Euphorbia caput-medusae L. – a journey from the foggy Cape of Storms to the arid wind-blasted sands of the Namib Desert (part 1)

by Graham Williamson

Fig 1: A large plant of Euphorbia caput-medusae *at Cape Point. The branches (which do not rebranch) are up to 40 cm long. Plants grow within dense coastal fynbos vegetation close to the sea.*

In a new, wide ranging, monophyletic classification of the Southern African euphorbias (Euphorbiaceae) *Euphorbia caput-medusae* L. has emerged to lie within (Clade A) which comprises *Euphorbia* subg. *Rhizanthium* sect. *Medusea* (Bruyns et al, 2006). For the scientific explanation of these changes the original paper should be consulted. In the above paper the following species were considered synonymous with *E. caput-medusae*: *E. marlothiana* N.E.Br., *E. muirii* N.E.Br., *E. tuberculata* Jacq., *E. tuberculatoides* N.E.Br., *E. bolusii* N.E.Br., *E. confluens* Nel and *E. ramiglans* N.E.Br. It is interesting to note that N. E. Brown first described 5 out of the 7 species now considered synonymous. The plants discussed in this account are in order from the northernmost colonies to the furthest southern colonies. All illustrations were taken in habitat and diagrams also from field material. A location map is included.

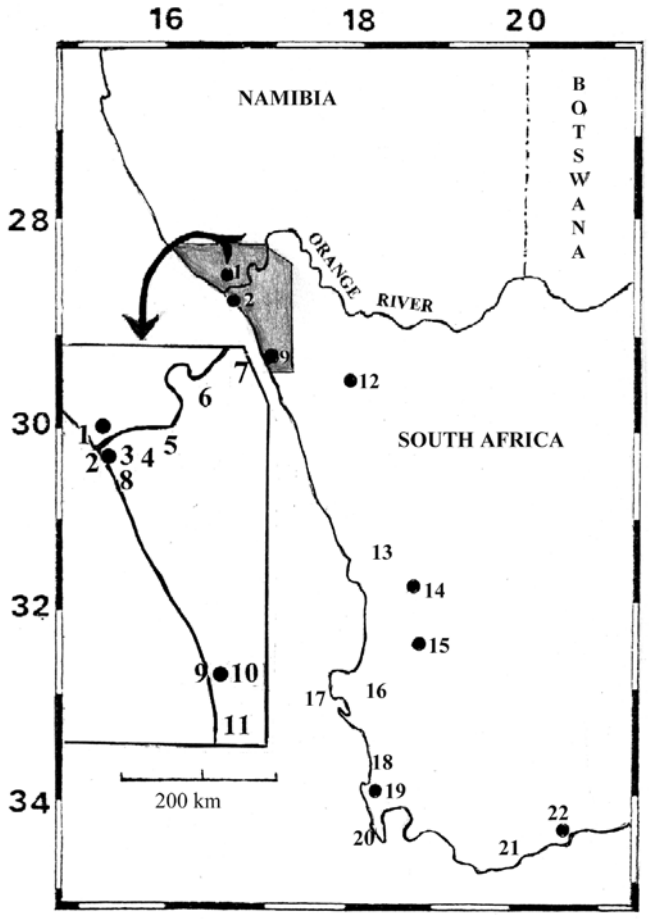
Introduction

In the mid 1980's while discussing the *E. caput-medusae* complex with late colleagues of mine, David Hardy and Larry Leach, they suggested that it would be useful to look at *E. caput-medusae* especially to unravel the existence of the original type. At that stage I was working in the Bolus Herbarium, University of Cape Town on indigenous Zambian orchids. I mentioned to the late Professor of Botany, Ted Schelpe, that I was intending to look at *E. caput-medusae*. He just laughed and said "The best of luck!"

