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Helianthus debilis Nuttall subsp. *cucumerifolius* (Torrey & A. Gray) Heiser (Asteraceae), a Newly Naturalized Plant in Taiwan

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ABSTRACT: We document the naturalization of the New World *Helianthus debilis* Nuttall subsp. *cucumerifolius* (Torrey & A. Gray) Heiser in central Taiwan. A taxonomic treatment, line drawings, and color photographs of this species from the wild are provided to aid in identification. This represents the first report of *Helianthus* species in Taiwan. The colony of *H. debilis* subsp. *cucumerifolius* was first observed in Taiwan in 1999. During our field survey in 2007 we witnessed the significant range expansion though the coast of Changhua County. The potential of *H. debilis* subsp. *cucumerifolius* to become an invasive species in Taiwan is worthy of attention.

KEY WORDS: Asteraceae, *Helianthus debilis* subsp. *cucumerifolius*, Naturalized plant, Taiwan.

INTRODUCTION

In recent years, many New World species of Asteraceae found their way to Taiwan and naturalized (Boufford and Peng, 1993; Peng et al., 1998a; Peng et al., 1998b; Peng and Yang, 1998; Tseng and Peng, 2004; Chen and Wu, 2006; Hsu et al., 2006; Wang and Chen, 2006; Yang and Hsieh, 2006; Chung et al., 2007; Chung et al., 2008; Tseng et al., 2008). In this study we report yet another aggressive species, *Helianthus debilis Nuttall* subsp. *cucumerifolius* (Torrey & A. Gray) Heiser, which has been established in the middle part of this island at least for a decade. *Helianthus debilis* subsp. *cucumerifolius* closely resemble *H. annuus* L., but the cypselas are pubescent in the former and glabrous in the latter.

TAXONOMIC TREATMENT

The genus *Helianthus* (Asteraceae) comprises 52 Species native to North America, Mexico, with some species introduced to the Old World. (Heiser et al., 1969). This genus includes perennial or coarse annual herbs. Stems are erect or decumbent, usually branched distally. Leaves are opposite or alternate, petiolate or sessile, blades usually 3-nerved, mostly deltate, bases cordate to narrowly cuneate, margins usually entire or serrate, rarely lobed, glabrous or hairy, often gland-dotted. Heads are usually radiate. Involucres are usually hemispheric, sometimes campanulate or cylindric, 5-40 mm in diam. Phyllaries are persistent, 11-40 in 2-3 series. Receptacles are flat to slightly convex, paleate. Paleae are usually rectangular-oblong, usually 3-toothed, sometimes entire. Ray florets are usually 5-30 in number, rarely 0, neuter; corollas usually yellow. Disc florets are 30-150 in number, bisexual, fertile; corollas yellow or reddish, tubes shorter than campanulate throats, lobes 5, triangular; style branches slender. Cypselas are compressed, often apically emarginate with pappus of up to 2 elongate awns. X = 17 (Rogers et al., 1982; Storbeck, 1984).

Helianthus debilis Nuttall subsp. ***cucumerifolius*** (Torrey & A. Gray) Heiser, Madroño. 13: 160. 1956. 瓜葉向日葵 Figs. 1 & 2

Basionym: *Helianthus cucumerifolius* Torrey & A. Gray, Fl. N. Amer. 2: 319. 1842.

Annuals or perennials, 30-200 cm tall. Stems erect, glabrous, hirsute, or puberulent. Leaves mostly cauline, mostly alternate,petioles 1-7 cm,blades deltate-ovate, lance-ovate, or ovate, 2.5-14 × 1.8-13 cm, bases cordate to truncate or broadly cuneate, margins subentire to serrate, abaxially glabrous to hispid, not gland-dotted. Heads 1-3. Peduncles 9-30 cm. Involucres hemispheric, 10-22 mm in diam. Phyllaries 20-30, lanceolate, 8-17 × 1-3 mm, apex acute to long-attenuate, abaxially glabrous or hispid, not gland-dotted. Paleae 7.5-8 mm, apically 3-toothed. Ray florets 11-23, corollas yellow. Disc

