

Unwelcome Naturalization of *Chromolaena odorata* (Asteraceae) in Taiwan

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ABSTRACT: In recent years many alien adventive species found their ways to Taiwan. In this report we document the naturalization of the New World *Chromolaena odorata*, a problematic weed, that is growing rampantly on southern part of this island. A taxonomic account, line drawing, and distribution map for Taiwan with notes on this obnoxious weed are provided.

KEY WORDS: Asteraceae, *Chromolaena odorata*, Taxonomy, Taiwan, Weed.

INTRODUCTION

Chromolaena DC., a genus native to the New World and containing about 165 species, has long been treated as a section of *Eupatorium*. In 1970 King and Robinson reinstated the genus *Chromolaena* from synonymy, which has since been followed by many authors (e.g., Berry *et al.*, 1997; Cronk and Fuller, 1995; Hind *et al.*, 1993; Muniappan, 1988; Pruski, 1992; Rao and Datt, 1996). *Chromolaena* is characterized by non-enlarged, glabrous style bases, few hairs on the corolla, a small but distinct carpodium, cylindrical involucre with deciduous involucre bracts, narrowly cylindrical corollas with lobes longer than wide, 5-ribbed achenes, and generally flat to slightly convex receptacles (King and Robinson, 1970, 1987).

One of the members of this genus, *C. odorata* (L.) R. King and H. Robinson, is an obnoxious neotropical weed. It has considerably extended its distribution to the paleotropics in the last 150 years (Gautier, 1992) and is now thoroughly naturalized in parts of Africa, India, Ceylon, Indochina, southern China, Malaysia and Indonesia. Recently it has invaded southern Taiwan and become rampant in certain localities. A taxonomic account with notes on this problematic weed follows.

TAXONOMIC TREATMENT

Chromolaena odorata (L.) R. M. King & H. Rob., *Phytologia* 20: 204. 1970; King & Robinson, *Ann. Missouri Bot. Gard.* 62: 923. 1975. Fig. 1 香澤蘭

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Fig. 1. *Chromolaena odorata* (L.) R. M. King and H. Rob. 1. Habit. 2. Head. 3. Head, longitudinal section. 4. Involucral bracts. 5. Floret. 6. Floret, corolla and pappus removed. 7. Stamens. 8. Achene. 9. Achene, cross section. 10. Pappus. All from 20 Dec 1989, Yang s.n. (HAST). Bar = 1 cm.

Eupatorium odoratum L., Syst. Ed. 10, 2: 1205, 1759; Chiu & Chang, Ill. Med. Pl. Taiwan 4: 241, 1995.

A perennial, profusely branched, sprawling herb to 2 (-3) m tall; stems terete, striate, densely pilosulose and brownish glandular-punctate. Leaves opposite, the median ones larger, deltoid to rhombic ovate, 7-15 cm long, 3.5-8 cm wide, apex acute to acuminate, base obtuse to very broadly cuneate or truncate, pilosulose on both surfaces, brownish glandular-punctate beneath, prominently 3-nerved, margins sparsely dentate, subentire toward apex, petioles 1-2.5 cm long; the upper leaves gradually smaller toward the inflorescence. Internodes elongate, (5-)9-20 cm long. Inflorescence of loose corymbs. Heads discoid, 10-11 mm long, 3-4.5 mm wide, with ca. 25-30 florets; peduncle 8-16 mm long, densely pilosulose; involucre cylindrical, ca. 7 mm long; bracts 4-seriate, distinctly imbricate, with 3 prominent, parallel green nerves and scarious margins, tips slightly flaring outward, outer bracts ovate to ovate-oblong, 1.8-2 mm long, 1.2 mm wide, inner bracts narrowly oblong, apex acute, base obtuse, 7-8 mm long, 1.3 mm wide, sparsely pilosulose. Receptacles convex, glabrous. Corolla 5-lobed, greenish below, purplish toward summit, 5.5-6 mm long, glabrous; anthers brownish, ca. 2 mm long, with a membranous appendage at apex, filaments ca. 2.5 mm long; style purplish, ca. 10-11 mm long, exserted; pappus capillary, brownish, subequal to corolla. Achenes blackish brown, narrowly oblong, 4-4.5 mm long, 0.4-0.5 mm across, 5-ribbed, the ribs strigillose, otherwise glabrous; pappus subequal to corolla.

Specimens examined: **Tainan:** Kuanmiao Hsiang, Hsien (as "Prov.") Road 177, 70 m alt., scandent subshrub at exposed site along road, very numerous, 31 Dec 1995, *Wang 1913* (TNM). **Kaohsiung:** Wanshoushan, 10-350 m alt., 12 Jun 1991, *Leu 956* (HAST); along Hsien Road 184, between Luchu and Chishan, 10 Jan 1995, *Leu 24468* (TAIF); roadside, Weiliaoshan, 500 m alt., 19 Dec 1992, *Hung 70* (PPI); Maolin Hsiang, sprawling herb along open roadside, near Maolinku, ca. 300 m alt., broadleaf forest, *Lai 135* (HAST); Shanping Forest Recreation Area, 695 m alt., trail near parking lot, abundant in exposed, cut-over forest land, crawling over other plants and forming dense carpets, 2 Dec 1998, *Lai 108* (HAST). **Pingtung:** Machia Hsiang, Liangshan, 20 Dec 1989, *Yang, s. n.* (HAST), *Peng 13641* (HAST).

