

Genus *Opithandra* B. L. Burtt and Species *Opithandra dinghushanensis* W. T. Wang as New Records for the Flora of Vietnam from Bac Huong Hoa Nature Reserve, Quang Tri Province

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Abstract: A new record of genus and species as *Opithandra* B. L. Burtt and species *Opithandra dinghushanensis* W. T. Wang for the flora of Vietnam. This is herb, which was called endemic of China, but up to now we have found it in Bac Huong Hoa Nature Reserve (Quang Tri province). Voucher specimens were deposited in the Herbarium of the Hanoi University of Science, Vietnam (HNU).

Keywords: Gesneriaceae, *Opithandra*, *O. dinghushanensis*, Bac Huong Hoa Nature Reserve, Quang Tri.

1. Introduction

According to W. T. Wang et al. 1998 [1], the genus *Opithandra* B. L. Burtt (Gesneriaceae) comprises about 10 species which mainly distributed in China, Japan, especially eight species in China. In Vietnam, the genus *Opithandra* B. L. Burtt has not been recorded previously (Pellegrin, 1930; Vu Xuan Phuong, 2005; Pham Hong Ho, 2000) [2-4]. During the field survey and based on the study of specimen and documents of Gesneriaceae of Vietnam, we found a species of *Opithandra*: *Opithandra dinghushanensis* W. T. Wang in Bac Huong Hoa Nature Reserve, Quang Tri province, Vietnam. This is the first record of

the species as well as the respective genus in Vietnam. Thus, to the present study, Gesneriaceae in Vietnam are known with 31 genera. In this article, we provide morphological characteristics of the genus *Opithandra* B. L. Burtt and some information about *Opithandra dinghushanensis* in Vietnam.

2. Material and Methods

We have examined various specimens of *Opithandra* B. L. Burtt, including those in Hanoi herbarium of Institute of Ecology and Biological resources (HN), Institute Biological Tropical (VNM), National Institute of Medicinal Material (HNPI), VNU University of Science, Hanoi (HNU), Kunming Institute of Botany, China (KUN), Kwangxi Institute of

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Botany, China (KIB), South Botany China Institute, China (SBCI), National Natural Museum of History Paris, France (P), and fresh specimens collected in recent field survey.

The comparative morphology method was used for study. This is the standard method for classification of plants, based on the morphological characteristics of the external organs, especially the reproductive organs, because the reproductive characteristics are closely related to the genetic code and little altered by the impact of the environment.

3. Results

3.1. The main morphological characteristics of the genus *Opithandra* B. L. Burt

OPITHANDRA B. L. Burt - Ô PI

B. L. Burt 1956. *Baileya*. 4: 162; Pan K. Y. in W. T. Wang, K. Y. Pan & Z. Y. Li, 1990. *Fl. Reipub. Pop. Sin.* 69: 260 [5]; Wang W. T. et al. 1998. *Fl. China*, 18: 289. [1]

- *SCHISTOLOBOS* W. T. Wang. 1983. *Bot. Res. Academia Sinica* 1: 15. [6]

Herbs, perennial, epipetric or terrestrial, rhizomatous, stemless. Leaves few to many, basal. Inflorescences often umbel-like, axillary, 1- to many-flowered cymes; bracts 2, opposite. Calyx actinomorphic, 5-sect from base to deeply 5-lobed; segments equal. Corolla violet, zygomorphic; tube tubular to funnelform, or cylindric, much longer than limb; 2-lipped; adaxial lip 2-lobed, usually distinctly shorter

3.2. Key to the genera of *Didymocarpeae* of Vietnam

1A. Stament 4, free or coherent couple or coherent 4 at the anther; staminodes 1.

2A. Stament 4, free; staminodes 1.

3A. Leaves opposite or near alternate; corolla 2 lipped (2/3); adaxial lip 2 lobed, abaxial lip 3 lobed; tube distend at the base. (with hunch) 1. *Boeica*

3B. Leaves basal; corolla 2 lipped (2/3); tube non distend at the base. (without hunch).....
..... 2. *Oreocharis*

2B. Stament 4, coherent couple or coherent 4 at the anther.

4A. Stament 4, coherent couple at the anther. Leaves basal or along the stems.

than, rarely nearly as long as abaxial lip; abaxial lip 3-lobed. Stamens 2, adnate to corolla tube near middle, included; anthers basifixed, free or coherent at apex, thecae parallel, not confluent; connective not projecting; staminodes 2. Ovary linear, 1-loculed, longer than calyx; capsule straight in relation to pedicel, linear, dehiscing loculicidally to base; valves 2, straight, not twisted. Seeds unappendaged.

Typus: *Opithandra primuloides* (Miq.) B.L. Burt [Boea primuloides Miq.] [7, 8].

There are ten species in the world, mostly in China, Japan. To the present study, one species is found in Vietnam.

