

Medemia argun – Past, Present and Future

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1. Two of the larger individuals of *Medemia argun* in the Dungul Oasis population in Egypt.

The genus *Medemia* has attracted the curiosity of palm experts for two centuries because of its romantic history and elusiveness in the wild. Its discovery is rooted in the tombs of ancient Egypt and the adventures of great 19th century explorers, and yet for much of the 20th century, living specimens were not seen in the wild. Here, we present the story of *Medemia*, from its 5th Dynasty past (2500 BC) to its 21st century present as an important yet threatened part of the modern Nubian Desert flora.

Medemia (Coryphoideae: Borasseae: Hyphaeniaceae) is a mysterious and little known monotypic genus of fan palm from the Nubian Desert oases of southern Egypt and northern Sudan (Fig. 1). The sole species, *M. argun*, resembles *Hyphaene*, to which it is closely related, especially in inflorescence, flower and leaf morphology. However, it is easily distinguished from *Hyphaene* by its supple leaves lacking a hastula, bright yellow petiole, lighter petiole armament, plum-like fruit with ruminant endosperm (Figs. 2 & 3) and, unlike co-occurring *H. thebaica*, an unbranched stem.

Medemia argun – a palm of ancient Egypt

The story of *Medemia* begins with Giuseppe Passalacqua, an Italian fortune seeker who went to Egypt in the early 1800s, initially trading horses, but later turning to something more lucrative: the excavation of ancient tombs for antiquities (David & Tapp 1992, Pain 2006). He succeeded in discovering many treasures but made his name with the discovery of the mummy of Natsef-Amun, a priest at the temple of Karnak, which was among the first to be investigated in scientific detail. In his excavations, Passalacqua found many fruits among the offerings to the dead. When he left Egypt he took up a good position as conservator of Egyptian Collections in the Berlin Museum. The famous German botanist, Karl Kunth, worked on Passalacqua's botanical treasures, among which he recognized fruits from three palms, *Phoenix dactylifera*, *Hyphaene thebaica* and a third species that was not known to science, which he named *Areca passalacquae* (Kunth 1826). Thus, *Medemia* was discovered, not as a living palm, but as an archaeological relic from the ancient tombs of Egypt.

Medemia fruits have been found in tombs from the 5th Dynasty (ca. 2500 BC) to Roman times (6–7th century AD) including the celebrated tomb of Tutankhamun (Täckholm & Drar 1950, Laurent-Täckholm 1951, Germer 1985, Schoske et al. 1992, Newton 2001). Archaeological specimens can be found in various collections including the Agriculture Museum in Cairo, the Economic Botany collections at the Royal Botanic Gardens, Kew (Fig. 4) and at the Natural History Museum in London. It seems that *Medemia* fruits were valued highly in ancient Egypt, though it is not known what that value may have been. Authors vary on the edibility of the fruit, Martius (1845) claiming that they are bitter and inedible, while others suggest that the

thin fruit flesh is sweet (Gibbons & Spanner 1996) and may have been acceptable to ancient tastes, especially to those living in the desert where fruit is scarce (Boulos 1968). It is also said that Nubian people processed *Medemia* fruits by burying them in the ground for some time to increase palatability (Täckholm & Drar 1950). The leaves are used for making mats and ropes (Täckholm & Drar 1950, Grant 1872, Boulos 1968). A tentative record of matting fragments in a predynastic tomb in Adaima in Upper Egypt has been reported (Newton 2001), which, if confirmed, would pre-date even the oldest fruit record. Of course, besides practical uses, *Medemia* may have held spiritual or ritualistic significance. It was cultivated in Thebes (Luxor) during the 18th Dynasty; in a list of 20 different trees grown in the garden of Enneni, an official of Thebes, 10 *Medemia* trees are recorded, along with 170 specimens of *Phoenix dactylifera* and 120 of *Hyphaene thebaica* (Täckholm & Drar 1950). *Medemia* also has a hieroglyphic name, *Mama-n-Khanen* (or *Mama-n-Xanin*), which differentiates it from *Mama*, the name for *Hyphaene thebaica* (Loret 1887).

