



A new natural hybrid of *Sphagneticola* (Asteraceae, Heliantheae) from Guangdong, China

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Abstract

A new natural hybrid, *Sphagneticola* × *guangdongensis* (Asteraceae, Heliantheae), is described and illustrated. Its chromosome number was revealed to be $2n = 53$, lending strong support for its hybridity and parental origin (*S. calendulacea* with $2n = 50$ and *S. trilobata* with $2n = 56$) as previously already confirmed by evidence from morphology and molecular data.

Keywords: chromosome number, invasive species, parental origin

Introduction

Sphagneticola Hoffmann (1900: 36) (Asteraceae-Heliantheae) is a small genus of four species that are common at lower elevations in the tropical and subtropical regions of the world (though not known to occur in Africa), including *S. brachycarpa* (Baker 1884: 181) Pruski (1996: 411), *S. calendulacea* (Linnaeus 1753: 902) Pruski (1996: 411), *S. gracilis* (Richard 1807: 490) Pruski (1996: 412), and *S. trilobata* (Linnaeus 1759: 1233) Pruski (Pruski 1996: 412). Among them, the widespread Asian *S. calendulacea* is the only species native to China (Fujian, Guangdong, Liaoning, Taiwan). *Sphagneticola trilobata*, native to the New World tropics but widespread in the Old World tropics, was originally cultivated as an ornamental ground cover in China but now has become an invasive species at least in Fujian, Guangdong, Guangxi, and Taiwan (Chen & Head 2011).

Recently, a new natural hybrid between *Sphagneticola calendulacea* and *S. trilobata* was discovered from Guangdong in south China (Wu *et al.* 2013; Ni *et al.* 2014). Evidence from morphology and molecular data (microsatellite and nrITS sequences) has strongly confirmed the parentage of the hybrid, with *S. calendulacea* as the maternal parent (ovule donor) and *S. trilobata* as the paternal parent (pollen donor) (Wu *et al.* 2013). The new hybrid is of potential invasiveness, appearing to be an equal competitor to its invasive parent *S. trilobata* and tending to sweep out rapidly its native parent *S. calendulacea* (Wu *et al.* 2013; Ni *et al.* 2014).

This new hybrid, however, has not as yet been formally named and described, causing much inconvenience in communication. In this paper, we name and describe the hybrid to facilitate communication, and report its chromosome number and chromosome morphology to provide cytological evidence for its parental origin.

Sphagneticola × *guangdongensis* Q. Yuan, **nothosp. nov.** (Figs. 1 & 2)

Type:—CHINA. Guangdong: Guangzhou, Tianhe District, Longdong, South China Botanical Garden, 23°11'38.24"N, 113°21'38.24"E, 28 m, 8 July 2012, Q. Yuan & C. Ren 525 (holotype IBSC; isotype IBSC).

Herbs, perennial, procumbent. Stems subglabrous or strigose. Leaves opposite, sessile or shortly petiolate; blade 3-lobed, oblong, (2–)5–8 cm long, (0.8–)1.5–2.5 cm broad, papery, sparsely strigose on both surfaces, base cuneate, apex acuminate, margin remotely serrulate. Capitula solitary on elongate peduncle, radiate; peduncle 6–15 cm long, strigose; involucre hemispheric, green; phyllaries 9–11, lanceolate, 2-seriate, subequal, 9–11 mm long, strigose, apex

acute. Ray florets 1-seriate, yellow; corolla 1.0–1.2 cm long, 3–4 mm broad, 2- or 3-dentate. Disk florets numerous, yellow; corolla 4–5 mm long, 5-lobed. Achenes unknown.

