NOTE

Two Newly Naturalized Plants in Taiwan

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ABSTRACT: Two newly naturalized plants in Taiwan are described and illustrated with color photos and line drawings in this manuscript. *Hypochaeris chillensis* (Kunth) Britton has become locally naturalized in low elevations, northern Taiwan. *Microstegium fasciculatum* (L.) Henrard has become locally naturalized in low elevations, central Taiwan.

KEY WORDS: *Hypochaeris chillensis*, *Microstegium fasciculatum*, newly naturalized.

INTRODUCTION

Naturalized plants are alien or exotic to a given region, and capable of establishing in new habitats without human intervention (Chen, 2008). Naturalization of alien plants must be noticed because it is considered as the first step of biological invasion (Wu et al., 2004). Naturalized flora of Taiwan has been established by Wu et al. (2004) and Chen (2008) according to researchers' field investigations or their examinations of herbarium specimens. Recently, newly naturalized plants have been reported steadily and the naturalized flora updated by further researchers' field work (Chen et al., 2009; Jung et al., 2009a, Jung et al., 2009b, Jung et al., 2009cd; Scholz et al., 2009; Wu et al., 2009). Here we report two recently naturalized plants for monitoring their future dispersal in Taiwan.

The first newly naturalized plant we describe here is *Hypochaeris chillensis* (Kunth) Britton (Asteraceae). Asteraceae is one of the major contributors to the naturalized flora globally as well as in Taiwan (Wu et al., 2004; Wu and Wang, 2005; Chen, 2008; Jung et al., 2009cd). *Hypochaeris* L. (Asteraceae) contains about 60 species in Australia, Eurasia, North and South America (Peng et al., 1998; Azevêdo-Gonçalves and Matzenbacher, 2005; Bogler, 2006; Jung et al., 2008, 2009d), and three alien species, *H. glabra* L., *H. microcephala* var. *albiflora* and *H. radicata* L., have been recorded in Taiwan as naturalized weeds (Peng et al., 1998; Jung et al., 2008, 2009d). *Hypochaeris radicata* naturalized at roadsides or farms in middle and high elevation in Taiwan (Peng et al., 1998) and recently at roadsides or gardens in low elevations, northern Taiwan. *Hypochaeris glabra* naturalized at roadsides and abandoned parks in low elevations, central Taiwan (Jung et al., 2008). A newly naturalized weed, *H. microcephala* var. *albiflora*, naturalized at parks or roadsides in low elevations, northern Taiwan (Jung et al., 2009d). We report *H. chillensis* (Kunth) Britton here as the fourth naturalized weed in Taiwan for this genus.

Another newly naturalized plant we describe here belongs to the genus *Microstegium* Nees (Poaceae). This genus has 15-20 species, native to Africa and Asia (Hsu, 2000; Chen and Phillips, 2006, Chen and Kuoh, 2007). Nine species, including one newly recorded species *M. japonicum*, have been recorded in Taiwan (Chen and Phillips, 2006, Chen and Kuoh, 2007). In other two botanical surveys, the first author found the well-established and naturalized grass, *M. fasciculatum*, in low elevations, central Taiwan. We describe and illustrate this alien grass with the other alien plant mentioned above.

TAXONOMIC TREATMENTS

1. ***Hypochaeris chillensis*** (Kunth) Britton, Notas Mus. La Plata, Bot. Bull. Torrey Bot. Club 19 (12): 371, 1892; Zuloaga and Morrone (eds.). Catálogo de las Plantas Vasculares de la República Argentina. II. Dicotyledoneae (Acanthaceae - Euphorbiaceae): 219, 1999; Bogler. Fl. N. Amer. 19: 297-299, 2006. —*Apargia chillensis* Kunth in A. von Humboldt et al., Nov. Gen. Sp. 4 (fol.): 2. 1818; 4 (qto.): 3. 1820. —*Hypochaeris brasiliensis* (Less.) Benth. & Hook. F. ex Griseb. Abh. Königl. Ges. Wiss. Göttingen 24: 217, 1879. 智利貓耳菊 Figs. 1 A-D, 2 & 3

Herbs perennial, radical blades ellipse to oblong, simple to parted, apex acute to acuminate, margin entire to loose-dentate, sparsely ciliate, both surfaces of blade glabrous, midrib sparsely pubescent on abaxial surface; cauline blades linear, lanceolate to oblong, simple, base amplexcaule, apex acute to acuminate, margin serrate, sparsely ciliate; capitulum arranged as a apical cyme or a cymose panicle, composed of ray florets, ca. 9 mm long, 3.5 mm wide; involucre 4-seried, involucral bracts

