

The Cactician



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THE SUBJECT OF SUCCULENT
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Notes on *Desmidorchis retrospiciens* Ehrenb.

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Summary

Ehrenberg's intended validation compiled in 1828 of *Desmidorchis retrospiciens* was not effectively published until 1900, by which time it had been predated by *Desmidorchis acutangula* Decne. (1838). *Desmidorchis retrospiciens* Ehrenb. was, however, validated in 1831 by a brief but recognisable characterisation, reference to an undistributed plate with analysis, direct reference to a preserved but now missing specimen at Berlin, and a plate of its pollinarium accompanying the protologue.

Some authors have rejected this name as invalid on the grounds that the description was inadequate, but the illustration that was prepared for publication in the botanical part of *Symbolae physicae* is original material cited in the protologue and sufficient on its own for validation as a plate with analysis. *Desmidorchis retrospiciens* Ehrenb. is lectotypified here.

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Notes on *Desmidorchis retrospiciens* Ehrenb. With particular reference to the validity of the name.

“A mammoth among stapeliads”

(White & Sloane, *The Stapelieae* ed.2, 1: 237. 1937)

Desmidorchis Ehrenb. is a generic name that is widely used and accepted, previously submerged in a catch-all concept of *Caralluma* R.Br., from which it differs in the robust habit of growth, stems not modified by an elongated terminal inflorescence, and floral structural details. DNA evidence suggests that it is actually embedded with *Crenulluma* Plowes close to *Pseudolithos* P.R.O.Bally, very distant from *Caralluma* R.Br. s.s.

The genus was first named and briefly circumscribed by Ehrenberg in a letter to the editor of the journal *Linnaea* (1829: 94-97). The diagnostic character that he highlighted proved to be common to all asclepiads, but he did not know that at the time. It had been based on a plant found on Dahlak Island, the largest of a group of islands called the Dahlak Archipelago in the Red Sea, off the coast of Eritrea (Fig. 1).

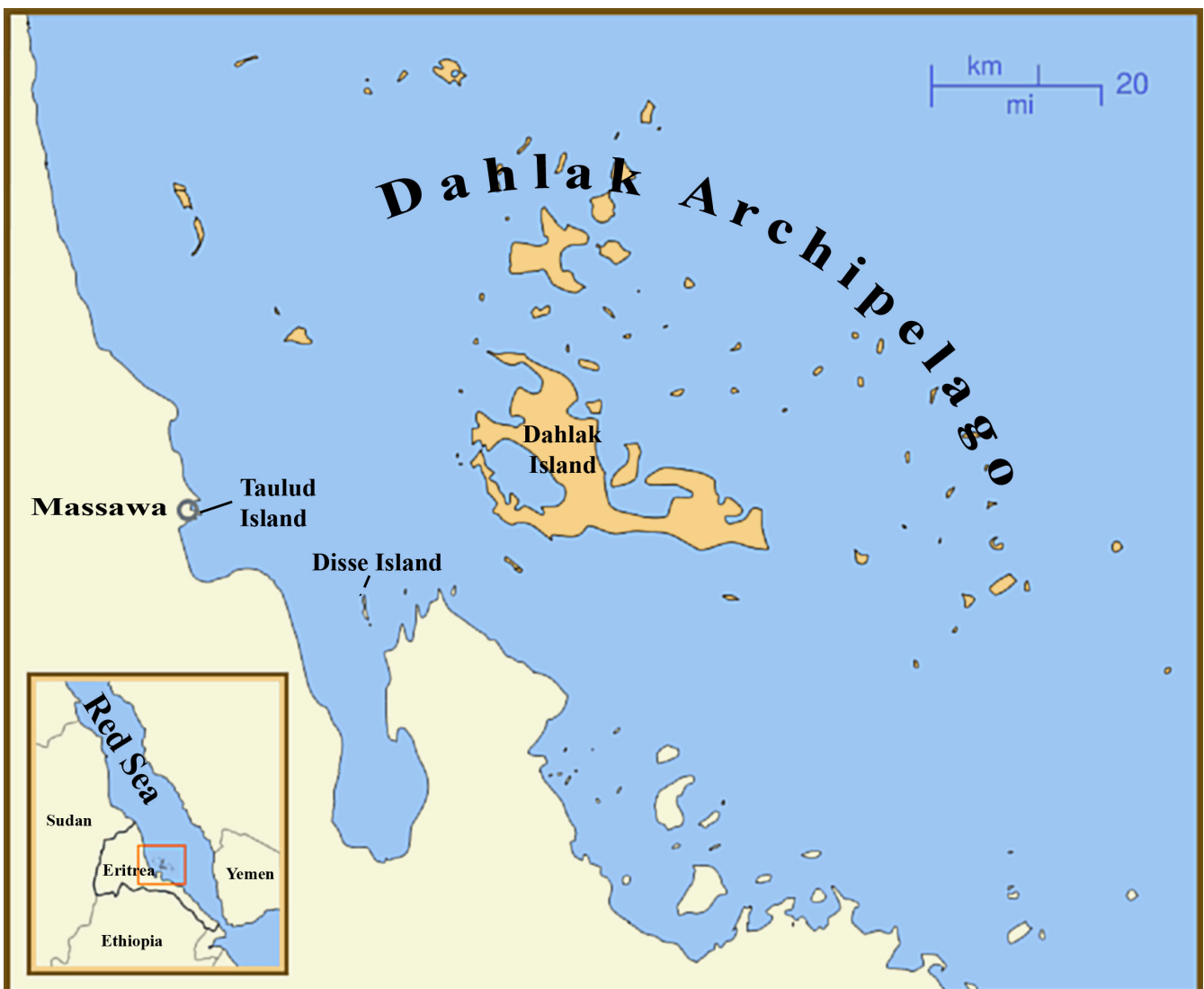


Fig. 1 Map of Dahlak Archipelago, showing place names used in this article.

