov.



[AQ1] Figure 5. *Aspidistra albopurpurea* sp. nov. (A) base of flowering plant (type specimen L. Averyanov, P. K. Loc, P. V. The, N. T. Vinh, HAL 5579); *A. khangii* sp. nov. (B) flowering plant, (C), (D) base of shoot with old flower (type specimen L. Averyanov, N. T. Hiep, N. S. Khang, P. V. The, K. Inkhavilay, S. Lorphengsy, LA-VN 104); *A. lubae* var. *lubae* (E)–(J) stem and flower details (type specimen L. Averyanov, T. Maisak, L. Osinovetz et al., CPC 1566a/no. 4); *A. stellate* sp. nov. (K), (L) flowering plants (type specimen (P. K. Loc, N. X. Tam, L. Averyanov, HAL 184). Photographs by L. Averyanov and N. S. Khang.

at 450–550 m a.s.l., 22 Mar 2001, P. K. Loc, N. X. Tam, L. Averyanov, HAL 184 (holotype: HN, isotypes: LE, MO).

Etymology

The species name refers to the star-like shape of its flower.

Description

Rhizome creeping, plagiotropic, sparsely branching, 4–7(10) cm long, densely nodal, covered by remains of fibrous-papyraceous bract remains, with many branching, yellowish–brown roots. Cataphylls convolute, narrowly cuneate, light green as young , later becoming dull brownish to almost black, papyraceous, up to 8 cm long, enveloping petiole, later splitting into fibrous-papyraceous remains. Leaves densely arising from rhizome, petiolate. Petiole stiff, erect, straight or slightly inclined, (15)20–25(30) cm long. Leaf blade horizontal to arching, elliptic to narrowly ovate, shortly attenuate at base and at apex, (12)16–22(25) cm long, (4.0)4.2–5 .0(6.0) cm wide, straight or slightly wavy along margin, dark green, as young with sparse yellowish–green spots, later usually becoming spotless, with strong, prominent midvein and insignificant secondary veins. Flowers solitary, arising from rhizome near apex, pedunculate. Peduncle arising horizontally, white to pinkish, terete, (3)4–5(6) cm long, 2.0–2.5 mm in diameter, with (3)4–5(6) sterile bracts; bracts broadly ovate, concave, rather fleshy, white or with pinkish tint, acute to shortly acuminate, 0.7–1.5 cm long and wide. Floral bract 1–2, white or with pink tint, broadly triangular-ovate, concave, 2.0–2.5 cm long, 1.5–2.0 cm wide, densely adpressed to perigone from below. Flowers horizontally placed, perigone tube urceolate, white or with pink tint outside (abaxially), dark purple inside (adaxially), 1.0–1.2 cm long and wide, with 6 linear-caudate lobes. Lobes subequal, rather thin, revolute along margin, with 3 longitudinal grooves, obtuse to blunt at apex, rather smooth, primarily straight, later curved, (2.5)3.0–3.5 cm long, 3–4 mm wide at base. Stamens 6, subsessile or with very short filaments, inserted near base of perigone; anthers bean-shaped, 2.5–3.0 mm long, 1.0–1.2 mm wide; pollen sacs introrse; pollen white. Pistil white, desk-shaped, peltate; ovary inconspicuous; style stout, cylindrical, 0.8–1.0 cm tall, 2.5–3.0 mm in diameter; stigma white, fleshy, discoid-peltate, slightly convex, 1.0–1.3 cm in diameter, shallowly 3-lobed, with broad entire lobes; upper surface of stigma finely papillose.

Distribution

Northern Vietnam (Tuyen Quang province, Na Hang district). Endemic to northern Vietnam.

Ecology

Primary broad-leaved evergreen dry forest on limestone outcrops, commonly in shady slopes, at 450–550 m a.s.l. Flowering in March–April. Locally very common (LC).

Similar species

Aspidistra stellata is at the first sight similar to a group of species with narrowly triangular to lineate perigone lobes much longer than the perigone tube, and sessile or subsessile stigma, but is clearly distinguished by the lobes without basal adaxial appendages and the pistil with an elongated style raising the stigma to the level of the opening of the tube. A detailed comparison of the species in question is given in the key below.

