

# First confirmed record of *Nymphoides peltata* (S.G.Gmel.) Kuntze (*Menyanthaceae*) naturalised in southern Africa

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**Background:** *Nymphoides peltata* is a hydrophyte with a nymphaeid growth form and is known to be an invader of aquatic ecosystems.

**Objectives:** To document the presence of *N. peltata* outside of cultivation in southern Africa.

**Method:** Herbarium vouchers of newly collected material were compared against the vouchers of indigenous members of the genus and with the relevant botanical literature to confirm the identity of the species.

**Results:** *Nymphoides peltata* is confirmed as occurring outside of cultivation for the first time in South Africa. The species was recorded from two dams adjacent to the Umgeni River in the KwaZulu-Natal midlands.

**Conclusion:** This is the first record of a non-indigenous species of the *Menyanthaceae* family for South Africa outside of cultivation and adds to our knowledge of the alien aquatic flora of the region. *Nymphoides peltata* is listed as a Category 1a species, which means that it should be eradicated.

## Introduction

*Nymphoides peltata* (S.G.Gmel.) Kuntze, commonly known as yellow floating heart, is a perennial hydrophyte of the *Menyanthaceae* family. It grows in still or slow-flowing rivers and its indigenous range is extensive, including most of Europe, Asia Minor, north-central Russia (Tutin 1972) and Japan (Zoku 1965). The *Nymphoides* genus has approximately 50 species (Tipperry & Les 2011), 13 of which are considered indigenous to Africa and Madagascar (Raynal 1974).

Within Africa, *N. peltata* has been recorded outside of cultivation in Ghana (JIRCAS 2010) and Algeria (De Bélair 2010). De Bélair (2010) listed *N. peltata* as indigenous to Algeria based on a record of one population near the town of Ben Azzouz. The absence of any record of this species in earlier botanical literature covering this region (Gubb 1909; Quezel & Santa 1962; Raynal 1974; Wild 1961) suggests that it may be an introduced species that has escaped from cultivation.

Five *Nymphoides* species are indigenous to southern Africa and to date no naturalised non-indigenous species have been recorded (Bredenkamp 2006; Cook 2004; GBIF 2017; SAPIA 2016; Whitehouse 1996). Despite this, *N. peltata* is listed on the *South African National Environmental Management: Biodiversity Act* (NEMBA) regulations (NEMBA 2014) as a Category 1a species, making it a species requiring compulsory control and eradication. This pre-emptive measure was based on *N. peltata* being invasive in Canada (Darbyshire & Francis 2008) and Sweden (Larson & Willén 2006), as well as naturalised in the American states of Tennessee (Chester 1996), Oklahoma, New York and Arizona (Clarke 1937; Correll & Correll 1972; Crow & Hellquist 2000).

*Nymphoides peltata* is cultivated as an ornamental plant in garden pools (Chester 1996) and aquaria (Allgayer & Teton 1987). In 2007, a landowner from Gauteng, South Africa, reported a cultivated population growing so prolifically that he needed assistance in its control (Henderson 2017). It was growing in an artificial, contained pond and was probably destroyed, as recent attempts to find this population have been unsuccessful (D. Cindi [South African National Biodiversity Institute], pers. comm., 01 November 2016).

This article reports the first record of *N. peltata* outside of cultivation in South Africa.

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## Research methods

An unknown *Nymphoides* species was reported in two dams adjacent to the Mgeni River in the KwaZulu-Natal Midlands (S29.44952° E30.31430°; Figure 1) in January 2016 (H. Grobler [Karkloof Safari Spa], pers. comm., 28 January 2016). Herbarium voucher specimens were collected and submitted to the KwaZulu-Natal Herbarium and were identified as *N. peltata* by the author. This was done through comparing the voucher specimens to the existing collections of this genus and to descriptions in the relevant literature (Darbyshire & Francis 2008; Mackinder 1990; Tippery, Les & Jones 2012; Whitehouse 1996). The Compton (NBG), KwaZulu-Natal (NH), Bews (NU) and the National Herbarium (PRE) did not have any specimens of *N. peltata*.

## Ethical considerations

Material was gathered under permit OP 3929/2015 issued by Ezemvelo-KZN Wildlife.

