

Who Determines Classification for Magnoliaceae? Some changes are afoot...

Richard B. Figlar

Recently, there have been some discussions between magnoliaphiles on who has the authority to name, or classify, magnolias. Because taxonomy is one of my abiding interests, I joined the discussion. In an upcoming issue of *Magnolia*, I will discuss this subject in greater depth, so this is a taste of what's to come.

The late James Edgar Dandy of the British Museum is generally regarded as the "father" of the currently accepted classification for the *Magnolia* family. In 1927, after a long and critical study of *Magnoliaceae*, Dandy published his famous taxonomic treatment. His system of ten genera: *Liriodendron*, *Magnolia*, *Talauma*, *Manglietia*, *Aromadendron*, *Michelia*, *Kmeria*, *Pachylarnax*, *Alcimandra*, and *Elmerrillia* soon gained wide acceptance, and over the next 60 years or so, Dandy became the acknowledged world authority on the genus *Magnolia* and the family *Magnoliaceae*. Dandy's system remained essentially unchanged and unchallenged until after his death in 1976.

Several years later (1985), Hans Nooteboom, a noted taxonomist from Rijksherbarium, Leiden, The Netherlands, began a series of taxonomic studies of *Magnoliaceae*, mainly Malaysian species, and postulated bold changes in classification (at least it seemed that way at the time), highlighted by the reduction of *Talauma* and *Aromadendron* to *Magnolia*. As it turned out, many in the botanical and scientific community were quite supportive of Nooteboom's system and within a few years, the name *Talauma* became little more than a footnote in *Magnoliaceae*. Later (1987, 1993) Nooteboom continued to question and study other *Magnoliaceae* segregates, sometimes over and over again, especially as the famous Chinese

taxonomist Liu (Law) Yuhu began adding or supporting the inclusion of even more "genera" to the family, such as *Parakmeria*, *Manglietiastrum*, *Woonyoungia*, *Tsoongiodendron* etc.

In 1997, I began corresponding regularly with Nooteboom with the intent of exchanging information on morphological observations. I indicated to him that I had observed several (new) morphological similarities between *Michelia* and subgenus *Yulania*, which suggested to me that Dandy's logic was flawed when he separated *Michelia* from *Magnolia*. I presented my taxonomic evidence to Nooteboom hoping that he would use my arguments for his own taxonomic work on the family. Instead, he suggested that I present this work at the International Symposium on the Family Magnoliaceae in Guangzhou, China in 1998.

This I did, and somewhat to my surprise, many at the symposium supported my hypothesis that *Michelia* belongs to genus *Magnolia*. One reason for this is that beginning in the early 1990s, molecular biologists began using DNA to study plant systematics. By using DNA, many more "characters" are available for study than can be found using traditional morphology, and unlike morphological comparisons, the results can be quantified. Molecular study methods have greatly improved in the last few years, and quite a few independent studies have been performed on an increasing number of Magnoliaceae taxa using DNA characters. It turns out that virtually all these studies confirm that *Michelia* is allied with *Yulania* as a magnolia "in-group" with little quantitative genetic distinction to regard it any more than a section or subgenus of *Magnolia*. Not only that, but these studies support the position now touted by Nooteboom himself that only two legitimate genera best describe the family: *Magnolia* and *Liriodendron*. Nooteboom has been working with a molecular scientist and I expect him to rewrite the family within a year or so.

Some may ask, "So why is it important that these familiar generic names, *Michelia* and *Manglietia*, be replaced with the generic name *Magnolia*?" Here's why. Consider the example of four male family

members who are direct descendants: grandfather, father, son and grandson. One day while traveling, they all lose their memories. Other people, trying to help them, decide to “give” them names. Since the grandfather, the father, and grandson looked very much alike, they were given the name “Smith.” The son, however, looked somewhat different from the other three, so he was given the name “Jones.” Much later, genealogists were able to use DNA sequencing to analyze the relationships between these four individuals. This technology revealed that the Jones individual was actually part of the Smith group or “phylogenetic tree.” Thus, his name was changed from Jones to Smith, and others in the community considered them all Smiths from that day on.

In the past, Magnoliaceae scholars were similarly tricked into thinking that *Manglietia* represented a different genus because it had four or more seeds per carpel (instead of two). Recent cpDNA studies of Magnoliaceae, however, have now given us strong evidence that *Manglietia* (Jones) is really part of *Magnolia* (Smith) since *Manglietia*'s ancestors *and* descendants are both members of genus *Magnolia*. If we were to retain the name *Manglietia*, it would be necessary to drop the name *Magnolia* since that group would no longer be monophyletic (a group composed of an ancestor and all its descendants). (N.B. *cpDNA* is an abbreviation of chloroplast DNA, which is part of the genome. Researchers favor cpDNA because it is relatively stable and doesn't change much through evolution, hence making it useful for demarcating major groups.)

Thus, DNA analysis can often provide valuable independent data for the taxonomist, especially when morphological interpretations result in problematic classifications as we have in Magnoliaceae. Even with the addition of DNA tools, traditional morphology is still very important in developing a better Magnoliaceae classification. There is still much work to be done, but the changes are coming. Already, in one of the most widely used college textbooks on plant systematics (Judd, et. al. 1999), Magnoliaceae is shown as consisting of just two genera: *Magnolia* (218 spp.) and *Liriodendron* (2 spp.).

So, to answer the question of who decides the “proper” classification? Well, I guess it could be anyone who wants to do the work to make a cogent argument. And, as all scientific arguments go, such work requires acceptance from other knowledgeable experts in order to fly. It’s probably good that the science of plant systematics is done that way—it’s more democratic than having to rely on some permanent authority or central clearing house to decide. Magnoliaceae has a lot of catching up to do. Stay tuned.

For those interested in learning more about plant systematics using DNA analysis, see:

Judd, WS, CS Campbell, EA Kellogg, and PF Stevens. *Plant Systematics: A Phylogenetic Approach*. Sinauer Associates, Sunderland, MA. 1999



The Magnolia Society Endowment Fund

The Magnolia Society Endowment Fund needs your support

Please send your contributions to:

The Magnolia Society Endowment Fund

5637 South Ryan Street

Seattle WA 98178-2296 USA

Contributions are tax deductible in the United States

