

# Notes on *Acmella* (Asteraceae: Heliantheae) in Taiwan

Kuo-Fang CHUNG<sup>1</sup>, Yoshiko KONO<sup>1</sup>, Chiu-Mei WANG<sup>2</sup>, and Ching-I PENG<sup>1,\*</sup>

<sup>1</sup>Herbarium (HAST), Research Center for Biodiversity, Academia Sinica, Nangang, Taipei 115, Taiwan

<sup>2</sup>Department of Botany, National Museum of Natural Science, 1 Guancian Rd., Taichung, Taiwan

(Received June 25, 2007; Accepted December 2, 2007)

**ABSTRACT.** In several recent pictorial guides on Taiwanese wildflowers and medicinal plants, color photographs of unknown *Acmella* species with radiate capitula were erroneously identified as *Acmella paniculata* or its synonyms, despite this plant's having discoid capitula. As nearly all books attribute medicinal properties to these *Acmella*, it is imperative to clarify their taxonomy. In this article we document the occurrence of five species of *Acmella* in Taiwan, two with radiate capitula that were not reported for the flora of this island before, namely: *A. brachyglossa* and *A. ciliata*. Detailed description and color photographs and chromosome cytology of all five species of *Acmella* are provided to aid in identification.

**Keywords:** *Acmella brachyglossa*; *Acmella ciliata*; *Acmella oleracea*; *Acmella paniculata*; *Acmella uliginosa*; Chromosome cytology; Compositae; Invasive plants; Naturalized plants; *Spilanthes*.

## INTRODUCTION

The genus *Acmella* Rich. (Asteraceae) comprises 30 species and 9 additional infraspecific taxa that are mainly distributed in the tropical and subtropical regions around the world (Jansen, 1985b). One of the most distinct and recognizable members of the genus is *Acmella oleracea* (L.) R. K. Jansen, a species characterized by its large, cylindrical discoid capitula. For centuries, *Acmella oleracea* has been widely cultivated for horticultural, medicinal, insecticidal, and culinary purposes (Jansen, 1985b; Lee, 1994; Hind and Biggs, 2003). In particular, this species is famous as a folklore remedy for toothache and for throat and gum infections, earning it the English nickname, the "toothache plant." It has been long known that chewing the capitula of *Acmella oleracea* will numb the mouth and temporarily relieve dental and oral pain (Jansen, 1985b; Hind and Biggs, 2003), and its application for this is still widespread in Taiwan (Chung, 1997; Chiu and Chang, 1998) and many other parts of the world (Hind and Biggs, 2003). Despite its long and wide application as a folk medicine, the taxonomy of *Acmella oleracea* and its congeners in Taiwan has been chaotic.

Augustine Henry (1896), based on his collections from Bankinsing (currently Wanluan Township, Pingtung County, *A. Henry 812*) and South Cape (currently Oluanpi, Hengchun Township, Pingtung County, *A. Henry 219*) in southern Taiwan, was the first to document the existence of *Acmella paniculata* (Wall. ex DC.) R. K. Jansen (mis-typed as *Spilanthes 'acinella'* L.) on the island. Subsequently Hayata (1904) and Kitamura (1941), in their studies of Taiwanese Compositae, enumerated it as *Spilanthes*

*acmella* (L.) Murray. In 1950 Koster and Philipson studied the type specimen of *Verbesina acmella* L., basionym of *Spilanthes acmella* (L.) Murray, and noted that this specimen actually represents a species of *Blainvillea* Cass., rendering *S. acmella* auct. non (L.) Murray for the species. The next available name *Spilanthes paniculata* Wall. ex DC. was therefore taken as the correct name for the species (Koster and Philipson, 1950). Although this treatment was soon taken up by Hara (1951) and Kitamura (1969), Li (1978) did not seem to be aware of these works and instead followed the earlier works of Hayata (1904) and Kitamura (1941) in using the name *Spilanthes acmella* (L.) Murray in the first edition of the Flora of Taiwan. Moreover, Li's treatment (1978) of *Spilanthes acmella* was erroneously accompanied by a line drawing (based on *M.T. Kao s.n. 1962*, TAI) portraying the cultivated *Acmella oleracea* (as *Spilanthes acmella*), which further complicated the taxonomy of *Spilanthes* in Taiwan. The confusing of various species and misapplication of names is commonplace among folk herbalists (e.g., Liu and Ou, 1981; Chung, 1997) and anonymous information sources posting on the Internet (Hind and Biggs, 2003).

Based on the cladistic analysis of morphological and cytological characters of *Spilanthes* Jacq. (sensu Moore, 1907), Jansen (1981, 1985b) re-circumscribed the genus and restored the generic status of *Acmella*, which had long been subsumed to a section under *Spilanthes* by earlier taxonomists. Jansen's taxonomy was followed by Peng et al. (1998) in the second edition of the Flora of Taiwan, in which two discoid species, the cultivated *A. oleracea* (L.) R. K. Jansen and the indigenous *A. paniculata* (Wall. ex DC.) R. K. Jansen, were described and illustrated with line drawings and color photographs. In the same year, Chiu and Chang (1998) illustrated three species of *Acmella* (as *Spilanthes*) in a book on medicinal plants

\*Corresponding author: E-mail: bopeng@sinica.edu.tw; Tel: +886-2-2789-3821; Fax: +886-2-2789-1623.

in Taiwan. In this work, they included the cultivated *Acmella oleracea* (as *S. acmella* L. var. *oleracea* Clarke), a species with inconspicuous ray florets (as *Spilanthes paniculata* Wall. ex DC.), and another species with radiate capitula [as *Spilanthes acmella* (L.) Murray]. Subsequent to the publication of the second edition of the Flora of Taiwan (Peng et al., 1998) and a Chinese version of the simplified flora (Peng and Chung, 1999), the name *Acmella paniculata* (Wall. ex DC.) R. K. Jansen appeared in two pictorial guides to the wild flowers of Taiwan (Lin, 2003; Dai, 2006). The color photographs in the two books, however, show *Acmella* species with noticeable radiate capitula that are similar to those of the ‘*Spilanthes acmella*’ in the work of Chiu and Chang (1998). In 2007, Chung et al. reported the naturalization of a radiate species, *Acmella uliginosa* (Sw.) Cass., in northern Taiwan. This species, however, differs considerably from the radiate species illustrated in Chiu and Chang (1998), Lin (2003), and Dai (2007) in having much smaller capitula.

Because most publications in Taiwan (e.g., Chiu and Chang, 1998; Lin, 2003; Dai, 2006) and online reports attribute medicinal properties to these unknown radiate *Acmella*, naming these plants correctly is important. Additionally, a timely report on the naturalization of alien species is crucial to effectively controlling and eradicating potential invasive species (Wu et al., 2003; Xu et al., 2004; Yang et al., 2005). To clarify the taxonomy of *Acmella* in Taiwan, we surveyed herbarium collections, consulted folk herbalists, and visited localities where photographs of *Acmella* with radiate capitula were taken. As a result, we document the existence of two additional *Acmella* species with ray florets, which are new to the flora of Taiwan. A key to the species in Taiwan and their color photographs are provided to aid in their identification. Additionally we summarize and tabulate the sources of misapplied names of *Acmella* occurring in Taiwan (Table 1).

