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# The Flora of The State of Qatar: Its History and Present–Day Status

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# الفلورا القطرية: تاريخها وحاضرها

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ترجع دراسة النباتات في دولة قطر إلى تاريخ حديث نتج عنه إصداران عن الفلورا القطرية في عامي 1981 و 1983، ومنذ ذلك التاريخ تم تجميع العديد من العينات، وتمت دراسات خاصة في مجال البيئة مما أوضح فجوات في الفلورا القطرية يجب أن يتم تداركها. كما قامت نشاطات واسعة في المناطق الصحراوية المتاخمة للمدن أدت إلى إبادة العديد من البيئات الطبيعية. هذا بالإضافة إلى التوسع في الممارسات الزراعية وإدخال نباتات الزينة الذي نتج عنه ظهور عدد من الآفات والنباتات الغازية للفلورا القطرية. عموما قبل البدء في إعادة إصدار حديث للفلورا القطرية يجب أن يتم حصر شامل لنبات الفلورا القطرية على أن يشمل الأسماء المرادفة للأنواع. هذه الدراسة تشتمل على تاريخ الدراسات في الفلورا القطرية والموقف الحالي لها.

**Keywords:** *Flora, State of Qatar.*

## ABSTRACT

The history of botanical exploration in the State of Qatar is of recent origin. Various collections culminated in 2 major Floras for the State of Qatar in 1981 and 1983. Since then, further collections and focus on several aspects of the ecology of the State of Qatar had shown gaps that need to be covered. At present there is an ongoing activity, some resulting in the elimination of some natural habitats. This, besides activities in agricultural and horticultural practices, has introduced a number of alien species and invasive taxa to the flora of the State of Qatar. Before updating the Flora, it is of vital importance to commence by preparing an up-to-date checklist of the present Flora and to incorporate the synonymy. The present study focuses on the history and present status of the flora of the State of Qatar.

# Introduction

The State of Qatar is a small country with arid conditions and poor soils with stony ground making up to 88% of the land and a saline coastline, as well as inland salt flats. Yet it has a plant diversity that may be considered rather rich considering the features of the land.

The history of botanical exploration in the State of Qatar is of recent origin. Little has been written about the State of Qatar's natural history prior to the oil boom. Attention did not focus on plant life in the State of Qatar inspite of the fact that the country was and still is dependent on natural range plants as a supplementary feed for its livestock.

In this contribution a survey of earlier investigations dealing with plant diversity in the State of Qatar is presented and the information pertaining to the floristic composition is updated.

# History of Botanical Exploration and Collections in the State of Qatar

In 1970 Mrs Cheryl Wilson visited the State of Qatar as well as other Gulf States and made a small collection documented by botanical drawings of selected plants. Contact with Mrs Wilson failed in 1996 to get more information on the nature of her previous mission to the State of Qatar. Her specimens were examined at Kew; they refer to a few species and the collected material was very little. Mrs Wilson did not submit any report but donated her drawings to the Museum of Natural History and Antiquity in Doha.

In 1975 UNDP requested the late Professor Obeid from the Sudan to study the natural vegetation and flora of the State of Qatar and to assess the actual range and pasture situation in accordance with an agreement between the Government of the State of Qatar and UNDP. Professor Obeid visited the State of Qatar from 17 March to 20 April. He collected 211 plant species representing 156 genera related to 46 families. The list also included Arabic vernacular names provided by the locals. The report presented to UNPD [1] laid down the foundation for future studies of ecology and flora in the State of Qatar and included the first report on range plants. Duplicates of his collections were dispatched to the late Vivi Täckhlom, Cairo University Herbarium, another set was kept at the Ministry of Industry and Agriculture, Doha (specimens not seen), and some selected specimens were dispatched to Edinburgh for confirmation of the identifications. That specific set of specimens was later returned to the Sudan after the death of the collector and is now deposited at the Herbarium of the University of Khartoum.

In 1978, Professor Loutfy Boulos from Egypt visited the State of Qatar between 29 March and 5 April. He collected 332 specimens belonging to 46 families and 79 genera. The material was sent to Kew, Cairo, Florence and the Qatar National Museum, Doha. The local collection could not be traced. However, few specimens were examined by the author at Kew.

A breakthrough came in 1978 when Professor Batanouny from Egypt was appointed as a member of staff in the Department of Botany and Microbiology and at the time when the University of Qatar moved to its present premises. A herbarium was established in 1986. Batanouny collected over 3000 specimens. Unfortunately, most of the specimens met an ill fate since none of the material was properly preserved. There are no collection booklets or available notes in Doha to refer to and the estimate of the extent of his collection was based on some of his surviving specimens, which were later poisoned and are now deposited in the Herbarium of the University of Qatar.

Batanouny [1] added 10 families to those reported earlier by Obeid [2] and Boulos [3]. These include: Avicenniaceae, Cleomaceae, Cynomoriaceae, Gentianaceae, Menispermaceae, Oxalidaceae, Papaveraceae, Hydrocharitaceae, Juncaceae and Palmae (Arecaceae).

