

## What does *Tropical and Subtropical Plant* mean?

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Alexander von Humboldt (1769-1859), founder of plant geography, studied the physiognomy of vegetation during many of their expeditions, determining that environmental conditions and that plants distribution depends on the climate (Bolle, 2022). After that, many studies on this subject have been developing, still nowadays, trying to understand and characterize landscapes. As a result, it is common to use terms as tropical, subtropical, temperate plants. For this, remains the question: what that means?

The world is divided in climate zones that correspond to areas with distinct climates due to weather patterns, latitude, or communities of plants and animals (Climate zones, 2023). The classification may change according to the subject area of study (Luttge, 2008). For example, in a geodetically concept, a tropical zone is considered as the areas limited by the latitudes of 23° 27'N and S, corresponding to Cancer and Capricorn tropics. In a climatological view, tropics are the zones of equal day and night length, warm and cold, wet and dry. For a phytogeographical, consists on areas indicated by the distribution of palms and in a botanical concept, areas in a well-separated pantropical floristic province. Another definition is from the biology of productivity: zones of optimal carbon fixation and photosynthesis, that corresponds to area of tropical rainforest occurrence.

It is observed that there is no exact a definition and there are several factors that need to be taken into account to classify plants into defined groups. Plants are very dependent on edaphoclimatic conditions for their growth and development. Considering the climate, one of the most comprehensive classifications systems and widely used today is that of Köppen-Geiger climate classification (Köppen and Geiger, 1928). This classification is based on the assumption that natural vegetation is the best expression of the climate of a region, in its original form or with modifications, distinguishing five main climate zones. Four of these main climates are thermally defined (A, C, D, E), one is hydric (B). The basis for this procedure was Liebig's law of the minimum: while plant growth in the higher latitudes is primarily restricted by the temperatures, precipitation is the decisive limiting climatic factor in the lower latitudes. In this classification, it is possible to verify the terms A (tropical), B (arid), C (temperate), D

(continental), and E (polar) (Dubreuil et al., 2018, Diercke, 2023).

For a long time, the classification into tropical, subtropical and temperate has been used to define the climatic suitability of ornamental plant, as it occurs for several other species on the planet. A tropical plant is defined as a plant that grows naturally in a tropical climate. In the same logic, subtropical and temperate plants, those that grown in subtropical and temperate zones. But, considering the information previously presented, according to Köppen-Geiger classification, tropical climates are characterized by an average annual temperature above 18 °C (64.4 °F), and generally high annual precipitation, and so, high humidity. Thus, species that originate or adapt to this climatic condition would be classified within this group. On the other hand, for temperate climate plant, according to the Köppen climate system, temperate climates present temperature of warmest month greater than or equal to 10 °C, and temperature of coldest month less than 18 °C but greater than -3 °C.

But the term Tropical Plant refers to any type of plant that naturally flourishes in an environment that resembles the Tropics, a region of the Earth surrounding the equator. Tropical plants require consistently warmer temperatures and more humid environments than temperate climate plants. Tropical plants also come in both blooming and foliage plants. Species of Heliconias, Torch ginger, Alpinias, Zingiber, Bromeliads, palms, and orchids are considered tropical plants. Contrary to what is expected, most tropical plants do not do well in direct sunlight and should be located in shadier environments. Because many tropical plants naturally grow near to the sea, many species of tropical plants can tolerate higher than average salt levels. Tropical plants are great for growing in the greenhouse and thrive in the more humid conditions of the greenhouse, and so can grow commercially anywhere when there is climate control.

And subtropical climate, is a type of climate within the temperate by the Köppen classification. So, plants in some subtropical areas have to endure blazing heat, thick humidity, times of heavy rains, or long periods of drought and also temperatures that can drop as low as 0 degrees F

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(-18 C.). While subtropical plants may have the exotic look of tropical plants, many of them also have the hardiness of temperate plants.

Since this is a very important topic for floriculture, knowing the center of origin of the species is the first aspect to be considered. However, current knowledge about the centers of origin of different species, technological advances in plant management associated with work carried out in

the area of genetic improvement allow conditions for the cultivation of tropical, subtropical and temperate species in the different climatic zones of the planet. It has to be considered that species of ornamental plants of a certain climatic origin can be economically cultivated in another climatic zone. Each region has its particularities and these, with the aid of science, allow increasingly accurate information.

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## References

BOLLE, W. O caráter exemplar da obra de Alexander von Humboldt. **Revista do Instituto de Estudos Brasileiros**, n.81, p.18-41 2022. <https://doi.org/10.11606/issn.2316-901X.v1i81p18-41>

CLIMATE ZONES. Available at: <https://www.metoffice.gov.uk/weather/climate/climate-explained/climate-zones>. Access on: Feb 28, 2023.

DIERCKE. Klimate der Erde nach Köppen/Geiger. **Erde - Klima und Niederschläge**. Available at: <https://diercke.westermann.de/content/klimate-der-erde-nach-k%C3%B6ppengeiger-978-3-14-100700-8-229-3-0> Access on: Apr 24, 2023

DUBREUIL, V.; FANTE, K.P.; PLANCHO, O.; SANT'ANNA NETO, J.L. The types of annual climates in Brazil: an application of the classification of Köppen from 1961 to 2015. **Revista Franco-Brasileira de Geografia**, v.37, n.37, s.p., 2018. <https://doi.org/10.4000/confins.15738>

KÖPPEN, W.; GEIGER, R. **Klimate der Erde**. Gotha: Verlag Justus Perthes. 1928. Wall-map 150cmx200cm.

KÖPPEN, Wladimir (1936). "C". In Köppen, Wladimir; Geiger (publisher), Rudolf (eds.). *Das geographische System der Klimate [The geographic system of climates] (PDF)*. *Handbuch der Klimatologie. Vol. 1. Berlin: Borntraeger*.  
LUTTGE, U. **Physiological Ecology of Tropical Plants**, 2ed. Leipzig: Springer, 2008.