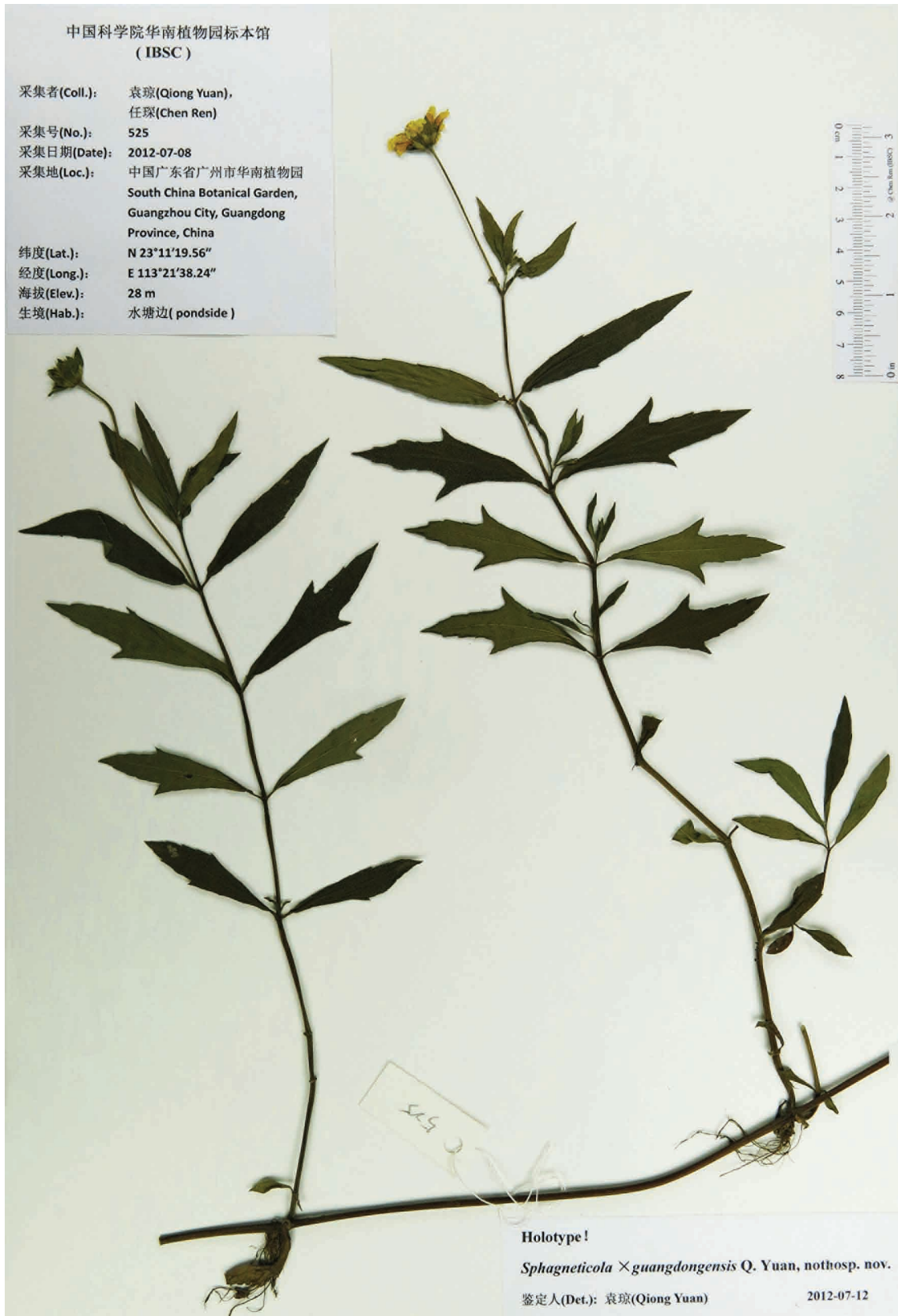


FIGURE 1. Holotype sheet of *Sphagneticola* × *guangdongensis*.

Cytology:—One population from Guangzhou, Guangdong, China (voucher: *Q. Yuan* & *C. Ren* 525, IBSC) was cytologically examined. Root tips were pretreated in 0.1% colchicine at about 20° for 3 h, fixed in Carnoy I (glacial

acetic acid : absolute ethanol = 1 : 3) at 4° for 30 min, then they were macerated in 1 : 1 mixture of 1 M HCl and 45% acetic acid at 37° for 45 min, and stained and squashed in Carbol fuchsin. Karyotype formula was based on measurements of metaphase chromosomes of three cells. The symbols used to describe the karyotype followed Levan *et al.* (1964).