## TAXONOMIC TREATMENT

*Acmella* Rich. in Pers., Syn. Pl. 2: 472. 1807; Jansen, Syst. Bot. Monogr. 8: 19. 1985.—*Spilanthes* sect. *Acmella* (Rich.) DC., Prodr. (DC.) 5: 620. 1836. 金鈕扣屬

Pantropical, about 30 species, mainly distributed in the tropics and subtropics. Many species have become naturalized and invasive. In Taiwan, one native species, one cultivated species, and three naturalized species are found.

### Key to species of *Acmella* in Taiwan

1. Capitula discoid (without ray florets).
  2. Leaves ovate to deltoid, leaf bases broad obtuse, truncate to slightly cordate; capitula cylindric, more than 1 cm wide; involucre bracts 15-18, triseriate; mature achenes without evident cork-like margins ..... 3. *A. oleracea*
  2. Leaves lanceolate, elliptic to narrowly ovate, leaf bases attenuate or cuneate; capitula cone-shaped, less than 1 cm wide; involucre bracts 9-12, biseriate; mature achenes with evident cork-like margins ..... 4. *A. paniculata*
1. Capitula radiate (with ray florets).
  3. Leaves ovate to deltoid, leaf bases broad obtuse, truncate to slightly cordate; capitula ovoid; mature achenes with evident cork-like margins ..... 2. *A. ciliata*
  3. Leaves lanceolate, elliptic to narrowly ovate, leaf bases attenuate or cuneate; capitula cone-shaped; mature achenes without evident cork-like margins.
    4. Disc florets 4- or 5-merous, corollas light yellow or greenish, ray florets relatively inconspicuous; involucre bracts 7-11, biseriate; achenes of disc florets 1.5-3 mm long ..... 1. *A. brachyglossa*
    4. Disc florets 4-merous, corollas yellow to orange, ray florets conspicuous; involucre bracts 5-6, uniseriate; achenes of disc florets 1.2-1.8 mm long ..... 5. *A. uliginosa*

1. *Acmella brachyglossa* Cass., Dict. Sci. Nat. (ed. 2) 50: 258. 1827; Jansen, Syst. Bot. Monogr. 8: 73. 1985.

短舌花金鈕扣 (新擬中名) Figures 1A, 1D, 1Ja

Annual herbs. Plants 10-30 cm tall, stems decumbent

**Table 1.** Sources of misapplied names of *Acmella* in Taiwan.

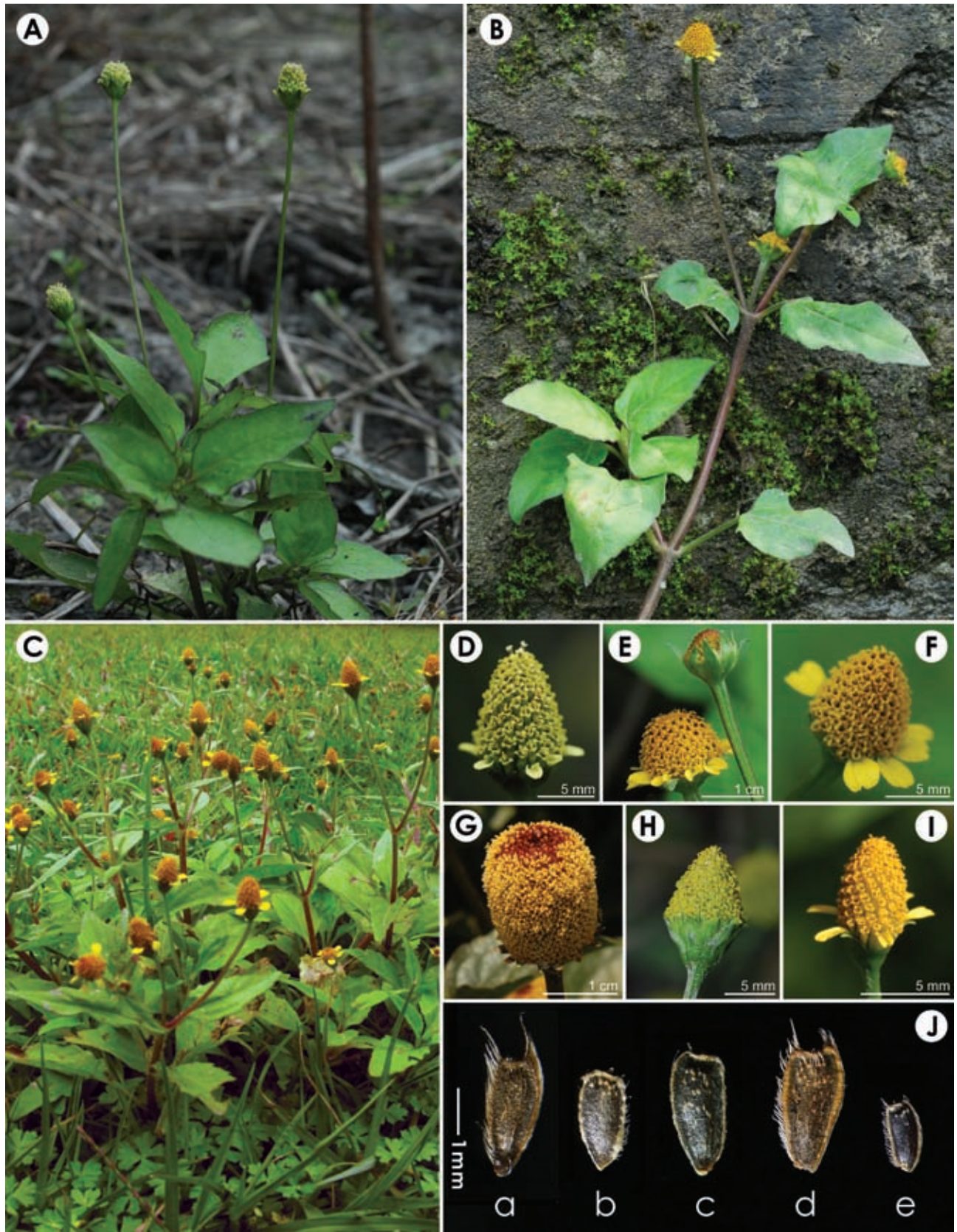
	<i>Acmella brachyglossa</i>	<i>Acmella ciliata</i>	<i>Acmella oleracea</i>	<i>Acmella paniculata</i>
Li (1978)			‡ ‘ <i>Spilanthes acmella</i> ’	† ‘ <i>Spilanthes acmella</i> ’
Liu & Ou (1981) <sup>1</sup>			‡ ‘ <i>Spilanthes acmella</i> ’	† ‘ <i>Spilanthes acmella</i> ’
Chung (1997) <sup>2</sup>			†‡ ‘ <i>Spilanthes acmella</i> ’	
Chiu & Chang (1998) <sup>3</sup>	†‡ ‘ <i>Spilanthes paniculata</i> ’	†‡ ‘ <i>Spilanthes acmella</i> ’		
Lin (2005) <sup>4</sup>		‡ ‘ <i>Acmella paniculata</i> ’		
Dai (2006) <sup>5</sup>		‡ ‘ <i>Acmella paniculata</i> ’		

† Misapplied in description.

‡ Misapplied in illustration, including line drawings or photographs.

<sup>1</sup>劉國柱、歐潤芝; <sup>2</sup>鍾錠全; <sup>3</sup>邱年永、張光雄; <sup>4</sup>林文智; <sup>5</sup>戴德泉.



