

Notes on Australian taxa of *Nymphoides* (Menyanthaceae): typification and nomenclature

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Introduction

This paper is presented as a precursor concerning type collections for any revision or Flora account of Australian *Nymphoides* taxa that may eventuate.

There are currently 20 species of *Nymphoides* Ség. (Menyanthaceae) recognised as occurring in Australia (Aston 2003). Those described since 1950 had their type collections clearly designated when first described, but are included here for completeness. Those described prior to 1950 were initially placed under the generic names of either *Limnanthemum* S.G.Gmel. or *Villarsia* Vent. and most of them have been treated, at one time or another, under all three generic names. This paper designates lectotypes where necessary, provides explanatory notes, and details the nomenclature and types for all Australian species except *N. indica* (L.) Kuntze and *N. parvifolia* (Griseb.) Kuntze. Although the two excluded species occur in Australia they were described from other countries and their typification has not been fully investigated by the author.

For species described before 1950, lectotypes are here designated for the currently accepted taxa *N. crenata* (F.Muell.) Kuntze, *N. exiliflora* (F.Muell.) Kuntze, *N. geminata* (R.Br.) Kuntze and *N. minima* (F.Muell.) Kuntze. They are also here designated for the taxonomic synonyms *N. hydrocharoides* (F.Muell.) Kuntze [under *N. aurantiaca*] and *Limnanthemum geminatum* (R.Br.) Griseb. var. *parvifolium* Griseb. [under *N. exiliflora* (F.Muell.) Kuntze]. *Villarsia geminata* var. β R.Br. is also placed under *N. exiliflora* and recognised as an informal synonym of *L. geminatum* var. *parvifolium*. Robert Brown's informal variety of *Villarsia geminata* var. α is placed with *N. geminata* (R.Br.) Kuntze. The holotype and possible isotypes of *N. exigua* (F.Muell.) Kuntze, the holotype and isotypes of *N. furculifolia* Specht, and the holotype of *Villarsia trachysperma* F.Muell. [a taxonomic synonym of *N. indica* (L.) Kuntze] are given. The holotype and isotype of *N. stygia* (J.M.Black) H.Eichler are given and the name is considered a *nomen ambiguum*. Basionyms and nomenclatural synonyms, all of which occur under the generic names of either *Limnanthemum* or *Villarsia*, are cited.

Abstract

Of the 20 species of *Nymphoides* Ség. (Menyanthaceae) currently recognised as occurring in Australia (Aston 2003), only those described since 1950 were initially named within this genus. Those described prior to 1950 were initially placed under the generic names of either *Limnanthemum* S.G.Gmel. or *Villarsia* Vent. and most have been treated, at one time or another, under all three genera. Nomenclature and explanatory notes relevant to all but two [*N. indica* (L.) Kuntze & *N. parvifolia* (Griseb.) Kuntze] of these early Australian taxa are provided with information on their type material. Lectotypes are designated where necessary. Species described under *Nymphoides* since 1950 are also included, together with their original type designations.

Several formal or informal names used for species of *Nymphoides* in *Aquatic Plants of Australia* (Aston 1973) are now outdated. Corrections for these are included here.

Muelleria 27(2): 119-126 (2009)



Lectotypes previously designated by other authors for *N. aurantiaca* (Dalzell) Kuntze and its taxonomic synonym *Villarsia aurantiaca* Ridl. ex C.B. Clarke are included. Although the type collections of these are extra-Australian, the species also occurs within Australia.

Species given names now placed in synonymy, or misapplied or informal names under *Nymphoides* in *Aquatic Plants of Australia* (Aston 1973), are included in this paper. The names as used there, with those which should now be used for them following in square brackets, are *N. geminata*, *sensu* Aston *op. cit.* 111, *non* (R.Br.) Kuntze [*N. montana* Aston], *N. hydrocharoides* [now a taxonomic synonym under *N. aurantiaca* (Dalzell) Kuntze], *N. stygia* [*nomen ambiguum*], *Nymphoides* sp. [*N. subacuta* Aston] and *Nymphoides* sp. aff. *exiliflora* [*N. geminata* (R.Br.) Kuntze].

Typification and Nomenclature

Nymphoides aurantiaca (Dalzell) Kuntze, (as *Nymphodes aurantiacum*), *Revis. gen. pl.* 2: 429 (1891).

Limnanthemum aurantiacum Dalzell in Hooker's *J. Bot. Kew Gard. Misc.* 2:136 (1850). *Type citation*: "Crescit prope Malwan; fl. Sept." *Type*: Bombay, India, Dalzell *s.n.*

Lectotype: K; *fide* Cramer, L.H. in Dassanayake, M.D., ed., *Revised Handb. Fl. Ceylon* 3: 211 (1981).

