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## A New Subspecies of *Hippophae* (Elaeagnaceae) from China

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**ABSTRACT.** In this paper, a new subspecies of *Hippophae* (Elaeagnaceae), *H. rhamnoides* subsp. *wolongensis* Y. S. Lian, K. Sun & X. L. Chen, from China is described and illustrated. According to an analysis of the distribution and main characters, it is allied to *H. rhamnoides* subsp. *sinensis* Rousi but is distinct in having rosulately arranged flower buds, larger, alternate leaves with usually more or less sinuous margins, longer petioles, and longer peduncles. *Hippophae rhamnoides* subsp. *wolongensis* is rare and occurs only in Wenchuan and Mao Counties of Sichuan Province, at 1660–1920 m. A key including five subspecies of *Hippophae rhamnoides* in China is provided.

**Key words:** China, Elaeagnaceae, *Hippophae*, Sichuan.

*Hippophae* L. is a small genus of Elaeagnaceae in which 6 species and 10 subspecies have been recognized (Lian, 2000). These species are distributed widely but sparsely in Asia and Europe. Most of them, however, are restricted to the Qinghai–Tibetan plateau and adjacent areas, and only the species *Hippophae rhamnoides* L. occurs in both Asia and Europe. All of the species and six of the subspecies are found in China (Lian, 1988, 2000; Lian & Chen, 1996).

The authors, investigating populations of *Hippophae rhamnoides* in Gansu, Qinghai, Sichuan, Yunnan, and Xizang (Tibet) Provinces in 2000, found several unusual populations from Wenchuan and Mao Counties in Sichuan. These populations were found to occur together with populations of *H. rhamnoides* subsp. *sinensis* in the above locations but at different elevations. After critical study based on ample specimens gathered from the special populations, the specimens were found to represent a new subspecies of *H. rhamnoides*. Following are the description and discussion of the new subspecies. A key including five subspecies of *Hippophae rhamnoides* in China is also provided.

***Hippophae rhamnoides* L., Sp. Pl. 1023. 1753.**

*Hippophae rhamnoides*, which comprises nine subspecies, is now widely distributed in temperate

Asia and Europe. Subspecies *rhamnoides*, subspecies *fluviatilis* V. Soest, and subspecies *carpatica* Rousi are represented in Europe, and subspecies *caucasia* Rousi, subspecies *turkestanica* Rousi, subspecies *mongolica* Rousi, subspecies *sinensis* Rousi, subspecies *yunnanensis* Rousi, and the new subspecies *wolongensis* are represented in Asia. Subspecies *sinensis*, subspecies *yunnanensis*, and subspecies *wolongensis* are restricted to China.

***Hippophae rhamnoides* subsp. *wolongensis* Y.**

S. Lian, K. Sun & X. L. Chen, subsp. nov.

**TYPE:** China. Sichuan: Wenchuan, Wolong, 1920 m, in the Sea Buckthorn shrub community on mountain slopes or river banks (fruit), 25 Sep. 2000, Y. S. Lian, X. L. Chen & K. Sun *w11* (holotype [pistillate], NWTC). Figure 1.

Subspecies haec margine foliorum plus minusve sinuata, petiolis longioribus 2–4 mm longis, pedunculis 3–5 mm longis, gemmis florum masculorum 5–11, femineorum 5–7, rosulatum insertis, fructibus et seminibus conspicue minoribus differt.

Shrubs or small trees, deciduous, 3–5 m high; usually much branched, young branches red-brown, striate, and covered with scales on the surface; old branches dark brown, constricted into a spine tip. Leaves usually alternate, or sometimes subopposite on the upper branchlets, elliptic-lanceolate, 50–85 × 6–16 mm, acute or acuminate at the apex, base cuneate or broadly cuneate, blade margins usually ± sinuous, upper blade surface green, covered by scales, often early deciduous, lower blade surface covered by dense, gray scales, sometimes mixed with a few red-brown scales; costae impressed in a conspicuous groove on the upper surface; petioles 2–4 mm long. Staminate flower buds 5–11, pistillate 5–7, rosulately arranged, with red-brown scales on the outside. Fruits yellow, subglobose, 4–5.5(6) × (4.5)5–6(7) mm, with sparse red-brown scales; peduncle 3–5 mm long. Seeds obovate to oblong, mucronate at the apex, 3–4 × ca. 1.5 mm, seed coat easily separated from endocarp. Flowers were only collected in bud; fruiting in September to October. This subspecies is distributed in the shrub community on mountain slopes at 1660–1920 m.



