



New combinations in *Agave* (Asparagaceae): *A. amica*, *A. nanchitlensis*, and *A. quilae*

JOACHIM THIEDE^{1*} & RAFAËL GOVAERTS²

¹*Schenefelder Holt 3, 22589 Hamburg, Germany; e-mail: joachim_thiede@gmx.de*

²*Royal Botanic Gardens, Kew, Richmond, Surrey TW9 3AE, U.K.*

*author for correspondence

Phylogenetic studies of *Agave* Linnaeus (1753: 323) and related genera (Asparagaceae, Agavoideae) thus far published were based either on molecular (Bogler & Simpson 1996; Bogler *et al.* 2006; Good-Ávila *et al.* 2006; Scheinvar *et al.* 2017) or on morphological data (Hernández-Sandoval 1995; Tambutti in Eguiarte *et al.* 2006). Most studies showed that the genera *Manfreda* Salisbury (1866: 78), *Polianthes* Linnaeus (1753: 316) and *Prochnyanthes* Watson (1887: 457) are nested within the large genus *Agave*, thus rendering *Agave* as traditionally circumscribed (= *Agave* s.str.) paraphyletic. The sole study in which *Manfreda*, *Polianthes* and *Prochnyanthes* grouped separate from and not nested within *Agave* is the molecular AFLP study of Gil-Vega *et al.* (2007).

To convert these phylogenetic results into classification, Thiede (2001) suggested a monophyletic re-circumscription of *Agave*: *Manfreda*, *Polianthes* and *Prochnyanthes* were included in *Agave* (= *Agave* s.l.) and together classified as *Agave* subg. *Manfreda* (Salisb.) Baker (1877: 807). However, in the molecular studies, the support values for the clades are partly very weak to moderate only, none of the studies is based on a broad sampling of taxa and loci, and the samples of *Agave* subg. *Manfreda* show different patterns and either together form a clade (Bogler & Simpson 1996) or are broadly dispersed over the tree of *Agave* (Good-Ávila *et al.* 2006). A molecular phylogeny with strongly supported clades based on a broad sampling of taxa and loci of *Agave* s.l. is much needed to corroborate its phylogeny and the taxonomy derived thereof.

Most of the necessary name changes to accommodate the broadened, monophyletic re-circumscription of *Agave* (s.l.) were published by Thiede & Egli (1999; 2001), Etter & Kristen (2007), Thiede (2012), Govaerts & Thiede (2013), and Thiede (2015). The available binomials in *Agave* for species formerly placed in *Manfreda*, *Polianthes* and *Prochnyanthes* have been meanwhile incorporated in the ‘World Checklist of Asparagaceae’ (Govaerts *et al.* 2016), ‘JSTOR Global Plants’ (<http://plants.jstor.org/>), and the taxonomic synopsis by Thiede (2001), in contrast to Mexican taxonomists who follow traditional generic classifications and continue to recognize the genus *Polianthes* (e.g., Solano 2002) and publish new species in *Polianthes* (e.g., Castro-Castro *et al.* 2016).

Here, we complete the transfers into *Agave* by validating a combination which was not validly published, and by publishing two further necessary new combinations. Identifiers are cited for all the new nomenclatural acts as provided by the IPNI registration repository. They are listed in brackets after the new combinations.

Agave amica (Medikus) Thiede & Govaerts, **comb. nov.** (77153983-1)

Basionym: *Tuberosa amica* Medikus (1790: 430)

≡ *Polianthes tuberosa* Linnaeus (1753: 316) ≡ *Agave tuberosa* (L.) Thiede & Egli (1999: 112), *nom. illeg.*, Art. 53.1. ≡ *Agave polianthes* Thiede & Egli (2001: 166). Type (lectotype, designated by Verhoek in Jarvis *et al.* 1993: 78): Herb. Hermann 3: 34, No. 125 (BM-000594676, digital image seen).

= *Crinum angustifolium* Houttuyn (1780: 165).

= *Polianthes gracilis* Link (1821: 330) ≡ *Polianthes tuberosa* var. *gracilis* (Link) Beurling (1854 publ. 1856: 110).

= *Polianthes tuberosa* f. *plena* Moldenke (1948: 41).

When transferring *Polianthes tuberosa* into *Agave*, Thiede & Egli (2001: 166) published the replacement name *Agave polianthes* due to the earlier *Agave tuberosa* Miller (1768: n.° 4). Later, the homotypic *Tuberosa amica* became known, which is the oldest binomial whose epithet is not preoccupied in *Agave*, thus needing the above new combination.

Agave amica is the ‘Tuberose’ or ‘Nardo’, a bulbous plant with white nocturnal flowers with intensive odor, best known as *Polianthes tuberosa*. The Tuberose is cultivated worldwide in (sub-)tropical regions where it represents one of the most important cut flowers, grown commercially as cut flower in India, New Zealand, Japan and Mexico, and for the perfume industry in India and France (Barba-González *et al.* 2012).

The Tuberose was already cultivated in Mexico by the Aztecs in pre-conquest times as a perfume flower named “Omioxochitl” (= bone flower) and illustrated in several early Spanish codices of the conquest time (Trueblood 1973). In the 1651 edition of Hernandez’ ‘Rerum Medicarum Novae Hispaniae Thesaurus’, the Tuberose is illustrated as “De Omioxochitl” (omioxochitl) and its origin given as “Provenit in frigidis, & temperatis regionibus” (Hernandez 1651: 277). The Tuberose is still known from cultivation only and of unknown origin in the wild, but most probably originated in Mexico where all species of the genus *Polianthes* are native (Solano 2002). It may have originated in Jalisco (Mexico) where the similar *Agave dolichantha* Thiede & Egli (1999: 111; ≡ *Polianthes longiflora* Rose 1903: 10) was rediscovered in the wild (Cedano *et al.* 1995; Cházaro & Machuca 1995).

Agave nanchititlensis (Matuda) Thiede & Govaerts, **comb. nov.** (77153982-1)

Basionym: *Manfreda nanchititlensis* Matuda (1974: 54) ≡ *Agave nanchititlensis* (Matuda) Thiede & Egli (1999: 110), *nom. inval.*, Art. 41.5. Type: *Matuda 37640* (holotype MEXU MEXU00119944, digital image seen, isotype IEB).

The combination *Agave nanchititlensis* (Matuda) Thiede & Egli was not validly published according to ICN Art. 41.5. Note 1 (McNeill *et al.* 2012), since Thiede & Egli cited the page reference of the whole publication of Matuda (1974; “51–55”), but not the exact page on which the basionym was published (“54”). To make the combination available, it is validated here.

Agave quila (Arturo Castro-Castro & Aarón Rodríguez) Thiede & Govaerts, **comb. nov.** (77147853-1)

Basionym: *Polianthes quila* Art. Castro & Aarón Rodr. in Castro-Castro *et al.* (2016: 720). Type: *A. Rodríguez & A. Castro-Castro 7149* (holotype IBUG, isotypes CIIDIR, ENCB, IEB, MEXU, XAL).

This species was recently published under *Polianthes*, and a new combination under *Agave* is proposed here.

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