New record of an alien plant, *Verbena bracteata* (Verbenaceae) in Korea

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**ABSTRACT:** *Verbena bracteata* Cav. ex Lag. & Rodr. (Verbenaceae), native to North America and an alien plant in China and Japan, was newly found in central and southern areas of Korea. This species can be distinguished from other *Verbena* taxa in Korea by having larger floral bracts and stems that are prostrate or procumbent to decumbent-ascending. *Verbena bracteata* grows in dry and sunny grasslands or along roadsides. A precise description, illustration, photographs, and a key to related taxa are provided.

**Keywords:** alien plant, new record, North America, *Verbena bracteata*, Verbenaceae

**INTRODUCTION**

Verbenaceae J. St.-Hil., including approximately 800 species in about 32 genera (Cardoso et al., 2021), is mainly distributed in tropical and subtropical regions, particularly in southeast Asia, Central and South America, and the West Indies, with few species occurring in the temperate zones (Sanders, 2001; Marx et al., 2010; Olmstead, 2013; Frost et al., 2017). There are approximately nine species of *Verbena* belonging to five genera in Korea (Im, 2018; Kim, 2018). Among then, *V. officinalis* is the only native species in Korea (Lee, 1980; Lee, 1996; Im, 2018; Kim, 2018), and the other two species are alien species (Park, 1998; Kil et al., 2001; Kang et al., 2020).

During a plant diversity field survey in Korean Peninsula, an unrecorded alien plant, *Verbena bracteata* Cav. ex Lag. & Rodr. was found in abandoned fields and roadsides in Gyeonggi-do and Gyeongsangnam-do, Korea. *Verbena bracteata* belongs to sect. *Verbena*. The sect. *Verbena* comprises ca. 46 species that are mainly distributed in the New World (Nesom, 2010a). The three sections are recognized within *Verbena*, primarily based on inflorescence structure (Nesom, 2010a). In Korea, three species in the genus *Verbena* are reported; *V. officinalis* L., *V. bonariensis* L., and *V. brasiliensis* Vell. (Kim et al., 2018). Among then, *V. officinalis* is the only native species in Korea (Lee, 1980; Lee, 1996; Im, 2018; Kim, 2018), and the other two species are alien species (Park, 1998; Kil et al., 2001; Kang et al., 2020).

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**TAXONOMIC TREATMENT**

*Verbena bracteata* Cav. ex Lag. & Rodr., Anales Ci. Nat. 4: 260, 1801.—TYPE: cult. in SPAIN. without date and collector (holotype: MA, photo!).

*Verbena bracteosa* Michx., Fl. Bor.-Amer 2: 13, 1803;

*Zappania bracteosa* (Michx.) Poir., in Lamarck, Encycl. 8: 843, 1808.—TYPE: USA. Tennessee, without date, Michaux s.n. (isotype: P, photo!).


Verbena bracteosa var. albiflora Cockerell, in F. P. Daniels, Fl. Boulder 204, 1911.


Korean name: Gin-po-ma-pyeon-cho (긴포마편초).

Herbs, annual or biennial, 10–30 cm tall. Stems several, prostrate or procumbent to decumbent-ascending, rarely erect, diffusely branched, quadrangular, coarsely hirsute. Leaves opposite, thick membranaceous; petiole 0.3–1.5 cm long, winged or widely margined, hirsute, upper leaves subsessile; blade lanceolate to ovate-lanceolate or oblanceolate, 1–5 cm long, pinnately incised or usually 3-lobed, lateral lobes narrow or divaricate, middle lobes cuneate-ovate, incised toothed or cleft, narrowed into a short margined petiole, hirsute on both surfaces. Inflorescences terminal, usually solitary, spikes, slender, 2–20 cm long, bracts linear-lanceolate, acute-acuminate, entire; 8–15 mm long, 2–4 times as long as the calyx, hirsute. Flowers zygomorphic; calyx 3–4 mm long, 5-lobed, hirsute; corolla pale blue to purplish-blue, narrowly funnelform to somewhat trumpet-shaped, 4–6 mm long, 5-lobed, glabrous, tube relatively slender, limb 2–3 mm in diam.; stamens 4, didynamous; filaments short, anthers yellow, 0.2 mm long; pistil 1, ovary superior, 2 carpels, 4-lobed; style short. Fruit schizocarps, oblong, 2–2.5 mm long.