Ehrenberg compared it with other plants from elsewhere that he thought were *Stapelia quadrangula* Forssk., but those were actually the same as the Dahlak species. A specimen was preserved and a sketch of it prepared by an artist on the expedition, and that became the basis for an engraved plate, one of 24 such lithographed plates, mostly coloured by hand, for the botanical part of *Symbolae physicae* (1828-1845). This monumental work was an account of the animals and plants collected by members of the 1820-1825 expedition to north Africa and the Arabian peninsula led by General von Minutoli with Friedrich Wilhelm Hemprich (1796-1825) and Christian Gottfried Ehrenberg (1795-1876) as zoologist and botanist respectively.

The expedition ended in disaster with Hemprich, Ehrenberg and almost all of their assistants falling ill with fever while stationed at the Eritrean port of Massawa. Hemprich died in June 1825 and Ehrenberg buried him on the island of Taulud. Ehrenberg himself recovered but remained weak and finally returned to Europe from Cairo at the end of 1825 to begin work on his part of the account of the expedition. Most of this work was published in 17 parts bound in 4 sumptuous folio volumes in 1828, all devoted to fauna. The expedition had gathered 34,000 animal specimens in 4000 species and 46,000 botanical specimens in some 3000 species.

Alas, finance for the fifth and final part of *Symbolae physicae* dealing with the botany of the expedition dried up and the publishing project was abandoned after the first 24 plates had been printed in 1828. The intention had been to issue these in parts of 10 plates each. Much later, Karl

Schumann found the few plates that had been printed and distributed them in the wrappers that had been designed and printed for the first 10 plates (Fig. 2), together with his own new text, in the year 1900. Thus, these first few plates were not effectively published until 1900, long after the new taxa in them had been published elsewhere under different names.

In the case of *Desmidorchis retrospiciens*, this taxon was published as *Desmidorchis acutangula* by Decaisne in 1838. However, Ehrenberg had himself inadvertently validated his name in 1831 mainly by reference to the 1828 undistributed plate in his 1831 paper on the pollen of asclepiads: "Als ich vor einigen Monaten (1828) die in Dhalac

Fig. 2 Wrapper cover of Ehrenberg, *Symbolae physicae. Botanica* (1828, issued 1900).

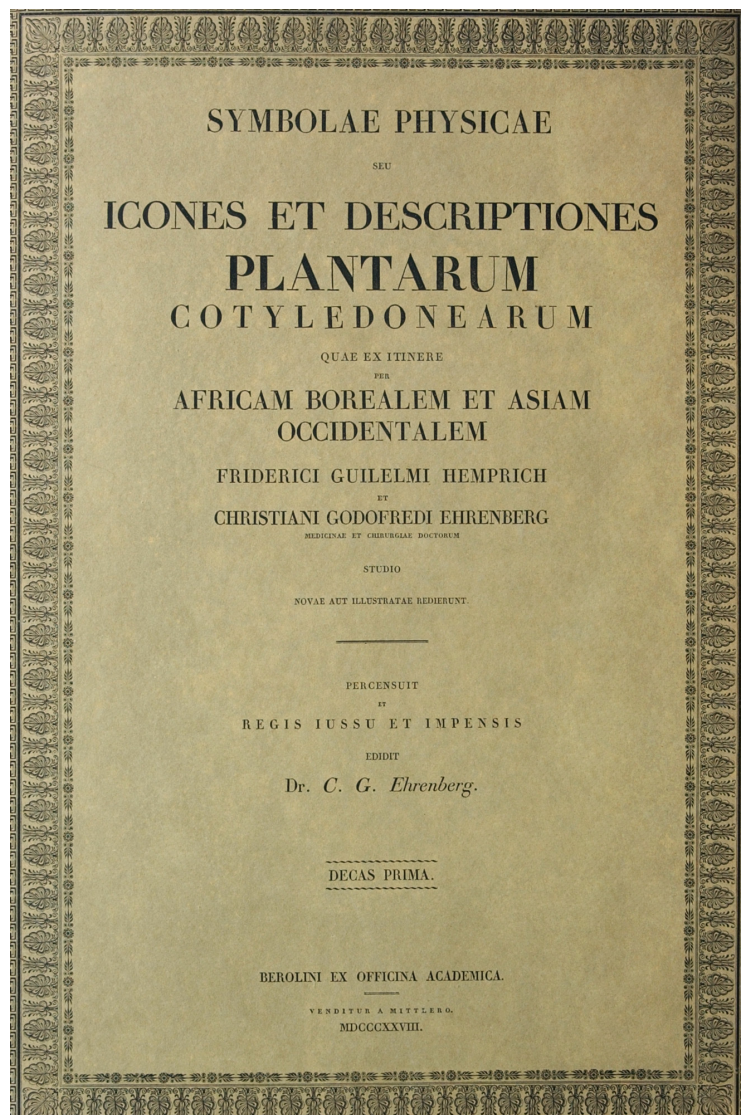


Fig. 3 *Desmidorchis retrospiciens* as depicted in the lectotype Plate 7 from Ehrenberg, *Symbolae physicae. Botanica* (1828, 1900).

Botanica I.

III.



*I** DESMIDORCHIS* retrospiciens*
Insula Dalac et Habesfina.
II. quadrangula
Strepelia quadrangula Forsk.
Arabia.

Linnaeus in Syst. pinast.

