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Allan Cunningham and the Boab (*Adansonia gregorii*; Bombaceae)

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Abstract

Orchard, A.E. Allan Cunningham and the Boab (*Adansonia gregorii*; Bombaceae). *Nuytsia* 28: 1–9 (2017). The Australian Boab, now known as *Adansonia gregorii* F.Muell. was first noticed botanically by Allan Cunningham during Phillip Parker King's second survey voyage in 1819, and first collected by Cunningham in the following year at Careening Bay. Cunningham saw only fruiting material, and considered the tree to belong to the genus *Capparis* L., giving it the manuscript name *C. gibbosa* A.Cunn. He described but did not formally name the species in King's *Narrative of a Survey*. The name was published with a valid description in Heward's biography of Cunningham in 1842. In the interim Cunningham had drafted a paper comparing his species with the African genus *Adansonia* Juss., but unfortunately never published it. Subsequently Mueller described the species again, as *A. gregorii* F.Muell., based on specimens collected near the Victoria and Fitzmaurice Rivers, and this name became accepted for the species. In 1995 Baum recognised that the two descriptions referred to the same taxon, and made the combination *Adansonia gibbosa* (A.Cunn.) Guymer ex D.Baum. A subsequent referral to the Spermatophyta Committee and General Committee resulted in the name *C. gibbosa* being rejected, on the grounds that 'it seems unlikely that…Cunningham had any intention that this [Heward's] description should validate the name of a new species.' Recent rediscovery of Cunningham's draft paper shows that, on the contrary, Cunningham clearly believed that his name *C. gibbosa* was suitable for acceptance, and according to the practices of his day, should be published. That his premature death and subsequent unrecognised description of the species in Heward's paper resulted in his discovery going unacknowledged, and being overtaken by Mueller's later description, is unfortunate, but now irreversible.

Introduction

Adansonia gregorii F.Muell., is one of Australia's most readily recognised trees (Figure 1, 2). It is widespread in the Kimberley region of Western Australia, extending into the adjacent western Northern Territory. This paper traces its discovery by Allan Cunningham, his work towards its description, and its subsequent nomenclatural history.

History of discovery and nomenclature

This species first came to botanical attention during the second of Phillip Parker King's survey voyages in the *Mermaid* in 1819. King was accompanied by the botanist Allan Cunningham, attached to the voyage on the recommendation of Sir Joseph Banks. Cunningham first saw the Boab at Still Bay in the West Arm of Cambridge Gulf on 22nd September 1819, when he described seeing 'The large Gouty Tree observed on the shore of the large Island without leaves, I found bearing fruit at the Extremities of

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Figure 1. *Adansonia gregorii*. A – habit; B – fruit, with senescing leaves. Photographs by A.E. Orchard taken at Sheep Island, Camden Harbour, 27 April 2016 (A) and Vansittart Bay, 24 April 2016 (B).

the branches, which I with some Difficulty gather'd. It proves to be a *Capparis*, No. 251 seed list. The wood is soft succulent & spongy, of even arborescent habit of growth.' It seems from this description that he did not collect botanical specimens, only seeds.

The following year, during King's third survey voyage, Cunningham saw the tree again at a number of sites, without making collections, until the expedition was obliged to spend 18 days at Careening Bay in Port Nelson. Here the *Mermaid* was hauled on shore for repairs to her keel and stern post and Cunningham was free to explore the Kimberley flora at leisure.

At Careening Bay Cunningham collected 54 species, the largest number for any site on the Kimberley coast. Among his collections was the 'gouty *Capparis*', which received a longer than normal entry in his specimen list (Cunningham 1821), a list which was subsequently sent to Banks at Soho Square and to William Aiton at Kew. The following was written in January 1821, on the expedition's return to Sydney, as Cunningham prepared a 'fair copy' of his specimen list for Banks and Aiton:

> *308. Capparideae. The young leaves of a Tree of very extraordinary appearance, exhibiting a Trunk 12–20 feet high of a soft spongy nature, 5–9 feet diameter, from which proceed subsucculent branches for the most part naked in the months of Aug^t^ & Sept., bearing large one-locular pedicell'd fruits which, with its internal character of a dry corky pulp enveloping the seeds, has induced me to consider it a Capparis, and, its specific title, gibbosa, has suggested itself from its gouty swollen stems. Its young compound leaves (latterly observed) may however lead me to Crataeva. What is Stephania Willd., see Jacqu., schoenbr. t. 111? This singular tree was first observed by me in Sept^r^ 1819, on the Shores of Cambridge Gulf in Lat. 15° & Long. 128° 30' and has been traced thro' all the intermediate trendings on this interesting arid coast, so far to the West^d^ as Brunswick Bay in 124.45 on the same parallel, from which HM's Cutter took her departure, at the breaking up of the Monsoon, for Port Jackson in October last (1820). It expands its flowers most probably when fully in expanded leaves, in December to February & March during the Rains.*

The surviving copy of this list, it is interesting to note, is annotated 'Mr Aiton requests that this list may be returned'. It seems that Banks'/Brown's copy was misplaced, Aiton's copy was borrowed, and not returned! The species is not mentioned during the fourth survey voyage in *Bathurst* in 1821.

