

Additions to the Flora of Singapore, new and overlooked records of naturalised plant species (1)

L.M.J. Chen, B.C. Ho, L.M. Choo & S.L. Koh

Herbarium, Research & Conservation Branch,
Singapore Botanic Gardens, National Parks Board,
1 Cluny Road, 259569, Singapore
Lily_Chen@nparks.gov.sg

ABSTRACT. Nine species of plants that are casual or have become naturalised are newly recorded for Singapore. Six of these are weeds assumed to have only recently arrived in Singapore: *Cuscuta campestris* Yunck., *Clidemia capitellata* (Bonpl.) D.Don, *Decalobanthus peltatus* (L.) A.R.Simões & Staples, *Erigeron bellioides* DC., *Justicia comata* (L.) Lam., *Mecardonia procumbens* (Mill.) Small. The remaining three have been in Singapore for some time but have been previously overlooked: *Pseudelephantopus spicatus* (Juss. ex Aubl.) C.F.Baker, *Praxelis clematidea* R.M.King & H.Rob and *Spigelia anthelmia* L.

Keywords. Acanthaceae, Asteraceae, Convolvulaceae, Loganiaceae, Melastomataceae, naturalised species, new records

Introduction

During the course of routine collection and identification of material coming into the Herbarium of Singapore Botanic Gardens, along with taxonomic work being done for the *Flora of Singapore* project, nine species of non-native but naturalised plants were newly recorded for Singapore. These are reported here.

1. *Cuscuta campestris* Yunck. (Convolvulaceae)

A native of North America, this parasitic weed has naturalised in many parts of the world. In Singapore, it was collected for the first time in 2011. It can be distinguished from *Cuscuta australis* R.Br., already recorded from Singapore, by the shape of the corolla scales. In *Cuscuta australis* the scales are bifid with few fimbriae, in *C. campestris* the scales are not bifid and the fimbriae are many. See the account in the *Flora of Peninsular Malaysia* by Staples (2015) for a detailed description of *Cucusta campestris*.

Specimens examined. SINGAPORE: **Jalan Bahar:** 23 Apr 2009, *Leong et al.* SING 2009-347 (SING [SING0137312]). **Zhenghua Park:** 10 May 2011, *Lua LHK-11-19* (SING [SING0166636], WLU). **Admiralty Park:** 20 Mar 2012, *Lua et al.* SING 2012-86, (SING [SING0182076]). **Pulau Ubin:** 20 Feb 2012, *Soh* SING 2012-028 (SING [SING0174106]).

2. *Clidemia capitellata* (Bonpl.) D.Don (Melastomataceae) (Fig. 1A–C)

The staff at the SING herbarium noticed a “much hairier version” of the invasive *Clidemia hirta* (L.) D.Don growing in the Nee Soon area about a decade ago but no collections were made as they did not find the plants in flower. In 2016, fertile specimens were collected by various NParks staff and these were identified as *Clidemia capitellata*.

Clidemia capitellata is native from southern Mexico to Colombia and the West Indies but has apparently also naturalised in several areas in Brazil where it is a weed in Gurana plantations (Miléo et al., 2007). In flower, *Clidemia capitellata* is easily distinguished from *C. hirta* as the sessile flowers “are clustered and well placed on a strong central axis and at the ends of short branches” (Croat, 1978), whereas the flowers of *C. hirta* are in short, terminal or axillary panicles (Fig. 1A–B). The persistent calyx lobes on the berries of *Clidemia hirta* are linear, but in *C. capitellata* the lobes are triangular (Fig. 1C). A short note on this species was included in *The Plant Observatory* website in 2015. For a detailed description of *Clidemia capitellata*, see Croat (1978). We are currently unaware of any previous reports of naturalisation of this species from areas outside of the Americas.

Specimens examined. SINGAPORE: **Central Catchment Nature Reserve:** MacRitchie, 27 Jan 2016, *Lua SING 2016-026* (SING [SING0230840]); Chestnut Peninsula, 15 Aug 2016, *Ali Ibrahim et al. SING 2016-241* (SING [SING0230842]); Upper Peirce access road, 28 Nov 2017, *Ho et al. SING 2017-683* (SING [SING0232225]).

