

Flora of Gebel Uweinat and some neighbouring regions of Southwestern Egypt

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Flora of Gebel Uweinat and some neighbouring regions of Southwestern Egypt

LOUTFY BOULOS

This work is dedicated with love to my wife SOAD who managed to maintain her good temper and devotion to her husband and two sons throughout 24 years, especially during my long travels abroad and expeditions in the desert.

RÉSUMÉ

BOULOS, L. (1982). Flore du Djebel Uweinat et de quelques contrées voisines de l'Égypte du sud-ouest. *Candollea* 37: 257-276. En anglais, résumé français.

Les résultats botaniques de deux expéditions au Djebel Uweinat et dans quelques régions voisines de l'Égypte, du Soudan et de la Lybie, en 1968 et en 1978, sont présentés avec un commentaire écologique sur la variation des types de végétation. Une liste de 79 espèces arrangées alphabétiquement à l'intérieur de 32 familles, assorties de leur noms vernaculaires, a été établie sur la base des spécimens récoltés par l'auteur et de la littérature disponible sur le sujet. Les principales collections du Djebel Uweinat par l'auteur et d'autres collecteurs sont déposées dans les herbiers suivants: BR, CAI, F, FI, K, ULT.

ABSTRACT

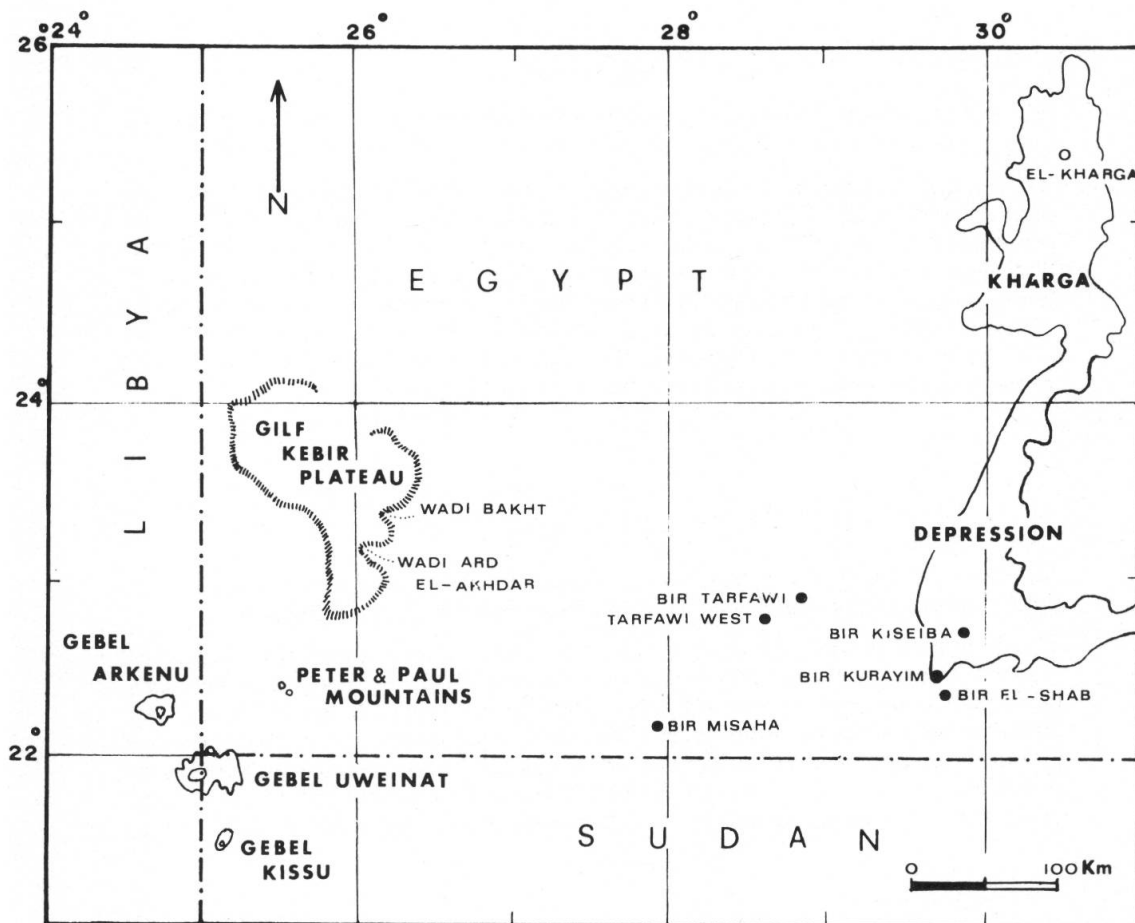
BOULOS, L. (1982). Flora of Gebel Uweinat and some neighbouring regions of Southwestern Egypt. *Candollea* 37: 257-276. In English, French abstract.

The botanical results of two expeditions to Gebel Uweinat and some adjacent regions in Egypt, Sudan and Libya in 1968 and 1978 are given together with ecological comments on the different vegetational types. A list of 79 species, alphabetically arranged after their 32 families, with vernacular names for some plants, is compiled after the specimens collected by the author and available published information. Major collections from Gebel Uweinat by the author and other collectors are deposited in the following herbaria: BR, CAI, F, FI, K, ULT.

History of botanical exploration of the area

Among the several expeditions to Gebel Uweinat, after it had been located by Hassanein Bey in 1923, only a few paid any attention to the study of its flora. This may also apply to the floristic investigation of Gilf Kebir, which was discovered by Prince Kemal el Din in 1925, and other remote areas in the southwestern desert of Egypt. The pioneer works by HASSANEIN BEY (1924) and Prince KEMAL EL DIN (1928) provided very little botanical information about the newly discovered Gebel Uweinat and Gilf Kebir plateau.

SHAW (1931), SHAW & HUTCHINSON (1931, 1934) gave the first accurate botanical information about Gebel Uweinat and Gilf Kebir, based on the collections made by Shaw during the two expeditions of Major R. A. Bagnold in 1929-1930 and 1932. HUTCHINSON (1933) gave a brief botanical account of the 1929-1930 expedition.



