A miscellany of topics on the subject of succulent plants authored and edited by Roy Mottram

Taxonomy
Botanical History
Databases &c.
Summary

A journey through the life and times of Carl Linnaeus during his most creative period, an examination of the cacti that he encountered and a complete re-evaluation of the 22 species known to him in 1753, the starting date for botanical nomenclature.

A new name combination is validated for Stenocereus heptagonus, along with proposals for 6 new lectotypifications, 3 neotypifications and 1 epitypification (all highlighted in green print).
Linnaean cactus legacy
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Carl Linnaeus (1707-1778) (Fig. 1) was a Swedish physician and natural historian, who rose to stardom as a result of his cataloguing of natural history objects and organisms under a universal system of two-ranked names, the so-called binomial nomenclature and a system of simple rules for new name creation. In his country of birth, Sweden, he has become something of a national hero, and his image appears on the modern 100 Swedish Kroner banknote (Fig. 2). He has also been commemorated on Swedish postage stamps of 1939, 1963 and 1978.

Linnaeus did not invent binomial nomenclature as is often assumed. It had been randomly applied by some authors from as early as the 14thC.

Highly regarded by Linnaeus and
frequently cited by him were the sixteenth and seventeenth century dictionaries of plants known as the *Pinax* (index or register) and the *Phytotinax* (index of plants) by Caspar Bauhin (1560-1624) (Fig. 3), which contained many binomials (Fig. 4). Indeed, Bauhin wrote in the preface of his *Phytotinax* of 1596:

“For the sake of clearness, I have applied one name to each plant, and added also some easily recognisable character.”

This has led many commentators to describe Bauhin as the true founder of the binomial system. However, there were others even earlier than Bauhin, including Mathioli and Tabernaemontanus, who had also occasionally applied binomial names.

Nevertheless, authors before Linnaeus had applied binomials very inconsistently, preferring instead to use the long descriptive sentences known as phrase-names that were becoming ever more cumbersome as each differentiating character was added in order to distinguish them from related plants that were already known. Linnaeus’s genius was to recognise that this anarchic approach was a road to chaos and that simplification was needed.

Linnaeus attended Lund University, joining it at the age of 21, and was then at Uppsala University in 1730-1731, where he gave public lectures on botany. It was here that he befriended another student at the University, Peter Artedi, with whom he shared ideas about natural history, classification and nomenclature. Just how much of Linnaeus’s concepts were inspired by this close
LIB. XII. SECT. I.

Colore fructus variat, virides interneae purpurei, cerei, albi variegati.

Ficus Indica grana.

Quidam Tunas (id elt, fructus) nullos gignunt, sed sub foliis fructum alium Grayn dictum duntum, vermiculum felicit feliejs adhaerecen
tem & tenui pellicula oduratem, & hæc celebratissima Ind. Cochinillia, qua Graiae colorantur, Idem.

Arbor Cochenillei, Claud. Duredo.

X. Ficus Indica fynofo sylvelris.


Ficus Indica folio fructu minore.

Indorum ferrumatrix, Adver.

Opuntia oftosollos, quos artum fruturis & laxationibus profut: de qua & Author hist. generalis Indiarum.

Arbor rupturas confidant, Ovied. qui supractum Cardum Tunas in banc arborem transmutari.

XIII. Mippo nonnullis Indis Calabia, quæ ossium fruturi alligatae ex ferrumine folet,

XIV. Cereus Peruvianus spinosius frutru rubro nucis magnitudine.

Cardis species, quem Chri. Rani Cereum appellant, Oviedo.

Euphorbiæ arbor Cerei effigie, Ad. Lob. loco.

Cereus spinosus, Lugd. Ger.

Cereus Peruvinianus, Tab.

XV. Ficus Indica levis pilosa: hæc ex Cretæ miffa: eaq; duplex, altera folio rotundata, altera folio oblongo.

XVI. Ficus Indica humilis: hæc ex Horto Doctoris Saltzmanni Poliatri & Profess. Argentinensibus habeb, quæ pedem viæ fuperant, ramis

Tela Arriano, Gui.

Ficus Indica minima, alii Lichen marinus, vel Opuntia marina, de Bry.

SYC O.
acquaintance, we are never likely to know, because Artedi met with a tragic death by drowning in an Amsterdam canal in 1735. Linnaeus inherited Artedi’s unpublished notes and manuscripts on ichthyology and the Umbelliferae.

Students at that time were pretty much left to their own devices, so Linnaeus spent much of his time in the neglected botanical garden at Uppsala and the rich libraries of the University. He also worked on the herbarium of Joachim Burser (1583-1639) and used it extensively for his botanical training. The 25 volumes of some 3200 specimens contained a great diversity of plants, some collected by Burser himself but also many obtained from Caspar Bauhin, and they were arranged in the order of Bauhin’s Pinax. Many of Linnaeus’s taxa have subsequently been lectotypified with Burser specimens, on the assumption that they were seen by him and therefore original material, although he seldom mentioned them, and none of the cactus Burser specimens were ever cited.

He began to travel, visiting Lapland (1732), west and east Dalarna, a region of Sweden (1734), through Denmark, Germany and Holland (1735), and to England (1736). In England he was proclaimed a member of the Imperial Academy of Naturalists and given the illustrious pseudonym of ‘Dioscorides Secundus’.

A flowering of genius.
By the age of 28 in 1735 he had already written several manuscripts that would later become his major works. The first edition of his innovative system of classification for minerals, animals and plants was published in 1735, which he called Systema naturae (1735). This included large tables of plants organised into a new classification with many new names and was full folio in size (Fig. 5). It was here that the name Cactus as a genus was borne.

Plants were classified based on their numbers of stamens (male parts) and ovaries (female parts), the so-called sexual system. It was actually Sebastien Vaillant (1669-1722), a demonstrator of plants at the Jardin des Plantes, Paris, who had first drawn attention to...
the value of sexual organs in plants for classification. Vaillant had proposed a classification based on the number of stamens and ovaries, which Linnaeus then adopted for his own system. He broke down the plant kingdom into 24 orders, based on the number of flower stamens and ovaries (Fig. 6), which may seem artificial but it conveniently approximates well to a system of natural relationships.

Cacti fell into the order with over twenty stamens, the Polyandria, later moved to the Icosandria, also having more than twenty stamens. It should be especially noted that he equated his new name Cactus with Melocactus, a pre-Linnaean generic name formalised by the earlier author Tournefort. Linnaeus was a great believer in simple names, so he shortened the word Melocactus to just Cactus. This happens to coincide with the application of the word cactus in ancient times to the Spanish artichoke, a prickly plant found in Sicily, as well as being very loosely applied to almost anything thorny or unpleasant, but whether Linnaeus had the ancient usage in mind at the time he never made clear.

By good fortune Linnaeus was able to work in the garden of the wealthy Dutch banker and patron of the sciences, George Clifford (1685-1760), and was made the Director of the garden of his De Hartecamp estate, south of Haarlem, in 1737.

By 1736 he had already authored fourteen printed works, and shortly afterwards came the most sumptuous of his works, a major illustrated catalogue of the plants in Clifford’s garden, Hortus cliffortianus (Fig. 7), completed in only 9 months in July 1737 & published in 1738, illustrated with 36 magnificent uncoloured plates by the famous botanical artist George Ehret.
Initially it was distributed to a few friends of Clifford in 1738, but not placed on the market until 1739.

Contemporary coloured copies are exceedingly rare and only known in the botanical libraries at Paris and Uppsala. (Fig. 8). Fig. 9 is a painting by the Dutch master Jacob de Wit of three unknown people.
Classe XI.

ICOSANDRIA.

MONOGYNIA.

CACTUS g. pl. 390.

1. Cactus faberundus, rectus tuberculis ovatis barbatis.
   Melo-Cactus mammillaris major teffilis & globosus, spinis brevioribus. Morif. biff. 3. p. 171.
   7.2o. f. 1
   Opuntia Echino-Melo-Cactus effrige tuberosa, fructu levissimo amethesino. Bryo. prod. 2. p. 79.
   Cactus in repibus America, Curassavia, aliarumque.
   Hac tota obvallatur undique tegiturque papillos ovatis barbatis, uti Mesembryanthemum; la.
   Ascet (quod congeneres non) uti Euphorbia; fructificant uti Cactus.

2. Cactus quatuordecim-angularis subinundatis.
   Melo-caetos, effr. eff. 36. 36.
   Melo-cardus echnatus. Dalesch. biff. 1442.
   Melo-cardus, fulcis rech. spinis ad angulos appositis, major. Morif. biff. 3. p. 179.
   Echino-Melo-Cactus major non lacinaceus, collis rechis. Herm. parad. 135.
   Cactus in repibus marginibus Americae, uti Jamaicae & aliarum.
   Figura sust ita lepsa Echinum reftet, undeque spinis obvallatis, in apice corpore discoides convect.
   zo volvo lastru stricto, et quo flores producunt.

3. Cactus septem-angularis oblongus crecatus.
   Cactus in America. 
   Non ра planta exala ovata ets, septem angulis profunde inculptis; dicunt alii se tamen ped.
   dalem & dopdalem unidos; non ра tamen stilis figura semper per plantas annos simul siti, nec
   licet bene cresceveris figuram mutare.

4. Cactus quadrangularis longus creclus, angulis compressus.
   Cereus creclus minor, fructu spinoso, collarum numero varius. Herm. parad. 117.
   Ficoidea f. Ficus americana creclus, cere effrige, maxima cactus quadrangularis vel porus angulorum
   numero variabilis, spinis longissimus armato, flore subvulvato, fructu spinoso rotundo, seminibus migris.
   majoribus & spinisemibus pleno Kigg. botan. 20. Plak. alm. 147.
   Cactus in America, Curaçao & alibi.
   Angulis in haec planta compressi & fructibus membranacei sunt.

5. Cactus sex-angularis longus creclus.
   Cactus in Surinam.
   Hae planta alissima est & firma.

6. Cactus novem-angularis longus creclus, angulis obtusis.
   Cereus peruanus spinosus, fructu rubro multa magnitudine. Baub. pin. 478.
   Cereus spinosus. Dalesch. biff. 1859.
   Melocactus americanae muticolorum, flore albo, fructu atro-purpureo. Tourn. inf. 653.
ICOSANDRIA. MONOGYNIA.

Euphorbiæ adultæ plantæ, quæ ceri effigie. Stap. theophr. 1057.
Cretst in America, praestim Jamæica infest in mari timis arenoïs & silvis campis trésbris aridis & aperiis ubique.

7. CACTUS fræpis novem-angularia longus eretæs, angulis oblongis, spinis lanis brevioribus.
Cretst in Curaçao.

8. CACTUS octangularis longus eretæs, angulis comprimis truncatis, spinis lanis longioribus.
Cerei cæladiciæ octastylis maxime angulosæ, spinis albis longibus longitùs, lanugine flavus. Boerh. lugsb. 1 t. 293.
Cretst in Curaçao.
An varietas sola praecedentis?

9. CACTUS quinquangularis longus eretæs, articulatus.
Cretst in America.
Caulis eretæs, quinquangularis, articulatus, internodiis pedaliibus. Spinerum acrosi par marginem abique tomento nilo manifesto admittit pro ductum. Angulis variis variis ad sex; nullis exanguis emissis et caele radices, fed tenues, eretæs, debiles persistit.

10. CACTUS frondes, angulis quinque pluribusque obtusis.
Cerei frondes minor polygonus articulatus. Herm. parad. 120. Boerh. lugsb. 1 p. 293.
Cerei americani major articulatus, flore maximo noccu le aperiente & fructu album odorantem spirante. Fol. hed. 1 f. 232 t. 234.

11. CACTUS francisci, angulis quinque pluribusque obtusis.
Cerei francisci minor polygonus articulatus. Herm. parad. 120. Boerh. lugsb. 1 p. 293.
Cerei francisci major articulatus, flore maximo noccu le aperiente & fructu album odorantem spirante. Fol. hed. 1 f. 232 t. 234.

12. CACTUS triangularia frondes articulatus.
Ficoides americanus five Cerei eretæs cribratus, foliis triangularibus profunde canaliculatis. Phuk. aln. 147 f. 29 f. 3.
Mellocactus americanus repens trigonous, flore albo, fructu violaceo. Plun. spec. 19.
Cretst in Jamæica, Brasilia variisque alis americæ regionibus in silvis campis trésbris aridibis in們 & aperiens.

13. CACTUS tereti-compactus articulatus ramifolius.
Opuntia caturlavia minima. Boerh. lugsb. 2 p. 82.
Ficus indica leu Opuntia caturlavia minima. Kigg. beaum. 19 t. comm. bert. 1 p. 107 t. 56.
Cretst in Curaçao.
13. Cactus compressus articulatus ramosus, articulis ovato-oblongis, spinis setaceis.
Opuntia maxima, folio spinoso laetissimo & longissimo. Tournef. inf. 140. Boerh. lodd. 2 p. 82.
Crestit in America.
An hoc a sequenti specie re ipsa disincta sit fere dubium est, spinas raro subulatas excribit, communiter vero setas fuscitatis, & caule longe minus ramoso est.

Opuntia major, folio oblongo rotundo, spinis longis & validissimis confertim asperibus obtuso, flore late. Selen. flor. 193. hist. 2. p. 149. t. 224. f. 5.
Opuntia major, validissimis spinis munia. Tournef. inf. 239. Boerh. lodd. 2 p. 82.
Tuna major, spinis validis foliis ciliate, flore gibbo. Dill. els. 396. t. 295. f. 380.
Tuna elatior, spinis validis nigris ciliate. Dill. els. 397. t. 294. f. 379.
Crestit in Jamaicæ & plurimis Americae regionibus.