3. *Decalobanthus peltatus* (L.) A.R.Simões & Staples (Convolvulaceae)

This very large climber is widely distributed from Tropical Africa to Malesia and some of the Pacific Islands (Staples, 2010, 2015). It was first collected in Singapore from an offshore island in 1996, and subsequently from the mainland in 2013. It is presumed to have naturalised only recently as it is rather unlikely that such a prominent species could have evaded collectors for almost two centuries, because not only is this a large liana that forms thickets that can smother nearby vegetation, but it is also shade intolerant (see GISD, 2015: species profile of *Merremia peltata* (L.) Merr.). For a detailed description of this species, see the account in the *Flora of Peninsular Malaysia* by Staples (2015) under the name *Merremia peltata*.

Specimens examined. SINGAPORE: **Turf Club Ave.:** 3 Nov 2014, *Lua & Siow SING 2014-370* (SING [SING0213536]). **Springleaf Estate:** 21 Jul 2013, *Staples et al. 1544* (SING [SING0200058], SINU). **Marina Mall:** 21 Jul 2013, *Staples et al. 1543* (SING [SING0200057], SINU). **Pulau Tekong:** 15 Aug 1996, *Tan et al. T-1058* (SINU); *ibid.*, 26 Mar 1996, *Tan & Chua 941* (SINU).

