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Notes on Two Newly Naturalized Plants in Taiwan

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ABSTRACT: *Senecio inaequidens* DC. and *Sporobolus tenuissimus* (Mart. ex Schrank) Kuntze were recently found in southern part of Taiwan. *Senecio inaequidens* occurred at middle-altitude mountain area, and *Sporobolus tenuissimus* was found at plain and low-altitude mountain area. The present study offered the taxonomic description, photographs and illustrations of these two species.

KEY WORDS: Asteraceae, Compositae, Graminae, New record plant, Poaceae, *Senecio inaequidens*, *Sporobolus tenuissimus*, Taiwan, Taxonomy.

INTRODUCTION

We reported the recent finding of two adventive species from Taiwan: *Senecio inaequidens* DC. and *Sporobolus tenuissimus* (Mart. ex Schrank) Kuntze. *Senecio* is a cosmopolitan genus of 1,250-3,000 species, depending on circumscription (Diggs *et al*., 1999). Based on the generic concepts, eight species and one additional variety of *Senecio* are recognized in recently revised Flora of Taiwan (Huang *et al.*, 2003), includes six endemic species, and one naturalized species, *Senecio vulgaris* L., (Peng and Chung, 1998; Chung and Peng, 2002). Genus *Sporobolus* has ca. 150 species in tropical and warm temperate area, and four species are recognized in recently revised Flora of Taiwan (Huang *et al.*, 2000). *Senecio inaequidens* and *Sporobolus tenuissimus* occurred in the southern part of Taiwan (Fig. 1). We offered the description, photographs illustration of these species, and keys to distinguish these species from related taxa in Taiwan.

TAXONOMIC TREATMENT

1. ***Senecio inaequidens*** DC. Species Plantarum 2: 866-872. 1753; Gibbs Russell *et al.*, Memoris of the Botanical Survey of South Africa 2(1-2): 1-152 (pt. 1). 1987.
窄葉黃菀 Figs. 2-4

Stems woody at base, decumbent with adventitious roots, then erect, about 50 cm tall. Phyllotaxis alternate, radical leaves simple, withered by anthesis, cauline leaves linear, simple, occasionally lobed, 2-5 cm long, 0.5-0.7 cm broad, amplexicaul, incised, acute, glabrous, with one clear midrib. Capitula (heads) radiate, numerous to terminal or terminal and upper

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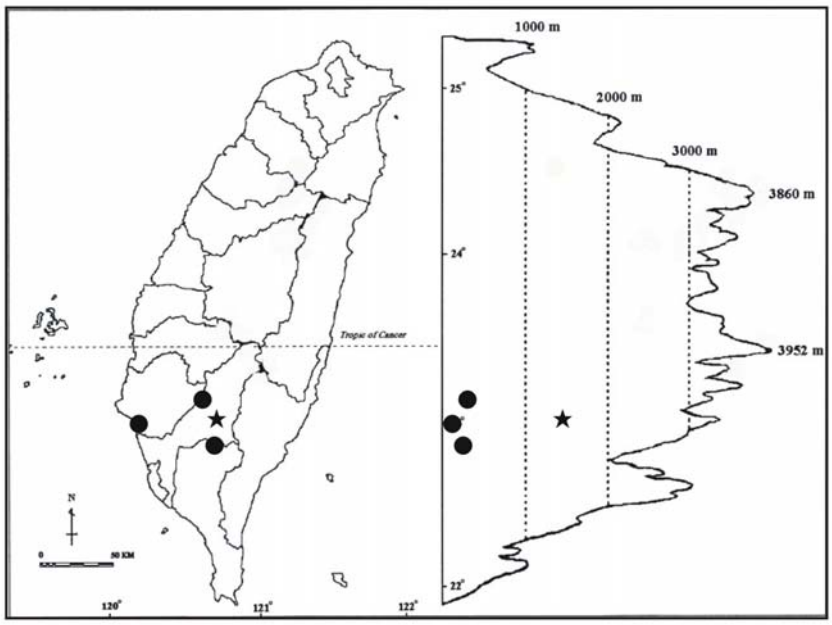

Fig. 1. Distribution of *Senecio inaequidens* DC. (★) and *Sporobolus tenuissimus* (Mart. ex Schrank) Kuntze (●) in Taiwan.