On my first experience of reading the type descriptions in Linnaeus' Species Plantarum Vol. 1 published in 1753, and attempting to unravel his complicated multiple descriptions, which included five varieties, the daunting prospect seemed insoluble. The Linnaean synonymy presented a mind-boggling picture of vari-

ous plants which, as far as I could judge by the short inadequate Latin diagnoses, were all possibly separate species unrelated to what was supposedly the typical form. At this stage I decided the search was akin to the quest for the "Holy Grail" and gave up.

As luck would have it, on leaving Sandton in Johannesburg, I was employed by the Anglo American Corp. as Senior Dental Officer and seconded to the Diamond Division in Oranjemund, Namibia. During this period, from 1977 to 1994, my wife and I completed numerous expeditions to the Sperrgebiet (Prohibited Diamond Area) and the neighbouring Richtersveld. This experience allowed us, over the years, the unique opportunity to explore the whole range of *E. ramiglans* N.E.Br., *E. confluens* Nel, *E. melanohydrata* Nel and *E. namibensis* Marloth. The following account sets out our experiences with the *Euphorbia caput-medusae* complex in habitat, mainly photographic, and also includes a number of diagrammatic line drawings. No attempt is made to rearrange the synonymy as reported by Bruyns et al. in the journal Taxon (May, 2006).



Map. 1: Localities mentioned in text. 1. ORANJEMUND, 2. ALEXANDER BAY, 3. Kortdoring plains, 4. Kortdoringberg, 5. Beauvallon, 6. Swartwater, 7. Annisvlakte, 8. Lichen field, 9. PORT NOLLOTH, 10. Fifteen-Mile Mtns., 11. Kleinzee, 12. SPRINGBOK, 13. Klawer, 14. CLANWILLIAM, 15. CITRUSDAL, 16. Hopefield, 17. Saldanha, 18. Melkbosstrand, 19. CAPE TOWN, 20. Cape of Good Hope, 21. Stilbaai, 22. MOSSELBAAI (towns are written in captions)

Habitats

One of the first phenomena one notices is the extraordinary range of habitats these plants have evolved in. The furthest northern populations (*E. ramiglans*) exist under Namib Desert conditions in the southern south-western corner of Namibia. Here the mean recorded annual precipitation over 53 years was 51 mm with numerous years where no rain fell (Oranjemund records). The vegetation is almost wholly dependant on the life-giving Atlantic fog. The unidirectional winds are among the strongest experienced in Southern Africa. Moving southwards the habitat, leaving the desert behind, passes through Namaqualand semi-arid karroid vegetation with annual precipitation about 250-350 mm to Renosterveld (fine-leafed shrubs and some succulent vegetation) with a varied annual rainfall in the region of 500-700 mm. The southern most populations occur at Cape Point south of Cape Town and extend eastwards along the coast to Mossel Bay. This vegetation belt comprises coastal fynbos, typical of the Cape Flora Kingdom. The rainfall reaches over 1000 mm annually but can be as low as 350 mm in drought years, a far cry from the northernmost populations of *E. ramiglans* in the Namib Desert where the annual precipitation is about 51 mm. These wide ranging respective habitats begin from the southern Namib Desert, about 70 km north of the Orange River mouth, then a further 900 km to Cape Point, the southern most colony, where *E. caput-medusae*, the type of this group occurs.

E. muirii, the last member of the complex grows about 340 km eastwards along the Cape coast ending at Mossel Bay making a total distance separating the colonies about 1310 km, measured around the coast. These respective habitats are indeed challenging and reflect in the surrounding vegetation which responds to the mean annual recorded precipitation.

