

A new efficient methodology to teach plant determination in the tropics.

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Field plant identification is a challenge faced every day in the tropics. Many professionals involved in biological studies would like to master an easy method to know, in the field, the scientific names of the plants they are dealing with. Some times people would be very pleased even by knowing just the genus or the family, or just the order of the plants.

Tropical Dendrology developed by Dr. L. R. Holdridge

Dr. Leslie R. Holdridge developed a procedure to know the plants in the field, by means of simple, fresh characteristics of non reproductive organs (leaves, twigs, bark, odors, tastes, exudations, buttresses, etc) (1). This way, it is possible to teach how to identify plants down to family or genera level (and, in some cases, down to species level) during a normal quarterly course (2) . After the course, students "are able to know" a high percentage of trees and shrubs found in the American tropics.

First of all, we should clarify the meaning of "to know" the trees and shrubs, as it is used in the precedent paragraph. We should distinguish two levels of knowledge: one is defined by the terms 'determination' or 'identification', and the other, by the terms 'predetermination' or 'preidentification'.

Determine and predetermine plants

When we speak on "determining", we refer to the process of fixing a plant to a taxum (variety, species, genus, family, etc). In general terms, in the process of determining it is assumed that the person has certain taxonomic knowledge and that he / she uses systematic procedures, both involving flowers and fruits. As plant determinations usually involve the use of herbarium material, floras, manuals, microscopes, etc, specialists prefer to work at the lab or the herbarium and not in the field. This way of doing things is particularly important the first time a species of a given site is determined. Experienced Taxonomists and Dendrologists know that once samples are deposited in an herbarium - after being correctly determined - it will be possible for them to determine some plant populations without having access to their flowers or fruits, just on the basis of sterile samples of which their collection site is known. However, determining the great majority of plants involve flowers and fruits, as stated above.

When mention is made in this article of the word 'predetermining', reference is indeed made to the following facts: most of plant individuals within genera, families and orders show macroscopic characteristics in their non reproductive organs that, in many cases, are held

by all or by a high percentage of the individuals within the taxum involved. Because of this, experienced dendrologists and taxonomists are able to "predetermine" - at a glance - many plants, indicating one family or a small groups of families, even if specialists are dealing with a sterile sample.

In some cases, they can even go this way down to genera level and / or to species level. Normally, such skill comes after long practice, during which the person realizes the presence of outstanding characteristics, and he / she notes differences and perceives peculiarities in the species, genera, families and orders. These characteristics are, then, integrated through a global pattern in the mind of the botanist, emerging the image of the taxa and enabling him / her to predetermine the plant sample he / she is dealing with.

In many cases, both 'predetermining' and 'determining' are simultaneous processes, depending on the experience of the specialist and on the taxa involved. Anyway, it is obvious that this type of predetermination pave the way for accurate determination. Such ability to predetermine plants is seen also in persons having little or no previous formal taxonomic training, but who are used to handle plants at the herbarium or in the field.

An efficient methodology to teach tropical dendrology

After comparing the exuberance of tropical flora with that of Maine and Michigan where he studied, Dr. L. R. Holdridge developed a system that integrates the above discussed knowledge, and that also enables the teaching of tropical plant "predetermination", as we defined such a term in this article. Two methodological aspects will be briefly explained: the sequence followed during a tropical dendrology course, and the series of family and genus short descriptions.

The sequence followed to teach different subjects is very important. For example: at the beginning of the course, students learn those groups which are very easily recognizable and common in the surroundings, such as the families Asteraceae, Melastomataceae, Piperaceae, Myrtaceae, and the genera *Inga* (Mimosaceae) and *Ficus* (Moraceae). As the course advances, instructors select those groups of plants which are increasingly "difficult to be recognized" and rare or less common in the surroundings. At the end of the course they teach those species which do not fit with the normal characteristics of its group (the exceptions).

Three characteristics are always present in the series of descriptions assembled by Dr. Holdridge to typify genera and families, namely: leaf class (simple, compound), leaf arrangement (opposite, alternate, etc.), and the presence and types of stipules.

Combining these three type of characteristics with others such as type and color of exudates, pellucide-punctate structures, leaf blade consistence, nectaries, odors, etc, there appear short descriptions which are very easy to be memorized, and which enables students to predetermine most of the plants. As descriptions do not cover all the elements belonging to the taxa involved, it is obvious that exceptions will be found. Directions are given during the course to appropriately manage such situations.

What to do with that knowledge?

It is obvious that in most cases it is not enough to know the family and genus, but the student must go down to species level and sometimes even go down to subspecies or to variety levels. To do this, he / she should go to herbaria, use floras, field manuals or - simply- ask somebody who knows the local flora. In every case, knowing the family or the genus will help tremendously in going down to genus or species level, and in memorizing species and variety names, uses, distribution, etc.

In the other hand, during the course students gain special skills enabling them to continue making progress in species identification on their own when working anywhere in the Tropics. For instance: students draw plant samples, and prepare a **personal matrix** in which he / she arranges most of the taxa (families and genera) according to their outstanding characteristics. These devices allow the student to quickly define a few taxa that finally lead them to identify the samples he / she is working with during the course practices (4). They also will be the basis for the student to prepare a personal matrix specially designed for the site where he /she will work in the future.

This and other **details are given** in the "Tropical Dendrology" page of this Website. Also, previous students have given testimonials about the efficiency of such teaching devices which are included in the "Instructors and References" page (there are links at the bottom of this page).

The Tropical Dendrology course offered in Costa Rica

The Tropical Dendrology course offered in Costa Rica is devoted mainly to teach "predetermination" techniques (see this term above) and is given as an intensive short course (two weeks).

The course is addressed to professionals and lay persons in biology, forestry, biodiversity, birding and ornithology, ecology, agroforestry, ethnobotany, field guiding, and other areas in the natural resource field. Also professional taxonomists, working both at the herbarium or in the countryside, have attended the course because they found themselves well prepared to identify plants in the herbaria, but they usually failed when they tried with fresh samples in the field. If you are interested, please go to the "Tropical Dendrology" page of this Website (there is a link at the bottom of this page).

References

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