axillary corymbs. Involucre subcylindric, 4 mm long, 3 mm broad, calyculate; outer bracts linear, 2 mm long, 0.5 mm broad, glabrous, purplish at margin, apex obtuse; inner bracts ca. 21, oblong, glabrous, apex obtuse, purplish. Ray florets ca. 13, female, pappus whitish, corolla tube 2 mm long; rays yellow, 5-7 mm long, 2-3 mm broad; disc florets ca. 90, bisexual, corolla yellow, 3-4 mm long. Stamens 5, anthers syngenesious, not caudate; filaments collar dilated. Style branches truncate, with a crown of hairs. Achenes ellipsoid, 1.5 mm long, 0.4 mm broad, 10-ribbed, and the ribs with hispid. Pappus whitish, 4 mm long, with many fine bristles.

Specimens examined: TAIWAN—Kaohsiung Hsien: Taoyuan Hsiang, Tenghie forest road, *M.-J. Jung x040101, x040107, x040108, x040109, M.-J. Jung x041002, x041003, x041004* (NCKU).

Distribution and Note: Common name of *S. inaequidens* includes: Narrow-leaved ragwort, Molteno disease senecio, and Canary weed and Burchell senecio. Spread areas of *S. inaequidens* include South Africa, Europe continent, and Southern America (Rzedowski, 2003). In Taiwan, only one population was found at Tenghie, the middle-altitude mountain area in the southern Taiwan (Fig. 1). *Hypochaeris radicata* L., *Plantago lanceolata* L. and *Verbena bonariensis* L., which naturalized in recent decades, could be found at the same area. By the numbers of ray florets and blade shape, it could be distinguished from other *Senecio* species in Taiwan.

The original habitats of *Senecio inaequidens* are grasslands (ca. 1400-2800 m) of South Africa, but it occurs widely in secondary habitats of Southern Africa (Hilliard, 1977; Werner *et al.*, 1991; Meusel and Jäger, 1992). It was introduced into Germany in 1889 as a wool alien (Brandes, 1910), and then into Western and Southern Europe (Wagenitz, 1987; Guillerm *et al.*, 1990; Ernst, 1998; Brandes, 1999). After 1990, *S. inaequidens* were recorded in Eastern and Northern Europe (Skovgaard, 1993; Often, 1997; Ernst, 1998; Ljungstrand, 2000). In Germany, highways and railways were most important for initial colonization of an area (Griese, 1996; Radkowitsch, 1997).