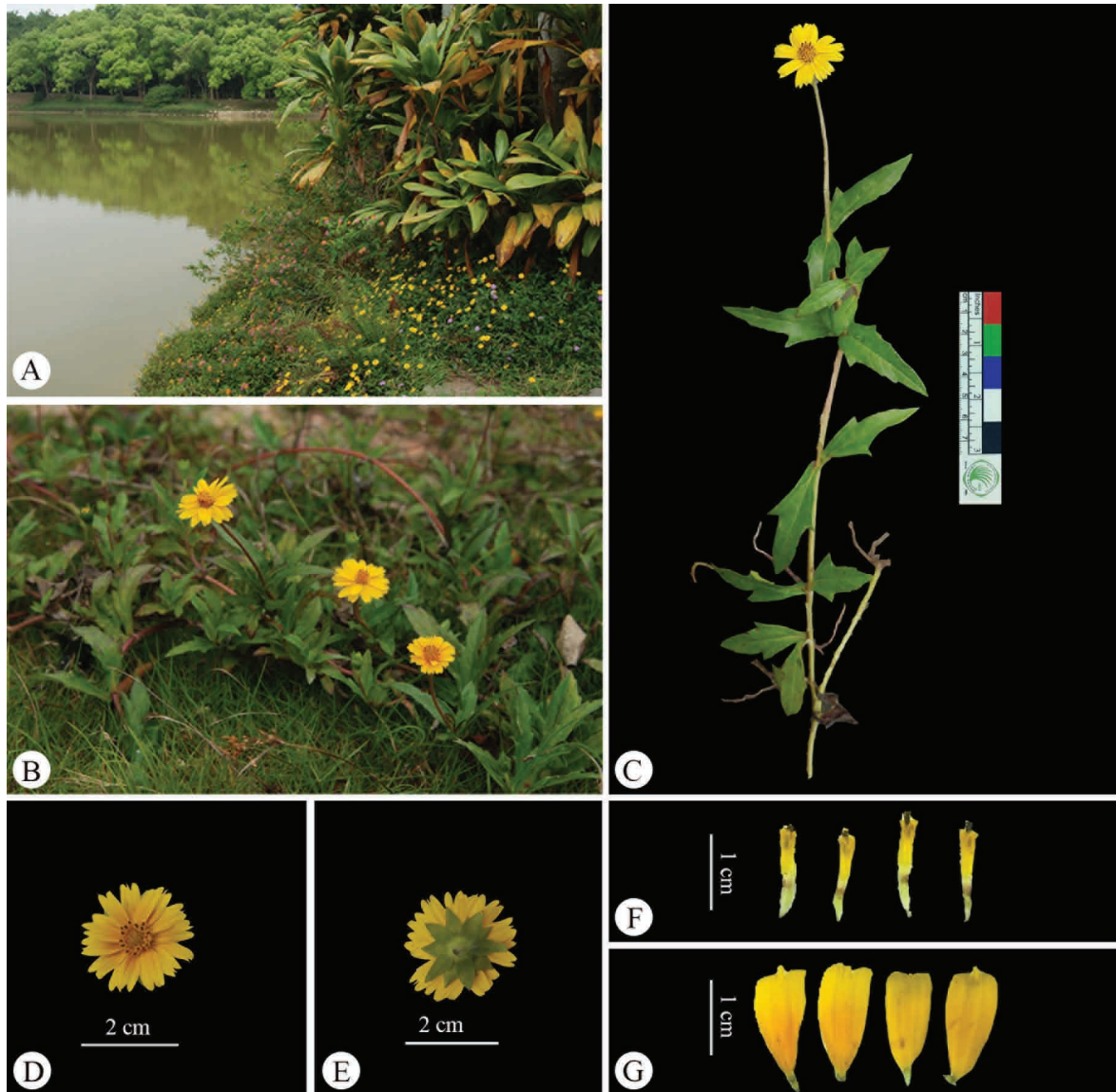


FIGURE 2. *Sphagneticola* × *guangdongensis* in the wild. **A.** Habitat. **B–C.** Habit. **D.** Capitulum (top view). **E.** Capitulum (bottom view). **F.** Disk florets. **G.** Ray florets. Photos by Q. Yuan.

