

Sansevieria versus *Dracaena*: an invited opinion

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Abstract

Based on the reality that biological research is always servant to exploring biological evolution, the logical consequence is that organismal species should carry formal names that give expression to their proper place in the evolutionary phylogenetic framework (the “tree of Life”). Results of recent molecular phylogenetic studies involving species of the genera *Dracaena* and *Sansevieria* support the option of considering all *Sansevieria* species as representing a special, drought adapted branch in the species tree of the genus *Dracaena*. Adapting the formal nomenclature of *Sansevieria* to this outcome requires all of its species to be transferred to *Dracaena* and their formal names adapted accordingly. It is argued that *Sansevieria* hobbyists do well to recognize this reality but are in no way forced to follow it in their communication tools (journals, labels etc.).

Introduction

Recently Peter A. Mansfeld asked me to write up my opinion on the matter of using the name *Dracaena* for what thus far used to be called *Sansevieria* from a scientific angle because I am a professional taxonomist, albeit recently retired but interested in *Sansevieria* as hobby plants. My taxonomic activities and publications over the years have dealt with the genera *Amorphophallus* (Araceae), *Typhonium* (Araceae) and *Euphorbia* (from Madagascar) but I have also worked on the systematics and classification problems of domesticated plants. My two *Sansevieria* papers (on *S. sambiranensis* and on the first cultivar ever of *S. liberica*) were published in *Sansevieria Online* recently (Hettterscheid 2022; Hettterscheid & Damen, 2023). The *Sansevieria-Dracaena* case thus appeared on my plate as a side track of my interest in *Sansevieria* (or was that *Dracaena*....?). Enough said, on to the case itself.

Biological nomenclature: a most important tool!

Biological sciences work with organisms and any organism on this planet can be grouped with its immediate relatives in a classification unit called “species. The scientific name of species today is the legacy of Carolus Linnaeus and is subject to internationally accepted rules of biological nomenclature. The rules are collected in a number of nomenclature codes and taxonomists apply those rules in order to safeguard that organismal names are not random tags to be changed and proposed at will. After all, species names are at the heart of biological communication. I assume that all or most readers of *Sansevieria Online* know what species names look like and that the first part of such a name identifies a genus to which a species is assigned. It is this genus name that is subject of this contribution.

Taxonomy and evolutionary relationship: a brief history of a revolution and its final outcome.

Linnaeus lived in bliss ignorance of evolution. It just wasn't "invented" because Charles Darwin had not been born. To Linnaeus and most of his contemporaries, organisms were put on the earth in three single days of divine creation. Species were thought to be immutable. So when Linnaeus thought it worthwhile to start grouping/classifying organisms in species and species in larger boxes (genera), he just had to choose morphological characters as grouping criteria and start "creating" species using morphological similarities and differences of his own choice. The species came out as a most central concept and morphologically similar species were classified in genera. Then he applied a system of Latinized terms to create two-part names for his species.

With the formulation of evolutionary theory by Charles Darwin, the static view of species changed into a dynamic one, where species change over time and give rise to new species and finally go extinct. This process implies that species show a thing called "evolutionary relatedness", analogous to "family relatedness" in human family dynasties (e.g. "The Rothchild's"). For a long time the choice for morphological similarity and dissimilarity to indicate evolutionary relatedness remained. Consequentially taxonomists used the genus name as expressing close evolutionary relatedness of species in it. Otherwise stated: two species in one and the same genus are considered evolutionarily (or: phylogenetically) closer related than any one of them is to a species in a different genus. Different classifications of species in genera were based on different assumptions of which morphological characters are more important than others to indicate evolutionary relatedness. Those were the days of "taxonomic authorities" with famous names like Vernon Heywood, Adolph Engler, Nicholas E. Brown, Joseph Dalton Hooker, Carl Blume etc. They founded their own systems of classification for plants, based on their personal choice of morphological characters. And there was no such thing as consensus between them. Authority reigned supreme! But in the long run, scientists don't like authoritarianism.....

