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 & F.C.How

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ABSTRACT. Four new species of *Aspidistra* Ker Gawl. (Asparagaceae) are described and illustrated: *A. basalis* Tillich, *A. columellaris* Tillich, *A. gracilis* Tillich from China, and *A. coccigera* L.V.Averyanov & Tillich from Vietnam. The application of the name *A. longifolia* Hook.f. to plants from SE Asia and the intraspecific variability of *A. hainanensis* W.Y.Chun & F.C.How across its range from peninsular Malaysia to SE China is also discussed.

Keywords. Asparagaceae, *Aspidistra*, China, Malay Peninsula, Thailand, Vietnam

Introduction

The genus *Aspidistra* Ker Gawl. (Asparagaceae: Nolinoideae) is distributed from Assam (India) in the west to southern Japan in the east, and from Central China southwards to the Malay Peninsula but the centre of diversity is SE China (Guangxi Province) and adjacent northern Vietnam. During the past three decades the number of known species has increased considerably from 11 in 1980 to more than 100.

The recognition of new *Aspidistra* species is ongoing and stems largely from more widespread collecting, especially in remote areas of SE Asia combined with more detailed study of living plants. Since the publication of a comprehensive key to the genus (Tillich 2008), additional new species have been published (Hou et al. 2009; Lin et al. 2009, 2010; Lin & Liu 2011; Xu et al. 2010).

As a result of this ongoing work, a further four new species can now be added. One of them was collected by the second author in Vietnam, while three more species have been in cultivation for several years at the Juniper Level Botanical Gardens, Raleigh, North Carolina, USA. This Garden obtained the plants from several collectors, mostly with incomplete collection location details. Cuttings of these plants were sent to the Botanical Garden Munich and added to the rich *Aspidistra* collection where they grew vigorously and came to flower during the summer and autumn of 2009 and 2010. Once they flowered, it was apparent that these plants represented four clearly different and undescribed species (see Tillich 2008) and this paper accordingly names them formally.

Aspidistra basalis Tillich, **sp. nov.** (Fig. 1D & 3H, I.)
Species Aspidistra lurida Ker-Gawl. similis, sed differt pedicello 0.5 cm longo, floribus ad solum prostratis, stigmate convexo, laeve, 8 maculis albis peripheric is proviso, lamina foliorum ca. 40 × 4–5 cm. TYPE: Cultivated plant in the Munich Botanical Garden, originally from the Nanjing Botanical Garden, Jiangsu Province (?), China, *Tillich 5720* (M, including flowers in the liquid collection).

Rhizome epigeous, diameter 8–10 mm, richly branched, covered with deltoid scales. Cataphylls up to 6 cm long. ***Leaves*** solitary, 2–5 cm apart. Petiole 3–5 cm, stout, stiff, ventrally with a deep v-shaped furrow. Blade narrowly lanceolate, 35–45 × 4–5 cm, without clear limitation, tapering gradually to petiole, sharply folded at base, dark green, shiny, margin finely serrate and revolute, midrib sharply protruding abaxially. ***Peduncle*** up to 0.5 cm, or flower subsessile. ***Perigone*** bowl-shaped, blackish purple inside and out. Lobes 8, in two whorls of 4, outer lobes deltoid, 6–7 mm long and wide, inner lobes 6–7 × 5 mm, more or less romboid distally. All lobes with 4 low basal keels, the submarginal keels connected to those of the adjoining lobe, the two median keels disappearing in the middle of the tube. ***Stamens*** 8, inserted at tube base, subsessile, anthers broadly ovate, ca. 1.5 mm long. ***Pistil*** mushroom shaped, 5–6 mm high. Stigma circular, c. 10 mm in diameter, smooth, convex, light red, the margin with 8 soft strongly reflexed lobes and 8 submarginal, white-edged, radially elongated, weak indentations (Fig. 3H). Fruit unknown.

Etymology. The species name relates to the flower position adjacent to the soil or litter surface.