Figure 1. *Hippophae rhamnoides* subsp. *wolongensis* Y. S. Lian, K. Sun & X. L. Chen. —A. Habit of pistillate plant with fruits. —B. Pistillate flower bud. —C. Seed. —D. Habit of staminate plant with flower buds. —E. Staminate flower bud. —F. Basal leaf blade of staminate plant showing petiole and scales. —G. Close-up of scale trichomes. (A, B, C, F & G based on Y. S. Lian, X. L. Chen & K. Sun *w11* (pistillate, NWTC); D & E based on Y. S. Lian, X. L. Chen & K. Sun *w21* (staminate, NWTC); drawn by Jianlu Bai.)

This subspecies has an affinity with *Hippophae rhamnoides* subsp. *sinensis* in several characters, including the endocarp easily separating from the seed coat, the length of the fruit usually less than or equal to the width, and the leaves relatively larger. They differ in that the flower buds of subspecies *wolongensis* are rosulately arranged while those of subspecies *sinensis* are 4-angled, tower-shaped in staminate form and cruciform in pistillate form; larger, alternate leaves with usually more or less sinuous margins in subspecies *wolongensis* vs. smaller, opposite or subopposite leaves with entire margins in subspecies *sinensis*; and longer petioles (2–4 mm long vs. 1.5–3 mm) and peduncles (3–5 mm vs. 1–2.5 mm) in subsp. *wolongensis* than in subsp. *sinensis*. Subspecies *wolongensis* is confined to Wenchuan and Mao Counties of Sichuan Province, but subspecies *sinensis* is widely distributed in southwestern, northwestern, and northern China. *Hippophae rhamnoides* subsp. *wolongensis* occurs together with subspecies *sinensis* in Wenchuan and Mao Counties; however, subspecies *wolongensis* occurs at 1660–1920 m while subspecies *sinensis* is found at over 2100 m.

*Paratype.* CHINA. **Sichuan:** Mao County, Changhai, 1660 m, in the Sea Buckthorn shrub community on mountain slopes (flowers in buds), 26 Sep. 2000, Y. S. Lian, X. L. Chen & K. Sun w21 (staminate, NWTC).

KEY TO FIVE SUBSPECIES OF *HIPPOPHAE RHAMNOIDES* IN CHINA

- 1a. Flower buds rosulately arranged or alternatively opposite or subopposite; length of fruits usually less than or equal to breadth.
  - 2a. Leaves elliptic-lanceolate, blade margins usually more or less sinuous; flower buds rosulately arranged; peduncles 3–5 mm long . . .  
 . . . *H. rhamnoides* subsp. *wolongensis* Y. S. Lian, K. Sun & X. L. Chen
  - 2b. Leaves lanceolate or narrowly lanceolate, blade margins entire; flower buds opposite or subopposite; peduncles 1–2.5 mm long.

- 3a. Branchlets stiff; most leaves opposite or subopposite, lower blade surface covered with white scales or rarely mixed with rusty-red scales, petioles 1.5–3 mm long; staminate flower buds manifestly 4-angled, tower-shaped, pistillate flower buds cruciform; most fruits tangerine, endocarp separating easily from the seed coat . . . . .  
 . . . . . *H. rhamnoides* subsp. *sinensis* Rousi
- 3b. Branchlets soft; most leaves alternate, lower blade surface covered with rusty-red scales, petioles 1–1.3(2) mm long; staminate flower buds inconspicuous, 4-angled, tower-shaped, pistillate flower buds near cruciform or bifid ovate; most fruits yellow, endocarp sometimes hard to separate from the seed coat . . . . .  
 . . . *H. rhamnoides* subsp. *yunnanensis* Rousi
- 1b. Flower buds spirally arranged; the length of fruits usually longer than breadth.
  - 4a. Branches silvery, usually with more-branched thorns; leaf blades 2–4(5) mm wide, upper surface silvery; peduncles 3–4(7) mm long . . . . .  
 . . . . . *H. rhamnoides* subsp. *turkestanica* Rousi
  - 4b. Branches brown, with less- and un-branched thorns; leaf blades (3)4–8 mm wide, upper surface often green; peduncles 1–4 mm long . . . . .  
 . . . . . *H. rhamnoides* subsp. *mongolica* Rousi

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