Taxonomy was saved by the bell when in 1966 an English translation was published of a book originally written in German by German entomologist Willi Hennig (20.04.1913 – 5.11.1976). This book was originally titled "Grundzüge einer Theorie der phylogenetischen Systematik" and published in Germany in 1950. However (excuse me please, dear readers of *Sansevieria Online*!!) German never developed into an influential language in global science and the book was overlooked until the 1966 English translation (Hennig, 1966). And this edition exploded like a bomb in the world of taxonomy and systematics. It revolutionized the way organismal characters should be used to reconstruct evolutionary (phylogenetic) relationships. It ended the influence of personal, "a priori" judgement of the phylogenetic value of any particular character. Side effect was a raging "war" between Hennig's fanatic and very sharply tongued followers (then called "cladists" and often in a more or less derogatory sense) and those opposed to Hennig's ideas, often equally fanatic. I will skip this fantastically exciting chapter in the history of biological systematics but those interested are warmly recommended to read David Hull's book on the subject (Hull, 1988).

After the dust had settled, phylogenetic systematics came out as the glorious winner and ever since, it is fundamental to all relevant scientific papers dealing with or relying on evolutionary relationships of organismal groups. The phylogenetic method consists of procedures that allow anyone to investigate the results of papers on organismal phylogeny, thus answering science's demand of reproducibility of results from one and the same set of data. Taxonomy thus became a lot more

“democratic” and reliable in scientific terms. Nowadays the methodology of phylogenetic systematics has developed far beyond Hennig’s basics and has entered a realm where high statistic reliability of suggested phylogenies is a major goal. To reach this goal, molecular characters have proven to be a necessary basis for reliable phylogenies and morphological characters have lost their former primacy in this respect. No serious taxonomist will publish classifications exclusively based on morphological characters anymore.