Rothberg in lapis del.

nach dem Leben gemalte und frisch zergliederte Pflanze in meine *Symbolae physicae* aufzunehmen beabsichtigte.” This plate with analysis (Fig. 3) therefore forms part of the protologue, and the taxon was therefore validly published in 1831, complying with Art. 38.7. The second figure on this plate was labelled as *Desmidorchis quadrangula*, but that was a misapplied name and the plant actually figured was *Desmidorchis retrospiciens*, although from a different gathering.

species can achieve (Figs. 5-6). Therefore, even without plate 7 from *Symbolae physicae*, this remark on its own, coupled with the stated locality, is sufficient description to positively identify the species, as pointed out by Plowes (1996: 73).

Stapelia quadrangula Forrsk. was the only named species in the protologue of *Desmidorchis* Ehrenb., and, even if misapplied, would automatically become the type spe-

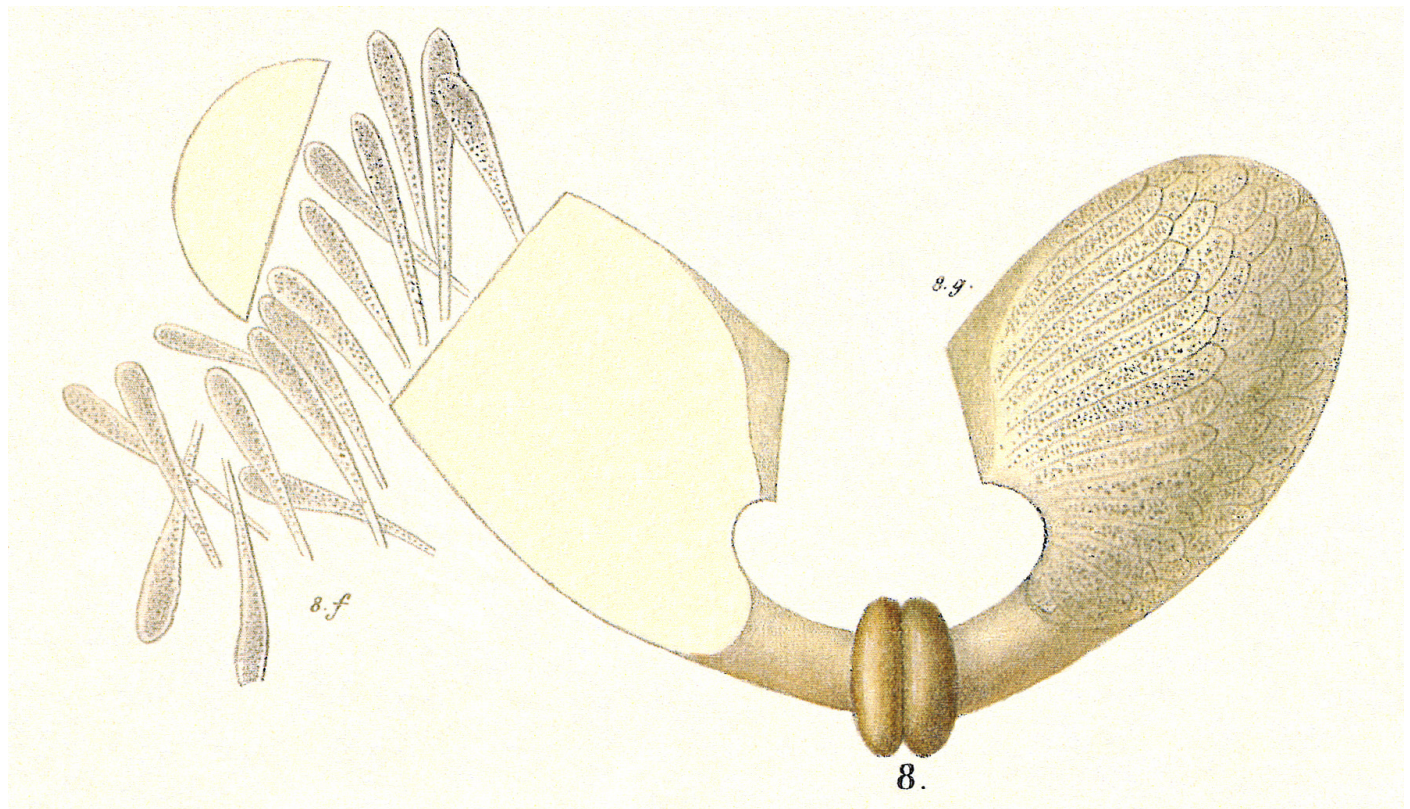


Fig. 4 Illustration of the mode of dehiscence of the pollinia, from *Über das Pollen der Asclepiadeen*: t.2, fig.8. 1832.

A diagnostic character of *D. retrospiciens* mentioned in the protologue is its height: “as tall as a man”. This can apply to no other stapeliad of the region. When commenting on the distribution of this species, White & Sloane (1937, 1: 237) said “everywhere it appears as a mammoth among stapeliads, forming clumps six feet and more in diameter and, in the var. *tombuctuensis*, attaining a height of over four feet.” Although man-high may have been a slight exaggeration, there is no doubting the massive scale that

species of the genus in accordance with the rules of nomenclature. For this reason it became necessary for Mottram (2009) to make a conservation proposal to preserve the present application of the name.

The protologue is also accompanied by a plate (Fig. 4) showing a pollinium of *Desmidorchis retrospiciens*, including the mode of dehiscence to release the club-shaped grains of pollen. This adds further analysis to that shown in *Symbolae physicae* t.7.



Fig. 5 Darrel Plowes beside *Desmidorchis retrospiciens* DP7546 (Sudan, Derudeb, between Kassala & Sinkat). Photo: Darrel Plowes.

Fig. 6 Len Newton sniffing flowers of *Desmidorchis retrospiciens* (Kenya, northern). Photo: Len Newton.