In March 1982, Al Amin from the Sudan was commissioned by the Arab Organization for Agricultural Development to write a book on the wild plants of Qatar. He spent the period March to end of May and collected over a thousand specimens. His book [4] includes 297 species related to 154 genera and 58 families and the author made some additions to Batonouny's work.

Al Amin, in the last publication on the flora of Qatar [4], did not recognize three of the families in Batanouny's work [1], namely Cynomoriaceae, Gentianaceae, Papaveraceae and has sunk the Cuscutaceae into the Convolvulaceae. Further, he split the lumped legumes into their 3 respective families: Papilionaceae (=Fabaceae), Caesalpinaceae and Mimosaceae. He recognized the Illecebraceae as a distinct family from Caryophyllaceae and added 2 new families: Linaceae and Ranunculaceae. Tables (1) and (2) summarize the contributions of earlier studies on the flora of the State of Qatar.

It is worth mentioning that all these families exist in the flora of Qatar (see checklist)*. New additions to the flora of the State of Qatar include 1 family, 12 genera and 28 species [5] and recently we encountered in a mixed vegetation dominated by *Phragmites australis* in pools of treated sewage water extending from Abu Hamour, Doha a new record of *Althenia* (Zannichelliaceae) most likely introduced by birds.

Further collections by the staff and students of the Department of Botany enriched the herbarium and raised the number of recorded taxa for the State of Qatar. The Herbarium of the University of Qatar at present houses over 1500 specimens and has a newly appointed technician.

**Table 1**: Contributions of earlier collectors of flowering plants in the State of Qatar**

| Author | Year | No. of Families | No. of Genera | No. of Species | No. of Specimens |
|---|---|---|---|---|---|
| M. Obeid | 1975 | 46 | 156 | 211 | |
| L. Boulos | 1978 | 46 | 179 | 260 (+3varieties) | 332 |
| Batanouny | 1981 | 56 | 212 | 313 | Over 3000 |
| H. Al Amin | 1983 | 58 | 202 | 300 | |

** See also Table 3.

**Table 2**: Summary of data on taxonomic categories: (F) Families, (G) Genera and (S) Species

| Author (year) | Obeid (1975) | | | Boulos (1978) | | | Batanouny (1981) | | | Al Amin(1983) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | F | G | S | F | G | S | F | G | S | F | G | S |
| Gymnosperms | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Dicotyledons | 41 | 124 | 174 | 41 | 140 | 204 | 48 | 164 | 250 | 50 | 156 | 242 |
| Moncotylodons | 4 | 30 | 36 | 4 | 36 | 50 | 7 | 47 | 62 | 7 | 45 | 57 |
| Total | 46 | 155 | 211 | 46 | 179 | 255 | 56 | 212 | 313 | 58 | 202 | 300 |

* Qatar's Biodiversity and Action Plan, 2002.

All above-mentioned studies have focused on flowering plants. Scanty rains, as recorded for the State of Qatar, and saline lowlands with no high mountains are not expected to support the growth of lower plants and lichens. Up to date, only one gymnosperm (*Ephedra foliata*) and one Pteridophyte (*Ophioglossum polyphyllum*) have been recorded in the State of Qatar [6]. The moss *Funaria* sp. is known from a number of shaded localities in towns during the rainy season. It is most probable that it has been introduced with shade plants imported from Holland as it is still appearing in soils with potted plants from Europe. Recent studies on the lichens in the State of Qatar have so far revealed the existence of one fruticose lichen (*Ramalina farinacea*) and one foliose (*Xanthora*) and a number of crustose lichens related to the genera *Buelia* and *Caloplacca* [7].

Over the years, expansion in agriculture and the ever-increasing herds of livestock demanded bulk import of fodder and grain as animal feed. This meant more introduced weeds and their possible naturalization, adding to the recorded species for the State of Qatar. On the other hand, the import of horticultural plants from various countries did not only introduce weed species but various macro-fungi not previously known in the flora. Another source of alien species is imported in the form of birds' seeds and as well as household hand-made goods of natural products such as brooms made of *Sorghum* spp.

The checklist presented to Qatar National Biodiversity and Action Plan gives the plants in the order of Gymnosperms followed by the Dicotyledons, and the Monocotyledons. Under these three classes, families are arranged in an alphabetical order. For each family the order and other super category have been included in the same column as the family. The same system has been applied to the genera and species. For each species the synonyms are given accompanied by notes and information pertaining to their habitat and distribution. Arabic vernacular names are given in Arabic and their English transliteration.

The total number of species (up to date) is 371 belonging to 236 genera (183 Dicotyledons and 53 Monocotyledons) in 62 families (53 dicots, 8 monocots and 1 gymnosperm).