## Results

*Nymphoides peltata* was discovered in two dams that are part of a series of interconnected dams that are also connected to the Mgeni River, upstream of where the Mgeni joins the

Karkloof River. The two dams have areas of 3.2 and 0.2 ha, and have *N. peltata* concentrated along the dam edges amongst indigenous sedges (Figure 2). In 2016, the *N. peltata* flowered from January to April, dying back in the winter months, and in 2017, it flowered again in January. Hippos (*Hippopotamus amphibius* L.) on a game farm on which the dams are located were seen eating *N. peltata* (P. le Roux [Karkloof Safari Spa], pers. comm., 09 February 2017).

## Taxonomic treatment

*Nymphoides peltata* (S.G.Gmel.) Kuntze in *Revis. Gen. Pl.* 2: 429 (1891).

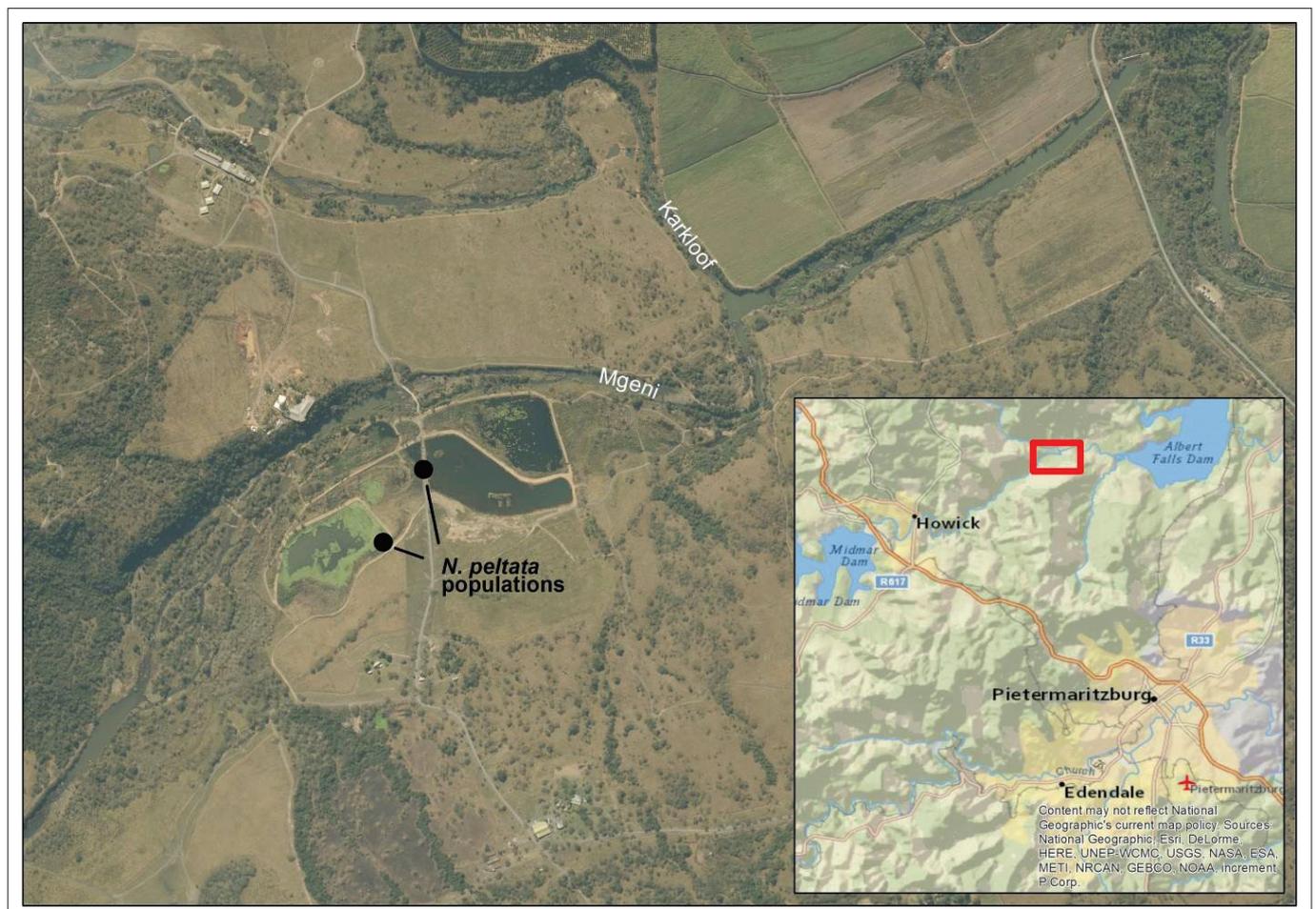
Type: JAPAN, *Von Siebold s.n.* (L0421238, lecto, JSTOR Plant Science image!).