On the track of *Euphorbia ramiglans*

Beginning with the type sheet housed in the Bolus Herbarium (BOL) immediate problems emerged. As often encountered with old type sheets, the material was minimal consisting of only 5 branches cut off from the main plant and a foot note by N. E. Brown saying that "one piece had been retained for Kew". One branch has one flower and there were apical leaves present. The original collection date is recorded as "Anno 1883. Flor Aug. Sept." and the collector H. Bolus with the locality Nama'land Minor. However, fortunately the

Fig. 2: Euphorbia ramiglans *about 22 cm broad on sand-blasted coastal sands in southern Namib Desert about 65 km north of Oranjemund in Namibia. Photo taken in 1980's.*

Fig. 3: Same locality as Fig. 2, inflorescences after good rains

Harry Bolus registers are kept in the archive collection of the University of Cape Town under "Journey to Namaqualand – 1883". Bolus arrived in the coastal town of Port Nolloth at 6 a.m. on 21st August and he writes that on the day of arrival he partook of a walk, in the company of his companion Rev. Jones two miles east of Port Nolloth. During this walk he records in his register "*Euphorbia* with numerous branches, fleshy – 6 pieces (cut to 12)". It must be noted that on the type sheet the recorded collection date is Anno 1883 Flor Aug.-Sept. Only 6 halves survive as the type with the other halves lost to posterity. Although there is no precise locality recorded on the type sheet but with the collecting date coinciding with Bolus' register it seems logical to assume that our modern collections seen and photographed east of Port Nolloth are possibly the mysterious *E. ramiglans*. It must be added here that in White, Dyer & Sloane (1941) they state "without precise locality" but even in their day numbers of plants were known from Alexander Bay collected by Mrs. Grobler and also by M. Otzen from Grootderm as illustrated in White, Dyer & Sloan (1941) Vol. 1, page 366. Perhaps the area around Port Nolloth demarked as forbidden ground deterred collecting.

Following Bolus' collection locality is where we began our search for the "locus classicus". Throughout our search we encountered numbers of a medusoid *Euphorbia* plant located from about 5 km east of Port

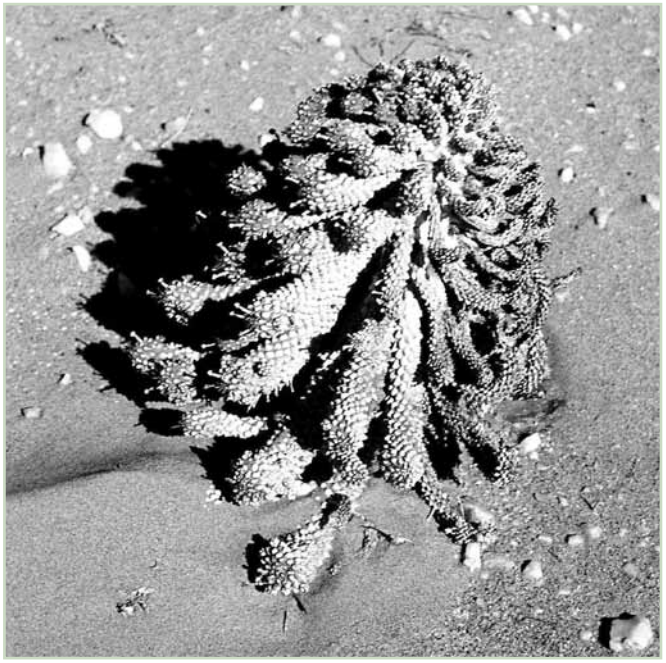


Fig. 4: Same locality as Fig. 2. Beginning of dunelet can be seen on leeward aspect of plant indicating high winds.

Fig. 5: Euphorbia ramiglans *growing in deep sands on Kortdoring plain E. of Alexander Bay. Plant about 15 cm in diameter and virtually submerged*

