Training Manual for The Main Floraof the Lake Tana Biosphere Reserve

"Community-based Climate Adaptation and Biodiversity Conservation in the model area of Lake Tana Biosphere Reserve, Ethiopia"

Content

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TRAINING MANUAL
FOR
THE MAIN FLORA OF THE LAKE TANA BIOSPHERE RESERVE

June, 2018

TABLE OF CNTENTS

CONTENTS **PAGE**

EXCUTIVE SUMMARY 1

1. INTRODUCTION 2

1.1.The need for healthy ecosystems and the role of floral species 2

1.1.1. Ecosystem services 3

1.1.2. The role of floral species 4

2. FLORAL DIVERSITY AND ESSENCES OF FLORAL DIVERSITY LOSSES 5

3. HEALTHY ECOSYSTEMS AND SUSTAINABLE DEVELOPMENT 8

3.1. Introduced species are not good guests 8

4. MAIN LTBR FLORA SPECIES 10

EXCUTIVE SUMMARY

Human societies all over the globe have continued to benefit from resources available from nature. Food, water, medicines, timber and non-timber forest products, fodder, and etc are essential goods that are derived by human from nature for its basic needs and survival. Untile recently, however, this relationship between man and nature has largely been viewed through the eyes of subsistence economy. However, as a result of increasing human population and thereby growing needs of energy and food security, people are forced to renew their thinking and approach towards management of natural resources. The recent emergence of concept of ecosystem services is the result of such a contemporary thinking, recognizing the fact that range of services provided by different types of ecosystems have potential to address a number of socio-economic and ecological challenges that human societies are facing today.

The Lake Tana Biosphere Reserve (LTBR) which is located in the Amhara National Regional State comprises Lake Tana and its associated environments, which is internationally known as an important conservation hotspot. It is part of the two biodiversity hotspots i.e., Eastern Afromontane and Horn of Africa Biodiversity Hotspots. The area is a stronghold for different plants and animals (Friis *et al*., 2010). This floral identification manual provides details on floral species of LTBR, description, distribution, and habitat of different plant species.

This manual is therefore an important resource material, and it tries to describe grasses, shrubs and trees in the LTBR. As the unique habitats, the shores of Lake Tana is a paradise for biodiversity conservation and has a high level of biodiversity. The LTBR ecosystem is known for its local and international significance. As a result, the Nature and Biodiversity Conservation Union (NABU) is supporting the protection of this unique ecosystem of the area and promoting sustainable development in the region. Therefore, this training manual, which is funded by NABU, will help the experts in the field to identify different floral species, their conservation status, distribution, Economic and medicinal importance so as to design sustainable conservation measures of flora in the Lake Tana Biosphere Reserve.

1. INTRODUCTION

The ongoing growth in human population and resource consumption is changing the planet earth in fundamental ways. One consequence of this growth is the loss of biodiversity, which is typically estimated either by the net movement of species towards higher categories of extinction risk or as the rate at which species are actually going extinct. By either measure, biodiversity loss is on the rise. As species disappear we lose both known and unknown benefits they provide.

A rich flora can be found around Lake Tana. The still waters of Lake Tana merge into papyrus reed-beds and natural forests rise up from overflowing wetlands. The Ethiopian Orthodox Churches are found scattered over the islands and shores of Lake Tana are surrounded by dense patches of natural forests (Alemayehu Wassie, 2007). These rich habitats still shelter a wide variety of beautiful flower and plant species, including some endangered endemic species. The thickets surrounding old churches are of vital importance in ensuring these endangered species, and as such their genetic resources are well protected.

The Zege Peninsula, located at the southern end of Lake Tana, is particularly worth visiting to see its pristine indigenous forest. The wetlands around Lake Tana are important strongholds for different plant species and provide an excellent habitat and source of natural resources needed by fish, wildlife, and humans. One of the most important wetland plants is the papyrus which is used as fuel and building material (Alemnew Alelign, 2007). Many plants around Lake Tana are known for their natural healing properties and are widely used in traditional medicine. More than 67 plant species are used as natural remedies used by the local communities for generations to treat a wide range of illnesses such as cough, swelling and weight loss (Tilahun Teklehaymanot, 2009)

1.1.The need for healthy ecosystems and the role of floral species

A healthy ecosystem provides a number of natural services for everyone including protection of water resources, soils formation and protection, nutrient storage and recycling, pollution breakdown and absorption, climate stability, maintenance of ecosystems, recovery from unpredictable events, biological resources(such as food, medicinal resources and pharmaceutical uses), wood products, ornamental plants, breeding stocks, population reservoirs, future resources, diversity in genes, species and ecosystems, social benefits such as research, education and

monitoring, recreation and tourism, and cultural values. All of which are quite a lot of services we get for free!

The cost of replacing these would be extremely expensive. It, therefore, makes economic and development sense to move towards sustainability. Genetic diversity helps to prevent the chances of extinction in the wild (Rao and Hodgkin, 2002). To prevent the well known and well documented problems of genetic defects caused by in-breeding, species need a variety of genes to ensure successful survival, and without this, the chances of extinction increases. As we start destroying, reducing and isolating habitats, the chances for interaction from species with a large gene pool decreases.

1.1.1. Ecosystem services

Ecosystem services are the many and varied benefits that humans freely gain from the natural environment and from properly-functioning ecosystems. Such ecosystems include, for example, agro ecosystems, forest ecosystems, grassland ecosystems, and aquatic ecosystems (Daily *et al*., 1997). Collectively, these benefits are becoming known as '**ecosystem services**', and are often integral to the provisioning of clean drinking water, the decomposition of wastes, and the natural pollination of crops and other plants.

Ecosystem services are grouped into four broad categories: **provisioning**, such as the production of food and water; **regulating**, such as the control of climate change and disease; **supporting**, such as nutrient cycles and crop pollination; and **cultural**, such as spiritual and recreational benefits. To help inform decision-makers, many ecosystem services are being assigned economic values.

Although some dislike the thought of trying to put an economic value on biodiversity (some things are just priceless), there have been attempts to do so in order for people to understand the magnitude of the issue: how important the environment is to humanity and what costs and benefits there can be in doing (or not doing) something. An ecosystem is a biological community of interacting organisms and their physical environment. A healthy ecosystem includes multiple species that serve similar functions or roles, for example, more than one species that fertilizes the soil and more than one that controls the population of a certain predator. This is crucial to supporting the long-term stability of the ecosystem because natural disturbances such as fires, disease, or changing climate can sometimes eliminate the entire species unable to survive the

change. With redundancy in environmental function, if one species dies off, another species that serves a similar role is more likely able to react and thrive after the disturbance. It can then take the place of the previously dominant species, thereby keeping the ecosystem resilient (Peterson *et al*., 1998).

Ecosystems consist both, biotic and abiotic components; and a complex exchange and interaction between them generates a range of goods and services through various different kinds of functions, such as nutrient cycling, biomass productivity, hydrological regulations and energy flow. Ecosystem services are the conditions and processes through which natural ecosystems, and the species that make them up, sustain and fulfill human life. They maintain biodiversity and the production of ecosystem goods, such as seafood, forage timber, biomass fuels, natural fiber and many pharmaceuticals, industrial products and their precursors (Daily *et al*., 1997).

In the context of sustainable development, wise use of a range of ecosystem services offer opportunities not only to alleviate poverty, but also contribute to enhance sectoral outputs and business performance. While rich biodiversity and a range of ecosystem services tend to be particularly important to the livelihoods of the poor, the impacts of biodiversity and ecosystem degradation is reported to have most severe impacts among people living in poverty, since they have few livelihood options. Therefore, the access to, and sustainable use of biodiversity and ecosystem services by the poor, are directly relevant to the efforts targeted at poverty alleviation.

1.1.2. The role of floral species

The world's economy and the needs of the poor are derived from biological resources Altieri, 2002). In addition, the richer the diversity of life, the greater the opportunity for medical discoveries, economic development, and adaptive responses to such new challenges as climate change. Biodiversity boosts ecosystem productivity where each species, no matter how small, all have an important role to play. A larger number of plant species means a greater variety of crops and greater species diversity ensures natural sustainability for all life forms. Healthy ecosystems can better withstand and recover from a variety of disasters (Munang *et al*., 2013).

While there might be survival of the fittest within a given species, each species depends on the services provided by other species to ensure survival. It is a type of cooperation based on mutual survival and is often what a balanced ecosystem refers to. For example, consider all the species

of animals and organisms involved in a simple field used in agriculture: crop byproducts feed cattle, cattle waste feeds the soil that nourish the crops, crops, as well as yielding grain also yield straw, straw provides organic matter and fodder, crops are therefore food sources for humans and animals.

Soil organisms also benefit from crops: bacteria feed on the cellulose fibers of straw that farmers return to the soil, amoebas feed on bacteria making lignite fibers available for uptake by plants, algae provide organic matter and serve as natural nitrogen fixers, rodents that bore under the fields aerate the soil and improve its water-holding capacity, spiders, centipedes and insects grind organic matter from the surface soil and leave behind enriched droppings. Earthworms contribute to soil fertility. They provide aerage, drainage and maintain soil structure. Thus, the earthworm is like a natural tractor, fertilizer factory and dam, combined! Industrial-farming techniques would deprive these diverse species of food sources and instead assault them with chemicals, destroying the rich biodiversity in the soil and with it the basis for the renewal of the soil fertility.

Many people may support environmental causes to help preserve the beauty of nature. For many decades, various environmentalists, biologists and other scientists have viewed the entire earth as a massive living organism or system due to the interdependent nature of all species within it. While there are disagreements and differences on how this works, it suggests that ecological balance and biodiversity are crucial for all of earth, not just humans.

2. FLORAL DIVERSITY AND ESSENCES OF FLORAL DIVERSITY LOSSES

Biodiversity refers to the number, variety and variability of living organisms. In its widest sense, therefore, it is synonymous with “Life on Earth”. It embraces two different concepts: one is a measure of how many different living things there are, and the other is the measure of how different they are. Although many definitions of biodiversity exist, the most often-cited is provided by the “Convention on Biological Diversity” (CBD, 1992) that defines biodiversity as the variability among living organisms from all sources including, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species, and of ecosystems.

