Phytotaxa 298 (1): 071–076
http://www.mapress.com/j/pt/

Article

ISSN 1179-3155 (print edition)
PHYTOTAXA
ISSN 1179-3163 (online edition)

https://doi.org/10.11646/phytotaxa.298.1.7

Clarification of the concept of *Aframmi* (Heteromorpheae, Apiaceae) and a new monotypic genus, *Normantha*

PIETER J.D. WINTER[1,2], PATRICIA M. TILNEY[1] & BEN-ERIK VAN WYK[1,*]
[1]*Department of Botany and Plant Biotechnology, University of Johannesburg, P.O. Box 524, Auckland Park 2006, Johannesburg, South Africa.*
[2]*Compton Herbarium, South African National Biodiversity Institute, Private Bag X7, Claremont 7735, Cape Town, South Africa.*
**Corresponding author. E-mail: bevanwyk@uj.ac.za.*

Abstract

Aframmi is a mixed concept made up of disparate elements from three different genera. Recent studies of *Aframmi angolense*, the type species of *Aframmi*, provide evidence that the species belongs to the genus *Heteromorpha*. An examination of the type specimen of *Aframmi longiradiatum* shows it to be fundamentally different from the generitype, *A. angolense*, and better placed in *Physotrichia,* in which it was originally described. The third element, previously misidentified as *A. longiradiatum*, is an as yet undescribed species with populations from both sides of the Zambia-Tanzania border as well as Angola. This new species is here accommodated in a new monotypic genus and described as *Normantha filiformis* P.J.D.Winter. The affinities of *Normantha* P.J.D.Winter & B-E.van Wyk with other genera currently considered to belong in the tribe Heteromorpheae are discussed. A combination of inflorescence and fruit morphological evidence as well as the extended, woody vegetative axis in common with the other (typically woody) genera in the tribe, lead us to postulate an affinity with *Pseudocarum*.

Keywords: African Apiaceae; fruit anatomy; *Heteromorpha*; new species; *Normantha filiformis; Physotrichia; Pseudocarum*

Introduction

This paper clarifies the rather confusing taxonomy and nomenclature of the mixed concept known as *Aframmi* C.Norman (1929: 199). The genus currently includes three elements: 1, *A. angolense* (C.Norman) C.Norman (1933: 236), the type species, from Caconda, Angola; 2, An undescribed species (Fig. 1) which Norman confused with *A. angolense*; 3, *Physotrichia longiradiatum* H.Wolff (1912: 48), treated by Cannon (1978) as *A. longiradiatum* (H.Wolff) Cannon (1978: 83). We present an analysis of evidence regarding each of these three elements in turn.

Aframmi C.Norman (1929: 199) is typified by *A. angolense* (C.Norman) C.Norman (1929: 199). Cannon (1978) mentioned that *Aframmi* is "an obscure genus of dubious affinities" and expressed the hope that collectors would provide more material with fully developed fruits from the two species that he recognised, to allow a proper assessment of relationships. The genus has remained poorly known, with subsequent collections mostly remaining unidentified at genus level due to the unknown fruit morphology.

One collection with developing fruits (*M. Koekemoer sub P.J.D. Winter 7792,* PRE, LUBA) provides a good match for the type species, *Aframmi angolense*, and was gathered in January 2009 on the Huila Plateau of Angola. Its heteromorphic mericarps (Fig. 2C2) conform to the configuration found in the genus *Heteromorpha* Cham. & Schltdl. (1826: 385) (Fig. 2B1–4), and are fundamentally different from those of plants currently known under the name *A. longiradiatum* (Fig. 2A1–3). Both Norman and Cannon apparently overlooked the fact that the fruits of the type specimen (*Gossweiler 4346* atBM) are heteromericarpic (Fig. 2C1), indicating that the species should be treated in *Heteromorpha*. This configuration, particularly in association with a woody rootstock, is unique in the family, and serves as a diagnostic character for *Heteromorpha* (Winter *et al.* 1993, Winter & Van Wyk 1996). It is clear, therefore, that *Aframmi angolense* represents a narrow-leaved form or variety of *H. gossweileri* C.Norman (1933: 236). As such we formally transfer this taxon to *Heteromorpha*.

