

НОВЫЕ ТАКСОНЫ NEW TAXA

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ELEVEN NEW SPECIES OF *BEGONIA* L. (BEGONIACEAE) FROM LAOS AND VIETNAM

ОДИННАДЦАТЬ НОВЫХ ВИДОВ БЕГОНИЙ (*BEGONIA* L., BEGONIACEAE) ИЗ ЛАОСА И ВЬЕТНАМА

Summary. Strictly endemic species *Begonia alta*, *B. babeana*, *B. crassula*, *B. gesneriifolia*, *B. minuscula*, *B. nahangensis*, *B. rigidifolia*, *B. rubrosetosa*, *B. rugosula*, *B. sonlaensis*, and *B. viscosa* (Begoniaceae) are described and illustrated. Relations and morphological differences of described species from their allies are shortly discussed.

Key words: *Begonia*, new species, local endemism, Begoniaceae, Vietnam, Laos, taxonomy, biological diversity.

Аннотация. В статье приведены иллюстрированные описания узкоэндемичных видов бегоний – *Begonia alta*, *B. babeana*, *B. crassula*, *B. gesneriifolia*, *B. minuscula*, *B. nahangensis*, *B. rigidifolia*, *B. rubrosetosa*, *B. rugosula*, *B. sonlaensis* и *B. viscosa* (Begoniaceae). Кратко обсуждаются родственные отношения описываемых видов и их морфологические отличия от таксонов ближайшего родства.

Ключевые слова: *Begonia*, новые виды, локальный эндемизм, Begoniaceae, Вьетнам, Лаос, таксономия, биологическое разнообразие.

INTRODUCTION

Begonia L. is the sixth largest genus in angiosperms (Frodin, 2004). It comprises more than 1500 species, most of which are local endemics with very restricted distribution in tropical and subtropical regions of the world. Meanwhile, inventory of the genus species composition and diversity in local floras, particularly in Indochina, remains very far from acceptable completing. Very few species are known from countries of eastern Indochina, whereas more than 175 species are reported from China (Gu et al., 2007) with 143 local endemics (82%).

Thus, only 3 species of the genus till now were tentatively reported for Cambodia, 14 species for Laos and 36 species for Vietnam (<http://elmer.rbge.org.uk>). The only available professional treatment of Laotian flora records only 12 documented species of *Begonia* (Newman et al., 2007). Relatively more extensive attempts were undertaken in studies of the

genus in Vietnam. Outstanding French plant taxonomist, François Gagnepain (1866–1952), was actually a pioneer in explorations of begonias in Indochina (Gagnepain, 1919a, b, 1921). Eminent Vietnamese botanist Pham Hoang Ho in his famous fundamental “Illustrated flora of Viet Nam” summarized later his discoveries (Ho, 1991, 1999). However, some species accepted in these editions were later excluded due to misidentification (Kiew, 2007). Uncritical “Checklist of plant species of Vietnam” includes 41 species of the genus reported for the flora of Vietnam (Nguyen T.B., 2003). At the same time, a number of new Indochinese species such as *Begonia bataiensis* Kiew, *B. cucphuongensis* H.Q. Nguyen et Tebbitt, *B. glutinosa* Kiew, *B. hahiepiana* H.Q. Nguyen et Tebbitt, *B. phamiana* Kiew, *B. phuthoensis* H.Q. Nguyen, *B. poilanei* Kiew and *B. sizemoreae* Kiew were recently added to our knowledge due to important, but still fragmentary investigations (Kiew, 2004, 2007; Nguyen H.Q., 2004; Nguyen H.Q.,

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Tebbit, 2005, 2006; Truong et al., 2005). As a result, total number of *Begonia* species known currently in eastern Indochina is actually not more than 48–50. It is remarkable that species concentration on the territory of China strikingly rises in southern, south-western and south-eastern direction with maximal diversity observed in south-eastern Yunnan and south-western Guangxi in regions closely allied to Vietnam and Laos (Gu et al., 2007). This fact gives straight evidence that vast areas of Indochina should be essentially richer in *Begonia* species than much better studied northern territories. Numerous isolated ancient mountain formations, particularly karstic rocky remnant limestone massifs well presented in Vietnam and in Laos undoubtedly provide home to numerous still undescribed local endemic species. Total actual number of *Begonia* species in eastern Indochina may be estimated as 180–200 species (anyway, their number certainly cannot be less than 150 taxa). Our explorations during last few years completely confirm this supposition and truly outline areas of eastern Indochina as an important centre of outstanding richness and diversity of *Begonia* species. Only small part of discovered species is described below. Further studies of this genus in Indochina represent exciting prospects for coming future.

***Begonia alta* Aver., sp. nov.** (Sect. *Diploclinium* (Lindl.) A. DC). Described from northern Vietnam (“Phu Tho prov., Tan Son distr., Xuan Son municipality, Du village, Ten Mountain, near mountain top, around point 21°06'49"N, 104°56'03"E. Primary broadleaved evergreen forest on steep mountain slopes composed with shale at elevation 800–1000 m a.s.l. Terrestrial herb to 2 m tall on very steep shady rocky slope. Locally common”).

Type (“18 February 2009, L. Averyanov, P.K. Loc, N.T. Vinh, L.T. Son, HAL 12745”) – LE (holotype, isotype), CPC Herbarium (isotype).

Terrestrial evergreen, regularly dioecious herb 1.5–2 m tall with hardly developed rhizome. Stems straight, erect, stout, cylindric, (6)8–12(15) mm in diam., few branching in upper part, olive-green, often with purple-brown tint, leafy in apical part, with internodes (3)4–12(18) cm long, slightly swollen at nodes. Stipules very early caducous, cuneate to narrowly-ovate, with broad base, acute, slightly concave, to 2(3) cm long, light green to whitish, scarious. Leaves petiolate, all cauline, glabrous. Petioles cylindric, fleshy, succulent, straight, dull olive-green to dull purple-brownish, (4)5–20(30) cm long.

Leaf blade strongly asymmetric, oblique narrowly ovate to ovate, oblique-cordate at base, attenuate at apex, with palmate-pinnate venation of 3–5(7) main branching veins, (8)10–22(30) cm long, (4)5–11(14) cm wide, thin, entire to very shallowly indistinctly lobulate in apical part, serrulate and finely ciliate along margin, uniform dull velvety green to gray-green, young velvety bluish-green fluorescent above, glossy purple-brown with light greenish nerves below. Inflorescence axillary, erect, arching to nutant, dichotomous, bracteate cyme (6)7–12(15) cm tall, arising from upper part of stem; peduncle (3)4–8(12) cm long, much shorter than leaves, light greenish, bearing dichotomously branching sparsely hairy axes with lax cluster of (2)4–8(12) flowers; bracts at nodes ovate, light greenish, scarious, very early caducous. Flowers glabrous, pedicellate, monosexual, light pink; pedicels straight (2)2.5–3(3.5) cm long, light pink to almost white. Staminate flowers zygomorphic, dichlamydeous, normally with 2 opposite ovate to broadly ovate sepals (1)1.4–1.8(2.2) cm long and 2 opposite elliptic to broadly lanceolate petals (0.8)1–1.2(1.5) cm long; stamens numerous, in dense capitulum, brightly yellow, filaments almost free, arranged in numerous whorls on short broadly conical axis, 1.5–2 mm long, anthers narrowly obovoid, about 1.5 mm long, connective not extend, apex slightly retuse. Pistillate flowers zygomorphic, dichlamydeous, normally with 2 sepals and 1 petal; sepals sub opposite, ovate to broadly ovate, orbicular to obtuse at apex, (1)1.4–1.8(2.2) cm long; petal elliptic to broadly lanceolate, (0.8)1–1.2(1.5) cm long; styles 3, brightly yellow, (2.5)3–4(5) mm tall, connate at the base into common stalk, stigmas cristate-bipartite, with shortly helicoid densely setose-papillose apices of lobules. Ovary inferior, composed of 3 carpels, white to pink, glabrous, 3-angular, with prominent oblique-triangular wings along each edge; wings subequal or apical wing distinctly larger; placentae axial, bilamellate. Capsules dry, light pink to pink-brown (when dry light dull yellowish-brown), loculicidal, nodding, 3-locular, ovoid, triangular in section, (8)10–14(16) mm long, (5)6–9(11) mm wide, with 3 oblique-triangular wings, to 1.6(1.8) cm tall, one of which distinctly larger, rarely wings subequal. Seeds ovoid, numerous, very small, light brownish. **Fig.** 1a–g.

Etymology. Described plant may be easily recognized as tallest among Indochinese begonias, hence its species epithet.

Ecology. Primary broad-leaved evergreen forests on shale at elevations 700–1000 m a.s.l. Terrestrial herb growing commonly of very steep

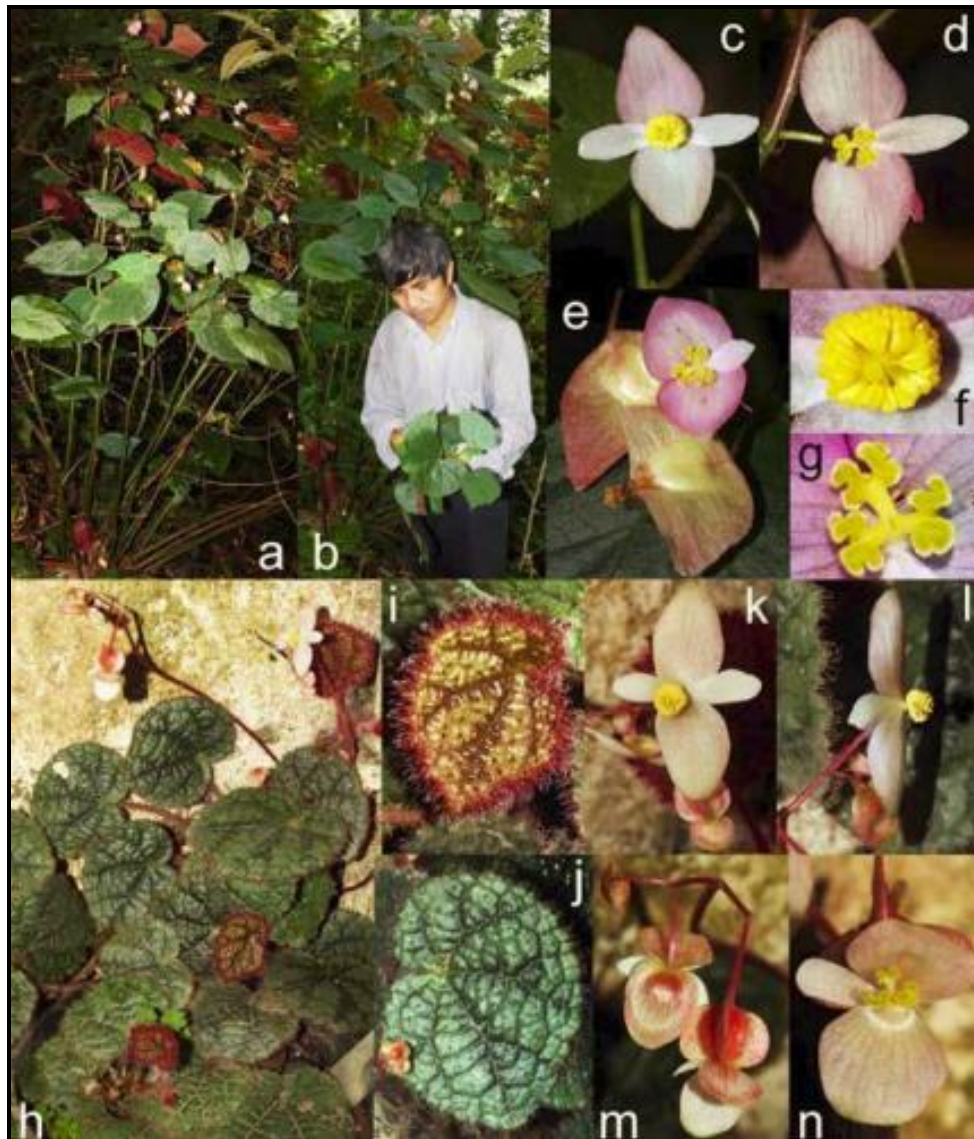


Fig. 1. *Begonia alta*: a, b – flowering and fruiting authentic specimen in its “locus classicus”, c – staminate flower, frontal view, d – pistillate flower, frontal view, e – pistillate flower and ripening fruits, f – androecium, g – pistil, styles and stigmas (type specimen – HAL 12745, all photos by L. Averyanov). *B. babeana*: h – flowering type specimen, i, j – young and mature leaves, respectively (adaxial surface), k, l – staminate flowers, frontal and side views, m – portion of inflorescence, n – pistillate flower, frontal view (type specimen – NQH 309, all photos by L. Averyanov).

shady rocky slopes. Flowers in January – February, fruits in March – April. Locally common (LR).