The living palm

The discovery of *Medemia* as a living palm came just eleven years after Kunth's study of Passalacqua's material was published. In 1837, the German Prince Friedrich Paul Wilhelm von Württemberg and the botanist Theodor Kotschy came upon the palm in Wadi Delah while exploring the Nubian Desert in northern Sudan. Material reached palm authority Carl von Martius who described it as *Hyphaene argun* in the third volume (second edition) of his monumental treatise *Historia Naturalis Palmarum* (1845). Martius states that von Württemberg referred to it in correspondence as *Medemia argun* and reported that Bedouin of the Ababda and Bisharian tribes call the palm *Argun*. The basis of von Württemberg's proposed generic name remains obscure to this day. The link between the living palm and Kunth's *Areca passalacquae* was made later by Unger (1859).

It was not until the German palm authority Hermann Wendland (1881) re-evaluated the borassoid palms that the genus *Medemia* was formally erected. Wendland also recognized two species, *M. argun* and *M. abiadensis*, based on minor fruit size differences, though subsequent authorities have not accepted this distinction and recognize only one species (Beccari 1908, 1924, Govaerts & Dransfield



2. An inflorescence with ripening fruit. Note also the bright yellow leaf petioles.



3. A fruit in section displaying the striking red ruminations and apical embryo.

2005). We have examined type material of *M. abiadensis* from the Paris herbarium (*d'Arnaud s.n.*, Sudan, 1843), which comprises fruits only. The fruits are unripe, which most likely accounts for the minor fruit difference, and based on this limited material no distinction between the species can be made. More importantly *d'Arnaud's* collection was allegedly made far to the south of all other records, although the accuracy of the locality information, which is reported ambiguously in the archive in Paris and in the literature, is questionable. Gibbons and Spanner searched extensively for *Medemia* in these reported areas but found only *H. thebaica* and *Borassus aethiopum* (Gibbons & Spanner 1999).

Throughout the 19th and early 20th century, sporadic sightings of *Medemia* were reported by explorers active in northern Sudan, and some specimens were also collected. Archived correspondence at the Royal Botanic Gardens, Kew indicates that *Medemia* was as mysterious and intriguing to botanists then as it is now. Among the most famous of explorers to come across *Medemia* were Captains John Speke and Augustus Grant, who found the palm in Sudan in May 1863 during their expedition to discover the source of the Nile. On their way northwards to Egypt, they took a short cut across the Nubian Desert from Abu Hamad until they met the Nile again at Koresko. They chanced upon *Medemia* at the isolated Wadi Soofur near the Egyptian border (Grant 1872).

Medemia – alive in Egypt

The chance discoveries of *Medemia* in Sudan came to an abrupt halt shortly after the end of the 19th century, the last published record being that of *d'Albertis* who collected for *Beccari* in 1907 (*Beccari* 1908). However, the first evidence of living *Medemia* in Egypt began to surface at this time. The earliest mention was given by *Ernest Sickenberger* in 1901 who was informed by the *Ma'mur* (police chief) of El Kharga that an unbranched fan palm with small fruits, called *doleib*, occurs at Nakhila near to Kurkur Oasis in the Nubian Desert of Egypt. The record was considered uncertain because *doleib* applies to *Borassus* in Sudan, a genus that does not occur in Egypt. However, it was subsequently proved authentic by *Bahay Issawy*, an Egyptian geologist who visited Nakhila in 1964, taking both photographs and fruit specimens which support the record unequivocally (*Boulos* 1968, *Langlois* 1976). *Issawy* found just one adult female *Medemia* at Nakhila, which is figured in the account of *Langlois*, but noted the remains of five others that had been felled, perhaps by nomads collecting leaves or fruits.