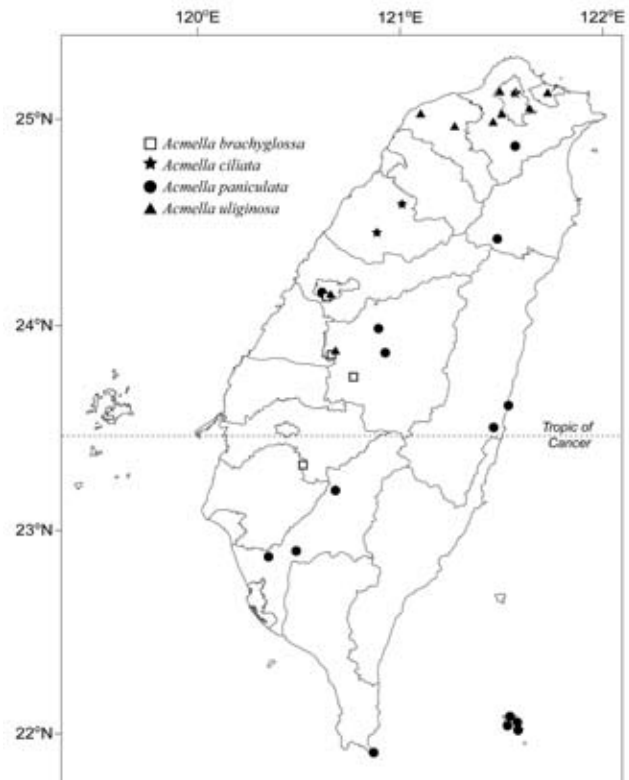


**Figure 1.** *Acmella* Rich. in Taiwan. A, habit of *A. brachyglossa*; B, habit of *A. ciliata*; C, habit of *A. uliginosa*; D-I, radiate (D-F, I) and discoid (G, H) capitula: D, *A. brachyglossa*; E & F, *A. ciliata*; G, *A. oleracea*; H, *A. paniculata*; I, *A. uliginosa*; J, achenes, the scale bar = 1 mm; a, *A. brachyglossa*; b, *A. ciliata*; c, *A. oleracea*; d, *A. paniculata*; e, *A. uliginosa*.

to usually erect, occasionally rooting at nodes, green, red to dark purple, glabrous to moderately pilose. Petioles 5-37 mm long, sparsely to moderately pilose, narrowly winged; leaf blades narrowly ovate to ovate,  $1.8-10 \times 0.8-6$  cm, apex acute to usually acuminate, margins sinuate to coarsely dentate, base attenuate, glabrous to sparsely pilose on both sides. Peduncles 4-12.8 cm long, sparsely pilose. Capitula, solitary, conical, 6.3-13 mm high, 6.5-9.5 mm in diameter; involucre bracts 7-11, biseriate, outer series 3-5, narrowly to broadly ovate,  $3.5-5.2 \times 0.9-3.2$  mm, inner series 3-6, lanceolate to ovate,  $3.4-4.6 \times 1-2.5$  mm; receptacle 5-11 mm high, 1-2 mm in diameter; palea stramineous, often purple-red tinge in early flowering stage,  $3.5-4.5 \times 0.5-0.9$  mm; ray florets 5-8, bisexual, corollas pale yellow, 2-3.1 mm long, tubes 0.9-1.5 mm long, limbs  $0.5-1.7 \times 0.5-1.5$  mm; disc florets 107-222, bisexual, pale yellow, corollas 4- or 5-merous, 1.5-2.1 mm long, tube 0.4-0.7 mm long, throat 1-1.5 mm long, lobe triangular,  $0.2-0.4 \times 0.2-0.3$  mm. Achenes dark brown to black,  $1.8-2.3 \times 0.5-0.9$  mm, surface strigose, margin densely ciliate with straight-tipped hairs but without evident cork-like margin; pappus of two subequal bristles, the longer bristle 0.5-1.1 mm long, the shorter 0.3-1 mm long.

*Specimens examined.* Taichung City: Nantun District, 15 Mar 2007, K.-F. Chung 1714 (HAST), C.-M. Wang 9773 (TNM). Nantou Co.: Mingjiang Township, Chieh-Yuan Herb Garden, 29 Mar 2007, C.-I Huang et al. 3105 (HAST); Luku Township, Guanghsing Elementary School, 29 Mar 2007, C.-I Huang et al. 3106 (HAST). Tainan Co.: Paiho Township, Tatungshan, 26 Oct 1992, H.-F. Yen 6 (HAST).

*Distribution and Notes.* *Acmella brachyglossa* is a weedy species commonly found in Central America, northern South America, and the West Indies (Jansen 1985b). In a distribution map of his monograph, Jansen (1985b) also indicated the occurrence of this species in Thailand, however, without citing voucher specimens. In Taiwan (Figure 2), the first documented specimen was collected by Yen in 1992 (H.-F. Yen 6, HAST) from Tainan County. In *The Illustrated Medicinal Plants of Taiwan*, volume 5 (Chiu and Chang, 1998), a plant in a color photograph that clearly shows all the characters of *Acmella brachyglossa* was referred to as *Spilanthes paniculata*, while the authors suggested that this plant probably represented a new record in Taiwan. According to Chiu and Chang (1998), that plant grows in moist places and along ditches. Although the history of its introduction to Taiwan is not known, *Acmella brachyglossa* appears to have been cultivated and propagated for more than a decade by folk herbalists in Taiwan for its alleged medicinal properties, i.e. cure for scurvy, toothache, and throat and gum infections (pers. comm. Kuo-Hsuan Hsu, 2007). This species can be easily distinguished from congeners in Taiwan by its pale yellow or greenish capitula and relatively inconspicuous ray florets, purple tinged pales in the early flowering stage, and densely ciliate achenes without an evident cork-like margin.



**Figure 2.** Distribution map of *Acmella* Rich. in Taiwan (*A. oleracea* excluded). *Acmella brachyglossa* (□), *A. ciliata* (★), *A. paniculata* (●), and *A. uliginosa* (▲).

Given its weedy behavior in other parts of the world, *A. brachyglossa* is likely to become widespread and rampant in Taiwan.

*Chromosome cytology.* The somatic chromosome number and chromosome morphology at mitotic metaphase of this species are reported here for the first time. The chromosome number  $2n = 78$  (Figure 3A) was observed for a plant collected in Taichung City (Chung 1714, HAST), which is concordant with a previous report of  $n = 39$  for plants collected from Ecuador and Venezuela (Jansen, 1985a). The chromosome length at mitotic metaphase varies gradually from about 2.3  $\mu\text{m}$  to about 1.0  $\mu\text{m}$ . Some chromosomes appear to have centromeres at median and submedian positions, but some have centromere positions that are uncertain. Satellites were not observed.