Distribution. Shaly mountains in central part of northern Vietnam in Phu Tho province (Tan Son district). Local endemic.

Notes. Described plant belongs to group of south-east Asian species with tall, erect, stout, leafy, weakly branching stems. Among them, the new species has closest relation to Taiwanese *B. chuyunshanensis* C.-I Peng et Y.K. Chen and *B. lukuana* Y.C. Liu et C.H. Ou. Vietnamese plant differs from both these species in pistillate

flowers having 2 sepals and 1 petal, in tall habit and glabrous leaves velvety green to grey-green above, often iridescent with green-blue. Like mentioned species, the new plant belongs to Sect. *Diploclinium*.

***Begonia babeana* Aver. et H.Q. Nguyen, sp. nov.** (Sect. *Coelocentrum* Irmsch.).

Described from central part of northern Vietnam (“Bac Kan prov., Ba Be national park”).

Type (“22 February 2009, NQH 309”) – CPC Herbarium (holotype).

Lithophytic, evergreen, stemless, regularly monoecious herb with thick, creeping, plagiotropic rhizome. Rhizome greenish to brown, (4)5–10(15) cm long, (3)4–5(7) mm in diam., sparsely hairy, with fibrose roots faced to the ground. Stipules semideciduous, herbaceous, greenish, triangular, 5–7 mm long, sparsely hairy to subglabrous. Leaves (2)4–6(8), shortly petiolate, distant along apical portion of rhizome, internodes (0.5)1–1.5(2) cm long. Petioles cylindrical, juicy, ascending to erect, dark brown to dull purple-brown, (3)4–6(8) cm long, (2)3–5(6) mm in diam., densely villose with long soft brown, brown-reddish or brownish-grey reflexed hairs. Leaf blade broadly oblique-ovate, unlobed, broadly cordate at base, broadly obtuse to almost roundish apex, shallowly crenulate to irregularly denticulate, (3)4–6(8) cm long, (2)3–4.5(5) cm wide, herbaceous, with palmate venation of 5–6(7) main branching veins and percurrent, loosely reticulate tertiary nerves (grooved on adaxial surface); blade above glossy uniform dark green (in young leaves light yellow-brown with irregularly dark brown palmate areas along main veins), irregularly rugosebullate, between grooved nerves, sparse setose with erect, subulate, whitish setae on tops of inflations; blade below reddish to pale green, irregularly cellulite, with raised veins, shortly hairy, particularly along veins; densely brown ciliate along margin. Inflorescence axillary, erect or ascending from apical part of rhizome, peduncle dark brown-purple to dark purple, glabrous, 6–10(15) cm long, exceeding leaves, bearing dichotomously branching bracteate, few flowered cyme 1–2(3) cm tall; floral bracts and bracteoles triangular, attenuate, glabrous, early caducous. Flowers monosexual, pedicellate; pedicels glabrous (rarely with few scarce hairs) straight to slightly arching, (8)10–12(15) mm long, pink to purple, tepals glabrous, light pink to almost white. Staminate flowers zygomorphic, dichlamydeous, normally with 2 opposite ovate sepals, (6)8–11(12) mm long, (4.5)5–7(9) mm wide and with 2 opposite, narrowly obovate petals (4)5–7(8) mm long, (2)2.5–3(3.5) mm wide; stamens about 1.5 mm long, numerous, in dense subglobose cluster, brightly yellow, arranged in numerous whorls on short conical axis, filaments free, anthers obovoid, as long as filaments, slightly retuse at apex. Pistillate flowers zygomorphic, dichlamydeous, with 2 sepals and 1 petal; sepals sub opposite, broadly ovate to sub orbicular, (6)8–11(12) across; petal narrowly obovate, as long as sepals or little shorter, (2)2.5–3(3.5) mm wide, obtuse to roundish at apex; styles 3, 2.5–3(3.5) mm tall, brightly yellow, connate at the base into short broad common

stalk, styles broadening and flattened toward the apex, stigmas densely setose-papillose, linear-cristate, lateral sides expanded into helicoids band. Ovary inferior, composed of 3 carpels, pink to purple, glabrous, 3-angular, with high subequal lunate wings along each edge; placentae parietal, bilamellate (?). Capsules dry, light grey-brownish, nodding, 3-locular, loculicidal, ovoid, triangular in section, (6)7–10(12) mm long, (3)4–4.5(5) mm wide, with 3 lunate subequal wings to 4(5) mm tall. Seeds ovoid, numerous, very small. **Fig.** 1h–n.

Etymology. Species name refers name of national park where plant was discovered (Ba Be national park, Bac Kan province of northern Vietnam).

Ecology. Primary and secondary dry broadleaved evergreen forests on remnant hills composed with solid marble-like highly eroded rocky crystalline limestone at elevations 200–300 m a.s.l. Lithophytic herb growing in humid crevices of vertical shady limestone cliffs. Flowers (under cultivation in Hanoi, CPC Garden) in February – March, fruits in May – June (July). Rare, usually forms very small populations (VU).

Distribution. Lowland limestone areas in centre of northern Vietnam in Bac Kan province (Ba Be district). Local endemic.

Notes. The new species is closely related to *B. semiparietalis* Yan Liu, S.M. Ku et C.-I Peng described from south-west Guangxi (Ku et al., 2006), but clearly distinct in its smaller plant size (particularly leaves), in brown, brownish-red to brownishgrey indumentum (not white), in rugose, glossy, uniform dark green, irregularly bullate adaxial surface of leaf blade with prominent grooved veins and in glabrous sepals and ovary (not long setulose-pilose).

Begonia crassula Aver., sp. nov. (Sect. *Diploclinium*).

Described from central Vietnam (“Quang Binh prov., Minh Hoa distr., Thuong Hoa municipality, environs of Mo O O O village, around point 17°39'21.1"N 105°54'41.7"E. Remnants of short tall broad-leaved primary forest on rocky top of remnant mountain composed with highly eroded solid crystalline limestone at elevation about 570 m a.s.l. Lithophytic herb or under shrub to 1.5 m tall on open rocks and exposed cliffs on rocky mountain top”).

Type (“28 July 2011, N.T. Hiep, L. Averyanov, N.S. Khang, N.Q. Vinh, CPC 3858”) – LE (holotype), CPC Herbarium (isotypes). **Digital paratype:** d-EXSICCATES OF VIETNAMESE FLORA 0189/CPC 3775.

Lithophytic evergreen, regularly monoecious, entirely glabrous herb 0.5–1.5 m tall with hardly developed rhizome. Stems ascending to erect, succulent, cylindrical, (3)5–7(8) mm in diam., normally un-branching, green, often with purple tint, leafy in apical part, with internodes (1)2–5(6) cm long. Stipules caducous, ovate, with broad base, acute, slightly concave, (1.5)2–3(3.5) cm long, 1–2 cm wide, light green to dull pink tint, glossy, leathery. Leaves petiolate. Petioles cylindrical, fleshy, succulent, straight, light green, sometime with pink tint, purple at base and at apex, (1)2–7(9) cm long. Leaf blade strongly asymmetric, transversely narrowly ovate, broadly cuneate to straight-perpendicular to petiole, shortly attenuate at apex, with palmate venation of 3–5(7) main branching veins, (1.5)3–6(7) cm long, (4)6–18(22) cm wide, fleshy, succulent, entire or hardly indistinctly denticulate along margin, uniform glossy green on both surfaces, sometime with light purple tint along margin and at apex, and reddish main nerves below. Inflorescence axillary, erect, arching to nutant, dichotomous, bracteates cyme (4)5–10(12) cm tall, arising by 1 from leaf axils in middle or upper part of stem; peduncle (0.8)1–3(5) cm long, shorter than leaves, green to purple, bearing dichotomously branching axes with cluster of 5–20 flowers; bracts at nodes, broadly ovate to almost orbicular, white to pinkish, scarious, very early caducous, 5–7 mm long and mm wide. Flowers pedicellate, monosexual, light pink; pedicels straight (5)8–12(15) mm long, pink to purple, glabrous, tepals entirely glabrous. Staminate flowers zygomorphic, monochlamydeous, flattened at base, normally with 2 opposite broadly ovate to orbicular tepals (6)8–12(14) mm across; stamens numerous, in dense capitulum, brightly yellow, filaments almost free, connate at the base, 1–1.5 mm long, anthers narrowly obovoid, 1.2–1.5 mm long, connective not extend or hardly extended in form of low obtuse dent. Pistillate flowers zygomorphic, dichlamydeous, normally with 2 sepals and 2 petals; sepals sub opposite, broadly reniform to almost orbicular, (6)8–10(12) mm across; petals oblique obovate to broadly obovate, as long as sepals, (4)5–7(8) mm wide; styles 3, brightly yellow, 1–2(2.5) mm tall, connate at the base into common stalk, tripartite and inflate toward apex into turgid cristate-capitate, densely setose-papillose stigmas. Ovary inferior, composed of 3 carpels, white, glabrous, 3-angular, with prominent purple wings along each edge; wings subequal or apical wing little larger; placentae axial bifid or undivided in basal part of ovary. Capsules dry, light green to dark purple and purple brown, loculicidal,

nodding, 3-locular, ellipsoid to ovoid, indistinctly triangular in section, (6)7–14(16) mm long, (4)5–8(10) mm wide, with 3 triangular-ovate wings, to 1 cm tall, one of which often slightly larger. Seeds ovoid, numerous, very small, with light brown reticulate testa. **Fig. 2, 3.**

Paratypes. Central Vietnam, Quang Binh prov., Minh Hoa distr., Thuong Hoa municipality, territory of Phong Nha – Ke Bang National Park, about 1–1.5 km to SW of Ban On village, Ca Xach Mountain, 17°39'20"N, 105°57'42"E. Primary closed evergreen broad-leaved gnarled stunted forest along rocky ridge composed with solid marble like highly eroded crystalline limestone at elevation 600–800 m a.s.l. Lithophytic herb up to 1 m tall on open rocky outcrops. Occasional. 20 January 2005, *L. Averyanov, P.K. Loc, P.V. The et al., HAL 5973* (CPC Herbarium, LE). Quang Binh prov., Minh Hoa distr., Dan Hoa municipality, Bai Dinh village around point 17°45'28"N 105°46'14"E. Very steep rocky slopes and rocky tops of highly eroded marble-like solid remnant limestone mountains at elevation 600–700 m a.s.l. Lithophytic herb to 1.5 m all with succulent juicy leaves in rock crevices and on shelves of vertical cliffs near mountain top. Common. 4 February 2009, *L. Averyanov, P.K. Loc, N.T. Vinh, L.T. Son, HAL 12231a* (LE, photo). Quang Binh prov., Minh Hoa distr., Dan Hoa municipality, Bai Dinh village around point 17°44'04"N 105°49'14"E. Remnants of primary evergreen broad-leaved forest on very steep slopes and on tops of remnant hills composed with highly eroded marble-like solid limestone at elevation about 400–500 m a.s.l. Lithophytic herb or under shrub to 1.5 m tall on very steep rocky slopes and on shelves of vertical cliffs. Leaves succulent, glossy dark green, petioles and stipules glossy brightly red. Common. 8 February 2009, *L. Averyanov, P.K. Loc, N.T. Vinh, L.T. Son, HAL 12472* (CPC Herbarium, LE). Quang Binh prov., Tuyen Hoa distr., Lam Hoa municipality, Chuoi village, around point 17°56'51"N 105°49'18"E. Primary broadleaved evergreen dry forest on very steep slopes and on tops of rocky ridge composed with highly eroded crystalline limestone at elev. 200–250 m a.s.l. Lithophytic herb to 0.5 m tall on open rocks along rocky ridge. Flowers pinkish, leaves uniform glossy green to gray, succulent white. Not rare. 3 May 2011, *L. Averyanov, P.K. Loc, N.Q. Hieu et al., CPC 2724* (CPC Herbarium, LE). Quang Binh prov., Minh Hoa distr., Thuong Hoa municipality, environs of Mo O O O village, around point 17°39'36.7"N 105°54'55.7"E. Remnants of short tall broad-leaved primary forest

