

A New Record of *Adenostemma madurense* DC. (Asteraceae) in Korea

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Abstract - *Adenostemma madurense* DC. (Asteraceae, *Adenostemma* L.), which is known to be distributed in Japan, Taiwan, Thailand and Nepal was recently found on Jeju Island in Korea. It is morphologically allied to *A. madurense* but distinguished from *A. lavenia* (L.) Kuntze by having such characters as broadly ovate or ovate to oblong leaves, 15-21 cm long × 7-12 cm wide and smooth achenes with slightly muriculate at the upper. Furthermore, *A. madurense* is found in dry mountain slopes in evergreen forests while *Adenostemma lavenia* occurs in the wetland and side of pond. This taxon was named 'San-mul-meo-wi' in Korean based on its habitat. We provide a description, illustrations, photographs, and the key to the related species in Korea.

Key words - Asteraceae, *Adenostemma madurense*, *Adenostemma* L., New record

Introduction

The largest family Asteraceae constitutes approximately 8% of all flowering plants with more than 23,600 species and is distributed on all continents of the world except Antarctica (Stevens, 2001). The plants of Asteraceae have been used in traditional medicine and food for long time (Woo *et al.*, 2010). The genus *Adenostemma* J. R. et G. Forst (tribe Eupatorie) includes about 26 taxa and is widely distributed in tropical regions of Asia, Africa, Australia, the America, and various oceanic islands. The genus is characterized by unequal number of phyllaries and florets and clavate glandular knobs on fruit. In Korea, one species (*Adenostemma lavenia* (L.) Kuntze) has currently been recognized (Lee, 1980; Lee, 1996; Lee, 2006). The taxon has strongly tuberculate or muriculate achenes and oblong-ovate to lanceolate leaves with denetate-serrate margins (Panigrahi, 1975; Koyama, 2001). It is distributed in the waterside or roadsides of forests, thickets on slopes and forest margins from India to Japan (Koyama, 2001; Chen *et al.*, 2011; Koyama, 2001; Orchard, 2011; Fig. 2).

In this study, we report the new distribution records of *Adenostemma madurense* DC. in Korea and provide a diagnostic key, descriptions, and photographs.

Materials and Methods

Standard taxonomic methods have been used for collection, drying, and further processing of the herbarium specimens (Bridson and Forman, 1998). The specimens were deposited in the Korea National Arboretum Herbarium (KH) with a proper voucher specimen number. The fresh plant specimens have been identified using relevant taxonomic literature (Panigrahi, 1975; Koyama, 2001). The photographs of the diagnostic characteristics were taken under a stereozoom microscope (Leica MZ16FA, Leica, Germany) fitted with a digital camera (Nikon P600, Tokyo, Japan).

Results and Discussion

Taxonomic Treatment

Adenostemma madurense DC. in Wight Contrib. Bot., Ind., 9 (1834) & P,rodr..5/113 (1836)

Adenostemma lavenia (L.) Kuntze var. *madurense* (DC.) Panigrahi in Kew Bull., 30(4):654 (1975)

Type: India Orientali, Penins. prope Madura, ?, Wight & Robert, 1400 (K, holotype, seen as photo!)

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Herbs, annual, 30-150 cm tall. Stems erect, or lower part of stem rooting, solitary, rigid, unbranched or branched upper part. white puberulent, Leaves 8-12, cauline, remote; basal leaves withered before anthesis; median leaves large; petiole narrowly winged, 5-10 cm; broadly ovate or ovate-oblong, 15-21 cm long, 7-12 cm wide, both surfaces sparsely puberulent or glabrescent, glabrose or rarely pilose on veins, apex acute or obtuse, base broadly or narrowly cuneate, margin obtusely toothed; upper leaves ovate-oblong, ovate or oblong, smaller than lower leaves, shortly petiolate. Capitula few, small, in a lax or dense corymb or panicle; peduncle slender, 0.8-4 cm, gray white or ferruginous puberulent; involucre hemispheric, 4-5 × 6-7.5 mm, to 7 mm in diam. at fruiting; phyllaries 2-seriate, green, equal, narrowly elliptic, thin, submembranous, outer phyllaries mostly connate, white villous, apex obtuse; corollas 1.5 cm long, densely hairy, Achenes blackish brown when mature, oblanceolate, irregularly subtriangular, 3-3.5 mm long, smooth, slightly glandular muricate at the upper part, sometimes contracted at base, apex obtuse; pappus 3 or 4 thick spreading setae, ca. 0.7 mm long (Fig. 1, 3).