The term "biodiversity", thus, refers to the variety of all life on earth, and explicitly recognises how the interaction of the different components of ecosystems results in the provision of essential ecosystem services on the one hand, and social and recreational opportunities on the other, including being a source of inspiration and cultural identity. A number of concepts have been developed in recent years relating to indicators and principles for biodiversity management, including "ecosystem integrity", "ecosystem health", "sustainability", and "resilience" (the ability of an ecosystem to withstand stresses and shocks). The variety of concepts and definitions that abound indicates the difficulties facing any attempts to establish a practical, working definition of biological diversity.

Genetic diversity is the variation of the set of genes carried by different organisms: it occurs on a small scale among organisms of the same species, among closely related species such as those in the same genus, and among more distantly related species, in different families, orders, or kingdoms. Genetic diversity might be characterised by a range of techniques: by observation of inherited genetic traits, by studying the chromosomes and their species specific karyotype, and by analysing the DNA information using molecular technology (Bolaric, *et al.*, 2005). Global genetic diversity is extremely large. It has been estimated that there are some 10^9 different genes present in the world's biota (Krishnamurthy, 2003). The number of possible combinations of gene-sequence variants in a population is so great that it cannot even be expressed in a meaningful way. This amazing variation in the genetic code offers opportunities for evolutionary change, the survival of species, adaptations to a changing environment, and the formation of new species.

Species diversity is the basic unit of classification in biology. Although a species might be defined as a group of similar organisms that interbreed or share a common lineage of descent, there is no universal agreement on how to define a species. Even when the species is the basic unit, it represents only one level of a complex phylogenetic hierarchy: related species are grouped in genera, related genera in families, families in orders, and so on, up to the highest level, the kingdom. World-wide, just 1,75 million of the estimated 13 to 14 million species have so far been described (Singh, *et al.*, 2017). Most of these described species are only poorly known in biological terms. There is no comprehensive catalogue on the known species. The number or richness of species is obviously a most incomplete measure of biodiversity. It is

complemented by: (a) **species diversity**, which measures the species in an area, adjusting for both sampling effects and species abundance. (b) **taxic (taxonomic) diversity**, which measures the taxonomic dispersion of species, thus emphasizing isolated evolutionary species. The basic idea behind this measure is that biodiversity might be better measured at higher taxonomic levels (such as genera or families). The explanation is that an area, for example, with ten species in the same genus is less diverse than an area with ten species, each belonging to a different genus. (c) **functional diversity**, which assesses the richness of functional features and interrelations in an area, identifying food webs along with keystone species and guilds. However, not only diversity is of importance. Species endemism, that is whether a species is restricted to ("endemic to") an area under discussion, is equally vital. For example, islands typically have fewer species than equivalent-sized continental areas. They have lower species richness but higher species endemism.

Ecosystem diversity: species exist in natural settings, within functioning communities and ecosystems, interacting with other species and the abiotic environment. Ecosystems function as entities with system-wide properties. Care about diversity must, therefore, also focus on system-wide aspects, such as dying coral reefs. Different classification systems exist to describe ecosystem diversity. On a world scale, bio-geographic zones, biomes, eco-regions, and oceanic realms are used. On a smaller scale, one deals with landscapes, ecosystems and communities.

Qualification of ecosystems on a global scale faces problems. A major reason for this is that they do not have a clearly delineated identity. They do not, in general, exist as discrete units, but represent different parts of a highly variable natural continuum. Biological causes of biodiversity loss, in essence, has to do with genes, species and ecosystems, it is also related to issues far beyond the confines of biology. Understanding the threats to biodiversity loss and offering solutions to them necessitates insights from the socio-economic and applied sciences. The major source of the recent interest in diversity of life on earth arises from the feeling of a rapid decline in biodiversity.

Extinction of species is part of an evolutionary process. However, during recent times, extinction rates are ten to a hundred times higher than during pre-human times. The main causes for this loss of biodiversity are:

i. **The loss of habitats**

Important biological causes of the loss of biological diversity include the loss of habitats, the introduction of exotic species, over-harvesting of biodiversity resources, and homogenisation of species in agriculture. The common factor of all these elements is that they are human-driven.

ii. **Demographic change**

Although the relation between population pressure and the impact on biodiversity is almost obvious, no systematic attempt has been made so far to analyze this relationship in a quantitative way. Global increases of energy consumption and the use of natural resources drive habitat conversion world-wide. Although there is ample theoretical evidence of the economic, social and political causes of biodiversity loss, empirical evidence for most of these relationships is fragmented, meager or non-existent.

3. HEALTHY ECOSYSTEMS AND SUSTAINABLE DEVELOPMENT

3.1. Introduced species are not good guests

Invasive species is a species that is not native to a specific location, and that has a tendency to spread to a degree believed to cause damage to the environment, human economy or human health. The term as most often used applies to introduce species that adversely affect the habitats and bioregions they invade economically, environmentally, or ecologically (Gaertner *et al.*, 2009). Such invasive species may be either plants or animals and may disrupt by dominating a region, wilderness areas, particular habitats, or wildland–urban interface land from loss of natural controls such as predators or herbivores. Invasive alien species are as those that are, firstly, outside their natural distribution area, and secondly, threaten biological diversity. Sometimes the term is used to describe a non-native or introduced species that has become widespread.

While all species compete to survive, invasive species appear to have specific traits or specific combinations of traits that allow them to out-compete native species. In some cases, the competition is about rates of growth and reproduction. In other cases, species interact with each other more directly. Common invasive species traits include the following:

- Fast growth
- Rapid reproduction
- High dispersal ability

- Phenotype plasticity (the ability to alter growth form to suit current conditions)
- Tolerance of a wide range of environmental conditions (ecological competence)
- Ability to live off of a wide range of food types (generalist)
- Association with humans
- Prior successful invasions

Moreover, an introduced species must survive at low population densities before it becomes invasive in a new location. At low population densities, it can be difficult for the introduced species to reproduce and maintain itself in a new location, so a species might reach a location multiple times before it becomes established. Repeated patterns of human movement offer repeated opportunities for establishment.

An introduced species might become invasive if it can out-compete native species for resources such as nutrients, light, physical space, water, or food. If these species evolved under great competition or predation, then the new environment may host fewer able competitors, allowing the invader to proliferate quickly. Ecosystems in which are being used to their fullest capacity by native species can be modeled as zero-sum systems in which any gain for the invader is a loss for the native. However, such unilateral competitive superiority (and extinction of native species with increased populations of the invader) is not the rule. Invasive species often coexist with native species for an extended time, and gradually, the superior competitive ability of an invasive species becomes apparent as its population grows larger and denser and it adapts to its new location.

Plant identification is challenging, but most important scientific task and can even be fun. Identification is mainly important for early detection of invasive plant species that have never been recorded in a target area. It is also important for differentiating edible plants from non-edible ones and toxic from nontoxic ones. Because failing to identify plants to eat is a question of death and life. This manual, therefore, have included a list plant species found within the Lake Tana Biosphere Reserve by incorporating basic identification characteristic features of each plant to assist Amateurs and Professionals identify plants in the field.

4. MAIN LTBR FLORA SPECIES

 **Scientific name:** *Typha latifolia*	**Description of the species:** It is a large marsh plant that measures approximately 90-270 cm. in height. This unique plant is best characterized by its large, cynidrical, brown spike of female flowers from which it gets its name. Immediately above this large, thick structure, protrudes a smaller, pointed, light-yellow spike of male flowers. Below the flowering bodies, the stem is thick and pithy. The leaves of the common cattail are large, thin, and tapered. It is a marsh plant and so grows best in extremely moist environments including freshwater marshes, ditches, and shorelines. Young flower spikes are edible as well. it absorbs pollutants and in fact is used as a bioremediator. It has large underwater/ underground rhizomes that allow for quick and dense proliferation. It is popular nesting areas for waterfowl, and provide protected pockets in which salamanders, frogs, and fish choose to lay their eggs. It serves as a food source and building medium for muskrats. Red-winged blackbirds consistently use it as a perch and as a support for nests.
 **Scientific name:** *Cyprus papyrus*	**-Description of the species:** Papyrus *(Cyprus papyrus)* is tall, robust, leafless aquatic plant that can grow four to five m. It forms a grass-like clump of triangular green stems that rise up from thick, woody rhizomes. Greenish-brown flower clusters eventually appear at the ends of the rays, giving way to brown, nut-like fruits. The younger parts of the rhizome are covered by red-brown, papery, triangular scales, which also cover the base of the culms. Botanically, these represent reduced leaves, so strictly it is not quite correct to call this plant fully "leafless" Papyrus can be found in tropical rain forests, tolerating annual temperatures of 20 to 30 °C, and a pH of 6.0 to 8.5. Papyrus flowers in late summer, and prefers full sun to partly shady conditions. Like most tropical plants, it is sensitive to frost. Papyrus sedge forms vast stands in swamps, shallow lakes, and along stream banks throughout the wetter parts of Africa, but it has become rare in the Nile Delta. It also occurs in Madagascar, and some Mediterranean areas such as Sicily and the Levant. The "feather-duster" flowering heads make ideal nesting sites for many social species of birds. As in most sedges, pollination is by wind, not insects, and the mature fruits after release are distributed by water.



Scientific name: *Phragmites*

Description of the species:

Phragmites is a genus of four species of large perennial grasses found in wetlands throughout temperate and tropical regions of the world. Phragmites australis, common reed, commonly forms extensive stands known as reed beds. Where conditions are suitable it can also spread at 5 m or more per year by horizontal runners, which put down roots at regular intervals. It can grow in damp ground, in standing water up to 1m or so deep, or even as a floating mat. The erect stems grow to 2–6 m tall.

The leaves are long for a grass; the flowers are produced in late summer. It is a helophyte, especially common in alkaline habitats.

Common reed is suppressed where it is grazed regularly by livestock. Under these conditions it either grows as small shoots within the grassland sward, or it disappears altogether.



Scientific name: *Polygonum*

Description of the species:

Polygonum is a genus of about 220 species of flowering plant in the family Polygonaceae. Common names include knotweed, knotgrass, bistort, tearthumb, mile-a-minute, smartweed and several others. The species are very diverse, ranging from prostrate herbaceous annual plants under 5 cm high to erect herbaceous perennial plants growing up to 3–4 m tall to perennial woody vines growing up to 20–30 m high in trees. Several are aquatic, growing as floating plants in ponds. The smooth-edged leaves range from 1–30 cm long, and vary in shape between species from narrow lanceolate to oval, broad triangular, heart-shaped, or arrowhead forms. The stems are often reddish or red-speckled. The small flowers are pink, white, or greenish, forming in summer in dense clusters from the leaf joints or stem apices.