15. Cactus compressus articulatus ramosissimus, articulis ovatis, spinis setaceis.
Ficus indica, folio spinoso, frutu majore. Bauh. pin. 458.
Ficus indica. Cæsif. fyt. 89. Dook. pamp. 813.
Ficus indica ciliatissimus ex uno folio natà. Bef. cyf. ant. 41.
Crestit in America, nova Hispaniæ, &c.

16. Cactus foliis eniformibus obtuso ferratis.
Epiphyllum americanum. Herm. prod. 238.
Phyllanthus americana, spinosis foliis longis crenatis & carnosis opuntiae in modum florigeræ. Pluk. altm. 296. t. 247 f. 5.
Opuntia folio plano glabro scolopendria. Boerh. lodd. 2 p. 82.
Opuntia forte affinis furinamentum, a foliorum crenis folia nova producens. Kigg. beaum. 19.
Cereus scolopendri folio brachiatum. Dill. els. 73. t. 64. f. 74.
Ficus indicis, scolopendria foliis. Till. pfl. 62.
Ficus seu Opuntia non spinosa, scolopendria folio finuario. Raj. dendr. 21.
Canambaya. Marq. bras. 78. t. 79.
Crestit in Brasilia, Mexico, Surinamet aliasque calidioribus Americae regionibus.
Hocce genus totum sedem in sola Americae posuit & in Hortorum hybrinaculis hucuscav etiam praecipuus est.
Singularis plantarum familia absque foliis, nuda, echinata fera tota; Folia si que fit, ista subulata caduca.
Divisia fuit in tria genera a Botanicis: in Opuntias, Cereus & Melocactus, non autem distinguendae ejus sedis facies & floribus confertum, in qua tam multa nota propria occurrit. Opuntia nomen rejicientem a Cl. Dillenio, Cereus & Melocactus & Tuna vix meliora vocabula dimittit, nomen antiquum superfluum Cactum assumo, quod veteres plantam indiginarunt aculeatam, carnosam, edulem, uti species 2da est.

PERESKIA. g. pl. 402.

1. PERESKIA.
Pereskia aculeata, flore albo, frutu flavescente. Plaum. gen. 35. Dill. els. 305. t. 227. f. 394.
Grotilaria, frutu majore, arbore spinosae, frutu foliaceo & viridi albo-cæsari. Selen. flor. 165. hist. 2 p. 86.
Raj. dendr. 27.
Portulaca americana latifolia ad foliorum orum lamugine obscura, longioribus aculeis horrida. Pluk. altm. 304. t. 215. f. 5.
Crestit in America in Insula Margarethæ, Jamaicæ, aliasque.
Apud nos non floret; ex figuris tamen Plurierianis patet cum Cacto valde affinis, si non ejusdem generis esse; qui itaque eam conjungerem velit, per me potest, cum calyce imbricatis fit, germine impositum, petala plura, stigma divsium, frutu mutum in hac est, quasamem germine post florescentiam, reliqua vero species non omnes Cacti eas rejecit. Succulentæ planta, & spinosa, (levis hoc folia foliis perfectis insfructa fit) confirmat idem.
holding a coloured copy of *Hortus Cliffortianus*. The open plate in this oil painting is quite faithful to the actual copper engraving of the original, but the captions in the book have been exaggerated to make them more legible.

Cacti were represented in *Hortus Cliffortianus* with seventeen plants growing in the Clifford garden, and listed on three pages (Fig. 10). They were all plants native to the Caribbean area or adjacent South America.

Linnaeus’s genera were very broadly based, and although at that time he recognised *Pereskia* as distinct from *Cactus*, he refused to adopt the genera *Melocactus*, *Opuntia* and *Cereus* which had been widely accepted at the time. Not long after, by 1748, he had also abandoned *Pereskia*.

Linnaeus’s concept of species was also extremely broad and some of his names included more than one species recognised today. On this subject he wrote to Haller: “Having fixed the species, you will reduce the varieties to their proper place under each, as I do not doubt your having the same opinion of them as I have. Have you observed what multitudes of varieties are put forth as species by Pontedera, Micheli, and others? If every minute difference, every trifling variation, is to establish a new species, why should I delay to exhibit ten thousand such species? and who cannot point out as many? I have always preferred taking two distinct species for one, reckoning them but varieties of each other, so long as I was doubtful of a clear and obvious mark of difference; rather than publishing any doubtful plant as a certain species.”

This philosophy can be readily recognised in the attitudes of many botanists today, although it neglects the importance of scientific precision and the fact that specialists can always spot significant differences of which the generalist is ignorant or blind. However, today even the most conservative of botanists has a far broader concept of species than Linnaeus ever had.

During the time that he was working on the *Hortus cliffortianus*, when he tired of that in the evenings he set about compiling an update of his *Fundamenta botanica* (1735), essentially a series of rules for naming plants and very similar to the modern *Code of nomenclature*. He called this new work *Critica botanica*, also published with the *Hortus* in July 1737.

The “see-saw of altercation.”

He dedicated *Critica botanica* to his favourite correspondent, John James Dillenius (Fig. 11), who had been brought to England from Germany by the wealthy patron William

![Fig. 11. John Jacob Dillenius (1684-1747). About a year before he died of apoplexy (stroke).](image)
Sherard in 1721 as his personal physician and to look after his famous garden at Eltham. Linnaeus later met him at Oxford in 1736, staying with him for eight days, and he frequently cited Dillenius plates from *Hortus elthamensis* (Fig. 12) in many of his later books.

Despite having praise heaped upon him by Linnaeus as “the foremost botanist of this age” and “the unshakable pivot of our science”, Dillenius was not amused. Churlishly he wrote a forthright letter dated 18 Aug 1737, admonishing Linnaeus: “I feel as much displeased with your *Critica botanica* as I am pleased with your *Lapland Flora*, especially as you have, without my deserving such a compliment, or knowing of your intention, dedicated the book to me. You must have known my dislike to all ceremonies and compliments. I hope you have burdened but few copies with this dedication. Perhaps only the copy you have sent me. If there be more, I beg of you to strip them out of this vain parade, or I shall take it much amiss.”

Dillenius went on to critique the *Critica*, and admonished Linnaeus for not giving the etymology of his new names, and particularly for recycling and applying old Greek and Latin names in a different sense to those of Dioscorides, Theophrastus & Pliny. He argued: “I think the names of the ancients ought not rashly and promiscuously to be transferred to our new genera….The day may come when the plants of Theophrastus and Dioscorides may be ascertained; and, till this happens, we had better leave their names as we find them.”

Among these disputed names was *Cactus*, of which he wrote:

“Why do you give the name of *Cactus* to the Tuna (Dillenius’s own generic name for cacti)? Do you believe the Tuna, or Melocactus (pardon the word), and the Arbor Vitae, were known to Theophrastus?” (Oxford, 18 Aug 1737).

Dillenius wriggled in subsequent letters and tried to placate the annoyed Linnaeus, but would have done even more harm with the put-down: “I cannot but observe that you are not very patient under the attacks of adversaries.”
For my part, I am not more pleased with my own opinion than with that of other people. I am ready to listen to any body’s remarks, for the sake of discovering truth, but have no inclination for the see-saw of altercation.” (Oxford, 28 Nov 1737).

Naturally enough, Linnaeus defended himself, and was later able to turn the argument back on Dillenius with the following: “With regard to unoccupied names in ancient writers, which I have adopted for other well-defined genera, I learned this from you. You, long ago, pointed out to me that your own genus *Draba* is different from the plant so called by Dioscorides.” (6 Aug 1739). Perhaps this is as near as we will ever get to being a confession that he had actually taken the name *Cactus* from ancient usage?

Dillenius died in 1747 of a stroke, then known as apoplexy, a fate which also befell Linnaeus himself in 1783.

All this prevarication could well have been annoyance because Dillenius had no particular wish to be seen to be associated with the sexual system of Linnaeus. English botanists in general rejected the system, partly because they were happy with the system of John Ray, and also because they were offended and disgusted at the very thought of sex in plant classification. In the rest of Europe, the Dutch loved it, but the eastern Europeans adopted the same combative attitude as the British. American botanists, however, took to it straight-away, looking on it as a breath of fresh air, a release from the drudgery of having to learn the characters of every single known plant in order to classify new discoveries.

### The American connection

A correspondence began in 1755 between Linnaeus and Dr. Alexander Garden (1728-1792), a Scottish physician living in Charles Town (now Charleston) in South Carolina (Fig. 13). Unlike the irascible Dillenius, Garden’s character was cheerful and benevolent, and he was said to have been fond of good company, particularly that of the opposite sex. His correspondence with Linnaeus became extensive over a period of 26 years, although it fell to another close friend, John Ellis of London, to honour Garden with the generic name *Gardenia*.

Garden sent Linnaeus many natural history specimens gathered in the neighbourhood of the town. Among the huge number of fishes, amphibians, insects, and of course plants that he sent to Europe, he is well known for having introduced the decorative Atlantic coast Loblolly Bay, a member of the tea family.
The only cacti he sent were the local opuntias, and then mainly to act as a host for the cochineal insect, or mealy bug as we know it (Fig. 14). Linnaeus had a great fascination for the mealy bug, as did a group of London scientists led by John Ellis, and Garden searched for a long time before he was able to send Ellis and Linnaeus examples of the elusive male. He finally succeeded in capturing a male in August 1759, studying it with his Cuff microscope and making notes of his observations, before sending a few specimens to Ellis and Linnaeus.

Garden described the local opuntia as being unlike the *Cactus cochenillifer* of Linnaeus in having obovate rather than ovate joints, yellow flowers instead of red, and it was heavily armed with spines and glochids instead of almost naked. This could have been either *Opuntia drummondii* (Fig. 15) or *Opuntia pusilla*, the two most common species in the environs of Charleston, which would have been lumped by Linnaeus into his catch-all species *Cactus opuntia*. The only other two opuntias of the area, *O. humifusa* and *stricta*, are more or less spineless.

Fig. 15 (bottom right) *Opuntia drummondii* (ex La Mortola 1912) from Britton & Rose, *The Cactaceae* 1: t.17, fig.6. 1919.
Fig. 16. The plans of Linnaeus’s garden at Uppsala, from Amoenitates academicae, ed.3 (1787).
Linnaeus’s garden

Linnaeus had probably encountered his first cacti in Clifford’s garden at Hartekamp, cataloguing them for his *Hortus Cliffortianus* in 1737.

The garden at Uppsala University had been established by Olaus Johannis Rudbeck (1630-1702) in 1685, who then cultivated 1800 plants. He was succeeded by his son, Olaus Olai Rudbeck (1660-1740) who was not so interested and allowed the garden to go into decline. By 1739 the number of species cultivated had dwindled to less than 300, while the professor’s residence and outbuildings had fallen into disrepair.

Linnaeus wrote to the Senate of the University, complaining about the state of affairs in the garden. Amazingly, this struck a chord and work immediately began to restore the buildings and garden. To run the garden, at Linnaeus’s suggestion, Clifford’s head gardener at Hartekamp, Dietrich Nietzel, was head-hunted for the job, an act seen by Clifford and his family as ingratitude for their kindness to Linnaeus and he remained out of favour from then on.

Under Nietzel, the garden thrived again, laid out to Linnaeus’s design (Fig. 16). The wages of the staff were doubled, a new hot-house was constructed, designed by Linnaeus’s friend and patron Baron Carl Hårleman, while the professor’s residence was rebuilt to a very high standard. By 1745, 3000 species were under cultivation.

It fell into decline once again after Nietzel died in 1756, but today the garden has been once more fully restored, thanks to the Swedish Linné Society, who rebuilt the Orangery in 1955, complete with lecture rooms and offices, and converting the house to a Museum.

Linnaeus compiled two catalogues of plants in the Uppsala garden, in 1742 and in 1745. The first list was published in 1748, while the second did not appear until 1787, edited and submitted as a dissertation by Samuel Naucler.

Table 1 gives a comparison of the cacti from the three catalogues, together with the list that appeared in *Species plantarum* in 1753.

Note that three of the entries only appear in *Species plantarum*, namely *royeni*, *moniliformis* & *portulacifolius*. This implies that Linnaeus had not seen living plants and he only knew them from the descriptions and illustrations of Van Royen, Plumier & Plukenet.
Table 1: Cacti listed in the catalogues of the gardens worked in by Linnaeus, compared with the species first published at the starting point of nomenclature in 1753.

<table>
<thead>
<tr>
<th>Species</th>
<th>1737 Clifford's Garden</th>
<th>1742 (publ. 1748) Uppsala Garden</th>
<th>1745 (publ. 1787) Uppsala Garden (Naucler)</th>
<th>1753 Species plantarum</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. <em>Cactus mammillaris</em></td>
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<tr>
<td>2. <em>Cactus melocactus</em></td>
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<tr>
<td>3. <em>Cactus heptagonus</em></td>
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<td>11. <em>Cactus grandiflorus</em></td>
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<td>13. <em>Cactus triangularis</em></td>
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<td>16. <em>Cactus ficus-indica</em></td>
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<td>17. <em>Cactus tuna</em></td>
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<td>18. <em>Cactus cochenillifer</em></td>
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<td>19. <em>Cactus curassavicus</em></td>
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<td>21. <em>Cactus pereskia L.</em></td>
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<td>22. <em>Cactus portulacifolius</em></td>
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**Taxonomic analysis**

Modern botanical nomenclature starts with the names of taxa described by Linnaeus in his two seminal works *Genera plantarum* ed.5 (Fig. 17) and *Species plantarum* ed.1 (Fig. 18). For the purposes of nomenclature, these two works are deemed to have been published simultaneously on 1 May 1753, and therefore both need to be taken into account in assessing the typifications of species. Also, wherever the earlier Linnaean works *Hortus Cliffortianus* (1738) and *Hortus Upsaliensis* (1748) are cited, data published there are also to be considered as part of the protologue.
ICOSANDRIA MONOGYNA.