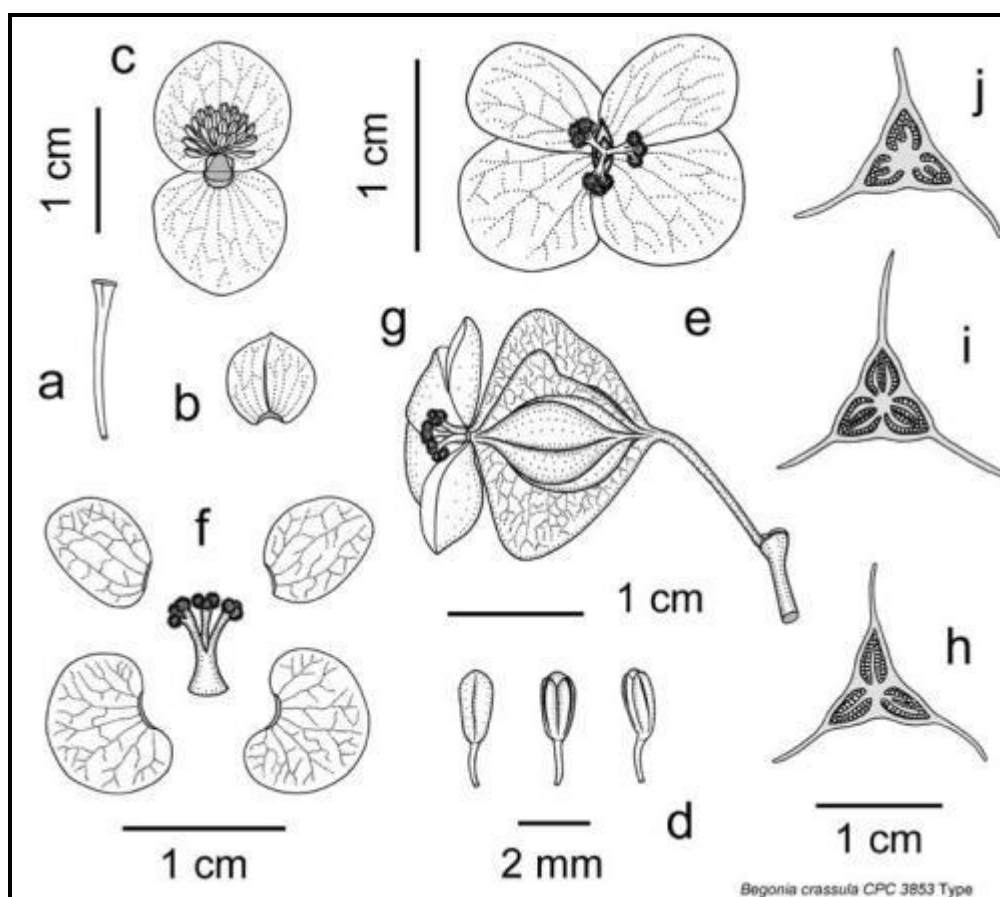


Fig. 2. *Begonia crassula*: a, b – pedicel and floral bract of staminate flower, c – flattened staminate flower, frontal view, d – stamens, e – flattened pistillate flower, frontal view, f – flattened tepals and pistil, side view, g – pistillate flower with developing ovary, side view, h–j – young fruit crosses, near base, at middle and near top respectively (all drawn from the type – CPC 3858 by L. Averyanov and T. Maisak)

on rocky top of remnant mountain composed with highly eroded solid crystalline limestone at elevation about 612 m a.s.l. Lithophytic herb or under shrub to 1 m tall on exposed open rocks on rocky mountain top. Locally common. 26 July 2011, *N.T. Hiep, L. Averyanov, N.S. Khang, N.Q. Vinh, CPC 3775* (CPC Herbarium, LE). Quang Binh prov., Minh Hoa distr., Thuong Hoa comm., Ban On Vill., 17°40'21"N, 105°57'59"E, 250–300 m. Edges of heavily logged primary evergreen broad-leaved forests and woodlands on slopes of limestone mts. Perennial herb. All plant parts glabrous. Flowers pink. Not rare. 27 July 2011, *P.K. Loc, N. Tap, N.Q. Hieu et al., CPC 5232* (CPC Herbarium, LE). Quang Binh prov., Minh Hoa distr., Thuong Hoa municipality, around point 17°41'28"N 105°53'42.7"E. Primary closed evergreen broad-leaved forest on rocky very steep cliffy slope of remnant mountain composed with solid crystalline limestone at elevation about 700 m a.s.l. near to the top of mountain. Lithophytic herb to 1.5 m tall on mossy exposed rock. Common. 5 August 2011, *N.T. Hiep, L. Averyanov, N.S. Khang et al., CPC 3962* (CPC Herbarium, LE). Quang Binh prov., Minh Hoa distr., Hoa Son B'Lam Lang

limestone mt., around point 17°42'13.7"N 105°47'33.9"E. Primary fractionally logged closed evergreen broad-leaved forest on ridge top at elevation about 700 m a.s.l. Lithophyte on wet, shady crevices rich in humus. Flowers pink; male flowers with 2 petals. Common. 15 August 2011, *N.T. Hiep, N.Q. Hieu, N.V. Tap et al., CPC 4264* (CPC Herbarium, LE).

Etymology. Species epithet reflects succulent habit of the plant.

Ecology. Primary forests, scrub, open rocks and cliffs on tops of remnant hills composed with solid marble-like highly eroded rocky limestone at elevations 200–800 m a.s.l. Lithophytic and occasionally terrestrial herb growing in upper part of slopes and on rocky hill tops, commonly among rocks or in cliff crevices. Flowers in July – August, fruits in September – November (December). Locally common, occasional co-dominant of shrubbyherbaceous lithophytic plant communities (LR).

Distribution. Limestone areas of central Vietnam in Quang Binh province (Minh Hoa and Tuyen Hoa districts). Local endemic.



Fig. 3. *Begonia crassula*. Digital paratype – d-EXSICCATES OF VIETNAMESE FLORA 0189/CPC 3775 (all photos and design by L. Averyanov).



Fig. 4. *Begonia gesneriifolia*. Digital epitype – d-EXSICCATES OF VIETNAMESE FLORA 0011/HAL 6354 (all photos and design by L. Averyanov).

Notes. According to its axial placentation with bifid placentae, the described species falls into Sect. *Diploclinium* and belongs to more or less natural group of species with erect stems without distinct rhizome, such as *B. boisiana* Gagnep., *B. chuyunshanensis* and *B. lukuana*. Described plant strikingly differs from all mentioned species in succulent habit, fleshy succulent leaves of characteristic shape, placed subperpendicular to petiole, in staminate flowers with 2 and pistillate flowers with 4 tepals. *Begonia crassula* is a typical element of xerophytic herbaceous vegetation on open rocky karstic limestone outcrops with very strict ecological requirements.

***Begonia gesneriifolia* Aver., sp. nov.** (Sect. *Reichenheimia* (Klotzsch) A. DC.?).

Described from central Vietnam (“Quang Binh prov., Bo Trach distr., Son Trach municipality, around point 17°30'32"N, 106°17'45"E at elev. 300–400 m a.s.l., territory of Phong Nha – Ke Bang National Park. Secondary closed broad-leaved evergreen forest and scrub on rocky steep slopes of remnant mountains composed with solid highly eroded crystalline deep gray limestone. Lithophytic herb on vertical shady cliff. Locally common”).

Type (“2 February 2005, *L. Averyanov*, *P.K. Loc*, *P.V. The et al.*, HAL 6354”) – CPC Herbarium (isotype), LE (holotype). **Digital epitype:** d-EXSICCATES OF VIETNAMESE FLORA 0011/HAL6354.

Lithophytic or occasionally terrestrial, evergreen, stemless, regularly dioecious herb with thick, stout, creeping, plagiotropic rhizome. Rhizome brown, (3.5)5–10(12) cm long, (6)8–10(14) mm in diam., covered by numerous dark brown persistent bracts, with many filiform roots faced to the ground. Stipules persistent, herbaceous, pink (later light brown), ovate to triangular-cuneate, (3)4–6(8) mm long, 2–4(5) mm wide at the base, acute to acuminate, attenuate into filiform thread (1)2–3 mm long. Leaves (6)8–12(15), arranged in rosette-like cluster at the apex of rhizome, long petiolate. Petioles cylindric, juicy, ascending, dull pink to brown-purple, (3)5–10(12) cm long, 3–5(6) mm in diam., young shortly hairy by short scurfy hairs, oldest subglabrous. Leaf blade symmetric (rarely slightly asymmetric), reniform, cordate at base, roundish at apex, shallowly crenulate, with palmate venation of (5)6(7) main branching veins, (3)4–7(8) cm long, (4)5–8(10) cm wide, thick, rigid, rugose; above uniform dark glossy green to almost greenish-black, glabrous; below uniformly glossy light green to whitish-green, scurfy hairy along

veins. Inflorescence axillary, erect or ascending from apical part of rhizome, peduncle straight, purple, glabrous, (10)15–20(24) cm long, much longer than leaves, bearing dichotomously branching bracteate, many flowered cyme 2–4(6) cm tall; bracts ovate to almost triangular, obtuse, (2.5)3–5(7) mm long, green to light greenish, sometime with purple tint, persistent, glabrous. Flowers pure white, monosexual, pedicellate; pedicels slightly arching, (6)8–10(12) mm long, light green to yellowish and pink, glabrous. Staminate flowers zygomorphic, dichlamydeous, normally with 2 opposite broadly ovate to almost orbicular sepals (5)6–8(9) mm across and 2 opposite narrowly obovate to broadly oblanceolate petals (3.5)4–5(7) mm long, 2.5–3(4) mm wide; stamens not numerous, in dense cluster, brightly yellow, arranged on short conical axis, filaments free, (0.6)0.8–1(1.2) mm long, anthers narrowly obovoid, as long as filaments, slightly retuse at apex. Pistillate flowers unknown. Capsules dry, light grey-brownish, nodding, 3-locular, with axial placentation, loculicidal, ovoid, triangular in section, (6)7–8(10) mm long, (3.5)4–6(7) mm wide, with 3 lunate, oblique-triangular or oblique-trapezoidal wings to 5–12 mm tall, apical wing distinctly larger. Seeds ovoid, numerous, very small, dark brownish. **Fig. 4.**

Etymology. Leaves of our plant exhibit certain superficial resemblance with leaves observed in some gesneriads (like species of *Boea* Lam., *Calcareaoboea* H.W. Li, *Paraboea* Ridl., etc.). The name of new species reflects this similarity unusual among *Begonias*.