At a subsequent date Cunningham clearly realised that his *Capparis* bore a striking resemblance to *Adansonia* from Africa, and spent some time researching the latter. Among his papers held at the Natural History Museum is a draft comparing *Adansonia* and *Capparis gibbosa* (Cunningham undated). The paper has comments on the two taxa set out side by side (presented sequentially below for ease of reading). Two points are worth noting from this draft paper: firstly, Cunningham clearly recognised the similarities between *Adansonia* and his *Capparis* (although not going so far as to suggest that his plant belonged in *Adansonia*), and secondly, he fully adopted the manuscript name *Capparis gibbosa* for his discovery, clearly expecting it be published. His draft paper is transcribed below.

A comparative view of Adansonia of southern Africa and Capparis gibbosa of the North West Coast of Terra Australis, both trees of singular habit.

Adansonia

Cal. 1-phyllus, 5-fidus deciduis. Cor. 5-petala. stamina numerosa filamenta intervasiicoalita. Antherae reniformis incumbentes. Stylus longissimus tubulosus. Stigmata plura, decemradiata prismatica. Caps. oblonga lignosa, 10-locularis, pulpa farinacea polysperma.

General Remarks

The Trunk is not above 12–15 feet high, but from 65 to 78 feet round. The lower branches extend horizontally, and as they are about 60 feet in length, their own weight bends their extremities to the ground, and thus form an hemisphaerical mass of verdure 120 or 130 feet diameter.

The Roots extend as far as the branches, that is the middle forms a Pivot, which penetrates a great way into the earth, the rest spread near the surface. The flowers are in proportion to the size of the Tree, and are follow'd by an oblong fruit, pointed at both ends, about ten inches long, 5 or 6 broad and coated with a Kind of greenish down, under which is a ligneous rind, hard and almost black, mark'd with rays, which divide it lengthwise into sides. The fruit hangs to the Tree by a Pedicle two feet long, and an Inch diameter. It contains a whitish spongy juicy substance, with seeds of a brown colour, and shaped like a Kidney-bean. The Bark of this Tree is nearly an Inch thick, of an ash-colour'd Grey, greasy to the touch, bright and very smooth; the outside is cover'd with a kind of Varnish, and the inside is green speckled with red. The wood is white and very soft, the first shoots being green and downy.

The leaves of the young Plants are entire of an oblong form, about four or five inches long, and almost three broad towards the top, having sev^{l} veins running from the middle rib: they are of a lucid green colour. As the Plants advance in height, the leaves alter, becoming divided into three parts, and afterwards into five lobes, which spread out into the shape of a Hand.

The Tree sheds its leaves in November, and new ones begin to appear in June. It flowers in July and the fruit ripens in October and November.

The Age of the Tree is perhaps no less remarkable than its enormous size. M. Adanson relates that in a Botanical excursion to the Magdalene Islands in the neighbourhood of Goree, he discover'd

some African Calabashes, from 5 to 6 feet diameter, on the bark of which were engraved or cut to a considerable Depth, a number of European Names. Two of these Names, which he was at the trouble to repair, were dated, one in the 14th and the other in the 15th Century. The letters were about 6 inches long, but in breadth they occupied a very small part only of the circumference of the Trunk, from whence he concluded they had not been cut when these Trees were young.

These Inscriptions however he thinks sufficient to determine pretty nearly the Age, which the Adansonia may attain, for even supposing that those in question were cut in their early years, and that Trees grew to the Diameter of six feet in two centuries, as the engraved letters evince, how many Centuries must be requisite to give them a Diameter of 25 feet, which is perhaps not the last term of their growth. The inscribed Trees mention'd by M. Adanson to have been seen by him in 1749, were observed two centuries before by Thévet; viz in 1555 [sic, Thévet, 1557], who speaks of them in the relation of his Voyage to Terra antarctica, or australis.

Capparis

Cal., Cor. Flores nondum vidi

Caps. (v. Bacca) elliptica corticosa pedicellata unilocularis polysperma. Semina in medulla, v.pulpa sicca suberosa nidulantia.