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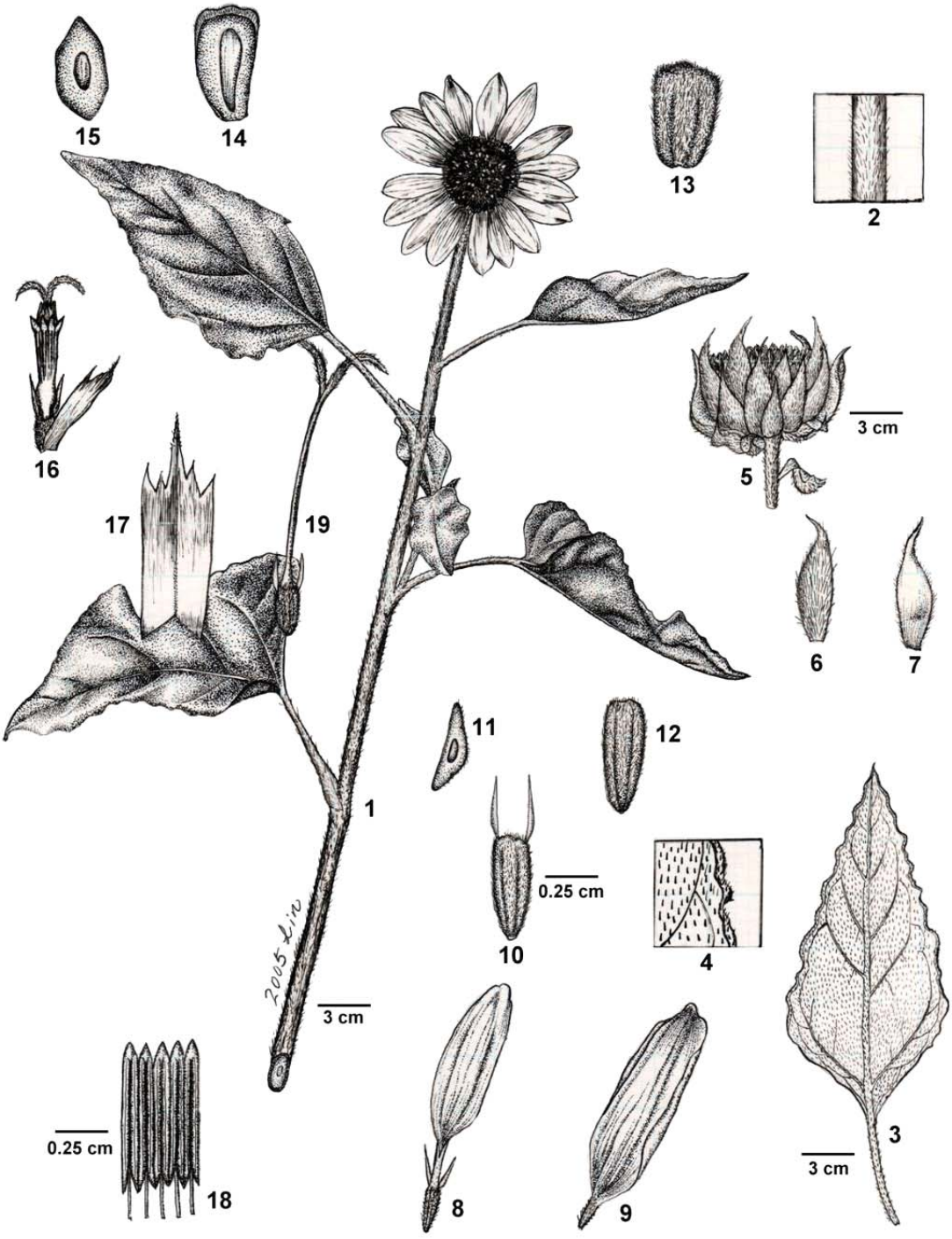