Ecology. Primary broad-leaved evergreen forests on remnant hills composed with solid marble-like highly eroded rocky crystalline limestone at elevations 300–400 m a.s.l. Lithophytic herb growing in crevices of vertical shady cliffs in upper part of hill and mountain slopes. Flowers in February – March, fruits in April – May. Rare, usually forms very small populations (EN).

Distribution. Limestone areas of central Vietnam in Quang Binh province (Bo Trach district). Local endemic.

Notes. Obviously related species *B. gesneriifolia* and *B. minuscula* (see description below) have some superficial resemblance with miniature Chinese begonias having almost round, symmetric leaves, such as – *B. zhengyiana* Y.M. Shui (Sect. *Coelocentrum*), *B. gulinqingensis* S.H. Huang et Y.M. Shui, *B. mashanica* D. Fang et D.H. Qin and *B. suboblata* D. Fang et D.H. Qin (Sect. *Diploclinium*). Meanwhile, rigid, symmetric,

reniform, crenate or crenulate leaves (always distinctly broader than long), scurfy hairy along veins on abaxial surface indicate certainly isolated taxonomical position of our plants described here. We see no close relatives of these both species among their Indochinese congeners.

***Begonia minuscula* Aver., sp. nov.** (Sect. *Reichenheimia*).

Described from central Vietnam ("Quang Tri prov., Huong Hoa distr., Huong Viet municipality around point 16°51'06"N 106°34'38"E. Partially destroyed primary broad-leaved evergreen forest on very steep rocky slopes of remnant hills composed with solid highly eroded crystalline limestone at elev. about 600–700 m a.s.l. Lithophytic herb on vertical tall cliff. Not common.")

Type ("7 May 2011, L. Averyanov, P.K. Loc, N.Q. Hieu, P.V. The, N.T. Vinh, CPC 2838") – CPC Herbarium (isotype), LE (holotype). **Digital epitype:** d-EXSICCATES OF VIETNAMESE FLORA 0184/HAL 2838.

Lithophytic, evergreen, stemless, regularly dioecious herb with moniliform creeping rhizome densely adpressed to substratum. Rhizome plagiotropic, fleshy, fragile, light brown, yellowish to pink, (0.5)1–4(6) cm long, (2)3–4(6) mm in diam., swelling at nodes, at nodes with few filiform roots faced to the ground and (1)2–4(5) leaves at apex. Stipules persistent, herbaceous, pink (later light brown), ovate to triangular-cuneate, (2)4–8(10) mm long, (1)1.5–4(5) mm wide at the base, acute to acuminate, finely ciliate along margin, attenuate into filiform thread 1–2(2.5) mm long. Leaves petiolate, young abaxially densely hairy with short fine whitish (nearly almost black when dry) hairs. Petioles cylindric, juicy, very fragile, ascending to almost straight, purple, (0.5)1–5(8) cm long, 1–2 mm in diam., young densely shortly hairy, oldest subglabrous. Leaf blade symmetric, reniform, shallowly cordate at base, shallowly crenate and roundish at apex, with palmate venation of 4–6 main branching veins, (1)1.5–3(4) cm long, (1.5)2–4(4.5) cm wide, thick and rigid; above very variable in coloration from velvety emerald green, dark green and olive green to pink, dull purple, brown-purple, dark brown, dark greenish-brown to almost nearly black, occasionally with palmately arranged roundish whitish spots, below uniformly glossy white to very light pink, often with reddish-pink veins. Inflorescence axillary, ascending from apical part of rhizome, erect, dichotomous, bracteate cyme (3)4–8(10) cm tall, longer than leaves, peduncle purple, bearing short dichotomously branching

densely scurfy hairy axis with (1)2–4 flowers; nodes swollen, bracts ovate to broadly ovate, shortly acuminate, (1.5)2–3(4) mm long, pink (later light brownish), persistent, sparsely scurfy hairy outside, ciliate along margin. Flowers pinkish-green, pedicellate, monosexual; pedicels straight to arching, (5)6–9(10) mm long, densely hairy with very short scurfy brownish hairs. Staminate flowers unknown. Pistillate flowers zygomorphic, dichlamydeous, normally with 2 sepals and 3 petals; sepals sub opposite, ovate to broadly ovate, orbicular to slightly obtuse at apex, (6)7–9(10) mm long, (4.5)5–6(7) mm wide; 2 petals obovate to broadly obovate, prominently attenuate to the base, as long as sepals, (3.5)4–6(6.5) mm wide, 1 petal much narrower, oblanceolate, (4.5)5–6(6.5) mm long, 2–2.5(3) mm wide, obtuse to roundish at apex, attenuate at the base; styles 3, (1.5)2(2.5) mm tall, connate at the base into common short stalk, styles flattened toward the apex, stigmas linearcrisate, densely setose-papillose. Ovary inferior, composed of 3 carpels, densely to sparsely scurfy hairy, 3-angular, with prominent lunate to oblique–triangular wings along each edge; wings subequal or apical wing distinctly larger; placentae axial, undivided, occasionally bilamellate. Capsules dry, light brownish, loculicidal, nodding, 3-locular, narrowly ovoid to ovoid, triangular in section, (4.5)5–6(8) mm long, (3.5)4–5(6) mm wide, with 3 lunate to oblique-triangular wings, to (1.5)2–4(4.5) mm tall, one of which often distinctly larger, not rare wings subequal. Seeds ovoid, numerous, very small, testa reticulate, dark brown. **Fig.** 5, 6.

Paratypes. Central Vietnam, Quang Tri Prov., Huong Hoa Distr., Huong Viet Municipality, to N of Sa Mui pass, around point 16°51'14"N 106°34'13"E at elevation 550–650 m a.s.l. Remnants of primary broad-leaved evergreen lowland forest on rocky remnant highly eroded solid marble like limestone hills and low mountains with very steep slopes and vertical cliffs. Lithophytic creeping herb on vertical shady cliffs. Leaves pure green to pink-brown. Very common. 31 March 2006, N.T. Hiep, L. Averyanov, P.K. Loc et al., HLF 5910 (HN, LE). Central Vietnam, Quang Binh prov., Minh Hoa distr., Dan Hoa municipality, Bai Dinh village around point 17°45'28"N 105°46'14"E. Remnants of primary evergreen broad-leaved forest on very steep slopes and on tops of low remnant hills composed with highly eroded marble-like solid limestone at elevation about 200–300 m a.s.l. Lithophytic creeping herb on tall vertical shady cliff composed by orange-brown crystalline limestone. Rare. 7 February 2009, L. Averyanov, P.K. Loc, N.T. Vinh, L.T. Son, HAL 12356 (CPC Herbarium, MO).

Etymology. Species name reflects dwarf habit of described plant.

Ecology. Primary broad-leaved, shady forests on remnant hills composed with solid marble like highly eroded rocky crystalline limestone at elevations 200–700 m a.s.l. Obligate lithophytic herb growing on vertical shady cliffs in upper part of hill and mountain slopes. Flowers in February – March, fruits in April – May. Very rare, regularly forms very small populations (EN).

Distribution. Limestone areas of central Vietnam in provinces Quang Binh (Minh Hoa district) and Quang Tri (Huong Hoa district). Local endemic.

Notes. This extremely miniature species is undoubtedly smallest among all begonias known in mainland Asia. According to its axial undivided placentae, the species should be placed into Sect. *Reichenheimia* in classification scheme of Yu-Min Shui et al. (Shui et al., 2002). Meanwhile, its superficially closest species, *B. zhengyiana* Y.M. Shui from SE Yunnan, was placed recently into Sect. *Coelocentrum* (Gu et al., 2007).

***Begonia nahangensis* Aver. et H.Q. Nguyen, sp. nov.** (Sect. *Coelocentrum*). Described from northern 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 at elev. 450–500 m a.s.l. Lithophytic herb adpressed in crevices of vertical shady cliffs. Abundant at elev. 400 m a.s.l.

Type (“22 March 2001, *P.K. Loc, N.X. Tam, L. Averyanov, HAL 214*”) – HN (holotype), LE (isotype), MO (isotype). **Digital paratype:** d-EXSICCATES OF VIETNAMESE FLORA 0112/NQH 315.

Lithophytic, evergreen, stemless, regularly dioecious herb with thick, stout, creeping, plagiotropic rhizome. Rhizome greenish to brown, (5)6–10(12) cm long, (4)6–10(12) mm in diam., covered by brownish persistent bracts, with filiform roots faced to the ground. Stipules persistent, herbaceous, greenish, triangular, 4–6 mm long. Leaves (1)2–4(6), arranged in rosette-like cluster at the apex of rhizome, adpressed to the ground, short petiolate. Petioles cylindrical, juicy, prostrate to ascending, dark brown-purple to brown, (2)3–6(10) cm long, (2)3–6(7) mm in diam., densely villose with long soft white hairs. Leaf blade round to slightly asymmetric, broadly oblique-ovate or

oblique-reniform, with hardly pronounced broadly obtuse apex, very shallowly crenulate, broadly cordate at the base, (5)8–12(15) cm across, usually a little broader than long, leathery, with palmate venation of 5–7 main branching veins and percurrent, loosely reticulate tertiary nerves; blade above dark green with light green palmate areas along main veins (young leaves pink- to purple-brown), smooth, sparsely conically bullate, each bulla apically with 1 erect, subulate, whitish seta; blade below violet to purple-violet, deeply irregularly cellulite-scrobiculate, densely white woolly-villose on nerves, densely long white ciliate along margin. Inflorescence axillary, erect or ascending from apical part of rhizome, peduncle dull purple-brown, glabrous, 8–12(15) cm long, exceeding leaves, bearing dichotomously branching bracteate, few flowered cyme 1–2 cm tall; bracts and bracteoles broadly-ovate, with entire-straight margin, roundish at apex, (1)1.5–2.5(3.5) mm long, light green to whitish, sometime with purple tint, persistent, glabrous. Flowers monosexual, pedicellate; pedicels slightly arching, (8)10–12(14) mm long, light dull purple-brown, tepals glabrous. Staminate flowers zygomorphic, dichlamydeous, normally with 2 opposite broadly ovate to almost orbicular, white to light pink (abaxially flushed with brightly red) sepals (6)8–9(10) mm long, and with 2 opposite white, narrowly obovate petals (3.5)4–5(6) mm long, 2.5–3(4) mm wide; stamens about 1 mm long, numerous, in dense cluster, light dull yellow, arranged on short conical axis, filaments free, anthers obovoid, as long as filaments, slightly retuse at apex. Pistillate flowers light olive-green, zygomorphic, dichlamydeous, with 2 sepals and 1(0) petal; sepals sub opposite, broadly reniform, distinctly broader than long, (4.5)5–6(7) mm long, (8)9–11(12) mm wide; petal (if present) narrowly obovate, as long as sepals, (2.5)3–3.5 mm wide, obtuse; styles 3, (2)2.5(3) mm tall, brightly yellow, connate at the base into short broad common stalk, styles broadening and flattened toward the apex, stigmas densely setose-papillose, linear-cristate, lateral sides expanded into helicoid band. Ovary inferior, composed of 3 carpels, light green, sparsely hairy with very short rusty-glandular reddish-brown hairs, 3-angular, with low lunate to oblique-triangular wings along each edge; apical wing distinctly larger; placentae parietal, bilamellate (?). Capsules dry, light grey-brownish, nodding, 3-locular, loculicidal, ovoid, triangular in section, (6.5)8–10(12) mm long, (3.5)4–5(7) mm wide, with 2 lunate low side wings and distinctly larger

