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Anthospermum, an unusual name for an African genus of Rubiaceae

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The mainly African genus *Anthospermum* L. has an enigmatic name, meaning 'floral seed.' Recent dictionaries of plant names relate the name to the complex reproductive biology of the genus, i.e., male flowers sometimes having ovaries capable of ripening seeds. However, Linnaeus himself mentioned how he coined the name, and he explained it differently. The Italian botanist Giulio Pontedera, who made earlier observations on the genus, confused flower buds with fruits and seeds with anthers. Hence, Linnaeus coined the name by combining the words flower (Greek *anthos*) and seed (Greek *spermum*) and herewith wanted to emphasise this error. *Anthospermum* seems to be another example of an insulting name given by Linnaeus.

Introduction

Ordinarily, researchers make use of scientific names of plants in Latin without ever considering their meaning. This is even more true for members of the general public for whom such names usually make little sense (Jiménez-Mejías et al. 2024). The name *Anthospermum* L. is enigmatic and can be translated as 'flower-seed' or 'floral seed' (Greek *anthos* = flower and *spermum* = seed). While working on a project investigating several aspects of all generic names in Rubiaceae (Verstraete et al. in press), we were struck by contradictions in the etymological interpretation of this name. Dictionaries of plant names relate the odd name with the complex reproductive biology of the genus, but Linnaeus himself gave a totally different explanation. In this paper, we compare the conflicting interpretations with the available literature.

The genus *Anthospermum*

Anthospermum L. is a genus of 39 species in the Rubiaceae family, occurring in Tropical and southern Africa and the Arabian Peninsula (POWO 2024). The southwestern Cape Floristic Region (13 species) and Madagascar (8 species) are notable centres of its diversity (Puff 1986). The genus belongs to the tribe Anthospermeae and is closely related to the southern African genera *Galopina* Thunb. and *Nenax* Gaertn. and the Macronesian genus *Phyllis* L., with which it forms the subtribe Anthosperminae (Thureborn et al. 2019). The South African endemic *Carpacoce* Sond. is in the monogeneric subtribe Carpacocinae. The other genera in the tribe (placed in subtribes Coprosminae and Opercullariinae) do not occur on the African continent, except for *Nertera granadensis* (Mutis ex L.f.) Druce, which is also found in Madagascar (POWO 2024). The tribe Anthospermeae is unique in Rubiaceae because it only comprises wind-pollinated taxa; anemophily is otherwise absent from Rubiaceae (Puff 1982). *Anthospermum* plants have a reduced habit (subshrubby and often heather-like, or herbaceous) and are dioecious or polygamous. The genus is

further characterised by unisexual or sometimes hermaphroditic flowers, long and feathery stigmata (in the female flowers), 2-locular ovaries with 1 ascendent ovule in each locule, and dry fruits subtended by a bracteolar carpophore, separating in two mericarps, tardively opening with three basal slits (Figure 1; Puff 1986; Robbrecht 2022).

The taxonomic history of the genus begins with the starting point of the nomenclature of angiosperms, i.e., *Species Plantarum* (Linnaeus 1753). In this publication, only *Anthospermum aethiopicum* L. from the Cape, South Africa was included (Linnaeus 1753: 1058), hence making it the type species. In the second edition, *A. ciliare* L. was added (Linnaeus 1763: 1512), while in the Supplement, Linnaeus' son added a third species, *A. herbaceum* L.f. (Linnaeus 1782: 440). A first survey of the genus was already done at the beginning of the 19th century (Cruse 1825), recognising eight species. Additional species were published especially at the end of the 19th and beginning of the 20th century. The genus was subject to a modern taxonomic revision based on extensive field work, adding 14 species to the genus (Puff 1986 and references therein). Recent molecular phylogenetic research demonstrated that the monophyly of *Anthospermum* was not proven, instead it was included in a highly supported *Anthospermum–Nenax* clade (Thureborn et al. 2019). In contrast, the sister genera *Galopina* and *Phyllis* were found to be monophyletic. A subsequent phylogenomic study of the tribe Anthospermeae corroborated the close relationship of *Anthospermum* and *Nenax*, but it could not confirm or reject the monophyly of the genera since only one species of either genus was included (Thureborn et al. 2024).