Notes. The species is similar to *A. lurida* Ker Gawl. but differs clearly by its shorter pedicels (0.5 cm), placing the flowers in horizontal position at ground level, the pink (not white) stigma with its marginal lobes bent downwards nearly to the base of the perigone tube, and the v-shaped leaf blades in cross-section, c. 40 × 4–5 cm (not flat, 15–20 × 3–5 cm).

The original plant from the Nanjing Botanical Garden was found in cultivation along with *A. minutiflora* Stapf and *A. retusa* K.Y.Lang & S.Z.Huang, so it was surprising that this remained undescribed.

Aspidistra coccigera L.V.Averyanov & Tillich, **sp. nov.** (Fig. 2C–G)
Species Aspidistra marasmioides H.-J.Tillich similis, sed rhizomate breve nec longe repente, petiolo 17–20 cm longo, lamina 15–18 × 6–7.5 cm, perigonio late cupiforme 20 mm diametro. TYPE: Vietnam, Quang Binh Province, Minh Hoa District, Dan Hoa Municipality, Chuong Lon Mountain, Vietnam-Laotian border, about 6 km N of Cha Lo border station, around point 17°44’04” N, 105°46’53” E; L.V.Averyanov, P.K.Loc, N.T. Vinh & N.S.Khang HAL 11693, , 19 April 2008 (holo HN; iso LE, M).