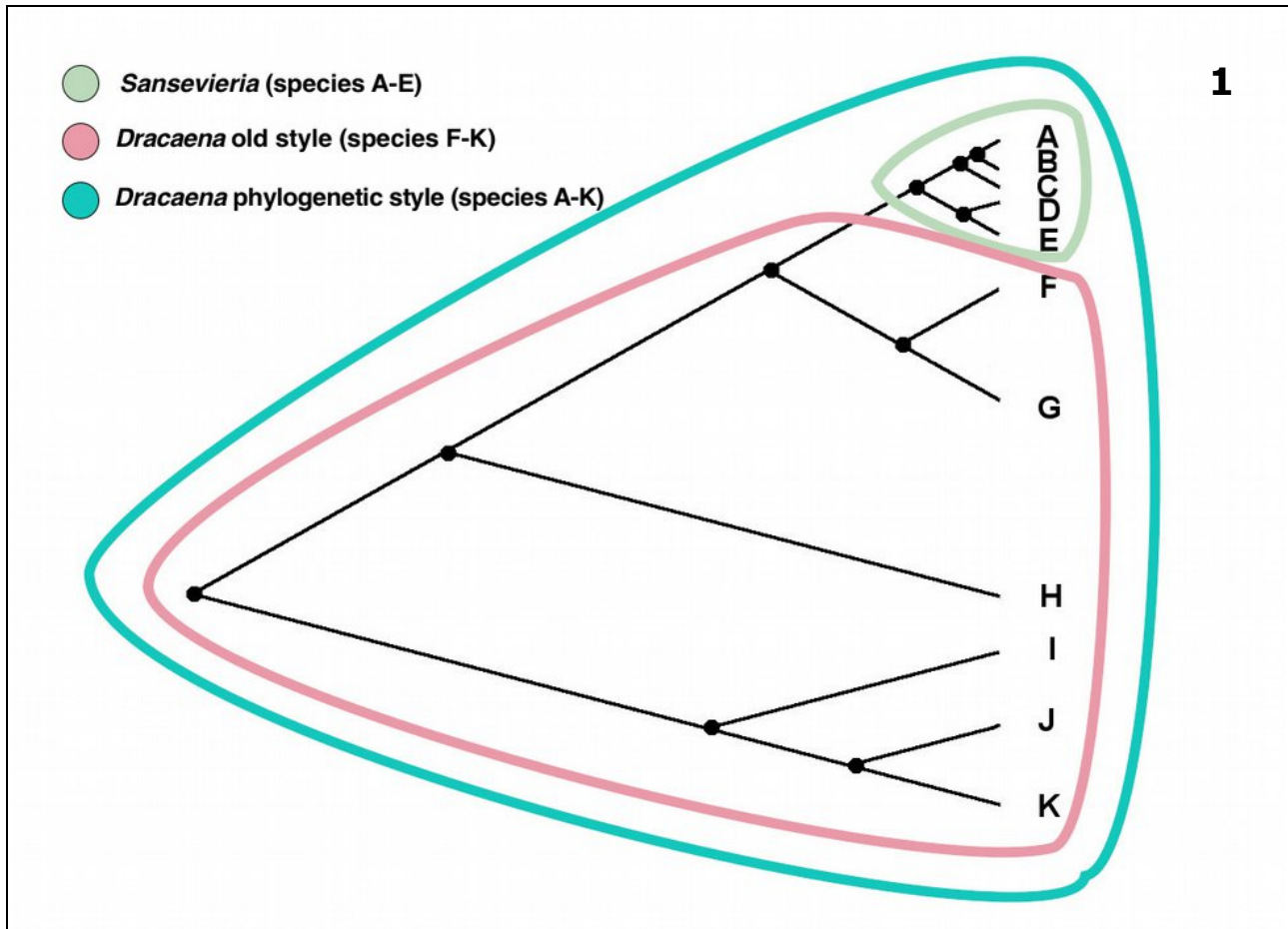


Fig. 1 – *Dracaena* phylogenetic Style

A simplified phylogenetic diagram of the genus *Dracaena* based on recent phylogenetic research (see reference list). The green line contains all species (A–E) now known as *Sansevieria* and defines a biologically/evolutionarily meaningful group/genus (see text below). The red line contains all species usually known as classical *Dracaena* (F–K, incl. some also known as *Pleomele* or *Chrysodracon*). This line does not represent a biologically/evolutionarily meaningful group/genus. The diagram shows that the *Sansevieria* group started at some moment in time as a specialized group from within *Dracaena* and so *Sansevieria* + classical *Dracaena*, taken together, form one bigger biologically/evolutionarily meaningful group, included in the turquoise line. This turquoise group, as one genus, must be called *Dracaena* because it is the oldest correct name for it and therefore has nomenclatural priority over the younger names of the also included genera *Sansevieria*, *Pleomele* and *Chrysodracon*.

Taxonomy today is a basic biological discipline of managing the enormous biodiversity on our planet by cutting it up in smaller evolutionary meaningful (phylogenetic) units and suggest names for such units. Proposing an evolutionarily meaningful genus requires that it contains **only and all** species evolved from one common ancestral species. This ancestral species is the “founding father” (usually considered extinct) of the genus as proposed. With the use of phylogenetic methods, tax-

onomists reconstruct evolutionary relationships among species (see above) and illustrate those species relationships in diagrams (see **fig. 1**). Such diagrams are then cut up in a way that the groups resulting retain that evolutionary meaning as described above (such groups are called a “monophyletic group” or “clade”). Thus a diagram may for instance be cut up in several genera and each genus needs to contain all species evolved from its ancestor in order to be “monophyletic”. I like to refer to a paper published earlier in *Sansevieria* Online (Budweg & Mansfeld, 2019) in which the authors explain how this is done and they also explain certain specific terms (like taxon, clade and cladogram: n.b. the words “taxon”/“taxa” should not be translated into “Taxone”/“Taxonen”, as done in this paper. Taxon and taxa are universal terms and not language-dependent).

Dracaena*, *Sansevieria*, *Chrysodracon* and *Pleomele

Recent reconstructions of evolutionary relations between all species put together of the genera *Chrysodracon*, *Pleomele*, *Dracaena* and *Sansevieria* (Van Kleinwee et al., 2011; Lu & Mordon, 2014; Baldwin & Webb, 2016; Takawira-Nyenyanya et al., 2018) indicate that all species of *Sansevieria* derive from one common ancestor (except for *S. sambiranensis*) but this is not the case for all *Dracaena* species. *Dracaena* as a genus therefore does NOT seem to fit the requirements of a biologically meaningful genus because from its common ancestor ALSO evolved the common ancestor of the genus *Sansevieria*. Put otherwise: *Sansevieria* species are a group of “*Dracaena* species” evolved from ONE particular *Dracaena* species and so *Sansevieria* belongs IN *Dracaena* and not next to it. *Dracaena* is evolutionarily “incomplete” without all *Sansevieria* species also included. Similarly the species of *Pleomele* (rarely accepted as a genus today) belong in *Dracaena*, as well as those of *Chrysodracon*. This is the scientific reality based on modern research into the evolutionary relations between all species of these “genera”.

As an aside I am happy to stress that Dutch botanist Jan Just Bos (Newton, 2004), whom I succeeded as director of the botanical gardens of Wageningen University, pointed out already in 1984 (Bos, 1984) that it was very plausible that *Sansevieria* in the future would prove not to be essentially separable from *Dracaena*. Later he became convinced of this and officially suggested for the first time *Sansevieria* as a full generic synonym of *Dracaena* (Bos, 1998).