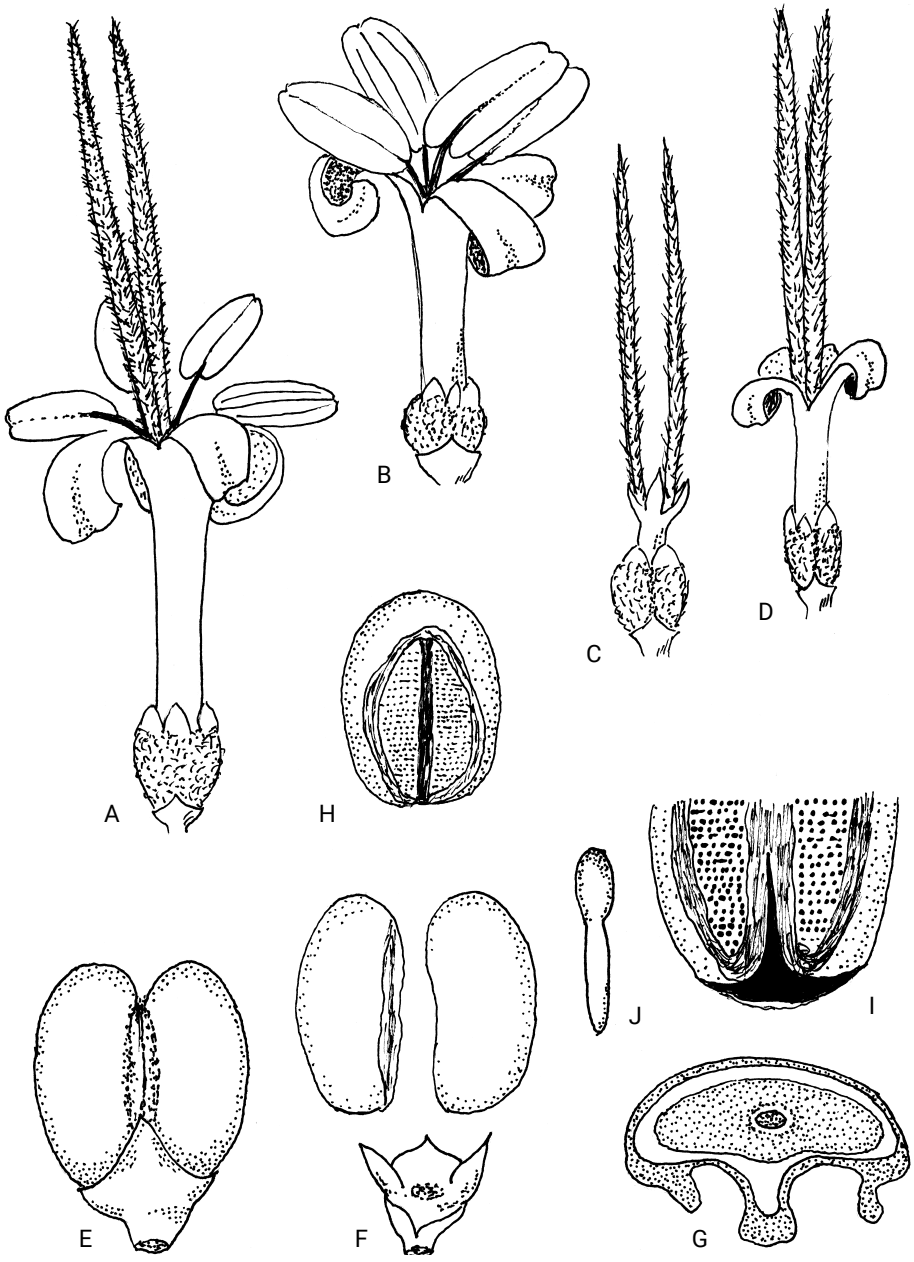


Figure 1. *Anthospermum herbaceum* L.f.; A, hermaphroditic, B, male and C, D, female flowers; E (parts separated in F), fruit and its carpophore; H, mericarp (in cross-section in G and opening at base in I); and J, embryo. Reproduced from Robbrecht (2022): Figure 1.