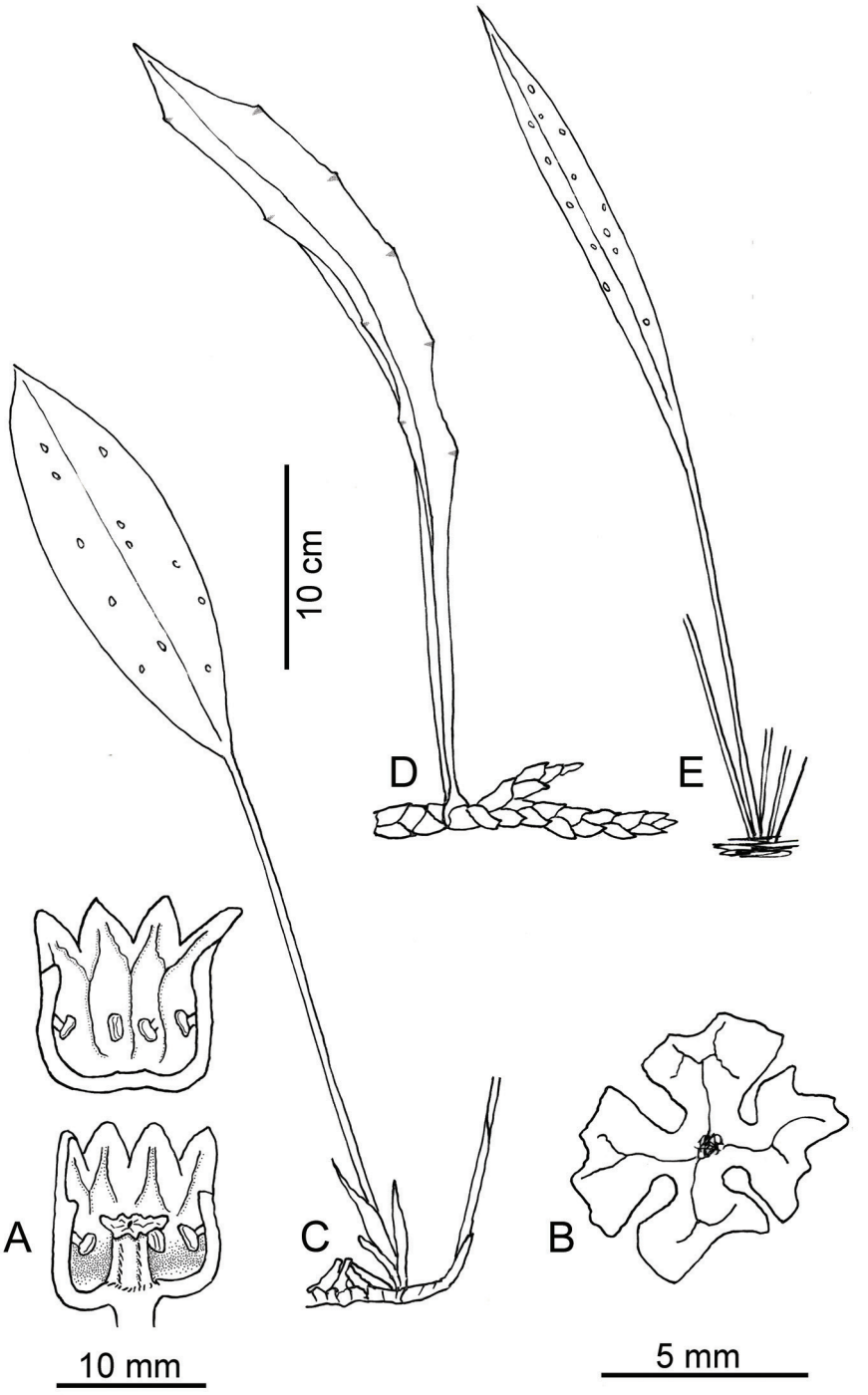

Fig. 1. A–B. *Aspidistra columellaris*. **A.** Flower longitudinally dissected. **B.** Stigma in upper view. **C–E.** Rhizomes and typical leaves. **C.** *A. columellaris*. **D.** *A. basali*s. **E.** *A. gracilis*.

Rhizome with very short internodes, ***leaves*** crowded, cataphylls up to 5 cm long. Petiole 17–25 cm long, stiff, blade ovate-acuminate, base rounded, 15–18 × 6.0–7.5 cm, light green, kept obliquely upright. ***Peduncle*** 2.5–6 cm long, erect or ascendant, purple, with 5 purple scales, 2 subtending the flower and 3 along the scape. ***Perigone*** widely cupuliform. Tube diameter 15–17 mm, white externally, internally blackish purple in upper third, white below. Lobes 6, (blackish-) purple, reflexed, smooth. ***Stamens*** inserted at mid-tube, filaments 1.5 mm long, protruding horizontally, anthers ovoid, 1.5 mm long. ***Pistil*** mushroom-like, c. 13 mm long, slightly exceeding the perigone, ovary depressed-conical, basal diameter c. 4 mm, style delicate, cylindrical, white, stigma circular, prominently convex, smooth, bright pink. ***Fruit*** depressed-globose, diameter c. 1.5 cm, deep purple, softly echinate.

Ecology. The species grows in primary broad-leaved forest on very steep slopes and rocky cliffs of remnant mountains of solid marble-like highly eroded limestone at elevations of 400–750 m a.s.l. The species is locally abundant.

Etymology. The species name relates to its purplish-red fruits.

Notes. The flowers of this species are similar to *A. marasmioides* Tillich from Haiphong Province, Vietnam. The latter species is distinguished by its richly branched, long creeping rhizomes, numerous leaves forming a dense carpet of horizontally oriented blades, and the flowers completely hidden below the leaves. In *A. coccigera*, there are clusters of fewer, much larger leaves, the blades are erect to semi-erect and the flowers and their bright pink stigmas are clearly displayed.

Aspidistra columellaris Tillich, **sp. nov.** (Fig. 1A–C; 2A, B)
Species Aspidistra leyeensis Y.Wan & C.C.Huang similis, sed differt perigonio 12 mm diametro, lobis erectis 4–5 mm longis, lamina foliorum scortea, ovalis, 18–20 × 5–7 cm. TYPE: Cultivated plant in the Munich Botanical Garden, collected in China (Province and collector unknown), *Tillich 5719* (M, including flowers in the liquid collection).

