



Aspidistra nigrescens (Asparagaceae, Convallarioideae), new species of “*Aspidistra zinaidae* group” from central Vietnam

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Abstract

The paper reports *Aspidistra nigrescens*, as a new species to science discovered in central Vietnam (Quang Binh Province). It provides species diagnosis, standard description, color illustrations, data about type specimens, ecology, phenology, distribution, preliminarily estimated conservation status, and notes about closely allied related species. Discovered species belongs to “*A. zinaidae* group”, species of which (*A. erosa*, *A. heterocarpa*, *A. multiflora*, and *A. zinaidae*) shares such characters as small, 6-morous, campanulate or urceolate flowers with dark purple to black lobes of perigone, and stamens inserted near middle of perigone tube. The group is morphologically well segregated and forms rather isolated, monophyletic, highly supported clade in molecular cladistics. An identification key of species belonging to “*A. zinaidae* group” is provided. Among members of this group newly discovered species morphologically is most close to *A. heterocarpa* sharing such particular character as cylindrical, drumstick-shaped pistil hardly broadening at the base and apex.

Key words: Dong Chau—Khe Nuoc Trong Nature Reserve, limestone flora, plant diversity, plant endemism, plant taxonomy, Quang Binh Province

Introduction

The genus *Aspidistra* Ker Gawler (1822: 628) is distributed in tropical and subtropical Southeast Asia with highest diversity in southern China and Vietnam. The recent comprehensive survey of *Aspidistra* listed 209 species with a number of subspecies and varieties (Tillich 2023). Since then, at least twenty-five species (Chu *et al.* 2024) have been discovered and described. In combination those data with ours presented in this paper, the total number of species belonging to the genus reached at least 235. At the same time, about 100 species are reported from Vietnam (Averyanov *et al.* 2024, Chu *et al.* 2024). Nevertheless, despite extensive research efforts, the global inventory of the genus diversity appears still far from complete. The paper presents one more new *Aspidistra* species belonging to the “*A. zinaidae* group” discovered recently in the low limestone hills of Quang Binh Province in central Vietnam.

Materials and methods

The type specimens of newly discovered species were collected during fieldwork in November 2024, stored in ethanol (50%) and later studied in laboratory. Observations and measurements of morphological features were made on living and alcohol-fixed, wild collected plants, as well as on herbarium materials. In the descriptions, for the quantitative characters, infrequent extreme values (i.e., rarely occurring minimal and maximal values) of a variation range are indicated in parentheses before and after the normal variation range. The detailed analytical photos of plants were made from the wild collected living material before the preparation of the voucher herbarium specimens. Photos were taken using the Canon EOS 750D, Sony DSC-HX80, and Sony Alpha A7 Mark II cameras with various compatible lenses. The studied voucher herbarium specimens are housed at the Herbaria of the Vietnam National University of Forestry (VNF) and the Komarov Botanical Institute of the Russian Academy of Sciences (LE). Scanned images of herbarium specimens and associated analytical photos are available in the open database “Herbarium LE” (<https://en.herbariumle.ru>). The IUCN Red List Categories and Criteria, version 16 (IUCN 2024) was used for the preliminary assessment of the species conservation status. The general terminology for the morphological descriptions follows Beentje (2016) and Simpson (2019).

Taxonomic treatment

Aspidistra nigrescens Aver. & C.H.Nguyen, *sp. nov.* (Fig. 1 & 2)

Type:—VIETNAM. Quang Binh Province: Le Thuy District, Kim Thuy Municipality, secondary and primary fractionally logged evergreen broad-leaved forest on very steep hill slopes composed by gray and yellow solid marble-like limestone at elevation 800–900 m a.s.l. around point 16°57.4N 106°35.3E, terrestrial herb in shady places, flowers white with dark violet, almost black lobes, locally common, 10 November 2024, *Nguyen Huu Cuong, Nguyen Van Ly, Phan Thanh Quyet, Duong Van Nam, Le Thi Phuong Thao, L. Averyanov, T. Maisak, AL3654* (holotype: VNF, isotypes: LE LE01277745 <https://en.herbariumle.ru/?t=occ&id=255607>; LE01277746 <https://en.herbariumle.ru/?t=occ&id=255608>; photos of plant used for the preparation of the type specimens: LE01255443 <https://en.herbariumle.ru/?t=occ&id=249265>; LE01255489 <https://en.herbariumle.ru/?t=occ&id=249264> & LE01255499 <https://en.herbariumle.ru/?t=occ&id=250162>).