Flowering : Aug. - Oct.

Fruiting : Sep. - Nov.

Korean : 산물머위(San-mul-meo-wi)

Voucher Specimens: Korea Jeju-do: Seogwipo-si, 04 Sep. 2016, K. H. Lee, KH0067 (2 sheets, KH)

A key to *Adenostemma madurense* DC. and it's a related taxon in Korea.

- 1. Stem divaricately branched; Leaves blade elliptic-lanceolate to elliptic, 4-7 × 3-5 cm, both surfaces sparsely puberulent, Achenes tuberculate and muricate ----- *A. lavenia* 물머위
- 1. Stem simple, solitary; Leaves broadly ovate or ovate-oblong, 15-21 cm long, 7-12 cm wide, both surfaces sparsely puberulent or glabrescent; Achenes smooth, slightly muricate at the upper part -----
----- *A. madurense* 산물머위

Candolle (1836) published a new species *A. madurense* DC., from South India. After, Panigrahi (1975) treated this taxon as variety of *A. lavenia* based on morphological characters of leaf, peduncle, and achene. However, Koyama (2001) recognized it as a distinct species, *A. madurense*,

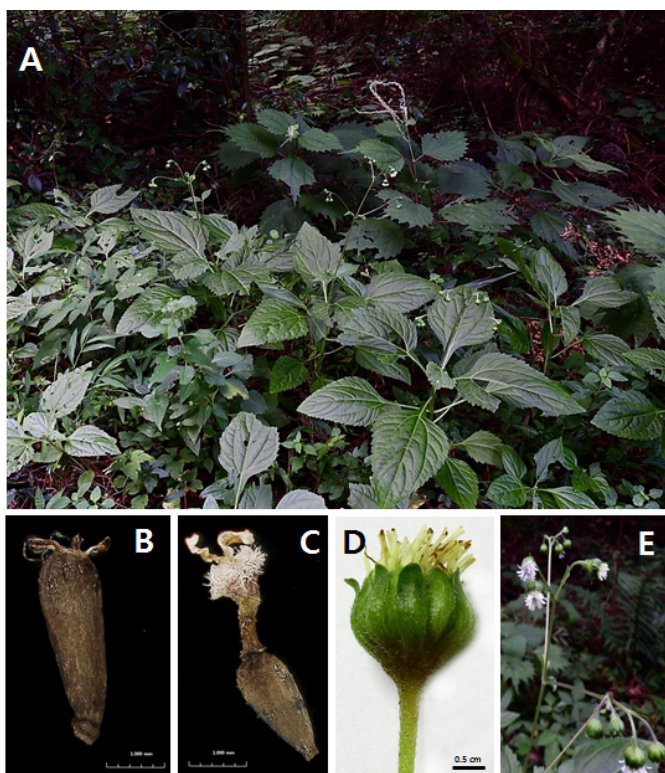


Fig. 1. Photographs of *Adenostemma madurense*; A. Habitat; B. Seed; C. Floret; D. Head; E. Inflorescence.

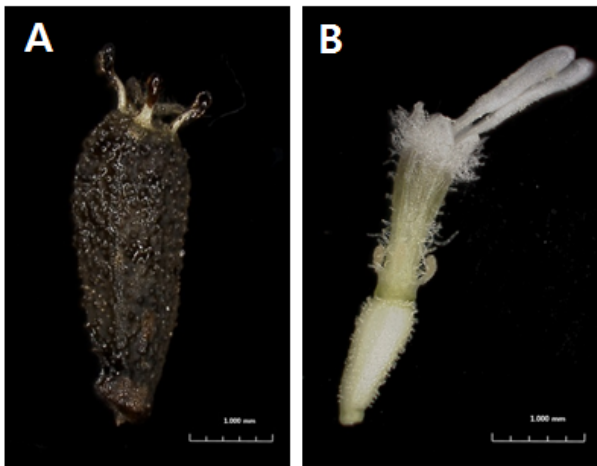


Fig. 2. Photographs of *Adenostemma lavenia*; A. Seed; B. Floret.