Rhizome epigeous, diameter 5 mm, with soon decaying scales. Cataphylls up to 7 cm long. ***Leaves*** solitary, 1–1.5 cm apart. Petiole slender, 20–35 cm. Blade ovate-acuminate, coriaceous, 18–20 × 5–7 cm, with numerous white spots. ***Peduncle*** 0.5–2.5 cm, with 4–5 purple spotted scales. ***Perigone*** cupulate, thick-walled, changing from green to beige externally, lobes abaxially spotted brownish-red. Tube 7–8 mm high, 12–15 mm in diameter, finely verrucose, purple-black internally. Lobes 8, deltoid, c. 4 mm long and wide, fleshy, erect to somewhat recurved, adaxially purple with beige tips, finely verrucose, with two low verrucose keels, each keel approaching the neighboring keel of the adjacent lobe and extending to the base of the tube. ***Stamens*** 8, inserted in the lower third of the tube, filaments short, directed obliquely downwards, anthers 2.5–3.0 mm, hooked around filaments, oriented downwards. ***Pistil*** 5 mm high,

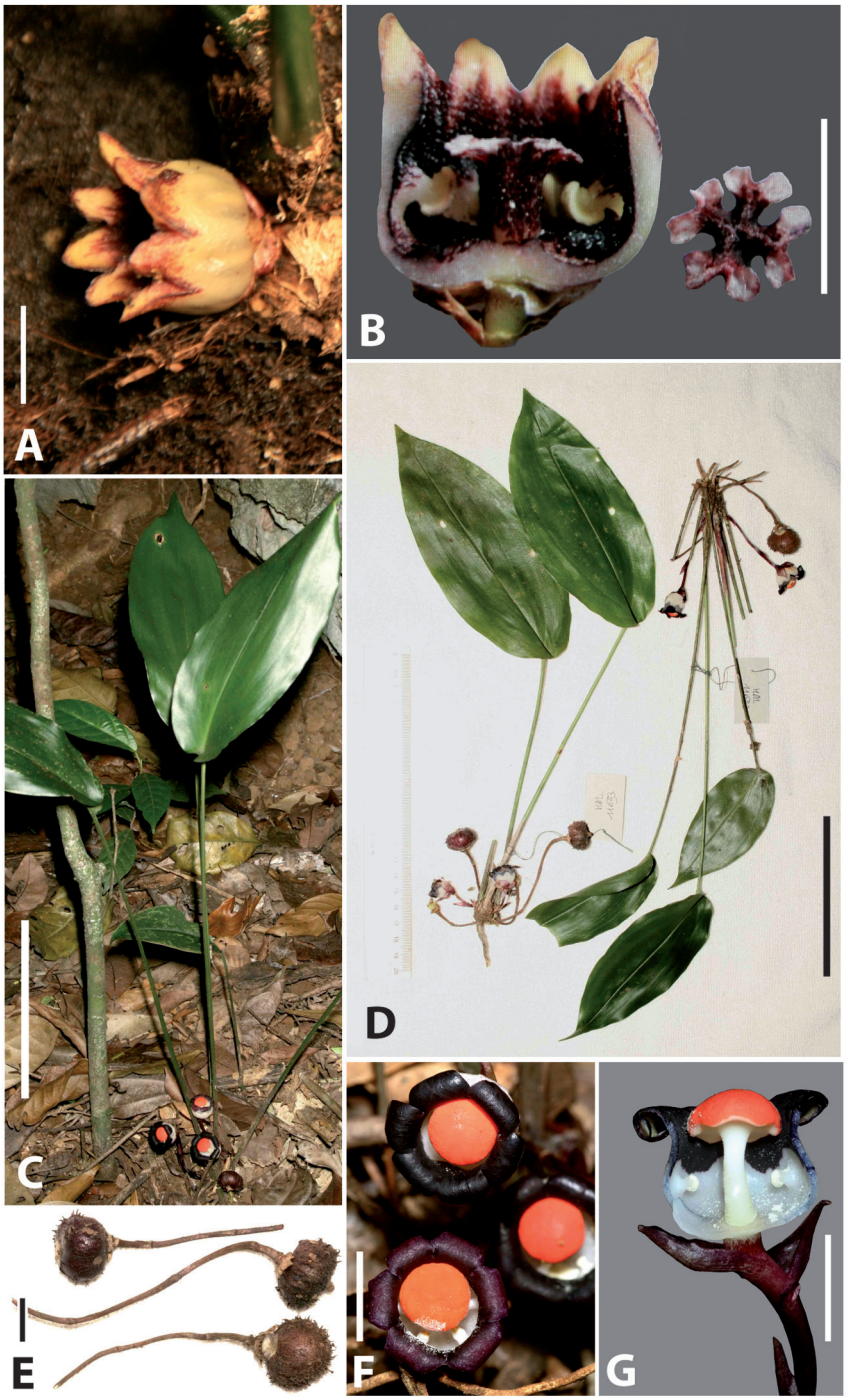

Fig. 2. A, B. *Aspidistra columellaris*. **A.** Flower. **B.** Flower longitudinally dissected, and stigma in upper view. **C–G.** *Aspidistra coccigera*. **C.** Plant at natural habitat. **D.** Plants with flowers and fruits prepared for herbarisation. **E.** Fruits. **F.** Flowers in upper view. **G.** Flower longitudinally dissected. Bar scale: A, B, E–G: 1 cm; C, D: 10 cm.

flat-topped. Style a stout column with 4 longitudinal groves alternating with the stigma lobes, dark purple. Stigma 7–8 mm in diameter, delicate, thin, upper surface purple, finely verrucose,cruciform with 4 arms bifurcating to 8 flattened, pale lobes (Fig. 1B & 2B).

Etymology. The name relates to the column-like style.

Notes. The species is similar to *A. leyeensis* Y.Wan & C.C.Huang with the stigma divided into separate lobes, but is clearly distinguished mainly by the characters in Table 1.

Table 1. Characteristics distinguishing *A columellaris* and *A. leyeensis*.

	A. columellaris	*A. leyeensis*
Leaf blade	ovate, c. 20 × 5–7 cm	lanceolate, c. 40 × 4–6 cm
Perigone diameter	12 mm	20–25 mm
Perigone lobes	erect	reflexed
Style	stout, with 4 longitudinal grooves	slender, smooth