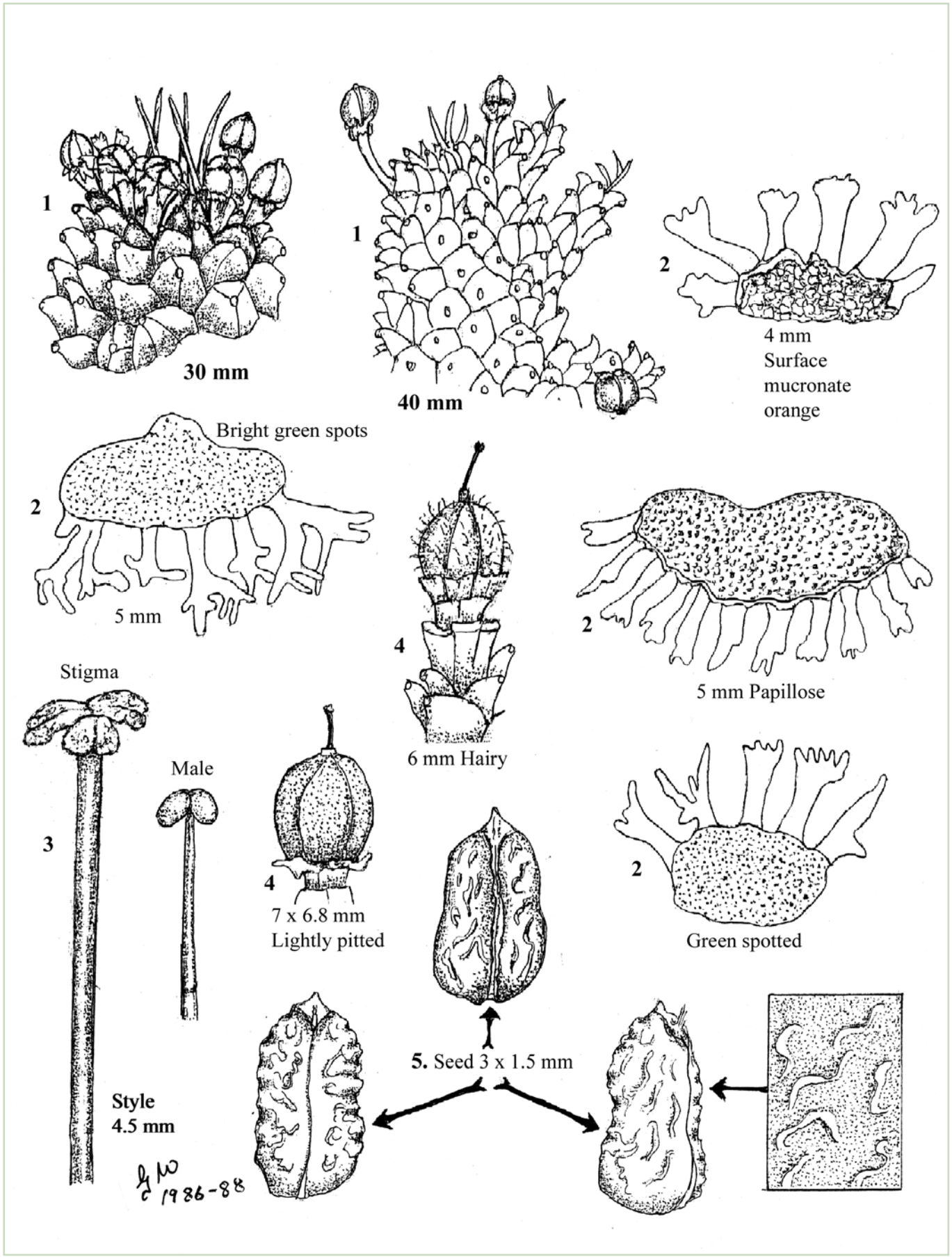


Fig. 6: Euphorbia ramiglans. *Various differences between populations displayed including cyathia at branch tips, glandular morphology, capsule surface and seed morphology as seen in populations from Kortdoringvlakte to Port Nolloth.* ***1.*** *Branch tips;* ***2.*** *Glands and processes;* ***3.*** *Female flower larger than male flower;* ***4.*** *Capsules;* ***5.*** *Seed morphology with enlargement of seed surface (white wrinkles on yellowish-brown background).*

Fig. 7: Submerged Euphorbia ramiglans *in full flower and leaf in same habitat as Fig. 5*

Fig. 8: Cristate E. ramiglans *20 cm high with exposed stem growing in severe wind corridor in the north Kortdoring plains.*

Fig. 9: Same locality as Fig. 8, but plant in flower after rains, about 20 cm high.