Map 1.

In 1933, the expedition of Marchesi to southern Cyrenaica reached Gebel Uweinat, where plant collections were made by Di Caporiacco. One year later, Mönsterin collected in Gebel Uweinat during the expedition of the Royal Geographical Society of Italy. Botanical results of both Italian expeditions in 1933 and 1934 were published by CORTI (1939) in which he identified and provided valuable information about 27 species from Uweinat.

The Trans-Saharan Belgian expedition of winter 1964-1965 passed by Uweinat. LÉONARD (1966) gave a brief account about the expedition and reported the presence of 25 different flowering plants from the foot of Gebel Uweinat, without giving their names.

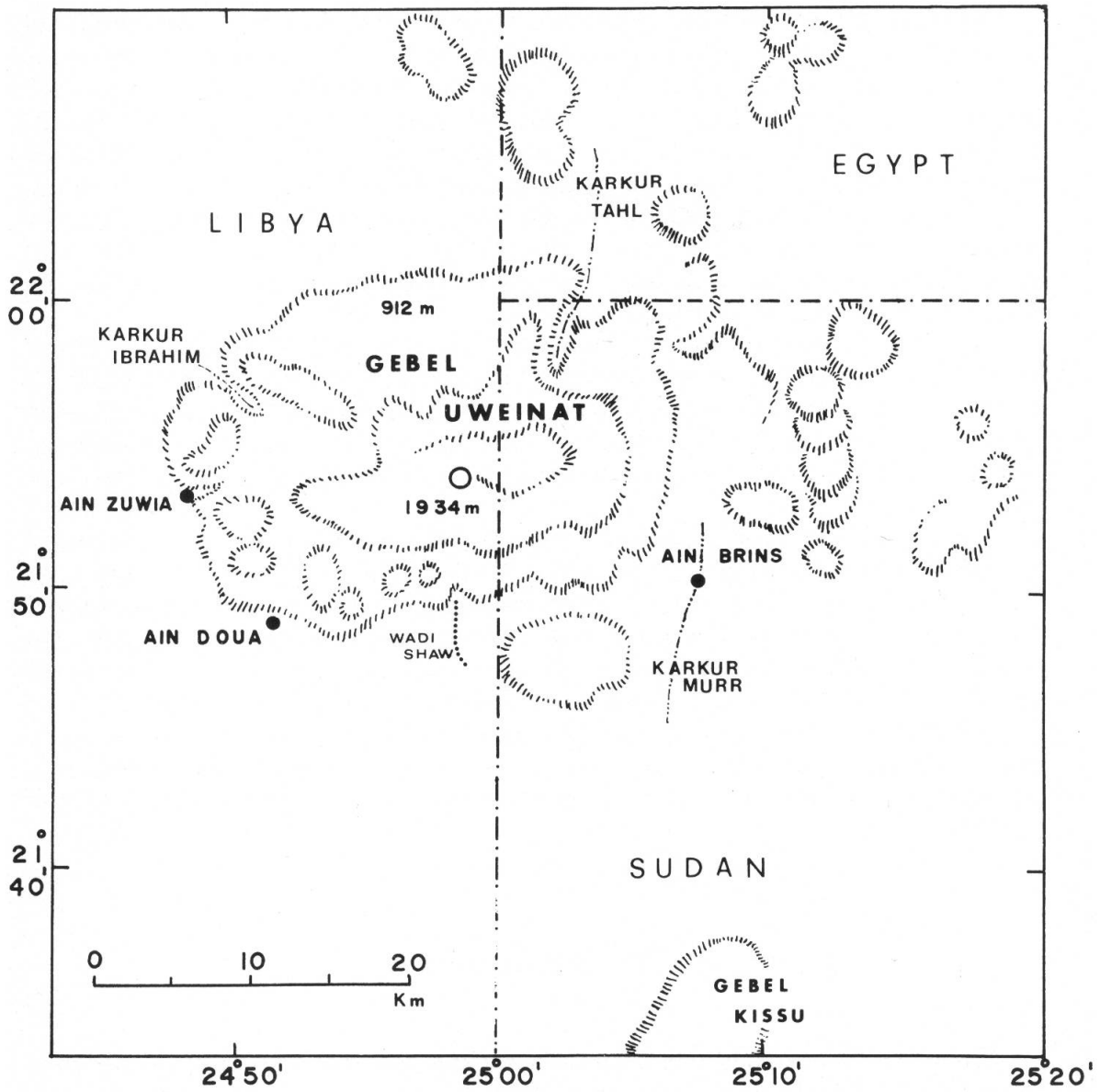
In 1967, the United States Naval Medical Research Unit Number Three (NAMRU-3, Cairo) visited Uweinat. OSBORN & KROMBEIN (1969) gave an account of its flora. Among other biological information, they provided a list of 55 plant species of which 45 were covered by the collections of Osborn. The extra 10 species were compiled from SHAW (1931), and SHAW & HUTCHINSON (1931, 1934).

From October 1968 to January 1969, a Belgian-Libyan expedition visited Uweinat. The Belgian group camped in Karkur Talh, with a small camp near Gilf Kebir. The present author, representing the University of Libya, joined the expedition for the first two months and camped independently near Ain Zuwia. The published results of the Belgian expedition included a chapter on the flora (LÉONARD, 1969). Another account on the flora and vegetation of Gebel Uweinat, based on the same expedition, was presented by LÉONARD (1971). In both papers, LÉONARD (1969 and 1971) described the vegetation, often citing the plants by their generic names without giving names of the species.

The present work

The botanical specimens collected during the two expeditions which I joined in 1968 and 1978 to Gebel Uweinat and some neighbouring regions (see map 1 and 2) comprise 165 and 32 numbers from both expeditions respectively. In some areas, where the plants were dry and no herbarium specimens could be preserved, notes were taken in the field and often dry vouchers were kept. Brief ecological comments are provided.