Fig.1. *Helianthus debili*s subsp. *cucumerifolius.* 1: Habit. 2: Portion of stem. 3: Leaf. 4: Portion of blade. 5: Head. 6: External phyllary. 7: Internal phyllary. 8: Ray floret. 9: Corolla of ray floret. 10: Ovary of ray floret. 11: Ovary of ray floret, cross section .12: Ovary of ray floret. 13: Achene. 14: Cypsela,longitudinal section. 15: Cypsela, cross section. 16: Disc floret.17: Palea. 18: Anthers. 19: Disc floret, corolla and anthers removed.

florets ca. 30; corolla 4.5-5 mm, lobes usually reddish, sometimes yellow; anthers dark brown, appendages dark brown; style branches usually reddish, rarely yellow. Cypselas 5-12 mm long, glabrous or sparsely hairy; pappus of 2 lanceolate or lance-linear awns 1.2-2.5 mm long.

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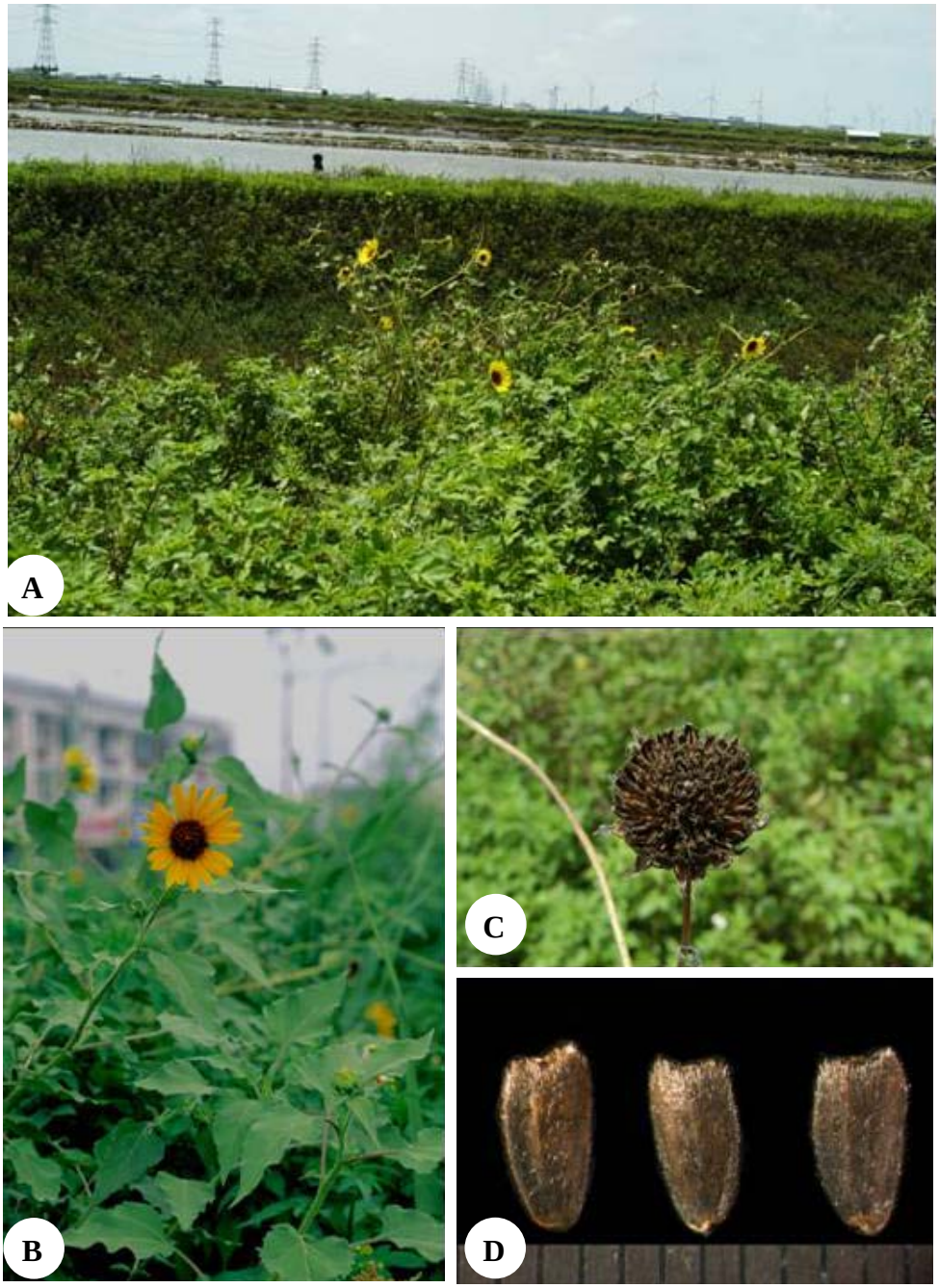