Villarsia aurantiaca Ridl. ex C.B. Clarke in King, G. and Gamble, J.S., *J. Asiatic Soc. Bengal Pt. 2, Nat. Hist.*, 74: 90 (1906). *Type citation*: "Pahang: Kwala Pahar, Ridley."

Lectotype: Peninsula Malaysia, Pahang, Kwala 'Pahar' (sphalm. for Pahang), Ridley *s.n.*, --.1890 (CAL 303131); possible isolectotype: Kwala Brawas, near Kwala Pahang, 14 May 1890, Ridley 550 (SING); *fide* Cheek, M. and Turner, I.M., *Kew Bull.* 53: 964 (1998). See note 1 below.

Nymphoides hydrocharoides (F.Muell.) Kuntze, (as *Nymphodes hydrocharodes*), *Revis. gen. pl.* 2: 429 (1891). *Villarsia hydrocharoides* F.Muell., *Fragm.* 6: 139 (Mar. 1868). *Limnanthemum hydrocharoides* (F.Muell.) Benth., *Fl. austral.* 4: 380 (Dec. 1868). *Type citation*: "Ad sinum Rockingham's Bay in stagnis. Dallachy."

Lectotype (here designated): Murray [River], Rockingham Bay, Qld, *J. Dallachy s.n.*, 29.vi.1865 (MEL 1505007); apparent isolectotypes: MEL 1505008, MEL

1505009, BRI 010375; possible remaining syntypes: MEL 1505010, MEL 1505011, MEL 1505012, MEL 1505013. See note 2 below.

Note 1: Cheek and Turner (1998) located only one collection (CAL 303131) fitting Clarke's protologue ("Pahang: Kwala Pahar, Ridley") for *Villarsia aurantiaca* and from the main specimen label, which seemed to be in Ridley's hand, corrected Clarke's spelling "Pahar" to "Pahang". The label also gave Ridley's name as collector and 1890 as the year of collection, without precise date. A second label was signed and dated 26 October 1903, apparently in Clarke's hand, and bore information which is largely reproduced in Clarke's protologue of three years later. The only other Ridley collection which Cheek and Turner could locate was from Kwala Brawas, near Kwala Pahang, 14 May 1890, Ridley 550 (SING). Because the species is rare in Malaysia, and because both collections were made in 1890, Cheek and Turner considered it possible that the CAL collection may be "merely a cursorily labelled duplicate" of Ridley 550 sent by Ridley to Clarke at some stage prior to Clarke's annotation of it in 1903.

In referring to the Ridley *s.n.* collection he was using, Clarke stated that "This example shows no fruit..." which, because of the importance of seed micromorphology and size in distinguishing species within Menyanthaceae (e.g. Sivarajan *et al.* 1989; Chuang & Ornduff 1992; Sivarajan & Joseph 1993; Aston 2003), is unfortunate. Cheek and Turner (1998) therefore prepared scanning electron micrographs of the seed from the possible isolectotype Ridley 550 (SING) and from other Malaysian specimens considered to be *V. aurantiaca*. Comparison of these scans with published SEM photos of Indian seeds of *Nymphoides aurantiaca* (Sivarajan & Joseph 1993) showed the two entities to be conspecific.

Ridley had annotated the unnumbered collection he sent to Clarke as *Villarsia aurantiaca* without reference to any other genus. Clarke accepted Ridley's name, again without mention of the epithet's earlier association with both *Nymphoides* and *Limnanthemum*. Cheek and Turner (1998) rightly treated *V. aurantiaca* as a new name and not just a new combination.

Note 2: The National Herbarium of Victoria (MEL) has seven sheets of material from Rockingham Bay that can be considered as possible syntype collections of

Nymphoides hydrocharoides. Only two of these are dated and, from a plain label "never can get much of this in flower" in Dallachy's hand on one sheet (MEL 1505013), it is evident that he made more than one collection of the species. Some undated material may have been collected after publication of the basionym in 1868. Only one sheet (MEL 1505007) gives a location more precise than "Rockingham(s) Bay", indicating the Murray River which flows into the Bay north of Cardwell. This sheet is dated and holds both labels and plant material which make it suitable for selection as the lectotype.

The lectotype designated bears Dallachy's plain label "Murray 29 Jun 1865" in his hand, and an additional blue "Botanical Museum of Melbourne" label stating "Rockinghams Bay". The blue label has Mueller's identification of *Villarsia hydrocharoides* in his handwriting, and also the initial "B" to indicate it has been seen by Bentham. The apparent isolectotype MEL 1505008 lacks the collector's name and any date but it bears a blue label with "Rockingham's Bay" and "*Villarsia hydrocharoides*" both in Mueller's hand, and also bears Bentham's initial. It is very well matched botanically with the lectotype, more so than any of the other sheets considered. The apparent isolectotype MEL 1505009 has Dallachy's plain label bearing field notes and "29 June 1865 Rockingham Bay" all in his hand, the identification *V. hydrocharoides* written by Mueller, and Bentham's initial.