Classis XII.

ICOSANDRIA

Charæter Classicus & notæ, quibus a Polyandria differt, sunt:
1. Calyx monophyllus, concavus.
2. Corolla unguibus parieti calycis affixa.

Dicitur Icosandria, quod Stamina numeros in hac familia circa vigintim numeros circiter conflat, in maxima generum parte; pro Charætere tamen non assumendus est numerus.

1. MONOGYNA.


ed. Prim. 402.


Cor. Petala numerosa, obtusifolium, lata, exteriors breviora, interors majora, conniventia.

Stam. Filamenta numerosa, tubulata, calyci inferta, corolla breviora. Anthora oblonga, erecta.


Per. Bacca oblongiafolium, unilocularis, umbilicata, uti calyx exasperata.

Sem. numerosa, subrotunda, parva, nidulantia.

Obs. Cereus diffa fuit planta longa, cylindraceo-angulata.

Melocactus subrotunda, angulata.

Opuntia ramosa, dichotoma.

Pereskiea arborea, foliofa: Fructus foliofa.

Ad monocotyledones Melocactus, ad dicotyledones vero Opuntia, eis dem tamen generis naturalis.

Fig. 17. Cactus from Genera plantarum ed.5: 210. 1754 (1 May 1753).

Note particularly that at the foot of the page from Genera plantarum are brief diagnoses and the place of publication of the names Melocactus (illegitimate here because it should be called Cactus), Cereus, Opuntia and Pereskiea as unranked infrageneric taxa. They are validly published, despite the rejection of Cactus L., and available for future use. These names were all subsequently used as genera by Miller and others and had been in common usage as genera in pre-Linnaean times.
There are no Linnaean protologues of cacti that include citations of herbarium specimens, and the few exsiccatea that do exist are undated and mainly preserved after the botanical nomenclature starting date of 1753. Illustrations, however, are frequently cited, both directly in the protologue, or indirectly via a reference to his own and other publications, but most researchers to date have taken little account of the numerous illustrations cited in *Genera plantarum*, *Hortus cliffortianus*, and *Hortus Upsaliensis*. This omission is rectified here with a fresh overview that has hitherto not been done.
Genus

*Cactus* L., *Species plantarum* 1: 466. (1 May) 1753, & *Genera plantarum*, ed.5: 210. 1754 [but considered to be (1 May) 1753] nom. rej. (1905).

The name *Cactus* was abandoned in 1905 and replaced with: *Mammillaria* Haw., *Syn. Pl. Succ.*: 177. 1812 nom. cons. (1905).

*Typ*: *Cactus mammillaris* L. typ. cons. (1905).

*Obs*: *Cactus melocactus* L., was the autotype under Art. 10.1, but in 1905 the type of *Cactus* L. was conserved as *Cactus mammillaris* L. Thus, *Cactus* L. nom. rej. is today a homotypic synonym of *Mammillaria* Haw.

This conservation was in serious conflict with the first 150 years of prior usage and irrational because the rules could have been applied without problem. Indeed, there was a spirited objection to the conservation from the American school of botany, led by Nathaniel Britton, who continued to use the name *Cactus* L. in its original sense, but gradually by default the conservation has become so widely and persistently used in this sense for over 100 years that it now seems to be impossible to correct (Art. 57.1, & Mottram 1993).

**Note**: Rejected names are not available for use. *Cactus* L. is a rejected name that is now referred to *Mammillaria* Haw. However, the epithets of such name combinations that are validly published are available for later legitimate recombinations.

Infrageneric divisions

*Cactus* L. nom. rej. infragen.

*Echinomelocactus* L., *Species plantarum* 1: 466. (1 May) 1753 nom. inval. (Art. 22.6)

*Descr*: Subrotundi (Almost globular).

*Typ*: *Cactus mammillaris* L. typ. cons. (1905).

*Syn*: *Cactus* L. nom. rej. infragen. *Cactus* (1753); *Mammillaria* Haw. (1812) nom. cons. (1905)

*Obs*: Comprised the two species *Cactus mammillaris* L. typ. cons. [*Mammillaria mammillaris* (L.) Haw.] and *C. melocactus* L. [*Melocactus communis* Link & Otto].


*Descr*: Subrotunda, angulata (Almost globular, angled).


*Obs*: Comprised the two species *Cactus mammillaris* L. typ. cons. [*Mammillaria mammillaris* (L.) Haw.] and *C. melocactus* L. [*Melocactus communis* Link & Otto].


*Descr*: Dicta suit planta longa, cylindraceo-angulata (Applied to any long, cylindrical angled plant). Divided into 2 infrageneric unnamed ranks, described as: Cerei erecti stantes per se (Erect, free-standing cerei), & Cerei repentes radiculis lateralibus (Creeping cerei with adventitious roots).
Syn: Cereus (L.) Mill. (1768).

Cactus L. nom. rej. infragen. Opuntia L., Species plantarum 1: 468. (1 May) 1753, & Genera plantarum, ed.5: 210. 1754 [1 May 1753].
Descr: Ramosa, dichotoma (Dichotomously branched). The description: Opuntiae compressae articulis proliferis, in Species plantarum applies only to the six species that directly follow it.
Typ: Cactus Opuntia L. (auto.) ≡ Opuntia ficus-indica (L.) Mill.
Syn: Opuntia (L.) Mill. (1768).
The last three of these species correctly belong to Pereskia (L.) Mill. and Epiphyllum Haw.

Cactus L. nom. rej. infragen. Pereskia L., Genera plantarum, ed.5: 210. 1754 [1 May 1753].
Descr. Arborea, foliosa: fructu folioso (Tree-like, leafy: with leafy fruit).
Typ: Cactus Pereskia L. ≡ Pereskia aculeata Mill.
Syn: Pereskia (L.) Mill. (1768).
Obs: Comprised two species: Cactus Pereskia and C. portulacifolius.

The 22 species:

1. Cactus mammillaris [Mammillaria mammillaris]. (Fig. 19)
Typ: Rocky places in tropical America.
[Introduced c.1687 from Curaçao].
Lectotyp: (design. Willdenow 1809: 30): Plukenet, Phytographia t.29 fig.1. 1691, as Ficoides, s. Melocactos mammillaris glabra, sulcis carens, fructum suum undique sundens. (Fig. 20).

According to Aiton (1811: 175), this species was cultivated in Bishop Compton’s garden from before 1688, the source of the plant illustrated by Plukenet. It probably first arrived in Europe from the Dutch West Indies in 1687 or earlier since Herman grew it at Leiden (1687: 670), crediting Simon van Beaumont (1641-1726) of The Hague for its introduction. Commelijn wrote: “America is its habitat, and it has been sent us from...
Fig. 20. Protologue of *Cactus mammillaris* L. from *Species plantarum*: 466. 1753.

Curaçao and other neighbouring islands.

Other cited original material:

Commelijn, J., *Horti medici amstelodamensis rario rum* 1: t.55. 1697. (Fig. 21) [Copied from the unpublished Moninckx Atlas (1686-1690) 5: t.9., reproduced in Wijnands (1983: t.36). An earlier depiction of the species of more natural shape was also executed in the Moninckx Atlas and dated 1687, but that did not appear in Commelijn's work and was therefore not seen by Linnaeus].

Hermann, *Paradisus batavus*: t. 136. 1698. (Fig. 22).

Principal homotypic synonyms:


*Neomammillaria mammillaris* (L.) Britton & Rose, *The Cact. 4*: 70. 1923.

Principal heterotypic synonym:

*Mammillaria simplex* Haw., *Syn. pl. succ.*: 117.1812 nom. illeg. (Art. 52.1). [Based on *Cactus mammillaris* a W.T.Aiton, which includes the type of *C. mammillaris* L.]

All three illustrations are readily identifiable, as this was the only mammillaria known at the time apart from *Mammillaria proliferara* from Haiti, which had been drawn and described by Plumier (1689-1690 or 1693) and by Plukenet (1691), but was overlooked by Linnaeus in this edition. It was, however,


Fig. 22. *Cactus mammillaris* L. from Hermann, *Paradisus batavus*: t. 136. 1698.
The Cactician 3: 1-83 ISSN 2052-952X Linnaean cactus legacy 27 July 2013

listed in ed. 2 of 1762 as a synonym of Cactus mammillaris.

The three illustrations show plants that were unnaturally elongated, as they invariably tend to be when in cultivation, but those of Commelijn and Hermann are particularly exaggerated.


Fig. 23. Protologues of Cactus infragen. Melocactus L. & Cactus Melocactus L. from Gen. Pl. & Sp. Pl. (1753).

2. Cactus Melocactus [Melocactus communis]. (Fig. 23)


Typ: West Indies. Cited as “Jamaica, tropical America” in Species plantarum, “On coastal rocks of America, such as Jamaica and elsewhere” in Hortus Cliffortianus, and “Rocky places of Jamaica and tropical America” in Hortus Upsaliensis.

Lectotyp: (design. Mottram 1993: 462): Tournefort, Inst. rei. herb. ed.3: t.425. 1719, as Melocactus without specific identity. (Fig. 24). Vernacular names from the text on loc. cit. page 653 were: “Melon épineux ou Tête à l’Anglois.” [Spiny Melon or Englishman’s Head, both early common names of Melocactus intortus (Mill.) Urb.] The illustration was listed by Linnaeus in the synonymy of the genus Cactus, and overlooked by other authorities because they assumed that “Melocactus Tournef. 425” was a page reference, whereas it is in fact a direct reference to plate 425.

Other original material:

Echinomelocactus, L’Echusse, Exoticorum libri decem: 92, t.92. 1605. (Fig. 25) [This was later claimed to be automatically the holotype by Heath (1994: 90), who believed it to be the only cited illustration and therefore the holotype].

Fig. 24. Cactus Melocactus L. from Tournefort, Institutiones rei herbariae 3: t.425. 1719 (Lectotype).
Fig. 25. Echinomelocactus, from L’Ecluse, *Exoticorum libri decem*: 92, t.92. 1605.

**Principal homotypic synonyms:**

*Cactus Melocactus α communis* W.T.Aiton, *Hortus kewensis*, ed.2 3: 175. 1811
nom. rej. & illeg. (Art. 52.1)
≡*Cactus melocactus* L. var. melocactus.


**Principal heterotypic synonyms:**

Miller said that he received his plant from Antigua along with the common sort and speculated that they might be variants of the same species.

*Neotyp.(design. Taylor, *Bradleya* 9: 78): Antigua; R. A. HOWARD 18492 (K).*


Only two illustrations were directly cited by Linnaeus. Of these, the illustration by Tournefort (1719) (Fig. 24) was designated by Mottram (1993) as the lectotype of *Cactus melocactus* L., because it was the only included element in *Genera plantarum*, and therefore the type of *Cactus* infragen. *Melocactus* L., making *Cactus Melocactus* L. automatically the type species of *Cactus* L. until the rejection at the 1905 Congress.

The specific epithet was spelt with a capital M to signify that it was named from the pre-Linnean generic rank name of *Melocactus*.

The name *Melocactus caroli-linnaei* was given to *Cactus melocactus* by Nigel Taylor in 1991 because it was said that the type locality cited by Linnaeus was Jamaica. However, Linnaeus did not unequivocally designate Jamaica as its type locality. There are no key characters mentioned in the protologue that would enable us to identify the species of *Melocactus* he cited, because to Linnaeus there was only one species in the sense of the generic name as applied today. The identity of Tournefort’s illustration is also uncertain, although it probably represents one of the three species figured by his compatriot and friend Plumier, namely *intortus*, *broadwayi* or *lemairei*, from the islands of the Caribbean occupied by, or friendly towards, France at the time.

So the correct name for *Cactus melocactus* L. is the earliest name that includes *Cactus melocactus* as a synonym. This happens to be *Melocactus communis* Link & Otto (1827), whose own correct identity is also still somewhat uncertain, but all authorities appear to think that this was the same as *Melocactus intortus* (Mill.) Urb., the earliest legitimate name for it in the rank of species, and the most common Caribbean species of *Melocactus*.

The plant that Link & Otto illustrated as *Melocactus communis* in plate 11 was in cultivation in the Berlin Botanical Garden, and appeared six years later in the checklist of cacti growing in that garden in Otto (1833: 364). In this checklist, Plate 11 is more precisely named as *Melocactus communis* var. *macrocephalus*, and Santo Domingo and (U.S. Virgin Islands) given as its source. Only *Melocactus intortus* occurs in the Virgin Islands, but two *Melocactus* species inhabit Santo Domingo. The checklist also lists three other illustrations in the synonymy of *M. communis*, namely those in *Curtis’s Botanical Magazine* t.3090 (1851) and the two by de Candolle from *Historia plantarum succulentarum* t.112 [listed erroneously as 12] (1803) and *Revue de la famille de Cactées* t.6 (1827). All these are evidently *Melocactus intortus* (Mill.) Urb.