Materials and methods

The relevant literature, mostly historical, was found available on the internet and consulted. All *Anthospermum* specimens in the Linnean herbarium at the Linnean Society of London were consulted online in September 2024 (https://linnean-online.org/view/type/specimen/Anthospermum.html).

Results and discussion

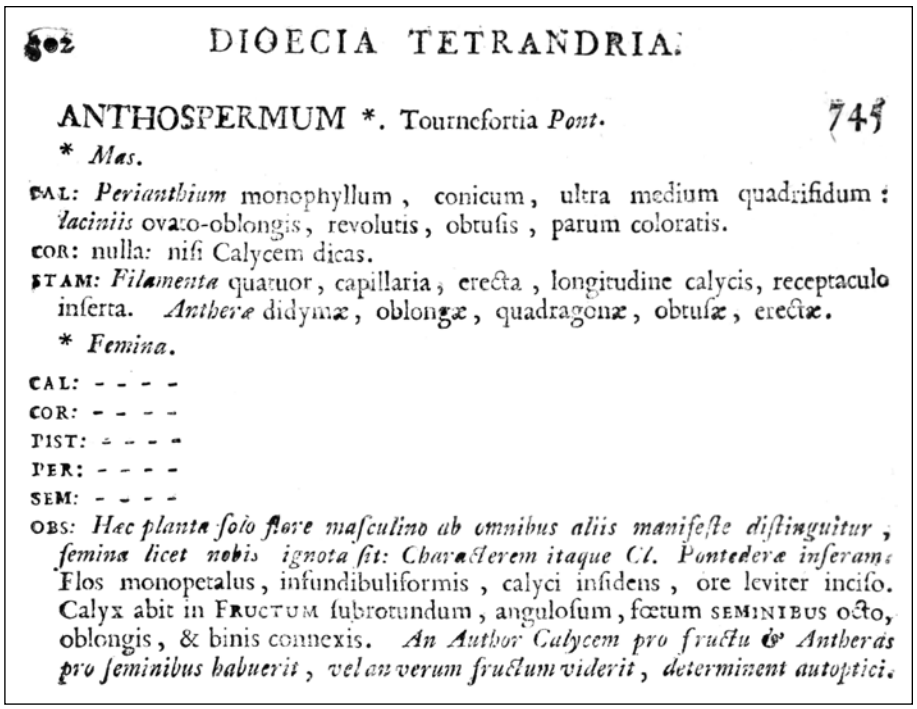
The etymology of the name

The name *Anthospermum* is enigmatic and means 'flower-seed' or 'floral seed' (Greek *anthos* = flower and *spermum* = seed). The *CRC World Dictionary of Plant Names* (Quattrocchi 2000: 161) explained the name as follows: 'the male flowers may produce seeds', while the *Dictionary of southern African Plant Names* (Clarke & Charters 2016: 23) explained it as: 'Although the flowers are usually dioecious – unisexual male and female – 'male' flowers sometimes have ovaries capable of ripening seeds.' Except for the fact that the plants, rather than the flowers, are dioecious, the latter etymology seems plausible. Puff (1986: 134) discussed in great detail the large morphological plasticity of *Anthospermum* species, showing phenomena such as reversion of male flowers to hermaphroditic ones.