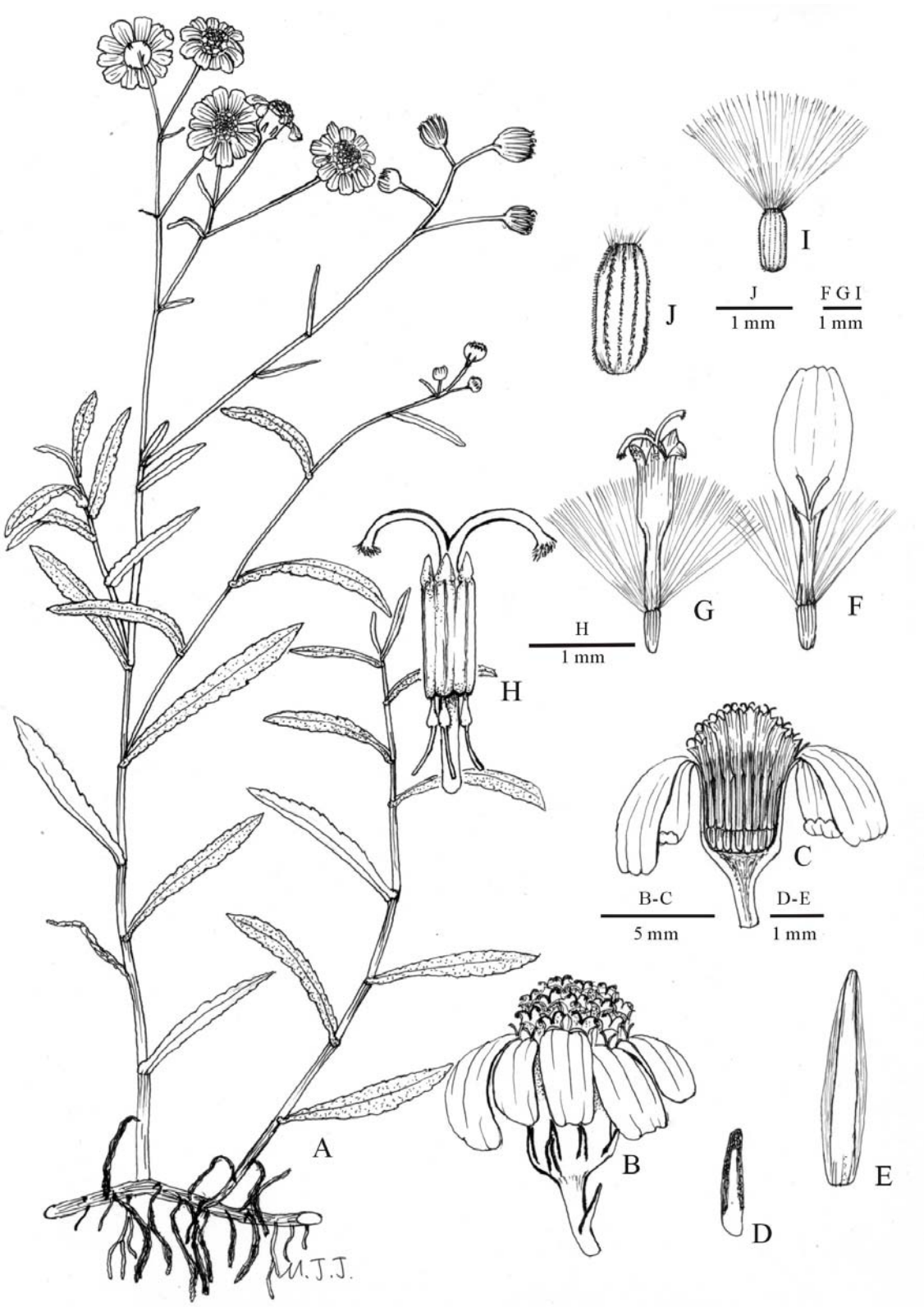

Fig. 2. Illustration of *Senecio inaequidens* DC. A: Flowering habit. B: Capitulum (Head). C: Capitulum, longitudinal section. D: Outer bract. E: Inner bract. F: Ray floret. G: Disc floret. H: Stamen and pistil in disc floret. I: Achene. J: Achene, closer view.