Accepted by James Boatwright: 31 Jan. 2017; published: 7 Mar. 2017

FIGURE 1. Holotype of *Normantha filiformis* (*Richards 5198,* K) showing the divided, non-sheathing leaves with filiform segments and the slender peduncles and rays.

Heteromorpha Cham. & Schltdl. (1826: 385)

Aframmi C.Norman (1933: 236), *synon. nov*. Type species: *Aframmi angolense* (C.Norman) C.Norman [≡ *Carum angolense* C.Norman].

Heteromorpha gossweileri (C.Norman) C.Norman (1933: 236). Basionym: *Annesorhiza gossweileri* C.Norman (1922: 118). Type: Angola, Cubango, Menongue, *Gossweiler 3405* (lectotype BM!, designated by Winter & Van Wyk 1996: 252; isolectotypes COI, K!, LISC). This species is illustrated in Van Wyk *et al.* (2013: 217)

Carum angolense C.Norman (1922: 118); H.Wolff in Engl. (1927: 371), *synon. nov*. *Aframmi angolense* (C.Norman) Norman (1933: 236). Type: Angola, Huambo, Caconda, *Gossweiler 4346* (holotype, BM!; isotype K!).

Bupleurum angolense C.Norman (1933: 234). *Heteromorpha angolensis* (C.Norman) C.Norman (1934: 206). Type: Angola, Planalto de Malange, Kela, *Gossweiler 9594* (lectotype BM!, designated by Winter & Van Wyk 1996: 253; isolectotypes K!, LISC).

The second species, *A. longiradiatum,* is known only from the type collection from the Kasanga River in the Democratic Republic of the Congo (DRC). Unfortunately, Cannon (1978) confused this species with another, superficially similar plant from the border region between Zambia and Tanzania, east of Lake Tanganyika. Both these plants have long, slender rays and pedicels which may account for Cannon's assertion that they were conspecific. Upon closer examination, it is evident that *A. longiradiatum* has sheathing leaf bases and linear ultimate leaf segments, while the Zambia-Tanzania plant has non-sheathing leaf bases and filiform ultimate leaf segments (Fig. 1).

The sheathing leaf bases and narrowly triangular involucral bracts of *A. longiradiatum* superficially resemble those of *Diplolophium zambesianum* Hiern (1877: 18). Closer investigation, however, shows the presence of calyx teeth, as well as a virtually glabrous ovary, thus eliminating the possibility that it could be a species of *Diplolophium* Turcz. (1847: 173). Cannon (1978), apparently for convenience alone, applied a broad concept of *Physotrichia longiradiatum* H.Wolff to accommodate the second element where it occurs in the border region of Tanzania and Zambia. We find no reason at this stage to deviate from Wolff's (1912) original placement of this species in *Physotrichia* because the fruits are not hairy, as is typical for *Diplolophium*.

Physotrichia longiradiatum H.Wolff (1912: 273)

Aframmi longiradiatum (H.Wolff) Cannon (1978: 587), *synon. nov*. [only as regards the type specimen] Type: D. R. Congo, Oberes Katanga, Kasanga fl., zwischen hohem grase, 23/3/1908, *Kassner 2666* (holotype, B†, photo in BM!; possibly isotypes *Kassner 2667*, BM!, photo in K!; BR!; K!). Note: *Kassner 2666* and *2667* are almost certainly part of the same collection – the label and label information are the same except that the 7 of *Kassner 2667* in the Berlin specimen appears to have been changed to 6. The BM and K specimens could therefore be interpreted as isotypes. This species is illustrated in Van Wyk *et al.* (2013: 258).