However, Linnaeus, who described the genus, explained the etymology in a different way. He already coined the name before publishing his *Species Plantarum* (Linnaeus 1753); he previously used the name in *Genera Plantarum* (Linnaeus 1737a: 302) and *Hortus Cliffortianus* (Linnaeus 1737b: 455, plate 27). In *Genera Plantarum* (Figure 2), he expressed doubt about the earlier work of Giulio Pontedera, who described the plant as *Tournefortia: 'An Author [Pontedera] Calycem pro fructu & Antheras pro seminibus habuerit, vel an verum fructum viderit, determinent autoptici'* [if the Author (Pontedera) took the calyx for a fruit and the anthers for seeds, or observed a genuine fruit, will be ascertained by dissections.] In the *Hortus Cliffortianus*, Linnaeus published a detailed plate (Figure 3), for which the announced dissections were made. He was now certain (Figure 4): *'Femina nobis non nota est, & quem fructum descripsit Cl Pontedera fuit absque dubio flos non explicatus, & semina solum antherae, unde Anthospermum nobis dicatur'* [The female is not known to us, and the fruit, which the Honorable Pontedera described, was without doubt an unfolded flower, and the seeds only anthers, whence we call it *Anthospermum*']. Linnaeus' name thus means 'floral seed' and alludes to Pontedera's wrong interpretation of a flower bud.

Pontedera's error

Pontedera (1718) published his genus *Tournefortia* in a letter to William Sherard, appended to his *Compendium Tabularum Botanicum*: *'Tournefortia est genus Plantae producens Florem Monopetalum, Infundibuliformem, calyci insidentem, & leviter per oras incisum, cujus calyx abit in fructum subrotundum, angulosum, octo seminibus foetum, oblongis, binis & binis dispositis'* [*Tournefortia* is a genus of plants producing a flower with a single petal, funnel-shaped, seated in a calyx, and slightly incised at



602 DIOECIA TETRANDRIA.

ANTHOSPERMUM *. Tournefortia *Pont.* 745

* *Mas.*

CAL: *Perianthium* monophyllum, conicum, ultra medium quadrifidum: *laciniis* ovato-oblongis, revolutis, obtusis, parum coloratis.
COR: nulla: nisi Calycem dicas.
STAM: *Filamenta* quatuor, capillaria, erecta, longitudine calycis, receptaculo inserta. *Antherae* didymae, oblongae, quadragonae, obtusae, erectae.

* *Femina.*

CAL: - - - -
COR: - - - -
PIST: - - - -
PER: - - - -
SEM: - - - -
OBS: *Haec planta solo flore masculino ab omnibus aliis manifeste distinguitur, femina licet nobis ignota sit: Characterem itaque Cl. Pontederae inferam:* Flos monopetalus, infundibuliformis, calyci insidens, ore leviter inciso. Calyx abit in FRUCTUM subrotundum, angulosum, fœtum SEMINIBUS octo, oblongis, & binis connexis. *An Author Calycem pro fructu & Antheras pro seminibus habuerit, vel an verum fructum viderit, determinent autoptici.*

Figure 2. Linnaeus' treatment of *Anthospermum* in *Genera Plantarum* (Linnaeus 1737a: 302). Smithsonian Libraries and Archives, available through Biodiversity Heritage Library.