Flowering: June to August.
Fruiting: August to October.

Distribution and habitat: Verbena bracteata is native to North America, whereas this species is non-native in China, Japan, and Korea (Shimizu, 2003; Mito and Uesugi, 2004; Wang et al., 2005). Two populations, each containing ca. 300 to 1,000 individuals, are found in open habitats, dry and sunny grasslands, or roadsides on lowlands. It grows together with herbaceous plants such as Humulus japonicas Siebold & Zucc., Phytolacca americana L., Portulaca oleracea L.,

Fig. 2. Illustrations of Verbena bracteata Cav. ex Lag. & Rodr. A. Habit. B. Spike. C. Flower with calyx and bract. D. Schizocarp. E. Mericarps (a, abaxial view; b, adaxial view).
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20210803-1-2 (NNIBRP99286), Park et al. 20210803-1-3 (NNIBRP99287), Park et al. 20210803-1-4 (NNIBRP99288), Park et al. 20210803-1-5 (NNIBRP99289), Park et al. 20210803-2-1 (NNIBRP99290), Park et al. 20210803-2-2 (NNIBRP99291), Park et al. 20210803-2-3 (NNIBRP99292), Park et al. 20210803-2-4 (NNIBRP99293), Park et al. 20210803-2-5 (NNIBRP99294), Park et al. 20210803-2-6 (NNIBRP99295), Park et al. 20210803-2-7 (NNIBRP99296), Park et al. 20210803-2-8 (NNIBRP99297), Park et al. 20210803-2-9 (NNIBRP99298), Park et al. 20210803-2-10 (NNIBRP99299), Park et al. 20210803-2-11 (NNIBRP99300), Park et al. 20210803-2-12 (NNIBRP99301), Park et al. 20210803-2-13 (NNIBRP99302), Park et al. 20210803-2-14 (NNIBRP99303), Park et al. 20210803-2-15 (NNIBRP99304), Park et al. 20210803-3-1 (NNIBRP99305), Park et al. 20210803-3-2 (NNIBRP99306), Park et al. 20210803-3-3 (NNIBRP99307), Park et al. 20210803-3-4 (NNIBRP99308), Park et al. 20210803-3-5 (NNIBRP99309) (NNH); same locality, 5 Oct 2021, Jin Hee Park & Kyu Tae Cho Park JH & Cho KT 20211005-1-1 (NNIBRP99310), Park JH & Cho KT 20211005-1-2 (NNIBRP99311), Park JH & Cho KT 20211005-1-3 (NNIBRP99312), Park JH & Cho KT 20211005-2-1 (NNIBRP99313), Park JH & Cho KT 20211005-2-2 (NNIBRP99314), Park JH & Cho KT 20211005-2-3 (NNIBRP99315), Park JH & Cho KT 20211005-3-1 (NNIBRP99316), Park JH & Cho KT 20211005-3-2 (NNIBRP99317), Park JH & Cho KT 20211005-4-1 (NNIBRP99318), Park JH & Cho KT 20211005-4-2 (NNIBRP99319) (NNH). Gyeongsangnam-do: Tongyeong-si, Dosan-myeon, Doseon-ri, 10 Aug 2019, Hyun Sik Kim & Sang Deog Shim KIMJH19233, KIMJH19234 (KB); same locality, 17 Jun 2021, Jung-Hyun Kim & Seog woo Kwon KIMJH21102, KIMJH21103, KIMJH21104, KIMJH21105, KIMJH21106, KIMJH21107 (KB); same locality, 22 Jun 2022, Jung-Hyun Kim KIMJH22048, KIMJH22049, KIMJH22050 (KB).