**2. *Acmella ciliata* (Kunth) Cass., Dict. Sci. Nat. (ed. 2) 24: 331. 1822; Jansen, Syst. Bot. Mongr. 8: 36. 1985.—*Spilanthes ciliata* Kunth in Humboldt, Bopland & Kunth, Nov. Gen. Sp. (folio ed.) 4: 163. 1820. 天文草 (中名出處: Chiu and Chang, 1998)**

Figures 1B, 1E, 1F, 1Jb

Perennial herbs 30-80 cm tall. Stems usually decumbent to ascending, rooting at nodes, green to purple, glabrous to sparsely pilose. Petioles 0.7-4 cm long, narrowly winged, glabrous or sparsely pilose; leaf blades ovate to broadly

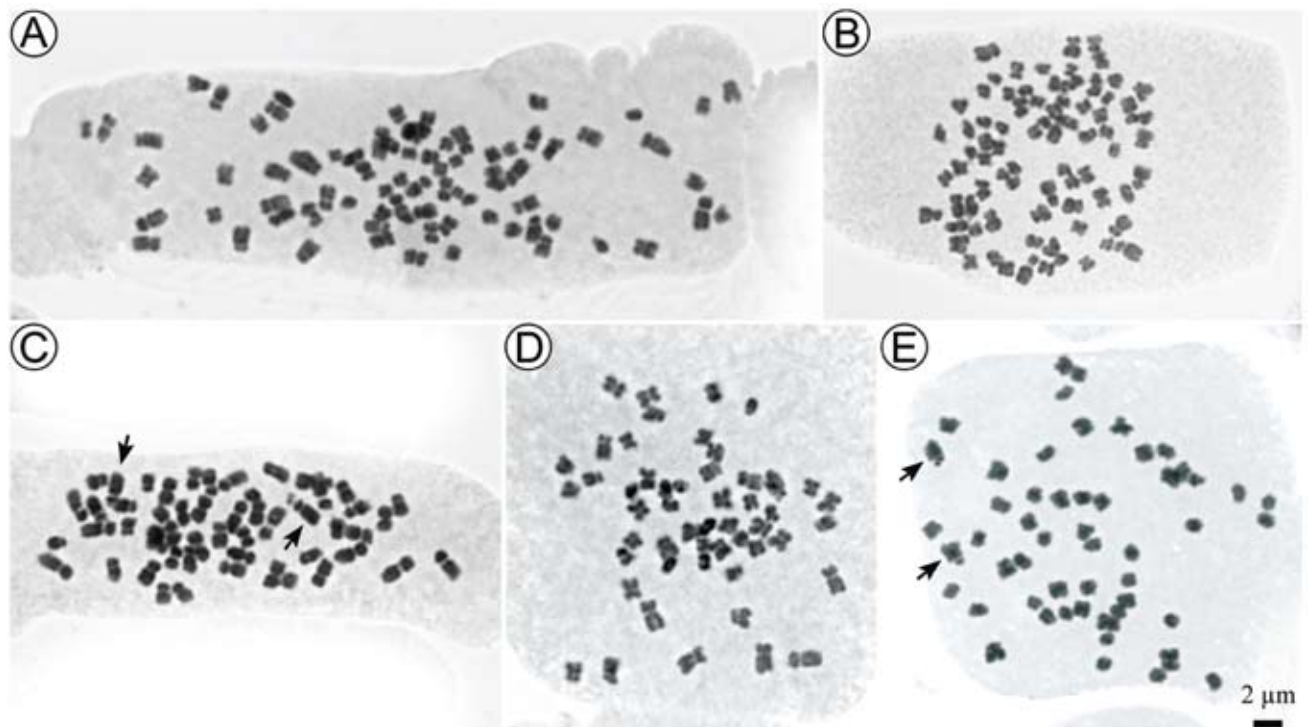


ovate, 2.3-7.5 × 1-5.9 cm, apex acute, margins denticulate to coarsely dentate, base usually truncate or cordate, glabrous to sparsely pilose on both sides. Peduncles 1-7.4 cm long, sparsely to moderately pilose. Capitula radiate, solitary or 2 or 3, terminal or axillary, broadly ovoid, 6-10.5 mm high, 5.5-9.5 mm in diameter; involucre bracts 7-10, biseriate, outer series 3-5, narrowly to broadly ovate or elliptic, 4-6.9 × 1-2.3 mm, inner series 3-6, lanceolate to ovate or elliptic, 2.8-6.1 × 1-2.9 mm; receptacles 3.8-7.4 mm high, 0.8-1.9 mm in diameter; palea stramineous, 3-4.5 × 0.4-0.8 mm; ray florets 5-10, bisexual, corollas yellow orange, 2.5-6.5 mm long, tubes 0.9-2 mm long, limb 1.2-4.7 mm long, 1.1-3 mm wide; disc florets 90-177, bisexual, yellow-orange, corollas 5-merous, 1.5-2 mm long, tube 0.3-0.6 mm long, throat 1-1.5 mm long, lobes triangular, 0.2-0.4 × 0.2-0.3 mm. Achenes black, 1.4-2.2 × 0.5-1 mm, long, without shoulders, margins sparsely to moderately ciliate, with evident cork-like margins, pappus usually absent or sometimes of 2 very short subequal bristles less than 1 mm long.

*Specimens examined.* Taipei City: Zhongshan District, Dajia Riverside Park, 3 Apr 2006, *M.-J. Jung* 040301 (TAIF), 040302 (TNM), 28 Mar 2007, *C.-I. Huang & K.-F. Chung* 3100 (HAST). Miaoli Co.: Dahu Township, Kungching Bridge, 30 Nov 2002, *C.-H. Yu* 440 (HAST); Nanjuang Township, Nanjuang, 23 Mar 2007, *C. M. Wang & C. Y. Li* 9840 (TNM), 28 Mar 2007, *C.-I. Huang & K.-F. Chung* 3099 (HAST), 13 Jun 2007, *C.-I. Peng, K.-F. Chung, and Y. Kono* 21144 (HAST).

*Distribution and Notes.* *Acmella ciliata* is native to northern South America and has naturalized in Celebes, India, Sumatra, and Thailand (Jansen, 1985b). In Taiwan (Figure 2), the earliest known documentation of this species (Chiu and Chang, 1998) erroneously referred to it as *Spilanthes acmella* and described it as a native species in the moist environments and hill ditches in the southern part of the island. Lin (2005) and Dai (2006) also misidentified *A. ciliata* as *A. paniculata*. *Acmella ciliata* is easily distinguishable from *A. paniculata* by its larger, broadly ovoid capitula, conspicuous ray florets (5-10), and shorter achenes (1.4-2.2 vs. 2.2-2.9 mm long) that lack ciliated margins at the mature stage. Although the exact origin of *A. ciliata* in Taiwan is not traceable, this species probably has been cultivated in Taiwan for more than a decade by folk herbalists for its medicinal properties (Chiu and Chang, 1998). Known herbarium records of this species indicate that *Acmella ciliata* is naturalized on damp, water-clogging, and disturbed areas in central and northern parts of Taiwan. In our recent field trips to southern China, we also found this species naturalized in the Guangxi Zhuangzu Autonomous Region (Chongzhuo, Peng et al. 20326, HAST; Hechi, Peng et al. 21060, HAST).

*Chromosome cytology.* The somatic chromosome number and chromosome morphology at mitotic metaphase of this species are reported here for the first time. The chromosome number  $2n = 78$  (Figure 3B) was observed for plants collected from Taipei City (Huang &



**Figure 3.** Somatic chromosomes at mitotic metaphase in *Acmella*. A, *A. brachyglossa*,  $2n = 78$ , from Chung 1714 (HAST); B, *A. ciliata*,  $2n = 78$ , Huang & Chung 3100 (HAST); C, *A. oleracea*,  $2n = 52$ , from a cultivated plant at the experimental greenhouse, Academia Sinica; D, *A. paniculata*, from Chung 1715 (HAST); E, *A. uliginosa*, from Peng & Chung 21013 (HAST). Arrows indicate satellite chromosomes.