Fig. 10: Flowers on Euphorbia ramiglans, *E. of Grootderm, turning red as they mature.*

Fig. 11: Euphorbia ramiglans *about 27 cm in diameter, cristate form, growing in the lichen field south of Alexander Bay.*

Fig. 12: E. ramiglans *about 20 cm in diameter, S. of Alexander Bay, growing in a crater in gypsum crust. Crater formed by periodic rains splashing the gypsum forming a solid surrounding wall.*

Fig. 13: Robust plants of Euphorbia ramiglans *about 30 cm in diameter, in sands about 20 km S. of Alexander Bay.*

Nolloth (where they were often in association with the coastal sand *Aloe arenicola* Reynolds) to the furthest eastern plants found south and south-west of Fifteen-mile-mountains. No other medusoid *Euphorbia* species was seen in the area. We concluded that these plants must represent the true *E. ramiglans*.

Over the years we were fortunate to see this plant in all its glory and various disguises. The full range, mapped out over these years of exploration, begins close to Kleinsee, south of Port Nolloth, eastwards as far as about 5 km west of the Fifteen-mile-mountains and then northwards from Port Nolloth where numbers of separate populations occurred all along the coastal sands to the wide Alexander Bay/Kortdoring plain. Towards the east of this windswept plain around Blouberg and Kortdoringberg there are numbers of plants. From Kortdoringberg *E. ramiglans* spreads in the sands north-eastwards close to the Orange River as far as Beauvallon east. Here within sight of each other, *E. ramiglans* meets *E. melanohydrata* Nel.

The separation between the two ecosystems is sharply demarcated and is indeed extremely interesting. At this point the river has a north east bend thus the full impact of the winds and Atlantic fog appears to diminish. The Beauvallon farm was located in this part of the Orange River valley due to the diminished affect of the fog allowing for higher penetration of sunlight, necessary for survival of the farm crops and growth of farm animals. It is surely astounding that during the evolution of *E. ramiglans* it should be so sensitive to the prevailing coastal conditions as to not impinge on *E. melanohydrata* territory. Larry Leach and I followed the *E. melanohydrata* distribution from east Beauvallon through the sands to the type locality at Swartwater (hence the epithet – '*melanohydrata*' = black water) as far as the margins of the Annisvlakte. *E. melanohydrata* is easily distinguished from *E. ramiglans* by the overall untidy, short-branched habit, the persistent star-shaped peduncles and the small, overall green, tridentate involucre glands.

There is but one further population of *E. ramiglans* to report on. This colony could be considered as aberrant and occurs about 65 km north of Oranjemund under severe arid Namib Desert conditions (51 mm rainfall with numerous years where no rain falls) in more or less mobile coastal sands about 10 km from the Atlantic seaboard. Although the rainfall is minimal the area is clothed in heavy fog which condenses daily sup-

Fig. 14: Very large E. ramiglans *40 cm broad, in sands close to Holgat River about 45 km S. of Alexander Bay. Stems now longer and thicker than the northern forms. Here the winds are not as severe as further north.*

plying life giving moisture. The fog effect is evidenced by wide, dense colonies of lignicolous and corticolous lichen species, especially concentrated in the Wolwekop area. One of the interesting features of this *Euphorbia* colony is the existence of more elongated peduncles compared with the southern *E. ramiglans* populations where the peduncles are short.

(to be continued)

Author's address:
Dr. Graham Williamson
Research Associate
Bolus Herbarium
University of Cape Town
Rondebosch, South Africa

Fig. 15: View from Kortdoringberg over the surrounding sand plains of Kortdoringvlakte east of Alexander Bay, habitat of E. ramiglans