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Two newly recorded species of Urticaceae among the flora of Vietnam used as green foods for H'môngbeef cattle

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Abstract:

***Oreocnide kwangsiensis* Hand.-Mazz. and *Boehmeria japonica* (L. f.) Miq. (Urticaceae) are newly reported among the flora of Vietnam that are used as green foods for beef cattle by local H'Mong people in northern Vietnam in the winter-spring season. The authors provide descriptions, illustrations, notes on utilisation, and a diagnostic comparison of these species with ones that are morphologically similar.**

Kewwords: ***Boehmeria japonica*, green foods, new record, *Oreocnide kwangsiensis*, Vietnam.**

Classification number: **3.4**

Introduction

Urticaceae Juss. comprises around 2,000 species and is grouped into 54 genera. The family is widely distributed in tropical regions, but also extends to temperate regions [1, 2].

Southern China and northern Vietnam, where high concentrations of limestone karst occur, is considered a biodiversity hotspot [3]. Due to their similar habitats, these two areas share many similar species, among them Urticaceae [4, 5]. Recent investigations in northern Vietnam have repeatedly reported dozens of new records of Urticaceae in the country although its original range of distribution is southern China [6-10].

Urticaceae appears to be of significant economic use, such as for fibre products, traditional folk medicine, food for local people, and feed for grazing [4]. During our extensive fieldwork in northern Vietnam in recent years, we noticed that local H'Mong people graze beef cattle by feeding two hitherto unknown Urticaceae species in the winter-spring season. After a comparison with specimens in major herbaria, such as HITBC, HN, HNU, IBK, IBSC, K, KUN, L, MO, NIMM, NY, P, PE, and VNMN (herbarium code according to http://sweetgum.nybg.org/science/ih/), and having consulting the related taxonomic literature dealing with the flora of Vietnam and neighbouring regions [4, 5], we confirm that these two species are *Oreocnide kwangsiensis* Hand.-Mazz. and *Boehmeria japonica* (L. f.) Miq., which have not yet previously been reported in Vietnam [5]. Reporting them as new records in this paper provides useful data for compiling the Flora of Vietnam and for their further economic use.

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Taxonomic treatment

1. *Oreocnide kwangsiensis* Hand.-Mazz., Sinensia 2: 2. 1931; Chen, et al. in Fl. China 5: 184. 2003 - Chéo béo Quảng Tây (in Vietnamese) (Figs. 1A, 1B).

Type: China. Kwangsi: Lin-yen bor.-occ.: Binglu, 800 m., 2 August 1928, R.C. Ching 6630 (holotype: PE, isotype: PE).

Description: shrubs, 1-1.5 m tall. Leaf blade narrowly elliptic or elliptic-lanceolate, 2-11×1-4 cm, stiffly papery, glabrous, base broadly cuneate or subround, apex acuminate or caudate-acuminate, margin entire. Basal veins 3, lateral pair reaching to apex, secondary veins indistinct, 2-3 pairs. Petiole 0.5-2 cm long. Stipules lanceolate, 3-4 mm long, sparsely pubescent. Pistillate inflorescences borne on axils of both young and older branches, often dichotomously branched three times, 5-8 mm long; glomerules 3-4 mm in diam., staminate flower sessile, 1 mm in diam., tepal 3, stamen 3. Pistillate flower coniform, ca. 1.5 mm long. Achene black, ovoid, compressed, 1.5-2 mm.

Ecology: *Oreocnide kwangsiensis* grows on the edges of secondary forest or shrubbery on limestone.

Distribution: China, new to Vietnam.

Specimen examined: Vietnam. Cao Bang: Ha Quang, Ha Thon, 5 March 2016, Do Van Truong, et al., T_CB 21 (VNMN). Ha Giang: Hoang Su Phi, Nam Ty, 22 March 2018, Do Van Truong, et al., VNMN_CIB 168 (VNMN).

Discussion: *Oreocnide kwangsiensis* was a species endemic to China. The type specimen was collected from Guangxi province, China where bordered with northern Vietnam [4]. Due to the similarity of habitats, it is also found in northern Vietnam. This species is morphologically most similar to *Oreocnide trinervis* Miq. from which it can be distinguished by the leaf shape and leaf surface morphology, as summarised in Table 1.

Table 1. Diagnostic comparison of *O. kwangsiensis* and *O. trinervis* [4].

