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STUDIES IN THE FLORA OF ARABIA: XXV

Tamarix in the Arabian peninsula

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ABSTRACT. Examination of recently collected material of *Tamarix* from the Arabian peninsula kept at the Herbarium of the Royal Botanic Garden, Edinburgh, provides a better understanding of the distribution of five species already known to occur in the area. In addition, four species new to this area are reported and their restricted distribution documented and discussed. Some literature records are also included.

INTRODUCTION

Material of *Tamarix* from the herbarium at the Royal Botanic Garden, Edinburgh (E), was sent to the author for identification. The last monograph of *Tamarix* (Baum, 1978) reports the occurrence and distribution of *T. arabica* Bge., *T. mascatensis* Bge., *T. aphylla* (L.) Karsten, *T. aucheriana* (Decne.) Baum, and *T. macrocarpa* (Ehrenb.) Bge. in the Arabian peninsula as defined by Wickens (1982). Four additional species were identified in the material examined. All species now known to occur in the Arabian peninsula are included in the following key and specimen citations.

KEY TO THE SPECIES OF TAMARIX IN THE ARABIAN PENINSULA

This key is simplified to enable quick identification; for a critical verification the user is referred to Baum (1978) where full descriptions of the species are given.

- | | |
|---|--------------------------|
| 1. Leaf margins fused, green branches thus articulating..... | 2 |
| + Leaf margins not fused, although leaves may be stem clasping, green branches not articulating | 3 |
| 2. Stamens 5 (Fig. 3)..... | 3. <i>T. aphylla</i> |
| + Stamens 10 (Fig. 5)..... | 5. <i>T. stricta</i> |
| 3. Stamens 4 (Fig. 4) | 4. <i>T. szovitsiana</i> |
| + Stamens 5 or more | 4 |
| 4. Stamens 5 | 5 |
| + Stamens 6 or more | 7 |

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5. Each of the 5 lobes of the nectariferous disk rather abruptly attenuating into the staminal filament (Fig. 2) **2. T. mascatensis**
 + Lobes of nectariferous disk distinct from stamens 6
 6. At least one filament emerging from under the disk near or at the margin (Fig. 1) **1. T. arabica**
 + Each of the filaments emerging from between the lobes of the disk (Fig. 10) **T. mannifera**
 7. Stamens 6-9 (rarely a flower with 10 stamens in the same inflorescence) (Fig. 9) **9. T. macrocarpa**
 + Stamens 10 or more 8
 8. Stamens 10 (Fig. 8) **8. T. passerinoides**
 + Stamens 11 or more (rarely a flower with 10 stamens in the same inflorescence) 9
 9. Stamens 11-12 (rarely a flower with 12-13 stamens in the same inflorescence) (Fig. 6) **6. T. aucheriana**
 + Stamens 13-15 (Fig. 7) **7. T. pycnocarpa**

ENUMERATION OF SPECIES

1. T. arabica Bge., Tentamen 55 (1852).

SAUDI ARABIA: near Riyadh, road to Hair, margin of sewage ditch, 28 iii 1984, *Collenette* 4878; Eastern Province, Abqaiq lagoons, 3 xii 1982, *Naylor* 112, 112a; 20 km NW of Khamis Mushayt, wadi, 13 iv 1982, *Baierle, König, Mahmoud* 82-1643; Najran, on sandy banks of wadi above town, 28 i 1980, *Collenette* 1672; Wadi Khulays, 75 km NNE of Jeddah, 7 ii 1980, *Collenette* 1763; 15 km N of Abha Taif, road in valley near water, 21 ix 1983, *Collenette* 4550; 10 km S of Jeddah, near the sewage works, edge of lagoon, 10 ix 1981, *Collenette* 2752; Jeddah, waste ground in town, 11 i 1980, *Collenette* 1508; Jeddah, north shore, 30 iii 1981, *Grainger* 123; Eastern province, Dhahran, near hospital in garden area, 26 x 1982, *Naylor* 108.

