

THE CONSERVATION STATUS OF *AMPELOCISSUS* PLANCH. (VITACEAE) OF SINGAPORE, WITH A SPECIAL NOTE ON *AMPELOCISSUS ASCENDIFLORA* LATIFF

C. K. Yeo*, W. F. Ang¹, Alvin F. S. L. Lok and K. H. Ong

¹Horticulture and Community Gardening Division, National Parks Board
100K Pasir Panjang Road, Singapore 118526

(*Corresponding author: zhaogin@hotmail.com)

ABSTRACT. — The conservation statuses of the five native species of *Ampelocissus* (Vitaceae) are reviewed here in light of recently collected plant specimens and sightings. Two species, *Ampelocissus ascendiflora* and *Ampelocissus thyrsoflora*, were thought to be extinct until recently when collections of these species were made again. Conservation measures are suggested for the two species that are critically endangered.

KEY WORDS. — Vitaceae, *Ampelocissus*, *Ampelocissus ascendiflora*, conservation, Singapore

INTRODUCTION

The genus *Ampelocissus* Planch. belongs to the family Vitaceae and has five species native to Singapore, namely *Ampelocissus ascendiflora* Latiff, *Ampelocissus elegans* (Kurz) Gagnep., *Ampelocissus gracilis* (Wall.) Planch., *Ampelocissus polystachya* (Wall.) Planch., and *Ampelocissus thyrsoflora* (Blume) Planch. *Ampelocissus cinnamomea* (Wall.) Planch. was listed as a native, presumed nationally extinct species by Chong et al. (2009). We believe that this is caused by the confusion of the name with *Ampelocissus ascendiflora*. Furthermore, all the *Ampelocissus ascendiflora* specimens in the Herbarium, Singapore Botanic Gardens (SING 0019898), were listed as *Ampelocissus floccosus* (Ridl.) Galet, thus adding to the confusion. *Ampelocissus elegans* and *Ampelocissus gracilis* were listed as nationally endangered, and *Ampelocissus polystachya* as nationally critically endangered, while *Ampelocissus thyrsoflora* was thought to be presumed nationally extinct.

Ampelocissus was first described by Planchon (1887), and was recently shown by Ren et al. (2011) to form a *Ampelocissus-Vitis-Nothocissus-Pterisanthes-Yua* clade. Ren et al. (2011) also supported the affinity between the genus to *Nothocissus* and *Pterisanthes* rather than to its congeneric species in Central America as earlier suggested by Soejima & Wen (2006). Thus, the genus may eventually be subsumed into another taxon in the future.

This is a genus of woody or herbaceous climbers with leaf-opposed tendrils not ending in adhesive discs, found along the fringes of lowland dipterocarp forest, along rivers, and in open spaces. All species in Singapore have simple, lobed to compound-toothed leaves. The inflorescence is leaf-opposed and cincinniferous, with bisexual flowers, each with a cupuliform calyx, 4–5 petals and stamens, and a disc adnate to the gynoecium with a minute stigma on a short style. The fruit is a 1–4-seeded berry. This agrees with the descriptions by Latiff (1982).

PAST AND PRESENT RECORDS

Ampelocissus ascendiflora and *Ampelocissus thyrsoflora* were originally thought to be extinct as they were not recollected for a considerable period in Singapore. *Ampelocissus ascendiflora* was collected by H. N. Ridley at the end of the 19th century at locations including Bukit Mandai (specimen bar code no. SING 00076833), Bukit Timah (SING 00076835), MacRitchie Reservoir (SING 00076836), and Choa Chu Kang (SING 00076834), but was not collected again until 1998 by Joseph Lai at the Bukit Timah Nature Reserve (BTNR; SING 0019898), and filed as *Ampelocissus floccosus*. In 2012, WFA and CKY collected a specimen at MacRitchie Reservoir (SINU, no. s.n.) after KHO discovered the population. *Ampelocissus thyrsoflora* was collected by Ridley in 1893 at Changi Beach (SING 0017204), only to be collected again by A. T. Gwee in 2010 in Pergam Marsh in the Western Catchment Area (SING 0153570). Tables 1 and 5 list the specimens collected.

In view of the relative rarity of these two species, we feel that they deserve the conservation status of nationally critically endangered. Both species are found in lowland dipterocarp forest: *Ampelocissus ascendiflora* on the fringes, and *Ampelocissus thyrsoflora*, a climber in the understorey (Latiff, 1982). Deforestation in Singapore would have adversely affected them (Corlett, 1991).

