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Plants of Malawi

Almost a technical scientific fantasy for an European tourist

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Indice

Augustin J. Salubeni 1940–2011

Mr. Augustin J. Salubeni passed away during the preparation of this book. As an expert of plants of Malawi at the Botanical Garden of Zomba City, had shared the idea to publish this book. He added that an English edition would be useful to Malawian people, mainly to the students.

Mr. A. J. Salubeni has not been able to read the proof of the manuscipt. Errors in classification and denomination in Chichewa and other local linguages have to be charged to the last Author.

The late Mr. Salubeni was a parataxonomist at the National Herbarium and Botanical Gardens (NHBG) in Zomba. On 1975 Augustin Salubeni moved from Chongoni to Zomba, where the Chitedze (Lilongwe), Chongoni (Dedza) and the University herbaria amalgamated in 1977 to form the National Herbarium of Malawi (MAL).

Augustine Salubeni was one of the few Botanists with vast field experience in collection and classification of Malawi flora.

Introduction

We believe it will be useful for European tourists in Malawi and in this part of sub–Saharan Africa (Mozambique, Tanzania, Zambia, Zimbabwe) to appreciate the great treasure that still exists: the plants in their environment with their real and putative usefulness. This book wants to highlight the plants of Malawi where, as in many other parts of the world, there is a drastic reduction of forests justified by the need for new lands for subsistence agriculture and to increase food production. It is known that being able to cultivate better the existing agricultural areas it is possible to grow plant food for export and that the quantity of food in the world is already sufficient for everyone and that the increase in human population (1.3%) can be largely compensated by the increased production through the work of genetic improvement of the actual agricultural species (2–4%).

There are many plants that are little or not at all known and even less appreciated by the people living in the richest areas in the world.

Asking visitors who have been in Africa how many types of animals have seen or known, immediately respond by listing at least a dozen species. But no one or only few of them know the same number of indigenous plants.

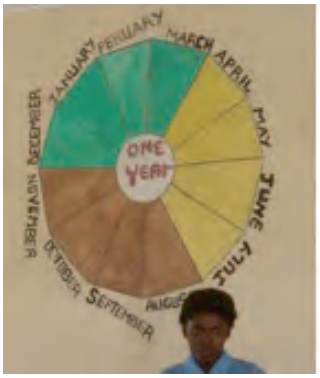
Most people do not remember that plants allow life on Earth and the existence of the actual mankind.

Climate and seasons

Malawi lies in the southern hemisphere so the seasons are reversed compared to the northern hemisphere. Thus the winter in Malawi is the summer in Europe and spring corresponds to autumn and vice versa. However, due to the rainy time, from November to March, the seasons are reduced to three:

a) rainy season with high temperature and insolation (*dzinja*) ;
b) seasons without rain with the ground still wet and temperature and sunshine that decreases (*masika*);
c) the dry season, winter, with low temperature then begins to rise, and the court days that then get longer (*chilimwe*).

For people living with primary resources (subsistence and commercial farming) these apparently trivial information are important. They are taught to children from kindergarten. Below is an example, two murals taken at the nursery and primary schools of Kausi, in the District of Mangochi.



Tourists at the beginning of the rainy season will notice rapid changes of colours of the vegetation. It is the spring that lasts only few weeks. At the end of the year, everything is deep green for the flourishing of plants with beautiful colour contrasts in relation to the plants and their development. Long days coupled with maximum temperature, high daily radiation and abundance of rains bode well for farmers who are very active in their *gardens*.

Arriving in Malawi at the rainy time, a tourist eventually sees the very nice atmosphere: there is a sea of green, the corn is collected and on the edge of the roads baskets are filled with many different fruits and vegetables, often unknown by European people.

The vegetation of Malawi

It is difficult to make a comparison of the vegetation of Malawi with those present in Europe. This is because few species evolved in Africa can live in Europe (if not under glass or in flat) and forms of life present in Africa are immeasurably more and different than those living in the northern hemisphere. Vice versa all plants arrived in Malawi (many for food interest) grow well even, though they may be somewhat different from those of the place of origin. Infact all living creatures are influenced by environmental conditions and react unpredictably by changing of daylight, terrain, temperature and humidity. The plants are not industrial engines or cars that perform in the same way to all latitudes.

Of these behaviors plant breeders know something in their plant improvement jobs. Thus they must wait years before making available to local farmers a new variety.

Tests and inspections are conducted during the seasons even if they use the most suitable genetic material and apply the most advanced and sophisticated technologies such as those based on DNA recombinant.

All plants are modified

Over time changes take place for all living things, as well as to African plants. Man contributes to these changes since – as we will see – all species have some real or alleged interest for those living in close contact with them. Man selects the plants in environments that are constantly changing by the man himself and this fact produces unexpected results. The seed of a good fruit not necessarily produces

similar plants. In fact beyond the similarity relations in accordance with the laws of genetics, environmental conditions allow the seed to survive (or less) to be seedlings, then plants to survive (or less) the drought, predators, diseases in different ways, to be a productive crop.

Deforestation continues

In Malawi we observe that deforestation takes place continuously even though rules and controls should prevent or limit this fact.

At the end of the rainy season tourists can remain surprised by the noise of the tree cutters. There is a stubborn pounding of machete on the trunks until the noise of falling branches and leaves everything ceases and a sudden, astonishing, almost frightening silence hits all living creatures around: the silence of the death, the end of a habitat. It is almost a ritual for the workers, but is a punishment for the tourist who tries to keep these treasures of nature. The farmers say – it is in this way that can expand the lands to cultivate. But they do not know that in doing so they run the risk of desertification.