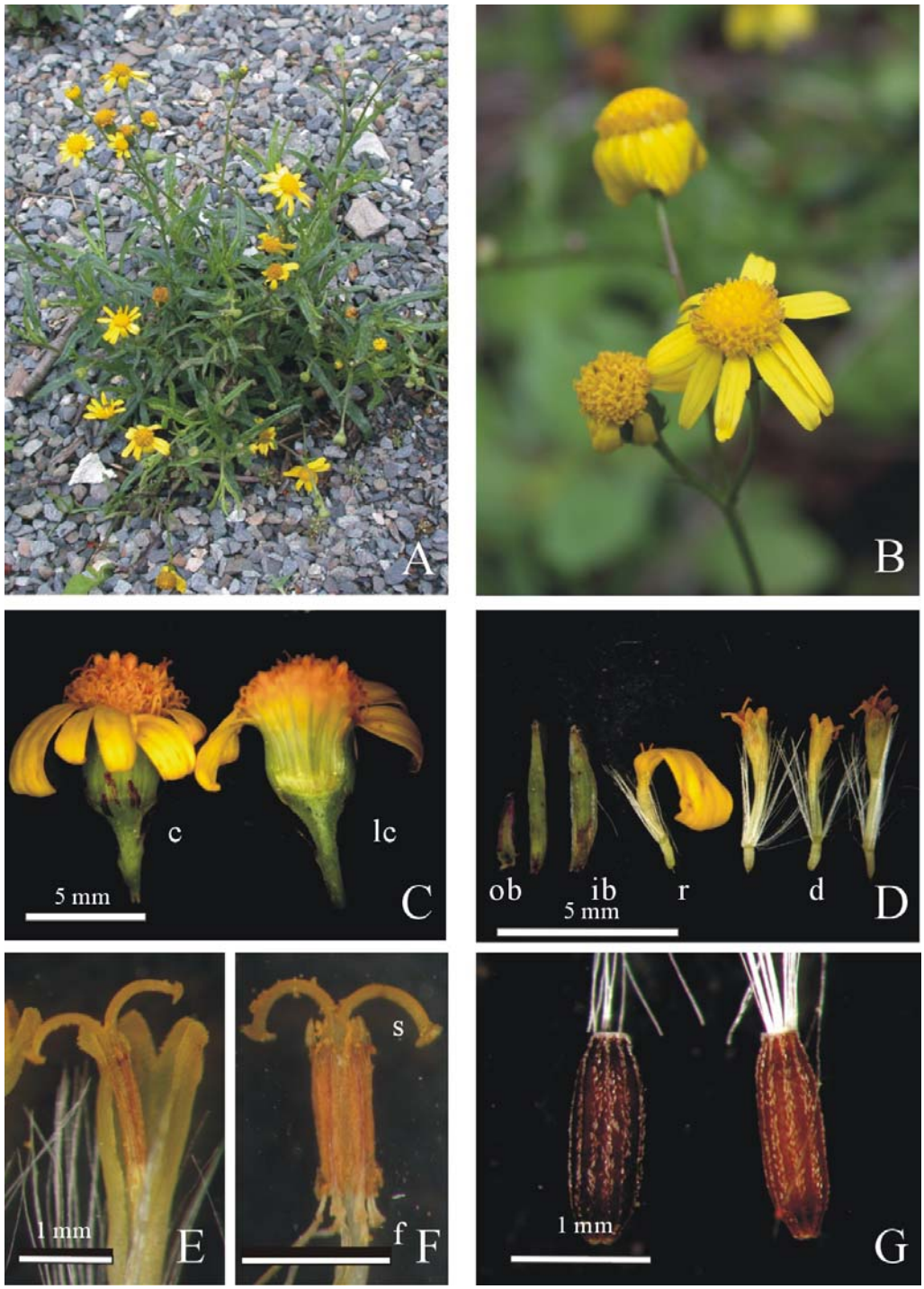

Fig. 3. *Senecio inaequidens* DC. A: Flowering habit. B: Capitula (Heads). C: Lateral view (c) and longitudinal section (lc) of capitulum. D: Outer bract (ob), inner bracts (ib), ray floret (r) and disc florets (d). E: Lateral view of dissected disc floret. F: Stamen with dilated collar filaments (f) and stigma (s). G: Achenes, ribbed with hispid.

2. ***Sporobolus tenuissimus*** (Mart. ex Schrank) Kuntze, Revis. Gen. Pl. 3(2): 369. 1898; Bor, N. L. Grasses of Burma, Ceylon, India and Pakistan (excluding Bambuseae) i-xviii, 1-767. 1960; Veldkamp, J. F. Blumea 48(3): 495-501. 2003. 熱帶鼠尾粟 Figs. 5 & 6

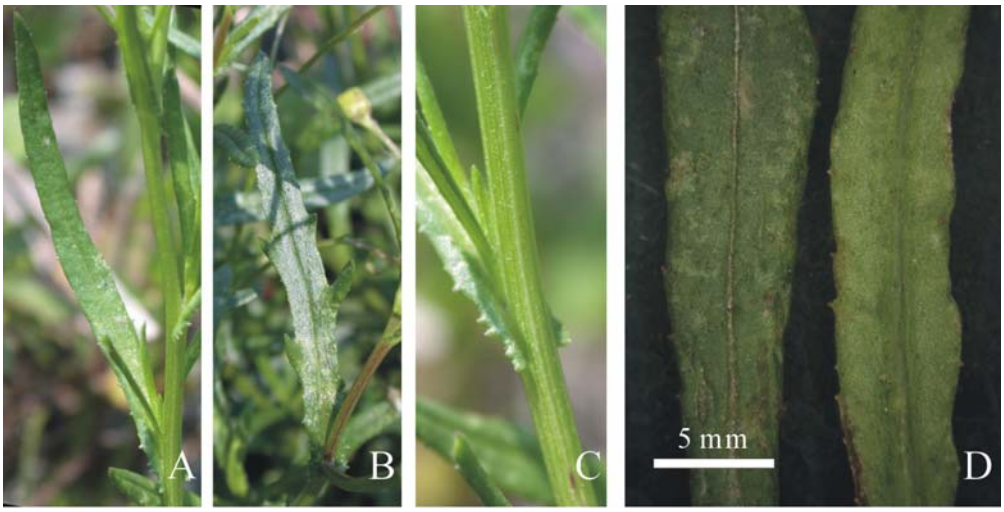

Fig. 4. A: Cauline leaves of *Senecio inaequidens* DC. are mainly simple. B: occasionally with lobes. C: amplexicaul, margin incised. D: From left to right: upper surface and lower surface of blades.