Ampelocissus polystachya was first collected by J. Sinclair in 1953 (SING 0019092), and is still commonly collected at the BTNR, MacRitchie Reservoir, Peirce Reservoir, and Chestnut Avenue (Table 4). Latiff (1982) reported that it is a species found in the understorey of lowland dipterocarp forest, but in Singapore it is found along the forest edge by the man-made trails. The increase in collection sites is probably owed to workers paying more attention to the species (which could otherwise be overlooked when vegetative), as well as the species adapting well to habitat disturbances. From our observations of the numbers of individuals at these locations, we would propose a status of nationally endangered.

The most common species are *Ampelocissus elegans* and *Ampelocissus gracilis*, as they are regularly collected. This is not surprising as the former is a species of the fringes of lowland dipterocarp and secondary forests, and the latter is found in the fringes of both these forest types and also swamp forest (Latiff, 1982).

They were and are still being found in various locations in the BTNR and Central Catchment Nature Reserve (CCNR) (Tables 2, 3). *Ampelocissus elegans* has recently been found on Pulau Ubin and Pulau Tekong (offshore islands), while it has been lost from Ang Mo Kio, Jurong Road, Tanglin Road, Singapore Botanic Gardens (SBG), and Bukit Arang (Table 2). *Ampelocissus gracilis* has been lost from Sungei Loyang, Choa Chu Kang, Kranji, Upper Tanglin woodlands, Changi, and SBG (Table 3). The locations of the losses are presently deforested and urbanised, except for the SBG which still contains a patch of the original forest.

KEY TO THE IDENTIFICATION OF THE NATIVE *AMPELOCISSUS* SPECIES

- 1a. Mature leaves simple..... 2
- 1b. Mature leaves lobed, trifoliolate, digitate or pedate, but immature leaves may be simple 3
- 2a. Stipules and bracts on tendrils small, not reflexed; leaves up to 13 × 8 cm *Ampelocissus gracilis*
- 2b. Stipules and bracts on tendrils prominent, ovate, reflexed; leaves often larger..... *Ampelocissus ascendiflora*
- 3a. Leaves 3-lobed to 3–5-foliolate but simple when young, leaflets sessile *Ampelocissus elegans*
- 3b. Leaves 3–7-digitate or pedate, leaflets stalked 4
- 4a. Leaves 3–7-digitate, reddish tomentose below; stems brown tomentose when young..... *Ampelocissus thyrsoiflora*
- 4b. Leaves 5–7-digitate or pedate, sparsely hairy; stems sparsely hairy when young..... *Ampelocissus polystachya*

The following short descriptions of the species are based on the authors' own observations supplemented by those of Henderson (1959), Backer & Bakhuizen van den Brink (1965), and Latiff (1982).

Ampelocissus ascendiflora Latiff

It is a herbaceous climber with a longitudinally ridged stem, up to 3 mm across, often white tomentose when young, turning brown when older. The tendrils are simple and each has a prominent, ovate bract, similar to the stipules (Fig. 1b). The leaf is white-tomentose when young, turning brown below and sparsely hairy above when older (Fig. 1c). The leaf blade is ovate, 4.5–18.0 × 5.5–14 cm, and petiole 4.5–16.0 cm long. The inflorescence is a panicle of spikes, 13–21 cm long. The flower has red petals and a yellow disc (Fig. 1f). The berry is about 8 mm across with 2 seeds about 7 × 6 mm. It is only known from the Malay Peninsula.

The species has been confused with *Ampelocissus cinnamomea* and *Ampelocissus floccosus*. Latiff (1982) described *Ampelocissus cinnamomea* as possessing simple to compound leaves and a petiole of up to 6 cm long, while *Ampelocissus floccosus* was noted to be endemic to Gunung Pulai, Johore, and has an even shorter petiole up to about 3 cm long. In Singapore, it is most similar to *Ampelocissus gracilis*, but is a larger plant with more prominent, reflexed, ovate stipules and tendril bracts.

Table 1. Previous Singapore collections of *Ampelocissus ascendiflora* Latiff deposited in the Herbarium, Singapore Botanic Gardens (SING, with bar code nos.) and Herbarium, Raffles Museum of Biodiversity Research, National University of Singapore (SINU, with accession no.).