The BRI 010375 sheet of apparent isolectotype material bears two plant portions that match the three portions on MEL 1505009. The BRI material would have been donated by MEL before the MEL material was mounted on the current sheets. The label on the BRI sheet is handwritten by the late J.H. Willis of MEL, who combined the basic information from MEL labels into "Rockingham Bay, N.Q'land. - in swamps", "John Dallachy" and "June 1865". His words include elaborations that do not appear on any of the MEL labels: "in swamps" must have been taken from "*in stagnis*" in the type citation.

Labels on the four sheets of "possible remaining syntype" material at MEL are inadequate to allow any certainty that they could be part of the lectotype collection. They are all undated and may or may not have been seen by Mueller in time for him to have considered them when preparing his description of *V. hydrocharoides*.

***Nymphoides beaglensis* Aston, *Muelleria* 6: 359 (1987).**

Type citation: "8 km east of Beagle Bay Mission, Dampierland Peninsula, in permanent pool known locally as 'Bunguaduk', 16°58'S, 122°44'E, Kimberley Region, Western Australia, 20.viii.1985, K.F. Kenneally 9451."

Holotype: PERTH; isotypes: MEL 1549338, PERTH (spirit).

***Nymphoides crenata* (F.Muell.) Kuntze, (as *Nymphodes crenatum*), *Rev. gen. pl.* 2: 429 (1891).**

Limnanthemum crenatum F.Muell., *Trans. Philos. Soc. Victoria* 1: 17 (1854). *Villarsia crenata* (F.Muell.) F.Muell., *Fragm.* 4: 127 (1864). *Type citation*: "In tranquil bends of the Murray River, Murrumbidgee, and Mitta Mitta, and in the nearest lakes and lagoons."

Lectotype (here designated): K; isolectotypes: MEL 2182281, 2182282, 2182283; probable isolectotype: MEL 1505131.

The lectotype sheet at K, although undated, bears a blue label with "*Limnanthemum crenatum*/ ferd Mueller/ Murray" in Mueller's hand. The specimen includes buds, flowers, fruit and seeds, and is the most complete of all type sheets seen.

All sheets at MEL are also undated. Two of the isolectotype sheets have a blue, printed "BOTANICAL MUSEUM OF MELBOURNE/ FERD. MUELLER, PH. & M.D." label annotated "*Villarsia crenata*/ ferd. Mueller/ Murray" in Mueller's hand, and initialled by Bentham. They also have labels or packets annotated by Mueller as "*Limnanthemum crenatum* ferd Mueller". The third isolectotype sheet bears only one plain blue unprinted label annotated by Mueller with "*Limnanthemum crenatum*/ ferd Mueller/ Murray/ Dr ferd Mueller".

The probable isolectotype sheet bears a label written in scripted handwriting of the kind that used to be used on the front of specimen display folders at MEL (in the early 1900s?). The label reads "*Limnanthemum crenatum*", with the words below repeating those of Mueller's type citation. Although collector and date are not given, it was not unusual for herbarium material to be used in display. The plant portions mounted on this sheet match with those of the isolectotypes and appear to be part of the same collection. Unfortunately, this is the most botanically complete sheet at MEL. It includes

a packet containing many seeds whereas a few seeds are present on only one of the isolectotype sheets.

Mueller's description and type citation of *Limnanthemum crenatum* was repeated in *Hooker's J. Bot. Kew Gard. Misc.* 8: 164 (1856).

***Nymphoides disperma* Aston, *Muelleria* 6: 197 (1986).**

Type citation: "Unnamed creek running into Pauline Bay, Vansittart Bay, Northern Kimberley, Western Australia, 14°12'30"S, 126°22'E, 22.v.1984, *S.J. Forbes 2098*."

Holotype: MEL 672226; isotypes: MEL 672227, MEL 2329836 (spirit), PERTH.

***Nymphoides elliptica* Aston, *Muelleria* 5: 268 (1984).**

Type citation: "10.3 km east of 'Musgrave' along the 'Marina Plains' road, 14°45'S, 143°35'E, Cape York Peninsula, Queensland, 13.v.1982, *Aston 2260*."

Holotype: MEL 612197; isotypes: BRI, CANB, K, MEL 612198 and 612199, MEL 2320257 (spirit).