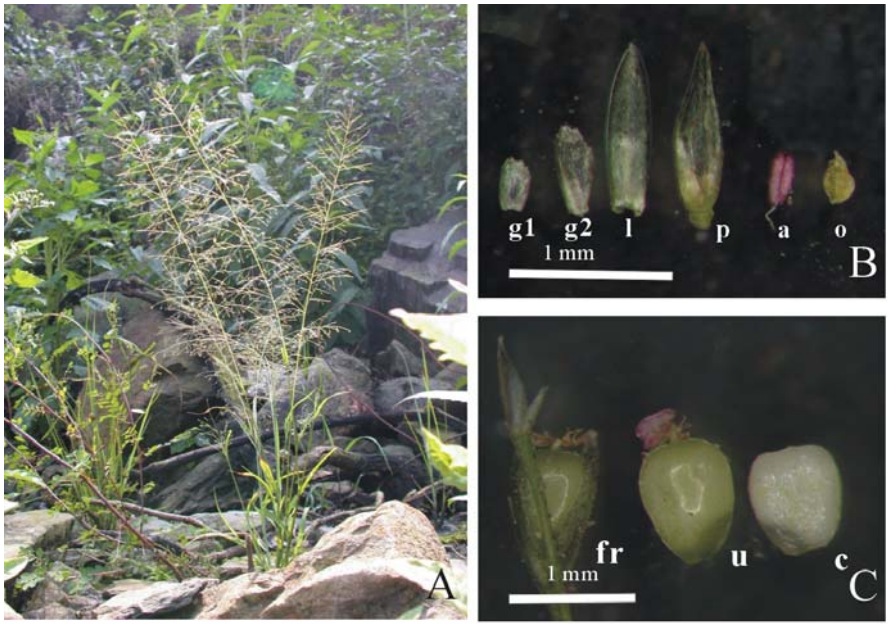

Fig. 5. *Sporobolus tenuissimus* (Mart. ex Schrank) Kuntze. A: Culm. B: Dissected spikelet. g1: lower glume; g2: upper glume; l: lemma; p: palea; a: anther; o: ovary. C: Dissected fruiting spikelet. fr: fruiting spikelets; u: utricle; c: caryopsis.

Culms erect, up to 30 cm in height. Blades linear, glabrous, ca. 5 cm long; ligule membranous, pubescent. Inflorescence divaricate apical panicle, 15-30 cm long. Spikelets 1-flowered, ca. 1 mm long; glumes membranous, oval to ovate, apex obtuse to acuminate; lower glume ca. 0.25 mm long, upper glume ca. 0.5 mm long; lemma lanceolate, ca. 1 mm long, palea lanceolate, boat-shaped, ca. 1 mm long; lodicule 2 per spikelet, inconspicuously 1-nerved, ca. 0.2 mm long; stamen 3, with purplish anther, ca. 0.25 mm long; pistil 1, ovary obovate, ca. 0.25 mm long, stigma pubescent. Utricle obovate, ca. 1 mm long, 0.75 mm wide, embryo 1/3-1/4 its length of urticle.

