

WHAT IS AN ARBORETUM?



Quiet, green space
that gives peace to
those that enter

Exhibition of
indigenous trees
and plants

Go to place
for all things related to
trees in Zambia

Collection of trees
and plants that
teaches us about
natural processes

A place where indigenous
trees and shrubs are
protected and celebrated



PARTS OF THE TREE

Trees act like our own mothers; they are providers, nourishers, carers and teachers. They produce flowers, fruits and seeds which become the future generations of their species. Trees spread their seeds in a variety of ways to ensure that their children can grow and thrive in perfect locations. Trees actually communicate with each other! They warn other trees about insect attack, browser damage, drought and fire and can even exchange nutrients with their neighbours.

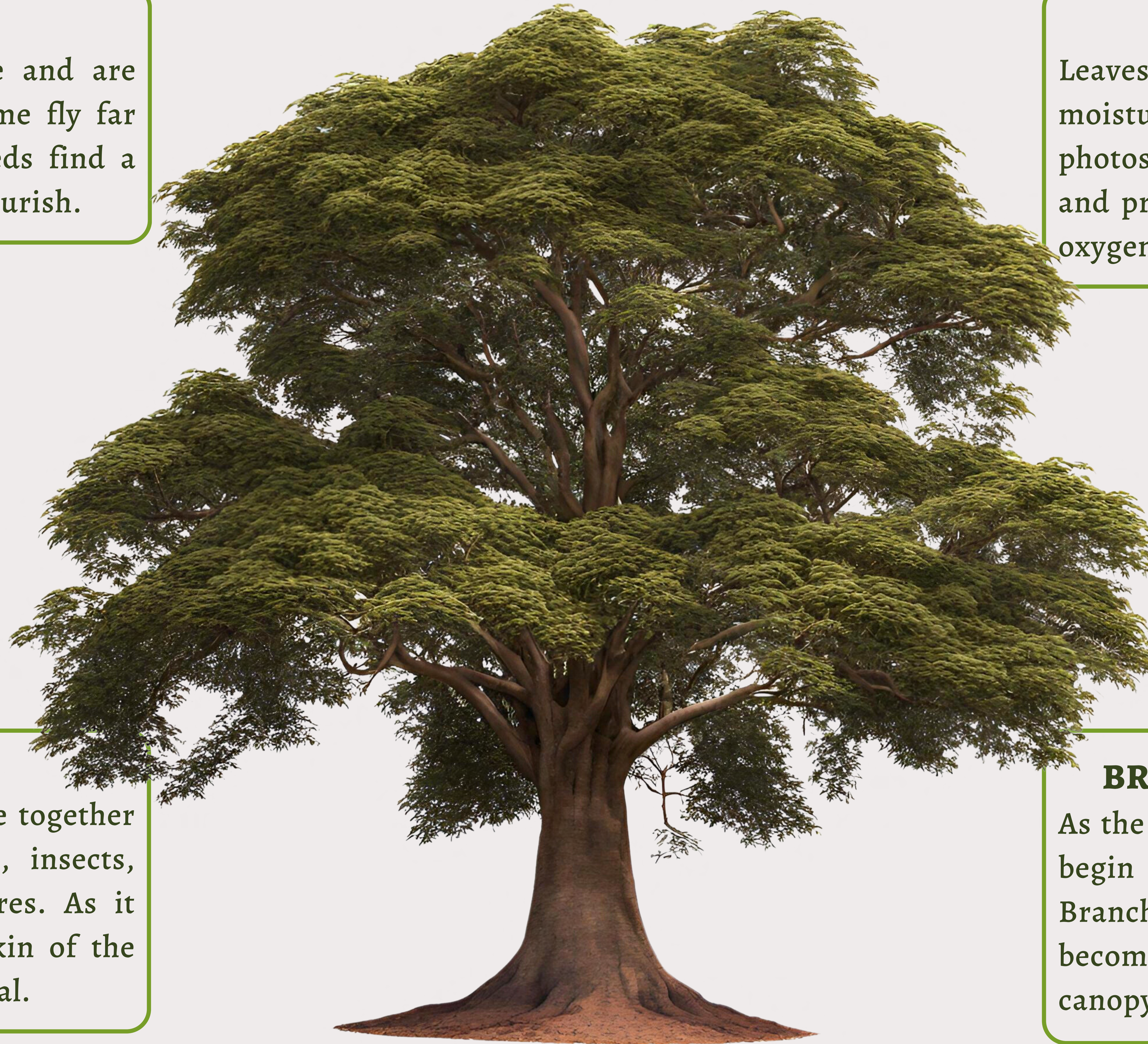
SEEDS

Seeds are the start of new life and are dispersed in different ways. Some fly far off, others remain close by. Seeds find a space where they can grow and flourish.



LEAVES

Leaves are light receivers and gas and moisture exchangers. Leaves use photosynthesis to exchange carbon dioxide and produce energy for the tree as well as oxygen.