***Nymphoides exigua* (F.Muell.) Kuntze, (as *Nymphodes exiguum*), *Rev. gen. pl.* 2: 429 (1891).**

Limnanthemum exiguum F.Muell., *Fragm.* 1: 40 (1858). *Villarsia exigua* (F.Muell.) Hook.f., *Fl. Tasman.* 2: 368 (1859). *Villarsia exigua* (F.Muell.) F.Muell., *Fragm.* 4: 128 (1864), *nom. illeg.*, later homonym. *Type citation*: "In paludibus subsalinis ad South Port Tasmaniae legit. Oldfield".

Holotype: Sheet bearing a field label "Wet muddy/ places in/ brackish/ water/ South Port" and with "Hb. Oldfield" added at the label top, all in the hand of A. Oldfield, also "Limnanthemum/ exiguum" in Mueller's hand at bottom of label, with "(Gentianaceae)" below; no date given (K 449394); possible isotypes: MEL 1505253, MEL 1505254 (see notes below).

Although Mueller saw and annotated the holotype material held at K, no definite isotype material has been located at MEL where it might be expected. MEL has no Southport collection gathered by Oldfield, but has Southport material collected by C. Stuart and there is a slim possibility that the K and MEL sheets hold parts of a joint Stuart/Oldfield collection. This possibility is explained below. Of the two relevant sheets at MEL, one (MEL 1505253) bears a field label "1781/ Aquatic/

South Port/ fl yellow/Dec/56" [i.e. 1856] in Stuart's hand, with "Limnanthemum/ exiguum/ ferd Mueller" added by Mueller. There is also an attached packet annotated on the outside with "South Port/V.D.L. St" in Stuart's hand, and the identification "Limnanthemum/ (Liparophyllum)/ exiguum/ ferd. Mueller" in Mueller's hand. Inside the packet is a loose label with "South Port/ Dec 55/ Water" [note 1855 at variance from 1856 on other label] in Stuart's hand and "Limnanthemum exiguum" added by Mueller. The sheet also has a standard blue printed label "BOTANICAL MUSEUM OF MELBOURNE/ FERD. MUELLER, PH. & M.D." annotated by Mueller with "Villarsia exigua/ ferd Mueller/ Van Diemen's Land", and has several specimens mounted on it. A second sheet (MEL 1505254) has several specimens in a packet bearing "Limnanthemum/ exiguum/ ferd Mueller" in Mueller's hand, and "South Port/V.D.L." in Stuart's hand.

The presence of two different dates (Dec. 55 and Dec. 56) on the Stuart material of MEL 1505253 raises the question of whether all the Stuart material on the two MEL sheets could have come from two different collections. If so, these collections may have been incorrectly amalgamated over the years before becoming mounted on the current sheets. Alternatively one date may be in error, in which case all material should belong to the one collection only.

G. Bentham has initialled the packet and blue label on MEL 1505253, indicating that he saw the Stuart material held at MEL. In *Fl. austral.* 4: 381 (1868) Bentham cited his examination of *L. exigua* from "South Port, C. Stuart" but did not mention any Oldfield collection of the species. It seems that he probably had reason for believing that the holotype material at K had been collected by Stuart (see next paragraph).

Helen Henderson (pers. comm.) of Perth, Western Australia, who is preparing a database of her and her husband's researches into Oldfield's collections, has provided information concerning joint collecting of Oldfield and Stuart in south-east Tasmania. Stuart was in the area from September 1855 to April 1856, and Oldfield met up with him at Southport in either very late December 1855 or very early January 1856 to collect for about ten days. A second joint trip of late February and early March 1857 does not involve *N. exigua*.

From the information above it can be seen that there is a possibility that the holotype at K, supposed by Mueller to have been collected by Oldfield, and the Stuart collections at MEL (or some of this Stuart material) may have been jointly collected. The label on the holotype is in Oldfield's hand and effectively has the same habitat and locality data in English as that published in Latin by Mueller. However, Oldfield has not indicated who made the collection but has instead annotated the label as being from his herbarium. The K and MEL material could all be part of a Stuart collection, some of which was given to Oldfield by Stuart for Oldfield's own herbarium. If that is so, then the MEL sheets would be isotypes. An alternative, that the holotype is an independent collection of Oldfield's, seems less likely because it consists of only two small plants and Oldfield normally collected in greater quantity.

***Nymphoides exiliflora* (F.Muell.) Kuntze, Revis. gen. pl. 2: 429 (1891).**

Villarsia exiliflora F.Muell., *Fragm.* 5: 46 (July 1865). *Limnanthemum exiliflorum* (F. Muell.) Benth., *Fl. austral.* 4: 381 (1868). *Type citation*: "In aquis stagnantibus ad sinum marinum Rockingham's Bay. Dallachy."

