

**NEW COMBINATIONS IN *DIMEROSTEMMA* (ASTERACEAE:
HELIANTHEAE – ECLIPTINAE)**

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ABSTRACT

The use of ray flower sexuality in subtribe Ecliptinae has been a convenient character to split large or taxonomically challenging genera into smaller units. This approach has resulted in the placement of sister species in different genera. The genera *Dimerostemma* and *Angelphytum* from South America are examples, species having pistillate ray flowers placed in *Angelphytum* G. M. Barroso and those with sterile ray flowers in *Dimerostemma* Cass. A molecular phylogenetic study has shown that *Dimerostemma* is paraphyletic with the exclusion of *Angelphytum* and that the two genera comprise a strongly supported monophyletic group. This result and the lack of enough morphological evidence for the division between the two genera lead us to consider *Angelphytum* a synonym of *Dimerostemma*. All species of *Angelphytum* are formally transferred herein to *Dimerostemma*, summing up 17 new combinations. The genus *Dimerostemma* is easily separated from other similar composites mainly by cypsela, the pappus consisting of stout, triquetrous, tapering awns (sometimes lacking) fused to an unstricted crown.

KEY WORDS: Asteraceae, Heliantheae, Ecliptinae, *Dimerostemma*.

The genera *Dimerostemma* Cass. and *Angelphytum* G. M. Barroso have collectively 29 species endemic to South America, with the highest concentration of species found in central-western Brazil. The genera belong to subtribe Ecliptinae of tribe Heliantheae, a group of 49 genera and approximately 380 species of shrubs and trees distributed mostly in the Neotropical region (Panero, 2007). *Dimerostemma*, originally monotypic, was emended by Blake (1917) to include species from *Oyedaea* DC. that lacked squamellae in their pappi. Robinson (1984a), while revising the generic limits of *Oyedaea*, placed in *Dimerostemma* all the Brazilian species, leaving within *Oyedaea* most species restricted to the Andes that bear a distinct neck at the apex of the cypsela.

In the original description of *Angelphytum*, Barroso (1980) considered the eradiate heads with peripheral fertile florets to differentiate her new genus from both *Zexmenia* La Lave & Lex. (with radiate heads) and *Dimerostemma* (bearing peripheral sterile florets). Robinson (1984b) transferred to *Angelphytum* all the Brazilian species with radiate heads that had been previously placed in *Zexmenia*. He justified his decision by alluding to the unreliability of eradiate heads as a distinguishing character, given that it occurs elsewhere in Ecliptinae, as in *Zexmenia* and *Wedelia* Jacq. (including *Aspilia* Thouars). With these new combinations and the inclusion of new species described since these taxonomic studies, the taxonomic limits between *Angelphytum* and *Dimerostemma* have become difficult to ascertain. The only morphological difference between these two genera is the peripheral or ray flower sexuality, sterile in *Dimerostemma*, fertile in *Angelphytum*. Except for this character, *Angelphytum* is essentially identical to *Dimerostemma*.

To elucidate the relationships of *Dimerostemma* and *Angelphytum*, a phylogenetic study based on ITS and ETS sequence data for the majority of the members of the Ecliptinae was constructed by Moraes (2004). In this study, the nine species of *Dimerostemma* and nine species of *Angelphytum* sampled are collectively revealed as a strongly supported monophyletic group. The only annual species of the group, *Dimerostemma annuum*, is basal to two main subclades containing each a combination of species of both genera. The generic type, *Angelphytum matogrossense* G. M. Barroso is clustered with most species of *Dimerostemma*. The results from molecular studies and the lack of any obvious morphological feature that can be used as a

synapomorphy to separate the main clades of the group, have led us to propose the placement of *Angelphytum* within *Dimerostemma*.

Dimerostemma is characterized by an involucre with an outer series of leaf-like phyllaries, disc corollas with cylindric upper throats, and by inner cypselae obovate in outline, cuneate toward base, usually laterally flattened, and mostly winged on the margins. The pappus is the most reliable feature for distinguishing *Dimerostemma* among ecliptinuous genera. The pappus of *Dimerostemma* is coroniform with awns mostly well developed that are distinct in being stout, triquetrous, tapering and continuous with the margins of the cypselae. *Dimerostemma* is the only member in the subtribe that is differentiated by the extension of phytomelanin from the body of the cypselae to the base of the awns. The crown is inserted directly on the apex of the cypselae body, not raised on a rostrum as in *Oyedaea*, *Zexmenia*, and *Wedelia*.

To formalize the transfer of *Angelphytum* into *Dimerostemma*, the following new combinations are required:

Dimerostemma apense (Chodat) M. D. Moraes, **comb. nov.**

Basionym: *Aspilia apense* Chodat, Bull. Herb. Boissier sér. 2 (3): 721. 1903.

Dimerostemma arnottii (Baker) M. D. Moraes, **comb. nov.**

Basionym: *Verbesina arnottii* Baker in Martius, Fl. bras. 6 (3): 215. 1884.

Dimerostemma aspilioides (Griseb.) M. D. Moraes, **comb. nov.**

Basionym: *Verbesina aspilioides* Griseb., Abh. Königl. Ges. Wiss. Göttingen 24: 194. 1879.