The chromosome number of *Sphagneticola* × *guangdongensis* was $2n = 53$ (Fig. 3A). The karyotype was formulated as $2n = 53 = 21sm + 30m + 2st$ (Fig. 3B).

Distribution and habitat:—*Sphagneticola* × *guangdongensis* is currently known from Guangdong (Foshan, Guangzhou, Zhaoqing, Zhuhai) in south China (Wu *et al.* 2013; this study) (Fig. 4). It grows at riverbanks, coastlands and other moist habitats at lower elevations (20–160 m).

Phenology:—Flowering almost all year round, but in full blossom in April; fruiting plants not seen.

Etymology:—The specific epithet is derived from Guangdong, a province in south China where the new hybrid is currently known to occur.

Additional specimens examined (paratypes):—CHINA. Guangdong: Foshan, Shanshui District, riverbank, 5 m, 27 April 2011, Q. Yuan 22 (IBSC), 23 (IBSC), 36 (IBSC); Guangzhou, Tianhe District, Longdong, pond side, 28 m, 26 May 2015, H. M. Li 5 (IBSC).

Discussion:—*Sphagneticola* × *guangdongensis* is intermediate between *S. calendulacea* and *S. trilobata* in leaf shape (Fig. 5). It differs from its parental species by the leaves 3-lobed and oblong (vs. often entire or sparsely serrulate, oblong to oblong-lanceolate in *S. calendulacea* and 3-lobed, ovate in *S. trilobata*, respectively).