The third taxon from the border region between Zambia and Tanzania, which Cannon (1978) confused with *Aframmi longiradiatum*, has non-amplexicaul, evaginate leaf bases, very narrow ultimate leaf segments that are usually falcate, and narrowly linear or acicular involucral bracts (Fig. 1). On closer examination, additional collections from Angola, incorrectly identified by Norman (1933) as *Aframmi angolense*, also clearly belong to this taxon. Townsend (1989) regrettably omitted the species from his treatment for the Flora of Tropical East Africa. It has fruits with large rib oil ducts (Fig. 2A3) and scattered druse crystals throughout the mesocarp, as well as regular vittae and a woody habit, the combination of which is characteristic of several genera of the tribe Heteromorpheae M.F.Watson & S.R.Downie in Downie *et al.* (2000: 289).

Since the type species of *Aframmi* is a species of *Heteromorpha* and *Aframmi longiradiatum* is here treated as a *Physotrichia*, the third remaining element is left without a name or even a generic placement. It is likely that its affinities lie within the tribe Heteromorpheae, based on woodiness, long, slender rays (Fig. 1) and prominent rib oil ducts (Fig. 2A3) which also characterise some other genera of that tribe. It differs from all other genera in the tribe in the much divided filiform leaves and leaf segments. The woody habit is very unusual for Apiaceae. The extended woody, vegetative axis was no doubt the basis for confusion with *Carum angolense,* and the combination of this character with the presence of vittae appears to be restricted to tribe Heteromorpheae, in the genera *Anginon* Rafinesque (1840: 56)*, Cannaboides* B-E.van Wyk in Van Wyk *et al.* (1999: 740)*, Heteromorpha, Polemannia* Eckl. & Zeyh. (1837: 347)*, Pseudocannaboides* B-E.van Wyk in Van Wyk *et al.* (1999: 742)*, Pseudocarum* C.Norman (1924: 333) and *Tana* B-E.van Wyk in Van Wyk *et al.* (1999: 743). Of these, the inflorescence architecture (i.e., long, slender rays and pedicels), fruit shape and prominent rib oil ducts agree most closely with that of *Pseudocarum.*