The genus *Opithandra* has leaves whorled; base asymmetric; inflorescences umbellike; ovary linear, longer than calyx, corolla zygomorphic, stament 2, staminodes 2, seeds without appendages so that *Opithandra* in Trib. 2. *Didymocarpeae* with 19 other genus as *Petrocosmea*, *Hemiboea*, *Henckelia*, *Microchirita*, *Primulina*, *Lagarosolen*, *Pseudochirita*, *Calcareaoboea*, *Didymocarpus*, *Gyrocheilos*, *Paraboea*, *Boea*, *Boeica*, *Oreocharis*, *Briggsia*, *Raphiocarpus*, *Cathayanthe*, *Baccarinda*, *Ornithoboea*.

The genus *Opithandra* is the closest to *Pseudochirita* but differs with leaf few to many, basal; calyx 5-sect from base to deeply 5-lobed; and *Pseudochirita* has leaf opposite; calyx connate to cup or campanulate, 5-lobed.

- 5A. Stigma conspicuously 2 lobed.
- 6A. Leaves basal. Inflorescences umbelike; corolla tube distend at the base.3. *Briggsia*
- 6B. Leaves alternate along the stems, asymmetric in the couple. Inflorescences cymes; corolla funnel, tube non distend at the base. 4. *Raphiocarpus*
- 5B. Stigma near entire, oblique undulate. 5. *Cathayanthe*
- 4B. Stament 4, coherent 4 at the anther. Leaves basal.6. *Beccarinda*
- 1B. Stament 2, free or coherent 4 at the anther; staminodes 3.
- 7A. Fruit capsular, not twisted.
- 8A. Bracts large into globose enclose at the base; fruit oblique in relation to pedicel.....
.....7. *Hemiboaea*
- 8B. Bracts small, opposite, not into globose enclose at the base; fruit straight in relation to pedicel.
- 9A. Ovary globose or broadly ovoid ; fillament adnate corolla tube near base; stament coherent or non coherent; corolla tube as long as limb.8. *Petrocosmea*
- 9B. Ovary cylindric or linear; fillament adnate at middle or toward to the top of the orcorolla tube; stament coherent; corolla tube longer limb.
- 10A. Stigma usually with 2 lobed.
- 11A. Anther dorsifixed; disc ring; capsular dehiscens by 2 or 4 valves.
- 12A. Inflorescences umbelike; corolla lobed round or obtuse; rarely abaxial lip as twice adaxial lip
- 13A. Sepal connate at the base, sepal lobes without upto base 9. *Henckelia*
- 13b. Sepal not connate at the base, sepal lobes upto base
- 14A. Plant usually stemless and leaves basal or plant with stem and leaves on the top.
.....10. *Primulina*
- 14B. Plant usually stem and leaves opposite along the stem. 11. *Microchirita*
- 12B. Inflorescences cymces; corolla lobed acute; abaxial lip as twice adaxial lip.
..... 12. *Lagarosolen*
- 11B. Anther balsifixed; disc cup; capsular dehiscens by 2 valves.
- 15A. Leaf opposite; calyx connate to cup or campanulate, 5-lobed..... 13. *Pseudochirita*
- 15B. Leaf few to many, basal; calyx 5-sect from base to deeply 5-lobed..... 14. *Opithandra*
- 10B. Stigma 1.
- 16A. Adaxial lip 2 or 4 lobed.
- 17A. Corolla 2 lipped (4/1), adaxial 4 lobed, abaxial 1 lobed; bracts into globose enclose at the base....
.....14. *Calcareaoboea*
- 17B. Corolla 2 lipped (2/2), adaxial 2 lobed, abaxial 3 lobed; bracts 2, opposite..... 15. *Didymocarpus*
- 16B. Adaxial lip 1, abaxial 3 lobed..... 16. *Gyrocheilos*
- 7B. Fruit capsular, usually twisted.
- 18A. Adaxial lip near as long as abaxial lip; inner abaxial lip without hair.
- 19A. Leaf blade abaxially with velutinous as cobweb. Fruit capsular dehiscent by 4 valves...17. *Paraboea*
- 19B. Leaf blade abaxially without velutinous as cobweb. Fruit capsular dehiscent by 2 valves... 18. *Boea*
- 18B. Adaxial lip shorter than abaxial lip; inner abaxial lip with long hair..... 19. *Ornithoboea*

3.3. Some information on *Opithandra dinghushanensis* W. T. Wang, a new record for the flora of Vietnam

Opithandra dinghushanensis W. T. Wang - Ô pi quang đồng

W. T. Wang, 1987. Bull. Bot. Res. Harbin, 7(2): 10, pl. 4, f. 1-5; Pan K. Y. in W. T. Wang, K. Y. Pan & Z. Y. Li, 1990. Fl. Reipub. Pop. Sin. 69: 265 [5]; Wang W. T. et al. 1998. Fl. China, 18: 296 [1]; Wei J. G., 2010. Gesn. S. China, 647 [9].

