Honey Desert Plants *of* Egypt's Wadi El Gemal National Park

Abu Ghosoun Community Development Association (AG-CDA) is a grassroots NGO located in southern Egypt, near the Red Sea, within the Wadi El Gemal National Park. Founded by the youth of the Ababda tribe in Abu Ghosoun Village, AG-CDA is dedicated to key areas including environmental conservation, environmental economics, social and community development, and tourism. The organization's mission is to empower the local Ababda community by creating employment opportunities, building assets, and improving overall living standards.

A cornerstone of AG-CDA's initiatives is the Beekeeping Project, which began in April 2019 and continues to this day. This project aims to introduce the Ababda community to beekeeping and honey production, serving both as an economic growth driver and a means of enhancing the ecological resilience of the Wadi El Gemal National Park. Bees play a crucial role in pollination, which supports the region's biodiversity and the interconnected ecosystems that depend on it. By facilitating natural pollination processes, the project helps maintain the park's ecosystem health, increases biomass, and supports the diverse fauna that relies on these plants.

Thanks to the involvement of both international and local experts, the project provides holistic training and technical support to young Ababda beekeepers. Employing a nomadic management approach, the colonies are moved in search of desert flowers and those along the Red Sea coast to produce

high-quality, rare, and precious honeys. These include *Acacia tortilis* and *Acacia raddiana* honey, known for its warm caramel aroma; multifloral honey from post-rainfall annual flora, with its warm caramel flavor and herbal notes; and the distinct *Avicennia marina* honey from coastal mangroves, characterized by its slightly spicy taste.

Let's discover some of the flowers visited by the bees in the Wadi El Gemal National Park!

Cover: AG-CDA Apiary site under *Acacia tortilis* subsp. *tortilis*
Page 2: : apiary work by AG-CDA ababda women
Opposite page: providing water for bees, south of Abu Ghosoun
Below: AG-CDA beekeeping team with beekeeping technicians Filomena Montemurro and María José Pastor Rodríguez

Bibliography: Mahmoud, T. (2010). Desert plants of Egypt's Wadi El Gemal National Park. The American University in Cairo Press
Springuel, I. (2006). The Desert Garden: A Practical Guide. The American University in Cairo Press.

Apiaries

In Wadi El Gemal, apiaries are often placed under wooden structures with roofs made of woven leaves. These structures serve a dual purpose: they provide shade to protect the bees from the harsh sun and act as a barrier against animals such as camels, sheep, and other livestock. This setup prevents the animals from intruding into the area and drinking from the bees' water troughs.

Opposite page clockwise from top left: Apiary training, Evaluation of colony nutritional status, Drinking stations crafted from traditional ababda materials, Wax recovery and processing, Anti-varroa organic treatment

Below: Shading structure to protect the apiary's water supply from camels and other livestock.

Zygophyllum coccineum

L., 1753 (Zygophyllaceae)

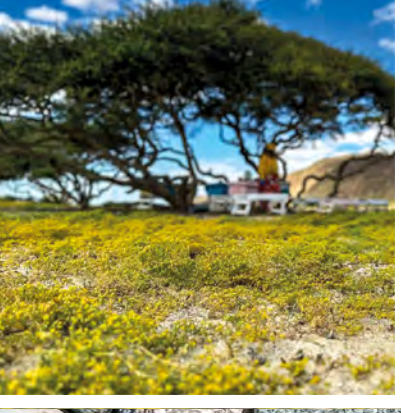
Common local name: (Bawwal) بوال

Flowering period: after rainfall, observed in February 2022

Description: a succulent undershrub, up to 75 cm high. Two leaflets, over 10 mm long, cylindrical, bright green to yellowish green, fleshy and carried on a long fleshy petiole. Flowers white. Capsule five-valved, about 1 cm long, with obtuse apex. Leaflets and sometimes petioles dropped under severe dry conditions (reducing the transpiring surface).

Importance and use: local use to enhance appetite. Modern studies indicate that it may be used as anthelmintic, diuretic, and for flatulent colic. Zygophyllin and Quinovic acid, which exhibit anti-inflammatory activity, have also been isolated from this plant.

Ecology and distribution: very common in the limestone wadis of the eastern desert. Recorded all over the Park coast and deep into Wadi El Gemal, al-Ghadir, Umm al-”Abas, and Abu Ghusun.



Zygophyllum simplex

L., 1767 (Zygophyllaceae)

Common local name: (Garmal) قرمل

Flowering period: after rainfall, observed in February 2023 and February 2024

Description: an annual prostrate herb, glabrous, and much-branched. Stem and branches pale-green or purplish, minutely striated. Leaves succulent, simple, sessile, oblong-cylindric, and with stipules. Flowers yellow, fading to white. Seeds oblong, enclosed in five-seeded capsules.

Importance and use: grazing. No local medicinal use. In other regions, infusions of leaves and seeds are applied to the eyes in cases of ophthalmia and leucoma. Seeds are anthelmintic, and used as food by nomads.