A list of 79 species, alphabetically arranged after their 32 families, is compiled from all available published information and herbarium specimens. Of these, 6 species (5 spontaneous and 1 cultivated) are not reported from Uweinat, but known from the southwestern desert of Egypt. Consequently we are left with 73 species from Uweinat, of which 7 are cultivated. Vernacular names of some plants, in Arabic and or "Tibw or Tibbu" which were provided by the guides during the 1968 and 1978 expeditions, are given in connection with the corresponding scientific names.



Map. 2.

The main collections from Gebel Uweinat and the neighbouring areas are deposited in the following herbaria: Jardin botanique national de Belgique (BR); Botany Department, Faculty of Science, Cairo University (CAI); Field Museum of Natural History, Chicago, Illinois (F); Istituto Botanico, Firenze (FI); Royal Botanic Gardens, Kew (K) and University of Libya (now Al Faateh University), Tripoli (ULT).

The vegetation

The scarceness of rain which may fall once every seven to ten years in Uweinat, and for longer intervals up to twenty years or more in Gilf Kebir and some other areas, may explain the extreme aridity of the southwestern desert of Egypt, a country with a few scattered small areas of vegetation, sometimes separated by hundreds of miles of sterile desert. The rain is not only erratic in terms of intervals but also in terms of quantity.

In our area, four vegetation types are recognized by the author (BOULOS *in* EL-BAZ & al., 1980).

Ephemeral vegetation

Ephemeral or annual plants appear after occasional rains, continue to grow and complete their life cycle in a period ranging from a fortnight up to one year, then dry up. The length of their life span usually depends on the amount of rain water available to the plants. These constitute the ephemeral vegetation. The seeds of ephemerals are known to be resistant to drought and heat prevailing in this and similar deserts, and may remain in soil for several decades until the next rain comes, then germinate again.

In the Gilf Kebir region, the dry remains of some plants suggest that certain perennials may behave as ephemerals, or potential annuals, in order to produce seeds in a shorter time, e.g. *Zilla spinosa*, *Trichodesma africanum* var. *abyssinicum* and *Citrullus colocynthis*. The term "potential annual" was proposed by HAINES (1951).

According to a NOAA satellite image, it was cloudy on 16-17 December 1977 over an area 5 km southeast of Peter and Paul mountains, some 50 km northeast of Gebel Uweinat. As our expedition on 20 October 1978 passed by a small wadi with sandy soil and trachyte boulders, some plants were still growing. The only species which was still rather green, bearing flowers and fruits, though showing some signs of senility, was *Fagonia arabica*, while *Stipagrostis plumosa* was almost dry; *Farsetia ramosissima* and *Trichodesma africanum* var. *abyssinicum* were perfectly dry. Considering that these plants have germinated after the rain of December 1977, ten months before we had seen them, it may be concluded that the perennial *Fagonia arabica* and *Trichodesma africanum* var. *abyssinicum* changed their growth form from perennials into potential annuals to meet these severe and unfavourable conditions of the environment. *Stipagrostis plumosa* and *Farsetia ramosissima* which are known to behave as annuals or perennials (cf. TÄCKHOLM, 1974), successfully acquired the annual habit producing their seeds which are now kept in the soil for the next unpredictable shower.

Ephemeral and perennial vegetation

Ephemeral and perennial plants occur mixed together in wadis and water catchments, a community entirely dependent on the rainfall, where no

perennial groundwater or any other permanent water supply is available. The difference between this and the previous category, where only ephemeral vegetation could occur, is the availability of additional moisture in the form of run-off producing a layer of temporary underground moisture, which is available to the root systems of perennial plants during their life time. In our case it is usually 3 to 4 years; this moisture unless replenished by further rainfall is soon depleted by the rapid evaporation. Again, the difference between this and the next category, where perennial vegetation occurs near wells, is the continuous supply of water from the wells which permits long-living trees to exist as well as smaller plants, irrespective of rain.

Ephemeral and perennial vegetation may be exemplified by the vegetation in some wadis of Gilf Kebir, e.g. Wadi Bakht and Wadi Ard El Akhdar. During our 1978 visit, the vegetation was quite desiccated. However, it was possible to identify the following species: *Panicum turgidum* (perennial), *Zilla spinosa* (perennial), *Stipagrostis plumosa* (perennial or annual), *Trichodesma africanum* var. *abyssinicum* (potential annual), *Anastatica hierochuntica* (annual).

Perennial vegetation near wells

The conspicuous perennial vegetation in the vicinity of wells comprises trees, shrubs and perennial herbs. Around the five wells (Bir Tarfawi, Tarfawi West, Bir Kiseiba, Bir El-Shab and Bir Kurayim) which we visited during our 1978 expedition, several species grow, covering small to large areas, depending on the abundance of water and its availability to the plants. The most luxuriant growth is certainly that at Bir Tarfawi, where palm trees of *Hyphaene thebaica* (dom palm) and *Phoenix dactylifera* (date palm) as well as *Tamarix nilotica* grow in dense groves. In a protected shaded area, under a date palm grove, *Juncus rigidus* grows in thick tufts up to 1.5 m high. Some of the date palm trees were still bearing rather good quality dates. Huge trunks of *Tamarix nilotica* trees were found lying on the ground, mixed with the debris of its leaves and branches, suggesting that *Tamarix* trees flourished in the not too distant past. This may also suggest that the ground water has become depleted and may no longer support large trees as it used to do a hundred to probably a few hundred years ago; the present living growth of *Tamarix nilotica* is in the form of shrubs and no large living trees were observed (see Figs. 7 and 8).

In the vicinity of other wells, *Tamarix nilotica* grows as a shrub forming sandy hummocks. At Bir Tarfawi West, these hummocks unite and form enormous crescent-shaped hills of pure stands.

A group of small shrubs of *Acacia ehrenbergiana*, about 1 m high, was recorded 25 km northwest of Bir Kiseiba, on a hummocky sand dune.

The herbaceous perennials are mainly grasses: *Sporobolus spicatus* grows around the wells, very close to the water or where the water level approaches the soil surface, in what would usually be saline soil. *Imperata cylindrica* and *Phragmites australis* grow near and around Bir Kiseiba and Bir Kurayim.

