



Article

A new *Atriplex* species from the island of Mauritius (Amaranthaceae)

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Abstract

Atriplex aellenii, which was previously identified as *A. halimus* L. var. *granulata*, is described here as a new species from the coastal zone of Mauritius (Mascarenes). It is known to be endemic to the island with morphological affinities to *A. brenanii*, a species from the uplands of tropical East Africa. The occurrence of *A. halimus* is not confirmed for islands of the western Indian Ocean. Only two coastal *Atriplex* species with a shrubby habit are reported for this region, *A. aellenii* and *A. perrieri*, endemic to southern Madagascar. Together with these two representatives, the coastal *A. repens*, native to Sri Lanka and adjacent territories, is also incorporated in the diagnostic key.

Keywords: *Atriplex aellenii*, Amaranthaceae, Mascarenes, East Africa

Introduction

The genus *Atriplex* L. comprises some 250 annual or shrubby species (see <http://www.theplantlist.org/browse/A/Amaranthaceae/Atriplex/>) distributed mostly in the arid or semi-arid regions of the world. They are recognized by the female flower being enclosed by a flattened bract-like cover consisting of two accrescent perianth valves often called bracteoles (Flores Olvera *et al.*, 2011). The majority of African species are localized in the arid northern, eastern and southern parts of this continent but their number is still questionable. A comprehensive revision was completed for the Horn of Africa, including both Ethiopia and Somalia (Friis & Gilbert, 1993; 2000), and *Atriplex* species from northeastern and eastern parts of the continent were recently added to that list (Sukhorukov, 2010; 2012). A number of shrubby African *Atriplex* with Kranz-type anatomy and a C₄ photosynthetic pathway are now united in a large C₄-clade (Kadereit *et al.*, 2010). They share a common habit and leaf shape and have similar reproductive traits. Some of these species are actually naturalised species of Australian origin that have been introduced to Africa as forage or ornamental plants and have escaped from cultivation, e.g. *A. nummularia* Lindl., which was mistakenly described from the Dead Sea area as a new species, *A. asphaltitis* Kasapl. (Kasapliligil, 1966). These similarly looking plants, either native or alien, are often ascribed to *A. halimus* L.. However, the latter is

a Mediterranean species and is absent from southern Africa, where it is not to be confused with native *Atriplex* species (Aellen, 1940). The variety, *A. halimus* var. *granulata* A. Chev., described from Algeria (Chevallier, 1905) and distinguished from the type variety by the presence of appendages on the adaxial side of the valves was reported from both tropical East Africa (Brenan, 1954) and Mauritius (Brenan, 1994). However, a thorough examination of herbarium material has shown that *A. halimus*, including all of its varieties, is not present in East Africa (Sukhorukov, 2012) or Mauritius.

Materials and Methods

Specimens of *Atriplex* from East Africa and the Mascarenes were revised in the following herbaria (acronyms according to *Index Herbariorum*: <http://sweetgum.nybg.org/ih/>): BM, E, FI, G, K, LE, MHA, MW, RO.

Taxonomic treatment

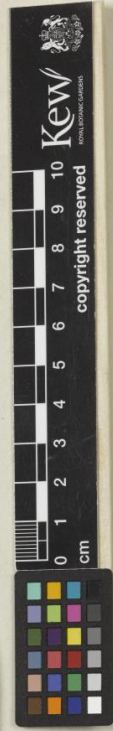
Atriplex aellenii Sukhor., *spec. nova* (Fig. 1).

Description: Suffruticose plants to 1m tall forming dense sprawling mats. Stems branched from base, whitish, to 5mm thick, their distal parts covered with bladder trichomes. Leaves alternate, ovoid, to 3.5cm long, entire or slightly undulate, with short (to 5mm) petioles, either grayish on both sides or green on one side only, truncate at base, slightly emarginated, with a short thin mucro at apex; with Kranz-type anatomy. Inflorescences axillary and terminal, to 10cm, male and female flowers intermixed in leafless interrupted clusters. Female flowers also occur in leaf axils below main inflorescences, either solitary or in small glomerules. The bract-like cover of female flower 2.5-7mm, rhombic, its valves connate for half their length or more, sclerified nearly to apex, more or less spongy, entire at base, three-lobed or dentate at apex, smooth or with 1-3 small appendages at base or in central part. Fruit 1.4-1.7mm, with hyaline pericarp readily scraped off. Seed red, with embryo oriented vertically.