Stigma	divided into 4 flat, slightly bifurcate lobes	divided into 8 narrowly-ovate lobes

Aspidistra gracilis Tillich, **sp. nov.** (Fig. 1E & 3F, G)
Species A. oblanceifolia F.T. Wang & K.Y. Lang similis, sed differt foliis anguste lanceolatis, lamina 25–30 × 2–2.5 cm, pedunculo erecto, 3–4.5 cm longo, ovario albo, stigmate convexo, laeve. TYPE: Cultivated plant in the Munich Botanical Garden, collected in China, Hong Kong S.A.R., Lantau Island, Sunset Peak (collector unknown), *Tillich 5718* (M, including flowers in the liquid collection).

Rhizome thin, with very short internodes, numerous ***leaves*** and dry petioles of decayed leaves densely clustered together, petiole 15–20 cm, semi-circular in cross section, blade narrowly lanceolate, 25–30 × 2.0–2.5 cm, light green with scattered paler green spots. ***Peduncle*** erect, 3.0–4.5 cm, with 3 scales along the scape and 2 subtending the flower. Flower obliquely erect to horizontal. ***Perigone*** campanulate, 14–16 mm long, 12–14 mm in diameter, grey-green or reddish-purple mottled externally, smooth and purple internally. Lobes 8, deltoid, straight or slightly spreading, thick-fleshy, 3.0–4.0 mm long and wide, finely verruculose adaxially. ***Stamens*** 8, inserted near tube base. ***Pistil*** mushroom shaped, ca 10 mm long, white, stigma circular, conspicuously convex, smooth. Fruit depressed-globose, pale green, mottled with red, c. 15 mm in diameter.

Etymology. The name relates to the dainty flowers, borne on an erect peduncle in horizontal position.

Fig. 3. **A–E.** *Aspidistra hainanensis* W.Y.Chun & F.C.How s.l. **A–C.** Plant from Thailand. **A.** Habit, note the many white spots on leaves. **B.** Flower longitudinally dissected. **C.** Flower in upper view, note the stigma composed of irregularly folded lobes. **D, E.** Plant from Laos. **D.** Flower in longisection. **E.** Flower in upper view, note the fine line pattern on the smooth stigma surface. **F, G.** *Aspidistra gracilis*. **F.** Flower longitudinally dissected. **G.** Flower in natural position. **H, I.** *Aspidistra basalis*. **H.** Flower in upper view. **I.** Flower longitudinally dissected. Bar scale: A: 20 cm; B–I: 1 cm.