*Chung 3100*, HAST) and Nanjuang, Miaoli County (*Peng et al. 21144*, HAST). This chromosome number of  $2n = 78$  is concordant with the previously reported meiotic chromosome number of  $n = 39$  for plants collected from Ecuador, and Zamora (Jansen, 1985a). The chromosome length at mitotic metaphase varies gradually from about 2.1  $\mu\text{m}$  to about 1.0  $\mu\text{m}$ . Some chromosomes appear to have centromeres at median and submedian positions, but we were uncertain about the exact centromere positions of others. Satellites were not observed.

Interestingly, a chromosome number  $2n = 65$  (pentaploid based on  $x = 13$ ) was observed for a plant collected from Nanjuang, Miaoli County (*Huang and Chung 3099*, HAST). This plant, growing alongside many typical *Acmella ciliata* that had set abundant achenes, had slightly narrower leaves and produced no achene in either the field or the experimental greenhouse, signs of a possible hybrid origin. Although  $2n = 65$  has been reported for *A. oppositifolia* (Lam.) R.K. Jansen, a close relative of *A. ciliata*, a pentaploid with  $2n = 65$  has not been reported for *A. ciliata* (Jansen, 1985a). Further studies are needed to understand the origin of this unusual chromosome number.

**3. *Acmella oleracea* (L.) R. K. Jansen**, Syst. Bot. Monogr. 8. 65. 1985; Peng et al., Fl. Taiwan 2nd ed. 4: 812, pl. 375, photo 406 (left). 1998; Peng & Chung in Yang et al., Manuals Taiwan Vas. Pl. 4: 220, fig. 237, photo 405 (left). 1999; Hind & Biggs, Curtis's Bot. Mag. 20: 33, pl. 460, fig. 2003.—*Spilanthes oleracea* L., Syst. Nat. 2: 534. 1767; Huang, Fl. Taiwan 6: 141, 'S. oleracea Clarke'.—*Spilanthes acmella* var. *oleracea* (L.) C. B. Clarke ex Hook. f., Fl. Brit. India 3: 307. 1881. 鐵拳頭

Figures 2G, 2Jc

*Spilanthes acmella* auct. non (L.) Murray: Li, Fl. Taiwan 4: 945, pl. 1256. 1978, pro parte.

Annual herbs up to 90 cm tall. Stems usually decumbent to ascending, green to red, glabrous. Petioles 2-6.5 cm long, narrowly winged, glabrous or very sparsely pilose; leaf blades broadly ovate to deltate, 5-10.5  $\times$  4-8 cm, apex short acuminate to acute, margins dentate, base truncate to short attenuate, glabrous on both sides. Peduncles 3.5-12.5 cm long, sparsely to very sparsely pilose. Capitula discoid, solitary, terminal, cylindrical, 10.5-23.5 mm high, 11-17 mm in diameter; involucre bracts 15-18, triseriate, margins entire to sinuate, outer series 5-6, narrowly ovate to lanceolate or sometimes ovate, 5.8-7.3  $\times$  2.1-2.8 mm, middle series 5-6, lanceolate, 5.8-7.3  $\times$  2.1-2.8 mm, inner series 5-6, lanceolate, 5.5-6.5  $\times$  1.3-2 mm; receptacles 8.3-21.5 mm high, 3.5-0.5 mm in diameter, occasionally 2 per capitulum, apex acute; palea stramineous, often with a purple-red tinged when young, 5.3-6.2  $\times$  1-1.2 mm; disc florets numerous, bisexual, yellow, corollas 5-merous, 2.7-3.3 mm long, tube 0.5-0.7 mm long, throat 2.2-2.6 mm long, lobes 0.3-0.6  $\times$  0.2-0.4 mm. Achenes black, 2-2.5  $\times$  0.9-1.1 mm, without evident cork-like margins and shoulders, margins moderately ciliate with straight-tipped hairs, pappus 2, inconspicuous, 0.3-1.5 mm long.

*Specimens examined*. Taipei City: Taan District, 23 Oct 1963, M.-T. Kao & C.-C. Chuang 5494 (TAI), NTU campus, 15 Jun 1962, M. T. Kao s.n. (TAI); Neihu District, 8 Aug 1943, Y. Simada 6145B (TAI); Nangang, cultivated, 26 May 1987, C.-I Peng 10869 (HAST). Yilan Co.: Jhuangwei Township (cultivated), 9 Apr 2002, C.-C. Lin 498 (TAIF). Hsinchu Co.: Hsinfeng Township, Hsinfeng to Tamei Village, cultivated, C.-I Peng 6389 (HAST). Taichung Co.: Tanzih Township, Dongbao Village, cultivated, 2 Jul. 2007. C.-M. Wang 10333 (TNM). Nantou Co.: Puli Township, Tapingting Farm, 17 Jul 1968, C.-C. Hsu 4626 (TAI).

*Distribution and Notes*. This plant is known mainly from cultivation in Taiwan and occasionally escapes into the field in other parts of the world (Jansen, 1985b; Hind and Biggs, 2003). *Acmella oleracea* is characterized by its large and cylindrical discoid capitula, a feature that is unique for the genus. For centuries, this highly ornamental plant has been admired for its medicinal value and widely cultivated around the world. Based on a cladistic analysis of morphological characters, Jansen (1985b) suggested that *A. oleracea* was mostly likely derived through cultivation from *Acmella alba* (L'Hér.) R. K. Jansen in central Peru. In Taiwan, *Acmella oleracea* is commonly cultivated for its horticultural and medicinal properties, especially for relieving toothache (Lee, 1994; Chung, 1997; Chiu and Chang, 1998).

*Chromosome cytology*. The somatic chromosome number of  $2n = 52$  and chromosome morphology at mitotic metaphase are reported here (Figure 3C) from plants cultivated in the experimental greenhouse, Academia Sinica. Our observation differs considerably from two previous reports from India (Mathew and Mathew, 1988:  $2n = 78$ ; Jose and Mathew, 1995:  $n = 30$  and  $2n = 60$ ). The chromosome length at mitotic metaphase varies gradually from about 2.6  $\mu\text{m}$  to about 1.2  $\mu\text{m}$ . Some chromosomes appear to have centromeres at median and submedian positions, but other centromere positions are uncertain. Satellites were observed at the distal regions of short arms of two submedian centromeric chromosomes (see arrows in Figure 3C).

**4. *Acmella paniculata* (Wall. ex DC.) R. K. Jansen**, Syst. Bot. Monogr. 8. 67. 1985; Peng et al., Fl. Taiwan 2nd ed. 4: 814, pl. 376, photo 406 (right). 1998; Peng & Chung in Yang et al., Manuals Taiwan Vas. Pl. 4: 220, fig. 237, photo 405 (right) 1999.—*Spilanthes paniculata* Wall. ex DC., Prodr. (DC.) 5: 625. 1836; Koster & Philipson, Blumea 6: 350. 1950; Hara, J. Jap. Bot. 26: 236. 1951; Kitamura, Acta Phytotax. Geobot. 24: 11. 1969; Chen, Fl. Reip. Pop. Sin. 75: 359, pl. 61, f. 1-2. 1979.—*Spilanthes acmella* var. *paniculata* (Wall. ex DC.) C. B. Clarke ex Hook. f., Fl. Brit. India 3: 307. 1881. 金鈕扣

Figures 1I, 1Jd

*Spilanthes acmella* auct. non (L.) Murray: Henry, Trans. Asiat. Soc. Jap. 24: suppl.: 54. 1896, 'acinella L.'; Hayata, J. Coll. Sci. Imp. Univ. Tokyo 18: 20. 1904;

Kitamura, Acta Phytotax. Geobot. 10: 32. 1941; Li, Fl. Taiwan 4: 495. 1978, pro parte excl. *Kao s.n.* 1962, pl. 1256.