Lectotype (here designated): "1st May 1865 Growing in moist places flower yellow ..." in Dallachy's hand, with "*Villarsia exiliflora* ..." added by Mueller, and "Rockingham's Bay" (MEL 1505001); remaining syntype: "Moist places a beautiful little plant – small yellow flowers ... 1865 5 and 6 April ..." in Dallachy's hand with "*Villarsia exiliflora* ..." and "Rockingham's Bay" added by Mueller (MEL 1505002); possible syntypes (collections undated): Sheet with printed "PHYTOLOGIC MUSEUM OF MELBOURNE / BARON FERD. VON MUELLER, PH. & M.D., LL.D." label bearing handwritten "Rockingham's Bay, Queensland. / Dallachy" (GOET). Sheet with blue printed "BOTANICAL MUSEUM OF MELBOURNE" label and "Rockingham's Bay, *Villarsia exiliflora* ferd. Mueller" in Mueller's hand, collector not given (L). "Rockingham's Bay, J. Dallachy" (MEL 1505003 & 1505004).

Limnanthemum geminatum (R.Br.) Griseb., *Gen. sp. Gent.* 346 (1838, in error 1839) var. *parvifolium* Griseb., (as *β parvifolia*), *loc. cit.* *Type citation*: "in litore inter tropicos (Br.), pr. York-Sound (Cunningham!)"

Lectotype (here designated): Sheet with printed "R. Brown, Iter Australiense, 1802-5" label numbered 2982, printed "Type Specimen" label, and with two near-identical labels stating "*Menyanthes* [*Nymphoides* crossed out] *caespitosa* / Desc port No 89 a Shoalwater Bay / in humidus" in R. Brown's hand (BM); probable isoelectotypes: "*Menyanthes geminata* / Port Jackson" *pro parte*, as to specimen at top right of sheet (BM). Printed "R. Brown, Iter Australiense, 1802-5" label numbered 2982 and label "*Menyanthes caespitosa* Shoalwater Bay Towards the Conical Hill" in Brown's hand, upper specimens on mixed sheet [excl. lower specimens from "Nepean"] (K). "*Limnanthemum geminatum* / *Menyanthes caespitosa* / ... / Shoalwater Bay" (MEL 1505006)! Sheet with "*Limnanthemum geminatum* (*Menyanthes caespitosa* Hb. Br.) Shoalwater Bay" apparently in Brown's hand, and also a Herb. Mus. Paris label printed "Australie/ Robert Brown/ Envoi du Jardin royal de Kew/ Recu le 19 Janvier 1884." (P).

Villarsia geminata var. *β* R.Br., *Prodr.* 457 (1810). "(T.) v.v."

Although Grisebach, *loc. cit.*, cited two collections when designating the varietal epithet *parvifolium* for Brown's informal variety *β*, he clearly used Brown's *Prodr.* as the primary basis for acceptance of the variety and for the provision of his own epithet for it. It is therefore fitting to choose Brown's Shoalwater Bay (Queensland) material as lectotype although Grisebach's text indicates that he did not see Brown's material. The Cunningham collections, made in 1820, from York Sound (Kimberleys, Western Australia) and seen by Grisebach are well outside the currently known range of *Nymphoides exiliflora* and possibly represent a different entity to Brown's collection. Articles 9.1, 9.2 and 9.9 of the *International Code* (McNeill *et al.* 2006) cover a situation of this kind.

See also notes under *Nymphoides geminata* (R.Br.) Kuntze concerning Brown's informal varieties.

Nymphoides furculifolia* Specht, (as *Nymphoides furculaefolia*) in Specht, R.L. & Mountford, C.P. (eds), *Rec. American-Australian Scientific Exped. Arnhem Land 3: 280 (1958).

Type citation: "South Bay, Bickerton Island (waterhole in sandstone hills): 455. Hyd. Type – Brisbane (BRI)"

Holotype: (BRI 017792); isotypes: (AD 96149108, K, MEL 595587, NSW). Each type has a printed Expedition label enlarging information in the type citation, e.g. giving "South Bay, Bickerton Island, in the Gulf of Carpentaria (13°45'S, 136°6'E)", collection date 5 June 1948, and collector *R.L. Specht 455*.

***Nymphoides geminata* (R.Br.) Kuntze, as *Nymphodes geminatum*, *Rev. gen. pl. 2: 429* (1891).**

Villarsia geminata R.Br., *Prodr.* 457 (1810) *pro parte*, as to var. α , excl. var. β . *Limnanthemum geminatum* (R.Br.) Griseb., *Gen. sp. Gent.* 346 (1838, in error 1839), *pro parte*, as to var. α , excl. var. *parvifolium* Griseb., (as β *parvifolia*), and excl. *Villarsia sarmentosa* Sims. *Type citation*: "(J.) v.v.", R. Brown.

