Department of **Agriculture and Fisheries**
Biosecurity Queensland

Invasive plant risk assessment

Ceylon hill cherry (downy rose myrtle)

Rhodomyrtus tomentosa

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Contents

Summary

Ceylon hill cherry (also known as downy rose myrtle) is a shrub native to early succession habitats in tropical and subtropical Asia. Its colourful flowers make it a popular garden ornamental, with several nurseries currently selling the species in Queensland.

Dispersal is via bird-dispersed seeds.

Considering the history of the species as a significant weed in Hawaii, Florida and parts of Asia, where it has formed pure stands within native vegetation, it seems reasonable to predict it will become a significant pest in Queensland.

Climate modelling suggests it is well suited to most of coastal Queensland, especially central Queensland. Habitats most at risk are predicted to include a range of disturbed sites, such as grazing land (native pasture), riparian areas (cleared or partially cleared creek banks) and perhaps the margins of wet forests and mangroves, mainly on acidic, sandy soils. Similar habitats have been invaded overseas.

As Ceylon hill cherry exists in gardens in Queensland, its spread into nearby bushland and farmland seems inevitable. As yet, naturalised populations of Ceylon hill cherry have not been detected in Queensland.

Introduction

Identity and taxonomy

Species identity: *Rhodomyrtus tomentosa* Aiton

Synonyms: *Myrtus canescens* Lour., *Myrtus tomentosa* Aiton

Varieties: var. *parviflora* and var. *tomentosa*

Common names: Ceylon hill cherry (Australia), Ceylon hill gooseberry (Australia), downy myrtle, downy rose myrtle (Hawaii), barley bues (Hong Kong, fruit), feijoa (France, note that same common name as *Acca sellowiana*), feijoarte-groseille (France), guayabillo forester (Spain), harendong sabrang (Indonesia), hill gooseberry, hill guava, Isenberg bush (England, Hawaii), karamunting (Malaysia), kemunting (Malaysia), kong nim (China), myrte-groseille (France), phruat (Thailand), ratberry (Hawaii), rose myrtle (Philippines), sim (Vietnam), sragan (Cambodia), tao jin niang (China).

Family: Myrtaceae

Sources: Agroforestree Database (2010); Burney and Burney (2007); Daley's Fruit Tree Nursery (2009); Herklots (1932); PIER (2010a); Tropicos (2010); Wikipedia (2010).

Description and biology

Ceylon hill cherry is an evergreen shrub usually 2–3 m tall (but up to 5 m) (Figure 1).

Figure 1. *Rhodomyrtus tomentosa* in a garden in Brisbane (Photo by Biosecurity Queensland)

Twigs, inflorescences and young leaves are densely white or yellowish tomentose (Wikipedia 2010). Leaves are elliptic or oblong-elliptic, 5–8 cm long and 2–4 cm wide. Leaf margin is entire. The petiole is 3–5 mm long. The upper leaf surface is glossy and glabrous, with three conspicuous longitudinal veins. The lower surface is white or yellowish tomentose (Agroforestree Database 2010).

Flowers are solitary or in three-flowered dichasia in upper axils; peduncles are up to 1 cm long, pedicels 0.5–2.5 cm long; bracts elliptic, leaf-like, 6–12 mm long, bracteoles elliptic or ovate, 2–3 mm long, persistent. The calyx is campanulate, 5–7 mm long, tomentose, five- to ten-ribbed, five-lobed and persistent. Each flower has five petals. Each petal is broadly obovate, 15–18 mm × 9–13 mm, red or pink (or white on the outside and tinged purplish-pink or pink) (Figure 1); stamens are numerous, 10–15 mm long, filaments pink; style 13–15 mm long; ovary three- to four-locular (Agroforestree Database 2010; Wikipedia 2010).