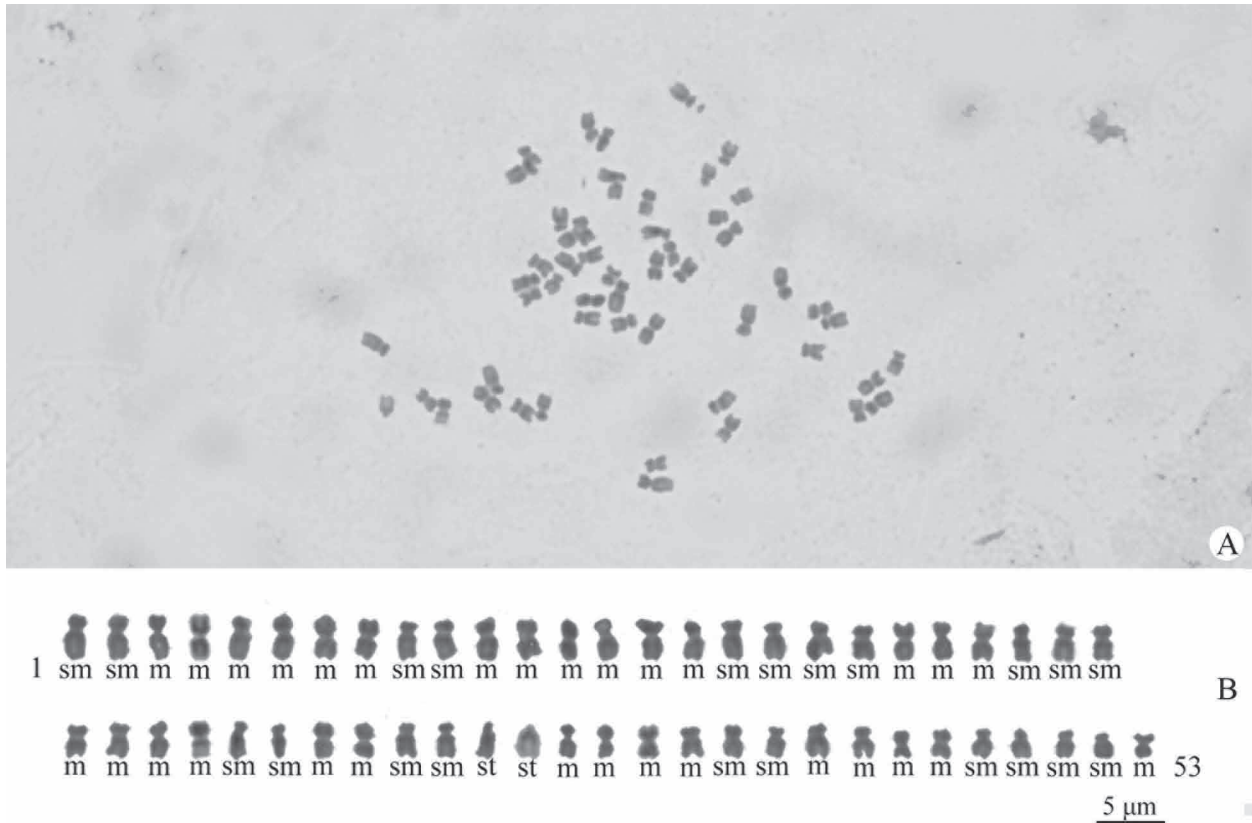


FIGURE 3. Mitotic metaphase chromosomes (A) and karyotype (B) of *Sphagneticola* × *guangdongensis*, both same scale.

Our cytological study lends strong support for the hybridity and parental origin of *Sphagneticola* × *guangdongensis*. The maternal parent *S. calendulacea* has $2n = 50$, the paternal parent *S. trilobata* has $2n = 56$ (Ren *et al.* 2012), and the new hybrid has $2n = 53$ (this study), indicating that 25 chromosomes in the hybrid come from *S. calendulacea* while the remaining 28 come from *S. trilobata*.

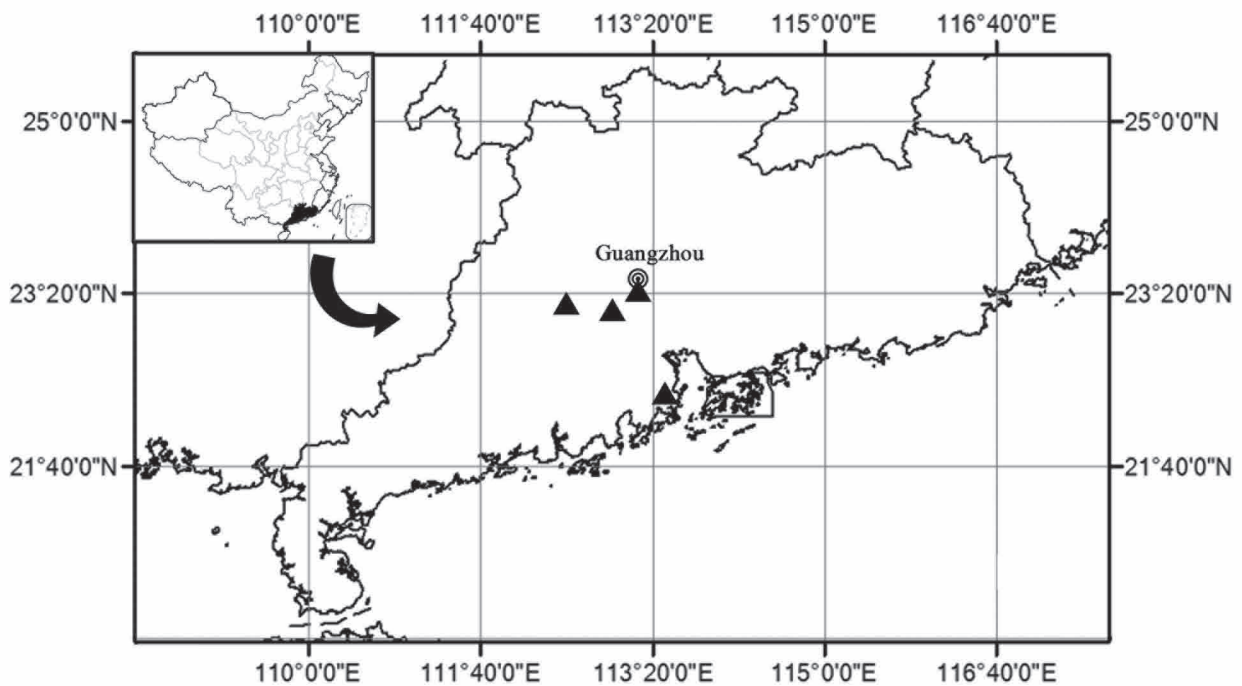


FIGURE 4. Distribution of *Sphagneticola* × *guangdongensis* (▲).