Fig. 2. *Helianthus debilis* subsp. *cucumerifolius.* A: Habitat. B: Flowering branch. C: Infructescences. D: Fruits.

Specimens examined: Taiwan. Changhua County. Lukang Town, Wangyetsuo, *elev.* ca. 10 m, at roadside, 16 Sep. 1999, *Y.H. Tseng 2284* (TCF); Shenkang Township, Chuanhsing, *elev. ca*. 5 m, near seashore, 22 Aug. 2007, *Y.H. Tseng 4061* (TCF); Fangyuan Township, Wangkong, *elev. ca*. 10 m, at roadside, 2 Nov. 2007, *Y.H. Tseng 4087* (TCF); Fuhsing Township, Changbin Industrial Area, Lukong South Road, *elev. ca*. 5 m, open waste roadside, 12 May 2000, *C.H. Lin 299* (HAST)

Notes on Distribution: *Helianthus debilis* subsp. *cucumerifolius* is native to North America, including Connecticut, Florida, Georgia, Louisiana, Maryland, Massachusetts, Michigan, New Hampshire, New York, North Carolina, Pennsylvania, Rhode Island, South Carolina, Texas, Vermont, Virginia, and West Virginia (Rogers et al., 1982; Storbeck, 1984), and naturalized in Japan (Nagada, 1972). In Taiwan it has been naturalized for at least a decade in open areas, at about 5-10 m above sea level, through the coast of Changhua County (Fig. 3). We first discovered a

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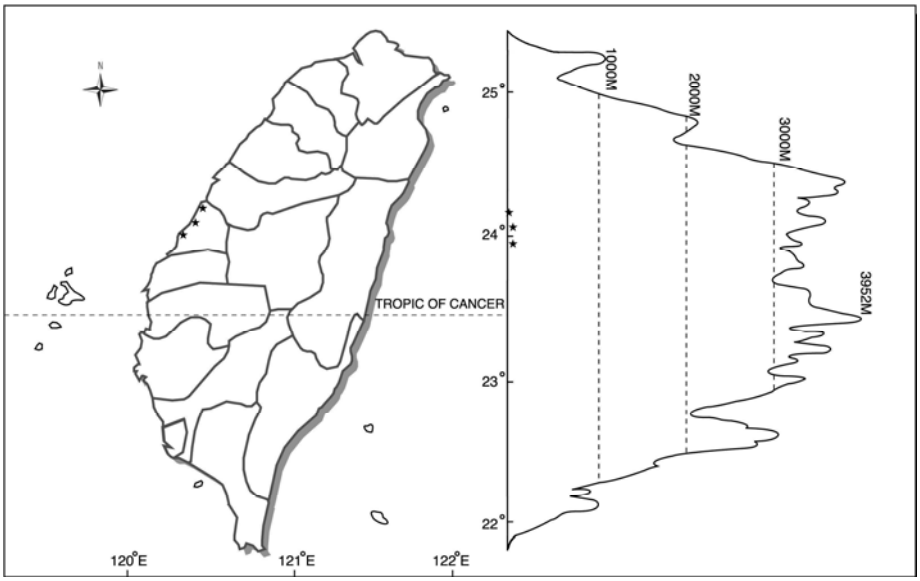


Fig. 3. Distribution of *Helianthus debilis* subsp. *cucumerifolius* in Taiwan.

colony of *H. debilis* subsp. *cucumerifolius* in 1999. During our field survey in 2008 we witnessed significant range expansion and many more wild populations were seen along across the coast of Changhua County. The potential of *H. debilis* subsp. *cucumerifolius* to become invasive in Taiwan is worthy of attention.