Figure 2. Flowers of *Rhodomyrtus tomentosa* (Photo by Biosecurity Queensland)

The fruit is an oblong edible berry, 10–15 mm × 8–10 mm, purplish-black, soft, crowned by persistent calyx lobes, tomentose; its wall is 1 mm thick and the pulp is sweet. Each fruit contains 40–45 seeds in six to eight pseudo-locules, divided by thin false septa (Agroforestree Database 2010; Wikipedia 2010).

The variety *tomentosa* (synonym *Myrtus canescens* Lour.) occurs in South-East Asia, southern China and Indochina. It has white tomentose leaves and lateral nerves that are 2–6 mm inside the leaf margin (less than one-third of the distance from the leaf margin to the central nerve). The leaf apex is not apiculate and veins are not reticulate. Pedicels are 1–2.5 cm long (Agroforestree Database 2010).

The variety *parviflora* (synonym *Rhodomyrtus parviflora* Alston) occurs in India and Sri Lanka. It has cream or yellowish tomentose leaves and lateral nerves that are 3–7 mm inside the leaf margin (over one-third of the distance from the leaf margin to the central nerve). The leaf apex is apiculate and veins reticulate. Pedicels are less than 1 cm long (Agroforestree Database 2010).

Ecology

Within its native range, Ceylon hill cherry is a quick-growing early succession species. In southern China it has been trialled as a pioneer species to provide shade for slower growing native plant species, thereby helping to restore degraded land (Yang et al. 2010).

It is fire adapted and sprouts prolifically after fire (CAIP 2010; Wikipedia 2009).

Reproduction and dispersal

Reproduction is from seeds (CAIP 2009; Starr et al. 2003), which are produced in large numbers. Birds are the primary dispersal vector, but seeds can also be dispersed by rats (Chung 2003; PIER 2010a; Wikipedia 2010).

While specimens can be propagated from stem cuttings (Wong 2008), vegetative reproduction does not occur in the wild (CAIP 2009). Cultivated specimens derived from cuttings produce fruit after two years (Agroforestree Database 2010; Verheij and Coronel 1991).

Germination rates are high (Wikipedia 2010). Fresh seeds germinate within one week (Agroforestree Database 2010). Seed viability can be maintained for 12 months when stored in hermetic air-dry storage at 5 ˚C (Royal Botanic Gardens, Kew 2008), suggesting seeds are relatively short-lived under field conditions.

In Java, flowering occurs from July to August and fruiting from September to October (Agroforestree Database 2010). In Singapore, it flowers all year (Wong 2008). In China, *R. tomentosa* exhibits geitonogamy and also outcrossing (Wei et al. 2009). Flowers are pollinated by bees (*Amegilla florae* and *Xylocopa nasalis*) (Wei et al. 2009).

Origin and distribution

Ceylon hill cherry is native to southern and south-eastern Asia, including Burma, Cambodia, China (Fujian, Guangdong, Guangxi, Guizhou, Hunan, Jiangxi, Yunnan, Zhejiang provinces), India, Indonesia, Japan, Laos, Malaysia, Philippines, Sulawesi, Sri Lanka, Taiwan, Thailand and Vietnam (PIER 2010a; Tropicos, 2010; Verheij and Coronel 1991; Wikipedia 2010). Hemsley (1884) stated that Ceylon hill cherry was 'spread nearly all over tropical Asia'.

It has naturalised in Florida, Hawaii and French Polynesia (GISD 2005).

Figure 3. Global distribution of Ceylon hill cherry (Pickering et al. 2006, used with permission)

Preferred habitat

Preferred climate is tropical to subtropical, generally where rainfall exceeds 1200 mm per year (PIER 2010a).

Preferred habitats include a range of disturbed and otherwise open natural sites, often near the coast. In southern China (within its native range) the species is sometimes dominant on 'degraded shrubland slopes' where the climax vegetation is 'low subtropical monsoon forest' (Yang et al. 2009).