Accession/						
S/No.	Bar Code No.	Herbarium	Collector(s)	Collector's No.	Date	Locality
1.	00076834	SING	H. N. Ridley	4747	23 Sep.1890	Choa Chu Kang
2.	00076836	SING	H. N. Ridley	s.n.	Feb.1893	MacRitchie Reservoir Woods
3.	00076835	SING	H. N. Ridley	5846	1894	Bukit Timah
4.	00076833	SING	H. N. Ridley	s.n.	—	Bukit Mandai
5.	0019898	SING	J. Lai	377	1998	Bukit Timah Nature Reserve
6.	2007020123	SINU	W. F. Ang & C. K. Yeo	s.n.	23 Feb.2012	MacRitchie Reservoir, Venus Link



Fig. 1. *Ampelocissus ascendiflora*. a, scrambling among leaf litter at the forest edge of Bukit Mandai; b, underside of leaves, the older leaf on the left; c, the prominent ovate stipule and ovate tendril bract; d, young inflorescence; e, inflorescence with open flowers; f, flowers. (Photographs by: Ang Wee Foong [a–c], Ong Kwan Han [d], and Yeo Chow Khoon [e, f]).

***Ampelocissus elegans* (Kurz) Gagnep.**

It is a herbaceous climber with stems that are covered in a dense indumentum, turn brown with age, and up to 8 mm across. The leaf is simple when immature, but 3-lobed to 3–5-foliolate with sessile leaflets when mature (Fig. 2a). The leaf blade is covered with dense white indumenta that turn brown with age, and are persistent on the nerves and below. The terminal leaflet is obovate, 9.5–20 × 4–9.5 cm, and the lateral leaflets are oblique ovate and 5–18 × 2–10.5 cm. The bases of the leaflet blades are decurrent. The inflorescence is a panicle of spikes and 21–38 cm long. The flower has green petals and a green disc (Fig. 2f). The berry is ovoid, ripens red, and is about 8 mm across (Fig. 2c). The species is reported from Myanmar, Thailand, and the Malay Peninsula.

Table 2. Previous Singapore collections of *Ampelocissus elegans* (Kurz) Gagnep. species deposited in the Herbarium, Singapore Botanic Gardens (SING, with bar code no.) and Herbarium, Raffles Museum of Biodiversity Research, National University of Singapore (SINU, with accession no.).

Accession/						
S/No.	Bar Code No.	Herbarium	Collector(s)	Collector's No.	Date	Locality
1.	00076846	SING	H. N. Ridley	s.n.	—	Ang Mo Kio
2.	00054461	SING	I. H. Burkill	s.n.	15 Apr.1913	MacRitchie
3.	00054458	SING	Anonymous	424	Jul.1889	Chan Chu Kang
4.	00054457	SING	J. S. Goodenough	1931	16 Mar.1889	Bukit Arang
5.	00054456	SING	J. G.	1931	7 Mar.1889	Jurong Road
6.	00054459	SING	H. N. Ridley	1934	29 Oct.1889	Seletar
7.	00054455	SING	H. N. Ridley	s.n.	1892	Tanglin Road
8.	00076840	SING	H. N. Ridley	s.n.	1892	Bukit Mandai
9.	00036301	SING	H. N. Ridley	s.n.	1899	Singapore Botanic Gardens, EcoGarden
10.	00046171	SING	C. K. Yeo	299	3 Oct.2000	Pulau Ubin
11.	00046173	SING	C. K. Yeo	214	29 Aug.2000	Upper Seletar Reservoir
12.	109176	SING	A. T. Gwee	2008-235	17 Jun.2008	Pulau Tekong
13.	153577	SING	A. T. Gwee	2010-837	22 Sep.2010	Western Catchment
14.	146720	SING	I. Hassan	2010-817	10 Aug.2010	Mount Faber
15.	2007012031	SINU	C. K. Yeo	125	13 Aug.2000	Upper Peirce Reservoir
16.	2007012004	SINU	C. K. Yeo	45	2 Aug.2000	Bukit Timah Nature Reserve
17.	2007012007	SINU	C. K. Yeo	280	24 Sep.2000	Nee Soon Swamp Forest
18.	2007012009	SINU	C. K. Yeo	80	8 Aug.2000	MacRitchie Reservoir
19.	2007012014	SINU	C. K. Yeo	99	9 Aug.2000	Rifle Range Road