The renowned Egyptian botanist *Loutfy Boulos* (1968) was the first to champion *Medemia* as "a member of the modern Egyptian flora." With *Vivi Täckholm* and *Mahmoud Zahran*, *Boulos* visited *Dungul Oasis* in November 1963, a remote and uninhabited site in the



4. Archaeological specimens of fruit from a Pharaonic tomb in Egypt held in the archaeological collections at Kew.

Nubian Desert west of the Nile, 160 km south-west of Aswan. The group discovered one tall female tree and seven juveniles (Boulos 1968, Zaharan 1968). The paper written by Boulos put *Medemia* on the map in Egypt and contained the first published images of the palm alive in the wild. However, earlier in the same year, though not reported until a decade later (Abdallah et al. 1972), three Egyptian sites to the east of the Nile were discovered at Wadi Difeit, Wadi Murra and Wadi Koresko by a team surveying the flora of Egyptian Nubia prior to the construction of the high dam at Aswan. Though many areas visited by this team were subsequently inundated by Lake Nasser, it seems that only the last of the three

Medemia sites, Wadi Koresko, would have been affected.

The frequent occurrence of *Medemia* fruits in offerings in the ancient tombs may indicate that the palm was more widely distributed in Egypt at that time. It has been stated that the ancient Egyptians imported *Medemia* from Upper Nubia, i.e. northern Sudan (Täckholm & Drar 1950), although we have not seen evidence to support this claim. Gibbons & Spanner (1996) suggested that trading routes through Dungul and Nakhila account for its presence as a cultivated introduction at these sites, implying that *Medemia* is not a native of Egypt (they were not aware of the sites

reported by Abdallah et al. (1972)). They appear to misinterpret the ancient road discussed by Täckholm and Drar (1950), which we understand to be a major route connecting upper and lower Nubia (i.e. northern Sudan and southern Egypt). We are not aware of trading routes at either Dungul or Nakhila. Evidence of human habitation has been found in Dungul, dating from a wet period in the Paleolithic (>20,000 BC; Hester & Hobler 1968). We accept that palms in general have been moved around desert oases by man and that the Egyptian *Medemia* sites have certainly been visited by nomadic people. However, given the relative proximity and similarity of these sites to those in northern Sudan (ca. 150–500 km), all of which fall within the Nubian Desert region that spans the political border, it seems more justifiable to assume that *Medemia* occurs naturally in Egypt until proven otherwise.

Recent exploration for *Medemia*

After the discoveries in Egypt, *Medemia* lapsed into obscurity once again, remaining unreported for more than three decades. Suspicions were raised that it might even have become extinct altogether (Uhl & Dransfield 1987), prompting the adventurous palm

enthusiasts and nurserymen Martin Gibbons and Tobias Spanner to resolve to rediscover the genus. They chose to hunt for *Medemia* in northern Sudan, rather than Egypt, aiming for the most frequently mentioned locality, Wadi Delah. In October 1995, they mounted a successful expedition to this site; their find of a *Medemia* population close to Murrat Wells was triumphantly reported in the pages of this journal (Gibbons & Spanner 1996). New scientific specimens as well as seeds were collected, facilitating the clarification of the morphology of *Medemia* as well as its introduction to cultivation. They also reported that mature trees are cut down by local people to harvest leaves for making rope. A year later, they found larger numbers of *Medemia* in Wadi Shagrib and estimated the population in that area to comprise around 1000 individuals (Gibbons & Spanner 1999).

Shortly after the rediscovery in Sudan, a team led by Irina Springuel of South Valley University, Aswan and Reinhard Bornkamm of the Technical University of Berlin surveyed Dungul Oasis in 1998 (Bornkamm et al. 2000). They found that the tall mother tree that had been so handsomely illustrated by Boulos (1968) was dead, its crown blown off and its

5. The entire Dungul Oasis population of *Medemia argun* viewed from the rim of the wadi. Note the tyre tracks indicating significant human activity in this fragile location. The dead trunk of the female palm reported by Boulos (1968) can be seen in the center of the population.