Lectotype (here designated): Sheet with "R. Brown, Iter Australiense, 1802-5" printed label, numbered 2982, and with two labels in Brown's hand, these being "Villarsia [above a ruled through *Menyanthes*] *geminata* / α *prodr 457* / Nepean / 1804 December" and "*Menyanthes elatior* / Nepean opposite Thomsons / Land / Decr 1804" (BM); possible isoelectotype: "R. Brown, Iter Australiense, 1802-5" printed label, numbered 2982, and handwritten "Nepean", excl. upper specimens from Shoalwater Bay (K); remaining syntypes: "*Menyanthes geminata* / Port Jackson" *pro parte*, excl. specimen at top right, coll. R. Brown (BM). "R. Brown, Iter Australiense, 1802-5" printed label, and handwritten [apparently by Brown] label "*Menyanthes geminata* / Port Jackson" (MEL 1505005). "*Menyanthes geminata* Flooded banks of the Nepean 1805" in Brown's hand (K).

[*Nymphoides* sp. aff. *exiliflora*, *sensu* Aston, *Aquatic Pl. Australia* 117 (1973)]

In describing the basionym *Villarsia geminata*, R. Brown, *loc. cit.*, recorded two infraspecific taxa, α and β . Taxon α was said to have subcoriaceous leaves 2.5–5 cm in diameter, with upper and lower surfaces differently coloured, and to have been collected by Brown from "(J)" [New South Wales]. Taxon β had smaller membranous leaves about 1.2–2 cm diameter with both surfaces similarly coloured, was sometimes stemless, and was collected from "(T)" [tropical Australia]. Brown expressed uncertainty as to the taxa, describing β as "*Forsan distincta*", i.e. perhaps distinct,

and did not formally name them or indicate their taxonomic rank. Under *Limnanthemum geminatum*, Grisebach *loc. cit.*, retained Brown's taxa and their designations of α and β , and also validly published the epithet *parvifolium* (as β *parvifolia*) for β . Under Article 35.4 of the International Code (McNeill *et al.* 2006) this epithet must be regarded as having the rank of variety. In publishing the var. *parvifolium* Grisebach automatically established the autonym *L. geminatum* var. *geminatum* for the taxon α (McNeill *et al.* 2006, article 26.3).

In this paper *L. geminatum* var. *parvifolium* is placed as a taxonomic synonym of *Nymphoides exiliflora*, and a lectotype for the varietal name has been designated in the account of that species, *q.v.*

***Nymphoides geminata sensu* Aston, *Aquatic Pl. Australia* 111 (1973), *non* (R.Br.) Kuntze.**

Now *N. montana* Aston, *q.v.*

***Nymphoides hydrocharoides* (F. Muell.) Kuntze.**

Now a taxonomic synonym under *N. aurantiaca* (Dalzell) Kuntze, *q.v.*

***Nymphoides minima* (F. Muell.) Kuntze, (as *Nymphodes minimum*), *Revis. gen. pl. 2: 429* (1891).**

Limnanthemum minimum F. Muell. *Fragm.* 1: 40 (1858). *Villarsia minima* (F. Muell.) F. Muell. *Fragm.* 4: 128 (1864). *Type citation*: "In stagnis aqua limpida repletis flumen Fitzmaurice versus."

Lectotype (here designated): Sheet with plain label stating "Limnanthemum/ minimum, ferd. Mueller/ Fresh stagnant waters near/ the upper Fitzmaurice/ Oct 55. ferd. Mueller" [c.14°50'S, 130°45'E] in Mueller's hand, and a blue printed "BOTANICAL MUSEUM OF MELBOURNE / ferd. Mueller, PH. & M.D." label with "*Villarsia minima*/ ferd. Mueller/ Arnhem's Land" in Mueller's hand and initialled by Bentham (MEL 1505000); isoelectotype: Specimen in type folder with label "Limnanthemum minimum ferd Mueller/ Fitzmaurice River Oct. 55 ferd Mueller." in Mueller's hand (K). The sheet at K also contains a Cunningham collection that is not part of the type.

***Nymphoides montana* Aston, *Muelleria* 5: 36 (1982).**

Type citation: "Lake Hill, south-west of Nunniong Plains, East Gippsland, Victoria, grid W6(-3), 20.i.1971, *Beaglehole & Finck ACB36345*."

Holotype: MEL 1504963; isotypes: BRI, CANB, MEL 1504964, MEL 1504965, NSW. Paratype also cited: "Morass Creek, about 9 km north of Benambra, at crossing of the Omeo to Corryong road, 36°52'S, 147°42'E, Victoria, 12.iii.1975, *Aston 1852*." MEL 1504989 to 1504999, MEL 2326032 (spirit), NSW.