Link & Otto’s own illustration (Fig. 26) is not characteristic of *Melocactus intortus* (cf. Fig. 27), which has more ribs and areoles per rib than their plate 11, but their concept of *M. communis* was probably mixed, because their typical form was described as being a very small plant, only 6 inches high.
3. *Cacti* erecti flaves per se.

**hagrangei.** 3. CACTUS erectus oblongus septemangularis. Hort.


*Habitat in America.*

3. CACTUS septem-angularis oblongus erectus.


*Creed in America.*

Nostra planta ovata oblonga, septem angulis profunde incisulis; dicunt alii se tandem pedalem & bipedalem vidisse, nostra tamen sibi figura semper per plures annos similis fuit, nec huc bene creverit heuram mutavit.

Fig. 28. *Cactus heptagonus* extracts from *Species plantarum* & *Hortus cliffortianus* (1753 & 1738).

3. *Cactus heptagonus* [Stenocereus heptagonus (L.) Mottram *comb. nov.*]


*Typ:* America.

*Lectotyp:* (designated here): Haiti, La Bande du Sud, clearings of hot, rough woodland, by the sea; Charles Plumier, in *Botanicon Americanum* 3: t.25. 1689-1697, as Opuntia monoclonos cereiformis amphi flore roseo fimbriato. Reproduced in Mottram (2002: 112). (Fig. 29)

Other phrase names cited by other authors that were known to Linnaeus applicable here:


Tournefort (1700: 653): Melocactus Americanus, monoclonos flore albo, fructu atro-purpureo. (Cierge epineux du Tertre [Spiny mound candle]).


Fig. 29. *Stenocereus heptagonus* (Haiti, La Bande du Sud, clearings of hot, rough woodland, by the sea). Plumier, *Botanicon Americanum* 3: t.25. c.1690. Also the lectotype of *Stenocereus fimbriatus*, designated by Lourteig (1991: 408).
Principal homotypic synonyms:


Stenocereus fimbriatus (Lam.) Lourteig, Bradea 5(44): 400-411. 1991.

Principal heterotypic synonyms:


The protologue of this taxon comprised the descriptions in Species plantarum (1753) and Hortus Cliffortianus (1738) (Fig. 28) in which no illustrations are cited. However, in the second & third editions of Species Plantarum (1762-63, 1764: 666-667), Linnaeus noted: “The history of the angular cacti [numbered] 3-14, remains somewhat obscure, but they mostly appear in the illustrations of Plumier, where they are skilfully delineated for the benefit of travellers to the Indies”. The set of 508 copies from Plumier’s original drawings known as the Codex Boerhaavianus were studied by Linnaeus at Leiden while he was collaborating with Van Royen in the winter of 1737-38, and Plumier’s Vol.3, plate 25 of what is now known as a Stenocereus was certainly among them (eventually recopied by Burman). This is therefore original material and available for designation as a lectotype of Cactus heptagonus L.

Linnaeus described a plant in Clifford’s garden as being “exactly ovate, with 7 deeply cut ribs and purplish flowers; it continued the same for many years, though it grew well; others say that they have seen it a foot and a half and two feet high.” The dimensions of the plant suggest a Melocactus to some, and indeed Jarvis (2007) identifies it as such, following the suggestion made by some earlier authors. In reality, it was a short top cutting of a rather stout cereus. Moscosco (1941: t.5B) provided a photo of a top cutting (Fig. 31a) from the Dominican Republic within reasonable distance of the type locality, which agrees well with the Linnaean protologue, including the requisite seven ribs, as also does the Britton & Rose photo (1909: t.67) (Fig. 31b). The photo of the top of a flowering stem of a plant from Curaçao in Backeberg (1960: 2183) appears to have eight ribs (Fig. 31c), the same as the plant in Plumier’s drawing.
Fig. 31. *Stenocereus heptagonus*

a. (Dominican Republic, Prov. Santiago, La Herradura, c.500m.). Moscosco photo from *Las Cactaceas de la Flora de Santo Domingo*: t.5B. 1941.


Miller (1768) also knew the plant and was credited with introducing it to Europe in 1728 (Aiton 1811: 176), and he definitely considered it to be an erect cactus with 7 or 8 angles, and the thickest of the Torch-Thistles. He quoted Boerhave who was said to have described it as having “several very long, white spines and a yellow down”. In 1771 (Abridged Gardeners dictionary ed.6), Miller grouped all his third to eighth sorts (heptagonus was number 6) together as all having the same form as the first, but differing in the size of their stems, number of angles and length of the spines.

Martyn (1807) noticed the inconsistencies between the two descriptions, commenting “The Cereus heptagonus of Miller does not seem to be the same as the Cactus heptagonus of Linnaeus. It rather agrees with his [Linnaeus’s] repandus”. However, the latter does not accord with Miller’s description of the flower, which he said was as large as that of a hollyhock, with inner petals white and with a scaly, hairy and “prickly” receptacle. This is the description of a stenocereus flower, and the only such species with 7-8 ribs from the Caribbean is the one species of Stenocereus that was figured by Plumier from Haiti. His plant had 8-10 ribs.

This taxon, which is widespread throughout the Caribbean, has always been poorly understood. Although Plumier’s drawing appears to indicate petals with fringed margins, no other authors have ever reported flowers like that. Plumier was rather unreliable in recording some morphological details, and in this case it is possible that his field sketch may have shown shading on the petals that was later misinterpreted by him as cilia when he came to write it up back in his quarters. Apart from the supposed fringed petals, there are no other characters to separate Stenocereus fimbriatus, S. griseus and S. hystrix. It is widely cultivated locally as field boundary and much prized for its juicy, blood-red fruits from early times, but has never enjoyed much interest from cactus fanciers.

This taxon should not be confused with the later homonym Cactus heptagonus Vellozo, whose plate 19 (1829) is referable to Pilosocereus arrabidae. It has also often been confused with Cactus peruvianus L., while Willdenow’s specimen at Berlin that is labelled as Cactus heptagonus L. seems to be the flower of a Cereus hexagonus or similar.

4. **Cactus tetragonus** [Acanthocereus tetragonus (L.) Hummelinck].


**Typ:** Curaçao & tropical America.

**Neotyp:** (design. Hummelinck 1938: 165): Curaçao; Hummelinck 196 (flower), 170 (fruit); U. Photographed prior to preservation (Fig. 33).

**Principal homotypic synonym:**


The Linnaean protologue (Fig. 32) contains no references to specimens or illustrations. To rectify the lack of typification, Hummelinck (1938) designated a neotype to fix the application of the name, with specimens of a flower and a fruit deposited at Utrecht.

A flowering stem of a plant is shown here for comparison in Fig. 34. Note the extrafloral nectaries on the receptacle areoles, a feature also to be seen in the related genus Epiphyllum.
Cereus erectus minor, frutin lipoisolo, collarum numero varians. Herm. par. 117.
Habitat in Curacao, America calidore. b

Fig. 32 (above). Extract from Species plantarum (1753).

Fig. 34 (right). Acanthocereus tetragonus (Yucatan).

Fig. 33. Acanthocereus tetragonus neotype (design. Hummelinck, Succulenta 20(11): 170. 1938.)
5. Cactus hexagonus [Cereus hexagonus = Cereus peruvianus hort. non (L.) Mill.]

Cactus hexagonus L., Species plantarum 1: 466. (1 May) 1753. Cactus erectus sexangularis longus L. Hort. clif. 181 nr.5. 1737. Hort. ups.: 119-120 nr.4. 1748. (Fig. 35).

Typ: Surinam.

Lectotyp: (design. Leuenberger 1989: 153): Cereus sirinamensis Trew, Observatio CXXIX: De Cerei plantae charactere generico, eiusque speciei Sirinamensis specifico, Acta Physico-medica academiae Caesareae Leopoldino-Carolinae Naturae curiosorum exhibentia ephemeresis sive observationes historias et experimenta 3: t.8. 1733. (Fig. 36)

Principal homotypic synonym:
Cereus hexagonus (L.) Mill., Gardeners Dictionary, ed.8: Cereus 1. 1768.

The cryptic citation in the Linnaean protologue to “Cereus sirinamensis. Eph. N. C. 3. p. 394. t. 7. 8.” is actually a reference to two engraved plates by Trew (1733: t. 7-8). Of these two illustrations (Fig. 36-37), Leuenberger chose plate 8 as the lectotype of this species in 1989.

Christoph Jakob Trew (1695-1769) was a Bavarian physician and botanist, who for 10 years was the Director and Curator of the Medical College Botanic Garden in Nuremberg. His portrait (Fig. 39) is taken from his celebrated florilegium Plantae selectae of 1733. In 1731 he had relinquished his post at the botanic garden to establish his own private garden in order to grow rare plants. Befriending the great botanical artist Georg Ehret, he commissioned him to draw plants from his collection, of which the two plates of Cereus hexagonus are examples.
Fig. 37. *Cereus hexagonus* from Trew (1733: t.7)

Fig. 38. *Cereus hexagonus* in cultivation at Whitestone in 1979.

Fig. 39. Portrait of Christoph Jakob Trew (1695-1769) by Georg Ehret (published in *Plantae selectae* (1750)).
6. **Cactus pentagonus** [Cereus pentagonus (L.) Haw.]

*Cactus pentagonus* L., *Species plantarum* 1: 467. (1 May) 1753. Cactus subquinquangularis erectus longus articulatus L. *Hort. cliff.*: 182 nr.9. 1737. (Fig. 40).

**Typ:** America.

**Neotyp.** (design. here): Brazil; Vellozo, J. M. da C. (prepared for publication 1790, but not published till 1829) *Cactus pentagonus*, *Florae fluminensis* 5: t.22. (Fig. 41).


**Principal homotypic synonyms:**

*Cereus pentagonus* (L.) Haw., *Synopsis plantarum succulentarum*: 180. 1812.


**Principal heterotypic synonyms:**

*Cereus fernambucensis* Lem., *Cactearum genera nova speciesque novae in horto Montvilliano culturarum*: 58, 79. 1839.

Linnaeus left no specimens and did not cite any illustrations. He indicated that he knew the living plant in Clifford’s garden, and it was also grown at Leiden. It was known only in Holland at that time and only introduced to England later (Miller & Martyn 1807: Cactus p.[4]). Miller himself appeared not to know it at all, and it was only edited into the list of cacti in *The Gardeners dictionary* by Martyn in the final and ninth edition, where he said that it had been grown at Kew since about 1769 (confirmed by Aiton in 1811).

Thomas Martyn’s description: “Stem jointed; the internodes a foot long. Knots of spines come out along the edge without any visible
nap [tomentum] among them. Sometimes, but rarely, the stem has six angles; it never puts out any roots [aerial roots from the stem], and though slender and weak, grows upright.” This description is merely an English translation of the Latin description given by Linnaeus himself of the plant growing in Clifford’s garden (1737: 182).

The only illustration to bear this name which appears to be in agreement with the Linnaean protologue, is that of Vellozo in Floraefluminensis (Fig. 41), prepared for publication in 1790, but not distributed until 1829. His concept agrees with the species most often found today under the name Cereus fernambucensis Lem. (1839: 58).

Since about 1800 the name has been mis-applied many times. The confusion appears to have started at the Berlin Botanical Garden. Despite Cactus pentagonus being listed as represented in the garden, the Willdenow herbarium has nothing labelled as such, but there is a 4-ribbed specimen labelled as Cactus tetragonus, which appears to be a young, seed-raised plant of a Cereus species. This could be C. fernambucensis but perhaps more likely to be a juvenile Cereus hankeanus F.A.C.Weber, as suggested by Taylor & Zappi (2004: 273). There are also two flower specimens labelled as Cactus heptagonus, also flowers of a true Cereus. Willdenow’s Cactus tetragonus was recognised by Backeberg (1960: 2363) as being something other than the Linnaean concept, so he gave it the new name of Cereus neotetragonus Backeb. citing Willdenow’s description and Werdermann’s colour photo (1934: t.77) as its type.

Willdenow added further to the confusion by describing the typeless Cactus prismaticus in 1814, said to differ from Cactus pentagonus in having a spreading rather than erect habit, but also 5-angled.

In 1818, Haworth received some cacti from Mr. Gul. Anderson at the Berlin Botanical Garden, among which was a plant that Haworth interpreted as being Cactus prismaticus, although received labelled as Cactus speciosus. The garden’s curator, Friedrich Otto (1833: 366), later listed Cactus prismaticus in the synonymy of Cactus pentagonus, where it has been accepted ever since.

Salm-Dyck grew a plant that he called Cactus pentagonus from about 1800, but his painting of it (Rowley 1999: 15) probably depicts a branch of Heliocereus speciosus, or a hybrid of that with Epiphyllum (Cereus speciosissimus). Cactus speciosus Cav. was first described from a plant in the Madrid Botanic Garden in 1803, and Salm-Dyck recorded having it from 1805. It was also grown in Berlin from about that date.

Most improbably, Britton & Rose (1909: 432-433) decided to equate Cactus pentagonus L. with a plant described as Cereus variabilis Engelm. nom. illeg., which was the type of Cereus subgen. Acanthocereus Engelm. (Engelmann 1863: 202-203), despite the fact that no Acanthocereus grows in the foot-long articulations called for in the Linnaean protologue, or consistently have 5-6 ribs.

At the same time, Britton & Rose (1920: 15) identified Vellozo’s plate as representing Cereus fernambucensis Lem., a position upheld by all subsequent authors.