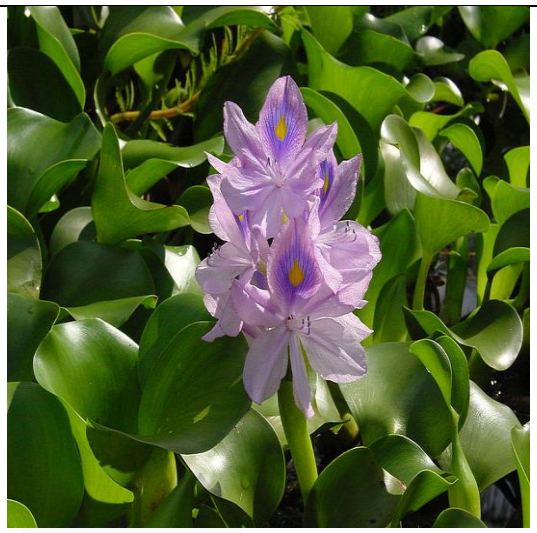
Polygonum species are occasionally eaten by humans, and are used as food plants by the larvae of some Lepidoptera species. Most species are considered weedy, especially in moist soils. Several species of *Polygonum* can be eaten cooked, for example during famines. The species *Polygonum cognatum* is regularly consumed in central parts of Turkey. In Chinese medicine, a *Polygonum* extract is used to treat urinary tract infections.

 **Scientific name:** *Vossia cuspidata*	**Description of the species:** The only known species is *Vossia cuspidata***,** native to Africa..Vossia is a genus of African and Asian plants in the grass family. The only known species is Vossia cuspidata, native to Africa, and to Bangladesh, and northern Indochina. Its common name is hippo grass
 **Scientific name:** *Potamogeton*	**Description of the species:** *Potamogeton* is a genus of aquatic, mostly freshwater, plants of the family Potamogetonaceae. *Potamogeton* species range from large (stems of 6m or more) to very small (less than 10cm). Height is strongly influenced by environmental conditions, particularly water depth. In many species, all the leaves are submerged, and in these cases, they are typically thin and translucent. Some species, especially in ponds and very slow-moving waters, have floating leaves which tend to be opaque with a leathery texture. Leaf shape has been found to be highly plastic, with variability due to changes in light, water chemistry, planting depth, sediment conditions, temperature, photo period, waves, and seasonality. The flowers, which are often overlooked, are greenish-brown and are composed of four rounded segments borne in a spike.
 **Scientific name:** *Nymphaea nouchali*	**Description of the species:** *Nymphaea nouchali* is a day-blooming non viviparous plant with submerged roots and stems. Parts of the leaves are submerged, while others rise slightly above the surface. The leaves are round and green on top; they usually have a darker underside. The floating leaves have undulating edges that give them a crenellated appearance. It has a beautiful flower which is usually violet blue in color with reddish edges. Some varieties have white, purple, or fuchsia-colored flowers, hence its name red and blue water lily. The flower has four or five sepals and 13-15 petals that have an angular appearance, making the flower look star-shaped from above.

 **Scientific name:** *Ludwigia peploides*	**Description of the species:** Most ***Ludwigia*** ***(***water primroses) are emerged plants; however, *Ludwigia repens* is mostly submersed and does not look much like the other *Ludwigias*. There are many species, some large and shrubby, and some small and floating. They commonly grow in shallow marshy areas, borrow pits and ditches. They flower in all seasons except winter. There are 30 species of *Ludwigia* . Water primroses grow to five or six feet tall; however some are only inches tall. Stems are branched and sometimes have long hairs. The leaves are ovate to lance-shaped, and up to six inches long. Most water primroses have conspicuous yellow flowers with four or five petals. The *Ludwigia* genus is present worldwide. They can be woody, herbaceous and aquatic. The *Ludwigia* occur predominantly in wetlands and in the transition areas between aquatic and terrestrial environments. As a result of their high plasticity *lugwigia* can colonize pretty much anywhere in slow flowing waters, river banks and wet meadows. They do prefer slow flowing water with a higher velocity.
 **Scientific name:** *Nymphoides*	**Description of the species:** *Nymphoides* or floating heart, is a genus of aquatic flowering plants in the family Menyanthaceae. The genus name refers to their resemblance to the water lily *Nymphaea*. They are aquatic plants with submerged roots and floating leaves that hold the small flowers above the water surface. Flowers are sympetalous, most often divided into five lobes (petals). The petals are either yellow or white, and may be adorned with lateral wings or covered in small hairs. Species of *Nymphoides* are sold as aquarium plants. *Nymphoides* grow in Australia, and others exist in Africa, America, and Asia.

 **Scientific name:** *Ipomoea aquatica*	**Description of the species:** *Ipomoea aquatica* grows in water or on moist soil. Its stems are 2–3m or longer, rooting at the nodes, and they are hollow and can float. The leaves vary from arrow head-shaped to lanceolate, 5–15cm long and 2–8cm broad. The flowers are trumpet-shaped, 3–5cm in diameter, and usually white in colour. Propagation is either by planting cuttings of the stem shoots that will root along nodes or planting the seeds from flowers that produce seed pods. *Ipomoea aquatica* is listed as a "Class A noxious weed", where it can be observed growing in the wild. It invades wetlands, floating stems form dense mats which can block the flow of water and prevent passage of boats.
 **Scientific name:** *Eleocharis*	**Description of the species:** *Eleocharis* is flowering plants in the sedge family, Cyperaceae. The genus has a geographically cosmopolitan distribution, with centers of diversity in the Amazon rainforest and adjacent eastern slopes of the South American Andes, northern Australia, eastern North America, California, Southern Africa, and subtropical Asia. The vast majority grow in aquatic or mesic habitats. The genus itself is relatively easy to recognize; all *Eleocharis* species have photosynthetic stems but no green leaves (the leaves have been reduced to sheaths surrounding the base of the stems). Many currently recognized species with very wide geographic ranges are highly polymorphic. Some of these species probably contain multiple independently evolving lineages.
 **Scientific name:** *Eleusine*	**Description of the species:** *Eleusine africana* is globally assessed as Least Concern as it is a widely distributed species and is a weed in some parts of its native range. Populations of this species do not appear to be well-represented in germplasm collections, therefore further collection of material for *ex-situ* conservation is recommended for this species. *Eleusine africana* is a robust, tufted annual grass that is primarily found in damp, sandy soils alongside rivers, dams and roadsides, as well as being a weed in disturbed areas and cultivated land.

 : **Scientific name:** *Nymphaea lotus*	**Description of the species:** This species of water lily has lily pads which float on the water, and blossoms which rise above the water. It is a perennial, grows to 45 cm in height. The color of the flower is white and sometimes tinged with pink. *Nymphaea lotus* is found in ponds, and prefers clear, warm, still and slightly acidic waters. It can be found in association with other aquatic plant species such as *Utricularia stellaris.* It is often used as a freshwater aquarium plant. In ornamental garden pools and in greenhouse culture it is grown for its flowers, which do not normally appear under aquarium conditions: Strong light is required for deep reddish color in the "red" forms.
 **Scientific name:** *Trifolium*	**Description of the species:** *Trifolium* consisting of about 300 species of plants in the leguminous pea family Fabaceae. The genus has a cosmopolitan distribution; many species occur in Africa, including at high altitudes on mountains in the tropics. They are small annual, biennial,orshort-lived perennial herbaceous plants.Clover or trefoil are common names for plants of the genus. The leaves are trifoliate; the small, few-seeded pods are enclosed in the calyx. Their ability to fix atmospheric nitrogen will help to improve the fertility of the soil and thus increase the yields of succeeding crops. Forage legumes also generally contain a large proportion of crude protein, and are thus a source of high-quality feed for livestock.
 **Scientific name:** *Echinochloa*	**Description of the species:** *Echinochloa pyramidalis* (antelop grass) is annual and mostly found in seasonally flooded areas, in pools, streams, and common in rice fields. In open places it tends to be rather short and robust and in closed communities it is tall and slender. This is a semi-aquatic species, almost invariably associated with water. It is usually associated with badly drained black clays. It receives regular flooding from the adjacent river and resultant deposits of silt and clay. Hence, it thrives along the borders of rivers and canals and spreads by floating culms across the water.



Scientific name:*Eichhornia crassipes*

Description of the species:

Water hyacinth (*Eichhornia crassipes*) is an aquatic plant, and is often a highly problematic invasive species outside its native range.Water hyacinth is a free-floating perennial aquatic plant (or hydrophyte) native to tropical and sub-tropical South America. With broad, thick, glossy, ovate leaves, water hyacinth may rise above the surface of the water. The leaves are 10–20 cm across, and float above the water surface. They have long, spongy and bulbous stalks. The feathery, freely hanging roots are purple-black.

An erect stalk supports a single spike of 8-15 conspicuously attractive flowers, mostly lavender to pink in colour with six petals. One of the fastest growing plants known, water hyacinth reproduces primarily by way of runners or stolons, which eventually form daughter plants. Each plant additionally can produce thousands of seeds each year, and these seeds can remain viable for more than 28 years. Some water hyacinths were found to grow between 2 and 5 m a day. The common water hyacinth (*Eichhornia crassipes*) is vigorous grows and mats can double in size in two weeks.

In their native range these flowers are pollinated by long tongued bees and they can reproduce both sexually and clonally. The invasiveness of the hyacinth is related to its ability to clone itself and large patches are likely to all be part of the same genetic form.Water hyacinths have three flower morphs and are termed "tristylous". The flower morphs are named for the length of their pistil: long, medium and short. However, the short morph is restricted to the native range due to founder events during its distribution.

Its habitat ranges from tropical desert to subtropical or warm temperate desert to rainforest zones. The temperature tolerance of the water hyacinth is the following; its minimum growth temperature is 12 °C; its optimum growth temperature is 25–30 °C; its maximum growth temperature is 33–35 °C, and its pH tolerance is estimated at 5.0–7.5. Leaves are killed by frost and plants do not tolerate water temperatures > 34 °C. Water hyacinths do not grow where the average salinity is greater than 15% that of sea water.