Herbs, perennial, epipetric or terrestrial, rhizomatous, stemless. Leaves few to many, basal; petiole 2-4(7) cm, densely grayish strigose, puberulent to woolly or velutinous; leaf blade narrowly elliptic to elliptic-ovate, 4-9 x 3-5 cm, herbaceous, nearly flat, short strigose, base oblique, broadly cuneate to cordate, margin nearly entire to indistinctly repand, apex acute; lateral veins ca. 5-7(8) on each side of midrib. Inflorescences often umbel-like, axillary, 1- to many-flowered cymes, mainly as 1-2 flowered cymes in the plant; peduncle ca. 5-7 cm, short strigose and tomentosa; bracts 2, opposite, linear, small. Calyx 5-sect from base; segments lanceolate to narrow elliptic, 2-2.5 x 0.8-1.0 mm, apex caudate-acuminate, tip somewhat obtuse or cuneate. Corolla violet, ca. 2.7-3.3 cm, glabrous, margin sparsely ciliate; tube funnelform, not swollen; corolla tube much longer limb; adaxial lip ca. 4-5 mm; abaxial lip ca. 7-8.5 mm, lobes entire; apex rounded. Stamens adnate to corolla tube near middle, ca. 1-1.2 cm; filaments sparsely puberulent; anthers coherent at apex, globose-ovoid, dehiscing from arcuate slits; staminodes 2, abaxial, ca. 1-1.5 mm, very small; disc cup but inconspicuous. Pistil included, ca. 1.5-1.7 cm; ovary puberulent. Style ca. 3-5 mm, glandular puberulent; stigmas 2; young fruit linear, fruit straight in relation to pedicel; seeds unappendaged.

Loc. class.: China, Guangdong, Zhaoqing, Dinghushan, Tielukeng. **Typus:** G.L. Shi 12470 (SCBI).

Ecology: Flower and young fruit in August-October. In every green forest, soil mountains and limestone mountains, mainly on the rocks in valley forests, moist places, mainly at 800-1100 m about the sea.

Distribution: Quang Tri (Bac Huong Hoa Nature Reserve: Voi Mep). [China (Guangdong: Dinghushan, Gaoyao Xian)].

Specimen: QUANG TRI, D.T. Xuyen, D.M. Tu, T.A. Duc, H.V. Hoan, N.T. Hieu, N.T. Hung, N.T. Huy, T.V. Hiep, BHH-XTD 519 A, B (HNU); at 16°45'08.7 N; 106°40'41.3 E; at 1003 m; date August 16th2014, sub-area 670A.



Fig. 1. *Opithandra dinghushanensis* W. T. Wang. 1. plant with flower; 2. sepal opened; 3. corolla opened with stamen and style; 4. anther (Specimen BHH-XTD 519 A, HNU; painter V. X. Phuong)

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References

- [1] Wang W. T. et al., Flora of China, 18: 245-401. USA, 1998.
- [2] Pellegrin F. in H. Lecomte, Flore générale de L'Indo-chine, 4: 487-565, Paris, 1930.
- [3] Vu Xuan Phuong, Checklist of Plant species in Vietnam, 3: 272-274, 2005.
- [4] Phạm Hoàng Ho, An Illustrated flora of Vietnam, 3: 12-29, Tre publishing house, Ho Chi Minh city, 2000
- [5] Pan K. Y. in W. T. Wang, K. Y. Pan & Z. Y. Li, Flora Reipublicae Popularis sinicae, 69: 125-581. Science Press, Beijing, 1990.
- [6] Backer C. A. & C. R. Bakhuizen, Flora of Java, 2: 518-534. Netherlands, 1965.
- [7] Burtt B. L., Notes Roy, Bot. Gard. Edinburgh, 36 (1), (1977) 151-155.
- [8] Davidson R. & B. L. Burtt, Notes Roy, Bot. Gard. Edinburgh, 21(4) (1954), 193-208.
- [9] Wei J. G., Gesneriaceae of South China, 778 pp. Giangxi Science and Technology Publishing House, 2010.

Chi Ô pi (*Opithandra* B. L. Burtt) và loài Ô pi quảng đông (*Opithandra dinghushanensis* W. T. Wang) chi và loài bổ sung cho hệ thực vật Việt Nam từ Khu bảo tồn thiên nhiên Bắc Hương Hóa, tỉnh Quảng Trị

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Tóm tắt: Ghi nhận chi *Opithandra* với loài *Opithandra dinghushanensis* W. T. Wang. - Ô pi quảng đông cho hệ thực vật Việt Nam. Đây là loài cây thảo, trước kia được coi là đặc hữu của Trung Quốc, hiện chúng tôi đã tìm thấy có ở Khu BTTN Bắc Hương Hóa (Quảng Trị). Mẫu vật hiện đang được lưu giữ tại Phòng tiêu bản thực vật của Trường Đại học Khoa học Tự nhiên (HNU).

Từ khóa: Gesneriaceae, *Opithandra*, *O. dinghushanensis*, Ô pi, Bắc Hương Hóa, Quảng Trị.