Hunt (1967: 445) followed Britton & Rose, but also, like Backeberg, subsequently did not distinguish Acanthocereus pentagonus from Acanthocereus tetragonus. Hunt was not willing to consider the possibility that Vellozo had the correct identification, because he was unaware of any evidence that any of the Linnaean elements were of
Brazillian origin.

In point of fact most of northern Brazil was under Dutch administration from 1630 to 1654, with headquarters at Recife in Pernambuco, then called Olinda (later Fernambuc). That was the Dutch Golden Age and the time of tulipomania, which reached a peak of excitement in 1637. The Dutch were importing all kinds of exotic plants from their colonies at the time, so it is very plausible that this cactus was from Pernambuco and in cultivation in Holland at the time of Linnaeus.

\textit{Cereus fernambucensis} matches the Linnaean protologue perfectly well in all respects, and does not fit well with any known \textit{Acanthocereus}. I therefore propose to restore the usage of \textit{Cereus pentagonus} (L.) Haw., with Vellozo’s illustration as its neotype.


Earliest of the later heterotypic synonyms:

\textit{Cereus albispinus} Salm-Dyck, \textit{Observationes Botanicae in horto Dyckensi notatae. Anno 1822: 5-6. 1822. T: Not cited. LT (design. here): Photo of plate titled “\textit{Cactus albispinus}. hor. Dyck.” in Rowley (1999: 14, t.16). Year unknown (after 1805), but believed to have been executed by Salm-Dyck himself. (Fig. 44).


\textit{C}ey \textit{ci} in Curaçao.
\textit{An varitas fòla præcedentís?}

Fig. 42. \textit{Cactus repandus} extracts from \textit{Species plantarum} & \textit{Hortus cliftortianus} (1753 & 1738).

7. \textbf{Cactus repandus} [\textit{Cereus repandus} (L.) Mill.].

\textit{Cactus repandus} L., \textit{Species plantarum} 1: 467. (1 May) 1753. \textit{Cactus erectus longus} octangularis: angulis compressis undatis, spinis lanae longioribus L. \textit{Hort. clift.}: 182 nr.8. 1737. (Fig. 42).

\textbf{Typ}: Tropical America (in \textit{Sp. Pl.}); Curaçao (in \textit{Hort. clift.}).

\textbf{Neotyp}. (design. here): Curaçao; Jun 1938, \textit{HUMMELINCK} 197; U. A photo of the neotype prior to preservation is shown in Fig. 43 (top left), from Hummelinck, \textit{Succulentia} 20(9): 133-140. 1938.
The Cactician 3: 1-83 ISSN 2052-952X Linnaean cactus legacy 27 July 2013

The history of this name is very convoluted, having been applied in three very different senses.

*Cactus repandus* was first recorded by Linnaeus in Clifford’s garden. In *Hort. cliff.*, Linnaeus said “Only a variety of the previous?”, a reference to *Cactus lanuginosus*, and giving its origin as Curaçao, the same as for *C. lanuginosus*. Following that initial description of 1737, Linnaeus had by 1753 broadened its origin to “tropical America”.

Linnaeus listed Sloane’s and Browne’s phrase names and Ehret’s plate 14 (Fig. 45) from Trew, *Plantae selectae* (1733) in the synonymy of *repandus* from the second edition of *Species plantarum* (1762-63) onwards. The plate and citations all refer to a plant endemic to the south coast of Jamaica that does not occur in Curaçao, correctly segregated by Miller as *Cereus gracilis* Mill.
in 1768, not *Cactus repandus* L. It appears that Linnaeus’s very broad species concept allowed him to countenance putting *Cereus gracilis* Mill. into the circumscription of *Cactus repandus* L.

Martyn (1807) continued the confusion by assigning *Cereus repandus* Mill. to *Cactus lanuginosus* L., but placing *Cereus gracilis* Mill. in the synonymy of *Cactus repandus* L. Martyn quoted page references only from the 3rd. edn. of *Species plantarum*, so maybe he had not seen the protologue of the first edn.

All the nineteenth century authors such as Willdenow (Fig. 46), De Candolle, Haworth, Salm-Dyck and Schumann followed the usage of *Cactus repandus* L. in the sense of *Cereus gracilis* Mill.
That usage in the wrong sense might have continued had it not been for yet a further change proposed by Britton & Rose (1920: 17-18) replacing that concept in favour of another very different Curaçaoan plant. No reasoning was given, and it represented a reversal of their opinion expressed in their paper on *Cereus and its allies* (1909) where they had put *Cereus repandus* (L.) Mill. in the synonymy of *Cereus lanuginosus* (L.) Mill., while correctly placing Haworth’s usage of the same name under *Harrisia gracilis* (Mill.) Britton.

Hummelinck (1938: 133-140) in turn followed Britton & Rose’s 1920 proposal, preserving material of a fruit and a flower under his numbers 197 & 198 at Utrecht (Fig. 43). These were not used for typification by Hummelinck.

The epithet *repandus* is a Latin adjective, the active present participle of *repare*, to creep, but Linnaeus used it specifically to describe the margins of leaves and angles that are wavy or sinuous. Here he applied it to the “angles”, said to be compressed and wavy, compared to the scarcely evident “angles” of *Cactus lanuginosus* L. It may have been this that prompted Britton & Rose to apply the name the way that they did, but it still contradicts the presence of wool called for in the *Cactus repandus* L. descriptive phrase.

The Britton & Rose choice of application (Fig. 47), although not agreeing in all respects with the Linnaean protologue, particularly regarding the presence or absence of “wool longer than the spines”, has been persistently in use since 1920. The uncertainty that surrounds the true identity of *Cactus repandus* L. is therefore probably sufficient grounds to maintain current usage supported by the above typification.

8. *Cactus lanuginosus* [Pilosocereus lanuginosus (L.) Byles & G.D.Rowley].

*Cactus lanuginosus* L., *Species plantarum* 1: 467. (1 May) 1753. Cactus erectus longus subnovemangularis: angulis obsoletis, spinis lana brevioribus L. *Hort. cliff.*: 182 nr.7. 1737. (Fig. 48).
*Typ*: Netherlands Antilles, Curaçao.
*Holotyp*: *Cactus lanuginosus* in Hermann, *Paradisus batavus*: 115. t.115. 1698. The only included element of the protologue, and therefore automatically its holotype. (Fig. 49)
*Cactus lanuginosus* (Curaçao) from Hummelinck, *Succulenta* 20(10): 151. 1938 (Fig. 50) is a useful interpretative illustration, as is his group of photos of a plant from.

**Fig. 19.—Cereus repandus.**

Fig. 47. Photo of *Cereus repandus* (L.) Mill. (Curaçao) taken by Britton & Shafer in 1913.
Venezuela, Isla Margarita, *Succulenta* **20**(9-10): 135, 147-153. 1938. (Fig. 51).

**Principal homotypic synonym:**
Pilosocereus lanuginosus (L.)

**Principal heterotypic synonym:**
*Cereus repandus* Mill. non L., *Gardeners dictionary*, ed.8:
*Cereus* 5. 1768 nom. illeg. (Art. 53.1).

Hermann's book, *Paradisus batavus* (1698) (Fig. 52) is frequently cited by Linnaeus, and is a work notable for containing the first ever illustration of a tropical orchid to flower in cultivation.
PARADISUS BATAVUS,
CONTINENS
Plus centum Plantas affabrèæ incilas & Descriptionibus illustratas.
CUI ACCESSIT
Catalogus Plantarum, quas pro Tomis nondum editis, delineandas curaverat
PAULUS HERMANNUS:
M. D.
In Academia Lugduno-Batava nuper Medicina ac Botanicae PROFESSOR,
Opus Polheximum.

LUGDUNI BATAVORUM;
Imprimi Puteis.
Audiant Abrahamum Elzevier.
Academia Typographia. MDCCXVII.

Fig. 52. Title page of Paradisus batavus. 1698.

Fig. 50. Cactus lanuginosus (Curaçao) from Hummelinck, Succulenta 20(10): 151. 1938.

Fig. 51. Pilosocereus lanuginosus (Venezuela, Isla Margarita) from Hummelinck, Succulenta 20(9-10): 135, 147-153. 1938.
9. **Cactus peruvianus** [Selenicereus grandiflorus (L.) Britton & Rose].

*Cactus peruvianus* L., *Species plantarum* 1: 467. (1 May) 1753. *Cactus eretbus longus suboctangularis: angulis obtusis* L. *Hort.* *cliff.*: 182-183 nr.6. 1737. *Hort.* *ups.*: 120 nr.5. 1748. (Fig. 53).

Typ: Jamaica, Peru, in sunny, dry coastline (*Sp. plant.)*; America; especially on the island of Jamaica in dry coastline, dry wooded countryside and open spaces everywhere (*Hort. cliff.*); Jamaica, in dry, sandy, open coastal places (*Hort. ups.*).

Holotyp: Euphorbii arbor cerei effigie, in L’Obel, *Plantarium seu stirpium icones* 2: 25. 1581. First published in Penna & L’Obel, *Stirpium adversaria nova*: 453. 1570, as Cereus, and later in Tabernaemontanus, Neuw Kreuter-Buch: 1085. c.1590, as Cereus Peruvianus. This is the only included element and therefore automatically the holotype. (Fig. 54).

Principal homotypic synonyms:
*Cereus peruvianus* Tabernaemontanus (= Jacobus Theodorus), *Neuw Kreuterbuch*: Cap. 27. 1085. c.1590.
*Cereus peruvianus* (L.) Mill., *Gardeners dictionary*, ed.8: Cereus 4. 1768.

Principal heterotypic synonyms:
*Cactus grandiflorus* L., *Species plantarum* 1: 467. (1 May) 1753.

Fig. 53. *Cactus peruvianus* extracts from *Species plantarum & Hortus cliffortianus* (1753 & 1738).

Fig. 54. *Cactus peruvianus* [Selenicereus grandiflorus] From Peña & L’Obel, *Nova Stirpium Adversaria*: 453. 1570 & 1576. Copied in L’Obel, *Plantarium seu stirpium icones* 2: 25. 1581. [= *Cactus peruvianus* of Tabernaemontanus (c.1590)].
resemble the garden cactus, but that is also of a South American, not a Caribbean, origin. It has, however, been interpreted as being *Stenocereus fimbriatus* (*Cactus heptagonus* L.) because Sloane’s phrase name was cited in synonymy in *Hort. cliff. and in the 2nd. edition of* *Sp. Plant*, which is the Larger Dido Tree of Jamaica, but the habit of growth is not a good match. Another possible identity that has been suggested is *Cereus repandus*, but that does not occur in Jamaica.

The true identity of L’Obel’s illustration is equivocal and it does conflict with the protologue in as much as it shows a plant with only 5 ribs whereas Linnaeus’s phrase name calls for 8-9 ribs. Very few cacti resembling the drawing have only 5 ribs from that area, but *Selenicereus grandiflorus* does fit the number of ribs, habit of growth and spination, and is recorded as having up to 10 ribs exceptionally.

The specific epithet of *peruvianus* was probably adopted from usage by the German herbalist Jacob Theodor Tabernaemontanus (1522-1590) who reproduced the L’Obel figure in his *Neu Kreuter-Buch*, calling it *Cereus peruvianus*. Linnaeus did not cite this reference under *Cactus peruvianus*, but the works of Tabernaemontanus were listed in his *Bibliotheca botanica* of 1736. Peru at the time of Tabernaemontanus was not clearly defined, and anywhere in the north-western part of South America was then known as Peru, distinguished from New Spain to the north by a vague and variable boundary that in the early sixteenth century included the whole of the South American continent north of the equator, other than Brazil. L’Obel’s own plant might therefore have originated from anywhere on the north-western part of the South American mainland, or the nearby islands.

Fig. 55. Palmacea, from Peña & L’Obel, *Nova Stirpium Adversaria*. 452. 1570 & 1576. This is probably illustrating the stem of a Catclaw Acacia (left) and a branch of a Rattan Cane (right), not a *Selenicereus* stem as suggested elsewhere.

We need to correct a long-standing error of identification for the drawing on the opposing page in Peña & L’Obel (1570: 452, Fig. 55). The right-hand drawing on this page is not a stem of *Selenicereus* as hitherto supposed, but a leafless branch of a member of *Palmae tribus Calameae*, probably a Rattan Cane. The other drawing to the left of it is probably the stem of one of the Wait-a-Minute trees, perhaps the Catclaw Acacia or a related species.

L’Obel’s drawing of what he called “Cereus” has also been widely misinterpreted. It is not *Cereus peruvianus* hort. non (L.) Mill. Not only does it not
10. *Cactus Royeni* [Pilosocereus royeni (L.) Byles & G.D.Rowley].
*Cactus Royeni* L., *Species plantarum* 1: 467. (1 May) 1753. Cactus erectus articulatus sub-decangularis: articulis subovatis, spinis lanam aequantibus L. *Roy. Lugdb.:* 279 nr.3. 1740. (Fig. 56).
Typ: Not cited.
Neotyp. (design here): Lesser Antilles, chiefly in rocky places; 1695-1697, *C. Plumer;* in Burman, *Plantarum Americanum fasciculus* 8: t.191. 1758. Seen by Linnaeus in *Codex Boerhaavianus* prior to Burman's publication in 1738, but not assigned by him to any Linnaean taxon. (Fig. 57a)
Typotyp. Melocactus monoclonos, fructu atropurpureo, cereiformis Plumier, C., *Botanicon Americanum* manuscript 3: t.30. 1689-1697. Reproduced in Mottram (2002: 117). (Fig. 57b).