[*Nymphoides geminata sensu* Aston, *Aquatic Pl. Australia* 111 (1973), *non* (R.Br.) Kuntze]

***Nymphoides planosperma* Aston, *Muelleria* 5: 39 (1982).**

Type citation: " Northern Territory, Kakadu National Park, c. 22 km north-east of Jabiru, 12°31'S, 132°58.5'E, 30.iii.1981, *Craven 6607*."

Holotype: MEL 1520239; isotypes: CANB (not seen), MEL 1520238, MEL 2327964 (spirit). [Also other material awaiting distribution from CANB at the time the name was published, and not seen by Aston.]

***Nymphoides quadriloba* Aston, *Muelleria* 5: 42 (1982).**

Type citation: "About 3 miles NNE of Katherine, Northern Territory, 10.iv.1967, *Adams 1747*." [Incorrectly given as c. 2 miles north of Katherine on at least the K and NT isotype sheets but corrected on the CANB sheet to the citation quoted above.]

Holotype: CANB 172340; isotypes: CANB 172339, CANB (spirit), K, NSW, NT 39334, also (not seen by Aston) A, E, L, US. Paratype also cited: "Property of L.J. Phillips, about 5–8 km NNE. of Katherine, c. 14°25'S, 132°18'E, Northern Territory, 7.v.1976, *Aston 1898*." BRI, CANB, MEL 1505244, MEL 1505245, MEL 2320273 (spirit), PERTH.

***Nymphoides simulans* Aston, *Muelleria* 16: 83 (2002).**

Type citation: "Queensland, Cape York Peninsula, 3.2 km E of 'Musgrave' along the 'Musgrave' to 'Marina Plains' road, 13 May 1982, *H.I. Aston 2255*."

Holotype: MEL 612170; isotypes: BRI, MEL 612171, MEL 2173027 (spirit).

***Nymphoides spinulosperma* Aston, *Muelleria* 10: 21 (1997).**

Type citation: "Victoria, Wimmera, c. 5.5 km (in a straight line) WNW of St Arnaud, along the St Arnaud–Bayena Rd, altitude 160 m, *H.I. Aston 2872*, 21.i.1996."

Holotype: MEL 2031021; isotypes: MEL 2031022, MEL 2031023, MEL 2037992 (spirit), NSW.

***Nymphoides spongiosa* Aston, *Muelleria* 5: 45 (1982).**

Type citation: "About 6 km east of the Howard River crossing of the Howard Springs to 'Koolpinyah' road, 12°26'S, 131°08'E, Northern Territory, 17.v.1976, *Aston 1936*."

Holotype: MEL 1505146; isotypes: CANB, MEL 1505145, MEL 2300180 (spirit), NT.

***Nymphoides* sp. *sensu* Aston, *Aquatic Pl. Australia* 117 (1973).**

Now *N. subacuta* Aston, *q.v.*

***Nymphoides* sp. aff. *exiliflora sensu* Aston, *Aquatic Pl. Australia* 117 (1973).**

Correctly *N. geminata* (R.Br.) Kuntze, *q.v.*

***Nymphoides stygia* (J.M.Black) H.Eichler, (as *N. stygium*), *Taxon* 12: 296 (1963).**

Limnanthemum stygium J.M.Black, *Trans. & Proc. Roy. Soc. South Australia* 42: 52, tab. 6 (1918). *Type citation*: "Dismal swamp, 15 miles north of Mount Gambier."

Holotype: Dismal Swamp, N of Mt Gambier, *J.M. Black s.n.*, 4 or 6.xii.1917 (AD); isotype: (K).

Black, *loc. cit.*, stated "fructu ignoto" in his description, and the fragmentary type material is deficient in showing diagnostic characters of inflorescence, infructescence and seed. Originally (Aston 1973) I accepted the name as representing a distinct species. Later (Aston 1986) I considered *Nymphoides stygia* was described from a depauperate plant of *Villarsia reniformis* R.Br. as the specimens, and figures published by Black, all represent a species of *Villarsia*. However, from the leaf shape it is perhaps more likely that it should be placed with one of the two varieties of *V. umbricola* Aston. These varieties can only be distinguished by the seeds (Aston 1969). It seems that the identity of the *Villarsia* taxon to which the name

Nymphoides stygia applies remains inconclusive, and the name is best considered a *nomen ambiguum*.

***Nymphoides subacuta* Aston, *Muelleria* 5: 48 (1982).**

Type citation: "McMinns Lagoon, approximately 30 km ESE of Darwin city centre, 12°31'S, 131°05'E, Northern Territory, 20.v.1976, *Aston 1954*."