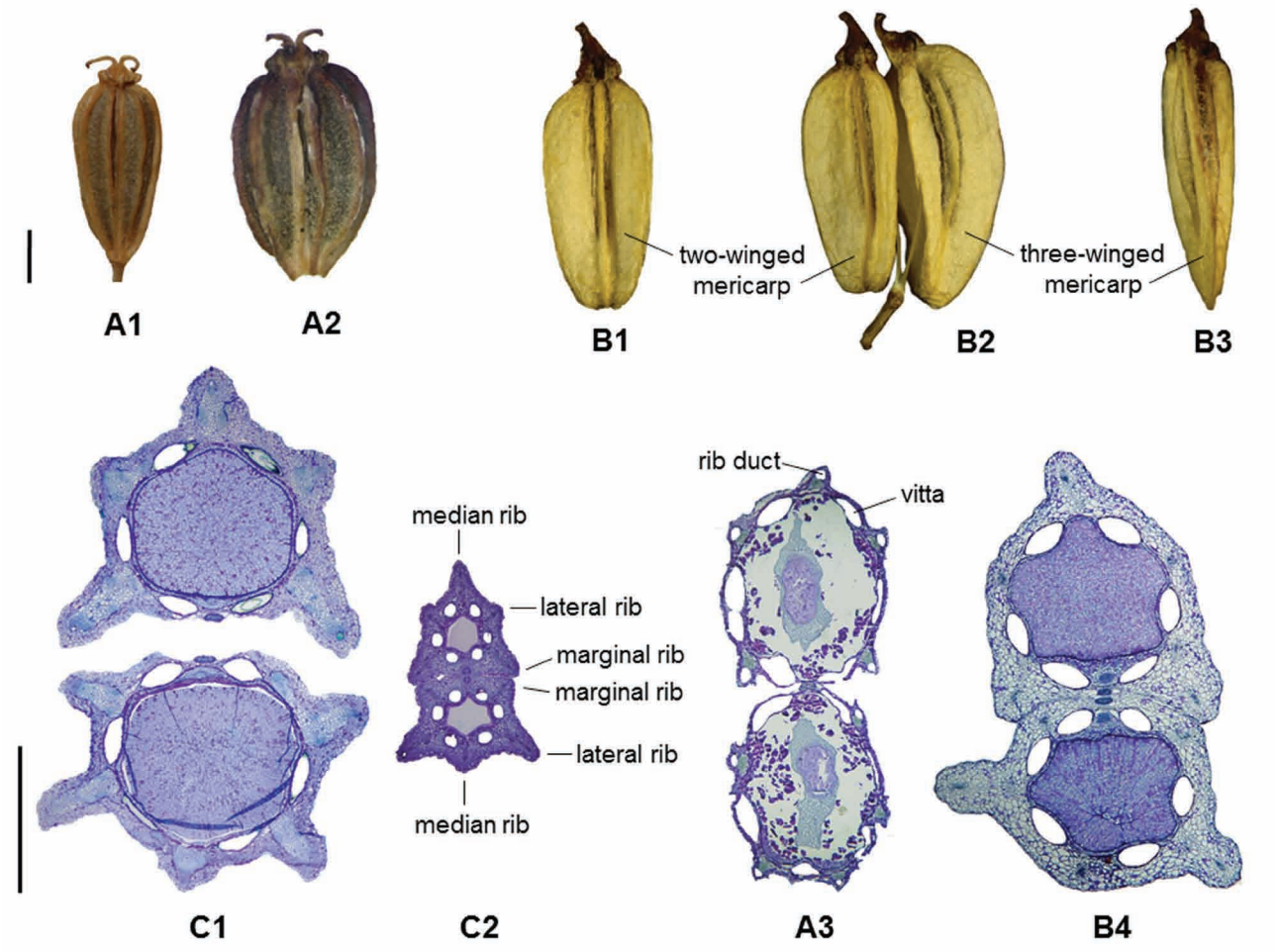

FIGURE 2. Fruits of *Normantha filiformis* (A), *Heteromorpha arborescens* (B) and *H. gossweileri* (C). A1, immature fruit (*Richards 5198*, K); A2, mature fruit (*Richards 12746,* K); A3, transverse section of mature fruit (*Richards 12746*, K); B1–3, mature fruit (*Van Wyk s.n.*, JRAU): B1, two-winged mericarp; B2, whole fruit; B3, three-winged mericarp; B4, transverse section of mature fruit (*Vlok 2633*, JRAU); C1, transverse section of fruit (*Gossweiler 4346*, BM); C2, transverse section of young fruit (*M. Koekemoer sub P.J.D. Winter 7792*, PRE, LUBA). Scale bars = 1 mm.

We considered alternative treatments to avoid creating another monotypic genus of African Apiaceae, but we concluded that the new species is not similar enough to *Pseudocarum* or any other genus to warrant its description in an existing genus. A third option would have been to submit a proposal to conserve the name *Aframmi* for this entity, with a conserved type but this approach would no doubt serve only to complicate future interpretation even further. As such we here describe the taxon as a new monotypic genus. A key to the identification of the new genus can be found in Van Wyk *et al.* (2013).

Normantha P.J.D.Winter & B-E.van Wyk, *gen. nov*. Similar to *Pseudocarum* and *Dracosciadium* Hilliard & Burtt (1986: 220) in the slender, filiform rays, the obovoid homomericarpic fruits and the large rib oil ducts but differs in the filiform leaf lobes, the longer, filiform involucral bracts and the erect, woody stems (stems climbing and woody in *Pseudocarum*, acaulescent, fleshy and rhizomatous in *Dracosciadium*). It differs from *Heteromorpha* in the homomorphic mericarps, the filiform leaf segments and filiform involucral bracts. Type species: *Normantha filiformis* P.J.D.Winter.