***Ampelocissus gracilis* (Wall.) Planch.**

It is a herbaceous climber with a stem that is up to 1 mm across, covered in dense indumentum, and turns yellow-brownish with age (Fig. 3). The leaf is simple, with an ovate leaf blade 5.5–13 × 3.5–8 cm, with a rounded to cordate base. The leaf blade is covered with white indumentum that turns brown with age and is persistent on nerves and below. The inflorescence is a panicle of spikes, up to about 13 cm long (Fig. 4a). The flower has red petals and a yellow disc (Fig. 4c). The berry is oblong, and ripens red (Fig. 4b). The species is found in the Malay Peninsula and Borneo.

Table 3. Previous Singapore collections of *Ampelocissus gracilis* (Wall.) Planch. species, deposited in the Herbarium, Singapore Botanic Gardens (SING, with bar code no.) and Herbarium, Raffles Museum of Biodiversity Research, National University of Singapore (SINU, with accession no.).

Accession/						
S/No.	Bar Code No.	Herbarium	Collector(s)	Collector's No.	Date	Locality
1.	00076828	SING	Anonymous	s.n.	1889	Choa Chu Kang
2.	0019090	SING	Anonymous	s.n.	1894	Sungei Loyang
3.	054435	SING	H. N. Ridley	1922	—	Kranji
4.	054436	SING	H. N. Ridley	268	Oct.1889	Seletar
5.	054437	SING	H. N. Ridley	5712	1893	Upper Tanglin
6.	054439	SING	H. N. Ridley	s.n.	1903	Woodlands
7.	00076827	SING	H. N. Ridley	s.n.	22 May 1889	Bukit Mandai
8.	00076826	SING	H. N. Ridley	s.n.	1892	Changi
9.	0019078	SING	J. S. Goodenough	4749	1892	Teban
10.	0036304	SING	H. N. Ridley	s.n.	1892	SBG
11.	0106406	SING	A. T. Gwee	2008-73	13 Mar.2008	Upper Seletar Forest
12.	0138018	SING	A. T. Gwee	2009-462	17 Nov.2009	Upper Peirce
13.	2007012037	SINU	C. K. Yeo	155	22 Aug.2000	Nee Soon Swamp Forest
14.	2007012063	SINU	C. K. Yeo	209	29 Aug.2000	Upper Seletar Reservoir
15.	2007012061	SINU	C. K. Yeo	266	22 Sep.2000	BTNR
16.	2007012057	SINU	C. K. Yeo	63	6 Aug.2000	MacRitchie Reservoir



Fig. 2. *Ampelocissus elegans*. a, habit of along road to Bukit Kallang Service Reservoir; b, young plant showing simple to trifoliate leaves; c, fruiting branch with a mature infructescence; d, berries; e, seeds; f, flowers. Scale bars = 2 cm (c), 5 mm (d, e), 1 mm (f). (Photographs by: Ang Wee Foong [a, b, f] and Yeo Chow Khoon [c–e]).