Fig. 57a & b. Neotype of *Cactus Royeni* L. & holotype of *Cereus monoclonos* DC. (a) from Burman (1758: t.191) and (b) from Plumier, *Botanicon Americanum* (1689-1697: t.30).

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Fig. 58a & b. A typical colony of *Pilosocereus royeni* (Lesser Antilles, St. Lucia) Kirkbright photos 2011.

**Principal homotypic synonyms:**


Named for Adrian van Royen (1705-1779), a student of Herman Boerhaave (1668-1739). Van Royen’s herbarium comprised specimens from the Leiden Botanical Garden, and Linnaeus stayed with van Royen at his home in 1737.

Linnaeus’s descriptive phrase appears to be an adaptation from those of Van Royen and Boerhaave appearing in Van Royen’s catalogue of the Leiden collection. It repeats the assertion that the original plant was articulated. What Boerhaave (1710, 1: 294) actually said was
“compressed at intervals as if in segments”. This is not normally the case with the plant that we grow today as *Pilosocereus royeni*, and this has puzzled commentators ever since. Herman’s Cereus nr. 4 (1698: 115), always regarded as being the same plant, was not so described, and Miller’s example of it from the British West Indies in 1728 was also not described as jointed. However, articulation can occur in this species if the water supply is erratic, and we should therefore consider it as just an aberration of poor cultivation.

The usual spelling of the specific epithet with two ‘i’s is incorrect. Linnaeus latinised all personal names in specific epithets. The accepted latinisation of Royen is also Royen, which is to be treated as a second declension noun with the genitive *royeni*, like Greek neuter nouns of similar construction.

There are no original materials extant cited by Linnaeus, but the presently accepted application of the name has never been disputed. It is a widespread and common species throughout the Caribbean, and has many synonyms, one of the oldest of which is *Cereus monoclonos* DC, based on Burman’s copy of Plumier’s drawing. Linnaeus will have seen this copy, but we have no evidence that he associated it with this species. In the circumstances, the best solution to the lack of typification is to neotypify *Cactus Royeni* with Plumier’s plate, the ‘Cierge Espineux’ (Spiny Torch) of the Lesser Antilles, the only contemporary uncited material available that also agrees with current usage.

There is a question about whether this species is truly different from *Cactus lanuginosus*, particularly as Herman’s plate 115, the holotype of that species, is cited in synonymy with *Cactus Royeni* in Linnaeus & Murray (1784: 459).

11. *Cactus grandiflorus* [Selenicereus grandiflorus (L.) Britton & Rose].

*Cactus grandiflorus* L., *Species plantarum* 1: 467. (1 May) 1753. Cactus repens subquiquangularis L. *Hort. cliff.*: 182 nr.10. 1737. *Hort. ups.*: 121 nr.11. 1748. *Roy. lugdb.*: 279 nr.10. 1740. (Fig. 60).

**Typ**: Jamaica; Mexico, Veracruz. **Lectotyp.** (design. Lourteig 1991: 406): Cactus scandens minor polygonus articulatus. *Par. Bat.* 120. Mexico, Veracruz?; BM-000628597. Herb. Clifford: 182, Cactus 10. This is uncited but presumed by Lourteig to be original material. However, it is not dated, so there remains some doubt, but is retained here as the priority lectotypification. (Fig. 59)
10. CACTUS scandens, angulis quinque pluribus obtusis.

Cereus scandens, major polygonus articulatus. 

Cereus americanus major articulatus, flore maximo noctu se aperiente & suavis-simum odorem spirante Volckamer, Nürnbergerische Hesperides: t. 234. 1708. (Fig. 61) Cited in both of Linnaeus’s garden catalogues and in Species plantarum.

2. Cereus scandens minor polygonus articulatus, from Herman, Paradisus Batarum (1698): t. 120. Cited in Hort. cliff. Said to have originated from Mexico, it might be another species of Selenicererus other than grandiflorus, such as spinulosus. Without a flower there is great uncertainty. (Fig. 62)

3. Ficoides americanum sive Cereus minima serpens americana, from Plukenet, Phytographia t.158, fig.6. 1692 was also cited in Hortus cliffortianus (1738), but erroneously transferred to Cactus flagelliformis in Species plantarum (1753). (Fig. 63).

The long description of the flower in Hortus Cliffortianum (1738: 182) may or may not have been from a plant in Clifford’s garden. The way that the description is introduced in the first paragraph suggests that it may not have been:

Principal homotypic synonym:
“It has been reckoned that it flowers only for one single night, and even then infrequently, indeed it opens at sundown, expands to its full diameter through the night, to close at sunrise; there has been a report of it having flowered by day on 30 Jun 1737.” The detailed observations of the flower thereafter therefore might not have been made by Linnaeus himself, but possibly by Van Royen in the summer before they met in the winter of 1737-38.
Fig. 64. *Selenicereus grandiflorus* (L.) Britton & Rose, from Sola Palma, Veracruz, Mexico. Photo: Roy Mottram.
12. **Cactus flagelliformis** [Aporocactus flagelliformis (L.) Lem.].

*Cactus flagelliformis* L., *Species plantarum* 1: 467. (1 May) 1753.
Cactus repens decemangularis L. *Hort. ups.*: 121 nr.12. 1748. (Fig. 65).
*Typ:* Tropical America.

*Lectotyp.* (design. Mottram 2011: 89): *Cactus flagelliformis* in Ehret, *Plantae et papiliones rariores depictae et aeri incisae a Georgio Dionysio* t.2. 1748. (Fig. 66).


**Principal homotypic synonyms:**


A specimen, LINN 633.2, from the Linnaean Society of London herbarium, preserved at Uppsala, has been listed as original material by Jarvis, but it is undated, and there would be difficulty in distinguishing it from *Aporocactus martianus* in the pressed condition. (Fig. 67).
Linnaeus knew this plant well. His first mention is in the 1748 Uppsala catalogue, where it was the only cactus to actually have a description, which read “It is small, scarcely thicker than a reed pen, with weak angles and beset with sharp spines, to a point where it is difficult to count the angles.”

The Species plantarum protologue includes three disparate elements. His earlier description starts with Plumier’s phrase name from Catalogus plantarum Americanarum: 6. 1703, Opuntia minima flagelliformis, from which he appears to have adopted the name. We do know, however, from Plumier’s plate in Botanicon Americanum 3: t.76 shown here, that Plumier applied the name to Rhipsalis baccifera. (Fig. 68).

The second illustration from Plukenet, Phytographia: t.158, fig.6 was first cited by Linnaeus in Hortus Cliffortianus (1738) as a synonym of his phrase name for Cactus grandiflorus, and under Cactus flagelliformis in Species plantarum (1753). It is actually an image of Selenicereus grandiflorus. (Fig. 63)

The third illustration cited appears in Species plantarum (1753) for the first time, and is Ehret’s painting that appeared in his work Plantae et papiliones rariores depictae et aeri incisae a Georgio Dionysio (1748). This plate was again copied in mirror image in the work of Trew, Plantae selectae (1750). This has been selected as the lectotype of this name by Mottram (2011: 89).

Fig. 67. Herbarium specimen of Cactus flagelliformis LINN633.2, Linnean Society of London.

Fig. 68. Opuntia minima flagelliformis in Plumier, Botanicon Americanum 3: t.76 [Rhipsalis baccifera] [cited by Linnaeus as the phrase name from Plumier, Catalogus plantarum Americanarum: 6. 1703].
13. *Cactus triangularis* [Hylocereus triangularis (L.) Britton & Rose].

*Cactus triangularis* L., *Species plantarum* 1: 467. (1 May) 1753. Cactus repens triangularis L. *Hort. cliff.*: 182 nr.11. 1737. *Hort. ups.*: 121 nr.13. 1748. (Fig. 69).

Typ: Jamaica, Brazil, and various other regions of the Americas in wooded fields growing and climbing on trees.

Lectotyp. (design. Doweld 2002: 12): Ficoides Americanum, seu Cereus erectus cristatus, foliis triangularibus profunde canaliculatis, from Plukenet, *Phytographia* t.29 fig.3. 1691. (Fig. 70)


Principal homotypic synonym:

*Hylocereus triangularis* (L.) Britton & Rose,


Other elements in synonymy listed by Linnaeus in *Hortus Cliffortianus* include Markgraves’s illustration of Jama-caru nr. 2 (Fig. 71), actually either *Cereus pentagonus* or *jamaicarum*. Markgrave called all cacti Jama-caru (Tupi Indian for any thorny edible tree).

*Hylocereus triangularis* was his Jama-caru nr. 1, with
no illustration, and Linnaeus misinterpreted the text.

Also listed is Plumier’s phrase name from Catalogus plantarum Americanarum: 19. 1703, Melocactus [americanus] repens, trigonius, flore albo, fructu violaceo, but because Plumier slightly modified his names from Botanicon Americanum we cannot be sure to which of his illustrations the 1703 phrase name applied. Linnaeus & Murray (1784: 460) cited “Plum. ic. 199, 200?” (in Burman 1758), thereby expressing this uncertainty.

A new contemporary element listed in Species plantarum ed.2: 669 is Bradley, Historia plantarum succulentarum 1: 4, t.3. 1716, as Cereus Americanus Triangularis radicosa (Fig. 72). It is often said to be Hylocereus triangularis, but it has the thicker, spindle-shaped articulations more typical of H. undatus. All species of Hylocereus were then considered to be the same thing but undatus was the plant cultivated in the West Indies, South America, and elsewhere across the Pacific for its vigorous and superior fruits to the native triangularis.

Hylocereus undatus is considered as native to some islands of the Caribbean, but its true origin is unknown. It may have arisen in cultivation by breeding or selection in historic times, parallelling the case of Opuntia ficus-indica, prized for the fruits and its flowers also have an economic value to
the natives as food and medicine (Degener 1932). First recorded and illustrated by Oviedo in 1535, it has been established through many parts of the world, including to many Pacific Islands and in China before 1830, from where its neotype is said to have
originated. It differs from *Hylocereus triangularis* in being larger in all its parts, the stem wings are more prominent, and the shorter joints are more spindle-shaped.

A further two illustrations were added to the second edition from *Academia Caesarea Leopoldino-Carolina Germanica Naturae Curiosorum*, cited as “E. N. C. 1752. v. 9 app. 199. t.10. f. 14” and “E. N. C. 1754 v. 9. app. 349. t.3” (See Heller & Stearn 1959: 39-40). The second reference is perhaps corrupted and could not be found, but the first is a reasonable representation of a flowering stem of *Hylocereus triangularis*.

Another illustration added to *Systema Vegetabilium* (1784: 460) is the very fine plate accompanying an article by Risler (1762: t.2), but this again is not *triangularis* but *undatus* (Fig. 73).

Many illustrations have been published purporting to be this species, but few can be traced to the epitype locality in Jamaica. A sketch of a joint collected by Nathaniel Britton near Mandeville, Jamaica in 1907 is shown in Fig. 74. It is the common native hylocereus of the Caribbean and Central America.

14. *Cactus moniliformis* [Opuntia (Conseola) moniliformis (L.) Steudel].

*Cactus moniliformis* L., *Species plantarum* 1: 468. (1 May) 1753. Cactus articulato-prolifer, articulis globosus spinosis glomeratis L. (Fig. 75).

*Typ*: Tropical America.

*Lectotyp*: (design. Mottram 2002: 88) Cactus articulato-prolifer, articulis globosis Plumier, in Burman, *Plantarum Americanum* fasc. 8: t.198. (20 Jun) 1758. (Fig. 76).

*Typotyp*: Haiti, Band du Sud, commonly found along the coast; 1689-1690 or 1693, *Charles Plumier*; Melocactus ex pluribus globulis opuntia modo nascentibus constatus et spinosissimus Plumier, *Botanicon Americanum* 3: t.11 (lower fig.). (Fig. 76 inset)

Original material seen by Linnaeus (as Burman copies), not cited or identified by him because he did not recognise it as the same plant but also belonging here is: Hispaniola (abundant at Port à Piment) & St. Thomas (Virgin Is.), very frequent in dry, wooded areas; 1689-1690, *Charles Plumier*; Opuntia arbor excelsa foliis reticulatus, flore flavescente Plumier, *Botanicon Americanum* 3: t.27-28 (Fig. 78-79).

**Principal homotypic synonyms:**

*Opuntia moniliformis* (L.) Steudel,
*Nomenclator botanicus*, ed.2 1: 334, 2: 221. 1841.
*Consolea moniliformis* (L.) A.Berger, *Die Entwicklungslinien der Kakteen*: 94. 1926.
Fig. 7. Cereus moniliformis extract from *Species plantarum* (1753)

Fig. 76 (left) Lectotype from Burman, *Plantarum Americanarum fasciculus* 8: t.198. 1758.
(above) Typotype from *Botanicon Americanum* 3: t.11. 1689-1693.

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*Opuntia* moniliformis (Porto Rico, Desecheo Island, Mona Passage) from Britton & Rose, *The Cactaceae* 1: 207, fig.261-262. 1919. The left-hand photo is by Lutz, showing the glomeriform juvenile growth formed by a proliferation from fruits falling to the ground.
Linnaeus made an indirect reference to the Plumier plate in the protologue by citing Plumier’s phrase name from his catalogue (1703: 20), which was supported in the second edition of *Species plantarum* by the addition of the explicit reference to “ic. 198”. No other elements exist, although Plumier included two other illustrations of a mature plant of the same species, however believing it to represent a different species. This was known to Linnaeus only from the copy of Plumier’s drawing. Linnaeus saw it in the *Codex Boerhaavianus* in the winter of 1737-38. Plumier’s original drawing (Fig. 76 inset) and manuscript description were not seen by Linnaeus. This drawing could not be related to any known species for the next 150 years until Britton & Rose realised that it was merely the juvenile form of the tree-like consolea that we call *Opuntia moniliformis* today (Fig. 77).