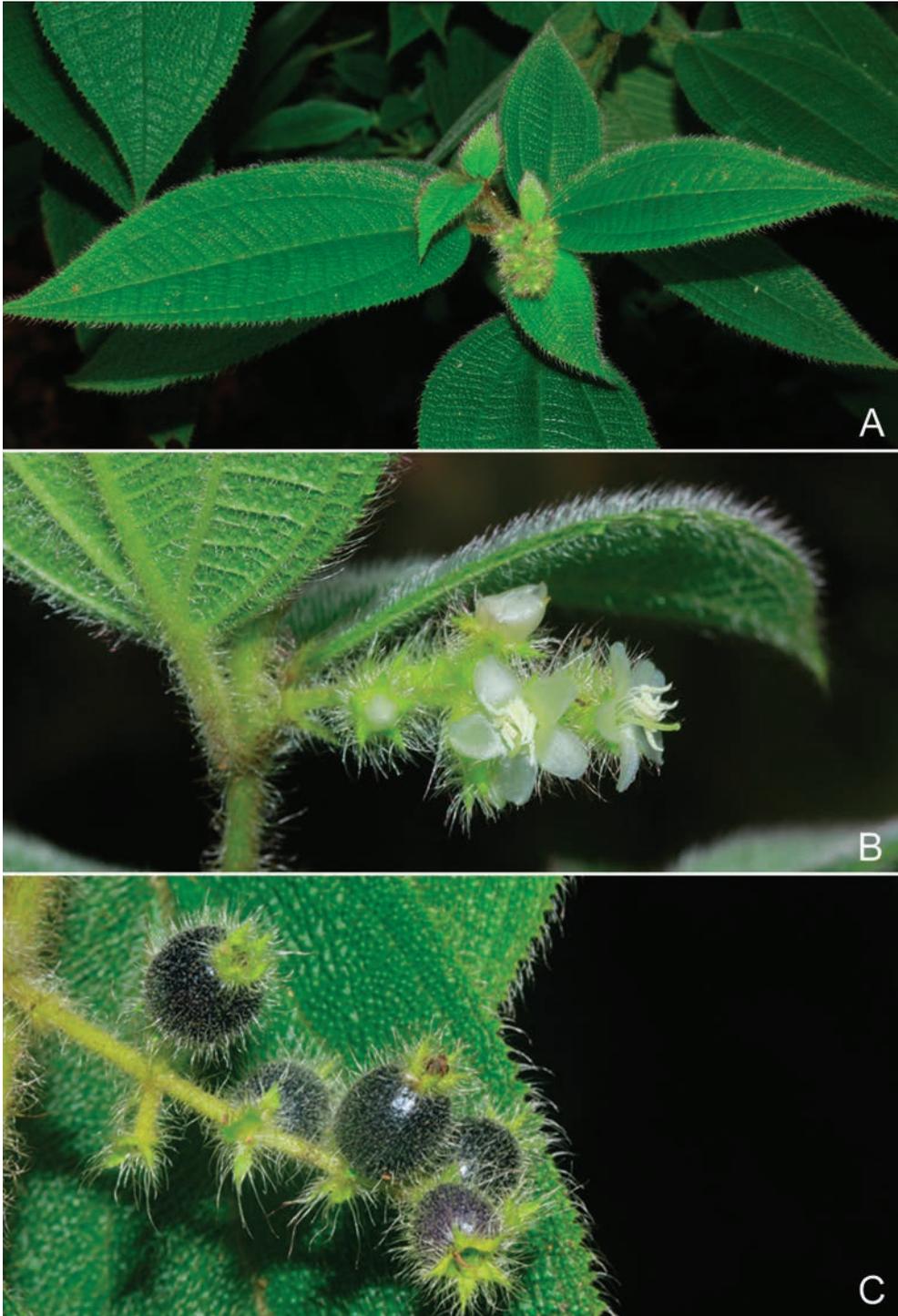


Fig. 1. *Clidemia capitellata* (Bonpl.) D.Don. **A.** Flowering stem. **B.** Inflorescence. **C.** Mature fruits showing the 'crown' of persistent calyx lobes. (Photos: L.M.J. Chen)

4. *Erigeron bellioides* DC. (Asteraceae) (Fig. 2A–B)

This South American species (Fig. 2A–B) is likely to be a recent introduction as we have not located any specimens of *Erigeron bellioides* before a collection that was made in 2017. The website *The Plant Observatory* included photos of this species along with a short note in January 2016. According to the *PIER* website, *Erigeron bellioides* has also naturalised in a number of Micronesian islands and Hawaii and has also been recorded from Australia and Taiwan (Jung et al., 2009). See Jung et al. (2009) for a detailed description of this species.

Specimens examined. SINGAPORE: **National Institute Education:** 27 Sep 2017, *Ho SING 2017-471* (SING [SING0239569]). **Bukit Batok:** 20 Jan 2018, *Ho & Yeo SING 2018-044* (SING [SING0239383]). **Upper Peirce:** 23 Jan 2018, *Niissalo SING 2018-045* (SING [SING0239384]).

5. *Justicia comata* (L.) Lam. (Acanthaceae) (Fig 3A–B)

We first encountered this South American *Justicia* L. species in 2009 when it was found growing as a weed amongst some semi-aquatic ornamental plant species in a local nursery. It struck us that it was something unique as the flowers were very small and the paniculate inflorescences appeared almost grass-like. Unfortunately, we were not able to obtain a specimen of the plant for verification. When a specimen was collected from Pasir Panjang in late 2017 it was identified as *Justicia comata*. Small colonies of this species have subsequently been found in Bishan-Ang Mo Kio Park in early 2018 (Fig. 3A–B).

A short note on this species by *The Plant Observatory* website in March 2017 also cited the occurrence of this species in Singapore as early as 2009. For a detailed description of *Justicia comata*, see the account by Ezcurra (2002).

Specimens examined. SINGAPORE: **Pasir Panjang:** 6 Dec 2017, *Chen SING 2017-732* (SING [SING0232230]). **Bishan Park:** 8 Feb 2018, *Chen SING 2018-128* (SING [SING0241808]).

6. *Mecardonia procumbens* (Mill.) Small (Plantaginaceae) (Fig. 4)

This species is native from the southern USA to Argentina (Souza, 1997) but is already recorded as naturalised in Africa, India, Indonesia (Java), Japan and Taiwan (Les, 2017). In Singapore, several specimens of this small, prostrate herb (Fig. 4) were found growing beside a drain with *Cuphea carthagenensis* (Jacq.) J.F.Macbr., another naturalised weed that also inhabits moist places. For a description of this species in English, see Hyland et al. (2010).

Specimens examined. SINGAPORE: **Khatib:** 02 Dec 2017, *Chen SING 2017-717* (SING [SING0232229]).



Fig. 2. *Erigeron bellioides* DC. **A.** Inflorescence. **B.** Mature seed head and achenes. (Photos: L.M.J. Chen)



Fig. 3. *Justicia comata* (L.) Lam. **A.** A small colony growing along the banks of a waterway amongst other naturalised species. **B.** Inflorescence. From *Chen SING 2018-128*. (Photos: L.M.J. Chen)



Fig. 4. *Mecardonia procumbens* (Mill.) Small. Flowering stem. From Chen SING 2017-717. (Photo: L.M.J. Chen)

7. *Praxelis clematidea* R.M.King & H.Rob. (Asteraceae) (Fig 5A–B)

While examining a living specimen of what appeared to resemble *Ageratum conyzoides* L., we noticed that the crushed leaves had a more foetid scent than usual (Fig. 5A). This prompted a further examination of the specimen which was established instead to be *Praxelis clematidea*.