6. Majestic stands of *Hyphaene thebaica* also occur in Dungul Oasis. *Phoenix dactylifera* occurs in the distance.

trunk still standing to 10 m. However, the juveniles that Boulos had reported were healthy and had grown to more than 3 m with one reproductive female and four reproductive males. Moreover, 29 new juveniles of various sizes were found. In about 35 years, the *Medemia* population size in Dungul had grown from eight to 36.

Research on *Medemia* today

Medemia argun is a palm with a rich history, and yet it faces an uncertain future. Numerous reports, dating back to the late 19th century, suggest that *Medemia* is at risk of over-exploitation for its leaves in both Sudanese and Egyptian sites (Wright 1901, Täckholm & Drar 1950, Boulos 1968, Gibbons & Spanner 1996). Correspondence with the Royal Botanic Gardens, Kew in January 1897 indicates that the botanist Georg Schweinfurth feared that the species would be exterminated, while subsequent communications in March of that year relate that the Sirdar of the Egyptian army had ordered that the population near to Murrat Wells should be preserved. The observations made by Issawy in 1964 and Gibbons and Spanner in 1995 indicate that the felling of trees for leaf collection is a serious threat to *Medemia* even now. Although *Medemia* has survived, population size appears to be limited in Sudan and highly restricted in

Egypt. Moreover, the likely impact of climate change on *Medemia* in these critical sites is unknown.

Here we pick up the story. *Medemia* is an important piece of Egypt's cultural and biodiversity heritage, although few Egyptians are aware of this or of the extreme threat faced by the palm in Egypt and its habitat. In response to this, a project was initiated at the Unit of Environmental Studies and Development (South Valley University, Aswan) that aims to survey the Egyptian Nubian Desert for *Medemia*, to monitor its populations and work towards its conservation. The project began as research work for the first author's Masters degree, but has grown to involve collaboration with the Egyptian Environmental Affairs Agency (EEAA) and the Royal Botanic Gardens, Kew. Recently, the International Palm Society has provided generous funding for the initial exploration for Egyptian *Medemia* populations, and we report on that fieldwork here.

Dungul Oasis

Our first priority has been to revisit the site at Dungul and monitor the status of the *Medemia* population there (Fig. 5). Following on from the expedition of Springuel and Bornkamm's team in 1998, we visited Dungul again in 2001, 2002, 2005 and 2007. To reach the oasis, we drive 180 km on paved road from Aswan



7. A group of *Medemia* individuals of different stages, suggestive of multiple phases of recruitment.

towards Abu Simbel before turning off the road at an unmarked point and heading straight across the desert for 50 km. There are no tracks or wadis to follow. We navigate by major landmarks and trust in the skill of our experienced Nubian drivers but always carry GPS, compass and satellite phone. The desert is treacherous in places, changing suddenly from stable sand to deep silt as fine as wheat flour. In a single wheel spin, a vehicle can be bogged down to the axles. It is vital to take two vehicles in case of a breakdown, but this does not guarantee an easy ride. When the second author visited Dungul in 2005, we lost our first vehicle to clutch failure and, shortly after, nearly lost the second in the sand. We were saved only by the skill of Awad, our driver, who extricated us after some nerve-racking moments and then mended the damage to the engine. Exploring any remote desert site safely requires extremely careful planning and proper logistical support. A recent tragedy, in which the lives of two EEAA staff were lost in the Nubian Desert following a vehicle breakdown, reminded us how costly any mistake can be.