15. **Cactus Opuntia** [≡ *Opuntia vulgaris* Mill. ≡ *Opuntia ficus-indica* (L.) Mill.]. *Cactus Opuntia* L., *Species plantarum* 1: 468. (1 May) 1753. Cactus articulato-prolifer, articulis ovatis spinis setaceis L. *Hort. cliff.*: 183 nr.15. 1737. *Hort. ups.*: 120 nr.6. 1748. (Fig. 80).

*Typ:* America, Peru, USA: Virginia, and now naturalised in Spain and Portugal. [Italy added in ed.2].

*Lectotyp.* (design. here): Ficus Indica Eýstettensis ex uno folio enata luxurians, Besler, *Hortus Eystettensis*, Classis Autumnalis: t. 6 (= 41), fig.1. 1613. [cited in *Hort. Cliff.* (1737)]. Supersedes the
lectotypifications of Howard & Touw (1981: 237), not identifiable, and that of Leuenberger (1993: 426), not cited or known to have been definitely seen by Linnaeus. (Fig. 81a).

Isolectotype: Ficus Indica Eystettensis ex uno folio enata luxurians, Folium Opuntiae cum flore & fructu, Besler, Hortus Eystettensis, Classis Autumnalis: t.7 (= 42). 1613. (Fig. 81b).

Three other illustrations were cited by Linnaeus as follows:

Bauhin & Cherler, Historia plantarum (1650 1: 154) [cited in Sp. plant. (1753), Hort. Cliff. (1738) & Hort. Upsal. (1748)]. [Opuntia ?ficus-indica (L.) Mill.] (Fig. 82)

Dodoens, Stirpium historiae pemptades sex, sive libri XXX: 813. 1583. [cited in Hort. Cliff. (1738) & Hort. Upsal. (1748)]. [Opuntia ficus-indica (L.) Mill.] (Fig. 83)

Tournefort, Institutiones rei herbariae 2: t.122. 1719. [cited in Gen. Plant. (1754)]. [Opuntia ?humifusa] (Fig. 84)

Principal homotypic synonyms:
Cactus Ficus-Indica L., Species plantarum 1: 468. (1 May) 1753.

Opuntia vulgaris Mill., Gardeners dictionary, ed.8: Opuntia nr.1. 1768.

Opuntia ficus-indica (L.) Mill., Gardeners dictionary, ed.8: Opuntia nr.2. 1768.

Miller (1768) provided the earliest substitute name, Opuntia vulgaris, in The gardeners dictionary of 1768. Miller’s own description also included what we know today as Opuntia humifusa, as is clear not only from his description but also from the fine illustration of his plant in his celebrated work Figures of the most beautiful, useful, and uncommon plants described in the Gardeners Dictionary, that particular plate having been published in 1757. This has led many authors to adopt the epithet vulgaris for what is otherwise known as Opuntia humifusa. However, this is a mistaken interpretation of the naming rules. The type of a substitute name has to be the type of the replaced synonym, and, as Linnaeus could not have seen the illustration of Miller in 1753, that cannot count.

Howard & Touw (1981: 236) placed great store on the fact that in the second edition, Linnaeus had added a reference to the plate of Miller (1760: t.191), depicting what
Fig. 81
Lectotype of *Cactus Opuntia* L.

(right) loc. cit. t.7 (= 42). 1613.
Lectotype of *Cactus Ficus-indica* L.
today is known as *Opuntia humifusa*, and the adding of the word *laxus* to his own phrase name. Contrary to the interpretation of Howard & Touw, Linnaeus's own definition of *laxus* was "libere in arcum flexibilis" (1762) meaning "in a freely flexible arch", a description that is more likely to apply to the branches of species with erect trunks than to those which are procumbent.

Britton & Rose confused matters further by thinking that they could somehow see *Opuntia monacantha* in the illustration of Bauhin & Cherler and applied the name *Opuntia vulgaris* in that sense.

Amongst the original material cited by Linnaeus, we must include elements known to have been used by him. The only illustration cited directly in *Species plantarum* was that of Bauhin & Cherler (1650: 154), which was probably *O. ficus-indica*. To many authors, this is therefore automatically the holotype of *Cactus Opuntia*, but, even if that were true, it is not useful because of its uncertain identity. It is a mirror image of one of the two superimposed woodcuts published by Peña & L'Obel in 1570, with additions of a seedling and a fruit section (Fig. 82).
De Ficus Indica.  

Ficus Indica.

C A P. x x i.  

Ficus Indica fructus & flor.

Fig. 83. Dodoens, Stirpium historiae pemptades sex, sive libri XXX: 813. 1583. [cited in Hort. Cliff. (1738) & Hort. Upsal. (1748)].

Opuntia.

Fig. 84. Opuntia humifusa in Tournefort, Institutiones rei herbariae 2: t.122. 1719. [cited in Gen. Plant. (1753)].
Of the other material worked on by Linnaeus, specimens in the herbarium of Joachim Burser (1583-1639) all predate Linnaeus’s description and are therefore usually considered eligible as uncited original material, and may be used in the absence of cited and identifiable original material. Following this logic, Leuenberger chose a specimen from the Burser herbarium to lectotypify Cactus Opuntia, which is an example of Opuntia ficus-indica (Fig. 85). However, Linnaeus also cited several illustrations in Genera plantarum, Hortus upsalensis and Hortus cliffortianus, making five directly cited elements that all take priority over the Burser specimen. Without a direct citation of the Burser herbarium or the specimen selected by Leuenberger, we do not know if Linnaeus studied that actual specimen.

The clearest and most obvious choice for a lectotype is the fine illustration of Besler (1613). This makes Cactus Opuntia L. & Opuntia vulgaris Mill. synonyms of Opuntia ficus-indica (L.) Mill., thereby maintaining current usage.

The widely accepted identification of Besler’s plate as Opuntia tomentosa Salm-Dyck is not credible because the flowers are yellow not red, the segments are much narrower with a downy not glabrous epidermis, and the species is not known to have been in cultivation until its first description in 1822.

16. Cactus Ficus-indica [Opuntia ficus-indica (L.) Mill.].
Cactus Ficus-Indica L., Species plantarum 1: 468. (1 May) 1753. Cactus articulatoprolifer, articulis ovato-oblongis, spinis setaceis L. Hort. cliff.: 183 nr.16. 1737. Hort. ups.: 120 nr.7. 1748. (Fig. 86).
Typ: Tropical America.
Lectotyp. (design. here): Ficus Indica eÿstettensis ex uno folio enata luxurians, Folium Opuntiae cum flore & fructu, Besler, Hortus eystettensis, Classis Autumnalis: t.7 (= 42). 1613. (Fig. 81b).
Isolectotyp: Ficus Indica eÿstettensis ex uno folio enata luxurians, Besler, Hortus eystettensis, Classis Autumnalis: t. 6 (= 41), fig.1. 1613. [cited in Hort. Cliff. (1737)]. (Fig. 81a).

Principal homotypic synonyms:
Cactus Opuntia L., Species plantarum 1: 468. (1 May) 1753.
**Opuntia ficus-indica** (L.) Mill., *Gardeners dictionary*, ed.8: Opuntia nr.2. 1768.

**Opuntia vulgaris** Mill., *Gardeners dictionary*, ed.8: Opuntia nr.1. 1768.

**Principal heterotypic synonyms:**


Numerous other synonyms exist.
Leuenberger (1991: 623) neotypified *Cactus Ficus-indica* with a specimen at the Stockholm Natural History Museum (S) (Fig. 87). It had a cultivated origin and the date of deposition is unknown. The verso of the specimen has the phrase name of *Cactus Ficus-indica*, but it has been altered from that of *Cactus Tuna*. The neotype specimen is somewhat atypical of *Opuntia ficus-indica* in that the joint is rather elongated for this species which rather fits *Opuntia cochenillifera* better. Note also the statement by Linnaeus in *Hortus Cliffortianus* that this species may not be different from his next two, i.e. *Cactus Opuntia* and *Cactus Tuna*. There was considerable confusion at the
time.

Of the illustrations published by Besler, *Hortus eystettensis* plate Aut. 6 &7 from 1613, plate 6 was cited by Linnaeus under *Cactus Opuntia* in *Hortus Cliffortianus*. Boerhaave (1720 2: 82) had already pre-empted my selections in this paper by citing Besler’s plate 6 under his phrase name for *Cactus Opuntia* (his Opuntia 6) and Besler’s plate 7 under his phrase name for *Cactus Ficus-indica* (his Opuntia 1). Boerhaave evidently had not realised that both plates were illustrating the same plant. Because of this the two figures rank as eligible original material with priority over the uncited and possibly unseen neotype specimen selected by Leuenberger.

The earliest illustrations of *Opuntia ficus-indica* are those of Fuchs (c.1560 or earlier, Fig. 88) and Matthioli (1559 & 1565, Fig. 89), also establishing the earliest known usage of the name *Opuntia* as a genus. *Opuntia ficus-indica* is naturalised all around the Mediterranean, and according to Fuchs and other sixteenth century herbalists it was already widespread in Europe before 1550. Fig. 90 is a typical roadside example of it growing in Capri, Bay of Naples, Italy.

17. *Cactus Tuna* [*Opuntia tuna* (L.) Mill.].

*Cactus Tuna* L., *Species plantarum* 1: 468. (1 May) 1753. *Cactus articulato*: prolifer, articulis ovato-oblongis: spinis setaceis L. *Hort. cliff.*: 183 nr.14. 1737. *Hort. ups.*: 120 nr.8. 1748. (Fig. 91).

Typ: Jamaica & throughout tropical America. Lectotyp. (design. Crook & Mottram 2004: 61): Tuna major, spinis validis flavicantibus, flore gilvo. Dillenius, *Hortus elthamensis* 2: t.295, fig.380. 1732. (Fig. 92)

**Principal homotypic synonym:**

*Opuntia tuna* (L.) Mill., *Gardeners dictionary*, ed.8: Opuntia nr.3. 1768.

**Principal heterotypic synonyms:**


17. CACTUS articulato; proliēre, articulis ovato-oblongis, spinis fubulatis.

Cactus compeclus articulatus ramosus, articulis ovato-oblongis, spinis fubulatis. Hortic. efliff. 183. Hortic. inf. 120. Roy. inqdb. 280.

Tuna major, spinis validis flavicantibus, flore gibbo.

Dill. eflbb. 396. t. 295. f. 238.

Opuntia major, folio oblongo rotundo; spinis longis & validissimis, flore luteo. Slaan. jam. 155. bifl. 2. p. 149. t. 224. f. 1.

Habitat in Jamaica & America salidiore.

14. CACTUS compeclus articulatus ramosus, articulis ovato-oblongis, spinis fubulatis.


Opuntia major, validissimis spinis munita. Tournef. inf. 239. Boerh. liggda. 2. p. 82.

Tuma major, spinis validis flavicantibus, flore gibbo. Dill. eflbb. 396. t. 295. f. 380.

Tuna clator, spinis validis nigricantibus. Dill. eflbb. 395. t. 294. f. 379.

Crescit in Jamaica & plurimis America regiisibus.

Fig. 91. Cactus Tuna extracts from Species planitarum & Hortus cliffortianus (1753 & 1738).

Fig. 92. Tuna major, spinis validis flavidicantibus, flore gibbo, from Dillenius, Hortus elthamensis 2: t.295: Fig. 380-381. 1732. The British Museum © copy, with original hand-colouring by Dillenius himself. Lectotype of Cactus Tuna L.
Fig. 93. Tuna elatior, spinis validis nigricantibus, from Dillenius, *Hortus elthamensis* 2: t.294: Fig. 379. 1732. The British Museum © copy, hand-coloured by Dillenius. Holotype of *O. elatior* Mill. as the only included element.


The Linnaean protologue was a mixture of two elements: *Opuntia dillenii* (Ker-Gawl.) Haw. and the species then also known as *Opuntia elatior* Mill.

Two of the three illustrations cited by Linnaeus were:
t.295 in Dillenius, *Hortus elthamensis* 2 (1732). [in *Sp. plant.*] 
t.294 in Dillenius, *Hortus elthamensis* 2 (1732). [in *Hort. Cliff.*] (Fig. 93). This is the autoholotype of *O. elatior* Mill. as it was Miller’s only included element. The two illustrations shown here (Fig. 92-93) are reproduced from the British Museum copy, hand-coloured by Dillenius, one of only four copies known to have been coloured by him.

The third cited illustration (Fig. 94) is a drawing by Sloane, in the Sloane Herbarium at the British Museum, of fruits only. These fruits are almost certainly those of *Opuntia dillenii*, with the characteristic blood-red pulp and clavate shape. However, the fruit alone is not very useful clue to identification, so the figure t.295 of Dillenius was chosen...
Fig. 94. *Opuntia ?dillenii* fruits from Sloane’s Jamaica herbarium, BM.

Fig. 95. *Opuntia schumannii* (Colombia, Santa Clara) Collected by John G. Sinclair in 1913. Britton & Rose, *The Cactaceae* 1: 114. 1919.

Fig. 96. *Opuntia tuna* PH960.02 (Colombia, Department Boyacá, Sogamoso) Photo Paul Hoxey.

as the lectotype of *Cactus tuna* by Crook & Mottram in 2004.