Ecology and distribution: very common in sandy, rocky, and saline habitats. Recorded in all wadis after the rainy season.

Curiosity: the flowering of Zygophyllum species in valleys that usually receive winter rains from November to January can be so intense that it transforms the landscape into a blooming meadow. Pollen analysis of honey produced in these rain-blessed valleys indicates that the honey is predominantly foraged from Zygophyllum.

Zilla spinosa

(L.) Prantl, 1891 (Crucifera)

Common English name: Spiny Zilla

Common local name: (Bisilla) بسلة

Flowering period: after rainfall, observed in February 2022, 2023 and 2024

Description: a perennial shrub up to 1 m high. Grows in dome-like clusters, and can stay green for several years after rain. Branches have many strong spines. Flowers pinkish-purple, sometimes pale mauve. Fruits are nutley-shaped.

Importance and use: : Zilla and Acacia are considered the most important grazing plants. Also important for wild animals like gazelle, wild rabbits, and Nubian ibex. Used as firewood when dry. Used medicinally in other regions to treat urinary tract diseases. Modern studies demonstrate that *Z. spinosa* contains some kinds of saponin and gums.

Ecology and distribution: Zilla is a genus specific to the Saharo-Arabian region. The most common plant in the Park. Recorded in all wadis.

Curiosity: In hyper-arid environments like Wadi El Gemal National Park, some plants survive by maintaining a small, living section at the base of the stem while the rest of the plant desiccates during extreme drought. When rain occurs, the plant regenerates from this preserved part, ensuring survival in harsh conditions.

Pulicaria undulata subsp. *undulata*

(L.) Mey, 1831 (Compositae)

Common English name: Crisp-leaved fleabane

Common local name: (Jitya) جيتيا

Flowering period: after rainfall, observed from february to may 2023 and 2024

Description: a low perennial shrub, often cushion-shaped, up to 60 cm high. Much-branched, the juvenile branches are densely white-appressed and wooly. Leaves oblong, sessile, with undulate margins (hence the name, undulata). Flowers yellow, in terminal cymes forming capitula (enlarged and rounded heads).

Importance and use: grazing, especially when alternatives are rare. Fumes from burning are used to treat measles and repel insects. Aerial parts contain essential oils that have a characteristic aroma and have exhibited antibacterial activities.

Ecology and distribution: grows in desert wadis, sandy and alluvial habitats. Recorded in Wadi El Gemal, Hafafit, and Abu Ghusun.

Pulicaria incisa

(Lam.) DC., 1836 (Compositae)

Common local name: (Rabul) ربل or (Shay al-jabal) شاى الجبل

Flowering period: after rainfall, observed on may 2023 and 2024

Description: a short-lived, perennial herb. Much-branched, wooly. Stem erect, branched mainly from the base. Strongly undulate and dentate leaves. Flowers yellow, forming solitary capitula, or a few together, in open cymose.

Importance and use: grazing. It has an aromatic scent and a tisane is brewed from it (in Arabic Shay al-jalab means “tea of the mountain”). It is a stimulant and anti-flatulent. Recently, bioactive lipids and antioxidants have been isolated from it, and it is now sought by the pharmaceutical industry for use as a traditional herbal tea.

Ecology and distribution: Grows in desert wadis, dandy and alluvial habitats. Common in the Park. Recorded in Wadi El Gemal and Abu Ghusun, and in Wadi al-Abyad it appears as a green wooly mat.

Lycium shawii

Roem. and Schult., 1819 (Solanacea)

Common English name: Desert thorn

Common local name: (Sahanun) سهانون

Flowering period: after rainfall, observed from January to March 2024

Description: a rounded, profusely spiny shrub. Shoots short, with terminal spine and clusters of leaves and one flower. Pale-violet flowers and orange-red fruits. Often cropped into stunted shapes by domestic animals; the only specimens that thrive are those that grow between the protecting branches of the Acacia. Interestingly, it shows very fast growth after the rainy season.

Importance and use: an important grazing plant, but shepherds are careful to avoid certain times when it becomes lethal for goats, especially at the beginning of branching after rain. In Tanzania the roots are boiled and the decoction used to treat sores in the mouth; in Somalia and Kenya it is used to treat coughs. The decoction is applied externally to relieve backache and to wash polio patients; cures tick fever in livestock.

Ecology and distribution: grows in stony desert and wadis. Recorded all over the Park but more common in Abu Ghusun and Wadi El Gemal.

Limonium axillare

Forssk.) Kuntze, 1891 (Plumbaginaceae)

Common English name: sea lavender

Common local name: (Shalili) شليل

Flowering period: April - May

Description: a low shrub with erect stem. Old branches are usually covered with the basal part of dead leaves. Leaves are oblanceolate, coriaceous, and glabrous. A rose-purplish inflorescence.

Importance and use: decoction of the root bark used locally for diabetes. Elsewhere, as in the United Arab Emirates, its antibacterial and antifungal properties are used to treat wounds and inflammation.