SOUTH YEMEN (PDY): Hadramaut, Wadi Hadjer, iv 1941, *Wissmann* 1121 (HBG); Gebirge der Hinterlandes von Aden, 1931, *Wissman* (HBG); Arabia felix, *Bové* (P)—both recorded by Baum (1978).

OMAN: 5 km ENE Mirbat, low dry hills, 19 x 1980, *Miller* 6180; Al Huquf escarpment, Al Quati, sandy wadi bed below brackish spring, 12 x 1984, *Miller* 6554; 5 km W Nizwa, by seepages on wadi side, 19 x 1984, *Miller* 6661; Muscat, Qurm Nature Reserve, 17 ii 1983, *Frey & Kürschner* 83-256; near Haqal, Masirah Is., sand and sabkha in upper wadi, 4 ii 1982, *Gallagher* 6356/3; Batinah: 3 km N of Sahil Harmul near Liwa, muddy salt flats at edge of lagoon, 28 iii 1980, *Edmondson* 3502; near Ras Al Hadd (in direction of Bilad Bani Bu Ali), on small sandy gravelly hills, 7 ix 1978, *Whitcombe* 323.

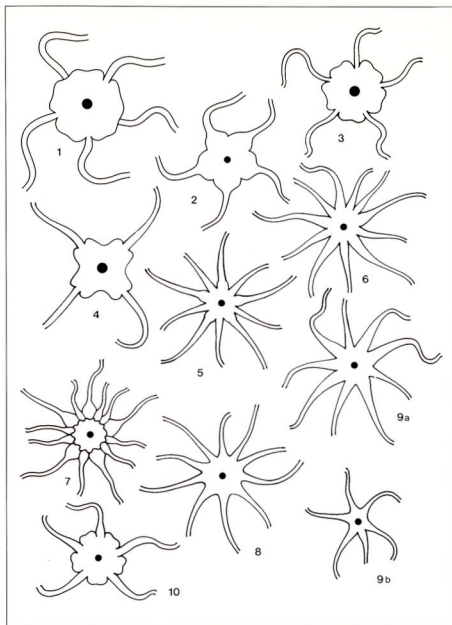
YEMEN ARAB REPUBLIC: Wadi Dahr, 12 km NW of Sanaa, weed of cultivated land, 6 iv 1981, *Miller & Long* 3471; Wadi Ayan, Berken von At Tur Gebirgstihama, on sand in wadi bed, 2 iii 1982, *Müller-Hohenstein & Deil* 32; Inlet of Wadi Ayan At Tur Gebirgstihama in sandy wadi bed, 17 ix 1982, *Müller-Hohenstein & Deil* 371.

UNITED ARAB EMIRATES: Abu Dhabi, in the vicinity of Umm am Nar near old Abu Dhabi Airport, 8 v 1982, *Western* 284 & 285.

Grows on dry river beds, sands probably reaching brackish or salty water table or growing near or at moist alkaline soils. This species was described from Yemen. It is known to occur in Egypt, Israel and Jordan, Somalia and even in Tanzania (Baum, 1978). See note under the following species.

2. T. mascatensis Bge., Tentamen 60 (1852).

OMAN: Bwai, sandy wadi bed near brackish water, 13 x 1984, *Miller* 6565; Ayun, by water hole, 19



FIGS 1-10. Semi-diagrammatic line drawings of the nectariferous disk and staminal filaments of the various *Tamarix* species occurring in the Arabian peninsula. 1, *T. arabica*. 2, *T. mascatensis*. 3, *T. aphylla*. 4, *T. szowitziana*. 5, *T. stricta*. 6, *T. aucheriana*. 7, *T. pycnocarpa*. 8, *T. passerinoides*. 9a, b, *T. macrocarpa*. 10, *T. mannifera*.

x 1984, *McLeish* 226A: Bwai, banks of sandy wadi, 29 iv 1982, *Maconochie* 3428; Al Hallaniyah, Kuria Muria Islands in dry gravel and rocky wadi, 22 ix 1981, *Gallagher* 6252/7; Batinah, 3 km N Sahil Harmul near Liwa, muddy salt flats at edge of lagoon, 28 iii 1980, *Edmondson* 3501.