Erect, glabrous suffrutex, 0.75–1.00 m tall, perennial, rootstock woody. Stems woody, ascending, with leaves regularly spaced along most of their length. Leaves 2–3-pinnatifid, deciduous?, (20–) 30–60 (–100) mm long; leaflets 10–30 mm long. Leaf bases non-sheathing. Petioles short, less than 10 mm long, subterete, filiform. Leaflets linear-acicular, entire, filiform, incision sometimes decursive. Umbels terminal only, or both terminal and lateral. Terminal umbels somewhat irregular, with long, ± 10 wiry, wide-spreading rays, 30 to 100 mm long. Bracts several, irregular, filiform,

simple or pinnatifid, 8–24 mm long; bracteoles filiform, subulate, ± 2 mm long. Pedicels (raylets) rather long and wiry, elongating with fruit set,10–22 mm long. Umbellules of 6 to 15 flowers. Calyx teeth minute, broadly triangular; petals yellowish-green, with an inflexed apex. Stylopodia low-conical, disk margin with regular indentations; styles short, divergent, stigmatic surface slightly clubbed. Fruits homomericarpic, obovoid, ± 5 x 2 mm, mericarps isodiametric; ribs 5, equal, rounded. Vittae well developed, 1 in each vallecula and 2 in the commissural face. Rib oil ducts large. Amphiseminal druse crystals present. Seeds pentagonal in section, very slightly sulcate on the commissural side. (Figs. 1 & 2).

Normantha filiformis P.J.D.Winter, *sp. nov*. (see diagnosis and description above). Type: Zambia, Kalambo Falls, 29/3/1955, *Richards 5198* (K, holotype!) (Figure 1).

The species is illustrated in Flora Zambesiaca 4: Tab. 152 (p. 586) [as *Aframmi longiradiatum*] and in Van Wyk *et al.* (2013, p. 239).

Distribution and habitat:— Angola, Zambia and Tanzania. According to notes on herbarium specimens, the plants occur on stony ground in grassland or open woodlands.

Specimens examined: — Angola: Foot of Serra do Ferreira de Amaral [perhaps Anhara?], on the eastern side, February 1907, *Gossweiler 2829* (BM!, sheet 1). Serra de Moco [Morro de Moco], near river, 2000 m, *Gossweiler 12284* (BM!).

Tanzania: T4, Sumbawanga distr.: Tatanda Mission, 8 deg. 32 min. S; 31 deg. 30 min. E, 1800 m. Shallow soil over small rocky outcrops in open *Brachystegia* woodland. Erect, single-stemmed perennial herb with short creeping rhizome, flowers yellow. 24 February 1994, *S. Bidgood, F. Mbago & K. Vollesen 2424* (K!).

Zambia: Northern Province, Mbala distr.: Kalambo Falls, perennial, 1 m, flowers yellowish green, 29/3/1955, *A.W. Exell, F.A. Mendonça & H. Wild 1281* (BM). Abercorn [Mbala] distr.: Hill above Mwambe village, 1800 m, on steep rocky hillside, among rough grass and scattered trees; umbels pale green and yellow, seeds dark brown, 15/3/1960, *H.M. Richards 12746* (K). Abercorn [Mbala] distr.: Kalambo Falls, 900 m, umbels pale yellow, stem pale green, 15/2/1964, *H.M. Richards 19032* (K). Lalambo Falls, top of the Gorge, 1200 m, woodland, steep bank, long grass; umbels yellow, leaves finely pinnate, 16/2/1965, *H.M. Richards 19697* (K). Mbala distr.: Kalambo Falls, near car park, shady woodland, perennial to c. 80 cm, 23 February 1970, *Drummond & Williamson 9965* (BM, 2 sheets!, LISC, SRGH).

Acknowledgements

Funding from the National Research Foundation (to the SARChI National Research Chair) and the University of Johannesburg is gratefully acknowledged. The first author thanks SANBI and ISCED for organising and funding the expedition to Angola. The directors and staff of BM, K and PRE are thanked for allowing us to study their collections (especially BM, for providing a fruit from *Gossweiler 4346* for anatomical study). We are also indebted to Dr Estrela Figueiredo for translations and for locating one of Gossweiler's localities.