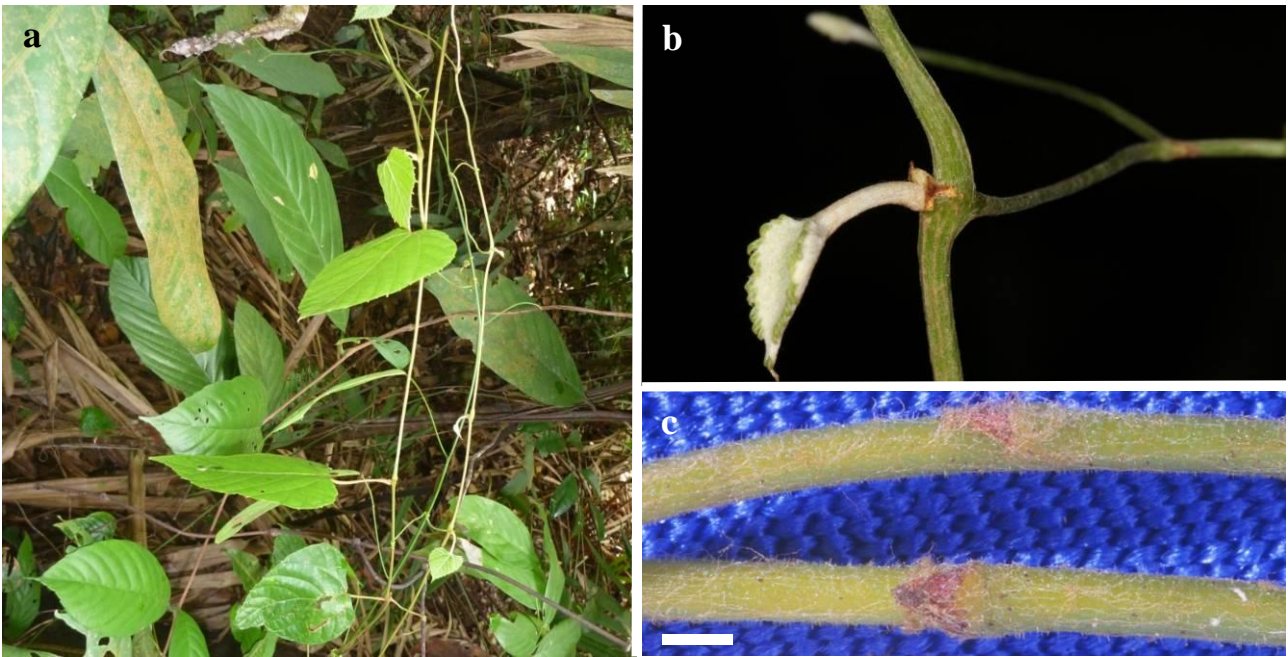


Fig. 3. *Ampelocissus gracilis*. a, habit at a forest near Bukit Kallang Service Reservoir; b, close up of stem with young leaf and its stipules; c, tendrils bracts. Scale bar = 1 mm (c). (Photographs by: Ang Wee Foong [a, b] and Yeo Chow Khooon [c]).