Typus: Mauritius, Baie du Cap, south coast; supratidal shrub vegetation. 10.I.1979. coll. *D.Lorence* 2254 (holotype – K [000912485]!; isotypes – G [174689]!, MO [2540923]!). Suffruticose forming dense sprawling mat. Leaves light grayish-green. Fruits green. Occasional locally. Alt. ca. sea level. Rainfall 1600 mm.

Affinities: The new species is morphologically similar to *A. brenanii* Sukhor. (Sukhorukov, 2012) from the uplands of Kenya and Tanzania though differs in its habit (forming dense sprawling mats), broader ovate leaves and small rhombic bract-like female

HERB. HORT. KEW.



HOLOTYPE
of *Atriplex aellenii* Sukhor.
13.E.200 S. Sukhorov
non *A. halimifolia* var. *granulata*
S. Sukhorov 20.12

MAURITIUS
Family: CHENOPODIACEAE
Name: *Atriplex halimus* L.
var. *granulata* Chevall.
Baie du Cap, south coast;
supratidal scrub vegetation.
Suffruticose forming dense
sprawling mat. Leaves light
grayish-green. Fruits green.
Occasional locally.
Alt. ca. sea level Rainfall 1600mm
Coll. D. Lorence 2254 10.1.1979
MISSOURI BOTANICAL GARDEN HERBARIUM

Figure 1. Holotype of *Atriplex aellenii* Sukhor.

flower cover (to 7mm, length-to-width ratio=1). *A. aellenii* differs from *A. halimus* by its almost completely sclerified bract-like cover whose valves are connate at least to half of their length (cover in *A. halimus* is not sclerified, with nearly free valves). No close morphological affinity to any of *Atriplex* species from the Horn of Africa has been observed. An Australian species *A. paludosa* R.Br. is similar in many respects though differing in (1) significant stem lignification, (2) dioeciousness, (3) dense female inflorescence and (4) absence of the appendages on the bract-like cover.

Etymology: The new species is dedicated to Paul Aellen (1896–1973), the prominent Swiss expert on Chenopodiaceae.

Distribution and habitat: Even though the genus *Atriplex* is not mentioned in the first compendium of Mauritius (Bojer, 1837; Baker, 1877), the new species appears to be one of the common plants in the coastal zone of the island with a relatively high annual precipitation of 800–1500mm (van der Plas *et al.*, 2012, as *Atriplex* sp.). The new species is known only in Mauritius as a coastal plant.

Additional specimens examined (paratypes): Mauritius, Baie du Cap, rough ground near sea, 11.XI.1973, *J.Cuého* 4013 (K!); Delta of the Black river, open sands near the Ocean, 10.IX.1981, *L.Averyanov* 447 (LE!).

Comments: *Atriplex* is represented on the islands of the Western Indian Ocean by only two species: *A. aellenii* from Mauritius and *A. perrieri* (Leandri, 1931) from coastal habitats of Southern Madagascar (Cavaco, 1954). *Atriplex* appear to be absent from other islands of this region (Cavaco, 1954; Fosberg & Renvoize, 1980; Stutz, 1982; Brenan, 1994). It is, however, useful to provide a key for determination of all suffruticose coastal *Atriplex* species that can be encountered in the area, excluding the Horn of Africa.

Key to the species of *Atriplex* on the islands of the Indian Ocean

1. Either all or most leaves or the majority of them opposite. Stems prostrate, with adventitious roots..... *A. repens* (seashore of India and Sri Lanka)
- Leaves alternate, stems ascending, without adventitious roots 2

2. All leaves to 2.5cm long, mostly acute at apex, only rarely emarginate with a short and thin mucro. Inflorescence leafy. Bract-like cover to 4.5mm, without appendages on adaxial side
 *A. perrieri* (Madagascar)
 – Leaves larger, never with a mucro at apex. Inflorescence leafless. Bract-like cover to 7mm,
 mostly with appendages..... *A. aellenii* (Mauritius)

