

Materials Towards a Revision of *Aulotandra* Gagnep. (Zingiberaceae)

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Abstract

Aulotandra Gagnep. has recently been transferred from the subfamily Alpinioideae, tribe Alpinieae, to the subfamily Siphonochiloideae. Materials towards a revision of *Aulotandra* and *Siphonochilus* J.M. Wood & Franks are presented.

Introduction

Harris et al. (2006) have included *Aulotandra* Gagnep. in a phylogenetic analysis in order to determine its correct place in the new classification of Zingiberaceae by Kress *et al.* (2002).

Aulotandra was, until recently, the only African genus of Zingiberaceae which had not been included in a molecular systematic study. Two molecular datasets, chloroplast and nuclear, placed *Aulotandra* closest to *Siphonochilus* J.M. Wood & Franks, showing that genetic divergence levels were smaller between accessions of *Aulotandra* and *Siphonochilus* than between *Aulotandra* and any other taxon included in the analysis.

In addition, phylogenetic analyses of the two data matrices showed that the species of *Aulotandra* and *Siphonochilus* sampled in that study formed a monophyletic group. It was clear from the shared synapomorphies and the high branch support for the clade containing these genera that this relationship was very close. The two data sets showed some discrepancy as to the relationships between these two genera - the ITS analysis indicating that *Aulotandra* was monophyletic, but the *trnL-F* results suggesting that the two genera were paraphyletic.

Accepting that *Aulotandra* and *Siphonochilus* form a monophyletic group led to the transfer of *Aulotandra* from subfamily Alpinioideae, tribe Alpinieae, to subfamily Siphonochiloideae. Taking this study further, it is clear that the species in subfamily Siphonochiloideae must be revised together.

Materials and Methods

A list of the names in *Aulotandra*, *Siphonochilus* and *Kaempferia* L. in Africa was compiled using the International Plant Names Index (www.ipni.org) and the World Checklist of Monocotyledons (<http://www.kew.org/wcsp/home.do>). Protologues were consulted and details of the type of each name were added. Where possible, the collector, collection number and herbarium location are given but, in some cases, it is not clear from the literature where types are to be found.

Results

In total, there are 30 names to be revised in the Siphonochiloideae, eight in *Aulotandra*, 12 in *Siphonochilus*, and 10 in *Kaempferia*. The majority of names are based on type specimens held at the Muséum national d'Histoire naturelle, Paris. A few are yet to be located; those collected by German botanists may have been lost.

Names in *Aulotandra* Gagnep.

1. *Aulotandra angustifolia* H. Perrier, Bull. Soc. Bot. France 86: 178. 1939.
Type: *Perrier de la Bâthie* 7264 (P).
2. *Aulotandra humberitii* H. Perrier, Bull. Soc. Bot. France 86: 180. 1939.
Type: *Humbert s.n.* (P).
3. *Aulotandra kamerunensis* Loes., Bot. Jahrb. Syst. 43: 389. 1909.
Type: *Zenker* 3696 (US, WU, WRSL).
4. *Aulotandra madagascariensis* Gagnep., Bull. Soc. Bot. France 48: LXXIX. 1901.
Type: *Humblot* 448 (P).
5. *Aulotandra trialata* H. Perrier, Bull. Soc. Bot. France 86: 181. 1939.
Type: *Perrier de la Bâthie* 1021 (P).
- 6a. *Aulotandra trigonocarpa* H. Perrier var. *trigonocarpa*. Bull., Soc. Bot. France 86: 179. 1939.
Type: *Perrier de la Bâthie* 19014 (P).
- 6b. *Aulotandra trigonocarpa* H. Perrier var. *calcicola* H. Perrier, Bull. Soc. Bot. France 86: 180. 1939.
Type: *Perrier de la Bâthie* 1672, 1687 (P).
- 6c. *Aulotandra trigonocarpa* H. Perrier var. *gypsicola* H. Perrier, Bull. Soc. Bot. France 86: 180. 1939.
Type: *Perrier de la Bâthie* 15943 (P).