Annual herbs up to 30 cm tall. Stems branched, erect or ascending, green to purple, glabrous to sparsely pilose. Petioles 0.4-4 cm long, narrowly winged, sparsely to moderately pilose; leaf blades narrowly ovate to ovate, 1.8-6.3 × 0.7-4 cm, apex acute to acuminate, margins dentate to coarsely dentate, sparsely ciliate, base attenuate, glabrous to sparsely strigose or pilose on both sides. Peduncles 2.2-16 cm long, sparsely pilose. Capitula discoid, solitary, terminal, conical, 8.4-12.5 mm high, 6.9-10 mm in diameter; involucre bracts 9-12, biseriate, margins sinuate to irregularly dentate, sparsely to moderately ciliate, outer series 4-5, narrowly to broadly ovate, 3-5.5 × 1.6-3.1 mm, inner series 4-7, lanceolate to ovate, 3-5.5 × 1.2-2.6 mm; receptacles 5-8 mm high, 1.1-3 mm in diameter, apex acuminate; palea stramineous, 3.3-5.1 × 0.6-1 mm; disc florets ca. 100-200, bisexual, yellow, corollas 4 or 5-merous, 1.4-2.2 mm long, tube 0.3-0.6 mm long, throat 1-1.6 mm long, lobes 0.3-0.4 × 0.2-0.4 mm. Achenes dark brown, 2.2-2.9 × 0.8-1 mm, cork-like margins evident, without shoulders, margins moderately ciliate with straight-tipped hairs, surfaces sparsely to densely tuberculate, pappus of 2 subequal bristles, longer bristle 0.5-1.1 long, shorter bristle 0.4-0.9 mm long.

*Specimens examined.* Taipei Co.: Wulai Township, 16 Oct 1932, *S. Sasaki s.n.* (TAI). Ilan Co.: Nanhutashan, 6 Nov 1972, *M.-T. Kao 6415* (TAI). Taichung City: Nantun District, 15 Mar 2007, *K.-F. Chung 1715* (HAST), *C.-M. Wang 9775* (TNM). Nantou Co.: Yuchi Township, Sun Moon Lake, Lalu, 21 Sep 1929, *Y. Kudo & S. Suzuki 15582* (TAI), Lienhuachi, 30 Dec 1925, *S. Sasaki s.n.* (TAI). Chiayi Co.: Alishan Township, 9 Oct 1906, *T. Kawakami & U. Mori 1771* (TI). Kaohsiung Co.: Alian Township, Takangshan, 10 Mar 1987, *M.-T. Kao 10466* (TAI), 14 Nov 1937, *A. Moriya 2372* (TAI, TI); Chishan Township, Oct 1905, *G. Nakahara 584* (TI), Nov 1907, *T. Kawakami & U. Mori 5549* (TAI), 10 Nov 1907, *S. Sasaki s.n.* (TAI); Liouguei Township, 19 Jul 1938, *S. Okamoto s.n.* (KYO), 12 Dec 1937, *S. Okamoto s.n.* (KYO). Pingtung Co.: 5 Dec 1915, *E. Matuda 1867* (TAI); Wanluan Township, Bankinsing, *A. Henry 812* (MO), *U. Faurie 944* (KYO); Hengchuen Township, Kenting National Park, Oluanpi, *A. Henry 219* (MO), Kueitsuchi, 30 Dec 1928, *Y. Kudo & S. Suzuki 15901* (TAI), 1 Feb 1985, *S.-Y. Lu 15230* (TAIF). Hualien Co.: Fengbin Township, 27 Mar 1930, *Y. Yamamoto 1317* (TAI); Juisui Township, Chimei, 27 Dec 1930, *Y. Yamamoto 2539* (TAI). Taitung Co.: 1 Aug 1931, *Y. Yamamoto 2589* (TAI); Luyeh Township, 9 Dec 1899, *K. Miyake s.n.* (TI); Lanyu, 19 Sep 1974, *M.-T. Kao 8728* (TAI), Wananchao-Yehyin, 27 Aug 1968, *C.-C. Hsu 4895* (TAI), between Hongtuo Village and Yuzen Village, 9 Jun 1983, *C.-I Peng 5278* (HAST), Hungtuo Village, 28 Apr 1983, *T. C. Huang, Yang, Kao, Chen, & Tang 9327B* (TAI), Yujen Village, 7 May 1984, *C.-I Peng 6588* (HAST), 14

Apr 1985, *C.-I Peng 7656* (HAST), en route from Hongtuo Village to Tienchih, 6 Apr 1987, *C.-I Peng & Y.-K. Chen 10771* (HAST), Yehyin, 4 Aug 1968, *Namba et al. s.n.* (TI), Hungtuo village to Yehyin Village, 7 Apr 1987, *H.-F. Yen 853* (HAST), Langtao Village, 27 May 1996, *T.-Y. Yang et al. 6588* (HAST).

*Distribution and Notes.* *Acmella paniculata* is distributed in India, Sri Lanka, Indochina, Malaysia, the Philippines, southern China, and Taiwan, occurring in moist and weedy habitats from sea level to up to 2,500 m (Jansen, 1985b). Although early collections suggest that *A. paniculata* was once widespread in Taiwan (Figure 2), more recent records stem mostly from the southeastern part of the island, especially Lanyu Island, Taitung County. However, *Acmella paniculata* has been incorrectly treated as an alien and naturalized plant of tropical American origin (e.g., Liu and Ou, 1981; Wu et al., 2004; Wu and Huang, 2005), an error that probably resulted from Li's confusion of this species with *A. oleracea* (Li, 1978). *Acmella paniculata* can be easily recognized by its discoid capitula (without ray florets; see the color photographs in Peng et al., 1998, and Peng and Chung, 1999) and ciliated achenes with evident cork-like margin. In central Taiwan, it was found to have been cultivated for decades by a local farmer as a means of curing toothache and a substitute for *A. oleracea* (pers. obser., K.-F. Chung, in 2007).

*Chromosome cytology.* The somatic chromosome number and chromosome morphology at mitotic metaphase of this species are reported here for the first time. The chromosome number  $2n = 52$  (Figure 3D) was observed for a plant collected in Taichung City (*Chung 1715*, HAST). This number is concordant with the meiotic count of  $n = 26$  for a plant collected in Lanyu Island, Taitung County (*Peng 5278*, HAST), in a report prepared by Ching-I Peng and published in Jansen (1985a). The chromosome length at mitotic metaphase varies gradually from about 2.3  $\mu\text{m}$  to about 1.2  $\mu\text{m}$ . Some chromosomes appear to have centromeres at median and submedian positions, but other centromere positions are uncertain. Satellites were not observed.

**5. *Acmella uliginosa*** (Sw.) Cass., Dict. Sci. Nat. (ed.2) 24: 331. 1822; Jansen, Syst. Bot. Mongr. 8: 55. 1985; Chung et al. Taiwania 52: 276, fig. 1-2. 2007.—*Spilanthes uliginosa* Sw., Prodr. (Swartz) 110. 1788. 沼生金鈕扣

Figures 1C, 1I, 1J

*Spilanthes iabadicensis* A. H. Moore, Proc. Amer. Acad. Arts 42: 542. 1907; Koster & Philipson, Blumea 6: 351. 1950; Hara, J. Jap. Bot. 26: 236. 1951; Grierson, Rev. Handb. Fl. Ceylon 1: 221. 1980; Koyama, Fl. Jap. IIIb. 32. 1995.