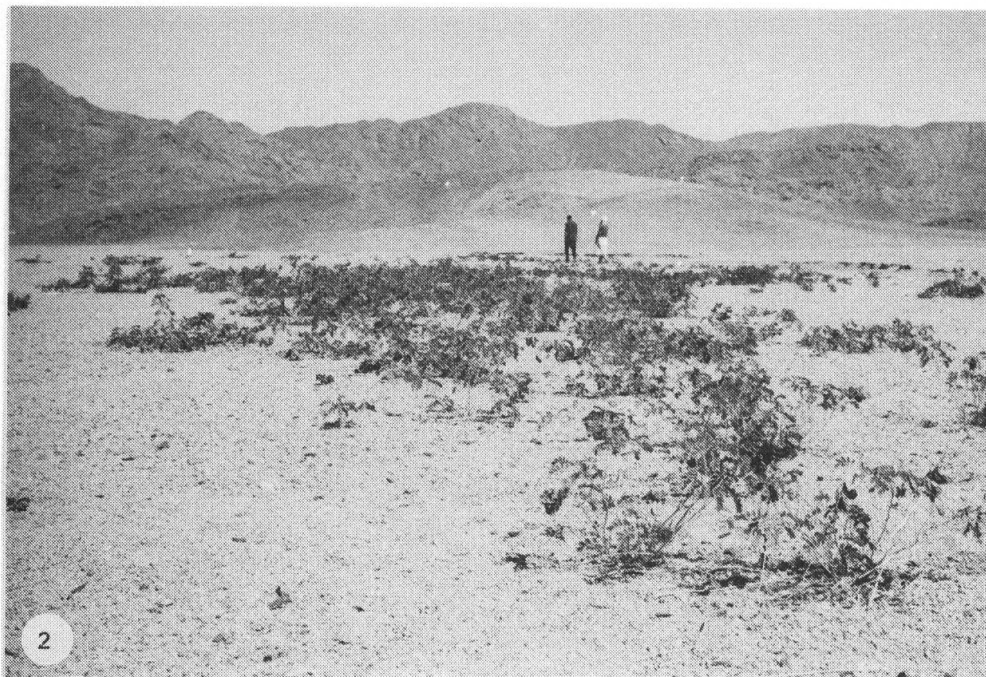


Fig. 1. — Dense growth of *Typha domingensis* (foreground) and *Imperata cylindrica* (background) around Ain Brins, Karkur Murr, Gebel Uweinat (photo L. Boulos, 27 October 1968).

Fig. 2. — Shrubs of *Cassia italica*, dominant in the gorge bed, Karkur Bu-Hleiga, affluent of Karkur Ibrahim, Gebel Uweinat (photo L. Boulos, 7 November 1968).

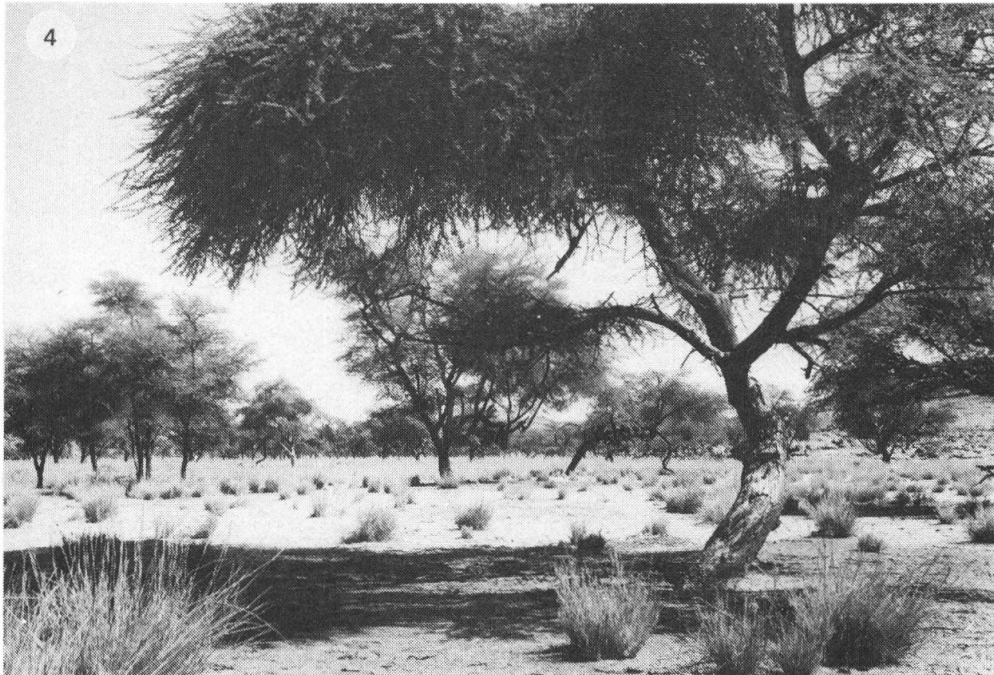
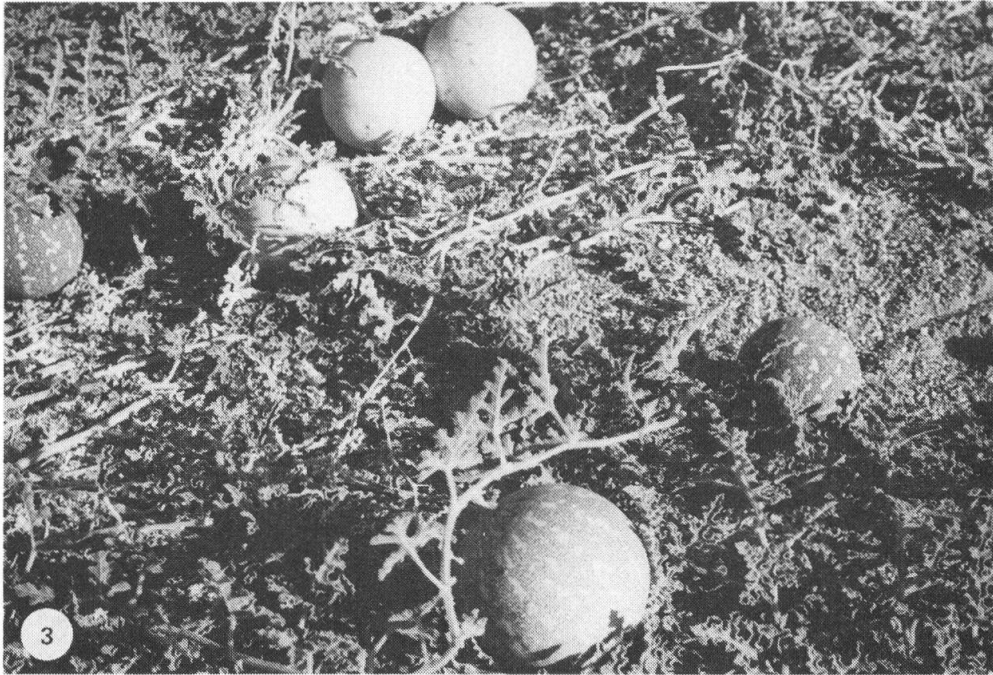