References

Cannon, J.F.M. (1978) Umbelliferae. *In*: Launert, E. (Ed.) *Flora Zambesiaca*, vol. 4. Flora Zambesiaca Managing Committee, Royal Botanical Gardens, Kew.

Chamisso, A. de & Schlechtendal, D. de (1826) De plantis in expeditione speculatoria Romanzoffiana observatis: Umbelliferae. *Linnaea* 1: 333–401.

Downie, S.R., Katz-Downie, D.R. & Watson, M.F. (2000) A phylogeny of the flowering plant family Apiaceae based on chloroplast DNA rpl16 and rpoC1 intron sequences: towards a suprageneric classification of subfamily Apioideae. *American Journal of Botany* 87: 273–292.
https://doi.org/10.2307/2656915

Ecklon, C.F. & Zeyher, C. (1837) *Enumeratio plantarum Africae australis extratropicae*. Hamburg, pp. 330–353.

Hiern, W.P. (1877) Umbelliferae. *In*: Oliver, D. (Ed.) *Flora of Tropical Africa*. Vol. 3. L. Reeve & Co., Ashford, United Kingdom.

Hilliard, O.M. & Burtt, B.L. (1986) Notes on some plants of southern Africa: XII. *Notes from the Royal Botanic Gardens Edinburgh* 43: 220–225.

Norman, C. (1922) New Umbelliferae from tropical Africa. *Journal of Botany (London)* 60: 118–120.

Norman, C. (1924) *Pseudocarum*. *Journal of Botany (London)* 62: 333.

Norman, C. (1929) Mr. John Gossweiler's Portuguese West African Plants. *Journal of Botany (London)* 67(Supplement 1. Polypet): 199–200.

Norman, C. (1933) Mr. John Gossweiler's Portuguese West African Plants, (continued). *Journal of Botany (London)* 67(Supplement 1. Polypet.): 177–203.

Norman, C. (1934) Notes on tropical African Umbelliferae. *Journal of Botany (London)* 72: 205–206.

Rafinesque, C.S. (1840) Scadiography of 100 genera of umbelliferous plants etc. *In*: *The Good Book, and Amenities of Nature*, etc. Philadelphia, pp. 41–61. [The American Midland Naturalist reprint no. 3 (1913–1914)]

Townsend, C.C. (1989) Umbelliferae. *In*: Polhill, R.M. (Ed.) *Flora of tropical East Africa*. Balkema, A.A., Rotterdam, 127 pp.

Turczaninow, N.S. (1847) *Diplolophium*. *Bulletin de la Société Imperiale des Naturalistes de Moscou* 20: 173.

Van Wyk, B.-E., Tilney, P.M. & Winter, P.J.D. (1999). Four new genera of woody Apiaceae of Madagascar. *Taxon* 48: 737–745. https://doi.org/10.2307/1223644

Van Wyk, B.-E., Tilney, P.M. & Magee, A.R. (2013) *African Apiaceae. A synopsis of the Apiaceae/Umbelliferae of sub-Saharan Africa and Madagascar*. Briza Academic Books, Pretoria, 317 pp.

Winter, P.J.D,.Van Wyk, B.-E. & Tilney, P.M. (1993) The morphology and development of the fruit of *Heteromorpha* (Apiaceae). *South African Journal of Botany* 59: 336–341. https://doi.org/10.1016/S0254-6299(16)30737-2

Winter, P.J.D. & Van Wyk, B.-E. (1996) A revision of the genus *Heteromorpha* (Apiaceae). *Kew Bulletin* 51: 225–261. https://doi.org/10.2307/4119323

Wolff, H. (1912) Umbelliferae africanae. Beiträge zur Flora von Afrika. XL. *Botanische Jahrbücher für Systematik, Pflanzengeschichte und Pflanzengeographie* 48: 261–283.

Wolff, H. (1927) Umbelliferae-Apioideae-Ammineae-Carinae, Ammineae Novemjugatae et Genuinae. *In:* Engler, A. (Ed.) *Das Pflanzenreich*, Heft 90 (IV. 228). Wilhelm Engelmann, Berlin.