Fig. 7 *Monolluma quadrangula* (Yemen, Wadi Dhahr, 14km NW of Sana'a). Dr. Abdul Rahman Al Dubaie, a Sana'a University lecturer in biology, gives scale to the size of this species during a trip by Darrel Plowes and Gerry Barad in Nov 1989 to follow in the footsteps of Pehr Forrskål. Photo: Darrel Plowes.



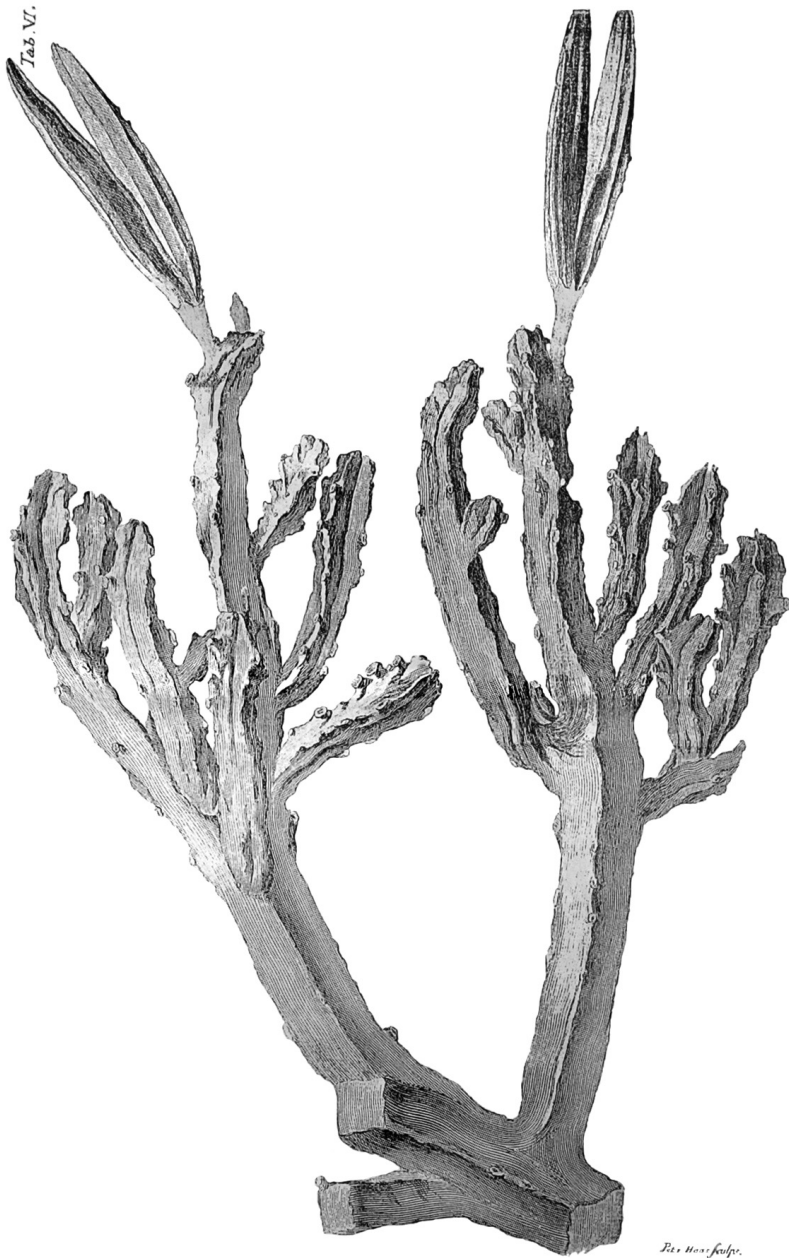


Fig. 8 *Monolluma quadrangula* (Arabia) Peter Haas copper engraving after drawings by G. W. Baurenfeind, from Forsskål, *Icones rerum naturalium*: t.6. 1776. The plate that was probably instrumental in causing Ehrenberg to confuse it with his *D. retrospiciens*.

The confusion with *Monolluma* (*Caralluma*) *quadrangula* Forssk.

It seems unlikely that Ehrenberg ever saw *Monolluma quadrangula* (Forssk.) Plowes. His concept of the species was most probably formed from seeing Forsskal's illustration (Fig. 8), which bears no flowers and the dimensions of the plant are not clear. The

two species are in fact completely unrelated, except in the old, very broad, sense of *Caralluma* N.E.Br., and cannot easily be confused.

Monolluma quadrangula (Forssk.) Plowes is quite a small plant in comparison to *D. retrospiciens* (Fig. 7), and only occurs to the east of the Red Sea, so there is no overlap in their distribution. Its flowers are borne singly, not in clusters, and its ribbed fruits are a diagnostic feature not present in *D. retrospiciens*.

Taxonomic summary

Desmidorchis retrospiciens Ehrenb., *Über das Pollen der Asclepiadeen*: 12-14, 16, 21, t.2 fig.8. 1831. Repeated in *Abhandlungen der Königlichen Akademie der Wissenschaften zu Berlin aus dem Jahre 1829*: 30-31, 34, 39, t.2 fig.8. 1832. Königlichen Akademie der Wissenschaften, Berlin.

Etym: From the active present participle of the Latin *spicare*, to furnish with spikes, and the adverb *retro*, backwards. Backward-facing-spike-bearing *Desmidorchis*.

T: Eritrea, Dahlak Archipelago, Dahlak Island (Red Sea); *Christian Gottfried EHRENBERG s.n.*
HT: B (lost). Exsiccatum seen by N. E. Brown (1904) who reported its label as stating “Red Sea: Dahlac Island, Ehrenberg.” There are no known isotypes.

LT(design. here): t.7, fig.1, in Ehrenberg, C. G., *Symbolae physicae. Botanica*. This is the engraved plate printed in 1828 after a drawing by the 1820-25 expedition artist Finzi (Fig. 3).