Fig. 3. — Vigorous growth of *Citrullus colocynthis*, covering a large area of the wadi bed, midway between Ain Zuwia and Karkur Ibrahim, Gebel Uweinat (photo L. Boulos, 24 October 1968).

Fig. 4. — Luxuriant growth of *Acacia raddiana* trees in Karkur Talh, Gebel Uweinat. Note the tufts of the perennial grass *Panicum turgidum* (photo L. Boulos, 28 October 1968).



Fig. 5. — Goats grazing at Karkur Talh, Gebel Uweinat. Compare vegetation with figure 4 (photo L. Boulos, 17 November 1968).

Fig. 6. — A small tree of *Ficus salicifolia* growing inbetween granite boulders at 850 m altitude, Karkur Abd El-Malek, affluent of Karkur Ibrahim, Gebel Uweinat (photo L. Boulos, 15 November 1968).



Fig. 7. — In the foreground huge trunks of *Tamarix nilotica* trees lying on the ground and mixed with debris of its leaves and branches. In the background living shrubs of *T. nilotica* and a grove of *Phoenix dactylifera* (date palm), Bir Tarfawi (photo L. Boulos, 27 September 1978).

Fig. 8. — A close up of some dead trunks of *Tamarix nilotica* trees in the foreground and a grove of *Phoenix dactylifera* (date palm) in the background, Bir Tarfawi (photo L. Boulos, 27 September 1978).

Desmostachya bipinnata was recorded by SHAW (1934: 282), but most probably a misidentification based on sterile specimens, and the plants in question may refer to *Imperata cylindrica*. Another perennial grass: *Stipagrostis vulnerans*, with stiff sharp spiny leaves, formed a pure stand extending over 1 km on the sand dunes near Bir El-Shab. *Alhagi graecorum*, a perennial leguminous shrublet, with spiny-tipped twigs and dull brown lomentoid fruits, was recorded from Bir Tarfawi and Bir Kurayim, covering extensive parts of the ground in the drier, or seemingly dry areas near the wells. It constitutes an excellent fodder, especially for camels.

Perennial vegetation in gorges

The perennial vegetation in the winding gorges (Karkurs) of Gebel Uweinat depend on ground water due to seepage. Occasional rains may feed the groundwater and allow ephemeral vegetation to appear shortly after showers.

The following vegetation types are recognized in the gorges.

1. *Vegetation near springs.* — This vegetation, which is restricted to the vicinity of springs within the gorges, may be compared with the perennial vegetation near wells previously described (type C). The difference between them is that the type "C" vegetation is oasis-like, lying within the open desert, in contrast with type "D" which is a closed wadi-like vegetation within a gorge. Ain Brins, at Karkur Murr provides an example of this vegetation (Fig. 1), where the following perennial water-loving plants grow near the springs: *Typha domingensis*, *Phragmites australis*, *Imperata cylindrica* and *Juncus rigidus*. The date palm, *Phoenix dactylifera* is also recorded; however, only small scattered trees occur. Some annuals grow on the muddy borders of the springs: *Eragrostis aegyptiaca*, *Polypogon monspeliensis* and *Portulaca oleracea*.

2. *Vegetation dominated by herbs and small shrubs.* — This type of vegetation (Figs. 2 and 3) is commonly met with in the gorges (Karkurs) of Gebel Uweinat. It comprises perennial herbaceous and small shrubby species, almost in the absence of trees. The following are the most characteristic: *Aerva javanica* var. *bovei*, *Cassia italica*, *Citrullus colocynthis*, *Pulicaria crispa*, *Crotalaria thebaica*, *Pergularia tomentosa*, *Cleome chrysantha*, *Cleome droserifolia* and *Fagonia thebaica*. One or few species may stretch over the greater part of a gorge. Toward the mouth of gorges, where they join the open desert, *Fagonia indica* and *Stipagrostis plumosa* are more frequent.

3. *Vegetation dominated by trees.* — Trees which characterize this vegetation are restricted to four species: *Acacia raddiana*, *A. ehrenbergiana*, *Maerua crassifolia* and *Ficus salicifolia*; the last three species also occur in shrubby forms within our area. Usually the two *Acacia* species grow together, and are associated with the perennial grass *Panicum turgidum*, e.g. in Karkur

Talh (Figs. 4 and 5, Talh is the local vernacular name of *A. raddiana*). The conspicuous element of the vegetation is mainly due to the luxuriant growth of *A. raddiana*, which forms together with the less common *A. ehrenbergiana* an open thorny forest, with dense tufts of *Panicum turgidum* covering a high percentage of the Karkur bed. In Karkur Abd El-Malek, however, *Acacia* trees are almost absent, while *Maerua crassifolia* trees are abundant, and *Ficus salicifolia* trees start to appear at about 850 m of altitude.

It is worthwhile to mention here that the record of *Olea europaea* cited by SIDDIQI (1977) from Gebel Uweinat is erroneous since it is based on two cultivated specimens which I collected (*Boulos* 3165 and 3183) from Kufra and Tazerbo Oases in Libya which are located some 320 and 650 km NW. of Uweinat respectively!