 **Scientific name:** *Echinochloa*	**Description of the species:** *Echinochloa crus-galli* is a type of wild grass originating from tropical Asia that was formerly classified as a type of panicum grass. It is commonly known as cockspur grass, water grass, etc. This plant can grow to 1.5 m in height and has long, flat leaves which are often purplish at the base. Most stems are upright, but some will spread out over the ground. Stems are flattened at the base. The seed heads are a distinctive feature, often purplish, with large millet-like seeds in crowded spikelets. Considered one of the world's worst weeds, it reduces crop yields and causes forage crops to fail by removing up to 80% of the available soil nitrogen. The high levels of nitrates it accumulates can poison livestock. It acts as a host for several mosaic virus diseases. *Echinochloa crus-galli* can adapt to nearly all types of wet places. It is often a common weed in paddy fields, roadsides, cultivated areas, and fallow fields. It grows on variety of wet sites such as ditches, low areas in fertile croplands and wet wastes, often growing in water.
 **Scientific name:** *Abutilon figarianum*	**Description of the species:** Plants of this genus include herbs, shrubs, and trees. They range in height from about 0.5 to 3m. The leaf blades are usually entire, but the occasional species has lobed leaves. They are palmately veined and have wavy or serrated edges. Flowers are solitary, paired, or borne in small inflorescence in the leaf axils or toward the branch tips. The calyx is bell-shaped with five lobes. The corolla is usually bell-shaped to wheel-shaped, with five petals joined at the bases. The flowers are most often yellow or orange, but can be red or pinkish, sometimes with a darker center.
 **Scientific name:** *Acacia abyssinica*	**Description of the species:** *Acacia abyssinica* can be confused with *A. sieberiana* var woodii, but *A. sieberiana* usually has fewer than 20 pairs of pinnae and larger leaflets (3-4 mm long), whereas the leaves of A. abyssinica usually have 20-40 pairs of pinnae and the leaflets are usually up to 2 mm long although some overlap occurs. Furthermore, in *A. abyssinica* the pinnae are relatively short so that the leaves appear long and narrow.

 **Scientific name:** *Acanthus pubescens*	**Description of the species:** *Acanthus* is a genus of about 30 species of flowering plants in the family Acanthaceae, native to tropical and warm temperate regions, with the highest species diversity in the Mediterranean Basin and Asia. This flowering plant is nectar producing and is susceptible to predation by butterflies, and other nectar feeding organisms. The genus comprises herbaceous perennial plants, rarely subshrubs, with spiny leaves and flower spikes bearing white or purplish flowers. One of the most characteristic forest margin species. It often forms a 5–10 m wide belt between the forest and the tall grassland, thus protecting the forest from the grassfires and eventually allowing the forest to expand.
 **Scientific name:** *Acanthus sennii*	**Description of the species:** This species is native to Ethiopia. A most unusual species from the highlands of Ethiopia, a shrub to 3' or more with silvery green leaves to about 3" wide, ruffle edged and spined, and spikes of nearly red flowers in summer and autumn. **-Ecology:** A well armed and rare shrubby acanthus from high elevation of Ethiopia with textural, attractive leaves prominent silvery veins. Orange red flowers in fall attract a lot of attention.
 **Scientific name:** *Acokanthera schimperi*	**Description of the species:** *Acokanthera schimperi* is a small tree native to eastern and central Africa as well as to Yemen. The bark, wood and roots of are used as an important ingredient of arrow poison in Africa. All plant parts contain acovenoside A and ouabaïne, which are cardiotonic glycosides. Its fruit is edible, and is eaten as a famine food. When ripe they are sweet but also slightly bitter. Unripe fruits have caused accidental poisoning as they are highly toxic. *Acokanthera schimperi* is native to Ethiopia, Eritrea, Somalia, Kenya, Uganda, Tanzania, Rwanda, and DR Congo. It is the only species in the genus that also occurs outside Africa, in southern Yemen.

 **Scientific name:** *Albizia*	**Description of the species:** Albizia is a genus of about 150 species of mostly fast-growing subtropical and tropical trees and shrubs of the family Fabaceae. Albizia grandibracteata is a deciduous tree with a rounded or flat crown. It can grow 6-30m tall. The tree is harvested from the wild for local use as a medicine and source of wood. It is cultivated as an ornamental and shade tree, and also to improve the soil fertility. Its habitat includes rainforest; riverine forest; grassland; remnant of transitional (riverine) forest; Acacia woodland between large gneiss boulders; near a rivulet in open woodland; tangle near stream; often a forest pioneer.
 **Scientific name:** *Allophylus abyssinicus*	**Description of the species:** Small to medium-sized tree up to 25 m tall, rarely a shrub; bole up to 90 cm in diameter, sometimes slightly buttressed; bark surface grey to greyish white, smooth or slightly rough, sometimes peeling in flakes; young braches densely reddish brown short-hairy, with many lenticels. Leaves alternate, 3-foliolate; stipules absent; petiole 2.5–10.5 mm long, soft-hairy; Flowers unisexual, slightly zygomorphic. *Allophylus* is widespread throughout the tropics and subtropics. In an extreme view *Allophylus* has been considered to represent a single but extremely variable species. *Allophylus abyssinicus* occurs in mountain forest, riverine forest and at forest edges at altitudes of over 1000 m.
 **Scientific name:** *Bersama abyssinica*	**Description of the species:** *Bersama abyssinica* is a species of medium-sized evergreen tree.The leaves are pinnately divided with a strongly winged rachis, and hence the common name winged bersama. *Bersama abyssinica* produces a hard, heavy wood that is used in the construction of houses. *Bersama abyssinica* grows in lowland bush savanna, gallery forests and montane forests, from sea-level up to 2700 m altitude. It behaves as a pioneer species and is considered a weed in forest plantations.This species is distributed across sub-Saharan Africa.

 **Scientific name:** *Bridelia micrantha*	**Description of the species:** *Bridelia micrantha* is a tree in the Phyllanthaceae family and is native to tropical and southern Africa. They are found growing in coastal forests, riverine forest, swamp forest, woodland and along forest margins.
 **Scientific name:** *Brucea. antidysenterica*	**Description of the species:** *Brucea antidysenterica* is an evergreen dioecious, erect shrub or small tree, up to 7m high. Stem sparsely to richly branched from the base, dull grey to grey-brown, marked by the persistent heart-shaped leaf-scars. In Ethiopia, *B. antidysenterica* can be found at altitudes 1000-3700 m. The shrub or tree is often found in regrowth of deforested areas or at forest edges. Its water requirements re not known, but it grows both in dry and in wet habitats. It flowers or fruits all the year round. The plant is not usually eaten by cattle, sheep or goats, although it bears fresh-looking green leaves, even in the dry season.
 **Scientific name:** *Buddleja*	**Description of the species:** *Buddleja* is a multi-branched shrub or occasionally small tree endemic to the semi-arid highlands flanking the Red Sea in Eritrea, Ethiopia, Saudi Arabia, Somalia and Yemen, where it grows in secondary scrub or around forest, often along watercourses, at elevations of between 2,200 and 3,600 m ; its range extends southward into the highlands of Kenya and Tanzania. It has a red-brown or grey bark. The leaves are long and narrow to 15cm with a pointed tip and are light grey-green on top. Flowers are of bright orange colour on a long spike to 20cm. The flowers are tubular, in small groups with a sharp and rather unpleasant smell. The fruits are small dry orange capsules that are open at the tip.

 **Scientific name:** *Ficus thonningii*	**Description of the species**: *Ficus thonningii* is an evergreen tree with a rounded to spreading, dense crown; it can grow 6 – 21m tall. The plant often begins life as an epiphyte, growing in the branch of another tree; as it grows older it sends down aerial roots which, when they reach the ground quickly form roots and become much thicker and more vigorous. They supply nutrients to the fig, allowing it to grow faster than the host tree. The aerial roots gradually encircle the host tree, preventing its main trunk from expanding, whilst at the same time the foliage smothers the foliage of the host. Eventually the host dies, leaving the fig to carry on growing without competition. It eventually becomes a stilt-rooted, banyan-like tree with multiple ascending trunks and massive wide-spreading branches. Tropical Africa - Senegal to Ethiopia, south to S. Africa.The species is widely distributed in upland forest, open grassland, riverine and rocky areas and sometimes in savannah.
 **Scientific name:** *Ficus vasta*	**Description of the species:** *Ficus vasta* is a large tree, with a massive trunk, and spreading branches whose tips form an inverted bowl up to 50m in diameter. It reaches a height of 25m. The trunk is smooth and grey, and is commonly buttressed. The bark is smooth and grey, except on young branches where it is yellow-white-brown, and flaking when dry. The leaves are elliptical, hairy, and rough to the touch. *Ficus vasta* grows as an epiphyte or as a chasmophyte. As the young tree grows, it sends down roots which thicken and become trunk-like, often fusing together and completely engulfing the trunk of the tree or rock it grew on. This process often kills the host tree and completely engulfs or covers the rock face. It grows in or near the Horn of Africa. It is primarily endemic to Ethiopia and Yemen, but can also be found in the Sudan, Somalia and Saudi Arabia, and into Uganda and Tanzania in the African Great Lakes Region. The tree grows along rivers forming stands or thickets. Additionally, it is found in dry savannah, and grows at elevations between 1,400m and 2,500m.