General Remarks

The particular line of Coast of Terra Australis where this remarkable Tree seems alone to be indigenous having never been visited at the Season wherein it produces its blossom, its floral fructification is wholly unknown; all therefore that is presumed of its natural Class and family has been gather'd from the structure of its well ripen'd fruit, with which the Trees have (during the periods of the surveys of the N.W. Coast) been abundantly laden.

The Trunk of this Tree has been observed 12 to 20 feet in height, and from 15 to 27 feet in circumference, of a subcylindrical form, very slightly conical, or rounded with a somewhat less Diameter at its extreme elevation than at its base. From the summit proceed strong arms, or main branches, which extend about 35 or 40 feet; in some, truly horizontal, whilst in others their inclination is in an irregular manner upwards; and the Roots (from the circumstance of the Tree being uniformly found growing in very shallow soil, and frequently among Rocks) scarcely even penetrate far beneath the surface, but rather spread themselves upon it. The fruit which has been always observed at the extremities of the branches is a capsule of an oval figure 5–8 inches long, rounded at the apex, having a hard woody brittle shell, cover'd with a greyish brown villous coat.

The fruit is inserted on the branch by a pedicle 2–3 inches long, and within its solitary cell is a whitish corky dry substance with which many reniform seeds are enveloped. The Cortex or outer Bark is about an Inch thick, of an ash-colour'd Grey, and of a glossy smooth appearance; the liber being of a brownish red colour. The wood is white of a coarse fibre, extremely soft, spongy and full of sap; so much so, that without difficulty a Sharp Instrument can be altogether thrust into it. The extremities of the branches which were bursting forth into leaf in September and October, are green and translucent, and very tomentose, the leaves themselves being of quinary insertion on a common Petiole.

This remarkable Capparis seems to cast its leaves in the middle of the dry season (June or July)

and the new ones make their appearance (as before stated) at the close of September, or beginning of October. It probably produces its flowers in the Rains (December to February) and we have gather'd its ripen'd Capsules in September and October. With respect to the rapid or tardy progress of the growth, or the subsequent duration of this remarkable Capparis which forms a feature in the Landscape of those portions of the Coast whereon it is found, it is impossible to form any just or correct Idea; since no facts of a defined series of stages of growth in the Tree were detected, nor were the observations made during the voyages sufficient to fix a Datum from which even a presumed Calculation could be made of the period required to allow the Tree to attain the enormous dimensions above stated. Altho' no wrecks of Old decay'd Trees were remark'd on those parts of the Coast where the species is most abundant, it is nevertheless possible that so far from its ever arriving at the extraordinary age allow'd Adansonia, it makes a more rapid advancement to maturity, and may really be of proportionate temporary Duration, an opinion grounded wholly on the acknowledged quick growth of Bombax Ceiba, a Tree of Equinoctial America, which arrives by the aid of Humidity, shade and warmth of Atmosphere, at considerable Dimensions in a few Years, approaching those of Capparis, to which also it is analagous in the deciduous Char^r of its compound leaves, the softness of its wood and the texture of its fibre.

The Capparis was first seen on the shores of Cambridge Gulf in Lat. 15° So. and Long. 128° 30' East, and it was traced on the North West Coast in the above parallel, so far to the Westward as 124° 25' E. in Brunswick Bay on the same extensive Shores.

The name of His Majesty's Cutter was deeply carved upon the stem of the largest Tree on the shores of Careening Bay, Port Nelson, with certain Initials and the Date of the Year of our Visitation.

A.C.

The above paper is typical of much of Cunningham's writing: it is thoroughly researched and logically written, almost to the point of pedantry. So why was it not published?

The paper is undated, but must have been written during Cunningham's residence at Strand-on-the-Green between 1831 and 1836. He probably had access to fresh material of the African *Adansonia*, presumably from specimens growing at Kew, as he was able to describe its development and colour when fresh. He also had access to literature which would not have been available in Sydney. It is known that during this period he met frequently with Robert Brown to discuss the taxonomy of various Australian plants (Orchard & Orchard 2015), and it seems inconceivable that the subject of such an unusual plant would not have come up in these discussions. Further, this draft paper is bound with other Cunningham manuscripts in the three volume compendium housed in the Botany Library, Natural History Museum. Other items in this compendium are seed, plant, bulb and specimen lists, copies of parts of Cunningham's journal, and letters to Banks (and a couple to Aiton), i.e. correspondence and documents sent to Banks, inherited from him by Brown and deposited in the British Museum. It seems very likely then that Cunningham wrote this draft paper and gave it to Brown for consideration and advice during the period 1831–1836. When Cunningham was unexpectedly recalled to Sydney in 1836 (where he died in 1839), the paper was forgotten, and later gathered up for binding with other Cunninghamiana.