Holotype: Long-styled plant *Aston 1954A*, MEL 1505123; isotype: CANB. Paratypes also cited: Short-styled plant *Aston 1954B*, DNA; Short-styled plant *Aston 1954C*, MEL 1505122, MEL 1505124; Style unspecified, leaves only, showing variation, MEL 1505125. [Also MEL spirit of isotype and paratype material. All plants of *Aston 1954* were collected within three metres of each other].

[*Nymphoides* sp. *sensu* Aston, *Aquatic Pl. Australia* 117 (1973)]

***Nymphoides triangularis* Aston, *Muelleria* 5: 265 (1984).**

Type citation: "14.8 km east of 'Musgrave' along the 'Marina Plains' road, 14°44'S, 143°37'E, Cape York Peninsula, Queensland, 13.v.1982, *Aston 2262*."

Holotype: MEL 612194; isotypes: BRI, CANB, MEL 612195, MEL 612196, MEL 2320253 (spirit).

***Villarsia trachysperma* F.Muell., *Fragm.* 6: 136 (1868).**

Type citation: "In lacunis juxta fluvium South Alligator-River. F.M."

Holotype: Sheet with plain white pencilled label "Lagoons of the tribu/ tary of the S. Alligator/ River 5 July 56" and a blue printed "BOTANICAL MUSEUM OF MELBOURNE./ FERD. MUELLER, PH. & M.D." label bearing, all in Mueller's hand, "*Villarsia trachysperma* F.v. M./ S. Alligator River" plus descriptive notes. (MEL 681834).

This has long been accepted, correctly, as a taxonomic synonym of the cosmopolitan species *Nymphoides indica* (L.) Kuntze, (as *Nymphodes indicum*), *Revis. gen. pl.* 2: 429 (1891). *Menyanthes indica* L. *Sp. pl.* 207 (1753). Note that Mueller never collected on the South Alligator River or its tributaries, having gone no further north towards that area than the vicinity of the Elsey Creek and Roper River (Gregory 1884). His collecting locality for the holotype remains unclear, but

on July 5, 1856, he was en route between the Victoria River and Elsey Creek.

The blue label cited here, and another on the holotype sheet, have both been seen and initialled by Bentham. I have not located any other possible type material held elsewhere, and an additional check by J. Bruhl (while ABLO) of K and BM specimens also proved negative. I therefore regard the MEL sheet as a unicate returned from K by Bentham after his examination of it.

Acknowledgements

I wish to thank the directors and staff of all the herbaria cited, both Australian and ex-Australian, for allowing me access to their collections. I thank Dr Jeremy Bruhl who, while ABLO at Kew, UK, provided additional comment and digital photos from K and BM in relation to possible type material of *Nymphoides exigua* and *Villarsia trachysperma*. My thanks also go to Dr Helen Henderson, Shenton Park, Western Australia, for sharing with me her knowledge of the joint field work of Oldfield and Stuart in Tasmania.

References

- Aston, H.I. (1969). The genus *Villarsia* (Menyanthaceae) in Australia. *Muelleria* 2, 3–61.
- Aston, H.I. (1973). *Aquatic plants of Australia*. Melbourne University Press: Melbourne.
- Aston, H.I. (1986). 'Menyanthaceae'. In J.P. Jessop & H.R. Toelken (eds), *Flora of South Australia* 2, 1048–1050. South Australian Government Printing Div.: Adelaide.
- Aston, H.I. (2003). Seed morphology of Australian species of *Nymphoides* (Menyanthaceae). *Muelleria* 18, 33–65.
- Cheek, M. and Turner, I.M. (1998). The identity of *Villarsia aurantiaca* Ridl. ex C.B. Clarke (Menyanthaceae) in the Malay Peninsula. *Kew Bulletin* 53, 961–965.
- Chuang, T.I. and Ornduff, R. (1992). Seed morphology and systematics of Menyanthaceae. *American Journal of Botany* 79, 1396–1406.
- Gregory, A.C. (1884). *Journals of Australian Exploration of Augustus Charles Gregory and Francis Gregory*. Government Printer: Brisbane (Facsimile edn 1969).
- McNeill, J. et al. eds (2006). *International Code of Botanical Nomenclature (Vienna Code)*. International Assoc. Plant Taxonomy; Europe. A.R.G. Gantner Verlag: Liechtenstein.
- Sivarajan, V.V., Chaw, Shu-Miaw and Joseph, K.T. (1989). Seed coat micromorphology of Indian species of *Nymphoides* (Menyanthaceae). *Botanical Bulletin of Academia Sinica* 30, 275–283.
- Sivarajan, V.V. and Joseph, K.T. (1993). The genus *Nymphoides* Seguiet (Menyanthaceae) in India. *Aquatic Botany* 45, 145–170.