 **Scientific name:** *Flacourtia indica*	**Description of the species:** *Flacourtia indica* is a bushy shrub or tree with a spiny trunk and branches. In shrub form it grows up to 8 m and as a tree it reaches a maximum height around 15 m feet. The drooping branches bear oval leaves, and the seeds are dispersed by birds. It is a species of flowering plant native to much of Africa and tropical and temperate parts of Asia
 **Scientific name:** *Gardenia ternifolia*	**Description of the species:** *Gardenia ternifolia* is an evergreen shrub or small tree that can grow up to 6 m tall. The intertwined branches have short twigs which are very hard and thorny. The plant is sometimes harvested from the wild for local medicinal use and as a source of dye. They occur in tropical Africa - Senegal to Ethiopia, Uganda and Kenya, south to Namibia, Botswana and Mozambique. -They occur in brachystegia woodland and grassland with scattered bushes at elevations of 700 - 1,680 m.
 **Scientific name:** *Grewia. ferruginea*	**Description of the species:** *Grewia ferruginea* is a shrub or small tree to 7m, young shoots, leaf and flower stalks covered with redbrown hairs. It is a widespread shrub, growing in riverine forest, near lakes and along rivers in open acacia-combretum woodland in dry and moist weyna Dega as well as moist and dry Kolla agroclimatic zones, 1,300–2,700 m. It is used for firewood, timber (local construction), farm tools, food (fruit), fodder (leaves), rope (bark).
 **Scientific name:** *Grewia bicolor*	**-Description of the species:** *Grewia bicolor* is a multi-stemmed shrub or small tree, up to 9 m high. Its bark is smooth, grey, becoming dark grey and deeply fissured and peeling away in straps with age. The young branchlets are velvety grey or brown. The leaves are alternate, simple and elliptic to slightly ovate, with a broadly tapering to rounded apex. *Grewia bicolor* naturally occurs in dry deciduous woodland and bushveld. It is frequently associated with mopane at low altitudes, on sandy flats and rocky mountain slopes. It is also occasionally found at medium altitudes in higher-rainfall areas. It is widespread, from northern KwaZulu-Natal to West Africa,

	Ethopia and Angola, also the Middle East and India. The bark of this Grewia is used for fibre, and the wood for axe handles and sticks. The leaves are browsed by game and livestock. The fruit is edible, sweetish but astringent. The roots are also used to treat chest complaints.
 **Scientific name:** *Helinus mystacinus*	**Description of the species:** *Helinus mystacinus* is climber with pubescent coiled tendrils. Branches reddish, pubescent. Leaves alternate, ovate; margins entire. Flowers with a distinct pentagonal disk, in axillary umbels, greenish white. Sepals ovate-deltate, pubescent. Petals obovate, rolled around the stamens. Fruit obovoid, pubescent, tuberculate. Its distribution is Ethiopia, Eritrea, and southwards to South Africa.
 **Scientific name:** *Juniperus procera*	**Description of the species**: *Juniperus procera* is a medium-sized tree reaching 20–25 m (rarely 40 m) tall, with a trunk up to 1.5–2 m diameter and a broadly conical to rounded or irregular crown. The leaves are of two forms, juvenile needle-like leaves 8–15 mm long on seedlings, and adult scale-leaves 0.5–3 mm long on older plants, arranged in decussate pairs or whorls of three. *Juniperus procera* is native to the Arabian Peninsula (in Saudi Arabia and Yemen), and northeastern, eastern, west-central, and south tropical Africa (in the Democratic Republic of the Congo; the Republic of the Congo; Djibouti; Eritrea; Ethiopia; Kenya; Malawi; Mozambique; Somalia; Sudan; Tanzania; Uganda; Zambia; and Zimbabwe). It is an important timber tree, used for building houses, for poles, for furniture; bark used for beehives.
 **Scientific name:** *Justicia schimperiana*	**Description of the species**: *Justicia schimperiana* is a perennial herb or shrub, up to 0.8–3 m tall. Leaf-blades lanceolate, up to at least 12 x 5 cm, sparsely pubescent with 0.3 mm long hairs especially along veins, apex acute, base shortly attenuate; petiole up to 3 cm long. Inflorescences are dense apical and subapical spikes, 8–12 cm long; bracts broadly ovate with broad whitish hyaline margins. Its distribution is in Somalia, Ethiopia, Eritrea, Kenya and Tanzania.

 **Scientific name:** *Mangifera indica*	**Description of the species:** *Mangifera indica* is a large fruit-tree, capable of growing to a height and crown width of about 30m and trunk circumference of more than 4m. It is native to the Indian subcontinent where it is indigenous. Hundreds of cultivated varieties have been introduced to other warm regions of the world. Mango was brought to East Asia around 400-500 BC, in the 15th century to the Philippines, and in the 16th century to Africa and Brazil by Portuguese explorers. The species was assessed and first named in botanical nomenclature by Linnaeus in 1753. Mango is the national fruit of India, Pakistan and the Philippines.
 **Scientific name:***Millettia ferruginea*	**-Description of the species:** *Millettia ferruginea* is a large shady tree to 35 m. Leaves are compound, up to 13 pairs of leaflets plus one at the tip, each leaflet to 9 cm long, pointed, hairy below. Flowers are large and violet, on stalks to 30 cm long, calyx with golden-brown to black hairs, the flower 2–3 cm long and the upright standard petal silky hairy outside. Fruit is large flat pods to 27 cm long and 3cm across, curved, with brown hairs when young, less hairy when mature. Pods break open when dry to set free 5–10 seeds. A tree confined to Ethiopia (endemic), found in upland forests, rain forests and forest remnants in Shoa, Tigray, Kefa, Sidamo, Ilubabor, Gojam, Wolega, Bale, Harerge and Gonder regions. It performs well in Moist and Wet Kolla as well as Dry, Moist and Wet Weyna Dega agroclimatic zones, 1,000–2,500 m. It is used for firewood, timber (local construction), tool handles, household utensils, shade, fish poison (ground-up seeds).
 **Scientific name:** *Mimusops kummel*	**Description of the species**: *Mimusops kummel* is an evergreen plant ranging in size from a shrub to a large tree usually growing up to 25 m tall, but occasionally to 35 m. *Mimusops kummel* occurs in tropical Africa - Guinea and Cote D'Ivoire to Eritrea and Ethiopia, south through Kenya, Uganda, Tanzania and Malawi. It is widespread but usually scattered in riverine forest; also found in upland dry evergreen forest and wooded grassland up to 2,100 m. In areas with an annual rainfall of 1,000 mm, it is characteristic of forests on the most humid soils.

 **Scientific name:** *Myatenus gracilipes*	**Description of the species:** *Myatenus gracilipes* is a spiny shrub; petals whitish; fruits red; in forest. tropical/subtropical moist broadleaf forest only. It occurs in Ethiopia, Uganda, E-D.R. Congo (Zaire), Tanzania, Nigeria, Cameroon, Bioko Isl. (Fernando Poo), Angola.
 **Scientific name:** *Myrica salicifolia*	**Description of the species:** *Myrica salicifolia* is a tree 6–9 m high; branches fairly stout, about 2.5 in. thick, sulcate, closely puberulous and glandular; young branchlets fairly densely leafy, almost tomentulose. Leaves oblong or oblong-lanceolate, rounded to a shortly mucronate apex, mostly truncate and unequal-sided at the base. Flowers monœcious. Male spikes axillary, mostly about twice as long as the petiole or sometimes racemosely arranged on long leafless shoots. Female spikes borne at the base of the young shoots, or axillary, and then about twice the length of the petiole, sometimes with one or two flowers at the base.
 **Scientific name:** *Myrsine africana*	**Description of the species:** *Myrsine africana* is the shrub that can achieve heights of over 2 m and may be dense if pruned or grown in strong sunlight. The fine-toothed leaves are at first deep red, but on maturity become glossy and dark green. The cream-coloured flowers appear in spring, with the male flowers boasting red anthers. Separate shrubs produce either male or female flowers, with the female plants also producing purple berries. The hardy plant is long-lived. It is increasingly popular for topiaries and small hedges generally, as it can so readily be pruned and shaped. It is indigenous to Macaronesia, Africa and South Asia. It typically has dense, dark-green to red foliage and produces tiny bright purple berries.The shrub sends up occasional shoots from its root system that go on to form new plants.

 **Scientific name:** *Nuxia congesta*	**Description of the species:** *Nuxia congesta* is native to South Africa, Swaziland, Zimbabwe, Mozambique and Zimbabwe, northwards to tropical Africa, Ethiopia and southern Arabia. It is also found on the islands in the Gulf of Guinea. It is a component of woodland, bushveld or grassland, and occurs along forest verges, but has a predisposition for rocky terrain and cliff ledges.
 **Scientific name:** *Olea capensis*	**Description of the species:** Olea capensis is black ironwood is a bushy shrub, or a small to medium-sized tree, up to 10 metres in height, occasionally reaching 40 metres. It is used as a source of food. Olea capensis has masses of sweetly scented bisexual flowers that produce large edible fruits. The wood of the tree is very hard, fine grained, and heavy, and although difficult to work, it is widely used for art and artifacts.
 **Scientific name:** *Olea europaea*	**Description of the species:** *Olea europaea* is a weed of warmer temperate and semi-arid regions, particularly those with a Mediterranean type climate. It becomes naturalised in open woodlands, parks, lowland grasslands, waste areas and along roadsides and waterways. It is an evergreen tree usually growing 2-10 m tall, but occasionally reaching up to 15 m in height. This species reproduces mainly by seed, however it also produces suckers after plants are damaged.
 **Scientific name:** *Olinia rochetiana*	**Description of the species:** *Olinia rochetiana* is shrub, small tree or less often a large tree, evergreen, usually 4–16 m tall but occasionally reach 27 m. It is often a small gnarled bushy tree in exposed rocky places.

 **Scientific name:** *Pavetta oliveriana*	**Description of the species:** *Pavetta oliveriana* is shrub or small tree, sometimes scrambling, 1.5–4.5m tall; young branches pubescent, the older ones covered with thin buff to fawn bark.
 **Scientific name:** *Pittosporium viridiflorum*	**Description of the species:** *Pittosporium viridiflorum* varies in size from a shrub of about 4m in height to a large forest tree of up to 30m. It is widely distributed in the eastern half of South Africa, occuring from the western Cape up into tropical Africa and beyond to Arabia and India.. It grows over a wide range of altitudes and varies in form from one location to another. It grows in tall forest and in scrub on the forest margin, kloofs and on stream banks. Many birds, including the Red-eyed Dove and several starlings eat the seeds. Goats and game (Kudu, Nyala, and Bushbuck) browse the leaves.
 **Scientific name:** *Premna schimperi*	**Description of the species:** *Premna schimperi* is a small spreading shrub or tree to 5–7 m. Young branchlets densely hairy. It occurs in dry bushland with acacia, carissa, euclea, myrica, maytenus and otostegia and at margins of podocarpus forests. It also grows in degraded and secondary forests.
 **Scientific name:** *Phytolacca dodecandra*	**Description of the species:** *Phytolacca dodecandra* is a trailing shrub or climber native to Tropical Africa, Southern Africa, and Madagascar. It has been selected and cultivated by Africans for centuries, particularly in Ethiopia and Eritrea. **Use:** It is used as soap and shampoo as well as a poison to stun fish. Endod is lethal to snails - a fact discovered by Ethiopian scientists - and may be effective controlling schistosomiasis.