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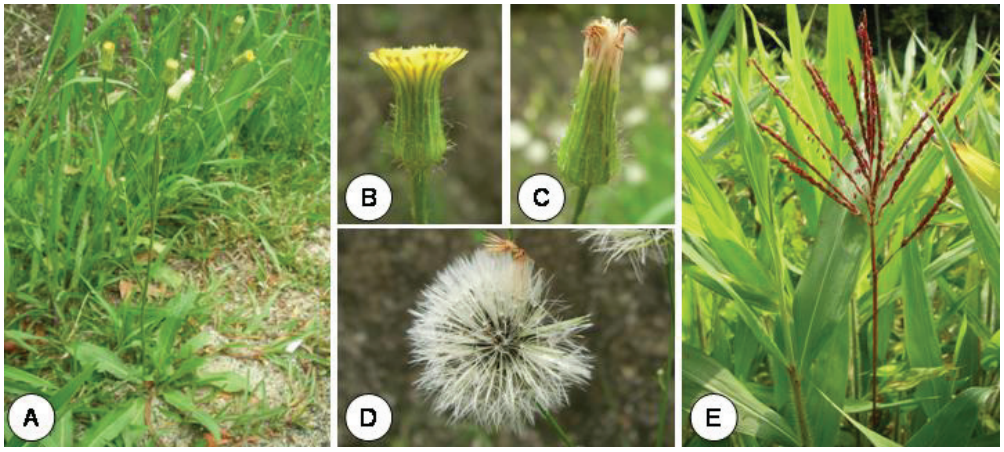


Fig. 1. Photos of *Hypochaeris chillensis* (Kunth) Britton and *Microstegium fasciculatum* (L.) Henrard. A-D: *H. chillensis*. A: Habit. B: Flowering head. C: Fruiting head. D: Head with mature achenes. E: *M. fasciculatum*.

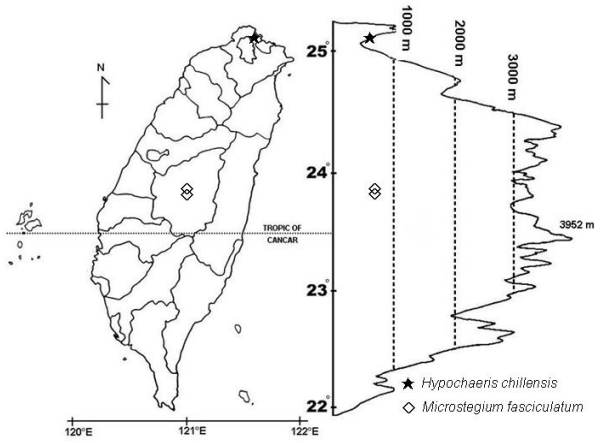


Fig. 2. Distribution map of *Hypochaeris chillensis* (Kunth) Britton (★), and *Microstegium fasciculatum* (L.) Henrard (◇).

linear, outer ones ca. 2.5 mm long, innermost ones to 8 mm long, elongated when fruiting, apex obtuse, villose on surface, villose hairs on outer involucres denser than that of inner ones, 1-nerved, midrib pubescent, 1.5-3 mm long, margin membranous and ciliate, cilia 0.2-0.3 mm long; chaff oblong, ca. 3.5 mm long, 1-nerved, membranous, apex bifid, ciliate and awned, awn ca. 1.5 mm long; corolla yellow, ca. 6.5 mm long, anther syngenesious, base obtuse, apex acute, ca. 0.8 mm long, stigma ca. 1.5 mm long; achene ellipsoid, monomorphic, scabrous, ca. 4.5 mm long, apex long-beaked, scabrous, ca. 4 mm long, pappus plumose sparingly, 4-6.5 mm long, branched bristles ca. 1 mm long.

Specimens examined: Taiwan. Taipei City, Fongguizui, 2 Jun 2009, *M.-J. Jung 4085* (TAIF), same loc., *M.-J. Jung 4086* (TAIF), 26 Jun 2009, same loc., *M.-J. Jung 4090* (TAIF).