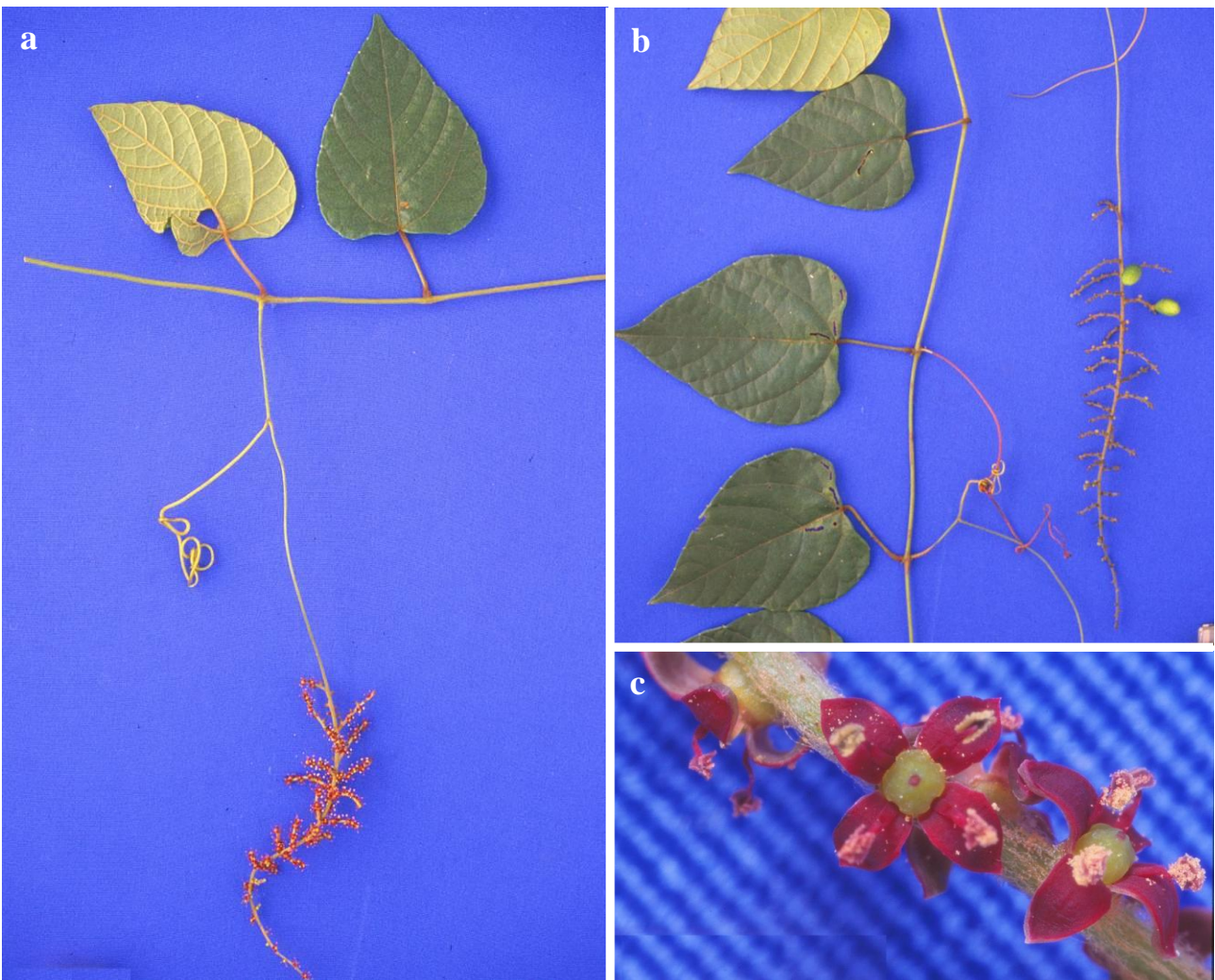


Fig. 4. *Ampelocissus gracilis*. a, branch in flower; b, branch in fruit; c, flowers. Scale bars = 2 cm (a, b), 1 mm (c). (Photographs by: Yeo Chow Khooon).

***Ampelocissus polystachya* (Wall.) Planch.**

It is a woody climber, with glabrescent stems up to 2.5 cm across, and which become warty and corky with age (Fig. 5a). The leaf is trifoliolate to pedately 5-foliolate and rarely biternately 7-foliolate (Fig. 5b). The terminal leaflet blade is broadly elliptic, 16.5–24 × 7–8.5 cm, and the lateral leaflet have blades that are obliquely elliptic and 13–15 × 5.5–6.5 cm. The leaf is sparsely hairy. The inflorescence is a panicle of spikes, up to about 30 cm long. The berry is globose-oblong and ripens purple. This species is found only in the Malay Peninsula.

Table 4. Previous Singapore collections of *Ampelocissus polystachya* (Wall.) Planch. species deposited in the Herbarium, Singapore Botanic Gardens (SING, with bar code no.) and Herbarium, Raffles Museum of Biodiversity Research, National University of Singapore (SINU, with accession no.).

S/No.	Accession/		Collector	Collector's No.	Date	Locality
	Bar Code No.	Herbarium				
1.	0019092	SING	J. Sinclair	39649	27 May 1953	Bukit Timah, Kruing Path
2.	2007012048	SINU	C. K. Yeo	54	3 Aug.2000	Bukit Timah Nature Reserve
3.	2007012052	SINU	C. K. Yeo	72	6 Aug.2000	MacRitchie Reservoir
4.	0113850	SING	A. T. Gwee	2008-179	20 May 2008	Chestnut Avenue
5.	0138014	SING	A. T. Gwee	2009-458	17 Nov.2009	Upper Peirce Reservoir
6.	0144494	SING	A. T. Gwee	2009-662	15 Dec.2009	MacRitchie Reservoir, Shinto Shrine

***Ampelocissus thyriflora* (Bl.) Planch.**

It is a herbaceous climber with stems that are up to about 8 mm across and covered in a dense, crinkled, brown indumentum. The leaf is digitately 3–7-foliolate, with the terminal leaflet blade obovate to oblong and 13–25 × 5.5–12 cm, while the lateral leaflet blades are the same shape as that of the terminal and 13–15.5 × 6–8 cm (Fig. 6). The inflorescence is a panicle of spikes 18–26 cm long. The berry is ellipsoid to globose and ripens pink. The species is found from Vietnam, Kampuchea, Thailand, the Malay Peninsula, Sumatra, and Borneo.

Table 5. Previous Singapore collections of *Ampelocissus thyriflora* (Wall.) Planch. species deposited in the Herbarium, Singapore Botanic Gardens (SING.).