 **Scientific name:** *Podocarpus falcatus*	**Description of the species:** *Podocarpus falcatus* is tall, evergreen tree that can reach a height of 45 m in nature. The bark is interesting, being smooth and ridged on younger stems and peeling off in flakes on the older trees. It is tree occurs from the southern Cape, northwards to the Limpopo and also eastwards to Mozambique. Ripe fruits are eaten by bats, bushpigs, fruit-eating birds. The large, dense crown is often a roosting and nesting site for various birds. The wood is used extensively for furniture, roof beams, floorboards, door and window frames and boat building. The ripe fruit is edible and very resinous. The sap is used as a remedy for chest complaints.
 **Scientific name:** *Prunus africana*	**Description of the species:** *Prunus africana* is a canopy tree 30–40 m in height. Large-diameter trees have impressive, spreading crowns. The bark is black to brown, corrugated or fissured, and scaly, fissuring in a characteristic rectangular pattern. The leaves are alternate, simple, elliptical, bluntly or acutely pointed. A central vein is depressed on top, prominent on the bottom. The flowers are androgynous, 10-20 stamens, insect-pollinated, 3–8 cm, greenish white or buff, and are distributed in 70 mm axillary racemes. The fruit is a drupe, red to brown, 7–13 mm, wider than long, two-lobed, with a seed in each lobe. It occurs in montane regions of central and southern Africa
 **Scientific name:** *Psidium guajava*	**Description of the species:** *Prunus africana* can range in size from as small as an apricot to as large as a grapefruit. Various cultivars have white, pink, or red flesh, and a few also feature red (instead of green or yellow) skin. It is widely cultivated in tropical and subtropical regions around the world The plant is used in many different shampoo products for its scent. It is also becoming a popular bonsai species and is currently quite popular in India and Eastern Asia It is an evergreen shrub or small tree native to the Caribbean, Central America and South America.

 **Scientific name:** *Pterolobium stellatum*	**Description of the species:** *Prunus africana* is widespread in Africa, where it is found from Sudan and Eritrea southwards throughout central, East and southern Africa to South Africa, but not in Angola, Namibia and Botswana. It also occurs in Yemen. In Ethiopia, since historical times, the infusion of the pounded bark has been a major ingredient for tanning leather at the same time giving it a bright red colour. The crushed leaves also yield a dark red dye for leather; ground and boiled in water to which a little oil or butter has been added to help fix the colour, they are also used to dye clothes for mourning, for dark colours in basketry and to colour mats. It is also used for firewood and fodder. Because of the sharp, recurved prickles, branches are used to make rat traps. It is sometimes planted to combat the weedy cactus Opuntia. In traditional medicine in East Africa, fresh leaves are chewed or a decoction is drunk to treat tuberculosis and related respiratory diseases. In Kenya a root decoction is used by the Maasai against stomach-ache. Juice of the roots is swallowed to treat snakebites. In Malawi a root infusion is drunk by women against infertility. It is a common shrub, forming thickets in margins and clearings of upland dry evergreen forest, Acacia woodland and riparian formations, mainly at 500–2500 m altitude.
 **Scientific name:** *Rhamnus primoides*	**Description of the species:** *Rhamnus prinioides* occurs from Ethiopia to Eritrea to South Africa at medium to high altitudes. They grow near streams or along forest margins. The small edible fruits are shiny red and berry-like. All parts of the plant are harvested and used for nutrition, medicine or religious purposes. In Ethiopia, where the plant is known as "gešo" or gesho, it is used in a manner similar to hops: the stems are boiled and the extract mixed with honey to ferment tej. It is also used in the brewing of tella, Ethiopian beer. It is one of the most and precious crops used for industrial uses both locally for domestic use and industrially. It is used for different local and fabricated products.

 **Scientific name:** *Rhus glutinosa*	**Description of the species:** *Rhus glutinosa* is a spreading or upright shrub or tree 3–10 m. The trunk may reach 25 cm diameter. This species is named for the new shoots which exude a shiny, sticky liquid (glutinous). It is used for firewood, farm tools, tool handles. A shrub or tree found in semiarid conditions in lowland and highland woodlands of moist and wet Weyna Dega and Dega agroclimatic zones of Gojam, Welo, Shewa, Harerge, Tigray and Arsi 1,500—3,300 m.
 **Scientific name:** *Rhus vulgaris*	**Description of the species:** *Rhus vulgaris* is a shrub or small tree that occasionally reaches 6 m. Branchlets brown, hairy. Its range extends from Cameroon in West Africa to Ethiopia and south to Mozambique, Malawi, Zambia and Zimbabwe. In Ethiopia, it is a very common shrub at forest edges and in woodlands in dry, moist and wet Weyna Dega and Dega agroclimatic zone in most regions, 1,500–2,800 m. It is used for firewood, farm tools, food (fruit), medicine (fruit decoction).
 **Scientific name:** *Rothmannia urcelliformis*	**Description of the species:** *Rothmannia urcelliformis* is shrub or small to medium-sized tree. Leaves opposite, lanceolate to elliptic, glossy dark green, veining conspicuous on the under surface. Flowers solitary, axillary, trumpet-shaped, creamy-white with reddish markings in the throat. Fruits spherical, blackish when ripe, distinctly scarred by the old calyx limb. Its habitat is in the understorey of evergreen forest.
 **Scientific name:** *Ruttya speciosa*	**Description of the species:** The shrubs reach heights of 90 to 150 centimetres. Ruttya speciosa has simple leaves that are opposite. The leaves are petiolate. Ruttya speciosa produces spikes of purple flowers. The shrubs produce loculicidal capsules. It is found on Ethiopian mountain sides along the banks of the Tacazze River.

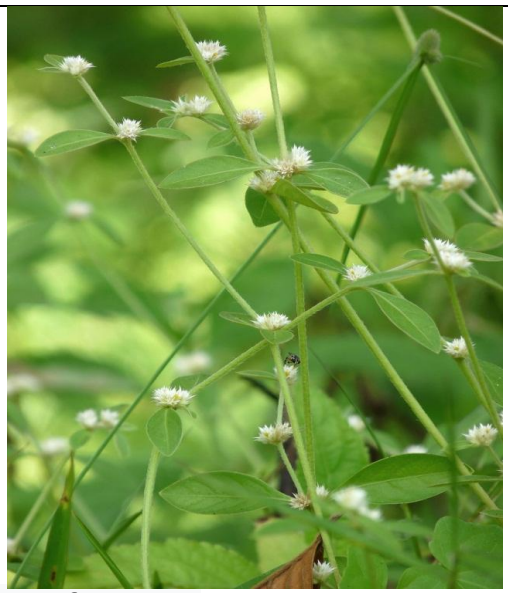
 **Scientific name:** *Sapium ellipticum*	**Description of the species:** *Sapium ellipticum* is a tree reaching usually to about 15 m high in dry situations, but to 40 m by over 2 m girth in damp sites, usually on stream-banks, of the savanna and forest zones. The wood is pale brown, somewhat coarse and fibrous. It is widely distributed from Senegal to West Cameroons and across tropical Africa. It is used as a source of food **(**fruit), medicine (leaf), exudations-gums, resins. Wood products are used for household, domestic and personal items.
 **Scientific name:** *Schefflera abyssinica*	**Description of the species:** *Schefflera abyssinica* is a tree with a large, spreading crown that can usually grow up to about 12 m tall when free-standing. It often starts life as an epiphyte in the branch of another tree and can then eventually send down roots that grow into the ground, providing extra nutriment and allowing it to grow more vigorously and out-compete the host tree It occurs in Tropical Africa - Nigeria, Cameroon, DR Congo, Sudan, Ethiopia, Somalia, Uganda, Kenya, Burundi, Tanzania, Malawi, Zambia. It is common in mountain rainforest, often in secondary formations; gallery forest; transition to grassland; usually at elevations from 1,400-2,800m, but occasionally descending to 1,200 m
 **Scientific name:***Schrebera alata*	**Description of the species:** *Schrebera alata* is a deciduous to evergreen shrub, sometimes with a scrambling habit, or a small tree that can grow 4 -24 m tall It occurs in Ethiopia, the Democratic Republic of Congo, Uganda, Rwanda, Burundi, Kenya, Tanzania, Angola, Zambia, Zimbabwe, Malawi, Mozambique, Swaziland and South Africa

 **Scientific name:***Senna septentrionalis*	**Description of the species:** *Senna septentrionalis* has leaves which are stipules linear, about 7-10 mm long, glabrous, venation not obvious. Flowers with petals about 13 mm long. Stamens usually ten, seven fertile (occasionally six) usually three large and four smaller plus three staminodes. Ovary glabrous, green in colour. Pods glabrous, about 7-8 x 1.5 cm. Seeds about 5 x 3 mm, shiny olive-green in colour, cotyledons green, radicle yellowish. It is an introduced species reported to be of hybrid origin in Mexico. In Australia this species grows like any other weedy species of Senna and shows little morphological variation. It usually grows as a weed of agricultural land but also found along roads through rain forest and other disturbed areas.
 **Scientific name:** *Solanum gigantum*	**Description of the species:** African holly is a short-lived, softly woody, spiny shrub or small tree usually growing 2 - 4 m tall, sometimes to 8 m. It occurs in Tropical Africa - Sierra Leone to Ethiopia and Somalia, south to Angola, Zimbabwe, Mozambique and S. Africa; E. Asia - India, Sri Lanka. Its habitat is forest edges, riverine forest and among rocks on granite outcrops; at elevations from sea level to 1,650 m
 **Scientific name:** *Steganotaenia araliacea*	**Description of the species:** Carrot tree *(Steganotaenia araliacea)* is a small, aromatic, deciduous tree growing 2 - 7 m tall. When crushed, the leaves have a carrot-like aroma. It occurs in Tropical Africa - widespread from western Africa to Ethiopia and south to northern S. Africa. Its habitat is in woodland and rocky outcrops, mainly at lower elevations but found up to 2,000 m.