Ecology and distribution: preferring a saline habitat, it is abundant along the coast of the National Park and in desert depressions, as in the Wadi El Gemal delta, Sharm al-Luli, and Umm al-”Abas.

Avicennia Marina

(Forssk.) Vierh., 1907 (Avicenniaceae)

Common English name: Gray mangrove

Common local name: (Shura) شورى or (Manjaruf) منجروف

Flowering period: it has a long flowering period. The first flowers can be observed as early as February and continue to appear until the end of August, but the peak of flowering occurs in July and August.

Description: an evergreen perennial plant. Bark gray and lightly fissured. Extensive root system: many respiratory roots (pneumatophores), covered with lenticels. Leaves opposite, ovate with an acute apex, glossy green above, the lower surface covered with white tomentose. Salt is secreted from the lower surface. Flowers are orange. Fruits are usually singles and compressed.

Importance and use: much is written about its importance. In summary, mangrove swamps serve as valuable nursery areas for several species of fish and invertebrates. They also provide the sea with large amounts of essential dissolved organic carbon. They protect shorelines from erosion and offer nesting and resting areas for birds. Locals use them as forage for camels. Honey is collected from bees that feed on mangrove flower nectar.

Ecology and distribution: grows in the intertidal zone on the shores of estuaries. One of the few green plants that can survive with their roots in salt water and leaves in the air. Recorded at 9 sites, but mostly in Hamata, Wadi El Gemal Island, and Hirtway.

Curiosity: The Gray mangrove is intensely foraged by bees, which manage to produce a monofloral honey. It is dark in color, not very sweet, featuring slight salty notes, and warm, caramelized, and spicy aromas reminiscent of licorice.

Balanites aegyptiaca

(L.) Delile, 1814 (Balanitaceae)

Common English name: Desert date, Egyptian balsam

Common local name: (Higlig) هجليج, (Lalub) للالوُبْ, (Balah al-sukkar) بلح السكر

Flowering period: July - August

Description: One of the most common but neglected wild plant species of the drylands. An evergreen spiny tree up to 8 m high. Young stems and spines are grayish-green, becoming light brown. Leaves often glabrescent, subsessile, or with a petiole and leathery. Flowers on spineless branches and yellowish or blue-green. Fruit is date-like, elongating in early stages, becoming ovoid and yellow at ripening.

Importance and uses: Known for its many uses, such as grazing, fuel wood, timber, and so on. The wood is hard, durable, and worked easily; and is used for wooden spoons, pestles, mortars, handles and camel saddles. Fruit is edible; main local use of fruits as antidiabetic. Studies have revealed additional uses such as pesticide and antihelminthic. Active compounds are saponins. In some regions, seeds are crushed to produce cooking oil.

Ecology and distribution: Common in sandy and stony soils. Wadi El Gemal is characterized by rich stands of *B. aegyptiaca*. Common also in Durunkat, Hafafit.

Acacia tortilis subsp. *tortilis*

(Forssk.) Hayne, Getreue Darstell. Gew. 1827 (Leguminosa)

Common English name: Umbrella thorn

Common local name: (Samur) سمر

Flowering period: April - May

Description: a medium-sized, umbrella-shaped tree, often with several trunks from the base, reduced to a small wiry shrub under extremely arid conditions. A distinctive spreading crown. Two thorn types, long-straight and shorter-hooked. White or pale yellow fragrant flowers cluster in round heads. Flowers later develop into bunches of spirally twisted pubescent pods.

Importance and use: local people eat the flowers, which taste sweet. Good browsing for animals. Provides fodder throughout most of the dry season when other sources are scarce, and shade for animals and people during the hot season. Some of the most palatable grass species grow beneath its canopy. A good source of charcoal and firewood.

Ecology and distribution: very resistant to drought and salinity. One of the most widespread trees in the Park. Recorded in Wadi El Gemal, Abu Ghusun, al-Ludayyid and Hulus.

Curiosity: It produces abundant flowers rich in pollen and nectar, heavily foraged by bees, resulting in dark monofloral honey with a warm, caramelized aroma and herbal notes.

Acacia tortilis subsp. *raddiana*

(Savi) Brenan, Kew Bull. 1957 (Leguminosa)

Common English name: Acacia

Common local name: (Sayyal) سيال

Flowering period: August - September

Description: a tall spiny desert tree. Its distinctive trunk can reach one meter in diameter in older trees. Young trees have an irregular crown; older trees a broad, rounded umbrella-shaped crown. A reddish bark. Flowers whitish-yellow, arranged in heads. Sometimes flowers twice a year. Legumes flattened, spirally twisted, with several very hard seeds. Branches, leaflets, and legumes are glabrous. In times of drought the tree can drop its leaves.

Importance and use: the most useful tree for local people: excellent for firewood and fodder for livestock. In prolonged rainless periods the main source of fodder for animals. Its wood is hard and good for construction. Gum from the tree is used to treat high stomach acidity or is dissolved in water and used to treat ocular infections and jaundice. The gum is important in many industries, especially the food industry.

Ecology and distribution: a most popular plant. You will see these trees all over the Park.

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