Names in *Siphonochilus* J.M. Wood & Franks

1. *Siphonochilus aethiopicus* (Schweinf.) B.L.Burt, Notes Roy. Bot. Gard. Edinburgh 40(2): 372. 1982.
Type: *Cienkowski s.n.*, *Steudner s.n.*
2. *Siphonochilus bambutiorum* A.D.Poulsen & Lock, Kew Bull. 54: 203. 1999.
Type: *Poulsen & Liengola 1146* (holo, C; iso BR, E, K, MO).
3. *Siphonochilus brachystemon* (K.Schum.) B.L.Burt, Notes Roy. Bot. Gard. Edinburgh 40(2): 372. 1982.
Type: *Volkens 201* (B), *Holst 3100* (B).
4. *Siphonochilus carsonii* (Baker) Lock, Kew Bull. 39: 841. 1984.
Type: *Carson s.n.* (K).
5. *Siphonochilus decorus* (Druten) Lock, Kew Bull. 54: 346. 1999.
Type: *Schweickert s.n.* (PRE).
6. *Siphonochilus evae* (Briq.) B.L.Burt, Notes Roy. Bot. Gard. Edinburgh 40(2): 372. 1982.
Type: *Prosch 12* (G).
7. *Siphonochilus kilimanensis* (Gagnep.) B.L.Burt, Notes Roy. Bot. Gard. Edinburgh 40(2): 372. 1982.
Type: *Le Testu s.n.* (P).
8. *Siphonochilus kirkii* (Hook.f.) B.L.Burt, Notes Roy. Bot. Gard. Edinburgh 40(2): 372. 1982.
Type: *Kirk s.n.* (K).
9. *Siphonochilus natalensis* (K.Schum.) J.M.Wood & Franks, Natal pl. 6(3): plates 560-561. 1911.
Type: *Wood 544* (K).
10. *Siphonochilus nigericus* (Hepper) B.L.Burt, Notes Roy. Bot. Gard. Edinburgh 40(2): 372. 1982.
Type: *Dalziel 276* (K).
11. *Siphonochilus parvus* Lock, Kew Bull. 46: 269. 1991.
Type: *Congdon 46* (K).
12. *Siphonochilus rhodesicus* (T.C.E.Fr.) Lock, Kew Bull. 39: 841. 1984.
Type: *Fries 1146* (UPS).

Names in *Kaempferia* L. in Africa

1. *Kaempferia aethiopica* (Schweinf.) Benth. var. *angustifolia* Ridl., J. Bot. 25: 131. 1887.
Type: *Welwitsch 683* (K).
2. *Kaempferia ceciliae* N.E.Br. Bull, Misc. Inform. 169. 1906.
Type: *Cecil 248* (K).
3. *Kaempferia dewevrei* De Wild. & T. Durand, Bull. Soc. Roy. Bot. Belgique

- 38: 142. 1899.
Type: *Dewèvre 1021*.
4. *Kaempferia ethelae* J.M. Wood, Gard. Chron. 23: 94. 1898.
Type: not known.
5. *Kaempferia homblei* De Wild., Repert. Spec. Nov. Regni Veg. 13: 195. 1914
Type: *Homblé 851, 907*.
6. *Kaempferia montagui* F.M. Leight., S. African Gard. 22: 57, 59. 1932.
Type: *Montagu 888/21 (K)*.
7. *Kaempferia pleiantha* K. Schum., Bot. Jahrb. Syst. 15(4): 425. 1892.
Type: *Buchner 694, Mechow 559b*.
8. *Kaempferia puncticulata* Gagnep., Bull. Soc. Bot. France 53: 353. 1906.
Type: *Kiener s.n. (P)*.
9. *Kaempferia stenopetala* K. Schum., Pflanzenr. IV 46 (Heft 20): 69. 1904.
Type: *Wood 1942*.
10. *Kaempferia zambesiaca* Gagnep., Bull. Soc. Bot. France 53: 355. 1906.
Type: *Le Testu 563 (P)*.

Recommendations

Preliminary morphological observations and the sequence results presented by Harris *et al.* (2006) suggest that there may be only one genus in subfamily Siphonochiloideae. In order to test this hypothesis, a molecular and morphological study with wider sampling should be carried out to determine the relationships between the species and assess the limits of these two genera. All names listed above should be revised so that the number of accepted species, their distributions and their conservation status may be confidently known.

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References

- Harris, D.J., M.F. Newman, M.L. Hollingsworth, M. Möller and A. Clark, 2006. The phylogenetic position of *Aulotandra* Gagnep. (Zingiberaceae). *Nordic Journal of Botany* **23(6)**: 725-734.

Kress, W.J., L.M. Prince and K.J. Williams, 2002. The phylogeny and a new classification of the gingers (Zingiberaceae): evidence from molecular data. *American Journal of Botany* **89**: 1682-1696.