 **Scientificname:***Stereospermum kunthianum*	**Description of the species:** *Stereospermum kunthianum* is a deciduous shrub or tree with a light, rounded crown; usually growing from 3 - 15 m tall. It reaches its full height in the moister areas of its range, rarely exceeding 6 m in the drier areas. The bole is rarely straight and often has forks and twisted branches, it can be 25cm in diameter. Its habitat is in dry areas of deciduous forest, woodland, bush, rocky outcrops, termite mounds and margins of evergreen forests. It occurs in Tropical Africa - Senegal to Sudan and Ethiopia, south to Zambia, Zimbabwe and Mozambique, avoiding the wetter regions of the continent.
 **Scientific name:** *Syzygium guineense*	**Description of the species:** **Distribution:** found in many parts of Africa both wild and domesticated. *Stereospermum kunthianum* is usually between 10 and 15 m, but some specimens have been found as tall as 25 m. The trunk is broad and fluted and the crown rounded and heavy, with a bark that is smooth when young, but becomes rough and black with age. The young leaves are purple-red in color, but as they mature their color becomes dark green; the leaves in general are shiny and smooth on both surfaces, with a tip that is long but rounded. It prefers moist soils with a high water table beside rivers, but this species will also grow in open woodland.
 **Scientific name:** *Teclea nobilis*	**Description of the species:** *Teclea nobilis* is evergreen shrub or tree. Leaves 3-foliolate with narrowly elliptic leaflets, aromatic when crushed, glossy dark green. Flowers in axillary and terminal branched sprays, creamy yellow-green, sweetly scented. Fruits in large clusters, orange-red when ripe It occurs in Ethiopia, East Africa and south to Zimbabwe and Mozambique Its habitat is **i**n riverine and evergreen forest

 **Scientific name:** *Tephrosia elata*	**Description of the species:** *Tephrosia elata* is mostly annual or sometimes biennial, shrubby herb, 0.5-2 m high, branching above. Stems and branches smooth, appressed pubescent. Leaves pinnate, usually with 6-10 pairs of leaflets; leaflets oblanceolate, elliptic to linear-elliptic, 3-8 cm long, sometimes emarginate at the apex, hairless above, shortly appressed-pubescent beneath Flowers 12-18 mm long, purple or reddish; standard truncate to cordate at the base. It occurs in Angola, DRC (Katanga), Burundi, southern Tanzania, Malawi, Mozambique, Zambia and Zimbabwe. Its habitat is mainly in woodland.
 **Scientific name:** *Terminalia brownii*	**Description of the species:** *Tephrosia elata* is a leafy deciduous tree with an attractive somewhat layered appearance and a rounded, flat topped, spreading crown; usually growing 4 - 15 m tall with some specimens to 25 m. It occurs in Tropical Africa - Nigeria, Cameroon, Central African Republic, northern DR Congo, Uganda, Tanzania, Kenya, north to Eritrea, Ethiopia Somalia, Yemen. The tree is mainly used locally as a source of medicines, timber and tannins. Its habitat in high rainfall woodlands, bushlands, and wooded savannah of the arid and semi-arid regions but can also be found in the sub-humid areas. It is often found near rivers in very dry areas.
 **Scientific name:** *Vangueria volkensii*	**Description of the species:** *Vangueria volkensii* is a spreading shrub or small tree, usually growing from 2.4 - 9 m tall with some specimens to 15 m. It occurs in East tropical Africa - Sudan, Ethiopia, Rwanda, eastern DR Congo, Uganda, Kenya, Tanzania, Malawi, Mozambique, Zambia, Zimbabwe. **Its habitat is in f**orest and grassland at elevations around 1,400 m

 **Scientific name:** *Vernonia amygdalina*	**Description of the species:** *Vernonia amygdalina* is a small shrub that grows in tropical Africa. It grows to a height of 2–5 m. The leaves are elliptical and up to 20 cm long. Its bark is rough. It is commonly called bitter leaf because of its bitter taste. The cooked leaves are a staple vegetable in soups and stews of various cultures throughout equatorial Africa. Grows under a range of ecological zones in Africa and produces large mass of forage and is drought tolerant.
 **Scientific name:** *Vernonia hochstetteri*	**Description of the species:** *Vernonia hochstetteri* is shrubby, with 1 m or more high. Leaves alternate, submembranous, ovate-lanceolate or lanceolate, acutely acuminate, cuneately narrowed into the petiole. Receptacle naked. Corolla gradually narrowed, puberulous. Anther-base shortly obtusely produced. It occurs in Ethiopian Nile land
 **Scientific name:** *Vernonia myriantha*	**Description of the species:** *Vernonia myriantha* is *l*arge shrub or even small, soft wooded tree. Although it can be a "messy" shrub, it is quite beautiful when in flower because the large inflorescences turn the whole shrub into a ball of colour varying from white to deep purple. Its habitat is in rocky scrub and grassland. It occurs in Zambia, Tanzania, Malawi, Mozambique, Zimbabwe; widespread in tropical Africa, extending to KwaZulu-Natal.

 **Scientific name:** *Alternanthera sessilis*	**Description of the species:** *Alternanthera sessilis* is a perennial herb with prostrate stems, rarely ascending, often rooting at the nodes. Leaves obovate to broadly elliptic, occasionally linear-lanceolate, 1–15 cm long, 0.3–3 cm wide. Flowers in sessile spikes, bract and bracteoles shiny white. The plant grows wild, but is also cultivated for food, herbal medicines, as an ornamental plant, in the aquarium trade, and as poultry feed. In certain regions of South East Asia, the leaves and young shoots are consumed as vegetables. It occurs throughout the tropical and subtropical regions of the Old World. It has been introduced to the southern United States, and its origins in Central and South America are uncertain
 **Scientific name:** *Ceratophyllum submersusm*	**Description of the species:** *Ceratophyllum submersusm* leaves fork three- to fourfold and end in 6 to 8 threadlike tips. The leaves are generally finer, softer and more bendable. The stems are always light green. The light green leaves, however, may assume an orange brown tint under very strong light. As it is a rootless plant, it can be left floating just under the water surface, or its stem ends may be stuck into the ground. Typically it occurs in mesotrophic to eutrophic still water bodies such as lakes, ponds and ditches, the latter particularly where they function as "wet fences". It is tolerant of salt and in some areas apparently preferentially occurs in brackish water. **I**t is distributed almost world-wide and grows mainly in stagnant waters rich in nutrients, some of which periodically fall dry. Considering its natural habitats in Central Europe we might safely say that it prefers overall warmer locations
 **Scientific name:** *Cyperus alopecuroides*	**Description of the species:** .*Cyperus alopecuroides* is perennial and rhizomatous sedge typically grows to a height of 1 to 1.5 m. The plant blooms between May and July producing yellow-brown flowers. Commonly found growing in moist and shady places such as seasonally moist grassland, on alluvial mud, swamps, in pond margins, lakes, streams and river beds, and it sometimes occurs in old cultivations. In some parts of the world, the leaves are considered to be antibiotic and its pastes are applied externally in cutaneous affections. It is also used as a fibre for mat making.

 **Scientific name:** *Echinochloa stagnina*	**Description of the species:** *Echinochloa stagnina* is a robust perennial grass with elongated rhizomes and decumbent or prostrate culms that are 30 - 200cm long, rooting from their lower nodes. The rhizomes are stout and often floating, bearing culms up to 2 m high. It occurs in tropical Africa - savannah areas from Mauritania to Somalia, south to S. Africa; E. Asia - Pakistan, India to Indonesia. The plant is claimed to be the most useful of all wild plants providing food and drink, material for thatch; caulking for boats; and a vegetable salt which can be heated until it turns to a powder and then used in making soap and indigo dyes. Its habitat is in swamps and standing water, often forming floating mats. A traditional food plant in Africa, this little-known grain has potential to improve nutrition, boost food security, foster rural development and support sustainable landcare.
 **Scientific name:** *Ipormea auqatica*	**Description of the species:** *Ipormea auqatica* grows in water or on moist soil. Its stems are 2–3 m or longer, rooting at the nodes, and they are hollow and can float. The leaves vary from typically sagittate to lanceolate, 5–15 cm long and 2–8 cm broad. The flowers are trumpet-shaped, 3–5 cm in diameter, and usually white in colour with a mauve centre. Its habita s in moist, marshy or inundated localities, shallow pools, ditches, rice fields, forming dense masses. Also found along roadsides at elevations from sea-level up to 1,000 m.
 **Scientific name:** *Ludwigia stolonifera*	**Description of the species:** *Ludwigia stolonifera* is a pantropical species with a biogeographical distribution that covers Africa and Asia. In the Mediterranean region, it is found in Turkey, Syria, Lebanon, Israel, Palestine, Libya, Egypt and the Sinai Peninsula. Its habitat is a perennial, floating aquatic, herbaceous plant that is found in lakes, shallow waters, ditches and rivers, sometimes in very high densities. Flowering occurs during spring and autumn. It can incorporate large amounts of heavy metals.

 **Scientific name:** *Nymphoides indica*	**Description of the species:** *Nymphoides indica* spreads by rhizomes, forming clusters of leaves, with clustered white flowers about 1 cm across. The flowers are sometimes described as having five petals, but can have more. Its habitat is rooting in mud, an occasional plant in ponds or wet places from near sea level to an elevation of about 825 m. Plants grow best when the roots are submerged in 30 - 60cm of water.The plant can spread rather vigorously when growing in areas with warm winters
 **Scientific name:** *Panicum subalbidum*	**Description of the species:** *Panicum subalbidum* is annual or short-lived perennial; stems robust, up to 200 cm high and 5–10 mm in diam. at the base, erect or decumbent, often rooting from the lower nodes; leaves linear, 20–50 cm x 7–15 mm, cordate to straight at the base. Grains used as food, fodder, culm leaf products for household, domestic and personal items.
 **Scientific name:** *Sphaeranthus suaveolens*	**Description of the species:** *Panicum subalbidum* is an erect or trailing perennial herb growing from 10 - 100cm tall. The lower stem often trails along the ground and roots at the nodes with thread-like roots. It occurs in Eastern Africa - Egypt, Sudan, Ethiopia, Kenya, south to Zambia and Mozambique. It is found at elevations from 360 - 2,600 m.
 **Scientific name:** *Amaranthis spinosus*	**Description of the species:** *Amaranthis spinosus* is an erect, much-branched annual plant growing up to 100cm tall.The plant is harvested from the wild for local use as a source of food and medicines. It is occasionally sold in local markets. It is a pantropical weed, extending sometimes into the temperate zone, it originally came from Tropical America. It occurs at roadsides, waste places and fields Leaves and stems used as raw or cooked as a spinach The seed is used as a poultice for broken bones.It is used internally in the treatment of internal bleeding, diarrhoea and excessive menstruation. It is also used in the treatment of snake bites. It is used to treat ulcerated mouths, vaginal discharges, nosebleeds and a range of skin problems including wounds, eczema, boils and burns