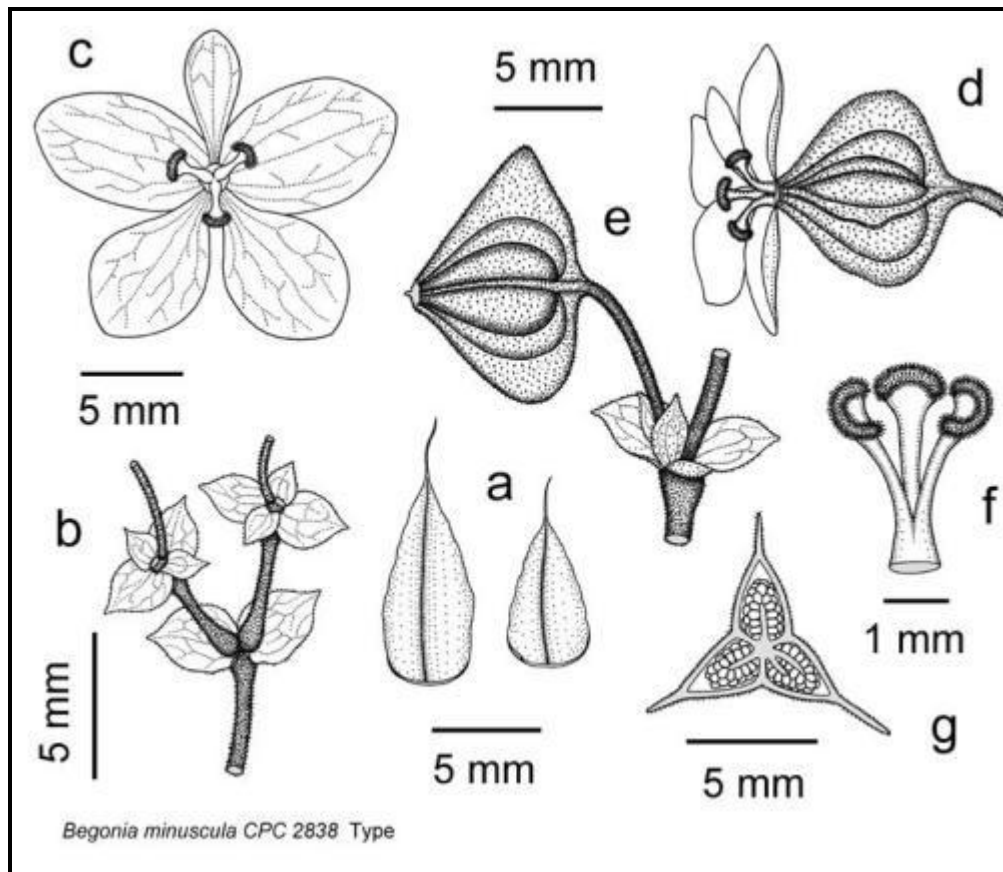


Fig. 5. *Begonia minuscula*: a – stipules, b – upper portion of inflorescence with floral bracts and pedicels, c – flattened pistillate flower, frontal view, d – pistillate flower and ripening ovary, side view, e – ripe fruit, side view, f – pistil, side view, g – fruit transversal section. All drawings from the type, CPC 3858, by L. Averyanov and T. Maisak.

oblique-triangular median wing to 4 mm tall. Seeds ovoid, numerous, very small. **Fig. 7.**

Paratype. Northern Vietnam, Tuyen Quang prov., Na Hang distr., Xuan Tan community, Cai village, 20°29'28"N, 105°20'04"E, at elev. about 124 m a.s.l. Growing on the limestone cliff, under broad-leaved forest, not common. 10 January 2007, *Nguyen Quang Hieu, NQH 315*" (CPC Herbarium).

Etymology. Species name refers area of its origin (Na Hang district of Tuyen Quang province of northern Vietnam).

Ecology. Primary broad-leaved evergreen forests on remnant hills composed with solid marble-like highly eroded rocky crystalline limestone at elevations 100–500 m a.s.l. Lithophytic herb growing in humid crevices of vertical shady cliffs. Flowers (under cultivation in Hanoi, CPC Garden) in January – February (March), fruits in April – May. Abundant at elevation about 400 m a.s.l. (VU).

Distribution. Limestone areas in centre of northern Vietnam in Tuyen Quang province (Na Hang district). Local endemic.

Notes. New species has closest relation to *B. fimbribracteata* Y.M. Shui et W.H. Chen described

from central part of Guangxi (Shui, Chen, 2005), from which distinctly differs in densely woolly-villose petioles and abaxial surface of leaf blade (not sparsely strigose), in glabrous peduncle, inflorescence axes, pedicels and tepals (not sparsely pilose with long hairs), in entire margin of floral bracts and bracteoles (not ciliate-fimbriate), in broadly reniform sepals of female flowers (not broadly obovate to orbicular), in olive green pistillate flowers (not white to pink) and in ovary sparsely hairy with very short rusty-glandular reddish-brown hairs (not sparsely setose with long erect hairs).

***Begonia rigidifolia* Aver., sp. nov.** (Sect. *Begonia*). Described from central Vietnam ("Quang Binh prov., Tuyen Hoa distr., Lam Hoa municipality, Chuoi village, around point 17°56'51"N 105°49'18"E. Primary broad-leaved evergreen dry forest on very steep slopes and on tops of rocky ridge composed with highly eroded crystalline limestone at elev. 200–250 m a.s.l. Lithophytic rosulate herb on shady vertical cliffs. Not rare").



Fig. 6. *Begonia minuscula*. Digital epitype – d-EXSICCATES OF VIETNAMESE FLORA 0184/CPC 2838 (all photos and design by L. Averyanov).



Fig. 7. *Begonia nahangensis*. Digital paratype – d-EXSICCATES OF VIETNAMESE FLORA 0112/NQH 315 (all photos and design by L. Averyanov).

Type (“3 May 2011, L. Averyanov, P.K. Loc, N.Q. Hieu, P.V. The, N.T. Vinh, CPC 2733”) – CPC Herbarium (isotype), LE (holotype). **Digital epitype:** d-EXSICCATES OF VIETNAMESE FLORA 0186/CPC 2733.

Lithophytic, evergreen, stemless, regularly monoecious, rosulate herb. Rhizome plagiotropic, creeping, fleshy, stout, (3)4–5(7) cm long, (0.5)0.8–1(1.2) cm in diam., densely covered by dark brown persistent, long, densely hairy bracts, at nodes with numerous thin, filiform roots faced to the ground and with (2)4–6(8) leaves at apex. Stipules persistent, herbaceous, purple (brown when dry), oblong-ovate to narrowly ovate, (0.7)1–2(2.5) cm long, (3)4–6(8) mm wide, with revolute lateral margin, caudate, keeled and hairy outside by sparse long white hairs, attenuate into long hairy filiform-caudate mucro 7–10(12) mm long. Leaves petiolate, peltate. Petioles cylindrical, juicy, fragile, erect to ascending, brown-purple, (5)7–10(15) cm long, (2)3–4(6) mm in diam., sparsely hairy with long-ciliate white hairs. Leaf blade symmetric to slightly asymmetric, ovate, almost entire or irregularly, indistinctly, finely denticulate along margin, attenuate at apex, with radiate venation of 6 slightly branching veins, (5)7–12(15) cm long, (4.5)5–9(11) cm wide, glabrous, coriaceous, leathery, rigid; brightly emerald-green with irregular radiantly arranged dirty-brownish or dark green to almost black-green spots above, light greenish-white to almost pure white, with irregular areas flushed by scarlet-purple below. Inflorescence axillary, erect or ascending from apical part of rhizome, peduncle straight, purple, glabrous, (6)8–14(18) cm long, as long as leaves or nearly so, bearing very short dichotomously branching bracteate, many flowered cyme 1–2(4) cm long with staminate and pistillate flowers; bracts and bracteoles ovate to almost triangular, acute, (2)3–5(6) mm long, persistent, purple, long-ciliate along margin with white hairs. Flowers pedicellate, monosexual; pedicels straight to slightly arching, (5)6–12(14) mm long, densely hairy with very short papillose hairs; sepals white, pink–purple toward apical margin; petals pure white. Staminate flowers zygomorphic, dichlamydeous, normally with 2 opposite broadly ovate to almost orbicular sepals (6)7–11(14) mm across and 2(4) opposite narrowly obovate to broadly oblanceolate petals (4)5–9(11) mm long, (1.5)2–3.5(4) mm wide; stamens numerous, in dense cluster, brightly yellow, arranged in numerous whorls on short conical axis, filaments free, (0.8)1–1.4(1.6) mm long, anthers narrowly obovoid, as long as filaments, slightly retuse at apex. Pistillate flowers zygomorphic, dichlamydeous, normally with 2 sepals and 1 petal; sepals sub opposite, broadly ovate to reniform,

orbicular at apex, broader than long, (3)7–8(9) mm long, (4)9–11(13) mm wide; petal narrowly obovate to broadly oblanceolate, (3)5–6(7) mm long, (1.5)2.5–3(3.5) mm wide, roundish at apex; styles 3, (2)2.5(3) mm tall, brightly yellow, connate at the base into short common stalk, styles broadening and flattened toward the apex, stigmas densely setosepapillose, linear-cristate, lateral sides expanded into short helicoid band. Ovary inferior, composed of 3 carpels, densely shortly papillose, 3-angular, with low lunate to oblique-triangular wings along each edge; apical wing distinctly larger; placentae axial, bilamellate. Capsules dry, loculicidal, nodding, 3-locular, narrowly ovoid to ovoid, triangular in section, 5–8 mm long, 3–5 mm wide, with 2 low lunate and 1 oblique-triangular wings, to 2–3 mm tall, rarely wings subequal. Seeds ovoid, numerous, very small. **Fig.** 8, 9.

Etymology. The plant is named after characteristically rigid coriaceous leaves unusual among its related species.

Ecology. Primary broad-leaved evergreen dry forests on remnant hills composed with solid marble-like highly eroded rocky crystalline limestone at elevations 200–300 m a.s.l. Lithophytic herb growing in crevices of vertical shady cliffs in middle and upper parts of remnant karstic hill slopes. Flowers in April – May (June), fruits in July – August (September). Not common, usually forms small populations (VU).

Distribution. Limestone areas of central Vietnam in Quang Binh province (Tuyen Hoa district). Local endemic.

Notes. Described plant belongs to easily recognized group of species with relatively stout fleshy peltate leaves and has obvious relation to Indochinese *B. cavaleriei* H. Lév., *B. peltatifolia* Li, *B. pulvinifera* C.-I Peng et Yan Liu, *B. vietnamensis* H.Q. Nguyen et C.-I Peng, *B. wangii* T.T. Yu and Malaccan *B. ignorata* Irmsch., *B. kingiana* Irmsch. and *B. tigrina* Kiew (Gu et al., 2007; Nguyen Q.H. et al., 2010; Peng et al., 2006). Large stipules covered outside with numerous large white hairs, long-ciliate petioles, rigid coriaceous glabrous emerald-green leaves marked above with black-green and below with scarlet irregular spots, as well as staminate flowers with 4 tepals and pistillate flowers of 3 tepals easily distinguish our plant from all related species. *Begonia vietnamensis* has very similar habit, fruits, shape and coloration of leaves and has probably closest relation to our new species. However, *B. vietnamensis* was placed into another section (*Reichenheimia*) in original description (Nguyen Q.H. et al., 2010) that appears doubtful.