*Spilanthes acmella* auct. non (L.) Murray: Thrower, Hong Kong Herb. 2. 105. 1987.

Annual herbs. Plants 10-30 (-50) cm tall. Stems one to several from base, erect to ascending or occasionally decumbent, green to purple, glabrous to moderately pilose.



Petioles 0.5-1.5 cm long, sparsely to moderately pilose, wingless or narrowly winged; leaf blades lanceolate, narrowly ovate or ovate, 1.3-5 × 0.3-2.5 cm, apex acute to acuminate, margins sinuate to dentate, sparsely ciliate, base attenuate to cuneate, glabrous to sparse pilose on both surfaces. Peduncles 1.2-3 cm long, sparsely pilose. Capitula radiate, solitary or 2 or 3, terminal, ovoid, 5-8 mm high, 4-6 mm in diameter; involucre bracts 5 or 6, uniseriate, narrowly to broadly ovate, 2-4 × 0.5-2 mm, sparsely to moderately ciliate; receptacle 3-6 mm high, 0.5-1 mm in diameter; palea stramineous or sometimes with a purple-red tinge in the early flowering stage, 2.5-3.5 × 0.5 mm; ray florets 4-7, bisexual, corollas yellow to orange-yellow, 1.5-3.5 mm long, tube 0.5-1.5 mm long, limb trifid, 1-2 mm long, 0.5-1.5 mm wide; disc florets 68-148, bisexual, yellow to orange yellow, 4-merous, corolla 1-1.6 mm long, tube 0.2-0.5 mm long, throat 0.7-1.2 mm long, lobe triangular, 0.2-0.3 × ca. 0.2 mm. Achenes black, 1.2-1.8 mm long, 0.4-0.6 mm wide, moderately to densely ciliate with straight-tipped hairs; pappus pale brown, of 2 sub- or unequal bristles, longer bristle 0.2-0.7 mm long, shorter 0.1-0.5 mm long. Phenology: flowering throughout the year in Taiwan.

*Specimens examined.* Keelung City: 30 Oct 1993, T.-C. Chung s.n. (HAST). Taipei City: Beitou District, Guandu Nature Park, 9 Mar 2007, C.-M. Wang 9698 (TNM); Nangang District, Academia Sinica, 27 Jan 2005, C.-I Peng 20234 (HAST), 12 Dec 2006, C.-I Peng & K.-F. Chung 21013 (HAST), 29 Mar 2007, C.-M. Wang & C.-Y. Li 9906 (TNM); Zhongshan District, Dajia Riverside Park, 18 Dec 2004, M.-J. Jung w121802 (TNM), w121806 (TAIF), 21 Mar 2007, C.-I Huang & K.-F. Chung 3092 (HAST). Taipei Co.: Banciao City, 26 Jun 2007, C.-I Huang & K. F. Chung 3210 (HAST); Tucheng City, 1 Jul 2007, C.-I Peng 21146 (HAST). Taoyuan Co.: Jung-Li City, 5 Apr 2007, K.-F. Chung 1717 (HAST); Kuanyin Township, Hsinpo, 10 Jan 2001, C.-I Peng 17230 (HAST). Taichung City: Nantun District, 15 Mar 2007, K.-F. Chung 1713 (HAST), C.-M. Wang 9771 (TNM). Nantou Co.: Mingjiang Township, Chieh-Yuan Herb Garden, 29 Mar 2007, C.-I Huang et al. 3104 (HAST).

*Distribution and Notes.* Native to tropical regions in Africa, America, and Asia, *Acmella uliginosa* is now widely naturalized and has become invasive in the wet and disturbed habitats of the Pacific islands (e.g., Fuji Islands), New Caledonia, the Ryukyu Islands (as *Spilanthes iabadicensis*, Koyama, 1995), the Philippines, and Hong Kong (Jansen, 1985b; Thrower, 1987, as *Spilanthes acmella*). Recently Chung et al. (2007) reported the naturalization of this species in Taipei, northern Taiwan. In addition to the collections cited in Chung et al. (2007), a comprehensive survey of herbarium specimens in Taiwan indicate that the earliest known record of *A. uliginosa* in Taiwan was in 1993 (T.-C. Chung s.n., HAST) in Keelung City, northern Taiwan. Subsequently it was found with increasing frequencies in the damp paddy fields, disturbed areas, and roadsides of northern and central Taiwan (Figure

2). On the campus of Academia Sinica, *A. uliginosa* has become one of the most dominant species around the man-made Ecological Pond. Such dominance was also observed in an abandoned paddy field in Taichung City (pers. observ., Chung, in 2007). Color photographs of *Acmella uliginosa* are also commonly seen through a Google search to the traditional Chinese webpages. In Taiwan *Acmella uliginosa* can be distinguished from congeners by its smaller, radiate capitula and the smaller (1.2-1.8 mm long) and ciliated achenes. In recent fieldtrips, we also found the naturalization of this species in southern China (Yunnan, Pingbian, Peng et al. 18710, HAST; Yingjiang, Peng et al. 19052, HAST) and Vietnam (Yen Minh District, Du Gia Community, Peng et al. 20166, HAST).

*Chromosome cytology.* The somatic chromosome number and chromosome morphology at mitotic metaphase of this species are reported here for the first time. The chromosome number  $2n = 52$  (Figure 3E) was observed for a plant collected on the campus of Academia Sinica, Taipei City (Peng & Chung 21013, HAST). This number is concordant with the previous reported meiotic chromosome number of  $n = 26$  for plants collected from Trinidad (Jansen, 1985a). The chromosome length at mitotic metaphase varies gradually from about 2.0  $\mu\text{m}$  to about 1.0  $\mu\text{m}$ . Some chromosomes appear to have centromeres at median and submedian positions, but other centromere positions are uncertain. Satellites were observed in the distal regions of the long arms of two median centromeric chromosomes (shown by arrows in Figure 3E).

**Acknowledgements.** We thank Nicholas Hind and David E. Boufford for critical comments on the manuscript; Robert K. Jansen for identifying *Acmella uliginosa*; Kuo-Hsuan Hsu, Wen-Chih Lin, and Ming-Jer Jung for guiding us to localities of *Acmella brachyglossa* and *A. ciliata*; Chieh-I Huang and Chieh-Hua Liu for helping with the fieldwork; Ming-Chao Yu for technical support; and Shan-Hua Wu for helpful discussion regarding the invasiveness of Asteraceae in Taiwan.

