

PTERISANTHES (VITACEAE) OF SINGAPORE: WITH A NOTE ON THE REDISCOVERY OF *PTERISANTHES CISSIOIDES* BLUME

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ABSTRACT. — The conservation statuses of three native Singapore species of *Pterisanthes* (Vitaceae) are reviewed here in light of recently collected plant specimens and sightings. All three species are still extant in Singapore and one of the species had been previously thought to be nationally extinct. The present-day restricted distribution of the species suggests that more aggressive conservation measures are needed for their continued survival.

KEY WORDS. — Vitaceae, *Pterisanthes*, Singapore

INTRODUCTION

The grape family, or Vitaceae, is represented by 25 native species in Singapore with over 20 species still extant in seven genera (Chong et al., 2009). The genus *Pterisanthes* Blume, described for its distinctive laminar inflorescence (Blume, 1825), has three species recorded from Singapore. Incidentally, Blume (1825) had based the genus on the species *Pterisanthes cissioides* (Fig. 1) as the nomenclatural type, which was previously thought to be extinct in Singapore (Chong et al., 2009). It was previously noted to be rediscovered (H. K. Lua, pers. comm.), but a specimen was only recently deposited in the Herbarium of the Raffles Museum of Biodiversity Research (SINU 2007012326) by CKY and WFA. The two extant species, *Pterisanthes eriopoda* (Miq.) Planch. (Fig. 2) and *Pterisanthes polita* (Miq.) Lawson (Fig. 3), are listed as Critically Endangered in Singapore (Chong et al., 2009).

Pterisanthes has been noted to show a close affinity to the genus *Ampelocissus* Planch, and it was further suggested by Steenis & Bakhuizen van den Brink (1967) that the former could have derived polyphyletically from the latter. This is the view that Latiff (1982, 1988) concurred with based on morphological and anatomical characters, existence of intermediate forms, and coincidence in their centres of diversity in Borneo and the Philippines. Later phylogeographic comparative work on fossil seeds of *Ampelocissus* and extant taxa also supported the affinity and the derivation of *Pterisanthes* from *Ampelocissus* (Chen & Manchester, 2007). This is also corroborated by a chloroplastic marker study by Soejiman & Wen (2006), which supported the *Ampelocissus*–*Nothocissus*–*Pterisanthes* clade. Thus, it appears likely that the genus may not stand and will likely in the future be subsumed into *Ampelocissus* or another genus.

Pterisanthes species are slender climbers with unbranched, leaf-opposed tendrils. The leaves are toothed, and simple in all the native species except *Pterisanthes cissioides* (Fig. 1), whose leaf could be simple, lobed to 3–5-foliolate. The inflorescence is also leaf-opposed and bears an unbranched tendril. The inflorescence is lamellar (Fig. 3b), with sessile flowers and sometimes pedicellate male or sterile flowers at the margins, except for *Pterisanthes eriopoda*, which has no pedicellate flowers. The fruit is a berry, and is 1–4-seeded.

A key for the identification of the three species in Singapore is below:

1. Leaves simple to 3–5-foliolate; inflorescence lamellar, rectangular, 14.5–25 × 2.5–8.5 cm, with pedicellate flowers present..... *Pterisanthes cissioides*
 - Leaves simple; inflorescence lamellar, narrow rectangular to sword-shaped, pedicellate flower present or absent..... 2
2. Leaves narrowly ovate-oblong, elliptic to ovate, densely tomentose when young and along the margins; inflorescence lamellar, narrow, 5–17.5 × 0.5–2.5 cm, with pedicellate flowers absent..... *Pterisanthes eriopoda*
 - Leaves ovate-oblong to broadly ovate, glabrous or sparsely puberulous when young; inflorescence lamellar, narrowly rectangular to sword-shaped, 3–36.5 × 0.5–3 cm, with pedicellate flowers present..... *Pterisanthes polita*

PAST AND PRESENT RECORDS

Previously all *Pterisanthes* species were listed as Critically Endangered except for *Pterisanthes cissioides*, which was last collected by I. Enoch in 1955 in Nee Soon prior to the present collection and thus listed as Presumed Nationally Extinct (Chong et al., 2009). From the present distribution of the three species, with each found only at one site locally, it is reasonable to recommend that they be assigned the Critically Endangered status. *Pterisanthes cissioides* and *Pterisanthes eriopoda* have the most limited populations, with each restricted to only one patch of the Nee Soon Swamp Forest (NSSF) adjacent to Mandai Track 7 and Taban Valley at Bukit Timah Nature Reserve (BTNR), respectively (Tables 1, 2), while *Pterisanthes polita* is slightly more widespread in the NSSF (Table 3).