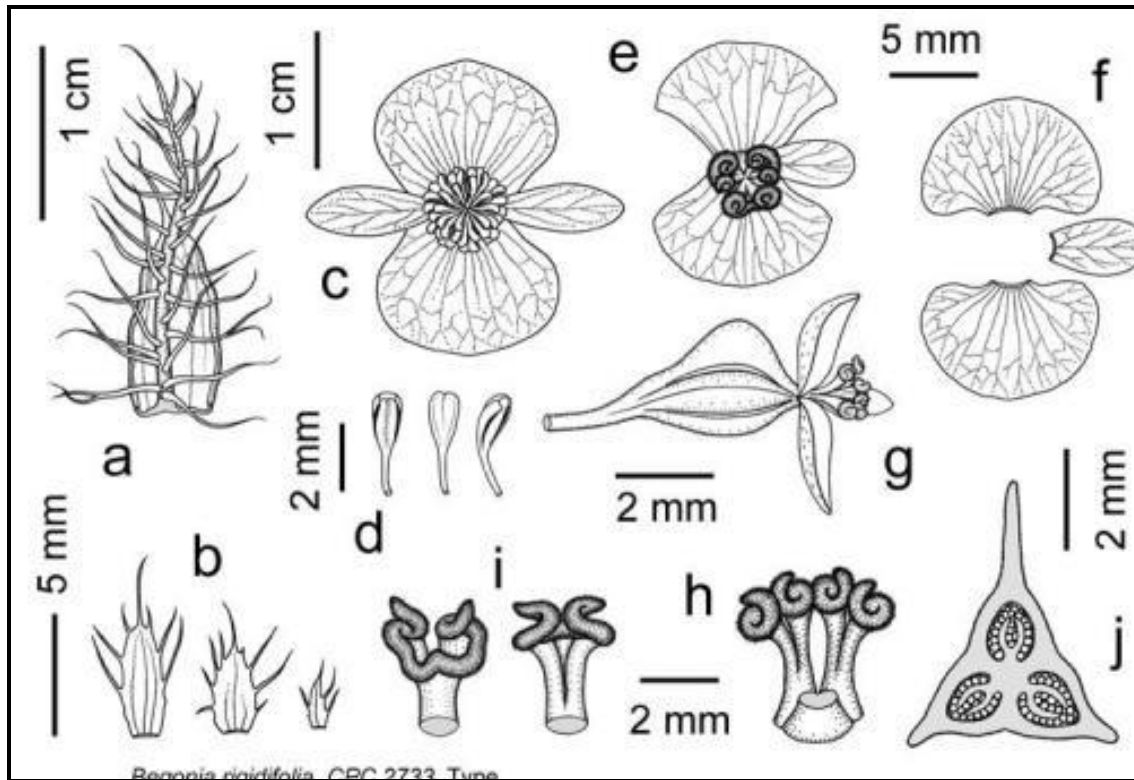


Fig. 8. *Begonia rigidifolia*: a – stipule, b – floral bracts and bracteoles, c – flattened staminate flower, frontal view, d – stamens, e – flattened pistillate flower, frontal view, f – flattened sepals and petal of pistillate flower, g – pistillate flower and ovary, side view, h – gynoecium with 1 removed style, i – styles, adaxial and abaxial views, j – cross section of ovary in middle part. All drawn from the type, CPC 2733, by L. Averyanov and T. Maisak.

***Begonia rubrosetosa* Aver., sp. nov.** (Sect. *Diploclinium*).

Described from central Vietnam (“Thua Thien – Hue prov., Nam Dong distr., Thuong Lo municipality, along Cha Mang stream, around point 16°07’35’’N 107°44’53’’E. Remnants of primary evergreen broad-leaved lowland forest on very steep hill slopes composed with stratified shale and sandstone at elev. about 150 m a.s.l. Terrestrial and lithophytic herb on very steep rocky slope. Leaves uniform green with reddish nerves. Locally very common”).

Type (“4 Apr. 2007, L. Averyanov, P.K. Loc, A. Averyanova, N.T. Vinh, N.D. Phuong, L.V. Hung, HAL 10883”) – CPC Herbarium (isotype), LE (holotype), MO (isotype). **Digital epitype:** d-EXSICCATES OF VIETNAMESE FLORA 0104/HAL 10883.

Terrestrial and lithophytic evergreen, regularly monoecious, herb 0.5–1(1.2) m tall with hardly developed rhizome. Stems erect, juicy, cylindric, 3–5 mm in diam., un-branching to few branching near base, green with purple tint to dark purple, leafy in apical half, with internodes (2)2.5–7(10) cm long. Stipules caducous to persistent, triangular, with broad base and acute to acuminate apex 5)8–12(15) mm long, (3)4–8(10) mm(wide,

light green to dull purple, later light brown. Leaves petiolate. Petioles cylindric, fleshy, straight, dark purple, (1)2–5(7) cm long, subglabrous at basal and middle part, densely hairy at apex with long dark purple hairs. Leaf blade strongly asymmetric, transversely narrowly ovate, oblique cordate at base, attenuate, (1.5)2–6(8) cm long, (6)10–18(22) cm wide, with palmate venation of 3–5 main branching veins, fleshy, very finely indistinctly denticulate and setose along margin, uniform green, below at base sometime with purple shading and purple veins. Inflorescence axillary, subterminal, erect, dichotomous, bracteate cyme (6)8–15(18) cm tall, arising from apical of stem; peduncle (1.5)2–6(8) cm long, longer than leaves, purple, bearing dichotomously branching axes with cluster of numerous flowers; bracts at nodes, broadly ovate to almost orbicular, white to light pinkish, scarios, very early caducous, 6–10 mm long and 5–7 mm wide, sparsely hairy with purple hairs outside. Flowers pedicellate, monosexual, tepals purple-red, pink or light pink toward margin; pedicels straight, 2–6(8) mm long, purple, glabrous to sparsely pubescent with long purple hairs; tepals outside with dense tuft of long cetaceous purple hairs. Staminate flowers zygomorphic, dichlamydeous, normally with 2 opposite broadly ovate to orbicular sepals (5)6–



Fig. 9. *Begonia rigidifolia*. Digital epitype – d-EXSICCATES OF VIETNAMESE FLORA 0186/CPC 2733 (all photos and design by L. Averyanov).



Fig. 10. *Begonia rubrosetosa*. Digital epitype – d-EXSICCATES OF VIETNAMESE FLORA 0104/HAL 10883 (all photos and design by L. Averyanov).

8(9) mm across and 2 opposite narrowly obovate to obovate petals (3.5)4–5(7) mm long, 3–4(5) mm wide; stamens numerous, in dense capitulum, brightly yellow, arranged in numerous whorls on short conical stalk, filaments free, 0.6–1 mm long, anthers narrowly obovoid, about 0.6–0.8 mm long, retuse at apex. Pistillate flowers zygomorphic, dichlamydeous, normally with 2 sepals and 3 petals; sepals sub opposite, broadly obovate to almost orbicular, 5–7 mm long, 4.5–6 mm wide; petals ovate to broadly ovate, as long as sepals, 3.5–4.5(6) mm wide; styles 3, brightly yellow, 1.5–2(2.5) mm tall, connate at the base, tripartite and inflate toward apex into turgid cristate, densely setose-papillose stigmas. Ovary inferior, composed of 3 carpels, purple-pink to dark purple, sparsely setose with purple hairs, 3-angular, with prominent subequal wings along each edge; placentae axial bifid (?). Capsules dry, purple-brown, later light brownish, loculicidal, nodding, 3-locular, ovoid, triangular in section, (4.5)5–7(8) mm long, (3.5)4–6(7) mm wide, with 3 subequal falcate-lunate roundish wings, to 2.5(3) mm tall. Seeds ovoid, numerous, very small.

Fig. 10.

Paratypes. Thua Thien – Hue prov., Phu

Loc distr., Bach Ma national park, N slope of Bach Ma mt system, to the N of point 16°12'11"N 107°50'23"E at elev. about 400 m a.s.l. Broadleaved evergreen primary closed wet mt. forest along deep rocky stream canyon. Terrestrial herb on steep rocky stream slope in wet place. Locally common. 29 April 2003, *N.T. Hiep, L. Averyanov, N.T. Vinh et al., HLF 1445* (HN, LE, MO). Central Vietnam, Thua Thien – Hue prov., Nam Dong distr., Huong Son municipality, around point 16°10'22"N, 107°36'24"E. Fractionally logged primary closed broad-leaved evergreen lowland forest along La Ma River on very steep hill slopes composed with clayey shale and sandstone at elevation about 300 m a.s.l. Terrestrial herb up to 1.5 m tall on wet slope along rocky stream valley. Occasional. 29 March 2005, *L. Averyanov, P.K. Loc, P.V. The, A. Averyanova, N.T. Vinh, HAL 7060* (HN, LE). Central Vietnam, Thua Thien – Hue Prov., Huong Thuy Distr., Duong Hoa municipality, Huong Thuy forest enterprise territory, around point 16°13'20"N, 107°34'23"E, SW slopes of Mang Chan ridge at elevation 600–800 m a.s.l. Fractionally logged primary closed evergreen broad-leaved forest along tops of ridge composed with rocky quartzite outcrops. Terrestrial herb up to 1.5 m tall in shady place. Flowers red. Leaves uniform green on both sides. Common. 10 May 2005, *L. Averyanov, P.K. Loc, T.V. Thao, N.T. Vinh, No HAL 8065* (HN, LE).

Etymology. Species epithet refers characteristic purple setose hairiness of

petioles, leaf margin, pedicels, floral bracts, tepals and ovary.

Ecology. Terrestrial and lithophytic herb, commonly on wet steep rocky slopes. Primary and secondary evergreen broad-leaved lowland forests on steep hill slopes composed with shale and sandstone at elev. 100–400 m a.s.l. Locally common (VU).

Distribution. Lowland sandstone and shale hill areas of central Vietnam in Thua Thien – Hue province (Nam Dong and Phu Loc districts). Local endemic.

Notes. *Begonia rubrosetosa* (like *B. alta* and *B. crassula* described above), undoubtedly belongs to Sect. *Diploclinium* and represents a member of more or less natural group of species with erect stems having no distinct rhizome. From the closest *B. boisiiana* described from northern Vietnam and its relatives our plant distinctly differs in characteristic dark reddish-purple indumentum of upper parts of petioles, long hairy sepals, entire leaves with straight setose margin and brightly reddish-purple flowers.

***Begonia rugosula* Aver., sp. nov.** (Sect. *Coelocentrum*).

Described from northern Vietnam ("Bac Kan prov., Cho Don distr., Xuan Lac municipality, Lung Ly locality, around point 22°17'24"N, 105°30'10"E, at elev. about 950 m. In partially destroyed primary closed evergreen broad-leaved forests near top of limestone mountain. Lithophyte").

Type ("May 2011, *L. Averyanov, CPC 1260aa*, type specimen originates from cultivated specimens collected at 6 March 2011, *N.Q. Hieu, N.T. Hiep, P.K. Loc, P.V. The, N.T. Vinh, CPC 1260a'*") – CPC Herbarium (isotype), LE (holotype).

Digital epitype: d-EXSICCATES OF VIETNAMESE FLORA 0185/CPC 1260a.