Notes. The species is similar to *A. oblanceifolia* F.T.Wang & K.Y. Lang and *A. insularis* Tillich, but is clearly distinguished as shown in Table 2.

Table 2. Characteristics distinguishing *A gracilis* from two related species.

	A. gracilis	*A. oblanceifolia*	*A. insularis*
Leaf blade	25–30 × 2–2.5 cm	35–50 × 2.5–4 cm	40–50 × 7–8 cm
Peduncle	3–4.5 cm	0.3–2 cm	0.2–0.5 cm
Flower position	horizontal	vertical	vertical
Perigone shape	narrow-campanulate	campanulate	cupuliform
Stigma colour	white	purple	purple
Stigma shape	convex, circular smooth	conical, 8-lobed, smooth	square, with 4 prominent radial ribs

Notes on *Aspidistra hainanensis* W.Y.Chun & F.C.How in SE Asia

In SE Asia there is a group of *Aspidistra* species that ranges from peninsular Malaysia through Thailand and Southwest-China (Yunnan) eastwards to Laos, Hainan, and Southeast-China (Guangxi) and is characterised by tufted, oblanceolate to linear leaves. The flowers of plants from different sites across that region are similar at first sight, bearing a campanulate to slightly urceolate perigone and mushroom-shaped pistils. However, they are distinguishable by several minor characters, such as the number and course of the adaxial perigone ribs, details of the stigma surface, and in colour patterns. The leaves also vary from variously spotted to homogeneously green.

As an example, two floral variants are shown in Fig. 3. The plant in Fig. 3A–C was purchased from a Thai flower market and is now in cultivation at the Botanical Garden Munich. The plant in Fig. 3D–E was collected by H. Billensteiner in Laos, Bokeo Province, and is now in cultivation at the Palmengarten Frankfurt/M. During the past several decades, some of these local variants have been described as new species: *A. hainanensis* W.Y.Chun & H.W.How, *A. yingjiangensis* Peng, *A. larutensis* deWilde & Vogel (Chun & How 1977, Peng 1989, de Wilde & Vogel 2005) and Phonsena & de Wilde (2010) recently discussed the taxonomy of this group. We agree with the conclusion of Phonsena & de Wilde (2010) that excessive splitting is unwarranted, and that presumably "local *Aspidistra* populations represent clones of uniform plants, each clone conserving its characteristics against those of remote populations".

Experience with *Aspidistra* has shown that taxonomically meaningful solutions can be obtained only by studying plants from a great number of well-documented collection sites side by side in cultivation and this is one of the best ways to circumscribe taxa. However, there is a problem in that Phonsena & de Wilde (2010) placed all these SE Asian plants into *A. longifolia* Hook.f., a species decribed from Assam, India, and based on two specimens from the Griffiths Herbarium at Kew

(Hooker 1892). One of these specimens (*Griffith 5887*, barcode 000099915) was designated twice as Type, initially by Tillich (2008) and independently by Phonsena & de Wilde (2010). Unfortunately, neither of these herbarium specimens are suitably preserved for detailed flower analysis but Hooker's description leaves no doubt that *A. longifolia* is clearly different from the SE Asian plants as he states "perianth 1/2 in. diam., fleshy, subglobose contracted at the mouth; lobes very small". This character combination clearly differs from the campanulate to slightly urceolate flowers with lobes (nearly) as long as or longer than the tube, which is the condition seen in all the SE Asian plants so far examined.

We therefore propose to regard the SE Asian *Aspidistra* specimens with oblanceolate to lineate, tufted leaves as part of the *A. hainanensis* W.Y.Chun & H.W.How complex, until more comprehensive cultivation experiments can provide clarity regarding their variability and taxonomic status.

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