Principal homotypic synonyms:

Desmidorchis sp. (aff. *Stapelia quadrangula* Forssk.), *De antheris et polline asclepiadearum*. Schlechtendalio suo Ehrenberg. S. P. D., *Linnaea* 4: 94-97. 1829 sine nom.

Caralluma retrospiciens (Ehrenb.) N.E.Br., *Gard. Chron.* ser.3 12: 370. (24 Sep) 1892. [Basionym page number cited as “33” in error].

Principal heterotypic synonyms:

Desmidorchis acutangula Decne., *Ann. Sc. Nat. Ser.* 2(9): 265. 1838. *T*: Senegambia Confederation; *PERROTTET s.n.* (P, lost). *NT*(Gilbert & Raynal: 323): Mali; *de WAILLY* 4872 (P).

Boucerosia russeliana Courbon ex Brongn., *Les résultats relatifs a la botanique obtenus par M. le Docteur Alfred Courbon, pendant le cours d’une exploration de la Mer Rouge exécutées en 1859-60. Séance du 14 Décembre 1860. Bull. Soc. Bot. Fr.* 7: 900. *T*: Eritrea, Disse Island, between Sero & Mequedel, in rocky places; 1859-1860, *Alfred COURBON* (P, <http://plants.jstor.org/flora/flota005913>) (Fig. 9).

Caralluma acutangula (Decne.) N.E.Br., *Gard. Chron.* Ser.3 12: 369. 1892.

Caralluma hirtiflora N.E.Br., *Kew Bull.* 1895: 264. 1895. *T*: Yemen or Eritrea, Hanish Islands (central Red Sea), 1882, *Lt. Edmond J. W. SLADE* 20 (K).

Desmidorchis quadrangula Ehrenb. non Forssk., in Ehrenberg, C. G. & Schumann, C. M., *Symbolae physicae. Publico usui obtulit C. Schumann. Botanica*: 13, t.7 fig.2. 1900 nom. illeg. *T*(only included element): t.7, fig.2, in Ehrenberg, C. G., *Symbolae physicae. Botanica* (1828, 1900).

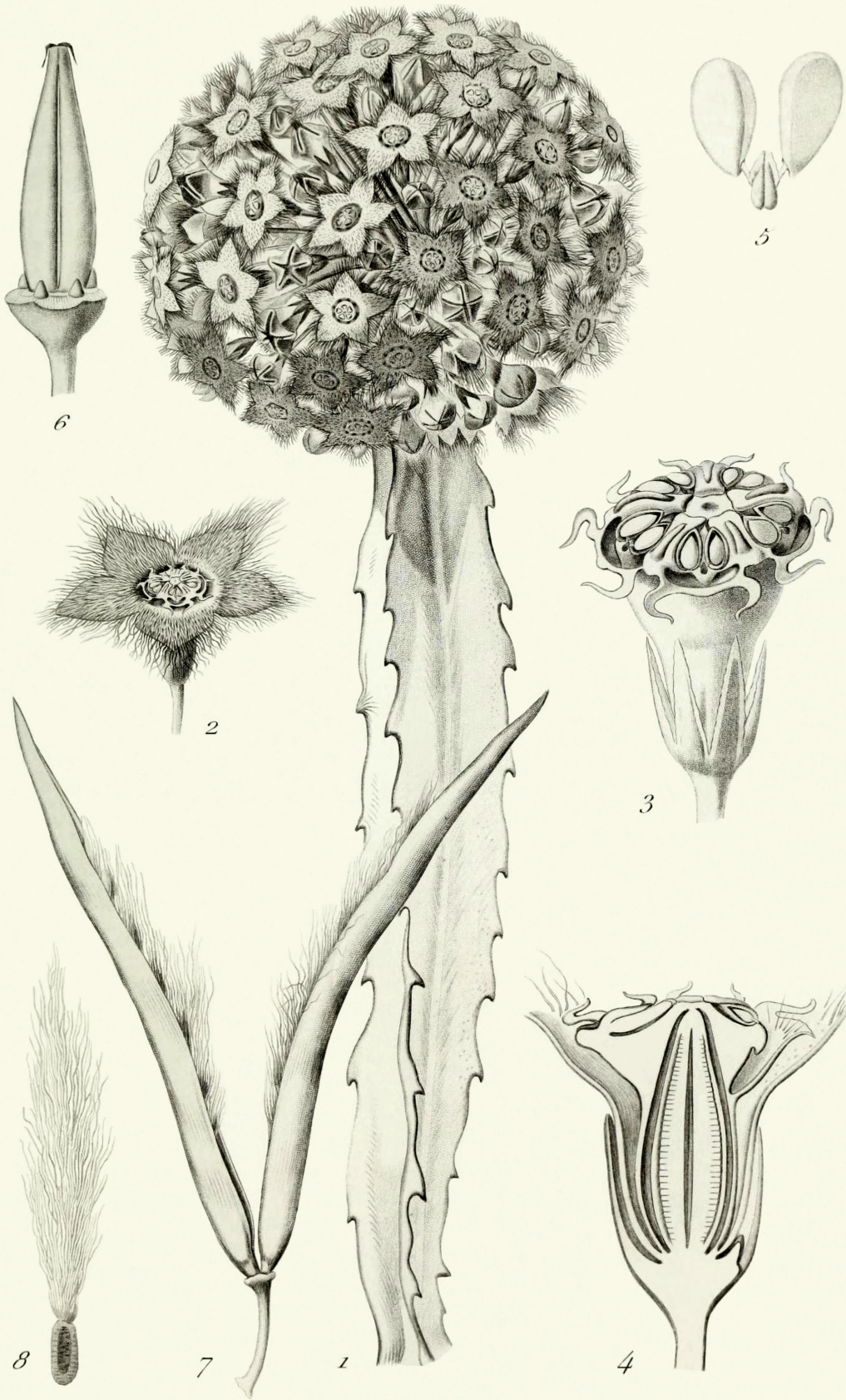
Boucerosia tombuctensis A.Chev., *La végétation de la région de Tombouctou, C. R. Congr. Intern. Bot. Paris 1900*: 271. 1901. *T*: Mali, Timbouctou Region, Arnassey, 25km ESE of Timbuktu; 30 Jul 1899, *Auguste J. B. CHEVALIER* 1318 (PC-CHEV).