YEMEN ARAB REPUBLIC: Becken von At Tur Gebirgstihama, Wadi La'ah, on fine sand, 3 iii 1982, *Müller-Hohenstein & Deil* 77; Kustentihama bei Luhaya, on salt pans, 9 iii 1982, *Müller-Hohenstein & Deil* 192.

SOUTH YEMEN (PDRY): Aden, Gold Mohur, Volcanic rocks, 26 xi 1952, *Grierson* 16. Hot Springs, 30 km E Mudia, sandy wadi, 19 iv 1953, *Grierson* 198 (EA); Hadramaut sandy wadi bed Sai'un area, *Gilliland* 4127 (EA)—last two recorded by Baum (1978).

SOCOTRA ISLANDS: Ras Kattanahan, hill slope, 18 ii 1953, *Popov* GP/50/131 (EA)—recorded by Baum (1978).

This species was described from Oman, but is also known in Iran, Somalia and Ethiopia. It grows on Wadi beds, sands, saline valleys and volcanic rocks and is typically a southern species of the peninsula. Apparently the material of *T. mascatensis* and *T. arabica* is very difficult to distinguish. In order to ascertain the identity of each, a careful examination of the androecium under a dissecting microscope is required and after the flowers have been treated with simmering water and preferably also soaked in lactophenol. In *T. arabica* at least one, usually two filaments out of five are inserted from below the nectariferous disk (Fig. 1), whereas the other three filaments are inserted in between the lobes of the disk. In *T. mascatensis* (Fig. 2) the filaments are more or less confluent with the disk lobes.

3. *T. aphylla* (L.) Karsten, *Deutsch. Fl.* 641 (1882).

T. orientalis Forsk., *Fl. Aegypt.-Arab.* 206 (1775).

T. articulata Vahl, *Symb. Bot.* 2: 48 (1791), nom. illegit.

SAUDI ARABIA: Wadi Sawawin, Iron ore deposit, 75 km SW of Tabuk, planted near cabins, 12 ix 1983, *Collenette* 4541; Farasan Islands, iii 1984, *Collenette* s.n.; N of Jeddah, 3 km S of Thawwal, among xeromorphic shrubs, 20 xi 1981, *El Sheikh, Frey et al.* 81-308; N of Jeddah, Wadi Qu dayd, in sandy areas of wadi, 29 iv 1982, *Podzorski* 1144; Wadi Halaqah, 32 km S of Baljurshi, 8 x 1983, *Collenette* 4592; Eastern Province, Dhahran, in planted garden, 1 viii 1983, *Naylor* 367; 1 km E of Marat, alluvial sand, 17 iii 1982, *Baierle, El Sheikh et al.* 82-319; Wadi Halahila, about 20 km N of police point on road 40 km NNW of Najran, in sandy wadi, 27 i 1980, *Collenette* 1660; Abu Arish near Jizan, below dam, 23 x 1983, *Collenette* 4656; 14 km N of Mahayl on the Jeddah-Gizan road, in sandy wadi near roadside, 19 ix 1981, *Collenette* 2821; Jabal Fayfa, c.6 km from Bani Malik, gravel bank at side of wadi, 5 v 1982, *Podzorski* 1171; near Mudhaylif on the Mahagl-Gzan road, in wide sandy wadi, 19 ix 1981, *Collenette* 2824.

SOUTH YEMEN (PDRY): Gebirge des Hinterlandes von Aden, Ka'tba, *Wissman* 1119 (HBG)—recorded by Baum (1978).

OMAN: near Wadi Tawinat, N of Dhofar, 12 v 1982, *Gallagher* 6464/21; Wadi Rafa'ad, Dhofar, 12 v 1982, *Gallagher* 6464/25, 6464/27; Western desert, Dhofar, v 1984, *Nodak* 161; Amlah near Ibri, Wadi al Ayn, 12 i 1978, *Whitcombe* 65.