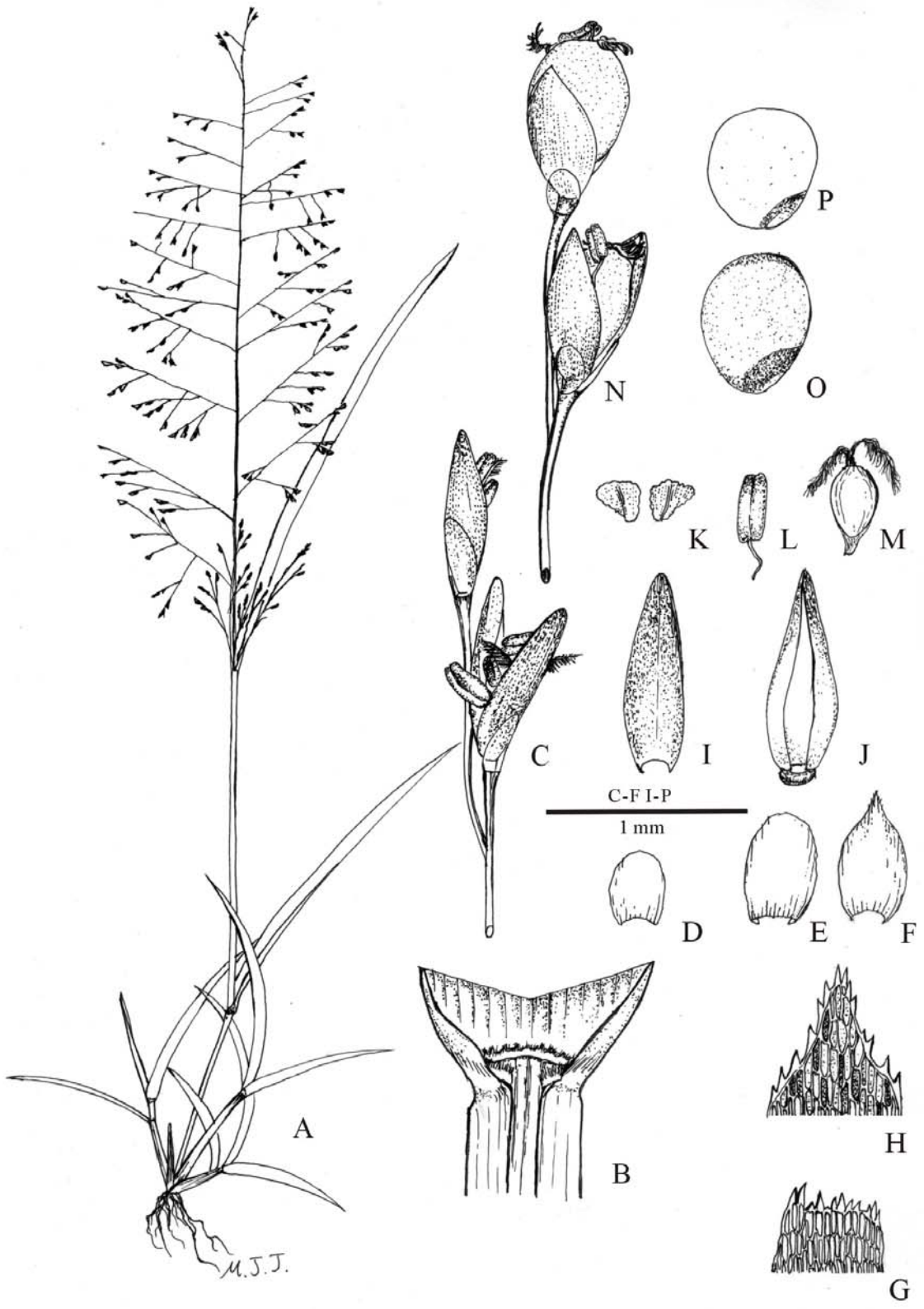

Fig. 6. Illustration of *Sporobolus tenuissimus* (Mart. ex Schrank) Kuntze. A: Flowering culm. B: Ligule. C: Spikelets. D: lower glume. E-F: upper glume. G: Apex of lower glume. H: Apex of upper glume. I: Lemma. J: Palea. K: Lodicules. L: Anther. M: Pistil. N: Fruiting spikelets. O: Utricle. P: Caryopsis.

Specimen examined: TAIWAN－Tainan city: campus of National Cheng-Kung University, *M.-J. Jung x040401, x040402* (NCKU). Kaohsiung Hsien: Liukuei Hsiang, Chaitouchi,, *S.-Z. Yang 25866* (PPI); Maulin Hsiang, Maulin National Scenic Area, *M.-J. Jung x031402, x031403, x031404* (NCKU).

Distribution and Note: Common name of *Sporobolus tenuissimus* is tropical dropseed. *S. tenuissimus* is native in Florida and South Carolina, America (USDA, NRCS. 2004). It was firstly found at cultivated area in Jia-Shien and Chi-Shen, Kaohsiung Hsien by Sheng-Zehn Yang, and then we collected specimens in the campus of National Cheng-Kung University, Tainan city and Moulin, Kaohsiung Hsien. All collection sites were low-altitude, south part of Taiwan (Fig. 1). It could be distinguished from other *Sporobolus* species in Taiwan by its divaricate panicle, but might be identified as *Eragrostis amabilis* (L.) Wight and Arn. (Chloridoideae, Poaceae). Characters of one floret per spikelet and utricle can be used to distinguish from it.