## LITERATURE CITED

- Chiu, N.Y. and K.H. Chang. 1998. The Illustrated Medicinal Plants of Taiwan, Vol. 5, SMC Publishing Inc., Taipei. (in Chinese: 邱年永、張光雄。1998。台灣原色藥用圖鑑、第五卷。南天出版社，台北市。)
- Chung, S.W., T.C. Hsu, and Y.H. Chang. 2007. *Acmella uliginosa* (Swartz) Cassini (Asteraceae): a newly naturalized plant in Taiwan. *Taiwania* **53**: 276-279.
- Chung, T.C. 1997. The World of Herbs. Published by the author, Taipei. (in Chinese: 鍾錠全。1997。青草世界彩色圖鑑。作者自行出版，台北市。)
- Dai, T.C. 2006. Flora of Nanjuang, Vol. 1, Huashia Press, Taoyuan. (in Chinese: 戴德泉。2006。南庄植物誌、上卷。華夏書坊，桃園市。)



- Hara, H. 1951. *Spilanthes* of the Bonin Islands. *J. Jap. Bot.* **26**: 236.
- Hayata, B. 1904. Compositae Formosanae. *J. Coll. Sci. Imp. Univ. Tokyo* **18**: 1-45.
- Henry, A. 1896. A list of plants from Formosa with preliminary remarks on the geography, nature of the flora and economic botany of the island. *Trans. Asiatic Soc. Japan* **24 (Suppl. 1)**: 1-118.
- Hind, N. and N. Biggs. 2003. Plate 460. *Acmella oleracea* Compositae. *Curtis's Bot. Mag.* **20**: 31-39.
- Jansen, R.K. 1981. Systematics of *Spilanthes* (Compositae: Heliantheae). *Syst. Bot.* **6**: 231-257.
- Jansen, R.K. 1985a. Systematic significance of chromosome numbers in *Acmella* (Asteraceae). *Amer. J. Bot.* **72**: 1835-1841.
- Jansen, R.K. 1985b. The systematics of *Acmella* (Asteraceae: Heliantheae). *Syst. Bot. Monogr.* **8**: 1-115.
- Jose, J.C. and P.M. Mathew. 1995. Chromosome numbers in south Indian Heliantheae (Compositae). *Compositae Newsletter* **27**: 7-10.
- Kitamura, S. 1941. An enumeration of Compositae. *V. Acta Phytotax. Geobot.* **10**: 15-37.
- Kitamura, S. 1969. Compositae of Southeast Asia and Himalayas IV. *Acta. Phytotax. Geobot.* **24**: 1-27.
- Koster, J. and W.R. Philipson. 1950. Nomenclatural changes in *Spilanthes* and *Blainvillea* with remarks and a key to the species of *Spilanthes* in the Malay Archipelago. *Blumea* **6**: 349-354.
- Koyama, H. 1995. Asteraceae (Compositae). In K. Iwatsuki, T. Yamazaki, D.E. Boufford, and H. Ohba (eds.), *Flora of Japan*, Vol. 3b. Kodansha Ltd., Tokyo, pp. 1-181.
- Lee, M.V. (ed.) 1994. *Chinese Medicinal Plants. Reader's Digest Associated Far East Ltd., Hong Kong*, 416 pp. (in Chinese)
- Li, H.L. 1978. Compositae. In H.L. Li, T.S. Liu, T.C. Huang, T. Koyama, and C.E. DeVol (eds.), *Flora of Taiwan*, Vol. 4. Epoch Publ. Co., Ltd., Taipei, pp. 763-965.
- Lin, W.C. 2005. *Wild Flowers of Taiwan—the 1300 Species Found in the Lower Elevation*, Vol. 3. Recreation Press, Taipei, 382 pp. (in Chinese: 林文智。2005。臺灣的野花-低海拔篇1300種(三)。渡假出版社, 台北市。)
- Liu, K.C. and J.C. Ou. 1981. *Edible Wild Plants of Taiwan*, Vol. 2. National Research Institute of Chinese Medicine, Taipei. (in Chinese: 劉國柱、歐潤芝。1981。臺灣野生可食植物(二)。國立中國醫藥研究所。台北縣。)
- Mathew, A. and P.M. Mathew. 1988. Cytological studies on the south Indian Compositae. *Glimpses Pl. Res.* **8**: 1-177.
- Moore, A.H. 1907. Revision of the genus *Spilanthes*. *Proc. Amer. Acad. Arts.* **42**: 521-569.
- Peng, C.-I, K.F. Chung, and H.L. Li. 1998. Compositae. In Editorial Committee of the Flora of Taiwan, Second Edition (eds.), *Flora of Taiwan*, 2<sup>nd</sup> ed., Vol. 4. Editorial Committee of the Flora of Taiwan, Second Edition, Taipei, pp. 807-1101.
- Peng, C.-I and K.F. Chung. 1999. Compositae (Asteraceae). In Y.P. Yang, H.Y. Liu, C.-I Peng, B.L. Shih, and S.Y. Lu (eds.), *Manual of Taiwan Vascular plants*, Vol. 4. The Council of Agriculture, The Executive Yuan, Taipei, pp. 215-290. (in Chinese)
- Thrower, S.L. 1987. *Hong Kong Herbs*, Vol. 2. Urban Council, Hong Kong. (in Chinese)
- Wu, S.H., S.M. Chaw, and M. Rejmánek. 2003. Naturalized Fabaceae (Leguminosae) species in Taiwan: the first approximate. *Bot. Bull. Acad. Sin.* **44**: 59-66.
- Wu, S.H., C.F. Hsieh, and M. Rejmánek. 2004. Catalogue of the naturalized flora of Taiwan. *Taiwania* **49**: 16-31.
- Wu, S.H. and H.H. Wang. 2005. Potential Asteraceae invaders in Taiwan: insights from the flora and herbarium records of casual and naturalized alien species. *Taiwania* **50**: 62-70.
- Xu, K., W. Ye, H. Cao, X. Deng, Q. Yang, and Y. Zhang. 2004. The role of diversity and functional traits of species in community invasibility. *Bot. Bull. Acad. Sin.* **45**: 149-157.
- Yang, Q.H., W.H. Ye, X. Deng, H.L. Cao, Y. Zhang, and K.Y. Xu. 2005. Seed germination eco-physiology of *Mikania micrantha* H.B.K. *Bot. Bull. Acad. Sin.* **46**: 293-299.

## 台灣菊科金鈕扣屬植物

鍾國芳<sup>1</sup> 河野淑子<sup>1</sup> 王秋美<sup>2</sup> 彭鏡毅<sup>1</sup>

<sup>1</sup>中央研究院生物多樣性研究中心 植物標本館 (HAST)

<sup>2</sup>國立自然科學博物館 植物學組

第二版台灣植物誌僅記載兩種不具有舌狀花的金鈕扣屬植物，但近年來，許多坊間的野花、草藥圖鑑所刊載及網路上所流傳的「金鈕扣 (*Acmella paniculata*)」的照片均具有舌狀花，與分類文獻所描述的 *Acmella paniculata* 出入甚大，此外，數種不同的植物都被鑑定為金鈕扣。根據作者走訪各標本館及與民間草藥界人士交流，證實台灣現有五種金鈕扣屬植物，除了第二版台灣植物誌描述不具有舌狀花的鐵拳頭 (*Acmella oleracea*)、金鈕釦 (*Acmella paniculata*) 以及近來報導之新歸化植物沼生金鈕扣之外 (*Acmella uliginosa*)，尚有短舌花金鈕扣 (*Acmella brachyglossa*) 及天文草 (*Acmella ciliata*) 等兩種新近歸化之具有舌狀花的金鈕扣屬植物，其中鐵拳頭栽培為園藝植物或藥用；金鈕扣為原生植物，早年廣泛分布於全島，但近年來主要發現於墾丁及蘭嶼；短舌花金鈕扣見於中南部；天文草現見於中北部；沼生金鈕扣於近年來出現並入侵中北低海拔的潮濕環境。本文提供這五種金鈕扣屬植物染色體細胞學資料以及詳細的形態分類描述、彩色生態照片，並製作檢索表，以利辨識。

**關鍵詞：***Spilanthes*；短舌花金鈕扣；天文草；鐵拳頭；金鈕扣；沼生金鈕扣；入侵植物；歸化植物。