Britton & Rose (1919: 113-114) misinterpreted *Opuntia tuna* and assigned the name to a plant from the southern lowland of Jamaica, near Kingston, which was probably *Opuntia dillenii*. In cultivation the name *Opuntia tuna* is also widely misapplied.
Fig. 97. *Opuntia tuna*:
1919, as *O. elatior*, *bergeriana*, *boldinghii*.

Opuntia tuna (L.) Mill. is native to the southern Caribbean and the north coast of mainland South America extending as far south as central Colombia (Fig. 98). The spination is sometimes almost absent, and the flower colour varies from a muddy orange-yellow to clear red, or yellow streaked with red.

Fig. 98. *Opuntia tuna* (South Africa) Cythna Letty painting from *Farming in South Africa* reprint nr. 24: t.5. 1940, as *O. schumannii*. 

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2. Flowering joint of *Opuntia elatior*.

3. Flowering joint of *Opuntia boldinghii*.
18. *Cactus cochenillifer*

[Opuntia cochenillifera (L.) Mill.]

*Cactus cochenillifer* L., *Species plantarum* 1: 468-469. (1 May) 1753. *Cactus articulato-prolifer, articulis ovato-oblongis subinermibus* L. *Hort. Ups.:* 121 nr.10. 1748. (Fig. 99).

*Typ*: Jamaica & tropical America.

*Lectotyp*: (design.

Howard 1989: 411):

Tuna mitior flore sanguineo, cochenillifera.


Fig. 99. *Cactus cochenillifer* L. extract from *Species plantarum* (1753).

Fig. 100. The lectotype illustration of *Cactus cochenillifer* L. in Dillenius, *Hortus elhamensis* 2: t.297: Fig. 383. 1732. British Museum © copy, hand-coloured by Dillenius.
Principal homotypic synonyms: Opuntia cochenillifera (L.) Mill., Gardener's dictionary, ed.8: Opuntia nr.6. 1768.

Nopalea cochenillifera (L.) Salm-Dyck, Cactae in horto Dyckensi cultae anno 1849: 64. 1850.

Three direct citations of illustrations appear in the Linnaean protologue, all of which represent Opuntia cochenillifera (L.) Mill. Of these, Howard selected the fine plate from Dillenius, Hortus elthamensis as the lectotype.

The other two cited elements were:

Ficus indica major laevis f. spinosa vermiculos, quos cochenilla vacant, proferens. Plukenet, Almagestum: 146, t.281, fig. 2. 1696. (Fig. 101).

Opuntia maxima, foliis oblongo rotundo majore, spinulis obtusis mollibus & inno-centibus obsito, flore striis rubris variegato. Sloane, A voyage to the islands Madera, Barbados, Nieves, S. Christophers and Jamaica 2: 152, t.8, fig. 1-2. 1725. “This Opuntia has been grown on the plantation of Mr. Worley, established in Jamaica from the American Continent”. (1696: 194-195). (Fig. 102).

Fig. 101. The cited illustration of Cactus cochenillifer L. from Plukenet, Almagestum botanicum: t.281, fig. 2. 1694.

Fig. 102. The cited illustration of Cactus cochenillifer from Sloane. A voyage to the islands Madera, Barbados, Nieves, S. Christophers and Jamaica 2: t.8, fig. 1-2. 1725.
19. **Cactus curassavicus** [Opuntia curassavica (L.) Mill.]

*Cactus curassavicus* L., *Species plantarum* 1: 469. (1 May) 1753. Cactus articulato-prolifer, articulis cylindrico-ventricosis compressis. L. *Hort. ups.*: 120 nr.9. 1748. (Fig. 103).

*Typ:* Netherlands Antilles, Curaçao.


**Principal homotypic synonym:**

*Opuntia curassavica* (L.) Mill., *Gardeners dictionary*, ed. 8: Opuntia nr.7. 1768.

**Principal heterotypic synonyms:**


*Opuntia antillana* Britton & Rose, The flora of the American Virgin Islands.

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**Fig. 104. Opuntia curassavica** lectotype (Wijnands 1983: 57), from Commelijn, *Horti medici amsteladamensis plantarum usualium catalogus* 1: 107, t.56. 1697.

Linnaeus cited two illustrations for this species, and that of Commelijn (1697) was selected to be the lectotype by Wijnands (1983: 57). Commelijn’s plant was badly short of light and grew unnaturally shaped joints, but is otherwise just about recognisable as the Pin Pillow (or ‘pincushion’ as we would say today), the vernacular name given to it in the 15th and 16th centuries.

The second cited illustration was a plant grown more naturally in Bishop Compton’s garden in London, which would perhaps have been a better choice, as follows:

Plukenet, *Almagestum*: 147, t.281, fig.3. 1696. (Fig. 105).

Bradley’s illustration was added to the second edition of *Species plantarum*.

However, none of these illustrations show the natural habit of growth and morphology well, so an epitype would be a useful complement.

20. **Cactus Phyllanthus** [Epiphyllum phyllanthus (L.) Haw.].

*Cactus Phyllanthus* L., *Species plantarum* 1: 469. (1 May) 1753. Cactus prolifer ensiformi-compressus serrato-repandus. L. *Hort. cliff.*: 183 nr.16. 1737. (Fig. 106).


Dillenius, *Hortus elthamensis* 1: t.64, fig.74. 1732. (Fig. 108).
Fig. 106. Cactus Phyllanthus extracts from Species plantarum & Hortus cliffortianus (1753 & 1738).

Principal homotypic synonym: Epiphyllum phyllanthus (L.) Haw., Synopsis plantarum succulentarum: 197. 1812.

Only seen by Linnaeus in Clifford's garden. Two illustrations are directly cited, and a further two in Hortus Cliffortianus.

The earliest type designation was by Madsen in the Flora of Ecuador, who wrongly treated LINN 633.6, the specimen collected by Patrick Browne in the Linnaean herbarium, as the holotype, but this was not preserved until 1758 and is not therefore original material. Moreover it has rickrack crenations that suggest Epiphyllum crenatum rather than E. phyllanthus. (Fig. 107).

Dillenius’s fine plate from Hortus elthamensis (Fig. 108) was selected as lectotype by Leuenberger in Flora of the
Guianas in 1997. This is unequivocal.

The three other illustrations cited by Linnaeus are shown in Fig. 109-111. Markgrave’s illustration is probably *Epiphyllum phyllanthus*, but the other two are Mexican and referable to *Epiphyllum ackermannii*, known to the Aztecs as Nopalxoch cuez altiquizi.

Fig. 109 (left). *Cactus Phyllanthus* L. in Markgrave, *Historia Natural do Brasil*: 79. 1648, as Canambaya. [cited in *Hortus cliffortianus*]

Fig. 110 (below). *Epiphyllum ackermannii* [Nopalxoch cuez altiquizi], Nova plantarum, animalium et mineralium Mexicanorum, in Hernandez, *Rerum medicarum Novae Hispaniae thesaurus, seu plantarum, animalium, mineralium historia*. 1651.

Fig. 111 (above). *Epiphyllum ackermannii* in Plukenet, *Phytographia*: t.247, fig.5. 1692. Copied from Hernandez (1651).

*Pereskia*. *Hort. eff. 122. Rev. leg. 281.


*Habitat* in America calidore, Jamaica, Margarethia.

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**P**ere**s**k**i**a. *g. pl.* 402.

1. **P**eresk**i**a.


*Roi dender. 27.


*Grefs in America in Insula Margarethia, Jamaica, aliasque.*

*Apud nos non flores; ex figuris tamen Plumerianis patet eam Cacto valde affinem, si non ejusdem generis esse; qui itaque eam conjungere velit, per me pactum, ego calyx imbricate fit; germinis impositus, petala piura, stigma divium, fruētus modo in hac retinet squamam germ. pell. florecentiam, reliquee vero species non omnes Cacti eas regeant. Succulentia planta, & spinoła, (licet hac sola folii perfecitis infructa fit) confirmat idem.*

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Fig. 112. *Cactus Pereskia* L. extracts from *Species plantarum & Hortus cliffortianus* (1753 & 1738).

Fig. 113. Lectotype of *Cactus Pereskia* L., in Dillenius, *Hortus elthamensis* 2: t.227: Fig. 294. 1732. a) Original colouring by Dillenius from the British Museum © copy (white pigment affected by age). Reproduced here with permission. & b) later inaccurate colouring.

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21. **Cactus Pereskia** L. [*Pereskia aculeata* Mill.].

*Cactus Pereskia* L., *Species plantarum* 1: 469. (1 May) 1753. Cactus caule tereti arboreo spinoso, foliis lanceolato-ovatis. L. *Hort. cliff.*: 183 Pereskia nr. 1. 1737. *Hort. ups.*: 122 nr. 14. 1748. (Fig. 106).

**Typ**: Tropical America, Jamaica, Margaretha [Venezuela, Isla Margarita, but only *P. guamacho* is known from there according to Leuenberger], and elsewhere.

**Lectotyp.** (design. Leuenberger 1986: 59, 65): *Pereskia aculeata* flore albo, fructu flavescente Plumier, in Dillenius, *Hortus elthamensis* 2: t. 227: Fig. 294. 1732. (Fig. 107).

**Typotyp.** Fielding-Druce herbarium (OXF), annotated by Sherard with a direct reference to this plate.

**Principal homotypic synonym:**


A mixed taxon. Three illustrations were cited by Linnaeus. The clearest and only one that is identifiable as *Pereskia aculeata* Mill. is the Dillenius plate chosen as lectotype by Leuenberger (1986: 59), taking up the hint that this would be an appropriate choice by Wijnands (1983: 58). Benson (1982: 911, 969) made the earliest lectotype designation, but his choice was confusing with references to specimens at both LINN and S. There are two specimens at S, and all three at both herbaria are of young sterile and spineless branches that cannot be clearly identified. Leuenberger (1986: 59, 64-65) rejected all these specimens on the grounds that they were without any direct reference in *Species plantarum* (1753) [or earlier].

The other two cited illustrations by Commelijn (Fig. 114) and Plukenen (Fig. 115) are actually *Pereskia guamacho* according to Leuenberger (1986: 89), another denizen of the Dutch East Indies and coast of Venezuela and the only species endemic to Isla Margarita, while *P. aculeata* is widespread throughout the Caribbean.

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*Fig. 114. Pereskia sp. in Commelijn, Hort medi amstelaedamensis plantarum usualium catalogus* 1: 135, t. 70. 1697. [perhaps *P. guamacho*].

*Fig. 115. Pereskia sp. in Plukenen, Phytographia* t. 215 fig. 6. 1692. [perhaps *P. guamacho*].
22. *Cactus portulacifolius* L. [Pereskia portulacifolia (L.) DC.]

*Cactus portulacifolius* L., *Species plantarum* 1: 469-470. (1 May) 1753. *Cactus caule tereti arboreo spinoso, foliis cuneiformibus retusis.* L. (Fig. 116).

*Typ:* Tropical America.

*Lectotyp:* (design. Leuenberger 1986: 93, 97): *Cactus caule tereti, arboreo, spinoso.* Burman ex Plumier, *Plantarum Americanum fasc. 8:* t.197, Fig.1. (20 Jun) 1758. (Fig. 117b).

*Typotyp:* Haiti, Le Grand Cul-de-Sac, Fond Parisien, in fields; 1689-1690 or 1693, Charles Plumier; *Opuntia arborescens spinosissima foliis portulaca cordatis.* Plumier, *Botanicon Americanum* 3: t.29. (Fig. 117a).

**Principal homotypic synonym:**


Linnaeus cited the phrase name from Plumier’s *Catalogue of American plants* (1703), which is an indirect reference to Plumier’s plate. This taxon has the same history as *Cactus moniliformis*, known only to Linnaeus from the copy of Plumier’s drawing published by Burman from the Codex Boerhaavianus. This Burman copy was selected as the lectotype by Leuenberger in 1986, having been seen by Linnaeus in 1737, and is directly cited in the second edition of *Species plantarum*.

Fig. 116. *Cactus portulacifolius* extract from *Species Plantarum* (1753).

Fig. 117. a) Typotype of *Cactus portulacifolius* from Plumier, *Botanicon Americanum*: t.29. 1689-1690 or 1693; b) The lectotype from Burman, *Plantarum Americanum fasciculus* 8: t.197, f.1. 1758.
Literature:


- (1623) Pinax theatri botanici. Ludovic Regis, Basle.


- (1720) Index alter plantarum quae in horto academicomo Lugduno-Batavo aluntur. Petrus van de Aa, Leiden.


- (1920) The Cactaceae. Descriptions and illustrations of plants of the cactus family.


Cereus repandus. 20(9): 133-140; 2: (Nov).


- (1993) Interpretation and typification of Cactus opuntia L., Opuntia vulgaris Mill., and Opuntia humifusa (Rafin.) Rafin., Taxon

- (1737) *Hortus clifortianus*. George Clifford, Amsterdam. [distributed 1738]
- (1753) *Species plantarum*. Laurentius Salvius, Stockholm.
- (1754) *Genera plantarum*, ed.5. Laurentius Salvius, Stockholm. [To be considered as having been published with *Species plantarum* (1 May 1753)]
- (1762-1763) *Species plantarum*, ed.2. Laurentius Salvius, Stockholm.
- (1764) *Species plantarum*, ed.3. Johan Thom de Trattner, Wien. [reprint of 2nd. edition with errata incorporated]

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- (1565) *Commentarii in sex libris Pedacii Dioscoridis Amazarbei de Medica materia*. Valgrisi, Venice.


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