S/No.	Bar Code No.	Herbarium	Collector	Collector's No.	Date	Locality
1.	0017204	SING	H. N. Ridley	—	1893	Changi beach
2.	0153570	SING	A. T. Gwee	2010-830	22 Sep.2010	Western Catchment, Pergam Marsh

CONCLUSIONS

Owing to more intensive collection by local workers, *Ampelocissus ascendiflora* and *Ampelocissus thyriflora* have been rediscovered. New conservation measures are required for these critically endangered species. One measure can involve the ex situ conservation of the local genotypes, by bringing them into cultivation in gardens and parks. The ornamental potential of these *Ampelocissus* species is great as their floral morphology and attractive foliage are similar



Fig. 5. *Ampelocissus polystachya*. a, woody stem along the Catchment Path, BTNR; b, a young leafy branch at the same location showing pedate leaves. (Photographs by: Ang Wee Foong [a], Yeo Chow Khoo [b]).

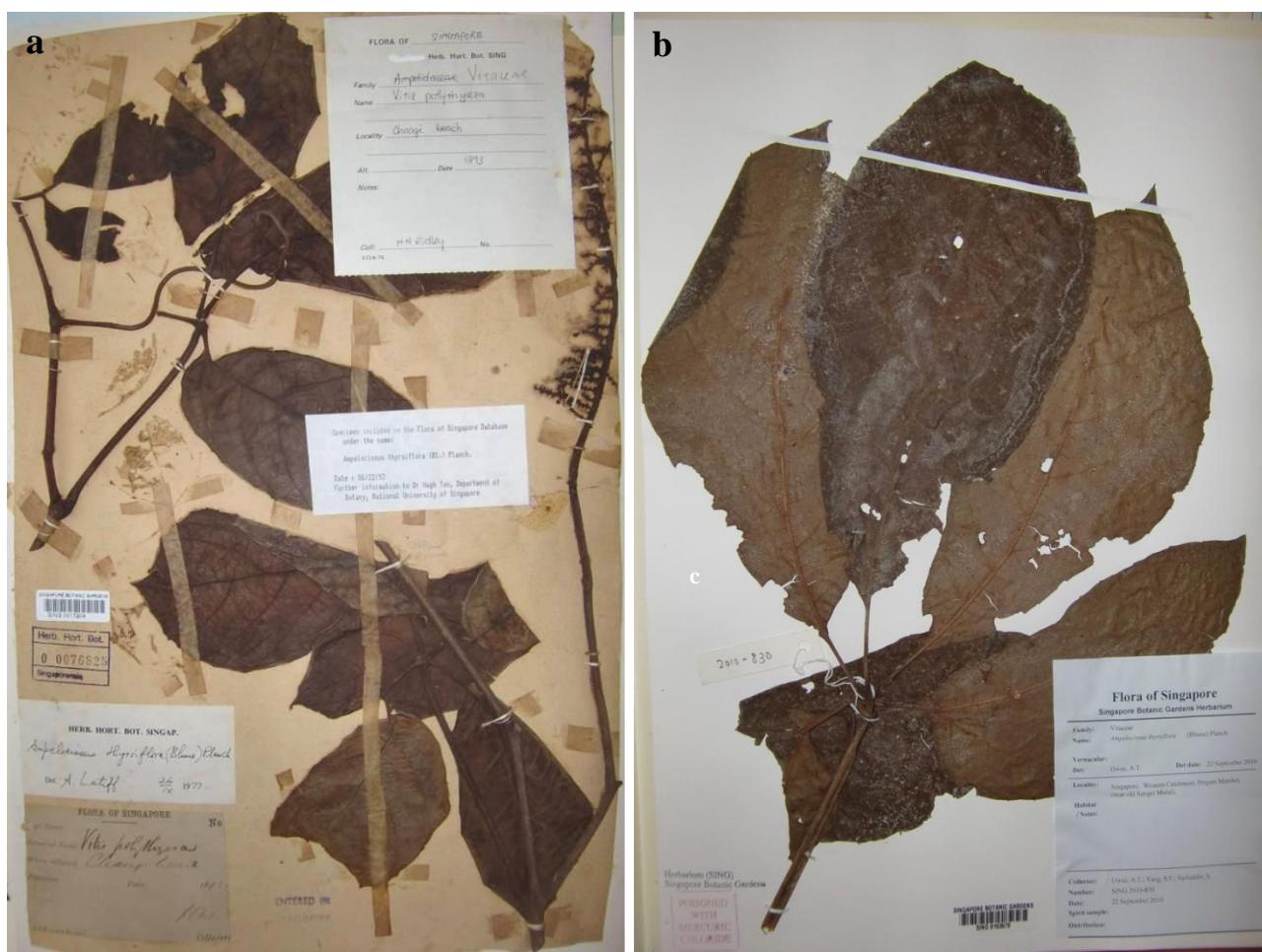


Fig. 6. *Ampelocissus thyrsoflora* specimens at SING. a, first collected by H. N. Ridley; and b, another collection by A. T. Gwee. (Photographs by: Yeo Chow Khoo). Note the brown indumentum that characterises the species.

to those of the ornamental *Vitis* species. They are known to be easily grown from rooted cuttings in water and soil, except for *Ampelocissus ascendiflora* and *Ampelocissus thyrsoflora*, which have not yet been trialled for their horticultural potential.

We would like to highlight three species to be considered as ornamental species. *Ampelocissus elegans* is probably the one with the most ornamental potential, as it tends to be free flowering. *Ampelocissus ascendiflora* also has potential, with attractive large leaves and red inflorescences. *Ampelocissus polystachya* is a woody species with the largest stem and thus may be suitable for covering larger structures such as gazebos. However, we have been unable to evaluate *Ampelocissus thyrsoflora* as we had not been able to obtain a living specimen, but from the size of its leaves and colour of its indumenta, it seems to be a promising species worth bringing into cultivation.