Paratype:—VIETNAM. Quang Binh Province: Le Thuy District, Kim Thuy Municipality, secondary and primary fractionally logged evergreen broad-leaved forest on very steep hill slopes composed by gray and yellow solid marble-like limestone at elevation 800–900 m a.s.l. around point 16°57.4N 106°35.3E, terrestrial herb in shady places, flowers white with dark violet, almost black lobes, locally common, 10 November 2024, *Nguyen Huu Cuong, Nguyen Van Ly, Phan Thanh Quyet, Duong Van Nam, Le Thi Phuong Thao, L. Averyanov, T. Maisak, DCKNT-NR036* (VNF).

Diagnosis:—*Aspidistra nigrescens* differs from morphologically most similar *A. heterocarpa* mainly in leaves aggregated at rhizome apex (vs. rhizome leafy throughout), lanceolate to broadly lanceolate leaf blade (vs. leaf blade elliptic), perigone tube urceolate, 6.5–8.5 mm long (vs. perigone tube campanulate, 5–5.5 mm long), perigone lobes adaxially black, broadly triangular sagittate, as long as wide (vs. perigone lobes adaxially dark purple, ovate oblong, distinctly longer than wide), filaments separate (vs. connivent forming annular structure), anthers oblong, 2.5–3 mm long, 1 mm wide (vs. anthers bean-shaped, 1.8–2.2 mm long and wide), stigma hemispheric, 2.4–2.6 mm across (vs. stigma flat or slightly convex, 2.8–3.2 mm across), and fruits finely rugose, 1–1.7 cm in diameter (vs. fruits smooth, 0.7–1 cm in diameter).

Etymology:—The species epithet refers to the black color of perigone lobes.

Description:—**Herb** terrestrial perennial rhizomatous, with orthotropic, ascending or suberect, rigid, epigeous rhizome and erect leaves. **Rhizome** rigid, to 6(8) cm long, simple or branching, 3–4.5 (5) mm in diameter, densely nodal, with numerous wiry, rigid, semi woody, roots, leafy at apex. **Cataphylls** convolute, cuneate, to 10–14 cm long, brownish when young, early splitting into dull gray-brown, papyraceous or fibrous remains. **Leaves** (3)4–5(6) densely arranged at the apex of rhizome, straight or hardly arching, (50)60–70(75) cm long, petiolate; petiole stiff, straight, (22)25–32(34) cm long; leaf blade, lanceolate to broadly lanceolate, tapering at base and acute apex, (28)30–36(40) cm long, (2.6)2.8–3.2(3.4) cm wide, more or less flat, uniformly grassy green on both surfaces, with prominent midvein and 3–4 secondary veins well seen on both sides (immersed adaxially, convex abaxially), arising from midvein in

basal half of leaf blade. **Flowers** odorless, commonly 1 to 3 on an individual stem, pedunculate, horizontal or nutant, not widely opening. **Peduncle** purple, (3.5)4–7(8) mm long, 1–1.5 mm in diameter, with 3(4) bracts, the two distal of which adjacent to perigone tube; bracts broadly ovate, concave, papyraceous to scarious, white, finely purple speckled, obtuse, (3.5)4–5.5(6) mm long and wide. **Perigone** urceolate, (9)10–12(13) cm long, (6)6.5–7.5(8) mm in diameter, of 6 lobes; perigone tube (6.5)7–8(8.5) mm long, (6)6.5–7.5(8) mm in diameter, glossy white outside, black inside, white at filament insertion area; perigone lobes subsimilar, in two distinct circles, broadly triangular sagittate, almost orbicular at apex, fleshy, smooth, straight or hardly reflexed, (4)4.2–4.5(4.6) mm long and wide, with adaxial surface smooth, black, and abaxial surface glossy white with black margin. **Stamens** 6; inserted at middle part of tube, filamentose; filaments white, very short, fleshy, 0.5–0.6 mm long, 0.6–0.7 mm across; anthers introrse, oblong, 2.5–3 mm long, about 1 mm wide; pollen pale yellow. **Pistil** entirely white; ovary inconspicuous; style cylindrical 8.5–9.5 mm long, (1.9)2(2.1) mm wide, slightly inflated at the base and apex; stigma capitate, (2.4)2.5(2.6) mm in diameter, hemispheric, orbicular, entire to indistinctly 3-lobed, finely rugose, sometime with 3 hardly visible irregular radial fissures. **Fruit** berry-like, globular, (10)12–15(17) mm in diameter, dirty green to pale dirty purple-brown, smooth or finely rugose, with 1–2(3) seeds.