4. *Vegetation of higher altitudes.* — According to LÉONARD (1971), *Ochradenus baccatus* occurs between 900 and 1400 m, while *Lavandula*, *Salvia*, *Heliotropium* and *Monsonia* occur between 1250 and 1850 m. Some of the last four species are considered by him as Mediterranean elements.

List of investigated areas during two expeditions in 1968 and 1978,

with collecting numbers of the author and dates of collections

Ain Zuwia, near the Libyan Police Station, Gebel Uweinat, 20 October 1968, *Boulos* 3245-3258.

Wadi Billy, ca. 12 km west of Gebel Uweinat, facing Ain Zuwia, 21 October 1968, *Boulos* 3259-3261.

Karkur Talh, Gebel Uweinat, 22 October 1968, *Boulos* 3262-3263.

Wadi Ain Ghazal, ca. 3 km south of Ain Ghazal (also called Ain Daw, Ain Kazit), Gebel Uweinat, 23 October 1968, *Boulos* 3264-3269.

Ain Zuwia, Libyan Police Station, Gebel Uweinat, 24 October 1968, *Boulos* 3270.

Wadi, midway between Ain Zuwia and Karkur Ibrahim, Gebel Uweinat, 24 October 1968, *Boulos* 3271-3276.

Wadi Shaw, ca. 30 km S.W. of Ain Zuwia, near the Sudanese-Libyan frontier, 26 October 1968, *Boulos* 3277-3285.

Karkur Murr and Ain Brins, 27 October 1968, *Boulos* 3286-3311.

Ca. 7 km southeast of Karkur Talh, 27 October 1968, *Boulos* 3312.

Karkur Talh, 28 October 1968, *Boulos* 3313-3326. The following species are recorded but not collected: *Acacia ehrenbergiana*, *A. raddiana*, *Pergularia tomentosa* and *Panicum turgidum*.

Gebel Kissu (Sudan), 29 October 1968, *Boulos* 3327-3328.

- Karkur Ibrahim, 30 October 1968, *Boulos* 3329-3344.
- Karkur Bu-Hleiga, affluent of Karkur Ibrahim, 30 October 1968, *Boulos* 3345-3349.
- Ain Zuwia, main source near the natural reservoir, 6 Novembre 1968, *Boulos* 3350-3353.
- Karkur Ibrahim, upstream, 7 November 1968, *Boulos* 3354-3361.
- Karkur Bu-Hleiga, affluent of Karkur Ibrahim, 7 November 1968, *Boulos* 3362-3370.
- Wadi Shaw, ca. 25 km southwest of Ain Zuwia, near the Sudanese-Libyan frontier, 9 November 1968, *Boulos* 3371-3384. The following species are recorded but not collected: *Pergularia tomentosa*, *Acacia raddiana*, *A. ehrenbergiana* and *Citrullus colocynthis*.
- Wadi Arkenu, near Gebel Arkenu, 10 November 1968, *Boulos* 3385-3388. The wadi mouth is facing south, Where an old tree of *Maerua crassifolia* stands as a land mark. The name of Gebel Arkenu is derived from the vernacular local "Tibw" name of the tree. The wadi extends over 4 km, most of which is obviously suffering of drought.
- Wadi Ghazal, ca. 30 km west of Ain Zuwia, 12 November 1968, *Boulos* 3389. *Acacia ehrenbergiana* forms the conspicuous part of the vegetation in the wadi. Flowers bright yellow, fruits thin, dark brown. The wadi was described by the guides to be rich in gazelles, hence its name. However, I did not see any, only one desert fox. The pods of *A. ehrenbergiana* and *A. tortilis* are known to be among the most favoured foods of the desert gazelles.
- Karkur Abd El-Malek, affluent of Karkur Ibrahim, 15 November 1968, *Boulos* 3390-3399. The downstream of Karkur Abd El-Malek is rather narrow if compared with the wide downstream of Karkur Ibrahim where they meet. Karkur Abd El-Malek is characterized by the abundance of *Maerua crassifolia* trees and shrubs, and almost the complete absence of both *Acacia raddiana* and *A. ehrenbergiana* which are quite abundant in the neighbouring Karkur Ibrahim. In the downstream of Karkur Abd El-Malek, the following species are also common: *Aerva javanica* var. *bovei*, *Cleome droserifolia* and *C. chrysantha*; the latter *Cleome* species is more frequent than the former. *Pergularia tomentosa* and *Fagonia indica* are fairly common. Going upstream, the granite rocks in the karkur bed are washed in contrast with the rocks on its sides which are obviously darker in colour. One *Acacia raddiana* toward the upstream was observed. At about 850 m of altitude, *Ficus salicifolia* trees start to appear: eight large and two small were seen (Fig. 6). In several protected parts of the gorge, *Hyoscyamus boveanus* was recorded. *Fagonia thebaica* was rather common, while only a few *Heliotropium bacciferum* shrublets were seen. In the middle and toward the upstream part of the gorge, *Cleome drose-*

rifolia becomes fairly common. Dry plants of *Forskhaolea tenacissima* were also observed.

Karkur Talh, 17 November 1968, *Boulos* 3400-3408. *Heliotropium bacciferum* is recorded but not collected.

Ca. 13 km southwest of Karkur Talh, 18 November 1968, *Boulos* 3409.

Tarfawi West, 27 September 1978, *Boulos* 12 523-12 524.

Bir Tarfawi, 27 September 1978, *Boulos* 12 525-12 529.

Bir Kiseiba, 28 September 1978, *Boulos* 12 530-12 533.

25 km northwest of Bir Kiseiba, 28 September 1978, *Boulos* 12 534.

El-Domat, near Bir Kiseiba, 28 September 1978, *Boulos* 12 535. The following species were recorded but not collected: *Phoenix dactylifera*, *Hyphaene thebaica* and *Sporobolus spicatus*.

North of Bir El-Shab, 28 September 1978, *Boulos* 12 536.

