



Variable morphology of the Madagascar endemic *Aristida tenuissima* (Poaceae: Aristidoideae) and the absence of *Stipa* (Poaceae: Pooideae, Stipeae) from Madagascar

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The widespread and species rich grass genera *Aristida* Linnaeus (1753: 82; Aristidoideae) and *Stipa* Linnaeus (1753: 78; Stipeae) are ordinarily simple to distinguish by the characteristic three awns in *Aristida* and a single awn in *Stipa*. A study of *Aristida* in Madagascar shows that the Madagascar endemic *Stipa perrieri* A.Camus (1934: 593) is in fact a 1-awned variant of *Aristida tenuissima* Camus (1933: 844) described and illustrated by Bosser (1969). There are no collections of *Stipa* or other members of Stipeae recorded from Madagascar.

Aristida tenuissima is a morphologically variable species in both habit and awn structure. The full range of variability within *A. tenuissima* is described and presented graphically in Figure 1, with the distribution presented in Figure 2, expanding Bosser's (1969) description and distribution statement. Most collections have single geniculate awns, while the larger plants are more likely to have three awns. The combination of a twisted awn column and the lack of articulation in the awn distinguish this species from all other *Aristida* in Madagascar.

Both *Aristida* and *Stipa* are plants of open arid areas with a single fusiform hardened and awned fertile floret and a pointed callus in every spikelet and were historically placed together in the tribe Stipeae (de Winter 1965). This similarity is superficial and does not reflect common origin. *Aristida* is a member of the Aristidoideae within the PACMAD clade (Barker *et al.* 1995, Grass Phylogeny Working Group 2001) and differs from *Stipa* by its C4 photosynthetic system, two sheaths around each vascular bundle, the presence of epidermal microhairs and embryo characters, as well as the presence of three awns. The three awns of *Aristida* are remarkably morphologically plastic in their lengths, relative lengths, orientation, fusion, twisting and disarticulation (Henrard 1929–1932, Hitchcock 1924, Allred 1986, Allred & Valdés-Reyna 1997). A number of species have reduced side awns or fail to develop them altogether rendering them deceptively similar to *Stipa*, e.g. the Asian and African *A. abnormis* Chiov. in Pirota (1903: 48), *A. fredschoizii* H.Scholz & Kürschner in Scholz (2000: 273) from Oman, and the North American *A. ternipes* Cavanilles (1799: 46) and *A. schiedeana* Trinius & Ruprecht (1842: 120): these were placed in *Aristida* section *Unisetia* Hitch. by Hitchcock (1924).

All material available at K, P and TAN has been examined. The description was compiled from direct specimen measurements only. Material infected with smut fungus was not included. A full typification is presented. All specimens cited here have been seen by the author. The lectotype sheet has been chosen because it includes plants with both single and triple awns. The morphological variability is further complicated by the fact that one tuft infected with smut fungus resulting in aberrant inflated spikelets and reduced awns is mounted on the isolectotype sheet P00446502.

Aristida tenuissima A.Camus (1933: 844). Type:—MADAGASCAR. Fianarantsoa: Mont Belamboany, pres du pelouse d'xerophiles, 1000 m, March 2012, *Perrier de la Bâthie 10866 pro parte* (lectotype designated here: P-03346042!; isolectotype: P-00446502!).