FIGURE 1. *Aspidistra nigrescens*. Plant in natural habitat. Photos by Cuong Huu Nguyen.

Distribution:—Vietnam, Quang Binh Province (Le Thuy District, territory of Dong Chau–Khe Nuoc Trong Nature Reserve). Endemic of limestone areas in central Vietnam.

Ecology and phenology:—Terrestrial rhizomatous herb. Primary and secondary fractionally logged evergreen broad-leaved forests on steep hill slopes composed by gray and yellow solid marble-like limestone at elevation of 800–900 m a.s.l., commonly in deep shade. Locally common. Flowers in October–November.

Conservation:—The species was observed in its single know location as a common plant, which can survive in secondary and degraded forests on the territory that is currently is officially protected. Following criteria and terms of the Red List IUCN (2024) we preliminarily estimate the conservation status of newly discovered species as a least concern (LC).

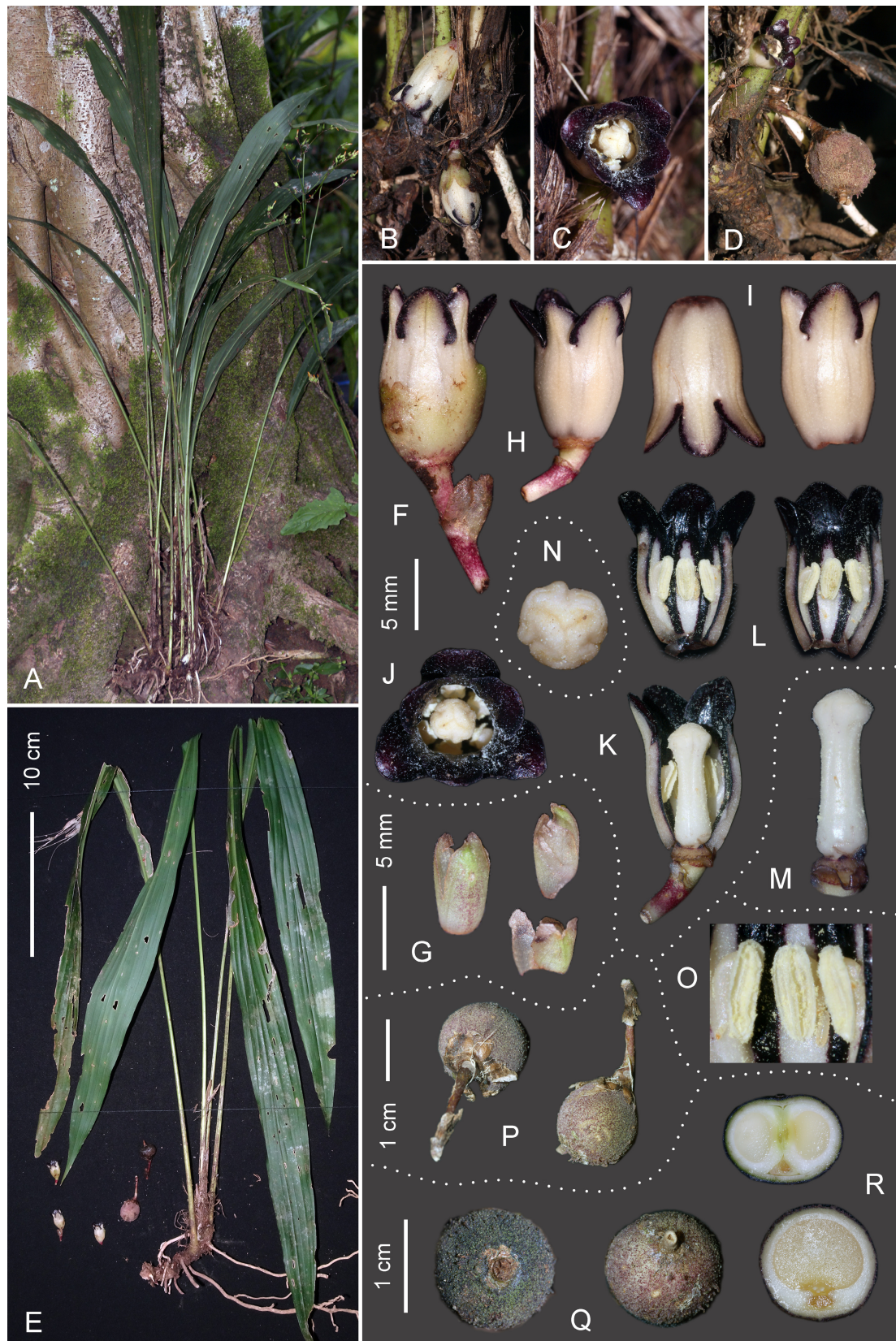


FIGURE 2. *Aspidistra nigrescens*. **A.** Flowering plant in natural habitat. **B, C.** Basal part of plants in nature with intact flowers. **D.** Basal part of plant with mature fruit. **E.** Flattened plant with flowers and fruit. **F.** Peduncle and flower, side view. **G.** Peduncle bracts. **H.** Peduncle and flower with bracts removed. **I.** Flower, sagittal section, abaxial side. **J.** Flowers, front view. **K.** Flower, tangential section showing intact pistil. **L.** Flower, tangential section showing stamens. **M.** Pistil, side view. **N.** Stigma, view from above. **O.** Anthers. **P.