Due to the resemblance to *Ageratum conyzoides*, a check through the herbarium specimens of this species in SING uncovered an undated but rather old specimen of *Praxelis clematidea* collected from Grange Road. In the website *Weeds in Australia*, it was indicated that *Praxelis clematidea* can be differentiated from *Ageratum conyzoides* by the 15–40 filament-like hairs in the pappus of *Praxelis clematidea* (Fig. 5B) and the 4–5 somewhat triangular bristles that taper to a point in *Ageratum conyzoides*.

Praxelis clematidea is native to South America but has since naturalised in many parts of the Old World tropics (Veldkamp, 1999). Apart from the specimens cited, *The Plant Observatory* website has also published photos of this species. For a detailed description see the account by Veldkamp (1999).

Specimens examined: SINGAPORE: **Grange Road:** s. dat., *Anonymous s.n.* (SING [SING0181745]). **Sengkang:** 21 Oct 2017, *Koh SING 2017-563* (SING [SING0232222]).

8. *Pseudelephantopus spicatus* (Juss. ex Aubl.) C.F.Baker (Asteraceae)

Pseudelephantopus spicatus is native to Central and South America but has naturalised extensively in the Old World tropics (Wiersema & León, 2013). There are three specimens of this species in the SING herbarium, all collected in 1933. The notes on Mohd Nur's specimen indicated that it was a "Common weed... with *Urena lobata*", but no further data or recent specimens of the occurrence of this species in Singapore could be located and it was not included in the checklist by Chong et al. (2009). There is a high likelihood that it no longer exists in Singapore.

In leaf, *Pseudelephantopus spicatus* somewhat resembles an *Elephantopus* but it can be clearly differentiated from the *Elephantopus* species occurring in Singapore, *E. scaber* L., by the shape of the two longest bristles on the pappus, and the absence of three broad, leaf like bracts subtending the capitulate inflorescences (Bunwong & Chanthanarotai, 2010). For detailed descriptions of *Pseudelephantopus spicatus* and *Elephantopus scaber*, see Bunwong & Chanthanarotai (2010).

Specimens examined: SINGAPORE: **Aljunied Road:** 23 Jul 1933, Mohd Nur s.n. (SING [SING0055684]). **Paya Lebar Road:** 6 Mar 1933, Teruya s.n. (SING [SING0055683]). **Geylang:** 4 Mar 1933, Teruya 2242 (SING [SING0055691]).

9. *Spigelia anthelmia* L. (Loganiaceae) (Fig. 6A–C)

This species is native to South America but has naturalised extensively in Tropical West Africa and the Malesian region (Tjitrosoepomo et al., 1987). In late 2017, we found a specimen of *Spigelia anthelmia* in Bishan Park (Fig. 6A–C) which prompted us to make further checks for this species in SINU and SING, uncovering a number of specimens dating back to 1999. A short note on this species was included in the website *The Plant Observatory* in January 2016. For a detailed description of this species, see Tjitrosoepomo et al. (1987).

Specimens examined: SINGAPORE: **Choa Chu Kang:** Bulim, 11 Dec 2006, Lee & Leong SING 2006-112 (SING [SING0090281]). **Central Catchment Park Connector:** 2 Jan 2018, Ho SING 2017-821 (SING [SING0232237]). **Bishan Park:** 16 Nov 2017, Chen SING 2017-695 (SING [SING0232228]). **Marina East:** 24 Mar 1999, Morgany & Tan M-224 (SINU). **Sungei Punggol:** 3 Dec 2003, Tan 862 (SINU). **Sungei Serangoon:** 17 Dec 2003, Tan 942 (SINU). **Pulau Serangoon:** 22 Dec 2003, Tan 1003 (SINU). **Changi Village Jetty:** 29 Jun 2006, Ali AI 704 (SING [SING0074915]).

ACKNOWLEDGEMENTS. The authors would like to thank Dr George Staples for providing the identities and the information on the naturalised Convolvulaceae. We are also grateful to Amanda Ng, Nanthini Elamgovan, Lim Jin Hong and staff of Bishan-Ang Mo Kio Park and HortPark for their support in the work carried out for the *Flora of Singapore* project. We would also like to thank Mr Chua Keng Soon and Dr Tan Swee Hee from the Lee Kong Chian Natural History Museum (LKCNHM) for the use of the herbarium (SINU).