BARK

Bark holds the insides of the tree together and protects it from elephants, insects, diseases, browsers, man and fires. As it ages, it wrinkles just like the skin of the human and like our skin, it can heal.



BRANCHES AND BRANCHLETS

As the trunk grows upwards, lateral shoots begin to sprout and form branches. Branches produce more lateral shoots that become branchlets or twigs, supporting the canopy of leaves.

ROOTS

When a seed germinates, the first things to appear are the roots. These initial roots continue to develop and then form an entire network of finer roots that anchor the tree in the ground. The root network also absorbs nutrients and water from the soil and forms a communication system between trees, sending messages about insect raids, drought, disease and much more.



SEED DISPERSAL



Leaving home for the first time needs to be done right! A mother tree can't move so she needs to make sure that her offspring reach the best place to grow and flourish. Seeds travel away from the mother tree but there are many challenges along the way - fire, insect damage, drowning and so on. Species have evolved different dispersal methods so that the seeds travel successfully and can start a new life!

WIND

EXPLOSIVE BALLISTIC

ANIMALS

WATER

COMBRETUM ZEYHERI Large-fruited Bush Willow

Large-fruited Bush Willow seeds have 4 large wings. Once they fall from the mother tree, they fly in the wind and take root far from their original home.



JULBERNARDIA PANICULATA Mutondo

Mutondo seeds are flat and oblong brown pods with a characteristic beak. These pods ripen and then split explosively to release 4 flat, round, smooth seeds that are propelled many metres from the parent tree.



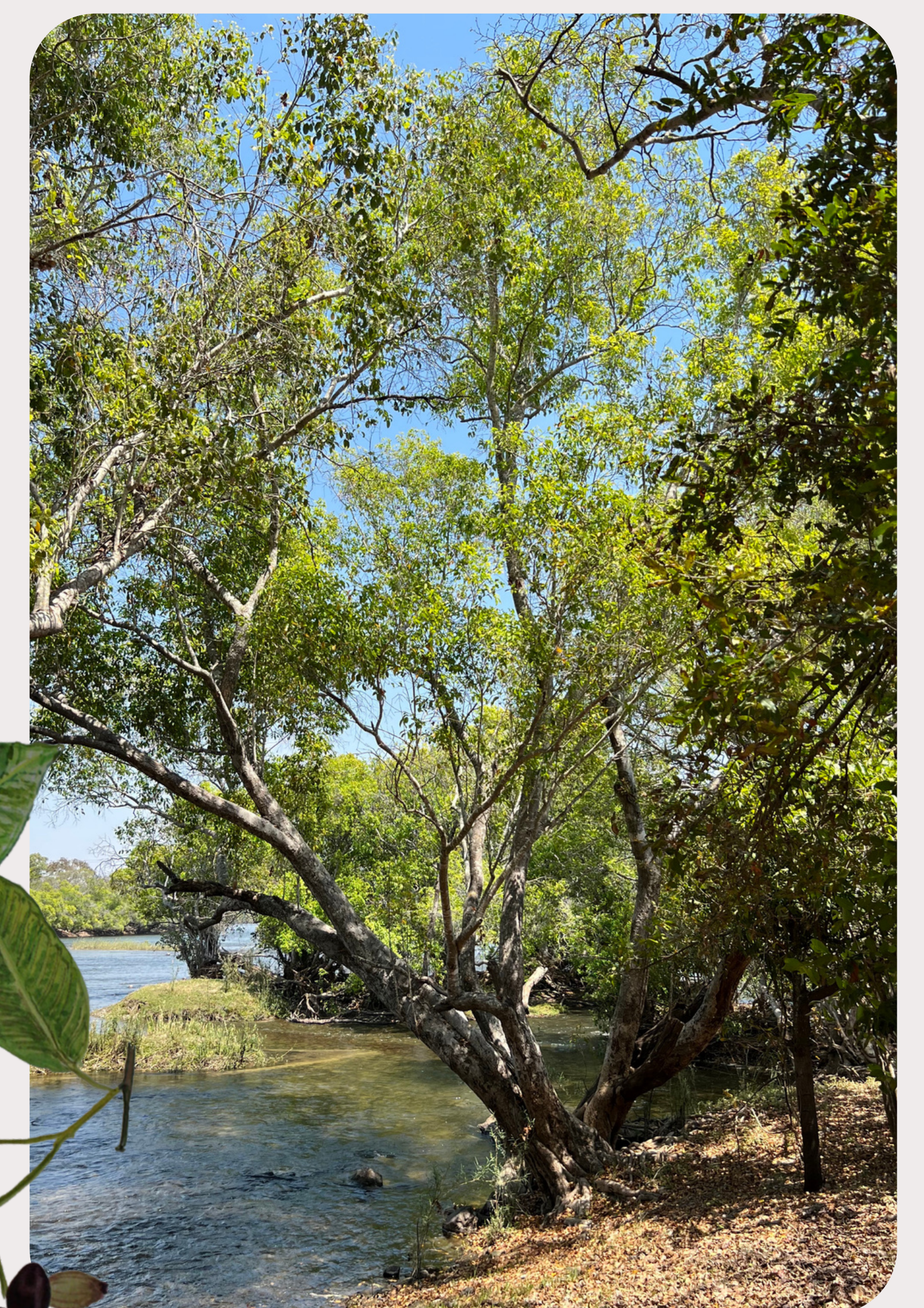
SCLEROCARYA BIRREA Marula

Marula produces round fleshy yellow fruit that encase the seed. The fruit is edible, rich in vitamin C and eaten by mammals (especially elephants) and birds. Seeds are passed through the animal's digestive system and dispersed.