Characteristics	*O. kwangsiensis*	*O. trinervis*
Leaf shape	Narrowly elliptic or elliptic-lanceolate	Broadly ovate or oblong-ovate
Leaf surface	Glabrous on both surfaces	Pubescent abaxially

Oreocnide kwangsiensis is popularly used for raising and fattening H'mong beef cattle. In a recent study, Hoang, et al. (2017) [11] determined the nutritional value of *Oreocnide kwangsiensis* and some other plant species by means of the *in vitro* gas production method. The results show that the organic matter digestibility and total digestible nutrients of *O. kwangsiensis* is higher than that of the other species studied. Furthermore, the crude protein values of *O. kwangsiensis* are higher than that of some conventional feedstuffs, such as elephant grass and corn stover [11, 12]. Hence, this new finding will significantly contribute to developing indigenous fodder crops for raising and fattening H'mông beef cattle, especially in the winter-spring season.

Conservation status: *Oreocnide kwangsiensis* is known from more than 120 collections in a wide range of habitats in many limestone locations in North-Western Guangxi and Southern Guizhou in China and Northern Vietnam. Therefore, this species has been assessed as being of least concern.

2. *Boehmeria japonica* (L. f.) Miq., Ann. Mus. Bot. Lugduno-Batavi 3: 131. 1867; Chen, et al. in Fl. China 5: 172. 2003 - Gai lá nhám (in Vietnamese) (Figs. 1C, 1D).

Fig. 1. Photographs of *Oreocnide kwangsiensis* (A, B) and *Boehmeria japonica* (L. f.) Miq. (C, D) (all photos taken by Fu Long-fei).

Table 2. Diagnostic comparison of *Boehmeria japonica, B. tricuspis, B. silvestrii, B. spicata,* and *B. allophylla* [4, 5, 13, 14].

Characteristics	*B. japonica*	*B. tricuspis*	*B. silvestrii*	*B. spicata*	*B. allophylla*
Leaf texture	Papery	Papery	Herbaceous	Herbaceous	Herbaceous
Leaf shape	Ovate or broadly ovate	Oblate to 5-angled or oblate to orbicular-ovate	5-angled or orbicular-ovate	Ovate-rhombic or rhombic	Elliptic
Leaf margin	Coarsely 7-14-dentate	Coarsely 8-12-dentate	8-10-dentate	Coarsely 3-9(-13)-dentate	Minutely serrulate

Type: Japan. *Thunberg s.n*. (LINN. no. 1456-5, lectotype selected by Yahara 1984: 133).

Description: subshrubs or perennial herbs, 0.6-1.5 m tall; upper stems and branchlets often densely appressed or patent strigose. Leaves opposite, equal or subequal in size, suborbicular, orbicular-ovate or ovate, 7-17(-26)×5.5-13(-20) cm, papery, adaxial surface roughish, strigillose, abaxial pubescent; base broadly cuneate or truncate, margin coarsely 7-14-dentate, teeth 6-20 mm long; apex cuspidate, sometimes inconspicuously tricuspidate. Petiole 6-8 cm long, appressed or patent strigose. Stipules lanceolate, 0.8-1.2 mm long. Spiciform inflorescence borne on unbranched axillary, or sometimes sparse branches; staminate one 3-15 cm long; pistillate one 7-20(-30) cm long. Staminate flowers 4-merous, sessile; pistillate flower: tepal 1-1.2 mm long. Achene obovoid, ca. 1 mm long, smooth.

Ecology: *Boehmeria japonica* grows in moist and humid limestone sites.

Distribution: China, Japan, and new to Vietnam.

Specimen examined: Vietnam. Cao Bang: Ha Quang, Ha Thon, 5 March 2016, Do Van Truong, et al., T_CB 12 (VNMN).

Discussion: *Boehmeria japonica* is most similar to *B. tricuspis* (Hance) Makino, *B. silvestrii* (Pamp.) W.T. Wang , *B. spicata* Thunb. and *B. allophylla* W.T. Wang. Despite most of these species being widespread in China, none have previously been reported in Vietnam [5]. Observation of morphological characteristics show that the leaf margin of some specimens collected from northern Vietnam has about 14 dentations, which matches very well with *B. japonica*, while others have less than 14 dentations. The detailed distinguishing characteristics of *B. japonica* and its relatives are summarised in Table 2.

The fibres of *B. japonica* are widely used to make ropes and cloth, while its leaves are used agriculturally as indigenous fodder crops [4]. Our recent finding shows that *B. japonica* is frequently used for raising and fattening H'môngbeef cattle during the winter-spring season in northern Vietnam. This new recording of this species in Vietnam will enable local people to develop more choices for its further economic use.

Conservation status: this species has been accessed as being of least concern [13].

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