It seems that they have not noticed that some crops, such as tobacco or cotton under a baobab tree grow better than those distant from it. Biodiversity works well.

The shade of baobab protects the plants in some hours of the day by the strong heat of the sun when it is not raining.

Similarly in a forest, many herbaceous species can live thanks to the shade of the shrubs and trees. For this same reason people live and work protected by large plants during the hottest hours of the day and the houses are built to shelter them.

Trees protect the soil against erosion and run–off. Due to deforestation during the rainy season it is increasingly common to see muddy water in the rives and flooded roads become difficult to navigate.

Fire is used to cleanse the Earth and to cook food

Walking in the winter in the countryside tourists can admire the large fires that – they say – are used to clean the fields.

Fire is necessary to humanity and the wood is the basic element. Many people, especially women, treat each day with fire for cooking, but many fires are illegal. They are started to destroy the trees at the edge of the forest, with the intent to expand the lands to cultivate. Who does that does not consider which plants burn: for many people all species are equal. Do not realize the importance of different trees. For some species there is a risk of extinction and in all cases the biodiversity is drastically reduced. Over time, they grow only plants of immediate utility, just as it happens in many richer countries all around the world.

Tourists may notice small plots of land ("gardens") where maize plants compete with other plants offspring of trees destroyed the previous year. Being able to sow the land already allocated to arable

land with new varieties – even if anything improved abroad with new methods – they could avoid a further deforestation and solve the problem of food shortages. This is what even the President of Malawi, the late Dr. Bingu wa Mutharika said long ago to his people.

In the richest countries of the world, where the problem of hunger does not exist and where the trees are often an obstacle "for development", many people who claim to be expert of agriculture, should reflect on the opportunity to use new improved varieties according to the most innovative technologies.

To know well plants

Plants are the first machine of life. They are complex engines that allow mineral substance to enter to be part of life. The plants live according to biochemical mechanisms similar to those found in animals and humans. They are able to grow, to develop, to reach sexual maturity, produce offspring and die just like humans.

The beauty of their forms is already laid down in the plant, according to the information of life present in the DNA in every cell. There are genes, portions of DNA, which "say" the genetic machinery how cells must grow, how fast relative to one another and how to convey these traits to offspring through seeds. The cell growth in an organism and the external factors (temperature, humidity, light, nutrients) break the harmony of its development. The changes of climatic factors with excess temperature, water, nutrients, light alert the genetic machine to modify the initial growth, enabling new genes that synthesize new substances to meet new needs. These new substances can be useful

to humans. Plant experts appreciate them more analytically and are able to know how to make them better.

Plants, agriculture, civilization

Knowing and distinguishing the plants were and are important acquisitions for mankind. It is said that civilization is the byproduct of agriculture, born when a new plant allowed one human population to grow and develop. The ability to count and write was important moments during collective registration and distribution of food to community members.

Classification of plants and its modernity

Starting from the mid 1700's, Carolus Linnaeus – as they signed the great Swedish naturalist – awarded all living beings two names: the name of the genus and the species name. The genus includes organisms that have some similarities. In species the similarity are accentuated. On the same principle, the genera are grouped into families and families in orders. This information can give proper importance to the tourist–plant–lover who wants to know them and classify them. Get to know the family or genus of a specimen may be already a success.

Today to recognize a plant is even more difficult by the fact that, because of the ease of transportation, different types can interbreed with one another thus giving rise to new combinations. It is well–known among experts, the sudden origin of *Primula kewensis* at the Kew Garden in London in the early 20th century when two Asian Primrose (*P. floribunda* and *P. verticillata*) were planted close together.

We must say that Linnaeus believed that species are all those that the Supreme Being created at the beginning. Instead, Charles Darwin, in the next century, observed that species change gradually according to some facts that a new discipline – the genetics – born with Mendel, began to clear up.

R.A. Fisher, J.Haldane, S. Wright discovered the role of natural selection, mutation, migration and random fluctuations (genetic drift) what factors, "forces" decisive for changes in gene frequencies and the

consequent evolution of populations of living things. More recently (in the years '50) American botanist E. Anderson included the process of introgression (the crossing and the test cross of different species) as evolutionary forces.

We must point out that after Linnaeus, scholars of plants, aided by increasingly sophisticated means, inflate the species by assigning a different name to different organisms for small features. So the color of the flowers or the size of a plant or a leaf was criteria for classifying differently two plants the same for all the rest. They arrived at the paradox to call a white poppy (a simple mutant of red) grown in a field of normal red poppy *Papaver album*. Today the botanical name has been reconsidered, thus it is based on several criteria including the analysis of proteins and DNA. However single plants and varieties belonging to the same species can differ by large segments of DNA. Remains clear the definition of species according to which it is a set of organisms able to crossbreed to give rise to a fertile progeny.

Tourists fond of plants cannot know whether a tree or a flower is capable of producing fertile offspring.

About this book

This book also shows beautiful or interesting plants without specific name. This because we failed to know in detail; for them we stopped to the genus or family.

For every plant we have attempted to bring images of leaves, flowers, fruits and seeds found in different seasons. This is because the tourist who sees a plant captures only the characteristics at a particular time of the vegetative cycle.

For some species we try to report the local names in different languages, customs and food medicinal properties real or believed so. These information were gathered by references (especially in relation to other parts of South Africa) and by local people; information sometimes contradictory to each other. They often seem ridiculous fantasies. However now that from the human genome analysis we learn the huge gene variation, every restricted generalization that they could create would be risky.