Preferred soil types are relatively infertile acidic sandy soils (Yang et al. 2009). It does not tolerate alkaline or limestone soils (Yang et al. 2009; Agroforestree Database 2010; PIER 2005).

Various publications state that the species can persist in riparian areas, along coastal shores in open, degraded sandy sites, in pastures, rangeland and other untended areas, pine flatwoods (acidic and poorly drained woodland), mesic to wet forests (Hawaii) and the margins of mangrove forests (PIER 2005, 2010a; Agroforestree Database 2010; Verheij and Coronel 1991; Wikipedia 2010).

In Hawaii, it grows to an altitude of 900 m (PIER 2010a). In its native range, it exists at elevations up to 300 m (rarely 1300 m). Variety *parviflora* occurs in montane habitats (woodland and grasslands) at elevations of 1800–2700 m (Agroforestree Database 2010; Verheij and Coronel 1991; Wikipedia 2010).

Ceylon hill cherry is described as frost-tolerant to –7 °C (Bailey and Bailey 1976; Daley's Fruit Tree Nursery 2009).

History as a weed elsewhere

Ceylon hill cherry is listed as a principal weed in Malaysia, a common weed in Thailand (Holm et al. 1979) and a serious weed in French Polynesia (Raiatea Island) (GISD 2005; PIER 2010a).

It was introduced into Hawaii in 1920 (Degener 1963) and has since escaped from gardens into various disturbed and natural habitats, in places dominating large areas (Starr et al. 2003). On Kauai and on Hawaii (Hilo) it has formed 'impenetrable thickets' (Figure 4) (PIER 2005; Wikipedia 2010) and 'is said to be displacing another invasive plant *Melastoma candidum*' (Smith 1998; Burney and Burney 2007). Together with *Psidium cattleianum* it poses a threat to habitat of an endangered native plant *Cyanea undulata* which is endemic on Kauai (PIER 2005; PIER 2010b).

Figure 4. Thicket of Ceylon hill cherry in Hawaii (Photo by Forest and Kim Starr, used with permission)

In Florida, Ceylon hill cherry has invaded native pinelands (CAIP 2009) after being introduced some time prior to 1924 as a garden ornamental. It is considered to be more of a threat than Brazilian pepper tree (*Schinus terebinthifolius*) (Langland and Burks 1998) and is listed as a 'Category 1' invasive species (CAIP 2009). There is concern that it will modify Florida's natural fire regimes (GISD 2005; Wikipedia 2010).

A risk assessment by PIER (2005) concluded that Ceylon hill cherry was high risk, based on the following attributes:

- a history of naturalisation beyond its native range
- a history of repeated human-mediated introductions
- an ability to form dense thickets
- prolific seed production, bird dispersal and fire tolerance.

Ceylon hill cherry is a prohibited plant species in New Zealand (Biosecurity New Zealand 2010).

Pest potential in Queensland

Distribution and status in Queensland (and Australia)

Ceylon hill cherry has been recorded in gardens in Brisbane and elsewhere in Australia. However, naturalised populations have not yet been recorded in Australia.

Ceylon hill cherry is commercially available in some nurseries, including several in South East Queensland, and has been promoted as a garden plant in the media (Coppin 2010; Burke's Backyard 2010; Green Harvest 2007; Happy Earth 2010; Spencer 2006; Subtropical Fruit Club, Queensland 2008).

In the Northern Territory, Ceylon hill cherry is listed in Schedule Class C weed ('not to be introduced to the Territory') (NRETA 2007). In Western Australia, it is banned from introduction with a consignment seized in 1998 (Starr et al. 2003). It is listed on the Northern Australian Quarantine Strategy (NAQS) target list for surveillance/detection.

Glanznig and Kessal (2004) consider it to be a 'sleeper' species (i.e. a species that is potentially invasive).

Potential distribution and impact in Queensland

Climate-matching software called Climatch (Bureau of Rural Sciences 2009) was applied to predict areas of Queensland where climate is similar to that experienced within the native range of Ceylon hill cherry. Coastal areas of Queensland appear suitable, especially central Queensland (Figure 5).