Fig. 5. *Praxelis clematidea* R.M.King & H.Rob. **A.** Habit. **B.** Inflorescence, with the capitulum on the right opened up to display the pappus on the florets. (Photos: A, P.K.F. Leong; B, L.M.J. Chen)



Fig. 6. *Spigelia anthelmia* L. **A.** Habit. **B.** Flower. **C.** Unripe capsules. (Photos: L.M.J. Chen)

References

- Bunwong, S. & Chantaranothai, P. (2010). A new record of *Pseudelephantopus spicatus* (Juss. ex Aubl.) C.F.Baker (Asteraceae) from Thailand. *Thai Forest Bull., Bot.* 38: 124–127.
- Chong, K.Y., Tan, H.T.W. & Corlett, R.T. (2009). *A Checklist of the Total Vascular Plant Flora of Singapore: Native, naturalised and cultivated species*. Singapore: Raffles Museum of Biodiversity Research, National University of Singapore.
- Croat, T. B. (1978). *Flora of Barro Colorado Island*. Stanford, CA: Stanford University Press.
- Ezcurra, C. (2002). El genero *Justicia* (Acanthaceae) en Sudamerica Austral. *Ann. Missouri Bot. Gard.* 89(2): 225–280.
- GISD (Global Invasive Species Database)* (2015). Species profile: *Merremia peltata*. Online resource. <http://www.iucngisd.org/gisd/speciesname/Merremia+peltata>. Accessed 2 Jan. 2018.
- Hyland, B.P.M., Whiffin, F.A., Zich, S., Duffy, S., Gray, B., Elick, R., Venter, F. & Christophel, D. (2010). *Australian Tropical Rainforest Plants (Edition 6) – Trees, Shrubs, Vines, Herbs, Grasses, Sedges, Pandans & Epiphytes*. CSIRO (Commonwealth Scientific and Industrial Research Organisation). Online resource. <http://keys.trin.org.au/key-server/data/0e0f0504-0103-430d-8004-060d07080d04/media/Html/taxon/index.htm>. Accessed 2 Jan. 2018.
- Jung, M.-J., Hsu, T.-C., Chung, S.-W. & Peng, C.-I (2009). Three newly naturalized Asteraceae plants in Taiwan. *Taiwania* 54(1): 76–78.
- Les, D.H. (2017). *Aquatic dicotyledons of North America: ecology, life history, and systematics*. Boca Raton, FL: CRC Press, Taylor & Francis Group.

- Miléo, L., Silva, J., Bentes, J. & Christoffoleti, P. (2007). Plantas daninhas hospedeiras alternativas de *Colletotrichum guaranicola* em cultivos de guaraná no Estado do Amazonas. *Planta Daninha* 25(4): 771–782.
- PIER (*Pacific Islands Ecosystems at Risk*). US Forest Service. Online resource. <http://www.hear.org/pier/>. Accessed 2 Jan. 2018.
- Souza, V.C. (1997). Studies on the delimitation of *Mecardonia procumbens* (Mill.) Small. (Scrophulariaceae). *Acta Bot. Bras.* 11(2): 181–189.
- Staples, G.W. (2010). Convolvulaceae. In: Santisuk, T. & Larsen, K. (eds) *Flora of Thailand*, vol. 10, part 3, pp. 330–468. Prachachon, Bangkok: Forest Herbarium, Royal Forest Department.
- Staples, G.W. (2015). Convolvulaceae. In: Kiew, R., Chung, R.C.K., Saw, L.G. & Soepadmo, E. (eds) *Flora of Peninsular Malaysia*, ser. II, Seed Plants, vol. 5, pp. 55–198. Kuala Lumpur: Forest Research Institute Malaysia.
- The Plant Observatory*. Online resource. <http://www.natureloveyou.sg/>. Accessed 2 Jan. 2018.
- Tjitrosoepomo, G., Kostermans, A.J. & Soerjani, M. (1987). *Weeds of rice in Indonesia*. Jakarta: Balai Pustaka.
- Veldkamp, J.F. (1999). *Eupatorium catarium*, a new name for *Eupatorium clematideum* Griseb., non Sch.Bip. (Compositae), a South American species naturalized and spreading in SE Asia and Queensland, Australia. *Gard. Bull. Singapore* 51: 119–124.
- Weeds in Australia*. Department of the Environment and Energy, Australian Government. Online resource. <http://www.environment.gov.au/cgi-bin/biodiversity/invasive/weeds/weedspeciesindex.pl?id=701&startLetter=A&IndexBy=sciname>. Accessed 2 Jan. 2018.
- Wiersema, J. H. & León, B. (2013). *World economic plants: a standard reference*. Boca Raton, FL: CRC Press.