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References

- Aellen, P.** 1940. *Atriplex* and *Blackiella* in Südafrika. Bot. Jahrb. Syst., 70: 383–401 .
- Baker, J.G.** 1877. Flora of Mauritius and the Seychelles: a description of the flowering plants and ferns of those islands. London: Reeve & Co.
- Bojer, W.** 1837. Hortus Mauritianus ou énumération des plantes, exotiques et indigènes, qui croissent à l'île Maurice, disposées d'après la méthode naturelle. Maurice: Imprimerie d'Aimé Mamarot et Compagnie.
- Brenan, J.P.M.** 1954. Chenopodiaceae. In: Turrill, W. B. and Milne-Redhead, E. (eds.), Flora of Tropical East Africa. London: Crown Agents: 1–25.
- Brenan, J.P.M.** 1994. Chenopodiaceae. In: Bosser, J., Cadet, Th., Cuého, J., Marais, W. (eds.), Flore des Mascareignes: la Réunion, Maurice, Rodrigues. 136. Myoporaceae to 148, Hydnoraceae. Mauritius-Paris-Kew-Réunion: Sugar Industry Research Institute *et al.*: 1–8 .
- Cavaco, A.** 1954. Chenopodiaceae. In: Humbert, H. (ed.), Flore de Madagascar et des Comores (Plantes vasculaires), 66-69: Chenopodiaceae-Phytolaccaceae. Paris: Firmin-Didot & Co: 1–15.
- Chevallier, L.** 1905. Troisième note sur la flore du Sahara. Bull. Herb. Boissier, ser. 2, 5: 440–444.
- Flores Olvera, H., Vrijdaghs, A., Ochoterena, H. and Smets, E.** 2011. The need to re-investigate the nature of homoplastic characters: an ontogenetic case study of the 'bracteoles' of *Atripliceae* (*Chenopodiaceae*). Ann. Bot., 108(5): 847–865. doi: 10.1093/aob/mcr203

- Fosberg, F.R. and Renvoize, S.A.** 1980. The flora of Aldabra and neighbouring islands. Kew Bull. Add. Ser. VII: 1–358.
- Friis, I. and Gilbert, M.G.** 1993. Chenopodiaceae. In: Thulin, M. (ed.), Flora of Somalia, vol. 1. London: Kew Botanic Gardens: 127–140.
- Friis, I. and Gilbert, M.G.** 2000. Chenopodiaceae. In: Edwards, S., Tadesse, M., Demissen, S. & Hedberg, I. (eds.), Flora of Ethiopia & Eritrea, vol. 2(1). Addis Ababa & Uppsala: Univ. Addis Ababa & Univ. Uppsala: 277–298.
- Kadereit, G., Zacharias, E., Mavrodiev, E. and Sukhorukov, A.P.** 2010. Molecular phylogeny of *Atripliceae* (Chenopodioideae, Chenopodiaceae): Implications for systematics, biogeography, flower and fruit evolution, and the origin of C₄ photosynthesis. Amer. J. Bot. 97: 1664–1687. doi: 10.3732/ajb.1000169.
- Kasaplilg, B.** 1966. Additamenta ad floram Jordanicae. J. Arnold Arboretum, 47: 160–170.
- Leandri, J.** 1931. Note sur les Chénopodiacées de Madagascar. Bull. Mus. Natl. Hist. Nat., ser. 2, 3(3): 329–332.
- Stutz, L.-C.** 1982. Herborisation îles Maldives. Candollea, 37(2): 599–631.
- Sukhorukov, A.P.** 2010. *Atriplex nilotica* Sukhor. (sect. *Teutliopsis*, Chenopodiaceae) – eine neue Art für die ägyptische Flora. Fedd. Repert. 121(1–2): 32–37. doi: 10.1002/fedr.201011126.
- Sukhorukov, A.P.** 2012. Taxonomic notes on *Dysphania* and *Atriplex* (Chenopodiaceae). Willdenowia, 42(2): 169–180.
- van der Plas, G.W., de Boer, E.J., Hooghiemstra, H., Florens, F.B.V., Baider, C. and van der Plicht, J.** 2012. Mauritius since the last glacial: environmental and climatic reconstruction of the last 38000 years from Kanaka crater. J. Quatern. Sci., 27(2): 159–168.