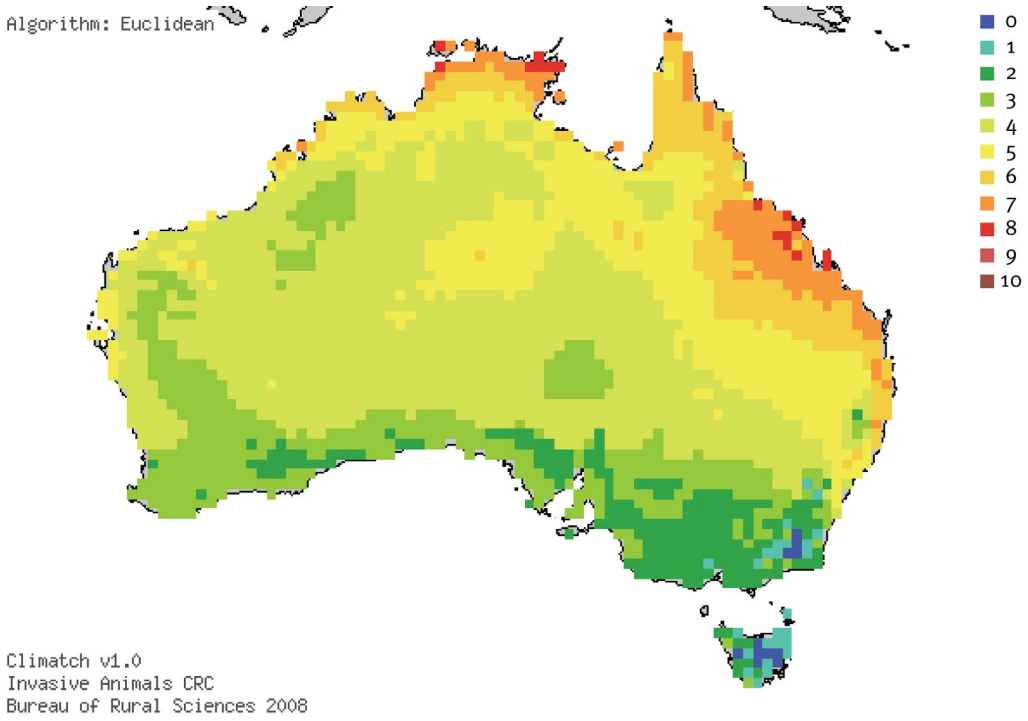

Figure 5. Areas of Australia where climate appears suitable for survival of Ceylon hill cherry. Red and orange indicate areas that are highly suitable, yellow is marginally suitable, and green and blue are unsuitable. Map produced using Climatch computer software (Bureau of Rural Sciences 2009)

Within the area where climate appears suitable, habitats most at risk are predicted to include a range of disturbed (cleared or partially cleared) sites, such as grazing land (native pasture), riparian areas (cleared or partially cleared creek banks) and perhaps the margins of wet forests and mangroves, mainly on acidic, sandy soils. Similar habitats have been invaded overseas.

Considering the history of the species as a significant weed overseas (especially Hawaii and Florida), where it has formed pure stands within native vegetation, it seems reasonable to predict it will become a significant pest in coastal Queensland. Potential impacts could include loss of pasture production and degradation of native vegetation.

As Ceylon hill cherry exists in gardens in Queensland, its spread into nearby bushland and farmland seems inevitable.

There are seven native species of *Rhodomyrtus* in northern Australia. While there is currently no evidence of hybridisation within the genus, the possibility of hybridisation between *R. tomentosa* and Australian native species cannot be ruled out. A number of native *Rhodomyrtus* species are in the nursery trade and *R. psidioides* is listed on the 'Grow me instead' list of recommended species (Grow me instead 2010).

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