Cunningham wrote a ground-breaking plant geography essay on the plants discovered during the King surveys, and this was published as an Appendix to King's *Narrative* (Cunningham 1827). In this Appendix (p. 25) he devoted half of his description of Capparides to his 'gouty-stemmed *Capparis*', but unfortunately did not mention the species epithet he had coined for it. Had he done so the name would have been validly published there.

When Robert Heward came to write Cunningham's biography/obituary (Heward 1842) he had access only to Cunningham's journals and some letters. However in the case of the Boab he was able to quote a substantial description from the journal, based on a collection made by Cunningham at Careening Bay: '…the arborescent gouty species of this genus, (*Capparis gibbosa*, A.Cunn.,) which was first observed on the shores of Cambridge Gulf, is frequent here, growing to an enormous size, and laden with large fruit. I measured the stem of one very remarkable tree of this species, and found it near twenty-eight feet in circumference, and scarcely twenty-five feet high. Some of the trees were in the earlier stages of vernation, the extremities of the naked branches appearing green, and one that I opened exhibited the character of *folia quintia*.'

In 1857 Ferdinand Mueller described *Adansonia gregorii*, based on his own specimens collected 'In planitiebus orariis et ripariis ad flumina Victoria et Fitzmaurice, ad promontorium Point Pearce alibique.' It is noteworthy that in the final paragraph of this description he cited 'Gouty-stem Tree, *All. Cunn. in King's Survey, App. p.* 25.' Mueller must have recognised it from the description, as he had no access to Cunningham specimens (or perhaps Hooker inserted the cross-reference in editing Mueller's paper). Neither had access to Cunningham's journal, specimen list, or draft paper, in all of which his manuscript name existed – these documents were all in the British Museum with Brown, and the only specimen was also in BM, in the set sent to Banks/Brown. So Mueller can be excused for not taking up Cunningham's epithet (he was unaware of it unless he had read Heward's biography). But in describing the species again he inadvertently created a taxonomic synonym.

In 1986 Gordon Guymer recognised the conspecificity of the two names and annotated the type specimen in BM as 'Adansonia gibbosa (Cunn.) Guymer' but did not publish the combination. Nine years later Baum (1995) took up Guymer's combination as *Adansonia gibbosa* (A.Cunn.) Guymer ex Baum as part of a revision of *Adansonia*. This combination was subsequently adopted by a small number of authors (see Wilson and Guymer (1999) for a summary of some of them). Almost immediately Macfarlane and Guymer (1995) indicated that a proposal to conserve the name *A. gregorii* would be prepared, and such a proposal (to reject the name *Capparis gibbosa*) was published by Wilson and Guymer (1999). See also Kenneally (undated, *c.* 1996).

The proposal to reject the name *Capparis gibbosa* was based on two arguments: first, that the publication of the name by Heward was actually or potentially invalid (i.e. he did not intend to publish a new name, the descriptive matter was inadequate), and second, the new combination *A. gibbosa* displaced the name *A. gregorii*, long used for an important and distinctive Australian tree.

The Spermatophyta Committee considered the proposal and voted 9:6 in favour of rejection, the bare 60% required to accept (Brummitt 2004). This decision was subsequently endorsed by the General Committee and the IBC.

The decision of the Spermatophyta Committee was based on the evidence presented by Wilson and Guymer (1999). The committee did not have access to Cunningham's journal, or his unpublished paper, and did not mention Cunningham's description (unnamed) of the species in King's *Narrative*. It is interesting to speculate whether their decision would have been different had they been aware of this material. After all, a change of mind by just one of the Committee would have seen rejection of the proposal.

It was claimed by the Spermatophyta Committee that Heward did not intend to validate this species name, yet he supplied the name and author, a description, and collection location for the type specimen (a specimen which still exists in BM). Later in the same biography Heward described from Cunningham's