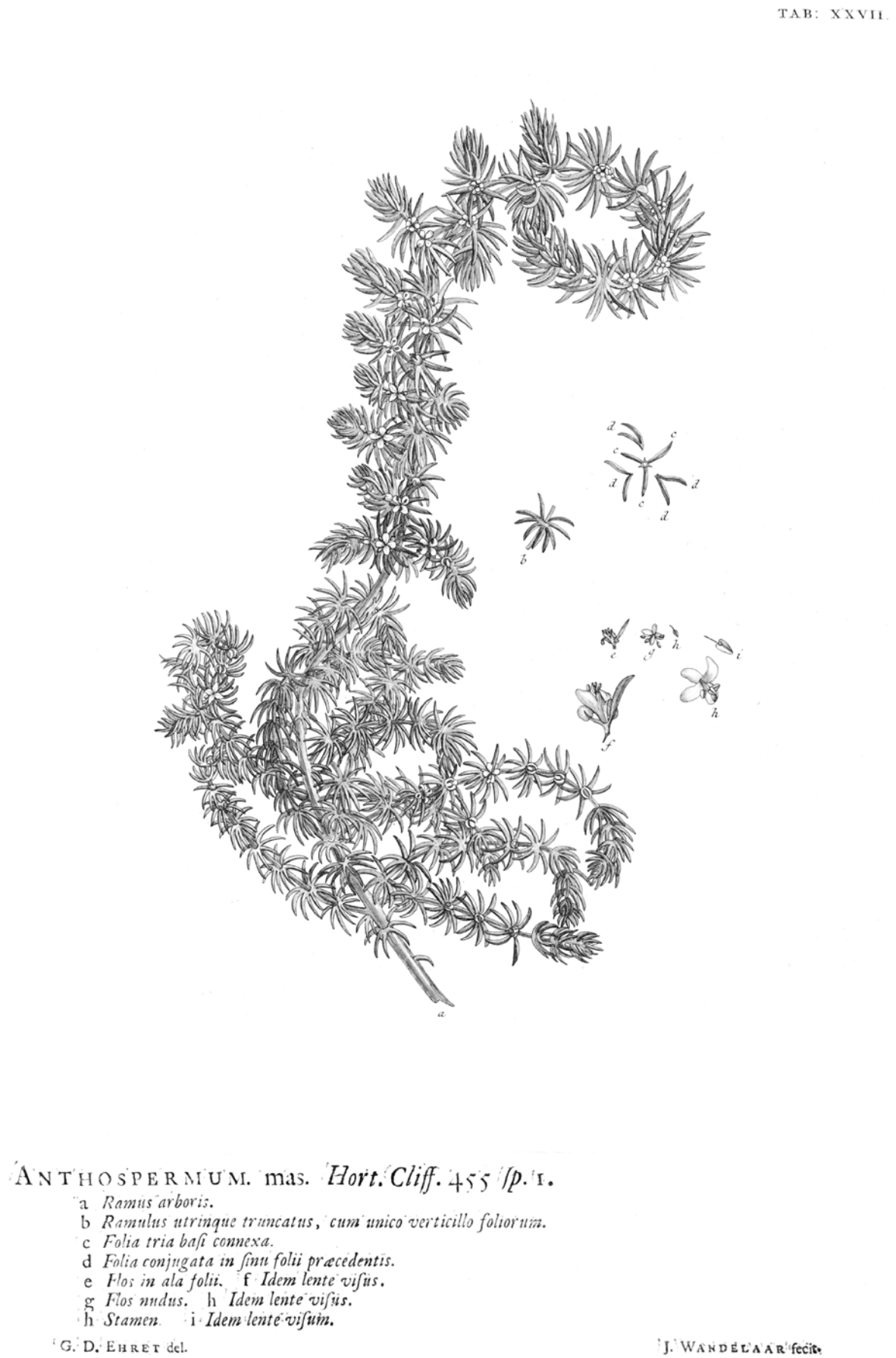
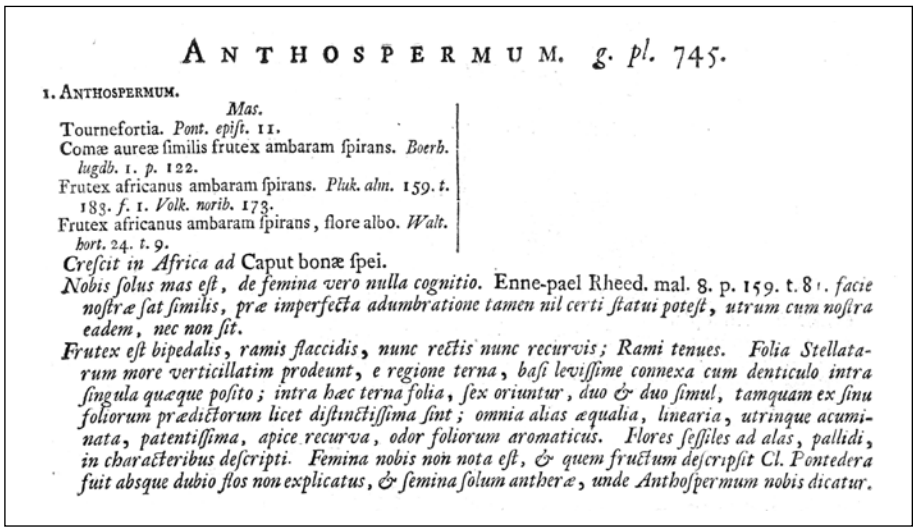