YEMEN ARAB REPUBLIC: Taiz prov., Masayna, near Ar Rahidah, wadi bank, 19 x 1983, *Gordon* 360; Tihama c.30 km W of Az Zuhrah on road to Al Luhayyah, on sand with *Suaeda*, *Tamarix*, *Capparis*, 21 xi 1982, *King* 228. Hodjeilah, wadi chaba, 2 v 1887, *Defflers* 132 (B.P)—recorded by Baum (1978).

KUWAIT: 10 x 1935, *Willeson* 315 (K)—recorded by Baum (1978).

This species has a wide distribution from Morocco to Senegal across North Africa to Pakistan and Afghanistan. It even reaches Kenya. It is also a popular tree as it is often planted and cultivated as an ornamental tree. Its most common name is Athl; among other names is Tarfa which applies to all other species as well. It grows on sandy soil and dunes, river banks, salty deserts and fields.

4. *T. szovitsiana* Bge., Tentamen, 26 (1852).

SAUDI ARABIA: Turayf camp, edge of clay pan, 12km W of camp, in silt, 30 iii 1983, *Collenette* 4220

This is a rare species and not fully understood. Its distribution range is Iran, Russian SFSR, Turkmen SSR and Uzbek SSR (Baum, 1978). This is a new record and a range extension to the west in the northern tip of Arabia near the border with Jordan.

5. *T. stricta* Boiss., Diagn. Pl. Or. Nov., II, 2: 56 (1856)

OMAN: Batinah 'Sohar Peak' 30km SW of Sohar, 20 iii 1980, *Edmondson* 3444; 10km South Bidaya-Sur road, along sandy wadi bed, 2 iv 1982, *Maconochie* 3317; NW of Yanqul, sandy gravel plain, 5 iv 1973, *Whitcombe* 172.

These are new records for the Arabian peninsula. This species was previously known from Pakistan and South Iran only (Baum, 1978). It can easily be confused with *T. aphylla*, from which it is recognised by the different number of stamens, see key. This species grows on sandy soil in the desert.

6. *T. aucheriana* (Decne.) Baum, Genus Tamarix, 148 (1978).

SAUDI ARABIA: Eastern province, Abqaiq lagoons, 3 xii 1982, *Naylor* 114; Al Jouf, 26km away at Dorumah, saline sand in sunken oasis, 21 i 1980, *Collenette* 1578; Kwajem DII, Munt (E)—recorded by Baum (1978).

OMAN: Seeb Airport Recreation Area, on sandy saline area, 12 iii 1982, *Maconochie* 3235; Mugshin, wadi dominated by *Prosopis* and *Tamarix*, 20 ix 1979, *Miller & Whitcombe* 2044; Hoquf, Mayhoos, by brackish water, 11 x 1984, *Miller* 6549.

UNITED ARAB EMIRATES: Abu Dhabi, 50km due S of Abu Dhabi town, desert track over sand dunes and minor sabkha depressions, 17 xi 1982, *Western* 367. Ras Al Khaima, estuary near sea, 20 ii 1943, *Zohary* 11522 (HJJ)—recorded by Baum (1978).

KUWAIT: Al Dbaiyyah A'rejjan Camp—Kuwait National Petroleum Co., White sand dunes, 6 iv 1981, *Armer* 145; Burgan hill, moist ground hill, 17 iii 1982, *Salmeen & Jalili* 11022; Swamps of Aradjan also Ain-el-Ahed, 5 i 1935, *Wilson* 148 (K)—recorded by Baum (1978).

This species occurs also in Turkmen SSR, Afghanistan, Iran and Iraq (Baum, 1978). It is confined to the eastern part of the Arabian peninsula, which is the southwestern part of its area of distribution. It grows in littoral swamps, saline depressions in sand and edges of canals.