Introducing these species into cultivation may be a viable means of ex situ conservation. Given the significant losses in natural habitats owing to great landuse changes in Singapore (Corlett, 1991), the option of incorporating native species into human-managed landscapes to conserve them may be an option that we will have to consider.

ACKNOWLEDGEMENTS

We would like to express our gratitude to the Chief Executive Officer and staff members of the National Parks Board (NParks) for allowing us access to collections of the Herbarium, Singapore Botanic Gardens (SING), the Keeper, Herbarium, Raffles Museum of Biodiversity Research, National University of Singapore (SINU) for allowing us to use the collections, and the Ministry of Defence for granting us access to parts of Nee Soon Swamp Forest within their training grounds.

LITERATURE CITED

- Backer, C. A. & R. C. Bakhuizen van den Brink, 1965. Vitaceae. *Flora of Java*, **2**: 86–94.
- Chong, K. Y., H. T. W. Tan & R. T. Corlett, 2009. *A Checklist of the Total Vascular Plant Flora of Singapore: Native, Naturalised and Cultivated Species*. Raffles Museum of Biodiversity Research, National University of Singapore, Singapore. 273 pp. Uploaded 12 Nov.2009. http://rnbr.nus.edu.sg/raffles_museum_pub/flora_of_singapore_tc.pdf.
- Corlett, R. T., 1991. Vegetation. In: Chia, L. S., A. Rahman & D. B. H. Tay (eds.), *The Biophysical Environment of Singapore*. Singapore University Press, Singapore. Pp. 134–154.
- Henderson, M. R., 1959. *Malayan Wild Flowers: Dicotyledon*. Malayan Nature Society, Kuala Lumpur. 478 pp.
- Latiff, A., 1982. Studies in Malesian Vitaceae, 4. The genera of *Ampelocissus*, *Ampelopsis* and *Parthenocissus* in the Malay Peninsula. *Federation Museum Journal*, **27**: 78–93.
- Planchon, J.-E., 1887. Monographiae des Ampélidées vraies. In: Candolle, A. de & C. de Candolle (eds.), *Monographiae Phanerogamarum. Prodrumi nunc Continuation, nunc Revision. Volumen Quintum*. Sumptibus G. Masson, Parisiis [= Paris]. Pp. 306–654.
- Ren, H., L.-M. Lu, A. Soejima, Q. Luke, D.-X. Zhang, Z.-D. Chen & J. Wen, 2011. Phylogenetic analysis of the grape family (Vitaceae) based on the noncoding plastid *trnC-petN*, *trnH-psbA*, and *trnL-F* sequences. *Taxon*, **60**: 629–637.
- Soejima, A. & J. Wen, 2006. Phylogenetic analysis of the grape family (Vitaceae) based on three chloroplast markers. *American Journal of Botany*, **93**: 278–287.