Basionym: *Limnanthemum peltatum* S.G.Gmel. *Novi Comment. Acad. Sci. Imp. Petrop.* 14(1): 527 (t. 17), 1770.

For a full description, see Darbyshire and Francis (2008).

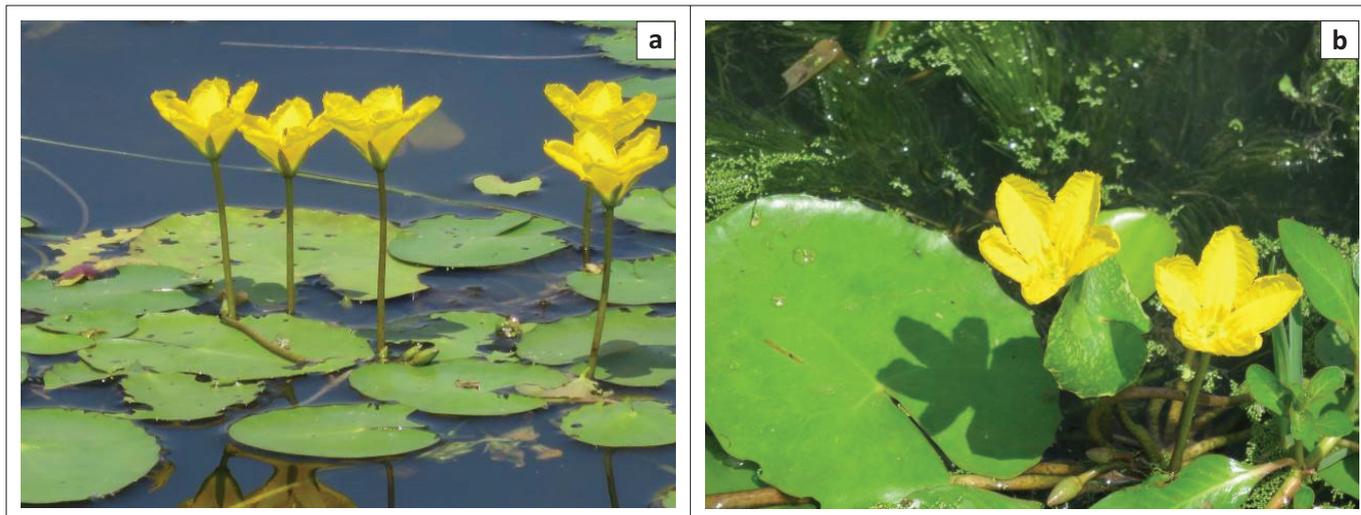
## Specimen examined

SOUTH AFRICA. KwaZulu-Natal: Karkloof Safari Spa, 700 m upstream from Karkloof and Mgeni rivers' confluence,



Source: Heather Terrapon, South African National Biodiversity Institute (SANBI)

FIGURE 1: Map of the known distribution of *Nymphoides peltata* in KwaZulu-Natal, South Africa.



Source: Photos courtesy of M. Cheek

**FIGURE 2:** *Nymphoides peltata* flowers on stalks approximately 50 mm above the water surface (a) and a close-up image of the flowers and leaves (b) at the KwaZulu-Natal site where the species was recorded.

29.44952 °S 30.31430 °E (-AD), 697 m.a.s.l., 28 Jan. 2016, Cheek M. 2435 (NH).

## Discussion

The origin of this *N. peltata* population is currently unknown. The seeds are dispersed through water and by birds, being disc shaped with marginal trichomes that can stick to waterfowl (Cook 1990). This is a possible pathway through which the plant could have arrived at these dams.

In its native range, *N. peltata* shows pioneer plant characteristics and can colonise large areas through vegetative growth in a season (Brock et al. 1983). *Nymphoides peltata* has had a significant impact on habitat structure and competitive interactions in the Swedish lakes where it has become established (Josefsson & Andersson 2001) and a weed risk assessment by the United States Department of Agriculture ranked the species high for impact and spread potential in the United States (USDA 2012).

Considering its impact elsewhere, this species warrants further research and a detailed weed risk assessment as laid out by Kumschick et al. (2015). A management plan has already been submitted to the Department of Environmental Affairs (Cindi 2016). However, surveys of nurseries and water bodies would help to get a more accurate delineation of *N. peltata*'s distribution and possible origin.

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## Competing interests

The author declares that he has no financial or personal relationships that may have influenced him in writing this article.

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