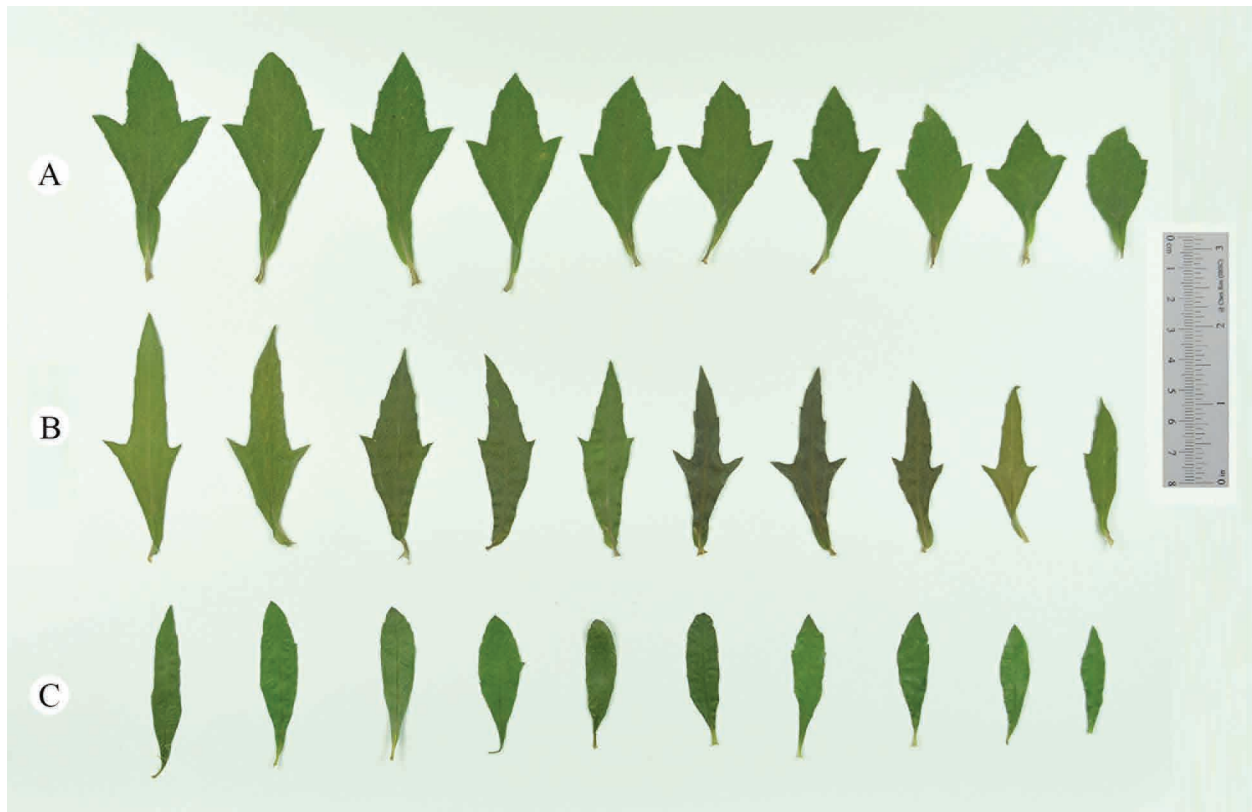


FIGURE 5. Leaf morphology in *Sphagneticola* × *guangdongensis* (**B**) and its two parent species, *S. trilobata* (**A**) and *S. calendulacea* (**C**). **A** from H. M. Li 4 (IBSC), **B** from Q. Yuan & C. Ren 525 (IBSC), and **C** from Q. Yuan17.

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