We do not drive to Dungul itself, but make a camp at the foot of the Sinn El Kadab plateau, some 3.5 km south of the oasis. The desert here lacks vegetation entirely but is not lifeless. Our camp is usually visited at night by Ruppell's sand foxes hoping to pick up food

scraps. Early the following morning, we climb the scarp and start our walk to Dungul. It is a different world on top of the plateau. At the very edge, just above our camp lies Dineigil Oasis, the southern part of the Dungul Oasis complex. It extends for about 1.5 km in a narrow strip only 200 m wide along a limestone ledge. The vegetation is dominated by the low, spiny legume shrub *Alhagi graecorum*, which here grows in remarkable parallel lines, following faults in the underlying rock. The site is dotted with a few acacias (*Acacia raddiana*, *A. ehrenbergiana*) as well as some large *Hyphaene thebaica* stands. Evidence of gazelles and invertebrates can easily be found showing how important these small vegetated areas are to desert animals.

To reach Wadi Dungul itself, we walk for the remaining 3 km across a spectacular landscape of sandy plains and blasted limestone canyons, with rock outcrops weathered by wind into remarkable shapes. We see no further plant life until we reach Little Dungul, a small area of vegetation close to Wadi Dungul occupied by a tamarisk hillock, some grass (*Imperata cylindrica*) and a lonely *Phoenix dactylifera*.

Shortly after Little Dungul, we come to the edge of Wadi Dungul, a beautiful view of the entire *Medemia* population opening up below us, with the trunk of the old dead mother tree

still standing in the middle. The population is separated from other palms in the valley. Farther to the east, some magnificent specimens of *Hyphaene thebaica* (Fig. 6) can be found along with more date palms.

At the last survey in 2007, 32 living *Medemia* palms were found growing in Dungul, comprising seven fertile adults (three females, four males) and 25 palms of varying sizes that have not yet flowered (Fig. 7). This represents a decline of four individuals since the visit of Springuel and Bornkamm in 1998 but an increase in the number of flowering females by two. In morphology, the palms match very well the description provided by Gibbons and Spanner (1996). The dead leaves are persistent on all of the palms, lending a shaggy appearance to the taller specimens in particular; clearly *Medemia* leaves are not harvested here. Carpets of fruits lie baking in the sun below the females. We have found evidence that gazelles and rodents feed on the fibrous fruit pulp. Even though some seeds become buried by blowing sand, it seems unlikely that any will be dispersed and germinate until significant rain falls. With at least 10 years between major rains, opportunities for recruiting juveniles are few and far between.

Our surveys at Dungul have resolved an outstanding mystery linked to the account of Boulos (1968) that was first raised by Langlois (1976). How could a lonely adult female have produced a cluster of juveniles? After 45 years, we found the answer; the remains of a male *Medemia* lie on the ground about 70 m from the famous old female reported by Boulos. From its weathered condition, it is clear that the palm fell many years ago, but it would once have stood about 9 m tall and bore many inflorescences which are still visible today.

During our visits to Dungul, we have monitored changes to the *Medemia* population, measured growth rates, gathered phenological data, collected seed for germination experiments and recorded human impacts on the site. The details of this work will be written up elsewhere. In summary, it is clear that despite a small loss of individuals over the past decade, the *Medemia* population at Dungul is currently healthy and has shown a dramatic increase in size since its first discovery by Boulos, Täckholm and Zahran in 1963. There is no evidence of these palms being exploited by man for their leaves or fruits. However, we have observed an intensification of human

activity in the Wadi. While we gain access to Wadi Dungul on foot, vehicle tracks are now widespread in the valley, especially around the *Medemia* population. Although this human activity in itself may not constitute a threat to the palms, it does place the palms at risk of accidental or malicious damage, by burning for example.

Other sites in Egypt

In conducting a survey for *Medemia*, we aimed to revisit all known Egyptian sites, although to date we have been unable to locate guides who know a route to Nakhila Oasis. We also selected other potential *Medemia* localities in the Nubian Desert mostly to the south of Aswan based on their similarity in vegetation type to the known sites. We have now visited Kurkur Oasis, Kharga Oasis, parts of the Toshka Depression, and some small sites on the Sinn El Kadab Plateau, all locations to the west of the Nile. Except for Kharga, these remote sites can be reached only by four wheel drive vehicle. It is disappointing, then, to report that despite considerable efforts they yielded no sign of *Medemia*.

