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NOTE

Ziziphus jujuba Mill. subsp. *spinosa* (Bunge) Peng, Li & Li: a New Plant Record for the Indian Subcontinent

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ABSTRACT: *Ziziphus jujuba* Mill. subsp. *spinosa* (Bunge) Peng, Li & Li has been recorded for the first time from the Kashmir Himalaya in India. The taxonomy of this taxon has been much debated. Very recently, however, it has been treated as a subspecies of *Ziziphus jujuba* Mill., to which it is closely related but differs markedly in having shrubby habit, longer and sharper spines, and in smaller, globose to ellipsoid drupe and stone. A differentiating key, taxonomic description, places of collection, and illustrations of the subspecies are provided to validate this new record.

KEY WORDS: Indian subcontinent, Kashmir Himalaya, Rhamnaceae, *Ziziphus*, *Ziziphus jujuba* subsp. *spinosa*.

INTRODUCTION

Ziziphus Mill. is one of the most important genera in Rhamnaceae. It comprises about 170 species, distributed mostly in the tropical and sub-tropical regions of the Old and New World, with a few species occurring in the temperate regions (Liu and Cheng, 1995). The plants are spinescent or thorny shrubs and trees with distinctive tri-nerved leaves, cymose inflorescence, and small perigynous flowers with the ovary surrounded by a thick nectary disc (Islam and Simmons, 2006). Two species: *Ziziphus jujuba* Mill. and *Z. mauritiana* Lam. (synonym: *Z. jujuba* Lam. non Mill.) are the major domesticated jujubes. These two species have been cultivated over large areas in the Old World (Liu, 2006); while some other species are cultivated on a more localized scale. However, all the jujubes have been relatively minor crops, although demand for their production remains steady in many parts of their original domestication (Azam-Ali *et al*., 2001).

The taxonomic delimitation of *Ziziphus jujuba* Mill. (Chinese jujube) has been much discussed. It was Phillip Miller who in 1768 named Chinese jujube as *Ziziphus jujuba*, based on the type specimen from Austria. In 1833, Bunge named wild jujube as *Z. vulgaris* Lam. var. *spinosa*, based on the type specimen from northern China. Gaertner in 1909, however, considered the wild jujube under *Z. sativa*. Again, in 1934, wild jujube was put under *Z. jujuba* Mill. as *Z. jujuba* Mill. var. *spinosa* (Bunge) Hu & Chow (Chen and Zhou, 1982). In 1994, C. Y. Cheng & M. J. Liu elevated wild jujube to the species level, naming it as *Z. acidojujuba* Cheng & Liu (Liu and Cheng, 1994). Ever since then, however, the delimitation of these two species has remained an issue of taxonomic debate. Concerning their relationships, detailed studies have shown that *Z. jujuba* has evolved from *Z. acidojujuba* (Qu *et al*., 1986; Wang *et al*., 1999; Peng *et al*., 2000; Liu *et al*., 2005). More recently, Li *et al*. (2010), using the SRAP markers, revealed that the genetic variation between these two species was too low to be recognized at the species level. Therefore, they suggested that *Z. jujuba* (Chinese jujube) and *Z. acidojujuba* (wild jujube) should be treated as two subspecies under *Z. jujuba*: *Z. jujuba* Mill. subsp. *jujuba* and *Z. jujuba* Mill. subsp. *spinosa* (Bunge) Peng, Li & Li, respectively. The RAPD and ITS analysis also supported this finding. The present study also adopts the same taxonomic treatment.

While revising genus *Ziziphus* in the Kashmir Himalaya, the authors collected many plant specimens which were identified as *Z. jujuba* Mill. subsp. *spinosa* (Bunge) Peng, Li & Li. Being a new addition to the flora of the Indian subcontinent from the Kashmir Himalaya, the present paper provides a differentiating key, taxonomic description, places of collection, and illustrations of this subspecies in the region. During the course of present study, the taxon has been found commonly growing on the terraced tablelands, locally called as 'Karewas', and along the foot hills in the Kashmir Valley.