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LITERATURE CITED

Brandes, D. 1999. *Senecio inaequidens* am Monte Baldo. Abh. Naturw. Ver. Bremen **44**: 245-256.

Brandes, W. 1910. Dritter Nachtrag zur Flora der Provinz Hannover. Jahresber. Niedersachs. Bot. Ver. **1/2**: 70-88.

Chung, S.-W. and C.-I. Peng. 2002. *Senecio kuanshanensis* (Asteraceae), a new species from southern Taiwan. Bot. Bull. Acad. Sin. **43**: 155-159.

Diggs, G. M. Jr., B. L. Lipscomb and R. J. O'Kennon. 1999. Shinners & Mahler's Illustrated Flora of North Central Texas. Austin College, Sherman and Botanical Research Institute of Texas, Forth Worth, USA. 1626 pp.

Ernst, W. H. O. 1998. Invasion, dispersal and ecology of the South African neophyte *Senecio inaequidens* in The Netherlands: from wool alien to railway and road alien. Acta Bot. Neerl. **47**: 131-151.

Griese, D. 1996. Zur Ausbreitung von *Senecio inaequidens* DC. an Autobahnen in Nordostdeutschland. Braunschw. Naturkundl. Schr. **5**: 193-204.

Guillerm, J. L., E. Le Floch, J. Maillet and C. Boulet. 1990. The invading weeds within the Western Mediterranean Basin. In: di Castri F., A. J. Hansen and M. Debussche. (eds.). Biological invasions in Europe and the Mediterranean Basin, p. 61-84, Kluwer Academic Publ., Dordrecht, The Netherlands.

Huang, T.-C. and Editorial Committee of the Flora of Taiwan. (eds.). 2000. Flora of Taiwan, 2nd ed. Volume Five. Editorial Committee of the Flora of Taiwan, Department of Botany, National Taiwan University, Taipei, Taiwan. 1143 pp.

Huang, T.-C. and Editorial Committee of the Flora of Taiwan. (eds.). 2003. Flora of Taiwan, 2nd ed. Volume Six: Editorial Committee of the Flora of Taiwan, Department of Botany, National Taiwan University, Taipei, Taiwan. 343 pp.

Ljungstrand, E. 2000. Rapport från Botaniska Föreningens i Göteborg ruderatexkusion i Göteborgstrakten lördagen den 30 september 2000. URL [www.pheromone.ekol.lu.se /klubb2000/goteborg30sept.html.]

Often, A. 1997. *Senecio inaequidens* DC. and *Solidago rugosa* Mill. found as naturals in Oslo, Norway. Blyttia **55**: 141-144.

Radkowitsch, A. 1997. *Senecio inaequidens* DC. - ein Beitrag zur Verbeitung in Deutschland unter besonderen Berücksichtigung von Bayern. Hoppea **58**: 389-404.

Rzedowski, J., H. Vibrans, G. Calderon de Rzedowski. 2003. *Senecio inaequidens* D.C. (Compositae, Senecioneae), a harmful weed introduced into Mexico. Acta Botanica Mexicana **63**: 83-96.

Skovgaard, F. 1993. En ny brandbaeger I Danmark. Medlemsblad for Dansk Botanisk Forening **1993**: 3-5.

USDA, NRCS. 2004. The PLANTS Database, Version 3.5 (http://plants.usda.gov). National Plant Data Center, Baton Rouge, LA 70874-4490, USA.

Wagenitz, G. 1987. Nachträge, Berichtigungen und Ergänzungen. In: Hegi, G. (eds.). Illustrierte Flora von Mitteleuropa, 2nd ed., VI. **4**: 1353-1452. Carl Hanser Verlag, München, Germany.

兩種台灣新歸化植物

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摘　　要

窄葉黃菀(*Senecio inaequidens* DC.) (新擬中名)及熱帶鼠尾粟(*Sporobolus tenuissimus* (Mart. ex Schrank) Kuntze) (新擬中名)為近期在台灣南部所發現之新記錄種植物。熱帶鼠尾粟分布於平原地區及低山帶，窄葉黃菀則分布於中海拔山區；本文描述此兩種植物，提供形態、解剖圖片以利鑑定。

關鍵詞：菊科、禾本科、新記錄植物、窄葉黃菀、熱帶鼠尾粟、台灣、分類。

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