Lithophytic, evergreen, stemless, regularly monoecious, herb. Rhizome plagiotropic, creeping, fleshy, more or less straight, (5)7–12(15) cm long, (2)3–4(5) mm in diam., densely hairy with longciliate white hairs, with 3–6(8) erect, distant leaves, internodes (0.6)1–2(4) cm long, at nodes with few dark brown, thin, filiform roots faced to the ground. Stipules persistent, herbaceous, light greenish (brown when dry), ovate, broadly ovate triangular to almost triangular, (2.5)3–5(6) mm long and wide, concave, hairy outside along midvein with sparse ciliate white hairs to subglabrous, attenuate into filiform-caudate thread, often ciliate along margin. Leaves petiolate. Petioles cylindric, juicy, fragile, erect, dull purple to brown-purple, (1.5)2–5(8) cm long, 1–2 mm in diam., densely hairy with straight, soft, erect, ciliate white hairs. Leaf blade

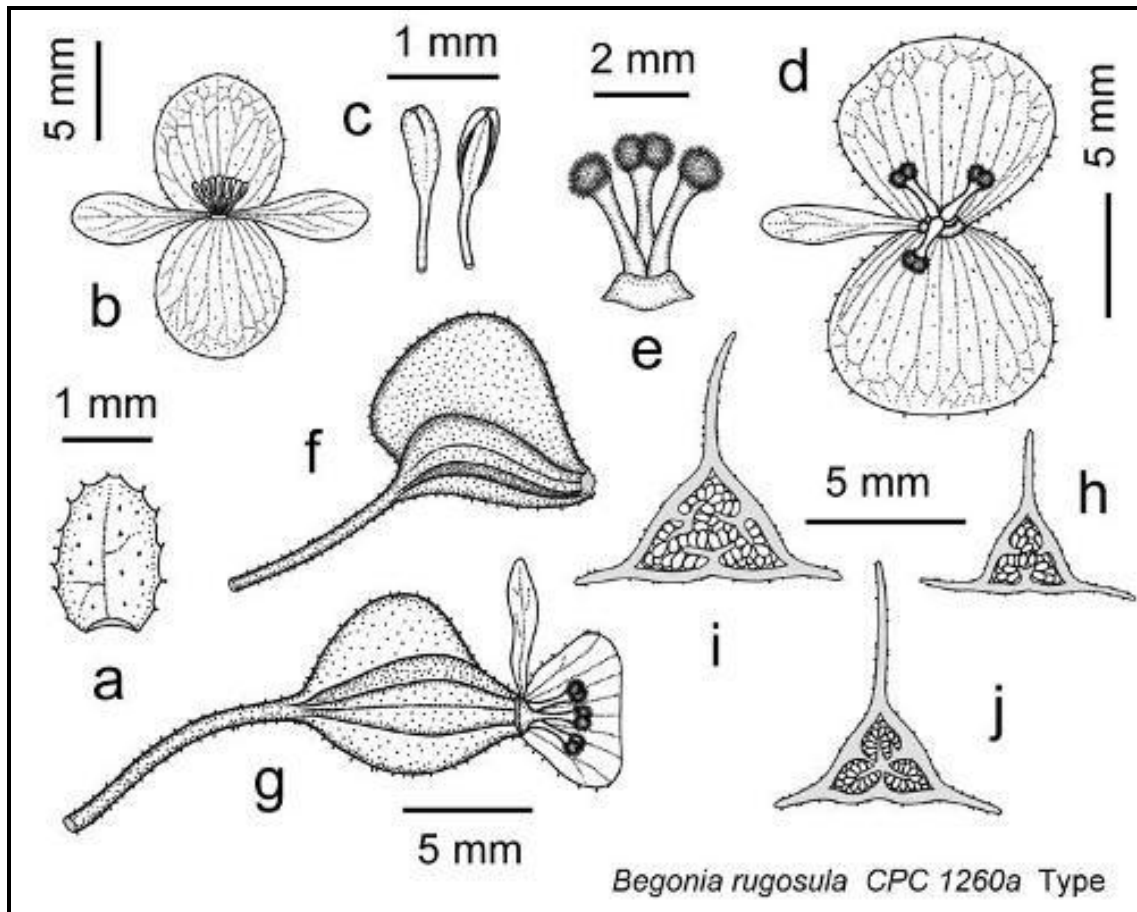


Fig. 11. *Begonia rugosula*: a – floral bract, b – flattened staminate flower, frontal view, c – stamens, d – flattened pistillate flower, frontal view, e – gynoecium, side view, f – ripening ovary, side view, g – pistillate flower, ovary and pedicel, side view (from below), h–j – cross section of ovary near top (h), at middle (i) and near base (j), respectively. All drawings from the type, CPC 2733, by L. Averyanov and T. Maisak.

asymmetric, ovate, entire to indistinctly denticulate along margin, acute to shortly attenuate at apex, with palmate venation of 5–6 slightly branching veins, (3.5)4–7(9) cm long, (2.5)3–4.5(5.5) cm wide, finely rugose and densely hirsute on both sides with stiff, erect, whitish to brownish-purple hairs; dark velvety green with irregular palmately arranged (along main veins) white spots above, purple to purple-violet, often with irregular palmately arranged (along main veins) light greenish spots below. Inflorescence axillary, erect from apical part of rhizome, peduncle straight, purple, glabrous, (4)5–8(12) cm long, longer than leaves, bearing short dichotomously branching bracteate, few flowered cyme 0.5–1.5(3) cm long with staminate and pistillate flowers; bracts and bracteoles ovate, roundish to obtuse, (1.5)2(2.5) mm long, persistent, light greenish, sparsely hairy with very short glandular rusty hairs abaxially and along margin. Flowers pedicellate, monosexual; pedicels straight to slightly arching, white to light purple, (5)6–8(10) mm long, glabrous; sepals white, olive-green at

basal half, with pink tint at apex, densely hairy with very short rusty-purple glandular hairs abaxially and sparsely hairy adaxially and along margin; petals white, olive-green to the base, glabrous. Staminate flowers zygomorphic, dichlamydeous, normally with 2 opposite broadly ovate to almost orbicular sepals (5)6–7(9) mm across and 2 opposite narrowly obovate to broadly oblanceolate petals as long as sepals, 2.5–3 mm wide; stamens not numerous, in dense cluster, brightly yellow, arranged in whorl on short conical slightly flattened axis, filaments free, about 0.8 mm long, anthers narrowly obovoid, as long as filaments, slightly retuse at apex. Pistillate flowers zygomorphic, dichlamydeous, normally with 2 sepals and 1 petal; sepals sub opposite, broadly ovate orbicular, (5.5)6–8(9) mm across; oblanceolate, as long as sepals or slightly longer, 1.5–2 mm wide, roundish to obtuse at apex; styles 3, 2–2.5(3) mm tall, brightly yellow, connate at the base into short common stalk, styles slightly broadening toward apex, stigmas, capitate, sub globular, usually hardly notched, densely setose-



Fig. 12. *Begonia rugosula*. Digital epitype – d-EXSICCATES OF VIETNAMESE FLORA 0185/CPC 1260a (all photos and design by L. Averyanov).



Fig. 13. *Begonia sonlaensis*. Digital epitype – d-EXSICCATES OF VIETNAMESE FLORA 0192/CPC 1876aa (all photos and design by L. Averyanov).

papillose. Ovary inferior, composed of 3 carpels, hairy with very short rusty-purple glandular hairs, 3-angular, slightly curved, with low lunate lateral wings and high oblique lunate apical wing; placentae axial, monolamellate at the base, parietal bilamellate at the middle and near apex. Capsules dry, loculicidal, nodding, 3-locular, narrowly ovoid to ovoid, triangular in section. Seeds ovoid, numerous, very small. **Fig.** 11, 12.

Paratype. Northern Vietnam, Bac Kan prov., Na Ri distr., Kim Hy municipality, vicinities of Lung Hin Con village (22°17'N 106°03'E), 27 km to 55 E of Bac Can city. Primary evergreen mixed mossy forest with *Pseudotsuga brevifolia* and bamboo along tops of karst remnant limestone ridge at elev. 700 m a.s.l. Adpressed lithophytic herb in crevices of shady vertical cliffs. Very common. Usual co-dominant of lithophytic herbaceous communities. 20 Oct. 1999, *N.T. Hiep, P.K. Loc, L. Averyanov, NTH 3725* (CPC Herbarium, LE).

Etymology. Species name refers finely rugose leaf surface.

Ecology. Primary broad-leaved and coniferous evergreen forests on remnant mountains composed with solid marble-like highly eroded rocky limestone at elevations 700–950 m a.s.l. Lithophytic creeping herb growing in crevices of vertical shady cliffs near tops of remnant karstic hills. Flowers in March – May, fruits in June – July (August). Locally common (VU).

Distribution. Limestone areas of northern Vietnam in Bac Kan province (Cho Don and Na Ri districts). Local endemic.

Notes. New species has certain relation to *B. auritistipula* Y.M. Shui et W.H. Chen described on the base of plants cultivated in Guangxi Botanical Garden of Medicinal Plants and in Kunming Botanical Garden (Shui, Chen, 2005) and originated expectedly from Guangxi. Nevertheless, their origin remains unknown up to now (Gu et al., 2007). Discovered plant has also obvious similarity with *B. debaoensis* C.-I Peng, Yan Liu et S.M. Ku described from SW Guangxi, *B. obliquifolia* S.H. Huang et Y.M. Shui described from SE Yunnan and insufficiently known species, *B. bonii* Gagnep., reported from northern Vietnam (Tonkin). Our plants (collected directly in nature) distinctly differs from mentioned species in smaller size of all its parts, in straight creeping rhizome, in hairy, ciliate and mucronate stipules, in densely villous petioles and rugose densely hirsute leaves (on both surfaces), in white to olive-green flowers, in sparsely rusty-glandular hairy sepals, in capitate stigmas (not band-like) and in ovary hairy with very short, rusty-glandular hairs (not strigose-hirsute). Our species is northern Vietnam. Meanwhile, it was observed as

certainly very local calcium dependent endemic of important co-dominant of herbaceous lithophytic plant cover in its area very restricted geographically.

***Begonia sonlaensis* Aver., sp. nov.** (sect. *Coelocentrum*).

Described from north-western Vietnam (Son La Prov., Yen Chau Distr., Muong Lum Municipality, Na Hat village around point 21°00'35"N 104°29'06"E. Primary coniferous forest with *Pinus kwangtungensis* and *Calocedrus rupestris* on very steep rocky slopes of remnant mountain composed with highly eroded solid limestone at elevation 1000–1150 m a.s.l. Lithophytic herb on vertical shady cliff. Occasional. *CPC 1876a* 1 April 2011. Coll.: *L. Averyanov, N.T. Hiep, T.B. Ngan*).

Type (pressed and prepared from cultivated plants, 23 April 2012, *L. Averyanov, CPC 1876aa*) – LE (holotype). **Digital epitype:** d-EXSICCATES OF VIETNAMESE FLORA 0192/CPC 1876aa.

Lithophytic, evergreen, stemless, regularly monoecious, rosulate herb. Rhizome short, plagiotropic, creeping, fleshy, stout, (2)3–4(5) cm long, 0.5–1 cm in diam., covered by pinkish triangularovate, acute, glabrous bracts, at nodes with numerous thin, filiform roots faced to the ground and with (2)3–4(5) leaves at apex. Stipules persistent, pinkish to almost white, (yellowish when dry), sub-hyaline, triangular-ovate, carinate, apiculate, 0.8–1(1.2) cm long, (5)7–9(10) mm wide, slightly concave to almost flat, glabrous, keeled outside, keel dorsally attenuate into acute narrowly triangular slightly outward reflexed mucro (1.5)2–3(4) mm long. Leaves petiolate. Petioles cylindric, juicy, fragile, erect to ascending, purple, (3)5–12(14) cm long, 1.5–2.5(3) mm in diam., glabrous. Leaf blade asymmetric, transversely ovate, almost entire or very indistinctly crenulate or dentate, shortly attenuate at apex, with radiate venation of 5–7 slightly branching veins, (6)8–10(15) cm long, (4)5–7(11) cm wide, glabrous, soft, fleshy; above – brightly uniform velvety green, below – uniform light greenish-white to almost white, with purplish margin. Inflorescence axillary, erect or ascending from apical part of rhizome, peduncle straight, purple, glabrous, (8)12–15(20) cm long, much longer than leaves, bearing short dichotomously branching bracteate, many flowered cyme (2)4–6(8) cm long with staminate and pistillate flowers; bracts and bracteoles ovate to broadly ovate, obtuse, (1)2–6(10) mm long, very early caducous, pinkish to almost white, hyaline, glabrous. Flowers light pink, almost odorless, pedicellate, monosexual. Pedicels straight to hardly arching, (6)8–10(12) mm long, sparsely hairy with very small scurfy hairs. Sepals

and petals light pink to nearly white with light pink tint, sparsely hairy outside with very small scurfy hairs. Staminate flowers zygomorphic, dichlamydeous, normally with 2 opposite broadly ovate triangular sepals (12)14–16(18) mm broad at shallowly cordate base, a little longer than broad, gradually narrowing toward apex, indistinctly finely crenulate to almost straight along margin and 2 opposite narrowly obovate to broadly oblanceolate petals (7)8–10(12) mm long, (3)3.5–5(5.5) mm wide; stamens numerous, in dense cluster, bright yellow, arranged in numerous whorls on short conical axis, filaments free, (0.8)1–1.2(1.4) mm long, anthers obovoid, twice to little shorter than filaments, slightly retuse or round at apex. Pistillate flowers zygomorphic, dichlamydeous, normally with 2 sepals and 3 petals, straight or indistinctly finely crenulate along margin; sepals, broadly ovate triangular to broadly ovate, (12)13–16(18) mm long, (9)10–12(14) mm wide; 2 petals obovate, 1 petal narrowly obovate to broadly oblanceolate, as long as sepals, obtuse; styles 3, (1)1.5–2(2.5) mm tall, brightly yellow, connate at the base into short common stalk, styles broadening and flattened toward the apex, stigmas densely setose-papillose, linear-cristate, lateral sides expanded into short helicoid band. Ovary inferior, composed of 3 carpels, glabrous to very sparsely hairy with very short scurfy hairs, 3-angular, with low lunate to oblique-triangular wings along each edge; apical wing distinctly larger; placentae parietal-axial at the base of ovary, parietal bilamellate at middle and at apex. Capsules dry, loculicidal, nodding, 3-locular, narrowly ovoid to cylindrical, triangular in section, (10)12–14(15) mm long, 4–5 mm wide, with 2 low lunate and 1 high oblique-lunate to lunate triangular wing, to 6–7(8) mm tall. Seeds ovoid, numerous, very small. **Fig.** 13.