Distribution and notes: *Hypochaeris chillensis* (Kunth) Britton is native to South America (Azevêdo-Gonçalves and Matzenbacher, 2005; Bogler, 2006) and naturalized in North America (Bogler, 2006). Nowadays, this alien plant is naturalized at roadsides in the range of Yangmingshan National Park, northern Taiwan (Fig. 2). *Hypochaeris chillensis* is characterized with dominant and amplexcaule cauline leaves, many-flowered inflorescences, and hairy involucres (Figs. 1A-D, 3A, C-D). A key to these naturalized *Hypochaeris* species in Taiwan is offered in below.

Key to *Hypochaeris* species in Taiwan

1. Leaves rosette and cauline, heads more than 5, arranged to a corymb or a panicle. ……..… 2
1. Leaves mainly rosette, head solitary or 2-5 heads arranged to a loosely corymb. ……... 3
2. Bases of cauline leaves attenuate, not amplexcaule; involucral bracts glabrous, corolla whitish. ……..… *H. microcephala* var. *albiflora*
2. Bases of cauline leaves amplexcaule, involucral bracts villose, corolla yellow. ……..…. *H. chillensis*
3. Leaves glabrous to sparsely pubescent, achenes dimorphic, marginal achene apexes truncate, central achene apexes beaked. … *H. glabra*
3. Leaves densely pubescent, achene monomorphic, achene apexes all beaked. …… *H. radicata*

2. ***Microstegium fasciculatum*** (L.) Henrard, Blumea 3: 453, 1940; Chen and Phillips, in: Fl. Reipubl. Popularis Sin. 22: 593-598, 2006.

蔓生莠竹 Figs. 1E, 2 & 4

Culms ascending, pubescent, hairs whitish, 4-5 mm long; internodes longer than sheath, extra-sheath branching, rooting at nodes. Leaf sheath 4-8 cm long, pubescent, hairs whitish, 4-5 mm long; ligule 2-3 mm long, apex truncate, blade lanceolate, apex and base acute, to 10 cm long, 1-1.8 cm wide, pubescent on both surfaces, hairs ca. 1 mm long, margin scabrid. Inflorescence apical, 5-10 racemes, digitately arranged, constricted to spreading, purple-reddish, to 10 cm long; rachis ca. 2/3 length of sessile spikelet. Spikelets paired,

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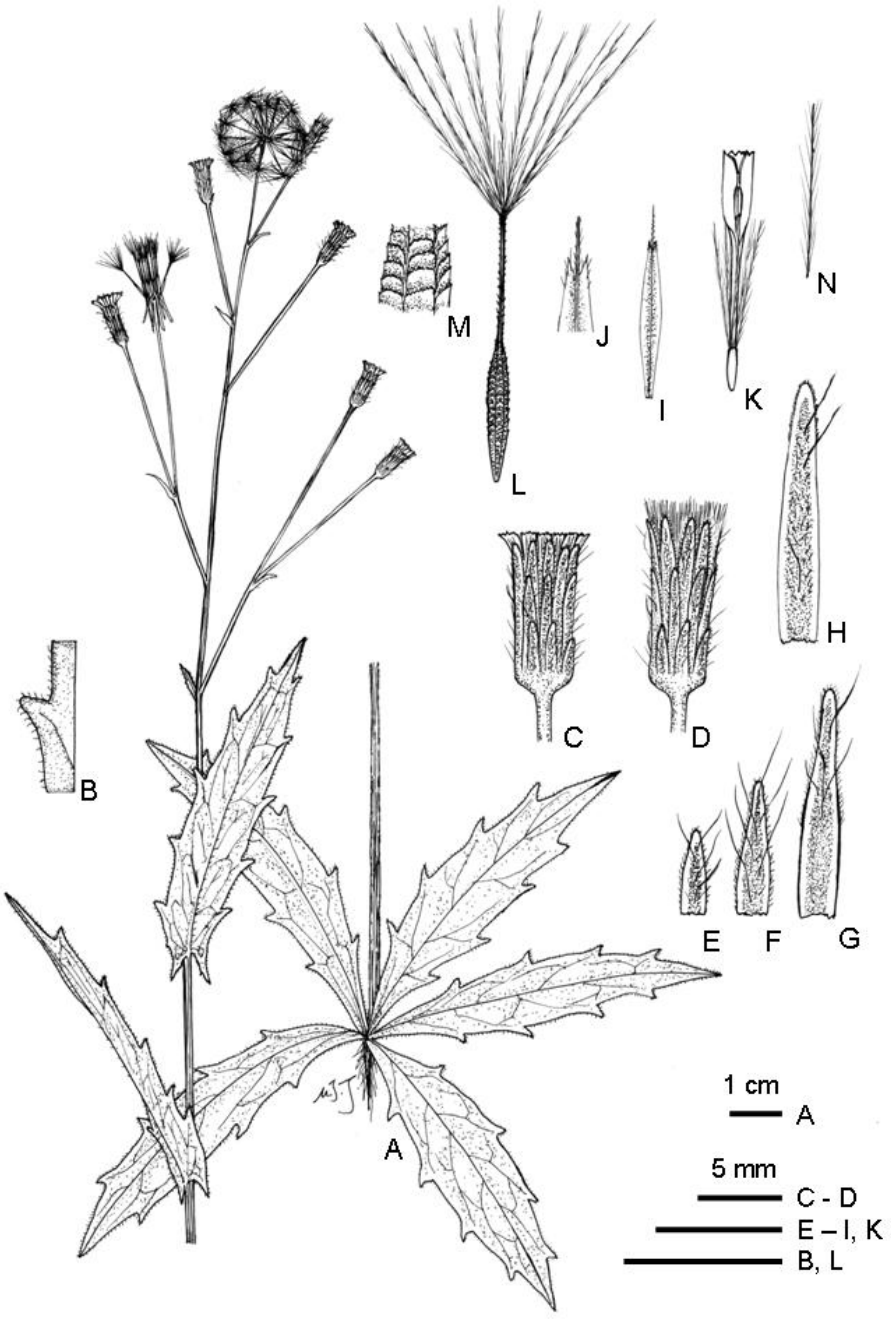