For more homotypic and heterotypic synonyms, see Gilbert & Raynal (1980: 322-323) & Goyder & al. (2012: 320).

Next page: Fig 9 The impressive engraved plate and fine example of botanical art at its best of *Desmidorchis retrospiciens* (Eritrea, Dese [Disse Island], *Alfred COURBON*), as *Boucerosia russeliana* from Courbon, *Flore de l’île de Dissée (mer Rouge), Annals des Sciences Naturelles. Botanique Ser.4* 18(4): t.7. 1862 from sketches by Faguet.

Ann. des Scienc. nat. 4^e Série

Bot. Tome 18. Pl. 7.



Faguet del.

Duméril sc.

Boucerosia Russeliana. Alf. Courb.

N. Rémond imp. r. Vieille-Estrapade, 15, Paris.

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- (1832) *Über das Pollen der Asclepiadeen. Ein Beitrag zur Auflösung der Anomalieen in der Pflanzen-Befruchtung, Abhandlungen der Königlichen Akademie der Wissenschaften zu Berlin aus dem Jahre 1829* : 21-39, t.1-2. Königlichen Akademie der Wissenschaften, Berlin. [Repeats the paper of 1831 unchanged, with new pagination. Includes validation of *Desmidorchis retrospiciens* on p.30-31, 34, 39, t.2 fig.8, publ. between Nov 1831 & sometime in 1832].

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Libyam Aegyptum Nubiam Dongalam Syriam et Habessiniam publico institutus sumptu Friderici Hemprich et Christiani Godofredo Ehrenberg studio annis mdcccxx-mdcccxxv redierunt. Publico usui obtulit C. Schumann. Georg Reimer, Berlin.

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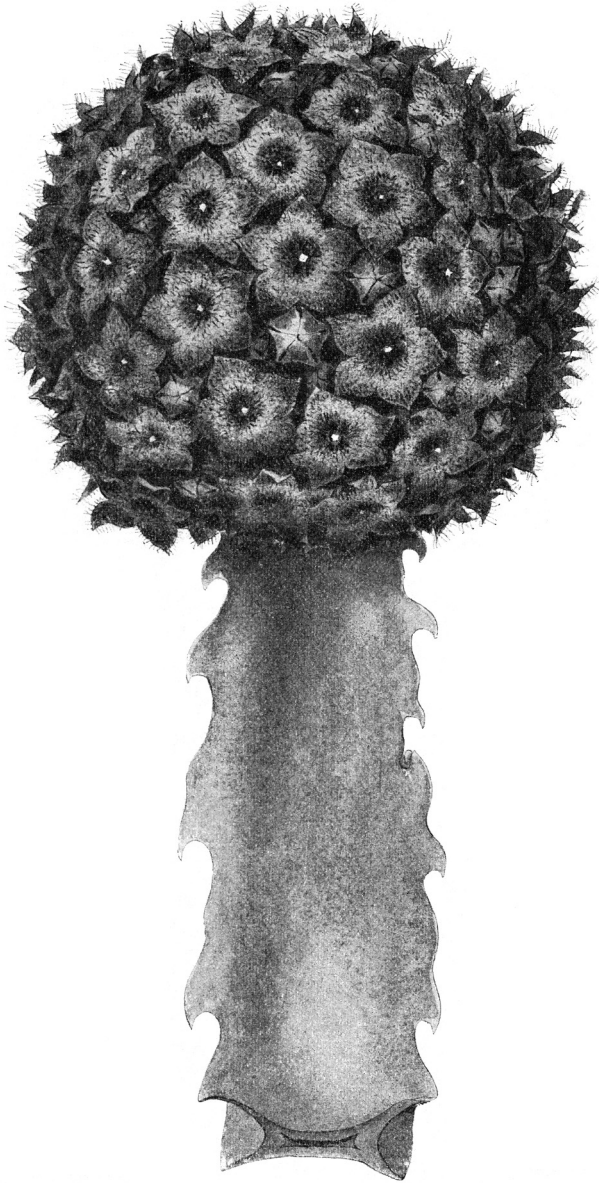


Fig. 10a *Desmidorchis retrospiciens* (Eritrea, nr. Saati, 140m, SCHWEINFURTH 519) Scheinfurth aquatint, in Berger (1910: 73) as *D. retrospiciens* var. *hirtiflora* (N.E.Br.) Berger.

Fig. 14. *Caralluma retrospiciens* (Ehrenb.) N. E. Br. var. *hirtiflora* Berger. Blütenstand $\frac{1}{2}$ nat. Größe. (Nach einem Aquarell von Prof. G. Schweinfurth).