The following short descriptions of the species have been gathered from the authors' own observations but greatly augmented by the work of early workers including Ridley (1922), Backer & Bakhuizen van den Brink (1965), Henderson (1959), and Latiff (1982). Figures illustrating *Pterisanthes cissioides* (Fig. 1), *Pterisanthes eriopoda* (Fig. 2), and *Pterisanthes polita* (Fig. 3) are provided to allow easy identification of the species. However, owing to the rarity of reproductive living specimens, only *Pterisanthes polita* has its inflorescence illustrated.

***Pterisanthes cissioides* Blume**

This species was thought to be extinct in Singapore until it was recently sighted in the NSSF by Lua Hock Keong and collected by CKY and WFA in Dec.2011, thus the authors propose that the conservation status of this species in Singapore be changed to Critically Endangered. *Pterisanthes cissioides* is a slender climber and is the only *Pterisanthes* species in Singapore with leaves that are simple to 3–5-foliolate and persistently hairy on lamina veins and below (Fig. 1). The terminal leaflet's lamina is up to 18 × 7 cm, ovate-oblong to elliptic, and the lateral leaflet up to 16 × 7 cm, asymmetric oblong. Its inflorescence lamella is rectangular, brownish-green, 14.5–25 cm × 2.5–8.5 cm, with few pedicellate flowers along the edge with pedicels up to 1.3 cm long. The berry ripens purplish-pink, is obovoid in shape, about 8 mm across, and 1–2-seeded with smooth seeds.



Fig. 1. (a) An individual of *Pterisanthes cissioides* found growing among leaf litter in NSSF. (b) Close up pictures of simple leaves. (c) Compound leaves. Scale bars = 1 cm (Photographs by: Ang Wee Foong).

Pterisanthes cissioides is distributed from Peninsular Malaysia, Singapore, Sumatra, Java to Borneo, often growing on the edge of lowland dipterocarp forests (Latiff, 1982). It is locally known only from the NSSF (Table 1).

Table 1. Previous Singapore collections of *Pterisanthes cissioides* Blume deposited in the Herbarium, Raffles Museum of Biodiversity Research, National University of Singapore (SINU).

S/No.	Accession No.	Collector	Collector's No.	Date	Locality
1.	2007012326	I. Enoch	s. n.	1955	Nee Soon
2.	2007019940	C. K. Yeo & W. F. Ang	s. n.	15 Nov.2011	Forest beside Mandai Track 7

***Pterisanthes eriopoda* (Miq.) Planch.**

This species is now found only at Taban Valley at the BTNR. It is a slender climber with simple leaves each with a lamina that is narrowly elliptic, ovate to ovate-oblong, 8–14 × 2.5–5 cm, with a semi-cordate to rotundate base. The lamina is tomentose when young but persistently hairy on the veins above, at the margins, and below. The inflorescence lamella is narrow, about 5–17.5 × 0.5–2.5 cm, with sessile flowers. The globose berry ripens black, is about 6–8 mm across, and 1–2-seeded with rugose seeds.



Fig. 2. (a) Habit of *Pterisanthes eriopoda*. Scale bar = 2 cm. Close up on a young leaf (b); shoot tip (c); and both sides of the older lamina (d). Scale bars = 5 mm. (Photographs by: Yeo Chow Khoon).

Table 2. Previous Singapore collections of *Pterisanthes eriopoda* (Miq.) Planch. deposited in the Herbarium, Singapore Botanic Gardens (SING), and the Herbarium, Raffles Museum of Biodiversity Research, National University of Singapore (SINU).

S/No.	Accession/Bar Code No.	Herbarium	Collector	Collector's No.	Date	Locality
1.	0017205	SING	H. N. Ridley	425	Nov.1889	Chan Chu Kang
2.	2007012328	SINU	C. K. Yeo	13	1 Aug.2000	Bukit Timah Nature Reserve, intersection between Taban Loop and South View Path, at the top of the valley

It is distributed from Peninsular Thailand, south through Peninsular Malaysia, Singapore to Sumatra, Java, and Borneo, and inhabits the fringes and understorey of lowland dipterocarp forests (Latiff, 1982). It is now known only from the BTNR (Table 2).

Pterisanthes polita (Miq.) Lawson

This species is slightly more widespread than the other two but is confined to the NSSF. It is a slender climber with simple leaves. The lamina is ovate-oblong to broadly ovate, 7–13 × 4–7 cm, with a semi-cordate base. The leaf blade is white-tomentose when young and sparsely hairy to hairless with age. The inflorescence is reddish, covered in brown hairs and the lamella is rectangular to sword-shaped, 3–36 × 0.5–3 cm, with few to many marginal flowers with pedicels 1.3–2.4 cm long. The globose berry ripens black, is 3–5 mm across, and 1–2-seeded, with smooth seeds.