Figure 3. Linnaeus' illustration of *Anthospermum* [*aethiopicum*] in *Hortus Cliffortianus* (Linnaeus 1737b: plate 27). Library of Meise Botanic Garden.



ANTHOSPERMUM. g. pl. 745.

1. ANTHOSPERMUM.

Mas.

Tournefortia. *Pont. epiſt.* 11.
Comæ aureæ ſimilis frutex ambaram ſpirans. *Boerh. lugdb.* 1. *p.* 122.
Frutex africanus ambaram ſpirans. *Pluk. alm.* 159. *t.* 183. *f.* 1. *Volk. norib.* 173.
Frutex africanus ambaram ſpirans, flore albo. *Walt. hort.* 24. *t.* 9.
Creſcit in Africa ad Caput bonæ ſpei.
Nobis ſolus mas eſt, de femina vero nulla cognitio. Enne-pael Rheed. mal. 8. p. 159. t. 81. *facie noſtræ ſat ſimilis, præ imperfecta adumbratione tamen nil certi ſtatui poteſt, utrum cum noſtra eadem, nec non ſit.*
Frutex eſt bipedalis, ramis flaccidis, nunc rectis nunc recurvis; Rami tenues. Folia Stellatarum more verticillatim prodeunt, e regione terna, baſi leviſſime connexa cum denticulo intra ſingula quæque poſito; intra hæc terna folia, ſex oriuntur, duo & duo ſimul, tamquam ex ſinu foliorum prædictorum licet diſtinctiſſima ſint; omnia alias æqualia, linearia, utrinque acuminata, patentiſſima, apice recurva, odor foliorum aromaticus. Flores ſeſſiles ad alas, pallidi, in characteribus deſcripti. Femina nobis non nota eſt, & quem fructum deſcripſit Cl. Pontedera fuit absque dubio flos non explicatus, & ſemina ſolum antheræ, unde Anthoſpermum nobis dicatur.

Figure 4. Linnaeus' treatment of *Anthospermum* in *Hortus Cliffortianus* (Linnaeus 1737b: 455). Library of Meise Botanic Garden.

the edges, whose calyx leads to a sub-rounded, angular fruit, bearing eight oblong seeds, arranged in pairs.]. Especially the eight 'seeds' (anthers) arranged in pairs are difficult to interpret. Note that the *Anthospermum* species studied by Pontedera and Linnaeus (nowadays *Anthospermum aethiopicum*) has tetramerous flowers (with a single whorl of anthers, as is standard in Rubiaceae). Do the eight seeds in fact correspond to the four anthers with two thecae each? Pontedera should not be ridiculed for his mistake because detailed observations of a small flower [the corollas (tube + lobes) of the male flowers are only ± 3 mm long] must have been challenging in the early 18th century, without powerful optical equipment.