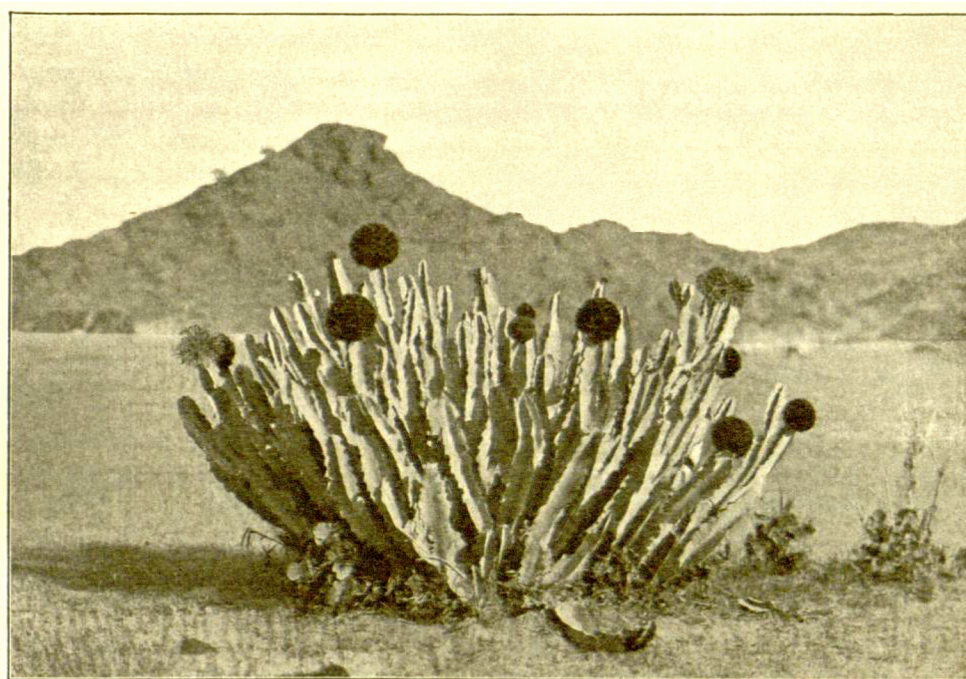


Fig. 10b *Desmidorchis retrospiciens* (Eritrea, nr. Saati, 140m, SCHWEINFURTH 519) Scheinfurth photo (1891-1894), from Engler & Drude, *Die Vegetation der Erde* 9(1.1): 139. 1910. Repeated in Berger (1910: 72) as *D. retrospiciens* var. *hirtiflora* (N.E.Br.) Berger.

Fig. 113. *Caralluma retrospiciens* (Ehrenb.) N. E. Brown bei Saati in der Eritrea (140 m ü. M.). — Photogr. von Prof. Dr. SCHWEINFURTH.

Appendix

Ehrenberg's original text from *Über das Pollen der Asclepiadeen* (1831): 12-14, 16, 21.
The original German protologue is reproduced below, together with an English translation kindly supplied by John Lavranos.

p.12-14

Meine sich nun anschliessenden Erfahrungen, welche den Hauptpunkt der Anomalie in der Asclepiadeen-Befruchtung ganz entfernen und aufhellen, habe ich fern von der Heimath auf einem sehr unbequemen arabischen Schiffe vor der Insel Dhalac begonnen und so wie ich fast in die Mitte von Africa gereist bin, um eine Anzahl Thiere der berliner Fauna zu entdecken, so war es mir auch beschieden, zuerst die Structur der *Asclepias Vincetoxicum* auf der Insel Dhalak an der Küste von Habessinien zu erfahren, wo ganz andre strauchartige hohe Stapelien mit Euphorbien gleichzeitig die Bäume, Sträucher und Kräuter der Landschaft bilden.

Im rothen Meere auf der Insel Dhalak hatte ich nämlich im Jahre 1825 Gelegenheit eine der *Stapelia quadrangula* Forskåls verwandte Pflanze aus der Familie der Asclepiadeen zu beobachten, welche dort mannshohe, aber blattlose, saftige Sträucher bildet. Die Blüthentheile dieser Asclepiadee sind zwar viel kleiner als die vieler andern Formen derselben Familie, welche in unsern botanischen Gärten blühen, allein es trieb mich damals irgend ein glückliches Vorgefühl zur feineren Anatomie derselben an. Bei genauerer Untersuchung der gelben Pollenmassen bemerkte ich unter dem Microscop, dass dieselben eine von der in der Botanik für die Asclepiadeen-Familie festgestellten Formen ganz abweichende Structur zeigten. Ich unterscheid nämlich an jedem der gelben Pollenkörper eine deutliche äussere lösbare Haut und in dieselbe eingehüllte, langgestreckte, mit den verdünnten Enden convergirende Schläuche. Die physiologische Wichtigkeit

My ensuing findings, which remove and elucidate the main point of the anomaly in the pollination of the *Asclepiadaceae*, have been initiated far from home on a most uncomfortable Arab vessel off the Island of Dhalak [now Dahlak] on a journey that took me almost to the heart of Africa in search of certain animals for the collections in Berlin, so I was destined in the first place to discover the structure of *Asclepias vincetoxicum* on the island of Dhalac, off the Abyssinian coast, where the landscape is dominated by entirely different shrubby, tall stapeliads with euphorbias, trees, shrubs and herbs.

In the Red Sea, on the island of Dhalak I indeed had the opportunity, in the year 1825, to observe a plant akin to Forskal's *Stapelia quadrangula*, in the family of the asclepiads, which in that locality forms succulent shrubs as tall as a man. The flowers of this asclepiad are, in their structure, much smaller than those of many other forms of the same family that flower in our botanical gardens, yet some fortunate intuition urged me at the time to look at the more detailed anatomy of these. On closer study of the yellow pollen-masses under the microscope, I noticed that these exhibited a structure totally divergent from those accepted in botanical science for the asclepiad family. In point of fact, I observed on each of the yellow pollen-bodies a distinct outer, detachable membrane that enveloped elongated tubes with rounded attenuated extremities. The physiological importance of this structure induced me at the time to regard this form as a genus in its own right within the asclepiad family and to attribute

dieser Structur bestimmte mich damals diese Form als eine eigne Gattung der Asclepiaden zu betrachten und derselben den Namen *Desmidorchis* beizulegen, womit ich zu bezeichnen suchte, dass dieselbe sich durch ein Bündel von Pollenschläuchen in einer Antherenhaut, anstatt der nackten, wachsartigen Pollenmassen auszeichne, oder dass sie ihre spermatischen Schläuche in Bündeln führe.