** Fruits with peduncles, side view. **Q.** Fruits, frontal and half-side views. **R.** Fruit, sagittal and cross sections. Photos, graphic correction, and design by L. Averyanov and T. Maisak from living plants prior to the preparation of the type herbarium specimens AL3654.

Notes:—*Aspidistra nigrescens* belongs to group of Vietnamese species with small, 6-morous, campanulate or urceolate flowers with dark purple to black lobes of perigone, and stamens inserted near middle of perigone tube. In our earlier publication (Averyanov *et al.* 2019) it was provisionally named as “*A. zinaidae* group”. This group beside species described here includes *Aspidistra erosa* Aver., Tillich, T.A.Le & K.S.Nguyen in Averyanov *et al.* (2019: 102), *A. heterocarpa* Aver., Tillich & V.T.Pham in Averyanov *et al.* (2018: 4) var. *heterocarpa*, *A. heterocarpa* var. *echinata* Aver., Tillich & T. A. Le in Averyanov *et al.* (2018: 7), *A. multiflora* Averyanov & Tillich (2015: 368), and *A. zinaidae* Averyanov & Tillich (2012: 8). The group is morphologically well segregated and forms rather isolated, monophyletic, highly supported clade in molecular cladistics (Vislobokov 2024 pers. comm.). Among members of this group newly discovered species morphologically is most close to *A. heterocarpa* (including its varieties) sharing such particular characters as cylindrical, drumstick-shaped pistil hardly broadening at the base and apex. However, both species differs in a series of morphological characters indicated in diagnosis and the key for identification of species mentioned group placed below.