Fig. 3. *Hypochaeris chillensis* (Kunth) Britton. A: Habit. B: Blade margin. C: Flowering head. D: Fruiting head. E-H: Involucral bracts. I: Chaff. J: Chaff apex. K: Floret. L: Achene. M: Achene surface. N: Part of pappus.

pedical of upper spikelet half length of sessile spikelet, ca. 2 mm long, coated with hispid, hairs purple-reddish. Lower glume ellipse to ovate, apex obtuse, 2-keeled, ca. 4 mm long, keels ciliate, hairs purple-reddish; upper glume ovate, apex acute, boat-shaped, ca. 4 mm long, 1-3 nerved, central ridge scabrous. Lower floret absent, upper floret bisexual, upper lemma ovate, apex bifid, notched, hyaline, ca. 2 mm long, lobes 2/3 long of upper lemma length, one awn rising from the notch, awn 8-10 mm long, column 4-5 mm long; upper palea lanceolate to ovate, apex acute, upper margin ciliate, hyaline, ca. 2 mm long. Anthers 3, ca. 2 mm long; ovary ca. 0.7 mm long. Pedical spikelet similar to sessile spikelet, keel cilia on lower glume of pedical spikelet shorter than cilia of sessile spikelet; upper lemma's awn shorter than sessile one, ca. 8 mm long.