Bir Kurayim, 28 September 1978, *Boulos* 12 537-12 541.

5 km southeast of Peter and Paul mountains, ca. 50 km northeast of Gebel Uweinat, in sandy soil with trachyte boulders, 2 October 1978, *Boulos* 12 542-12 544. *Trichodesma africanum* var. *abyssinicum* also observed. According to NOAA satellite image, it was cloudy on 16-17 December 1977 over the area.

Tributary of Karkur Talh, Gebel Uweinat, sandstone, slightly ferrogenous dyke of trachyte, 3 October 1978, *Boulos* 12 545-12 552.

Karkur Talh, 3 October 1978, *Boulos* 12 553. Numerous tufts of *Panicum turgidum* forming the cover on the gorge bed, grazed by camels, goats, gazelles and donkeys. Three feral donkeys were observed. The dominant trees in the gorge are: *Acacia raddiana* which forms a luxuriant growth including many trees, *A. ehrenbergiana* is less common. Other species observed are: *Pulicaria undulata*, *Citrullus colocynthis*, *Crotalaria thebaica* and *Fagonia indica*.

*List of plants alphabetically arranged after family names, with synonyms, vernacular names, numbers or references; species marked with an asterisk * are not recorded from Gebel Uweinat*

AIZOACEAE

Limeum obovatum Vicary = *L. indicum* Stocks ex T. Anders. — 3378.

AMARANTHACEAE

Aerva javanica (Burm. fil.) Juss. ex J. A. Schultes, var. *bovei* Webb, vernacular name: Arabic: Ehmim — 3265, 3274, 3283, 3289, 3338, 3352, 3354, 3374, 3386, 3403, 12 552.

ASCLEPIADACEAE

Pergularia tomentosa L. — 3266, 3281, 3342, 3345, 3357, 3368, 3396.

BORAGINACEAE

Heliotropium bacciferum Forssk. = *H. undulatum* Vahl, *H. ramosissimum* (Lehm.) Sieb. ex DC. — 3299, 3316, 3333, 3390.

Trichodesma africanum (L.) R. Br. var. *abyssinicum* Brand, vernacular name: Tibw: Yayabu — 3271, 3304, 3335.

CAPPARACEAE

Maerua crassifolia Forssk., vernacular names: Tibw: Arkenu; Arabic: Sarkh — 3260, 3323, 3393.

CISTACEAE

Helianthemum cf. *lippii* (L.) Pers., recorded by LEONARD (1969): as *Helianthemum* with no mention of the species. According to TÄCKHOLM (1974): 360-364, our species is probably *H. lippii*.

CLEOMACEAE

Cleome chrysantha Decne., vernacular name: Tibw: Illidoudi — 3273, 3279, 3305, 3318, 3340, 3348, 3358, 3366, 3382, 12 554.

Cleome droserifolia (Forssk.) Del., vernacular names: Tibw: Bobei; Arabic: Theiha — 3264, 3298, 3330, 3401.

COMPOSITAE

Pulicaria crispa (Forssk.) C. B. Clarke = *Francoeria crispa* (Forssk.) Cass., vernacular name: Tibw: Shini — 3254, 3275, 3301, 3336.

Pulicaria undulata (L.) Kostel., vernacular names: Tibw: Taganasu; Arabic: Rabal — 3317, 3331, 3394, 3407, 12 551.

CONVOLVULACEAE

Convolvulus austro-aegyptiacus Abdallah & Sa'ad — 3291.

Convolvulus cancerianus Abdallah & Sa'ad, recorded by OSBORN & KROMBEIN (1969): 8.

Convolvulus prostratus Forssk., recorded by OSBORN & KROMBEIN (1969): 8.

CRUCIFERAE

Anastatica hierochuntica L., dry specimens from Wadi Ard el Akhdar, Gilf Kebir, 4 October 1978.

Diceratella sahariana R. Corti, described from Gebel Uweinat, CORTI (1939): ccxii.

Farsetia ramosissima Hochst., 12 544, also recorded by OSBORN & KROMBEIN (1969): 9.

Morettia philaena (Del.) DC., vernacular name: Arabic: Taghar — 12 546.

Schouwia thebaica Webb, recorded by LÉONARD (1969): 115.

CUCURBITACEAE

Citrillus colocynthis (L.) Schrad., vernacular names: Tibw: Abur (fruits), Ubruzi (whole plant); Arabic: Handal — 3246, 3276, 3280, 3296, 3326, 3343, 3347, 3359, 3365, 3400, 12 549.

Citrullus lanatus (Thunb.) Mansfeld = *C. vulgaris* Schrad. (cultivated) — 3250.

EUPHORBIACEAE

Euphorbia granulata Forssk. — 3319, 3334, 3399.

GERANIACEAE

Monsonia nivea (Decne.) Decne. ex Webb, recorded by LÉONARD (1969): 115, as *Monsonia* with no mention of the species. According to TÄCKHOLM (1974): 299-300, *Monsonia nivea* is the only species that would possibly occur in our area.

GRAMINEAE

Aristida funiculata Trin. & Rupr., recorded by OSBORN & KROMBEIN (1969): 8.

Aristida mutabilis Trin. & Rupr. = *A. meccana* Hochst. — 3363, 3372, 3398.

Cynodon dactylon (L.) Pers. — 3270.

?*Desmostachya bipinnata* (L.) Stapf, recorded by SHAW (1934): 282, but most probably a misidentification, and the plant in question may refer to *Imperata cylindrica*; both species are difficult to separate if sterile.

Eragrostis aegyptiaca (Willd.) Del. — 3310.

Eremopogon cf. *foveolatus* (Del.) Stapf = *Andropogon* cf. *foveolatus* Del., recorded by CORTI (1939): ccvi.