Key for the species of *Aspidistra zinaidae* “group”

- 1 Pistil cylindrical, drumstick-shaped, hardly inflated at the base and apex; anthers without connective2
- Pistil mushroom shaped, style much narrower than stigma; anthers with fleshy, white connective.....3
- 2 Leaves distant on rhizome throughout, leaf blade elliptic, 3–6.5 cm wide; perigone tube rather campanulate, 5–5.5 mm long; perigone lobes adaxially dark purple, ovate oblong, distinctly longer than wide; filaments 0.8–1 mm long, 0.7–0.8 mm across, connivent forming annular structure; anthers bean-shaped, 1.8–2.2 mm long and wide; stigma shortly obpyramidal, flat or slightly convex at apex, 2.8–3.2 mm across; fruits smooth, 0.7–1 cm in diameter.....*A. heterocarpa*
- Leaves aggregated at rhizome apex, leaf blade lanceolate to broadly lanceolate, 2.6–3.4 cm wide; perigone tube rather urceolate, 6.5–8.5 mm long; perigone lobes adaxially black, broadly triangular sagittate, as long as wide; filaments 0.5–0.6 mm long, 0.6–0.7 mm across, separate, the tube wall between them appearing as black stripes; anthers oblong, 2.5–3 mm long, about 1 mm wide; stigma capitate, distally hemispheric, 2.4–2.6 mm across; fruits finely rugose, 1–1.7 cm in diameter.....*A. nigrescens*
- 3 Rhizome creeping or distally ascending, with 1–2 flowers; peduncles erect to ascending; perigone lobes finely erose at the upper third, outside with 5 nerves; pistil upcurved *A. erosa*
- Rhizome short, suberect to erect, with numerous flowers; peduncles more or less horizontal; perigone lobes smooth at the margin, outside with 3 nerves; pistil straight.....4
- 4 Peduncles 0.5–1.5 cm long; flower in obliquely erect position; perigone tube 7–9 mm long and wide; perigone lobes revolute.....
.....*A. multiflora*
- Peduncles 2–4 cm long; flower in horizontal position; perigone tube 4–6 mm long, 4–5 mm wide; perigone lobes erect to hardly spreading.....*A. zinaidae*

Among *Aspidistra* species known from China our new species is most close to *A. claviformis* Y.Wan (1984: 166) from which it differs in rather distant floral bracts (vs. bracts densely aggregated at the base of flowers), campanulate flower with perigone lobes straight or hardly recurved (vs. flower cupulate with perigone lobes strongly revolute), and style much longer than anthers, inflated at apex, with capitate, hemispheric stigma, entire to indistinctly 3-lobed (vs. style distinctly shorter than anthers, narrowing to the apex, with flat, distinctly 3-lobed stigma).

TABLE 1. Morphological differences between *Aspidistra nigrescens* and *A. heterocarpa*.

Morphological character	<i>A. nigrescens</i>	<i>A. heterocarpa</i>
Leaves arrangement on rhizome	leaves aggregated at rhizome apex	leaves more or less loosely distant on rhizome
Leaf blade shape and size	lanceolate to broadly lanceolate, 2.6–3.4 cm wide	elliptic, 3–6.5 cm wide
Peduncle color	purple	white to light greenish
Peduncle bracts, number and size	3(4) bracts, 3.5–6 mm long and wide	3–5 bracts, 2–3.4 mm long and wide
Perigone tube shape, size and color	urceolate, 6.5–8.5 mm long, 6–8 mm wide, white outside, black inside	campanulate, 5.0–5.5 mm long, 4.8–5.8 mm wide, white to light yellowish outside, deep purple inside
Perigone lobes shape	broadly triangular sagittate, as long as wide	ovate oblong, distinctly longer than wide
Perigone lobes apex	sepals and petals subsimilar, roundish	sepals obtuse, petals roundish
Perigone lobes color	black inside, white with black margin outside	dark purple inside, white with dark purple margin outside
Filament characters	0.5–0.6 mm long, 0.6–0.7 mm across, separate	0.8–1 mm long, 0.7–0.8 mm across, connivent at base forming annular structure
Anthers shape and size	oblong, 2.5–3 mm long, about 1 mm wide	bean-shaped, 1.8–2.2 mm long and wide
Stigma shape and size	stigma hemispheric, 2.4–2.6	stigma shortly obpyramidal, flat or slightly convex at apex, 2.8–3.2 mm across
Fruit characters	finely rugose, 1–1.7 cm in diameter, 1–2(3)-seeded	smooth and glossy, 0.7–1 cm in diameter, 1-seeded.

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