Distribution and notes

This species is distributed in southeastern United States, Mexico, the West Indies south to Argentina, and widely adventive in tropical parts of the Old World (King and Robinson, 1970). In Taiwan, it occurs at low altitudes in the southern part of the island (Fig. 2). It is frequently seen in alluvial soil in river valleys, often in abandoned crop land, and can reach to 3 m tall on open slopes along road cuts or landslide area, associated with other weedy plants commonly found in clearings or disturbed warm sites, such as *Rhus semialata* var. *roxburghiana*, *Broussonetia papyrifera*, *Pennisetum setosum*, *Lantana camera*, *Rubus* sp., *Hibiscus taiwanensis*, *Mimosa invisa*, *Polygonum chinensis*, *Staphytarpheta jamaicensis*, *Rubus piptopetalus*, *Achyranthes apera* var. *rubro-gusca*, *Desmodium scorpiurus*, *Lygodium japonicum*, *Microlepis speluncae*. Flowering period is between November and January.

Chromolaena odorata is an aggressive species that rapidly colonizes areas cleared for planting new crops, as well as nurseries, young and open plantations, agricultural fields, pasture lands, fallow fields, waste lands, road sides, river banks, rocky areas, and slash and burn areas in different parts of the world (Ambika and Jayachandra, 1990). It does not grow in heavy shade but instead thrives on open, poor, rocky soils. *Chromolaena odorata* contains turpentine and is highly flammable (Cronk and Fuller, 1995). The dieback of the upper parts

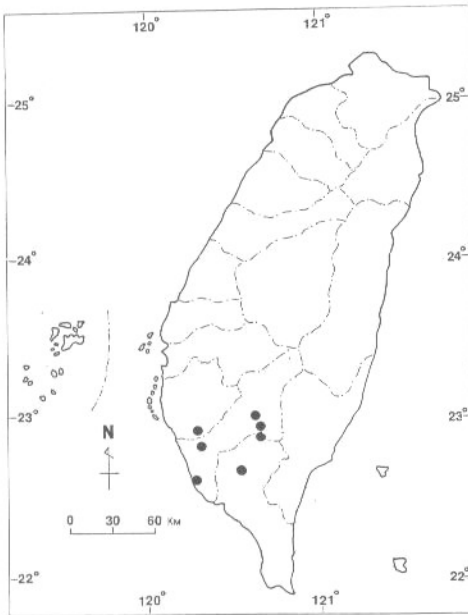


Fig. 2. Distribution of *Chromolaena odorata* in Taiwan.

of the plants after flowering coincides with the beginning of the dry season in most regions, and the plant frequently becomes a fire hazard. After burning, the rootstock remains alive and sprouts readily immediately after the onset of rains and form dense thickets (Muniappan, 1996). Ambika and Jayachandra (1980) reported that the leaves of *C. odorata* contain a large amount of allelopathic chemicals, which could be responsible for reducing the growth of radicle, plumule, and seedlings of other species. Ogbe *et al.* (1994) reported a strong inhibiting effect of the leaf extracts of *C. odorata* on the growth of maize seedlings. *Chromolaena odorata* contains exceptionally high nitrate content in the leaves and young shoots, sufficient to poison animals that feed on its foliage (Sajise *et al.*, 1972, 1974). It is believed to cause diarrhea, and in extreme cases death of livestock, as reported by

ranchers in the southern Philippines (Aterrado and

Talatala - Sanico, 1988). Since 1966, biological control has been pursued as a possible method for tackling this weed (Muniappan, 1996), but this has not proven very successful to date. While a world-wide effort is being made to control the spread of this rampant weed (Muniappan, 1988), Chiu and Chang (1995) unfortunately claimed "success" in introducing *C. odorata* (as "*Eupatorium odoratum* L.") for cultivation as a medicinal herb in Taiwan.

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台灣新歸化之惡劣雜草—香澤蘭(菊科植物)

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摘 要

原產美洲之香澤蘭(菊科)近年來大量歸化於台灣南部。香澤蘭為多年生蔓性草本，生長迅速，繁殖力強，植株並含植物相剋物質，在河谷向陽兩側、廢休耕地、崩塌地、林道邊坡、森林邊緣、牧場、火燒地區往往大量滋生，原生植被受其侵害至鉅。此外，香澤蘭之莖葉富含硝酸鹽，人畜誤食易中毒。本文提供其分類性狀描述、植物繪圖以及在台灣之分布圖。

關鍵詞：菊科、香澤蘭、分類、台灣、雜草。

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