SYZYGIUM GUINEENSE White Bark Water Berry

The Waterberry produces ovoid berries in clusters which are half white, half purple-black and glossy. The berries fall in the water and the whitish seeds from inside the fruit float down the river until they reach the perfect place on the river bank to germinate.



SEED GERMINATION

A SEED

Embryo essentially the beginnings of a new plant

Endosperm the nutrient tissue of the seed (often a combination of starch, oil and protein)

Seed Coat the protective covering



When the conditions are right - enough light, warmth and water - seeds germinate and start growing. Seeds hold enough food to put down a taproot. Once new leaves start to emerge, enough energy for the plants' growth is produced through photosynthesis.

PHYSIOLOGICAL DORMANCY

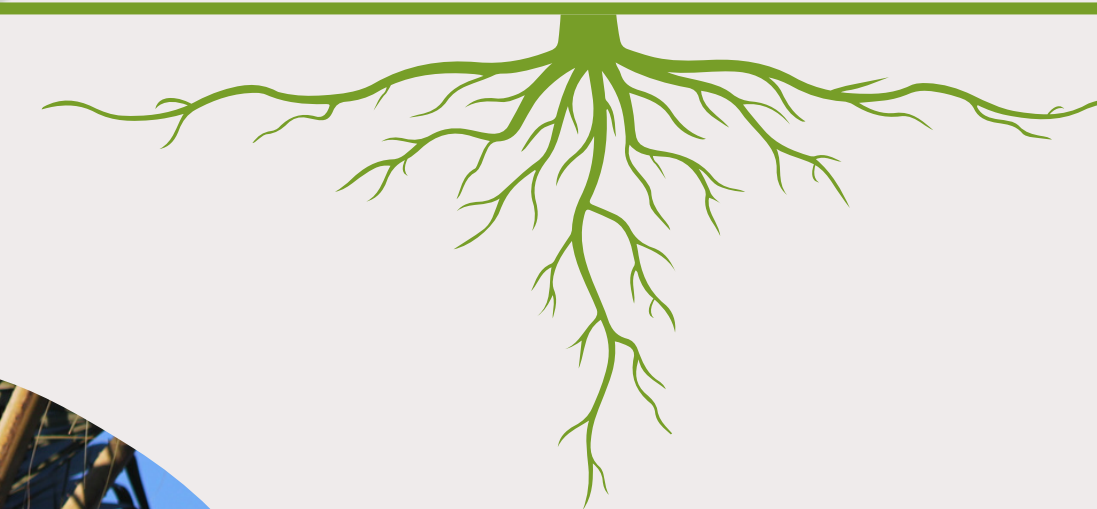
Seeds can lie dormant, sometimes for years, and germinate only when conditions are perfect. For example, in dry and cold climates, some seeds may only germinate after there has been a sufficient amount of moisture and warmth. Conversely, seeds of trees growing in warm and wet climates are able to germinate fast, carrying enough energy to quickly develop a strong taproot.

PHYSICAL DORMANCY

Other seeds lie dormant until the seed coat is softened sufficiently for germination to be triggered. For example, the seed coat can be softened by the digestive juices of a mammal that has eaten the seed. Passing through the mammal will corrode the coat enough to allow germination but avoiding any damage to the seed. The seed then starts to grow in the dung of the mammal and gets off to a good start!

Some seeds are formed inside a fruit, for example *Kigelia africana* (Sausage Tree). The fruit is eaten by hippos and monkeys and the seeds then emerge in the dung of the animal, ready for germination.

Some seeds are inside a hard nut, for example the *Hyphaene Palm*. The outer hard shell must be broken up and discarded or digested (usually by elephants) before the seed can be released to germinate.



SURVIVAL - A GAMBLE

The mother tree has a lot to consider when sending her seeds out into the world. The success of seed germination depends on soil conditions, available light, temperature and water. There are other risks to the seed such as insect damage, fire and drought.

The survival of the germinated seed also faces risks. If the seed germinates under a dense leaf canopy, for example in evergreen forests, the chances of growing tall are small because of competition from other trees for light, water and nutrients. If it germinates in a space provided by a fallen tree, it gains more light but it is at a higher risk of damage from foraging animals. What to do?!

Timing is very important for the success of seed germination and subsequent tree growth and, with an increasingly unpredictable climate, trees are facing more difficult times.