Linnaeus' interpretation

It is difficult to imagine how Linnaeus linked the vague and confusing description published by Pontedera to his concept of *Anthospermum*. Pontedera and Linnaeus were probably never in direct contact, and, in any case, the Italian botanist was not an adept of Linnaeus' revolutionary approach (Jönsson 2011). It is more likely that Linnaeus had more than only published evidence to establish the identity of Pontedera's *Tournefortia*. We assume that he also saw specimens used by Pontedera. We consulted Linnaeus' herbarium on the internet for possible specimens with annotations pointing to Pontedera. Puff (1986: 227) cited syntypes labelled *'Habitat in Aethiopiae'* and *'Caput bonae spei'*. He designated *Linn 1233.1* [(BM; herb. Clifford (in herb. Banks)] as lectotype of *A. aethiopicum*. The Linnaean Collections at the Linnean Society of London only have one other identified *A. aethiopicum*, viz. *Linn 1233.2*, consequently the only other syntype. Three other specimens are only identified to genus level, while *Linn 1233.4* and *Linn 1233.5* are identified as *A. ciliare* and *A. herbaceum*, respectively. None of these bear traces of ever having been seen or studied by Pontedera. His Italian collections are in OXF (Vegter 1983). Unfortunately, we were unsuccessful in locating South African specimens seen by him.

Linnaeus' attitude towards the work of Pontedera cannot be known for certain. His son reported that he loved a joke (Blunt 1971: 167), and his sense of humour was reflected in his writing as well as in his teaching (Jönsson 2002). Is there a degree of sarcasm in coining the rather improper name 'floral seed'? Did he perhaps not hold the Italian botanist in high regard? At any rate, Linnaeus refused to pick up *Tournefortia*, the name Pontedera used for this genus of Rubiaceae of the Cape, and he even re-used that name for a totally unrelated and different plant currently in Boraginaceae (*Tournefortia* L.). The young Linnaeus was confronted with heavy criticism on his revolutionary reform of botany by a generation of well-established scientists (Jönsson 2011). As a response, he was not afraid of reacting strongly, among others by giving plant names insulting his opponents (Humar 2024). He named *Dorstenia* L. (Moraceae) after the German botanist Theodor Dorsten, stating that its flowers are insignificant, as if withered and past their time, like the outdated work of Dorsten (1492–1552) (Jönsson 2002). Another German botanist, Johann Georg Siegesbeck (1686–1755), was ridiculed by being 'commemorated' in the name of a smelly little weed *Siegesbeckia* L. (Jönsson 2011; Heard & Mlynarek 2023). Hence, Linnaeus' *Anthospermum* might represent a similar case. Should Linnaeus' insulting names be interpreted in the context of the new regulation on derogatory names in the future Code (Turland et al. 2024)? The Code only envisages names derogatory to a group of people, published on or after 1 January 2026, so the names *Anthospermum*, *Dorstenia* or *Siegesbeckia* are not in danger of future rejection.

Composition of generic names in Rubiaceae

The peculiar etymology of the name *Anthospermum* came to our attention while working on a project

considering generic names in the family (Verstraete et al. in press). In Rubiaceae (and likely in most other angiosperm families), the most common way of naming a genus is by looking for a distinctive feature. To continue with African examples, *Carpacoce* refers to the shape of the fruit. Eponyms are the second largest category of generic names in Rubiaceae; *Alberta* E.Mey. is named after Albertus Magnus, a 13th century *'doctor universalis'*. Names may also refer to other names of taxa (e.g., *Paraknoxia* Bremek. refers to a relationship with *Knoxia* L.)., or to a cultural aspect (*Canthium* Lam. is based on a Malayalam name). Other names refer to a geographical origin (*Natalanthe* Sond., a synonym of *Tricalysia* A.Rich., referring to its discovery in Natal). None of these five categories apply to the name *Anthospermum*, which is unique in referring to a wrong observation. In Rubiaceae, we only know one slightly similar case. Achille Richard (in De Candolle 1830; Richard 1834) used the name *Nescidia* A.Rich. for a Mauritian species of *Coffea* L., which he knew only from flowering material. His name refers to the fact that the fruits were unknown to him (Latin *nescire* = not to know).

Conclusion

Quattrocchi (2000) as well as Clarke and Charters (2016) – and maybe other authors – made a wrong assumption when linking the etymology of the strange name *Anthospermum* with the complex reproductive biology of the genus. Instead, Linnaeus was inspired by an erroneous morphological observation made by Pontedera and hence composed this apparently insulting name in a way not paralleled in other generic names of Rubiaceae.

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