



# The Sections of Begoniaceae

The American Begonia Society

In the beginning there was Gondwanaland, a supercontinent made up of all the current continents “jig sawed” together into one land mass. If you look at all the genetic hotspots of Begoniaceae they all lined up way back then. As Gondwanaland broke up and the continents separated, those locations remained the genetic hotspots for today’s begonia species.

I love this way of looking at Begonia evolution, it is a bit romantic.

(slide 3) – the continents crashing together and giant waves rushing around

(slide 4) – monsters and giant beasts evolving on the continents and

(slide 5) – and on some rock face a begonia germinates, surviving all the extremes

(slide 6) – it mutates and multiplies, and survives

(slide 7) – soon it is spreading out and adapting to new territories, while the monsters die out

(slide 8) – Begonias continue to thrive and evolve, spreading to new ecosystems, taking over the world...

(slide 9) – hey... it could happen

(slide 10-16) It might be a bit extreme, but it does bring up what mechanisms did Begonias develop in order to survive? It turns out that begonia DNA is messy, and flexible. Instead of just reproducing the same genetics over and over again, chromosomes in begonias jump around in their numbers, leading to all sorts of potential blendings of DNA. That flexibility turns out to be a great way to evolve into a tolerance of high or low light, or low water and wet environments.

It also made for some really interesting man-made hybrids, whereas in nature most mutations are not so easily spotted, hiding below the surface of the leaves. Nature likes to modify using things like the leaf surfaces, and the organs inside the cells, to help with low light adaptation. In manmade hybrids we are always looking for some visible change we can market like spiraled leaves, variegation, double or crested flowers.

But since the good old days of Gondwanaland through to today’s 2,000 and counting species discovered in Begonia, it is a long slow process.

(slide 18-22) Speaking of long slow processes, plant taxonomy is also slowly changing.

The original plant taxonomy was all about visual documentation of plant characteristics, and that required developing a language sometimes only botanists can understand. A specialized tongue that made it clear exactly what kind of hairs were on a leaf or stem, or how sharply or how rounded the bumps on a leaf margin were. So, NOMENCLATURE (the naming of things) and TAXONOMY (the connections between things) had to grow up together.

This is still the standard way in which a new *Begonia* is cited, with exhaustive documentation of all it’s characteristics, but now we also include the molecular level of things. Newly cited Begonia

species include the chromosome number, and soon they will likely include a decoding of the entire DNA sequence of the plant.

(Slide 23-25) Once you have the DNA sequence of one plant you can compare it to the DNA sequence of other plants and trace it back to its ancestors, just as we do today for humans using Ancestry.com, or 23andme. And that leads us phylogenetics, the science of comparing DNA between species to map if and when they diverged from other members of their family tree.

That leads us to our handout which is a summary of the article by Peter Moonlight and many other researchers outlining the sections of Begoniaceae using phylogenetics. Your handout breaks all the different sections out by which continent they arose on (remember the monsters and beasts from earlier) and further splits that section down into all the species that are closely related to one another within it (like ancestry.com).

As you look through the handout you'll see each section's name, the TYPE (or the species that exhibits the clearest characteristics that define the section), the number of species within that section, and its distribution within the continent/region it comes from.

Trust me this handout is super simplified, the original article has much more detail which if you like science I really encourage you to read, it is fascinating how they put all these plants together and the international teamwork it required to do so.

**Further reading:**

Dividing and conquering the fastest-growing genus: Towards a natural sectional classification of the mega-diverse genus Begonia (Begoniaceae). Peter W. Moonlight, et al

First published: 25 January 2018 <https://doi.org/10.12705/672.3>Citations: 42

You'll probably need to read this simply because my presentation is likely filled with inaccuracies. Misconceptions about evolution:

<https://evolution.berkeley.edu/teach-evolution/misconceptions-about-evolution/>

John Hawks Weblog [https://johnhawks.net/weblog/topics/phylogeny/species\\_concepts.html](https://johnhawks.net/weblog/topics/phylogeny/species_concepts.html)