Etymology. Described plant name refers name of area where species was found (Son La province of north-west Vietnam).

Ecology. Primary coniferous, mixed and broad-leaved evergreen forests on remnant hills composed with solid marble-like highly eroded rocky crystalline limestone at elevations 1000–1150 m a.s.l. Lithophytic herb growing in crevices of vertical shady cliffs in middle and upper parts of hill and mountain slopes. Flowers under cultivation in April-May (June). Occasional (VU).

Distribution. Limestone areas of north-western Vietnam in Son La province (Yen Chau district). Local endemic.

Notes. New species differs from its closest relative – *Begonia pseudodryadis* C.Y. Wu (Wu, 1995) described from southern Yunnan in broadly

triangular-ovate, carinate apiculate stipules, pure velvety light green abaxial surface of leaf blade (uniform whitish below), triangular sepals (2 outer segments) of staminate flower, ovate petals (3 inner segments) of pistillate flower, and in capsules with broadly lunate adaxial keel and low narrowly lunate lateral keels.

***Begonia viscosa* Aver. et H.Q. Nguyen, sp. nov.** (Sect. *Diploclinium*?). Described from central Laos (“Vientiane prov., Vang Vieng distr., vicinity of Vang Vieng town, around point 18°54’58”N 102°24’52”E. Secondary broad-leaved evergreen dry forest on very steep rocky slopes and on the top of remnant mountain composed with highly eroded crystalline marble-like limestone at elevation 400–450 m a.s.l. Lithophytic under shrub with erect shoots to 2 m tall in crevices of open vertical cliffs. Locally common”).

Type (“24 April 2011, L. Averyanov, P.V. The, CPC 2438”) – CPC Herbarium (isotypes), LE (holotype). **Digital epitype:** d-EXSICCATES OF VIETNAMESE FLORA 0187/CPC 2438.

Lithophytic (occasionally terrestrial) deciduous or semideciduous, regularly dioecious under shrub 1–1.5(2) m tall with hardly developed rhizome. Stems ascending to erect, succulent, glabrous, cylindrical, (8)1–1.5 cm in diameter, normally un-branching, silvery-grey to light brownish, with numerous distichously placed leaf and stipule traces at nodes distant on (3)5–10(15) mm, leafless during dry winter, forming leaves of new generation at the end of dry season in March – April. Stipules semipersistent, ovate, with broad base, acute, concave, (1)1.5–2.5(3.5) cm long, 0.5–1.5(2) cm wide, light green, occasionally with pink tint, with scarious, membranous margin, glandular hairy. Leaves petiolate, hairy throughout with short glandular viscid capitate hairs. Petioles cylindrical, fleshy, succulent, stout, light green, pink to purple, (2)3–6(10) cm long. Leaf blade transversely ovate, broadly cuneate to unequally cordate at base, acute to shortly attenuate at apex, strongly asymmetric, with palmate venation of numerous branching veins, (3)4–10(12) cm long, (4)6–18(22) cm wide, palmately crisped, serrulate along margin, densely glandular hairy below, sparsely hairy or subglabrous above, light green, green, green-grey, to reddish-gray, purple and purple-brown, often with palmate irregular white spots. Inflorescence axillary, erect, dichotomous, bracteate, glandular hairy cyme (10)12–25(30) cm tall, arising by 1 (rarely 2) from apical part of stem, developed before, or simultaneously with leaves

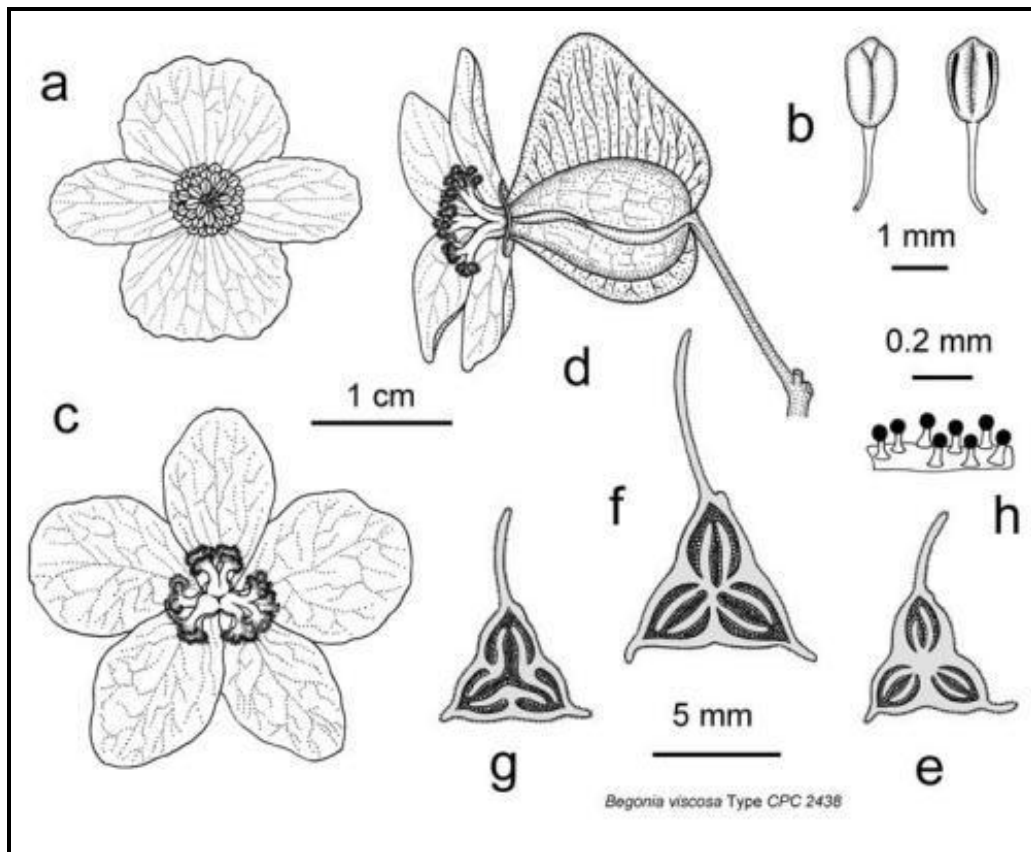


Fig. 14. *Begonia viscosa*: a – staminate flower, frontal view, b – stamens, c – flattened pistillate flower, frontal view, d – pistillate flower with developing ovary, side view, e–g – young fruit crosses, near base (e), at middle (f) and near top (g) respectively. All drawn from the type, CPC 3858, by L. Averyanov and T. Maisak.

formation; peduncle (5)6–14(18) cm long, longer than leaves, light green to yellowish-green, bearing dichotomously branching axes with cluster of 6–20 flowers; bracts at distinctly swollen nodes, insignificant, triangular, brownish, 1–3 mm long and wide. Flowers pedicellate, monosexual, subactinomorphic, dichlamydeous, white to very light pink; pedicels densely glandular hairy, straight (0.5)1–1.8(2) cm long, light green; tepals sparsely glandular hairy outside. Staminate flowers normally with 2 sepals and 2 petals opposite each other, irregularly crenulated to indistinctly denticulate along margin; sepals broadly ovate to almost orbicular, (8)10–12(14) mm long and wide; petals elliptic to narrowly obovate, (7)8–10 mm long, (4)5–7 mm wide; stamens numerous, arranged in numerous whorls on short stalk in dense capitulum, brightly yellow, filaments free, 1–1.5 mm long, anthers obovoid, about 1.5 mm long, connective extend at apex in form of small broad obtuse dent. Pistillate flowers normally with 2 (10)12–14(16) mm long and wide; petals elliptic to narrowly obovate, as long as sepals, 7–8 mm wide; styles 3(4), brightly yellow, (2)3–5(6) mm tall, connate at

the base, branching toward apex, stigmas turgid, all over densely setose-papillose. Ovary inferior, composed of 3 carpels, light greenish, often with pink or purple tint, densely glandular hairy, 3-angular, with wings along each edge, apical wing much larger; placentation axial bifid in middle part and at the base, parietal bifid in apical part of ovary. Capsules dry, light brown, loculicidal, nodding, 3-locular, ovoid, indistinctly triangular in section, 8–12 mm long, 6–8 mm wide, with 3 unequal wings, apical wing ovate, to 1.5 cm tall, much larger than 2 band-like lateral wings. Seeds ovoid, numerous, very small, with light brown reticulate testa. **Fig. 14, 15.**

Paratype. Central Laos, Vientiane prov., Vang Vieng distr., Na Khun village, around point 18°52'28"N, 102°24'21"E. Dry open shrubs and remnants of dry open broad-leaved forest on very steep slopes and cliffs of high remnant hill composed with solid marble-like highly eroded rocky limestone at elevation 400–600 m a.s.l. Lithophytic under shrub to 2 m tall on open rocks. Locally common. 21 January 2009, *O. Souliya, N.T. Hiep, L. Averyanov et al., LA-VN 83* (CPC Herbarium, LE).



Fig. 15. *Begonia viscosa*. Digital epitype – d-EXSICCATES OF VIETNAMESE FLORA 0187/CPC 2438 (all photos and design by L. Averyanov).

Etymology. Species name reflects viscid character of stipules, leaves, inflorescences and flowers due to glandular hairs producing glue secret and spreading throughout almost all parts of the plant.

Ecology. Dry primary forests, scrub, open rocks and cliffs on tops of remnant hills composed with solid marble-like highly eroded rocky limestone at elevations 400–600 m a.s.l. (and higher?). Lithophytic and occasionally terrestrial under shrub growing in upper part of slopes and on rocky hill tops, commonly among rocks or in cliff crevices. Flowers in March – April, fruits in (July) August – November (December). Locally very common, occasional co-dominant of shrubby-herbaceous lithophytic plant communities (LR).

Distribution. Limestone areas of central Laos in Vientiane province (Vang Vieng district). Local endemic.

Notes. Described species has obviously isolated taxonomical position. We could not find any similar and even related species of the genus described or reported in Indochina. Ovary placentation in lower part of ovary looks similar to placentation observed in some species of Sect. *Diploclinium* hence our plant may be tentatively placed here. However, toward the ovary apex the placentation is distinctly parietal typical for members of Sect. *Coelocentrum*. We cannot trace certain relation of discovered novelty with any presently known species of both mentioned sections. Viscid glandular indumentum on leaves,

inflorescences and flowers are very characteristic. In this connection, our species together with recently described *B. glutinosa* Kiew (Kiew, 2007) represents unique example among Indochinese begonias.

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