- Imperata cylindrica* (L.) Beauv., vernacular names: Tibw: Uhri; Arabic: Halfa — 3287, 12 533, 12 540.
- Panicum turgidum* Forssk., vernacular names: Tibw: Goushi; Arabic: Tammam — 3262, 3297, 3376, 3405, 12 548, 12 553.
- Phragmites australis* (Cav.) Trin. ex Steud. = *Ph. communis* (L.) Trin. — 3307, 3350, 12 541.
- Polypogon monspeliensis* (L.) Desf. — 3308.
- **Sorghum bicolor* (L.) Moench (cultivated) — 12 524.
- Sporobolus spicatus* (Vahl) Kunth — 3248, 12 529, 12 531, 12 538.
- Stipagrostis plumosa* (L.) Munro ex T. Anders. — 3293, 3380, 12 543.
- **Stipagrostis vulnerans* (Trin. & Rupr.) de Winter — 12 536.
- Stipagrostis zittelii* (Aschers.) de Winter, vernacular names: Tibw: Mali; Arabic: Nesha — 3312, 3402.

JUNCACEAE

- Juncus rigidus* Desf. = *J. arabicus* (Aschers. & Buch.) Adams, vernacular names: Tibw: Kordeih; Arabic: Dees — 3288, 12 525.
- Juncus subulatus*, recorded by OSBORN & KROMBEIN (1969): 10.

LABIATAE

- Lavandula stricta* Del. = *L. coronopifolia* Poir., recorded by SHAW (1934): 282, 288; CORTI (1939): ccxviii; OSBORN & KROMBEIN (1969): 7.
- Ocimum basilicum* L. (cultivated) — 3252.
- Salvia* cf. *lanigera* Poir., recorded by LÉONARD (1969): 114, as *Salvia* with no mention of the species. According to TÄCKHOLM (1974): 461-464, our species is most probably *S. lanigera*.

LEGUMINOSAE

- Acacia ehrenbergiana* Hayne = *A. flava*, vernacular names: Tibw: Idri; Arabic: Shelen — 3259, 3282, 3388, 3389, 3406, 12 534.
- Acacia nilotica* (L.) Willd. ex Del., subsp. *adansonii* (Guill. & Perr.) Brenan (cultivated) — 3247.
- Acacia raddiana* Savi = *A. tortilis* (Forssk.) Hayne, subsp. *raddiana* (Savi) Brenan, vernacular names: Tibw: Tihi; Arabic: Talh, Sayyal — 3261, 3263, 3268, 3284, 3303, 3351, 3385, 12 550.
- **Alhagi graecorum* Boiss. = *A. maurorum* Medic., pro parte, nomen confusum — 12 528, 12 539.

Argyrolobium saharae Pomel, recorded by OSBORN & KROMBEIN (1969): 8.

Astragalus vogelii (Webb) Bornm. — 3256.

Cassia italica (Mill.) Lam. ex Steud. — 3267, 3272, 3278, 3295, 3322, 3328, 3344, 3346, 3355, 3370, 3373, 3404.

Crotalaria thebaica (Del.) DC., vernacular names: Tibw: Tagar; Arabic: Kitkat — 3285, 3294, 3325, 3327, 12 545.

Indigofera arenaria A. Rich. — 3362, 3381.

Indigofera sessiliflora DC. — 3383.

Lotononis platycarpa (Viv.) Pichi-Sermolli, recorded by SHAW (1934): 282.

Parkinsonia aculeata L. (cultivated) — 3249.

MALVACEAE

Hibiscus esculentus L. (cultivated) — 3251.

MORACEAE

Ficus salicifolia Vahl — 3392.

NYCTAGINACEAE

Boerhavia diffusa L. var. *viscosa* (Choisy) Cuf., recorded by OSBORN & KROMBEIN (1969): 10.

Boerhavia diandra L. = *B. vulvariifolia* Poir., vernacular name: Tibw: Arke — 3314, 3332, 3367.

OROBANCHACEAE

Cistanche phelypaea (L.) Cout., vernacular name: Tibw: Barru — 3321, 3360.

PALMAE

**Hyphaene thebaica* (L.) Mart. — 12 530.

Phoenix dactylifera L. — 3302, 12 527, 12 532.

PORTULACACEAE

Portulaca oleracea L. — 3258, 3300.

PRIMULACEAE

Samolus valerandi L., recorded by OSBORN & KROMBEIN (1969): 8.

RESEDACEAE

Ochradenus baccatus Del., recorded by LÉONARD (1969): 116.

SALVADORACEAE

Salvadora persica L., recorded by CORTI (1939): ccxvi.

SOLANACEAE

Hyoscyamus boveanus (Dunal) Aschers. & Schweinf. — 3391.

Lycopersicum esculentum Mill. (cultivated) — 3255.

Nicotiana rustica L. (cultivated), vernacular name: Tibw: Taba (obviously from the French word tabac) — 3257, 3309.

TAMARICACEAE

**Tamarix nilotica* (Ehrenb.) Bunge — 12 523, 12 526, 12 535, 12 537.

TILIACEAE

Corchorus depressus (L.) Christens, vernacular name: Tibw: Arkeih — 3290, 3324, 3341.

Corchorus olitorius L. — 3253.

TYPHACEAE

Typha domingensis Pers. = *T. australis* Schum. & Thonn., vernacular name: Tibw: Ugin — 3286, 3353.

URTICACEAE

Forskhaolea tenacissima L., vernacular name: Tibw: Bedishru — 3306, 3315, 3329.

ZYGOPHYLLACEAE

Fagonia arabica L. — 12 542, also recorded by OSBORN & KROMBEIN (1969): 8.

Fagonia bruguieri DC., recorded from Uweinat, 29 October 1968, Léonard 4797 (CAI!).

Fagonia indica Burm. fil., vernacular names: Tibw: Bebiey; Arabic: Tleiha, Shkei'a — 3277, 3292, 3313, 3339, 3349, 3356, 3369, 3371, 3397, 3408, 12 547.

Fagonia thebaica Boiss. — 3377, 3387, 3395, 3409.

Tribulus mollis Ehrenb. ex Schweinf. = *T. ochroleucus* Maire ex Ozenda & Quézel = *T. macropterus* Boiss., var. *ochroleucus* Maire, vernacular name: Tibw: Yinnami — 3245, 3320, 3337, 3364, 3379.

Tribulus terrestris L. — 3361.

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