Recently, an intergeneric hybrid name has been published (Van der Meer , 2020) for hybrids between *Dracaena* and *Sansevieria*, *xDraviera* (or just: *Draviera*). He found out that a patent application was published in 2016 for a purported hybrid between *S. parva* and *D. surculosa*, to which the cultivar epithet ‘SUDRASAN01’ was given. Van der Meer published the first nomenclaturally correct hybrid genus name *xDraviera* for this hybrid and named the entire cultivar *xDraviera* ‘SUDRASAN01’. The hybrid was subsequently introduced in the trade as *Draviera* FIREFLIES (note that FIREFLIES is not the cultivar epithet but a so-called trade designation, possibly a trade mark, so the full name is *xDraviera* ‘SUDRASAN01’ FIREFLIES). *Dracaena* taxonomist Theo Damen (pers. comm. to the author) thinks it is not actually a hybrid between both genera but one between two “proper” *Dracaena* species (Fig. 2 & 3).



Fig. 2 + 3 – *xDraviera* ‘SUDRASAN01’ FIREFLIES – **Fig. 4** – *Sansevieria pinguicula* (Photo: N. Ch. Preuss)

Fig 5 – *Dracaena draco* (Photo: P. A. Mansfeld) – **Fig 6** – *Dracaena fragrans* (Photo: F. & K. Starr)

Fig. 7 – *Sansevieria metallica* (Photo: P. A. Mansfeld)

***Sansevieria* in *Dracaena*: consequences of “yes” or “no”.**

YES:

1. serious taxonomists will be happy. Biologists dealing with evolutionary developmental sciences are happy because they now have a better picture of where the ancestor of *Sansevieria* must be placed. This automatically improves their search for the most closely related plant species to *Sansevieria*, in order to compare character evolution in *Sansevieria* with the proper species(-group) in *Dracaena*.
2. plant trade and related legislation are not happy, insofar as they have to deal with *Sansevieria*, which is only a minuscule part of all plant trade in the world. They could easily ignore it, based on their customers usually being garden centers or private persons. However, when applying for Plant Breeder’s Right for a new cultivar by a commercial breeder of *Sansevieria*, he/she may be forced to use *Dracaena* as a genus name when the international authority on Plant Breeder’s Right changes *Sansevieria* to *Dracaena*. The same goes for patenting a new cultivar.
3. *Sansevieria* hobbyists are unhappy but there is no law forbidding them to keep using *Sansevieria*.
4. The name *xDraviera* becomes superfluous because it would be a hybrid of only *Dracaena* species.

NO:

1. taxonomists who still defend non-evolutionary based genera will be happy but they are on the road to extinction.
2. plant traders of *Sansevieria* (as said above, a very small number) will be happy as long as international legislation doesn’t change.
3. *Sansevieria* hobbyists will be happy. The only consequence will be that with time, the use of the *Dracaena* names for *Sansevieria* species will increase and finding information about species will force anyone to also seek such information using the *Dracaena* names as search criteria.
4. the name *xDraviera* could be maintained but only if it is proven that one of the parents is indeed *S. parva*.

Conclusion

I count myself with the supporters of the inclusion of *Sansevieria* in *Dracaena* (my Dr. Jekyll persona) but I shall not hesitate to use *Sansevieria* when I deal with fellow hobbyists (my Mr. Hyde persona). I do think, however, that editorial boards of journals dealing with *Sansevieria* and carrying the name *Sansevieria*, should be democratic and accept papers by authors who prefer to use *Dracaena* species names for “former” *Sansevieria* species. It will be helpful if editors ask authors to also mention the synonymous *Sansevieria* species name of the *Dracaena* species they mention in

their papers.

The tsunami of new names in *Dracaena* is unavoidable because they need to be nomenclaturally formalized (and many already have been, see below) in order to be used in (taxonomic) literature. It is unfortunate that some taxonomists have made it a point of having their personal names “immortalized” by scrounging the entire phylogenetic literature of the plant kingdom and starting to publish all possible new combinations of species names of genera in the process of being subsumed into other genera (Byng & Christenhusz, 2018). Judging from critical reviews of this initiative and its first publication, the authors and editors did not seek contact with taxonomic specialists of the majority of the genera dealt with. By refusing to do so, a new “name game” will inevitably follow because of their premature work and the unavoidable mistakes of such weakly informed initiatives.

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