emphasizing that it has broadly ovate leaves, obtusely leaf margin and slightly glandular muricate at the upper part of achene. *A. madurense* was known to be mainly distributed in Japan, Taiwan, Thailand and Nepal. Several populations of *A. madurense* have been observed from Jeju (Seogwipo-si, Jeju-do, 33°19'18.2"N 126°35'30.5"E) with more than 30 individuals per 5 m². *A. madurense* distinguished from the related *A. lavenia* by its broadly ovate leaf, smooth and lightly muricate in part of top on achenes (Panigrahi, 1975; Koyama, 2001; Fig. 2). The species grows on dry mountain slopes in evergreen forests together *Eurya japonica* Thunb., *Mallotus japonicus* (Thunb.) Muell. Arg., *Daphniphyllum macropodum* Miq., *Rubus sorbifolius* Maxim., *Trachelospermum asiaticum* (Siebold & Zucc.) Nakai, *Semiaquilegia adoxoides* (DC.)

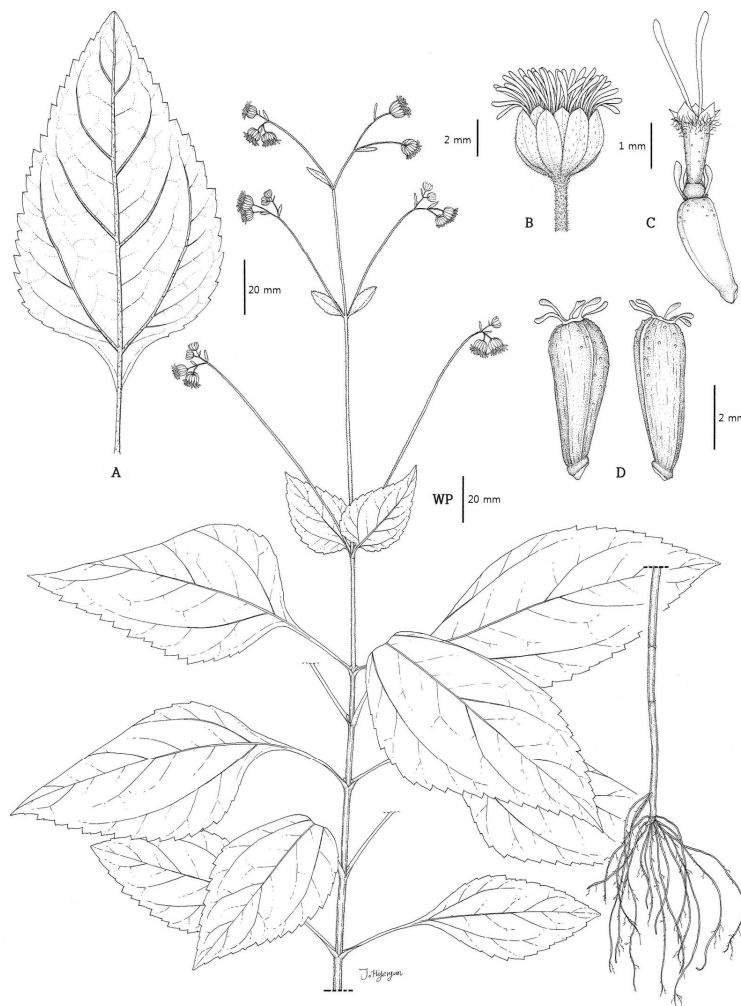


Fig. 3. Illustrations of *Adenostemma madurense* with a flowering inflorescence and leaves on stem; A. Leaf; B. Head; C. Floret; D. Seed.

Makino, *Boehmeria platanifolia* Franch. & Sav., *Oxalis corniculata* L., *Mosla dianthera* (Buch-Ham. ex Roxb.) ex Maxim., *Justicia procumbens* L., and *Ardisia japonica* (Thunb.) Blume. *A. madurense* was given the Korean name ‘San-mul-meo-wi’ based on its distinct habitat requirements.

Acknowledgment

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