LITERATURE CITED

Boufford, D. E. and C.-I Peng. 1993. *Soliva* Ruiz & Pavon (Anthemideae, Asteraceae) in Taiwan. Bot. Bull. Acad. Sin. **34**: 347-352.

Chen, S.-H. and M.-J. Wu, 2006. Note on two new additional plants to Taiwan – *Gnaphalium polycaulon* Pers. (Asteraceae) and *Ipomoea eriocarpa* R. Br. (Convolvulaceae). Taiwania **51**: 219-225.

Chung, S.-W., T.-C. Hsu and Y.-H. Chang. 2007. *Acmella uliginosa* (Swartz) Cassini (Asteraceae): a newly naturalized plant in Taiwan. Taiwania **52**: 276-279.

Chung, K.-F., Y. Kono, C.-M. Wang and C.-I Peng. 2008. Notes on *Acmella* (Asteraceae: Heliantheae) in Taiwan. Bot. Stud. **49**: 73-82.

Heiser, C. B., D. M. Smith, S. B. Clevenger and W. C. Martin. Jr. 1969. The North American sunflowers (*Helianthus*). Mem. Torrey Bot. Club **22**: 1-218.

Hsu, T.-W., C.-I Peng and C.-M. Wang. 2006. *Austroeupatorium inulifolium* (Kunth) King & Robinson (Asteraceae), a newly naturalized plant in Taiwan. Taiwania **51**: 41-45.

Nagada, T. 1972. Illustrated Japanese Alien Plants. Hokuryu-kan Tokyo, Japan. p. 31. (in Japanese)

Peng, C.-I and K.-C. Yang. 1998. Unwelcome naturalization of *Chromolaena odorata* (Asteraceae) in Taiwan. Taiwania **43**: 289-294.

Peng, C.-I, C.-H. Chen, W.-P. Leu and H.-F. Yen. 1998a. *Pluchea* Cass. (Asteraceae: Inuleae) in Taiwan. Bot. Bull. Acad. Sin. **39**: 287-297.

Peng, C.-I, K.-F. Chung and W.-P. Leu. 1998b. Notes on three newly naturalized plants (Asteraceae) in Taiwan. Taiwania **43**: 320-329.

Rogers, C. E., T. E. Thompson, and G. J. Seiler. 1982. Sunflower Species of the United States. Natl. Sunflower Assoc., Bismarck, North Dakota, USA. 75pp.

Storbeck, T. A. 1984. A Taxonomic Study of *Helianthus* Series *Microcephali* and Allied Species. Ph.D. dissertation. Indiana University. USA.

Tseng, Y.-H. and C.-I Peng. 2004. *Ambrosia psilostachya* DC. (Asteraceae), a newly naturalized plant in Taiwan. Endemic Sp. Res. **6**: 71-74.

Tseng, Y.-H., C.-M. Wang and C.-I Peng. 2008. *Clibadium surinamense* L. (Asteraceae): a newly naturalized plant in Taiwan. Taiwania **53**: 103-106.

Wang, C.-M. and C.-H. Chen. 2006. *Tagetes minuta* L. (Asteraceae), a newly naturalized plant in Taiwan. Taiwania **51**: 32-35.

Yang, S.-Z. and G.-P. Hsieh. 2006. *Eleutheranthera ruderalis* (Swartz) Sch.-Bip. (Asteraceae), a newly naturalized plant in Taiwan. Taiwania **51**: 046-49.

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臺灣新歸化菊科植物 — 瓜葉向日葵

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摘　　要

本文首次報導原產北美洲，目前已歸化於臺灣彰化縣沿海附近的瓜葉向日葵(菊科)，描述其形態特徵、地理分布及生育地環境，並提供彩色圖片與線繪圖以資辨識。作者等於 1999 年即已發現當地大量之瓜葉向日葵族群，目前再進行調查發現其分布範圍已有顯著擴張。瓜葉向日葵為臺灣新歸化植物，本屬亦為臺灣新記錄屬。

關鍵詞：菊科、瓜葉向日葵、歸化植物、臺灣。

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