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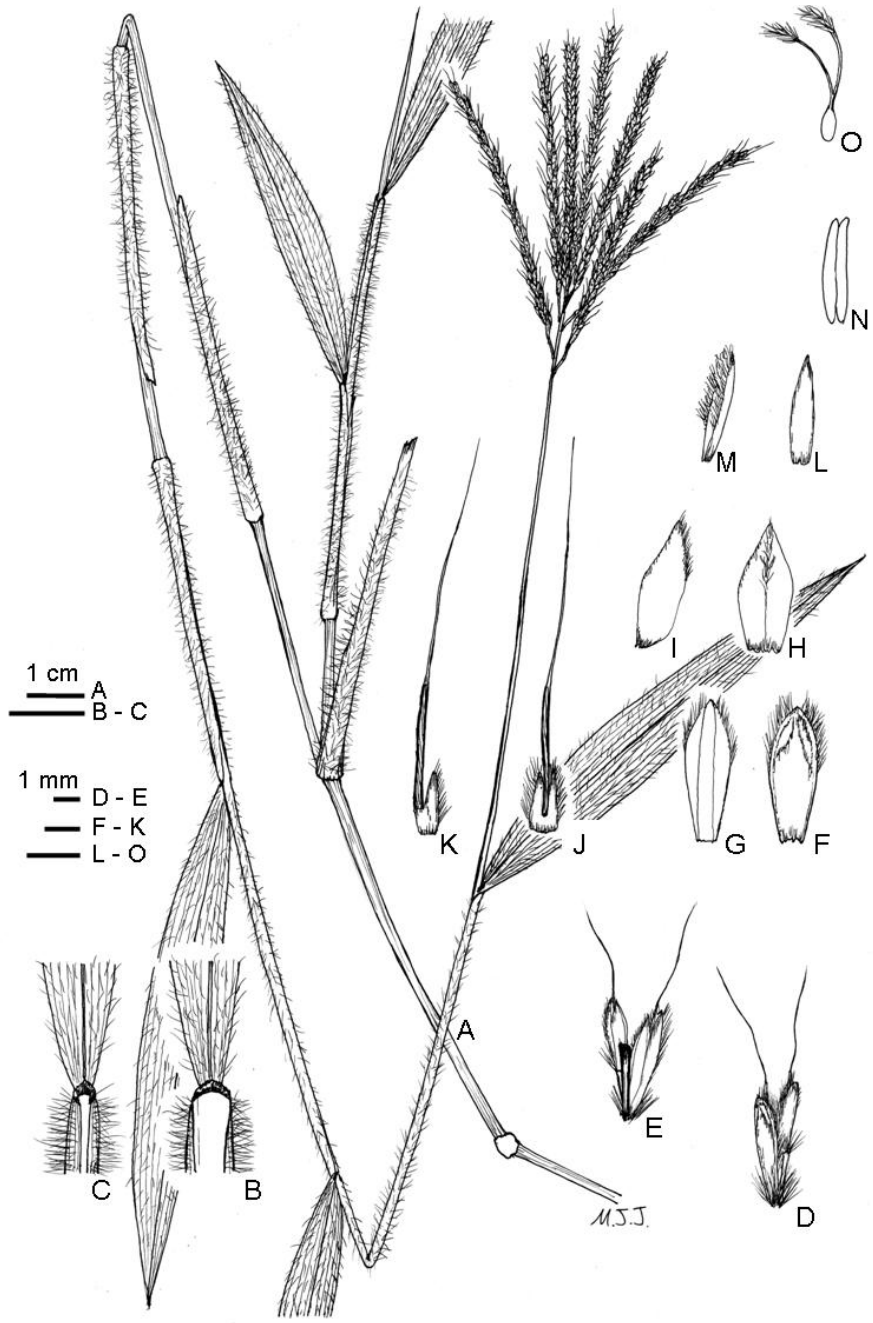


Fig. 4. *Microstegium fasciculatum* (L.) Henrard. A: Habit. B & C: Ligules on parts of leaves. D & E: Paired spikelets. F & G: Abaxial view (F) and adaxial view (G) of lower glume. H & I: Various view of upper glume. J & K: Various views of 2nd floret lemma. L & M: Various views of 2nd floret palea. N: Anther. O: Pistil.

Specimens examined: Taiwan. Nantou Hsien, Yuchih Hsiang, Shancha Lane, 22 Mar 2007, *M.-J. Jung 1591 (z032201)* (HAST, NCKU, TAIF), Shuishe, 5 Mar 2008, *M.-J. Jung 2435* (TAIF).

Distribution and notes: *Microstegium fasciculatum* (L.) Henrard is distributed in Africa and Asia (Chen and Phillips, 2006; Quattrocchi, 2006). In Taiwan, two populations of this alien grass were found in low elevation, central Taiwan (Fig. 2). One of its habitats is in a waste farm. The second habitat is a roadside near Sun-Moon Lake. *Austroeupatorium inulifolium* (Kunth) King & Robinson (Asteraceae), another aggressive naturalized weed, was also found at this second habitat. Glumes of *M. fasciculatum* are coriaceous, and the lower glumes are flat, without a longitudinal groove (Figs. 4F-G). Blades of *M. fasciculatum* are hispidulate (Figs. 4A-C), rather than other *Microstegium* species (glabrous,

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or tomentose in *M. geniculatum*) in Taiwan (Hsu, 2000). Besides, blades of *M. fasciculatum* are much wider (1-1.8 cm) than other *Microstegium* species (to 1 cm wide) in Taiwan. These characters could be used to distinguish *M. fasciculatum* from other *Microstegium* spp. in Taiwan.

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臺灣新歸化植物－智利貓耳菊、蔓生莠竹

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摘要：本文描述兩種臺灣新歸化植物，並提供其彩色照片及線繪圖。智利貓耳菊 (*Hypochaeris chillensis* (Kunth) Britton) 局部歸化於北部低海拔山區，蔓生莠竹 (*Microstegium fasciculatum* (L.) Henrard) 局部歸化於中部低海拔山區。

關鍵詞：智利貓耳菊、蔓生莠竹、新歸化。

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