Key to subspecies of *Ziziphus jujuba* Mill. in the Kashmir Himalaya

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1a.Shrubs; drupes globose to ellipsoid, small (0.6–2 cm across.), orange-red, not shiny, epicarp thick, mesocarp thin and ± sour, forming a big cavum when dry; stone small, globose to ellipsoid, obtuse at both ends, superficially tuberculate…..... ……***Ziziphus jujuba*** ssp. ***spinosa***

1b.Trees; drupes globose or oblong, large (1.4–4 cm across), red to dark-red, shiny, epicarp thin, mesocarp thick and sweet, not forming a cavum when dry; stone large, oblongoid, acute at both ends, deeply tuberculate……***Ziziphus jujuba*** ssp. ***jujuba***

TAXONOMIC TREATMENT

Ziziphus jujuba Mill. subsp. ***spinosa*** (Bunge) J. Y. Peng, X. Y. Li & L. Li, Agricultural Sciences in China 9(9): 1278–1284. 2010. *Z. vulgaris* Lam. var. *spinosa* Bunge, Enum. Pl. China Bor. 14.1833. *Z. jujuba* Mill. var. *spinosa* (Bunge) Hu & H. F. Chow, Familiar Trees Hopei 307. 1934; *Z. spinosa* (Bunge) Hu & Chen, Enum. Pl. China Bor. 14. 1833; *Z. sativa* Gaertn. var. *spinosa* (Bunge) Schneid., Ill. Handb. Laubholzk. 2: 261. 1909; *Z. acidojujuba* C. Y. Cheng & M. J. Liu, J. Hebei Agric. Univ. 17: 1. 1994. Figs. 1 & 2.

Deciduous shrub, 1–3 m high; branches flexuous, with strong paired spines, one spine straight and longer (2–5 cm), the other recurved and shorter. Leaves alternate, shortly petiolate, simple, ovate to lanceolate, 1–4.5 cm long and 0.5–2 cm wide, 3-nerved, glabrous, margin crenate-serrate, apex obtusely acute; upper leaf surface lustrous and dark green, the lower surface light green. Flowers axillary, single or in cymes, actinomorphic, hermaphrodite, 5-merous, shortly pedunculate, pedicellate, yellowish-green, 4–6 mm across. Calyx lobes 5, ovate-triangular, ca. 1.3 mm long, distinctly keeled on adaxial side, thickened at margin, with triangular apex. Petals 5, spathulate-obovate, clawed, tips truncate. Disc thin, obscurely lobed, glabrous. Stamens as many as petals, anthers dorsifixed. Ovary bicarpellary, bilocular; style 2-cleft, united to the middle. Fruit a small drupe, globose to ellipsoid, 0.8–2.5 cm long, 0.6–2 cm in diameter, orange-red; epicarp thick; mesocarp thin, ± sour, forming a big hollow on drying. Stone globose to ellipsoid, obtuse, superficially tuberculate, with two plumpish seeds, brown in colour, each seed ca. 2 × 4 mm.

Ecology: *Z. jujuba* Mill. subsp. *spinosa* commonly grows on 'Karewa' lands and in dry sandy fields/slopes along the foot hills in the Kashmir Valley.

Altitudinal range: 1600–2300 m (asl).

Flowering & Fruiting: May–September.

Specimens examined: **INDIA**, Kashmir: Beehama, 1800 m, 1-6-1981, *G. H. Dar 1864* (KASH, as *Z. jujuba*); Nunar 1750 m, 1-6-1981, *G. H. Dar 1864b* (KASH, as *Z. jujuba*); Ganderbal, 1800 m, 29-6-1983, *G. H. Dar 6007* (KASH, as *Z. jujuba*); Chatterhama, 1700 m, 2-7-1984, *G. H. Dar 8967* (KASH, as *Z. jujuba*); Chatterhama, 1700 m, 3-7-1984, *G. H. Dar 8970* (KASH, as *Z. jujuba*); Chatterhama, 1700 m, 9-9-1984, *G. H. Dar 8988* (KASH, as *Z. jujuba)*; Ganderbal, 1600 m, *G. H. Dar 8992* (KASH, as *Z. jujuba*); Bandipora, 2-5-1988, *M. Y. Baba & N. A. Dar 212* (KASH, as *Z. jujuba*); Prang, 14-6-1988, *M. Y. Baba & N. A. Dar 264* (KASH, as *Z. jujuba*); Botanical Garden, 1680 m, 5-5-2008, *Chesfeeda & G. H. Dar 651* (KASH); Harwan, Buddhist site, 1830 m, 1-6-2009, *Chesfeeda & G. H. Dar 655*, *656*, *657* (KASH); New Theed, 1800 m, 4-6-2009, *Chesfeeda & G. H. Dar 661* (KASH); Khimber, 1700 m, 11-7-2009, *Chesfeeda & G. H. Dar 668* (KASH); Malshahi Bagh, Ganderbal, 1700 m, 13-7-2009, *Chesfeeda & G. H. Dar 670*, *670a* (KASH); Beehama, 1750 m, 17-7-2009, *Chesfeeda & G. H. Dar 671*, *672* (KASH); Banihal, 2173 m, 13-8-2009, *Chesfeeda & G. H. Dar 673* (KASH); Islamabad, Qazigund, 2150 m, 14-8-2009, *Chesfeeda & G. H. Dar 677* (KASH); Baramulla, Pattan, 1600 m, 3-8-2009, *Chesfeeda & G. H. Dar 678* (KASH); Baramulla, Gauntamula, 1500 m, 7-6-2009, *Chesfeeda & G. H. Dar 663* (KASH); Uri, Chandanwari, 1340 m, 8-6-2009, *Chesfeeda & G. H. Dar 664*, *665* (KASH).

