# TWO DIFFERENT GROWTH FORMS OF DRACAENA DRACO L. (MONOCOTYLEDONES: LILIALES: AGAVACEAE)

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*ABSTRACT*. The Dracon Tree, *Dracaena draco* L., an inhabitant of the Madeiran, Çape Verdean, and Canary Islands, occurs in two growth forms: *a*. with a tall, cylindrical, and relatively slender trunk and an umbrella-like canopy, and *b*. with a shorter, biconical, and relative stout trunk and a more globose canopy. These two growth forms are linked to each other by trees showing intermediate properties.

It is well known that the common Dragon Tree (Dragon's Blood Tree, *Dracaena Draco* L.) is very variable in shape so that no single individual tree looks like another one. Its general shape is that of the so-called "Federbusch" tree (SCHENCK 1907; LÖSCH *& al.* 1990), a shape which is widespread under Macaronesian woody plants (SCHENCK 1907) so that it possibly could be an adaptation to these habitats (BEYHL, to be published).

From the top of an erect trunk, a sympodial group of branches arises which themselves branch in a similar way at their ends, these second-order branches branching in the same way, etc. This system of branches forms an umbrella-like canopy with the leaves growing only at the tips of the youngest branches. Such ramification events occur more or less regularly, mostly after about ten to fifteen years, each, and mostly after the formation of inflorescences at the tips of the branches (SYMON 1974).

This kind of canopy formation is a very regular one and can be simulated in mathematical models by computer programs (NEUREITHER 1992). These branches are "self-similar" in the sense of fractal geometry (MANDELBROT 1991). Also the East African species, *Dr. ombet* and *Dr. schizantha* (SUNDING 1970) and the Soqotran species, *Dr. cinnabari* (SUNDING 1970; MIES & ZIMMER 1993; BEYHL 1995) show a similar branching pattern whereas the canopy of the Halapepe (*Dr. aurea*) from Hawaii has a quite different shape (ROCK 1913). Also the extinct pteridophytes, *Lepidodendron* and *Sigillaria* from the Carboniferous showed a similar ramification of their canopies (KRÄUSEL 1950). It is also observed with Euphorbia arbuscula, a succulent tree from Soqotra (BEYHL, to be published).

Irregularities in the shape of individual, especially aged, trees are due to traumatic events which change the vitality of one or more branches. Storms, fire, infestations by insects

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or by rust, and cold periods can cause damage to parts of the canopy resulting in smaller or bigger deviations from the regular shape which then lead to the striking interindividual differences in appearance of dragon trees.

Apart from these secondary, interindividual differences, there are two major growth forms in *Dracaena Draco*:

*1*. Trees belonging to the first growth type are characterized by a cylindrical (*i.e.* isodiametric) and comparably tall trunk and first order branches which form a sharp angle with the upper part of the trunk. There is a tendency of the branches to be more or less cylindrical but this tendency is not marked very well. Aerial roots may be formed at the points where the branches emerge. The canopy has a flat, umbrella-like appearance. Most Capeverdean dragon trees belong to this category.

*2*. Trees belonging to the second growth type are characterized by a biconical and relatively short trunk and first order branches which on emerging from the trunk do not form a sharp angle. There is a tendency that the branches are swollen in the mid of their length, *i.e.* that they are *not* isodiametric. The canopy is not as flat as with the trees of the former group but is more or less globose. The conical shape at the base of the trunk is due to the formation of secondary roots at its base which add to the volume of the lower part of the trunk. The dragon tree of *Icod de los Vinos* and the historical one of *La Orotava* (Island of Tenerife, Canary Islands) belong to this second category.

These two different growth forms are connected to each other by trees which exhibit intermediate behaviour.

At the moment, it cannot be decided whether these two growth types are due to phenotypical variations (*i.e.*, external growth control) or represent two different genotypes (*i.e.*, internal growth control). In the first case, there could be influences of edaphic or climatic factors. If a dragon tree grows on a steep, inaccessible mountain slope there is no much space for the formation of an extended root system at the base of the trunk so that it will not swell there and will remain cylindrical. But if a tree grows in a place where it has the possibility to develop an extended root system then the lower part of the trunk will become thicker than the upper one. As branching follows flowering, short stems are formed if there is early flowering. In places with only rare and smooth climatic periodicity, stimuli to blossom and afterwards to branch occur relatively seldom so that the trunk of such a tree has time to grow higher until its first blossoming and branching. But if there are frequent and marked climatic periodicities such stimuli occur relatively often and and result in early branching of the trunk. These climatic events must not necessarily occur in distinct, "true" periods; also quasiperiodic climatic events are sufficient if they are only marked enough to initiate flowering.

Another difference between dragon trees concerns the margins of the leaves: There are individuals whose leaves bear small white margins whereas others bear small two-coloured margins which are white inside and red outside the leaf area. At the moment we cannot decide whether these foliar traits coincide with one or the other of the two growth types.

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