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# Salt tolerant plants in Aden (Yemen)

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ABSTRACT: In total 26 halophyte species are reported from Aden. Brief descriptions of each species and ecological notes are provided.

KEY WORDS: vascular plants, halophytes, Yemen, Arabian Peninsula

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## INTRODUCTION

Aden is a part of Republic of Yemen, which is located at the south-western corner of Asia and Arabian Peninsula. The main land of Aden extends between lat. 12°43'–12°57'N and between long. 44°40'–45°17'E on the coast of Gulf of Aden. It comprises two peninsulas, an eastern (Aden) and western one (Little Aden), both dominated by volcanic hills and separated by a bay. A desert plain running along the coast of the bay connects the two peninsulas.

The location of Aden shows that it is situated in the tropical region, so the air temperature is in July 36°C and 23°C in January. Aden receives an average of 50 mm rain per year, which usually falls during July and August. The highest humidity is in October (more than 85%) and lowest in April (when it falls to c. 30%).

So the climate of Aden shows that Aden is an extremely arid region, thus plant life can only support a limited number of plants or specialized plant – halophytes, psammophytes and xerophytes.

The author was able to make two field trips to different parts of Aden in order to collect plant specimens. The first was from November 1988 to January 1989 and the second in July – August 1989. The present paper includes a list of 26 species of salt tolerant vascular plants which are important and specialized constituents of the flora of Aden.

## LIST OF SPECIES

Plant specimens are numbered according to localities from which the collections were made. One full set of the specimens is deposited in Silesian University Herbarium (KTU) in Katowice, Poland.

The salt tolerant plants of Aden are listed below with the numbers of the collectors. The species are arranged alphabetically by family.

### *Aizoaceae*

*Sesuvium verrucosum* Raf.

No. 1030, 1308. Perennial, prostrate, succulent, stems much branched, leaves spathulate, flowers apetalous, perianth outside green and inside bright mouvish pink coloured. It grows in salty sand, commonly in Khormakar.

### *Asclepiadaceae*

*Calotropis procera* (Ait.) Ait. f.

No. 1016. A medium to large shrub, with the stem corky and whitish in colour. Leaves are large, up to 20 x 10 cm, pale green, mealy-velvety. All parts excude latex which causes irritation of the skin. It grows wild in salty soil.

### *Casuarinaceae*

*Casuarina equisetifolia* Forst.

A tree 10–20 m high with a monopodial stem. Leaves are reduced to scales, whorled at the nodes of branchlets. Branchlets green. Flowers unisexual. Fruit compound, cone-like. Introduced, cultivated as wind break on the salty soil.

### *Chenopodiaceae*

*Halopeplis perfoliata* (Forssk.) Bunge.

No. 1237. Low shrub up to 80 cm high, young stems covered with succulent clasping leaves. Dominating in salt marshes.

*Suaeda monoica* Forssk.

No. 1054, 1375. Abundant in salt marshes and saline sandy soils. This shrub is 2–4 m high with the stems much branched. The leaves are dark green, cylindrical, fleshy, getting black when dry.

*Suaeda vermiculata* Forssk.

The species reported by Boulos (1988) as No. 16573. Low shrub up to 1 m high. Stems branched, dark green, leaves succulent and variable in shape and size from almost spherical to cilindrical. It grows on littoral sand.

### *Combretaceae*

*Conocarpus lancifolius* Engl.

No. 1024, 1094, 1384. Tree up to 15 m high, salt-tolerant, enough draught resistant, with a relatively conical crown, and well distributed branches. It is fast growing tree.

### *Convolvulaceae*

*Cressa cretica* L.

No. 1008. 1086, 1349. Perennial up to 30 cm high, stems branched, densely leafy, flowers white. It grows in salty sand.

*Ipomoea biloba* Forssk.

No. 1048, 1822, 1379. Perennial prostrate, much branched, leaves bilobed, flowers pink. It grows in salty soil and littoral sand.

### *Cyperaceae*

*Cyperus conglomeratus* Rottb. *s. lat.*

No. 1175, 1295. Perennial herb, densely tufted, pale green, leaves terete stiff, flowers spikes in dense heads. It grows in the littoral sand.

*C. laevigatus* L.

No. 1051. Perennial rhizomatous plants, the clums either crowded on a short rhizome or interspaced in rows on a long creeping rhizome. Spikes in dense head. It grows in sea marshes.