Als ich vor einigen Monaten (1828) die in Dhalac nach dem Leben gemalte und frisch zergliederte Pflanze in meine *Symbolae physicas* aufzunehmen beabsichtigte, schien es mir nöthig, die Pollenstructur der gewöhnlichen Asclepiaden vergleichend zu untersuchen und als ein Zufall mir gerade *Asclepias syriaca* zuerst zuführte, an welcher Form, wie mir bekannt war, Herr Robert Brown seine so interessanten Entwicklungs- und Structur-Beobachtungen der Asclepiaden hauptsächlich gemacht hatte, so war ich nicht wenig erstaunt, als ich bei derselben fast die gleiche Structur der habessinischen *Desmidorchis* erkannte. Jede der beiden vom braunen Körper des Stigmas herabhängenden gelben Pollenmassen sah ich deutlich, wenn ich sie quer durchschnitt und die einzelnen Theile mit einem feinen Messer etwas drückte (ohne sie zwischen Glasplatten zu bringen, denn da werden sie zu Brei zerquetscht), aus einer zelligen Haut bestehen, in welcher langgestreckte, schlauchförmige, frei heraustretende Pollenkörner eingeschlossen waren. Den Einfluss dieser Beobachtungen erkennend, vervielfältigte ich sogleich meine Beobachtungen an allen mir zu Gebote stehenden Gattungen der Asclepiaden-Familie und wie sich das Gesehene nur immer mehr bestätigte, so erschien sowohl der bisherige Eintheilungsgrund der Asclepiaden-Familie immer mehr als unstatthaft, als auch die seit Beginn der physiologischen Botanik festgestellte schroffe Anomalie in der Bildung der Befruchtungstheile zeigte sich als ganz ungegründet.

to it the name of *Desmidorchis*, whereby I sought to indicate that [the said genus] was characterised by a bundle of pollen-tubes enclosed in an anther-membrane, in lieu of the naked, waxy pollen-masses, or that it bore its spermatic tubes in bundles.

When, a few months ago (1828) I proposed to include the plant, painted from live material and freshly dissected on Dhalak, in my *Symbolae physicae*, I thought it necessary to investigate the pollen-structure of the usual asclepiads comparatively and as, by chance, it was *Asclepias syriaca* that came to hand on which species, as I was aware, Mr Robert Brown had principally based his interesting observations on the development and structure of the asclepiads, I was not a little surprised when I observed, in this species, almost the same structure as that of the abysinian *Desmidorchis*. Each of the two yellow pollen-masses suspended from the brown body of the stigma became clearly visible to me when cut across and the individual parts compressed somewhat with a fine knife-blade (without placing them between glass plates where they are reduced to pulp) and are composed of a cellular membrane, in which were held elongated, tubular, freely distinguishable pollen-grains. Recognising the importance of these observations I at once multiplied my observations on all such asclepiad genera as were available to me and, as what I saw progressively confirmed, it appeared on the one hand that the hitherto accepted grounds for the division of the asclepiads was inadequate while, on the other, the sharp anomaly in the development of the fruiting structures, claimed since the beginnings of physiological botany proved to be entirely unfounded.

Die von mir trocken untersuchten Formen der Asclepiadeen meines Herbarii sind *Asclepias syriaca*, *Calotropis procera*, *Kanahia laniflora*, *Desmidorchis retrospiciens*, *Cynanchum cardiophyllum*, *Pergularia tomentosa*, *Sarcostemma pyrotechnicum*, *Solenostemma Argel* und noch mehrere Arten derselben Gattungen lieferten mir ein gleiches Resultat. Ich versäumte auch nicht die frischen Blumen des botanischen Gartens zu benutzen und untersuchte 3 Stapelien-Arten, *St. crassa*, *grandiflora* and *vetula*, so wie *Asclepias curassavica* mit *angustifolia*, deren Blüten im späten Herbst (1828) noch zu finden waren.

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Dagegen ist die Naht und Öffnung bei den Formen, welche der Gattung *Stapelia* zunächst stehen, *Stapelia*, *Desmidorchis*, *Lachnostomum* und *Hoia* dem Rande der Pistillarscheibe ihrer ganzen Länge nach zugewendet und zuweilen mit ihm parallel oder aufsteigend.

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Figur 8. ist eine Anthere der habessinischen *Desmidorchis retrospiciens*.

The exsiccate forms of the asclepiads in my herbarium that I examined are *Asclepias syriaca*, *Calotropis procera*, *Kanahia laniflora*, *Desmidorchis retrospiciens*, *Cynanchum cardiophyllum*, *Pergularia tomentosa*, *Sarcostemma pyrotechnicum*, *Solenostemma argel* and several other species of the same genera produced the same results. I also did not neglect to use the fresh flowers of the botanical garden and examined three *Stapelia* species, *S. crassa*, *grandiflora* and *vetula* and also *Asclepias curassavica* plus *angustifolia*, the flowers of which were still available in the late autumn of 1828.

On the other hand, the suture and dehiscence of those sorts close to the genus *Stapelia*, *Stapelia*, *Desmidorchis*, *Lachnostomum* and *Hoya* takes place facing the entire length of the rim of the stigmatic surface or are at times parallel to it or ascending.

Figure 8 is an anther of the Abyssinian *Desmidorchis retrospiciens*.

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Fig. 11 *Desmidorchis retrospiciens* DP7560B (Sudan, Red Sea coast, Jabal Elba)
above: DP7560B flower detail. below: DP7560A wider angle. Photo: Darrel Plowes.