Being the most widely distributed species of the genus, *Pterisanthes polita* is found from Myanmar to Peninsular Thailand, south through Peninsular Malaysia, Singapore, and Sumatra, to Borneo, and Mindanao (the Philippines) (Latiff, 1982). It is found on the fringes and in the understorey of lowland dipterocarp and swamp forests.

DISCUSSION

The current Singapore distribution seems to reflect a constriction of the range of the three species. *Pterisanthes polita* had been the most widely found, with collections from numerous localities around the Central Catchment Nature Reserve (CCNR), BTNR, and surrounding regions previously, but now only few individuals are found in many parts of the NSSF (Table 3). *Pterisanthes eriopoda* had experienced a contraction in range and is no longer reported from the CCNR though it still persists in the BTNR (Table 2). *Pterisanthes cissioides* had the most restricted range historically and fortunately still persists in a patch of the NSSF (Table 1). Interestingly, the first collection of the species is also the only previous historical specimen made quite late in the twentieth century, which attests to its rarity.

Furthermore, the historical abundance seems to be in turn correlated with geographical ranges of the species. *Pterisanthes cissioides*, the least collected species, is found in only Peninsular Malaysia, Java, Sumatra, and Borneo. The next more well-collected species, *Pterisanthes eriopoda*, is found in all the above-mentioned locations as well as Peninsular Thailand; and the most commonly collected species, *Pterisanthes polita*, is known from all the above mentioned localities as well as Peninsular Myanmar and Mindanao (the Philippines) (Latiff, 1982).

Table 3. Previous Singapore collections of *Pterisanthes polita* (Miq.) Lawson deposited in the Herbarium, Singapore Botanic Gardens (SING), and the Herbarium, Raffles Museum of Biodiversity Research, National University of Singapore (SINU).

S/No.	Accession/Bar Code No.	Herbarium	Collector	Collector's No.	Date	Locality
1.	0019167	SING	H. N. Ridley	s.n.	25 Mar.1889	Seletar
2.	0019162	SING	H. N. Ridley	1923	7 Dec.1890	Chan Chu Kang
3.	0019163	SING	H. N. Ridley	6013	1894	Choa Chu Kang
4.	0019166	SING	H. N. Ridley	s.n.	Feb.1896	Bukit Timah
5.	0019168	SING	H. N. Ridley	s.n.	1904	Bukit Panjang
6.	0019164	SING	E. J. H. Corner	s.n.	19 Oct. 1932	Jurong Road
7.	8394	SINU	J. F. Maxwell	78–43	5 Mar.1978	Nee Soon Swamp Forest
8.	2007012331	SINU	C. K. Yeo	133	16 Aug.2000	Nee Soon Swamp Forest
9.	2007012335	SINU	C. K. Yeo	153	22 Aug.2000	Nee Soon Swamp Forest



Fig. 3. (a) Leafy stem of a *Pterisanthes polita* individual growing in the NSSF. (b) Close up views of the inflorescence. Scale bars = 1 cm. (Photographs by: Ang Wee Foong). (c) Habit of a branch in flower. Scale bar = 2 cm. (Photograph by: Yeo Chow Khoo).

CONCLUSIONS

It is fortunate that all the three *Pterisanthes* species are still extant in Singapore although the country had lost close to 95% of its original vegetation (Corlett, 1992). From their distributions, it is clear that all three require good quality forests to survive, and habitat destruction has been the only significant threat to their continued survival. Notably, greater attention should be placed on *Pterisanthes cissioides* and *Pterisanthes eriopoda* as they are each restricted to one small population in the NSSF and BTNR, respectively, while *Pterisanthes polita* seems more widespread in the NSSF. With two of the species restricted to the NSSF, it suggests the special importance of this small area—covering less than 5 km²—has for conservation (Ng & Lim, 1992). It has been reduced from the original estimated area of 27.2 km² (Corlett, 1991; Turner et al., 1996). That the NSSF and its surroundings may face land use changes which may modify its hydrology is cause for concern for conservation.

All three species can benefit from ex situ conservation, and can be promoted for their ornamental potential because of their attractive and unusual inflorescences. They are probably easy to propagate as their stem cuttings have been successfully rooted in water and were often observed to be rooting along stems trailing in the leaf litter (pers. obs.). Their natural habitat suggests that they prefer some shade and moist soils, and though slow-growing in cultivation, they seem to tolerate more exposure to sunlight as long as they are well-watered (pers. obs.).

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