**Fig. 3.** Distribution of *Verbena bracteata* Cav. ex Lag. & Rodr. in Korea.


**Specimens examined:** KOREA. Gyeonggi-do: Incheon-si, Bupyeong-gu, San-gok-dong, 3 Aug 2021, Jung-Hyun Kim KIMJH21108, KIMJH21109, KIMJH21110, KIMJH21111, KIMJH21112 (KB), Jin Hee Park, Jung-Hyun Kim & Kyu Tae Cho Park et al. 20210803-1-1 (NNIBRP99285), Park et al. 20210803-1-2 (NNIBRP99286), Park et al. 20210803-1-3 (NNIBRP99287), Park et al. 20210803-1-4 (NNIBRP99288), Park et al. 20210803-1-5 (NNIBRP99289), Park et al. 20210803-2-1 (NNIBRP99290), Park et al. 20210803-2-2 (NNIBRP99291), Park et al. 20210803-2-3 (NNIBRP99292), Park et al. 20210803-2-4 (NNIBRP99293), Park et al. 20210803-2-5 (NNIBRP99294), Park et al. 20210803-2-6 (NNIBRP99295), Park et al. 20210803-2-7 (NNIBRP99296), Park et al. 20210803-2-8 (NNIBRP99297), Park et al. 20210803-2-9 (NNIBRP99298), Park et al. 20210803-2-10 (NNIBRP99299), Park et al. 20210803-2-11 (NNIBRP99300), Park et al. 20210803-2-12 (NNIBRP99301), Park et al. 20210803-2-13 (NNIBRP99302), Park et al. 20210803-2-14 (NNIBRP99303), Park et al. 20210803-2-15 (NNIBRP99304), Park et al. 20210803-3-1 (NNIBRP99305), Park et al. 20210803-3-2 (NNIBRP99306), Park et al. 20210803-3-3 (NNIBRP99307), Park et al. 20210803-3-4 (NNIBRP99308), Park et al. 20210803-3-5 (NNIBRP99309) (NNH); same locality, 5 Oct 2021, Jin Hee Park & Kyu Tae Cho Park JH & Cho KT 20211005-1-1 (NNIBRP99310), Park JH & Cho KT 20211005-1-2 (NNIBRP99311), Park JH & Cho KT 20211005-1-3 (NNIBRP99312), Park JH & Cho KT 20211005-2-1 (NNIBRP99313), Park JH & Cho KT 20211005-2-2 (NNIBRP99314), Park JH & Cho KT 20211005-2-3 (NNIBRP99315), Park JH & Cho KT 20211005-3-1 (NNIBRP99316), Park JH & Cho KT 20211005-3-2 (NNIBRP99317), Park JH & Cho KT 20211005-4-1 (NNIBRP99318), Park JH & Cho KT 20211005-4-2 (NNIBRP99319) (NNH). Gyeongsangnam-do: Tongyeong-si, Dosan-myeon, Doseon-ri, 10 Aug 2019, Hyun Sik Kim & Sang Deog Shim KIMJH19233, KIMJH19234 (KB); same locality, 17 Jun 2021, Jung-Hyun Kim & Seog woo Kwon KIMJH21102, KIMJH21103, KIMJH21104, KIMJH21105, KIMJH21106, KIMJH21107 (KB); same locality, 22 Jun 2022, Jung-Hyun Kim KIMJH22048, KIMJH22049, KIMJH22050 (KB).

**A key to Verbena and related taxa in Korea**

1. Stem prostrate or procumbent to decumbent-ascending; bracts much longer than the calyx ........................................ V. bracteata 긴포마편초
2. Spikes lax; leaves irregularly pinnatidid ........................................... V. officinalis 마편초
3. Spikes dense; leaves serrate-dentate.
   1. Leaves broad linear or linear spatulate ........................................ V. bonariensis 버들마편초
   2. Leaves ellipse or linear ellipse ................................................ V. brasiliensis 브라질마편초
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CONFLICTS OF INTEREST

The authors declare that there are no conflicts of interest.

LITERATURE CITED