Because of the nature of the terrain and harsh climatic conditions of high temperatures and scanty erratic rains, the dominant life form is of annuals, ephemerals and short-lived perennials as is expected in arid zones. These life forms make up over 60% of the total flora whereas perennials represented by trees, lianes, shrubs, undershrubs and perennial herbs are about 40% of the total number of taxa recorded. There are only 7 tree species in the State of Qatar.

These are: the mangrove *Avicennia marina, Acacia ehrenbergiana, A. tortilis, Ziziphus nummularia, Z. spina-christi*, the lianes *Cocculus pendulus* and *Ephedra foliata* (a gymnosperm). Besides the mangrove, which occupies the tidal and swampy muddy shorelines, the other species occupy deep rodats with relatively finer soils and more moisture retaining capacity. The alien tree species *Prosopis juliflora* is now naturalized.

The most dominant shrub is *Lycium shawii* (Awsaj, Ar.) which hardly reaches its maximum height due to extensive grazing by all livestock, as well as by the totally vegetarian desert lizard *Uromastyx microlepis*. All types of immigrant and resident birds feed on its fruits, which are small red berries locally known as Masaa (Ar.).

The most common family of flowering plants besides the grasses, legumes and composites is the Chenopodiaceae, which is represented by 22 species belonging to 16 genera mostly of halophytic taxa (*Salsola* with 5 species). Although the composites, legumes and grasses make up the largest species representation, most their genera are represented by one or two species each, except for few genera, e.g. *Launaea* (Compositae) and *Astragalus* (Fabaceae). Table (3) gives the number of genera related to the families with the highest species representation in the flora, and the number of species they comprise.

**Table 3**: Genera and species representation in the largest families of flowering plants in the flora of the State of Qatar.

| Class | Family | No. of Genera | Largest Genera | No. of Species |
|---|---|---|---|---|
| Dicotyledons | Compositae (Asteraceze) | 32 | *Launaea* | 5 |
| | Fabaceae | 18 | *Astragalus* | 7 |
| | Chenopodiaceae | 16 | *Salsola* | 5 |
| | Brassicaceae | 14 | *Sisymbrium* | 3 |
| | Caryophyllacea e | 9 | *Silene* | 3 |
| | Convolvulaceae | 2 | *Convolvulus* | 7 |
| Monocotyledons | Gramineae (Poaceae) | 43 | *Eragrostis* | 4 |

There is no area in the State of Qatar which is conserved, though there is a number of game reserves where wildlife is kept and feed is supplied.

Over the years many locals got involved in keeping large herds of domestic animals in pens in open areas [Izbas] in the State of Qatar. Although these herds are fed on imported and locally grown fodder, grazing natural vegetation is deemed necessary for their general health. Hence there has been a rising pressure on the natural plant cover and many species have been grazed to almost extinction. There are verbal reports on a number of species, which used to be good fodder plants, which disappeared.

Another present day activity, which brings a very adverse effect on biodiversity, in general, is the continuous conversion of natural habitats in the vicinity of large towns into residential areas by dumping building rubbish, leveling and covering by sand or earth. These leveled areas are later marked as future property sites. It has been observed in many areas in the State of Qatar that such disturbed areas are eventually colonized by two species: *Zygophyllum qatarense* and/or *Salsola imbricata*. Both species are widespread in towns, cities and the vicinity of the coastal area.

*Zygophyllum qatarense* is rapidly invading vast areas in the wild. There are no detailed studies on its autoecology, reproductive biology and economical potential if any. Because of its rapid invasion to these areas, attention should be focused on its study.

Many well-vegetated sabkhas have been eliminated in the past 10 years and many rodats face an ill-fate due to over-grazing by all kinds of herds. It is high time that those concerned with nature should consider protecting selected rodats and sabkhas around the country for the preservation of forms of biodiversity.

There are no species in Qatar among those included in the world lists of endangered species. However a number of species are subject to total disappearance from the flora of the State of Qatar if they continue to be exploited without any effort of conservation and/or introduction within the local agri–system. Among these are the favored wild edible species: *Glossonema edule* (Ar. Attar, Yarawa), which is eaten as unripe fruits; *Launaea capitata* (Ar. Hewa), the whole plant is collected and the rosette leaves are eaten as a salad. The desert truffles (*Termania* and *Tefrezia*), which is collected almost to extinction, so far no real effort is put into their possible cultivation as most other edible macro-fungi. Equally endangered are some local species of medicinal value in particular: *Halophyllum tuberculatum* (Ar. Sazab) and *Teucrium polium* (Ar. Yaad, Gaad).

Some species reported in the flora and are extremely rare and may face disappearance due to excessive over-grazing include: *Rhanterium epapposum* (Ar. Arfaj) a much favored plant by camels which forms pure stands in neighbouring Saudi Arabia, *Cullen plicatum*, an aromatic herb collected only once near Karaana, and *Koelpinia linearis* (Ar. Digan al Tais) recorded only once after a heavy rainy season but not seen ever since. Equally, the only Gymnosperm *Ephedra foliata* which is selectively grazed by an ever increasing number of camels.

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