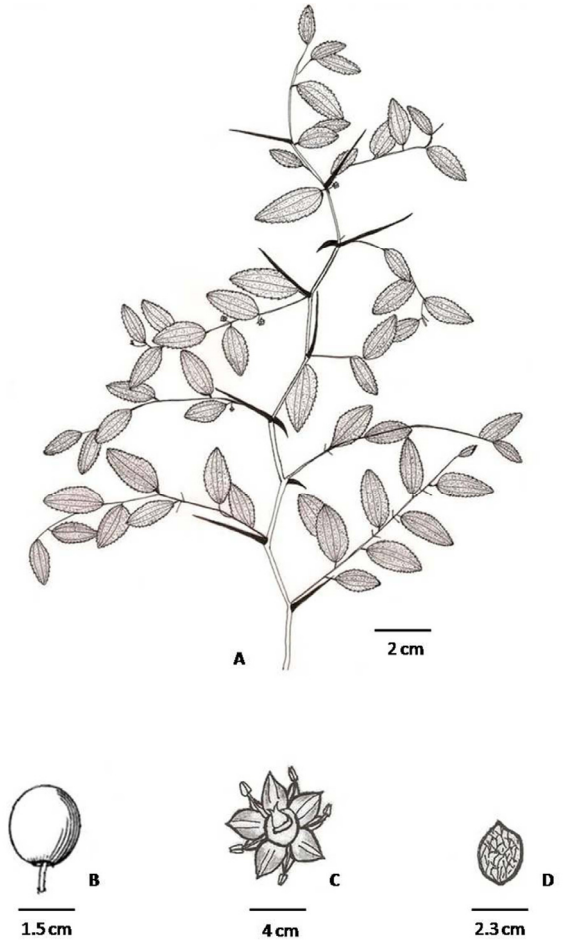


Fig.1. Illustrations of *Ziziphus jujuba* Mill. subsp. *spinosa* (Bunge) Peng, Li & Li. A: Habit. B: Fruit. C: Flower. D: Stone.

Vernacular name: 'Bar kond'.

English names: Wild jujube, Acid jujube.

Distribution: *Ziziphus jujuba* Mill. subsp. *spinosa* is widely distributed in the northern China; the present report is an extension in its distribution to the Kashmir Himalaya.