notes four taxa that are generally considered to be validly published: *Crinum norfolkianum* A.Cunn. ex Heward, *Hymenanthera oblongifolia* A.Cunn. ex Heward, *Lomaria norfolkiana* Heward and *Nephrodium remotum* Heward. The description of *Urtica gigas* A.Cunn. ex Heward in the same paper exactly parallels that of *Capparis gibbosa*, in that it is part of his journal commentary, in English, not in Latin, and is quite brief. Despite this it is usually accepted as validly published. Elsewhere, in letters to William Hooker and William Colenso, Heward said that he intended to publish or have published Cunningham names that were not in print at that time. For example, in a letter to Colenso just after Cunningham's death, and speaking of species collected in New Zealand by Cunningham in 1838, he said 'I have written a sketch of the labours of our late friend which if you will inform me how I can forward to you shall be transmitted. I shall also describe the new plants found by Cunningham in his visit of 1838, which shall be forwarded at the same time.' (Orchard & Orchard 2015: letter 6/o/1). To Hooker, Heward wrote in 1840: 'I have packed up a set of poor Allan Cunningham's last collection of ferns…Among the ferns there is I believe only three new species, viz. a *Gleichenia* which I have named after him, a *Davallia* and a *Dicksonia*.' (Orchard & Orchard 2015: letter 7/l/5). The *Gleichenia* was published as *Gleichenia cunninghamii* Heward in Hooker (1846). Bentham later published at least one name supplied by Heward based at least in part on Cunningham specimens: *Atriplex vesicaria* Heward ex Benth. There is thus little doubt that Heward intended that Cunningham's unpublished names should be committed to print, either by himself, or through him, by others.

The Code is clear that in making decisions on nomenclatural matters only actions actually made and intentions stated in print are to be considered; unstated intentions cannot be reliably invoked. Heward fulfilled all the requirements for valid publication, the only doubt being on his 'intentions'. It is generally agreed that he did validly publish other Cunningham names in the work in question, thus demonstrating his intention that they be formally recognised. Some descriptions were better and more adequate than others, but if all other conditions for valid publication were fulfilled (and they were for *Capparis gibbosa*) then I argue that all were validly published. How did Heward's actions differ from those of, for example, William Hooker, who frequently validly published names for new taxa by quoting from letters or journals received from abroad? Did Cunningham intend this extract from his journal to be a validating action? He couldn't – he was dead. However his previous actions, described above, show that he believed he had a new species, had gone to considerable trouble to describe and characterise it, had consistently used the name *Capparis gibbosa* for it, and had gone within a whisker of formally publishing it himself. So it can hardly be argued that Cunningham did not wish to see the plant formally described. If he had sent his draft paper to Hooker rather than (as suggested above) giving it to Brown, his name would almost certainly have been formally published in one of Hooker's journals (see Orchard (2013), for an account of Cunningham's publication collaboration with Hooker).

This leaves the argument that adoption of the name *A. gibbosa* would displace a long-used and familiar name, *A. gregorii*, applied to a tree of economic, cultural and iconic importance. There is certainly considerable merit to this argument, but, in view of the close vote, it is questionable whether it would have been sufficient to carry the day with a committee composed largely of botanists from the northern hemisphere.

Nevertheless, the vote was carried and there seems little point in resurrecting the argument in a formal sense. *Adansonia gregorii* remains a well-known and long-used name for a very familiar and locally characteristic tree, and little but confusion would be gained by changing it now for purely nomenclatural reasons. It is too late to retrieve for Cunningham the nomenclatural credit that he deserved for his discovery and investigation of the species, but this paper will put on record his achievements in this respect.

Concluding remarks

There are a few postscripts necessary to this tale. In his draft paper Cunningham doubted whether his *Capparis gibbosa* would be found to be as long lived as *Adansonia*, believing that it might be found to be, like *Bombax*, fast growing but of relatively short duration. In this he was wrong, and it is now clear that *A. gregorii*, like its African relatives, is very long lived. Cunningham mentioned in his draft paper that the largest tree at Careening Bay had been inscribed with the name and date of *Mermaid*'s visit. This tree still stands, in perfect health, 200 years later (Figure 2). Cunningham said that the largest tree at Careening Bay measured 28 feet in circumference (about 7 feet or over 2 m in diameter). Today the tree has split into two trunks, each about this size or a little larger. If the tree was already the largest 200 years ago, it is not unreasonable to assume a present age of over 400 years, probably much more, for this tree. Cunningham also believed that his plant, unlike African *Adansonia*, lacked a taproot, and had only surface roots. This is not so. Bowman (1997) has shown that *A. gregorii* has a well-developed taproot, from which it can resprout after fire. Finally: a disclosure. The author was a member of the Spermatophyta Committee that made the decision on *Adansonia* in the 1990s, but, like the other members of the committee, was unaware of the manuscript material transcribed above. It is a pity that this was so, and that a more informed decision could not have been made, but it is now too late to go back. The species should continue to be known as *A. gregorii*.

Figure 2. The Mermaid Tree (*Adansonia gregorii*). Photograph by T.A. Orchard taken at Careening Bay, 1 April 2016.

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