Dimerostemma bahiense (H. Rob.) M. D. Moraes, **comb. nov.**

Basionym: *Angelphytum bahiense* H. Rob., Proc. Biol. Soc. Wash. 97 (4): 966. 1984.

Dimerostemma goyazense (Gardner) M. D. Moraes, **comb. nov.**

Basionym: *Lipochaeta goyazensis* Gardner, Lond. J. Bot. 7: 406. 1948.

- Dimerostemma grisebachii** (Baker) M. D. Moraes, **comb. nov.**
Basionym: *Verbesina grisebachii* Baker in Martius, Fl. bras. 6.(3): 214. 1884.
- Dimerostemma hatschbachii** (H. Rob.) M. D. Moraes, **comb. nov.**
Basionym: *Angelphytum hatschbachii* H. Rob., Proc. Biol. Soc. Wash. 97 (4): 967. 1984.
- Dimerostemma herzogii** (Hassl.) M. D. Moraes, **comb. nov.**
Basionym: *Zexmenia herzogii* Hassl., Repert. Spec. Nov. Regni Veg. 7: 357. 1909.
- Dimerostemma hieronymi** (Hassl.) M. D. Moraes, **comb. nov.**
Basionym: *Zexmenia hieronymi* Hassl., Repert. Spec. Nov. Regni Veg. 14: 157. 1915.
- Dimerostemma indutum** (Chodat) M. D. Moraes, **comb. nov.**
Basionym: *Aspilia induta* Chodat, Bull. Herb. Boissier sér. 2 (3): 720. 1903.
- Dimerostemma matogrossense** (G. M. Barroso) M. D. Moraes, **comb. nov.** Basionym: *Angelphytum matogrossense* G. M. Barroso, Bol. Soc. Argent. Bot. 19 (1-2) 9. 1980.
- Dimerostemma myrtifolium** (Chodat) M. D. Moraes, **comb. nov.**
Basionym: *Verbesina myrtifolia* Chodat, Bull. Herb. Boissier sér. 2 (2): 393. 1902.
- Dimerostemma oppositifolium** (A. A. Sáenz) M. D. Moraes, **comb. nov.** Basionym: *Zexmenia oppositifolia* A. A. Sáenz, Hickenia 1(54): 285. 1982.
- Dimerostemma paraguariense** (Chodat) M. D. Moraes, **comb. nov.**
Basionym: *Verbesina paraguariensis* Chodat, Bull. Herb. Boissier sér. 2 (3): 722. 1984.
- Dimerostemma pseudosilphoides** (Hassl.) M. D. Moraes, **comb. nov.**
Basionym: *Zexmenia pseudosilphoides* Hassl., Repert. Spec. Nov. Regni Veg. 14: 263. 1916.

Dimerostemma reitzii (H. Rob.) M. D. Moraes, **comb. nov.**

Basionym: *Angelphytum reitzii* H. Rob., Proc. Biol. Soc. Wash. 97 (4): 968. 1984.

Dimerostemma tenuifolium (Hassl.) M. D. Moraes, **comb. nov.**

Basionym: *Zexmenia tenuifolia* Hassl., Repert. Spec. Nov. Regni Veg. 14: 178. 1915.

ACKNOWLEDGEMENTS

This paper is part of a Ph.D. dissertation submitted by the first author to the graduate course in Biologia Vegetal of Universidade Estadual de Campinas (UNICAMP), SP, Brazil. A fellowship was granted for the first year by CAPES and for the following three years by FAPESP (98/12857-1). Laboratory work was also supported by NSF grant 0344116 to JLP. The first author gratefully acknowledges the late Graziela M. Barroso for her supervision in the first two years of this dissertation. We thank Volker Bittrich who kindly photocopied most of the protologues of the names of the species of *Angelphytum* and *Dimerostemma* in the libraries of Europe and USA. We thank Billie L. Turner for reviewing the manuscript.

LITERATURE CITED

- Barroso, G. M. 1980. Um gênero novo da tribo Heliantheae (Compositae). Bol. Soc. Argent. Bot. 19: 8-11.
- Blake, S. F. 1917. A revision of the genus *Dimerostemma* Cass. Contr. Gray Herb. 52: 8-16.
- Moraes, M. D. 2004. Taxonomia e filogenia de *Dimerostemma*, e sua relação intergenérica na subtribo Ecliptinae (Asteraceae: Heliantheae). Ph.D. Dissertation, Universidade Estadual de Campinas.
- Panero, J. L. 2007. Compositae: Tribe Heliantheae, In: *The Families and Genera of Vascular Plants*, vol. VIII, Flowering Plants, Eudicots, Asterales, J. W. Kadereit and C. Jeffrey (eds.), pp 440-477, Springer-Verlag, Berlin Heidelberg.

- Robinson H. 1984a. Studies in Heliantheae (Asteraceae). XXXI.
Addition to the genus *Dimerostemma*. Proc. Biol. Soc. Wash. 97:
618-626.
- Robinson H. 1984b. Studies in Heliantheae (Asteraceae). XXXIV.
Redelimitation of the genus *Angelphytum*. Proc. Biol. Soc. Wash.
97: 961-969.