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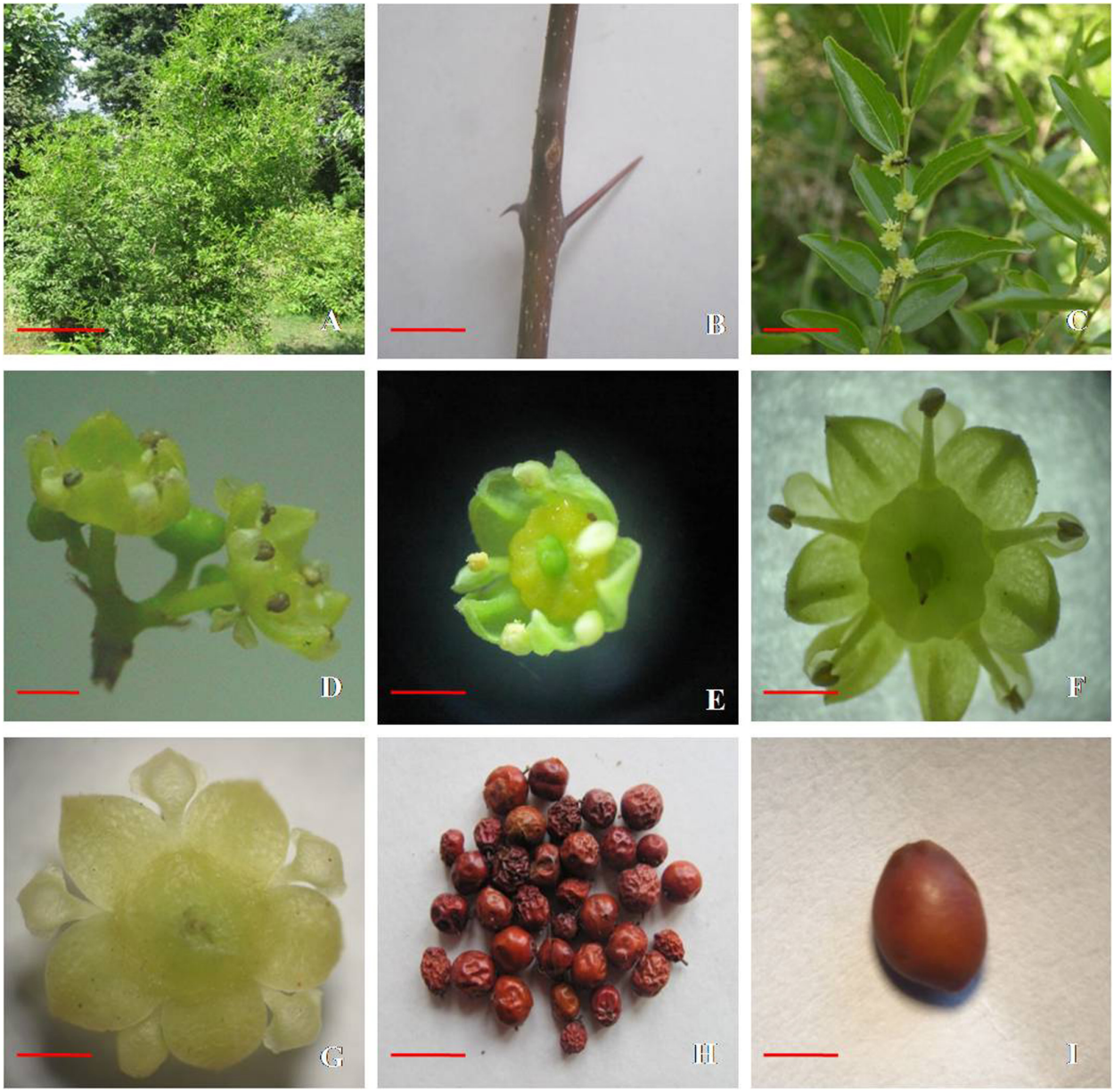


Fig. 2. Vegetative and floral parts of *Z. jujuba* subsp. *spinosa*. A: Habit (scale = 0.5 m). B: Stipular spines (scale = 0.5 cm). C: Flowering twig (scale = 0.9 cm). D: Inflorescence (scale = 7.2 cm). E: Young flower (scale = 7.5 cm). F: Flower [ventral view (scale = 8 cm)]. G: Flower [dorsal view (scale = 8 cm)]. H: Fruit (scale = 1cm). I: Seed (scale = 0.16 cm).

Local uses: Ripe fruits are edible. It is styptic, blood purifier and stomachic. Also used in the treatment of asthma, bronchitis, diabetes, eye diseases, inflammatory skin conditions, liver disorders, ulcers and wounds.

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在印度發現的棗屬新紀錄分布—*Ziziphus jujuba* subsp. *spinosa*

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摘要：本文報導在印度喀什米爾喜馬拉雅地區發現的*Ziziphus jujuba* subsp. *spinosa*新紀錄分布。本分類群的分類地位過去常有爭辯，但最近此分類群以亞種的位階置於*Ziziphus jujuba*之下，這兩個分類群相當接近，但*Ziziphus jujuba* subsp. *spinosa*具有成灌叢狀的生長習性、更長更尖的棘刺及較小、圓形至橢圓形棗核。本文提供兩種亞種的檢索表、採集地點及圖片以利辨認。

關鍵詞：棗屬、*Ziziphus jujuba* subsp. *spinosa*、鼠李科、印度次大陸、喀什米爾喜馬拉雅地區。

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