However, we have received reports from Bedouin in Wadi Allaqi of single palms that produce leaves that are good for making ropes. Wadi Allaqi, in the Nubian Desert to the east of the Nile, is close to the border with Sudan and to a reported Sudanese site of *Medemia* in Wadi Gabgaba, a main tributary of Wadi Allaqi. In April 2006, a group from South Valley University and EEAA led by Irina Springuel found a single unbranched palm in Wadi Neigit in the upstream part of Wadi Allaqi, ca. 50 km from the border with Sudan, which the first author later confirmed as a male *Medemia*. A juvenile some 2.5 m in height has also been located by the first author in another tributary of Wadi Allaqi known as Wadi Umm Gir (Fig. 8). In addition, a single juvenile palm has been found in Wadi Quleep, downstream of Wadi Allaqi, ca. 30 km from Lake Nasser. The Bedouin in this area call the palm *Elsaafa*, which means palm leaves in Arabic. We have also surveyed Wadi Gabgaba as far as the Sudanese border, but found no further *Medemia* palms.

The future of *Medemia* in Egypt

The Nubian Desert ecosystems in which *Medemia* occurs are rare, fragile and of extreme importance not only to *Medemia* but also to the unique plant and animal communities that depend on them for resources in this harsh

environment. Clearly the future of *Medemia* in Egypt depends on the security of each site as a whole. Dungul Oasis has been proposed as a protected area, along with Kurkur, but this status has not yet been confirmed by Egyptian law. In a new phase of our work, we aim to conduct broad biodiversity surveys in the Egyptian Nubian Desert Oases that will provide essential baseline data to underpin the case for their protection and will draw public attention to their national and international importance. In addition, we aim to establish a program to increase public awareness of *Medemia*, its cultural significance and Nubian Desert biodiversity. As part of this, we have established an *ex situ* *Medemia* garden in 2003 that now contains 21 juvenile palms and has been used to supply local schools with *Medemia* seedlings. We intend to use the *Medemia* garden as a key part of community outreach work in the new project phase.

Finally, with the larger part of the world *Medemia* population being found over the border, it is vital to build links with Sudan if conservation is to be effective on a global scale. With the help of robust field knowledge and public awareness, *Medemia* has an important role to play in the region as a flagship species for conservation, which ultimately may bring long-term security not only to the mysterious

palm itself, but also to the critical Nubian Desert ecosystems that it inhabits.

Acknowledgements

We express our deepest thanks to Prof. Irina Springuel and Prof. Ahmed Belal for their suggestions and continuous support. Toby Spanner, Martin Gibbons and Irina Springuel made useful comments on the manuscript. The Unit of Environmental Studies and Development has facilitated this research and funded the primary field investigations by HI, under the supervision of Abd El Samie Shaheen, Arafa Hamed and Magdi Ali of South Valley University, Aswan. HI was presented with a Young Scientist Award in 2005 by the UNESCO Man and the Biosphere Programme, which contributed to field trips and the nursery work. We thank the Nature Conservation Sector, EEAA for participating in the field trip in Nov. 2005 and supporting our activities towards the conservation of the area. We are extremely grateful to the Royal Botanic Gardens, Kew, the British Council (Cairo), the Bentham-Moxon Trust and the International Palm Society for funding fieldwork and study visits by HI to Kew. Finally, heartfelt thanks to all team members and local guides who have helped us in the field.

8. A lone, non-reproductive *Medemia argun* individual found in Wadi Umm Gir, Egypt. Leaves have been pruned by Bedouins for making ropes. Inexplicably, this palm also appears to have been burnt.



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