7. *T. pycnocarpa* DC., Prodr. 3: 97 (1828).

SAUDI ARABIA: 29km W of Dhahran, edge of salt pan, 13 iv 1982, *Podzorski* 808.

BAHRAIN: by UBF pool, moist sand, 24 i 1984, *Alder* 11, 12.

A new record from the Arabian peninsula; known from Iraq, Iran and Afghanistan (Baum, 1978). It grows in humid saline depressions.

8. *T. passerinoides* Del. ex Desv., Ann. Sci. Nat. Bot. I, 4: 347 (1824).

SAUDI ARABIA: North Asir Mts, wadi near main Taif road N of Jabal Ibrahim, near stream, 25 iv 1982, *Podzorski* 1114.

A new record for the Arabian peninsula; known from E Algeria, Egypt and the Sinai (Baum, 1978) where it grows in salty patches in the desert.

9. *T. macrocarpa* (Ehrenb.) Bge., Tentamen, 79 (1852)

SAUDI ARABIA: Eastern province, Abqaiq lagoons, 7 xii 1982, *Naylor* 113; Wadi Habagah, 32km S of Baljurshi-Taif-Abha road, in sand bordering the stream, 5 iv 1982, *Collenette* 3511. Asir province, Al-Mahala, along wadi sides, 5 iv 1978, *Nasher* 1H51; Wadi Habaquah, 5 iv 1982, *Grainger* 510.

QATAR: Al Khor, outside the town in salt marshes, 4 i 1977, *Boulos* 11165.

Known from Libya, Egypt, Israel, Jordan, Syria and Iran (Baum, 1978). The new records for the Arabian peninsula fill the gap in the area of distribution as previously known. It grows on salt flats and salty stream banks.

DISCUSSION

The distribution of the S Iranian *T. stricta* has been extended south to NE Oman. The area of *T. pycnocarpa* has also been extended from where it was known to occur in Iran and Iraq south to the Bahrain area. *T. passerinoides* was known from the Sinai peninsula and Egypt. It has now extended to the east. I regard the identification of *T. szovitsiana* as tentative. It is known from Iran only. Its single locality near Al Medina is puzzling. Many of the localities of the species previously known to occur in Arabia are new and additional to those in Baum (1978). It is now my opinion that the specimens reported as *T. arborea* from Sokotra Islands (Baum, 1978) should be *T. mascatensis*. This, however, should be ascertained by means of additional collections from Sokotra because the material so far examined was poor.

EXCLUDED SPECIES

The following species have been recorded from the Arabian peninsula, but the records are either based on misidentifications or require confirmation.

T. amplexicaulis Ehrenb.: recorded in Migahid, *Flora of Saudi Arabia* 1: 102 (1978) from N and E of the country, is likely to have been mistaken instead of *T. macrocarpa*.

T. nilotica (Ehrenb.) Bge.: recorded by Schwartz (*Flora des tropischen Arabien* 168, 1839) from N and S Yemen is probably *T. mascatensis*, and by Migahid (*Flora of Saudi Arabia* 1: 110, 1978) from N and E of the country is probably *T. mannifera*.

T. mannifera (Ehrenb.) Bge.: recorded by Schwartz (*Flora des tropischen Arabien* 168, 1839) from W Saudi Arabia and S Yemen and by Migahid (*Flora of Saudi Arabia* 1: 110, 1978) from N and E of the country. Same as for *T. nilotica* above, that the specimens are likely to be *T. mascatensis* and *T. mannifera* respectively. Indicated on Baum's distribution map of *T. mannifera* (p. 72) from NW Saudi Arabia, but no specimens are formally cited from there.

T. ramosissima Ledeb.: recorded from Qatar by Batanouny (*Ecology and Flora of Qatar* 131, 1981) is unlikely to occur in the Arabian peninsula.

T. florida Bge.: recorded from Saudi Arabia by De Marco & Dinelli (*Annali Bot. Roma* 33: 235, 1974) is unlikely to occur in the Arabian peninsula.

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