Key to *Aspidistra* species with perigone lobes conspicuously longer than tube and pistil not overtopping tube opening

1. Perigone lobes 6, without basal appendages, 30–35 mm long; style cylindrical, 0.8–1.0 cm long (Vietnam, Tuyen Quang) ..... *A. stellata*
   – Perigone lobes 6–14, with basal appendages: stigma sessile or subsessile at tube base 2
2. Perigone tube depressed urceolate; style about 2 mm long; stigma disc-shaped 3
   – Perigone tube campanulate to cupulate or urceolate; stigma sessile, depressed obconical to bowl-shaped 4
3. Perigone lobes (11–)12, 50–60 mm long, tube ca 30 mm in diameter (Vietnam, Hoa Binh) ..... *A. grandiflora*
   – Perigone lobes 8–10, 20 mm long, tube ca 20 mm in diameter (Vietnam, Ninh Binh) ..... *A. superba*
4. Perigone completely yellowish-green, lobes 6, erect, 13–18 mm long, their tips incurved (China, Guangxi) ..... *A. daxinensis*
   – Perigone at least partly red or purple 5
5. Perigone lobes 20–30 mm long 6
   – Perigone lobes 45–75 mm long 8
6. Lobes 6–8, fleshy, erect, tips incurved; tube yellow inside; stamens at base of tube (China, Guangxi) ..... *A. longipetala*
   – Lobes (6–)8, horizontally spreading, straight or reflexed 7
7. Tube purple inside; stamens at middle of tube at stigma level (China, Guangxi) ..... *A. patentiloba*
   – Tube yellow inside; stamens in lower third of tube, conspicuously lower than stigma ..... *A. guangxiensis*
8. Tube urceolate; lobes (6–)12, erect, 45 mm long, with tips incurved (China, Guizhou) ..... *A. luodianensis*
   – Tube campanulate; lobes 12(–14), divaricate, 70–75 mm long, straight (China, Guangxi) ..... *A. longiloba*

Acknowledgements – The authors cordially thanks the Directorate of the Center for Plant Conservation (Vietnam Union of Science and Technology Associations), Dr Nguyen Tien Hiep, Prof. Phan Ke Loc and MSc Nguyen Quang Hieu for organization of field work, which were supported in parts from investigation programs of USA National Geographic Society ("Exploration of primary woods along constructed highway Hanoi – Ho Chi Minh for their sustainable conservation (in limits of Ha Tinh and Nghe An provinces of central Vietnam)", 9129-12, "Flora of relict karstic formation of central Laos (Vientiane province, Vang Vieng and Kasi districts)", 9141-12), The Rufford Small Grant Foundation ("Assessment of distribution and natural status of *Paphiopedilum canhii*, Vietnam"), American Orchid Society ("Assessment of orchid endemism in NW Vietnam with special attention to *Paphiopedilum canhii*"), Chicago Zoological Society, Chicago Board of Trade Endangered Species Fund ("Assessment of current natural status of critically endangered species – *Paphiopedilum canhii* for its

conservation") and Mohamed bin Zayed Species Conservation Fund ("Studies of endangered coniferous species in Laos").

References

Averyanov, L, Tillich, H.-J. 2012. New taxa of *Aspidistra* (Asparagaceae) from central Vietnam. – Turczaninowia 15: 5–10.

Averyanov, L, Tillich, H.-J. 2013. *Aspidistra truongii*, a new species of Asparagaceae (Convallariaceae s.str.) from southern Vietnam. – Taiwania 59, in press.

Brauchler, C. Ngoc, L. H. 2005. *Aspidistra renatae* (Ruscaceae), a new species from central Vietnam. – Blumea 50: 527–529.

Liu, Y. et al. 2011. *Aspidistra erecta* (Asparagaceae), a new species from limestone areas in Guangxi, China. – Bot. Stud. 52: 367–373.

Tillich, H.-J. 2005. A key for *Aspidistra* (Ruscaceae), including 15 new species from Vietnam. – Feddes Repert. 116: 313–338.

Tillich, H.-J. 2006. Four new species of *Aspidistra* Ker-Gawl. (Ruscaceae) from China, Vietnam and Japan. – Feddes Repert. 117: 139–145.

Tillich, H.-J. 2008. An updated and improved determination key for *Aspidistra* Ker-Gawl. (Ruscaceae, Monocotyledons). – Feddes Repert. 119: 449–462.

Tillich, H.-J. and Averyanov, L. V. 2008. Two new species and one new subspecies of *Aspidistra* Ker-Gawl. (Ruscaceae) from Vietnam. – Feddes Repert. 119: 37–41.

Tillich, H.-J. and Averyanov, L. V. 2012. Four new species of *Aspidistra* Ker-Gawl. (Asparagaceae) from China and Vietnam with a comment on *A. longifolia* Hook f. and *A. hainanensis* W. Y. Chun et F. C. How. – Gard. Bull. Singap. 64: 201–209.

Tillich, H.-J. and Leong- Škorničková, J. 2013. *Aspidistra jiewhoei* (Asparagaceae), a new species from north Vietnam. – Gard. Bull. Singap. 65, in press.

Tillich, H.-J. et al. 2007. Six new species of *Aspidistra* (Ruscaceae) from northern Vietnam. – Blumea 52: 335–344.