### *Fabaceae*

*Pithecellobium dulce* (Roxb.) Benth.

No. 1093, 1334, 1360, 1371, 1408. Tall tree up o 15 m high. Branches greyish-white, leaves bipinnate, pinnae one pair per leaf. Flowers in small head, the heads aggregrated into axillary racemes or terminal panicles. Pods up to about 15 cm long, c. 1.5 cm wide spirally twisted. It grows in salty soil.

*Prosopis cineraria* (L.) Druce

No. 1224, 1376. Tree to 10 m high, branches greyish-green with small irregularly arranged prickles, leaves compound, bipinnate, leaflets about 12 pairs per pinna, inflorescence long spike. Pod yellow to yellowish-brown, up to 30 cm long. Few numbers of this plant found in coast part.

*P. juliflora* (SW.) DC.

No. 1010, 1129, 1209, 1239, 1352, 1410. A tall spreading shurb or a small tree, branches green, thorny. Spike long, creamy yellow. Pods up to 20 cm long. Compressed but turgid, straw-coloured. It was found in big population on littoral sand and saline soil.

### *Malvaceae*

*Thespesia populnea* Soland *ex* Correa.

No. 1006, 1321, 1380. A tree up to 10 m high, leaves cordate, flowers yellow (tulip like), fruit capsule to 4 cm wide. It grows in salty soil.

### *Meliaceae*

*Azadirachta indica* (L.) A. Tuss.

No. 1488. Tree up to 10 m high, branches pale brown, leaves compound bipinnate leaflets about 8 pairs. Flowers small creamy coloured, fruit drupe, golden-yellow when ripe. It grows in salty soil.

### *Myrtaceae*

*Eucalyptus camaldulensis* Dehn.

No. 1222. A tall tree, with a relatively conical crown, leaves silvery-green, falcate. Introduced, cultivated as wind break. It grows in salty soil.

### *Palmae*

*Hyphaene thebaica* (L.) Mart.

No. 1247. A tree up to 8 m high. It is a fan palm characterized by its dichotomously branched stem, with the leaves crowded at the tips of branches. It grows wild and cultivated, a large population is found on the coast of EL-Hiswa.

### *Poaceae*

*Aeluropus lagopoides* (L.) Trin. *ex* Thwait.

No. 1052, 1248, 1385. A perennial rhizomoid grass, stems much branched, inflorescence a dense globular or oblong head up to 1.5 cm long. Very common plants of the littoral sand and slat marshes.

*Halopyrum mucronatum* (L.) Stapf.

The species reported by Boulos (1988) as No. 16572. Perennial tough grass, growing in dense tussocks to 1 m high. It grows on littoral sand.

*Odyssa mucronata* (Forssk.) Stapt.

No. 1127, 1217, 1243. Perennial, growing in dense tufts to 2 m high, clums stiff leaves pungent and spine like. It grows on the littoral sand.

*Sporbolus consimilis* Fresen.

No. 1393. Perennial grass, growing in dense tussocks to 1.5 m high, grows on littoral sandy soil.

*S. spicatus* (Vahl) Kunth

No. 1042, 1320, 1393. Perennnial grass with naked creeping rhizomes, mat-forming panical narrowly cylindrical, smooth. It grows in salty soil.

### *Rhamnaceae*

*Ziziphus spina-christi* (L.) Willd

No. 1027, 1069, 1312, 1378. A tree 3–4 m high, branched creamy green armed with two forms of spines, one straight and second curved, leaves 3-nerved. Flowers white small, fruit an edible drupe of cherry size, globular, turning yellow when ripe. It grows in salty soil.

### *Tamariacaceae*

*Tamarix arabica* Bunge.

No. 1009, 1053, 1102, 1282, 1383. Shrub or tree up to 5–8 m high, branches reddish-brown, leaves small with distrinct blade, half-clasping, covered with salt crystals. Flowers small in long lax racemos spikes. It grows in salty soil and salt marshes.

### *Typhaceae*

*Typha domingensis* Pers.

The species reported by Boulos (1988) as No. 16891. Perennial 1.5 m tall herb, stems stout erect, linear, leathery, up to 1 m long and up to 10 mm wide. Monoecious plant, male flowers over-topping female flowers on a long brownish dense spike. It grows in salty marshes.

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## STRESZCZENIE

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