 **Scientific name:** *Argemone mexicana*	**Description of the species:** *Amaranthis spinosus* is an annual herb, growing up to 150 cm with a slightly branched tap root. Its stem is branched and usually extremely prickly. It exudes a yellow juice when cut. It has showy yellow flowers. Leaves are thistle-like and alternate, without leaf stalks (petioles), toothed (serrate) and the margins are spiny. The stem is oblong in cross-section. Flowers are at the tips of the branches (are terminal) and solitary, yellow and of 2.5-5 cm diameter. Fruit is a prickly oblong or egg-shaped (ovoid) capsule. Seeds are very numerous, nearly spherical, covered in a fine network of veins, brownish black and about 1 mm in diameter. It is naturalized throughout the tropics and sub-tropics as an agricultural weed. It tends to grow along roadsides, in fallow and cultivated lands, riverbanks, disturbed areas, and on floodplains.
 **Scientific name:** *Cynodon dactylon*	**Description of the species:** *Cynodon dactylon* blades are a grey-green color and are short, usually 2–15 cm long with rough edges. The erect stems can grow 1–30 cm tall. The stems are slightly flattened, often tinged purple in colour. The seed heads are produced in a cluster of two to six spikes together at the top of the stem, each spike 2–5 cm long. It has a deep root system; in drought situations with penetrable soil, the root system can grow to over 2 m deep, though most of the root mass is less than 60 cm under the surface. The grass creeps along the ground and roots wherever a node touches the ground, forming a dense mat. It occurs on in almost all soil types especially in fertile soil, It can be used for erosion control. It is very easy to plant it in the garden as a lawn grass and even for farm pastures.
 **Scientific name:** *Datura stramonium*	**Description of the species:** *Datura stramonium* is a foul-smelling, erect, annual, freely branching herb that forms a bush up to 60 to 150 cm tall. The root is long, thick, fibrous, and white. The stem is stout, erect, leafy, smooth, and pale yellow-green. The leaves are about 8 to 20 cm long, smooth, toothed, soft, and irregularly undulated. It grows wild in all the world's warm and moderate regions, where it is found along roadsides and at dung-rich livestock enclosures. It prefers rich, calcareous soil. Adding nitrogen fertilizer to the soil will increase the concentration of alkaloids present in the plant. It can be grown from seed, which is sown with several feet between plants.

 **Scientific name:** *Evolvulus alsinoides*	**Description of the species:** *Evolvulus alsinoides* is a very variable, perennial plant with slender, more or less branched stems that can become somewhat woody. It grows in a weed of sandy, open, dry grassland and rocky localities, in most of the tropics and subtropics, often on limestone, at low and medium altitudes. The whole bitter plant is used extensively as an alterative, anthelminthic, antidiarrhoeal, bitter, febrifuge, tonic and vermifuge. It is taken in an infusion to cure bowel complaints for which it is said to be a sovereign remedy - especially for dysentery. Combined with cumin and milk, it is used as a treatment for fevers, nervous debility, loss of memory, and also for syphilis, scrofula. A decoction is taken as a remedy for gonorrhea. An infusion of the plant is applied as a treatment for syphilis, scrofula, snake bites. An infusion prepared with oil is applied to promote hair growth. The powdered leaves are applied topically to treat sores. The mashed leaves are applied as a poultice on enlarged glands in the neck. The leaves are made into cigarettes, which are smoked to relieve bronchitis and asthma.
 **Scientific name:** *Trifolium repens*	**Description of the species:** *Trifolium repens* is a herbaceous, perennial plant. It is low growing, with heads of whitish flowers, often with a tinge of pink or cream that may come on with the aging of the plant. The heads are generally 1.5–2 cm wide, and are at the end of 7-cm peduncles or flower stalks. The leaves are trifoliolate, smooth, elliptic to egg-shaped and long-petioled and usually with light or dark markings. It is common throughout the British Isles, and globally cultivated as a forage crop.
 **Scientific name:** *Verbena officinalis*	**Description of the species:** *Verbena officinalis* is a perennial plant growing up to 1 m tall. It is usually gathered from the wild both for local use and for sale, but is sometimes also cultivated. It occurs in waste ground and roadsides, avoiding acid soils and shady positions. Leaves used for parboiled, seasoned and then eaten. The leaves are used as a tea substitute. The flowers are used as a garnish.

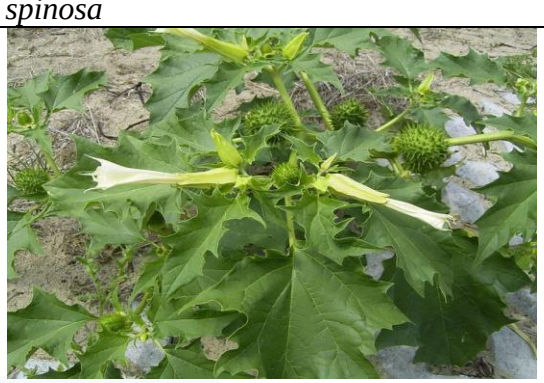
 **Scientific name:** *Xanthium spinosum*	**Description of the species:** *Xanthium spinosum* is an annual herb producing a slender stem. It is lined at intervals with very long, sharp, yellowish spines which may exceed three cm in length and may divide into two or three separate spines. The leaves are divided into linear or lance-shaped lobes, the middle much longer than the others, and are arranged alternately all along the stem. The plants, especially new seedlings, are toxic to livestock. It is known worldwide as a noxious weed that grows in many types of disturbed habitat.
 **Scientific name:** *Xanthium strumarium*	**Description of the species:** *Xanthium strumarium* is a much branched annual up to 1.2 m high.The seeds are dispersed through contaminated farm tools, waste soils and furry farm animals. It can be used as a medicinal plant. A yellow dye can be made from its leaves. However, these uses cannot compensate for its overall negative impacts. It can invade farmland, old lands, roadsides, wastelands, riverbanks and overgrazed pasturelands.
 **Scientific name:** *Acacia seyal*	**Description of the species:** *Xanthium strumarium* is a small to medium-sized tree, growing to 17 m tall and 60 cm in diameter at breast height; crown is umbrella shaped. A characteristic feature of the tree is its rust-coloured powdery bark. It occurs from Senegal to the Red Sea and in Arabia. It is common in many other parts of Africa, especially north of the equator, from 10 to 12 degrees. It also occurs in east and southern Africa. In the southern and western Sudan, It is one of the most common trees in the savannah and often occurs as a pure forest over quite large areas.
 **Scientific name:** *Centalla asiatica*	**Description of the species:** *Centalla asiatica* are slender, creeping stolons, green to reddish-green in color, connecting plants to each other. It has long-stalked, green, rounded apices which have smooth texture with palmately netted veins. The leaves are borne on pericladial petioles, around 2 cm. It grows in temperate and tropical swampy areas in many world regions. Because the plant is aquatic, it is especially sensitive to biological and chemical pollutants in the water, which may be absorbed into the plant. It can be cultivated in drier soils as long as they are watered regularly enough (such as in a home garden arrangement). In traditional medicine, it has been used to encourage lactation,

	but clinical efficacy and safety have not been confirmed by high-quality medical research. Contact dermatitis and skin irritation are possible from topical application, and headache, nausea, and drowsiness may occur from internal use. The herb may have adverse effects on liver function when used over many months.
 **Scientific name:** *Cirsium vulgare*	**Description of the species:** *Cirsium vulgare* is a tall biennial or short-lived monocarpic thistle, forming a rosette of leaves and a taproot up to 70 cm long in the first year, and a flowering stem 1–1.5 m tall in the second (rarely third or fourth) year. The stem is winged, with numerous longitudinal spine-tipped wings along its full length. It is often a ruderal species, colonising bare disturbed ground, but also persists well on heavily grazed land as it is unpalatable to most grazing animals. Nitrogen-rich soils help increase its proliferation. The stems can be peeled and then steamed or boiled. The tap roots can be eaten raw or cooked, but are only palatable on young thistles that have not yet flowered.
 **Scientific name:** *Echinochloa colona*	**Description of the species:** .*Echinochloa colona* is a clump-forming, annual grass producing stems 10 - 100cm long that can be ascending or decumbent. Seen more commonly as a famine food, the plant is sometimes cultivated by local people in Africa for its edible seed It occurs in Australia and spread to wetlands, and is threatening the habitat of swamp tea trees. The grass occurs throughout tropical Asia and Africa in fields, and along roadsides and waterways. It is considered an invasive weed in the Americas and Australia
 **Scientific name:** *Echinocloa stagnina*	**Description of the species:** *Echinocloa stagnina* is a perennial, or sometimes annual, semi-aquatic tropical grass. It reaches up to 10 m in length when floating, most of the plant being under water. It has stout floating rhizomes. It can be used for food: the sweet culms are sun-dried to extract sugar and the grains are consumed by people in periods of scarcity. However, it is mainly used as forage and burgu pastures on floodplains provide dry-season fodder for cattle. A traditional food plant in Africa, this little-known grain has potential to improve nutrition, boost food security, foster rural development and support sustainable landcare. It is widespread in tropical Africa and Asia where it has probably been introduced. It grows along rivers and in lakes and lagoons in water up to 3-10 m deep.

 **Scientific name:** *Hibiscus cannabinus*	**Description of the species:** *Echinocloa stagnina* is an annual or biennial herbaceous plant (rarely a short-lived perennial) growing to 1.5-3.5 m tall with a woody base. The stems are 1–2 cm diameter, often but not always branched. The leaves are 10–15 cm long, variable in shape.The flowers are 8–15 cm diameter, white, yellow, or purple; when white or yellow, the centre is still dark purple. The fruit is a capsule 2 cm diameter, containing several seeds. It is not known in a truly wild situation, but the plant is found in grassland and as a weed in fields and wasteland.
 **Scientific name:** *Hygrophila schulli*	**Description of the species:** *Hygrophila schulli* is a common species in many freshwater wetlands: seasonally flooded grassland (on clay or sand), alluvial acacia woodland and bushland, riverbanks, riverbeds and old rice fields. It has invasive tendencies and at times forms pure stands in polluted water bodies such as drainage channels, open gutters The species is found in India, Myanmar and in large parts of Africa. .
 **Scientific name:** *Persicaria senegalensis*	**Description of the species:** *Persicaria senegalensis* is an erect robust perennial herb. Stems up to 3 m tall, glabrous to thickly and softly white-tomentose, sometimes rooting at the lower nodes. It is widespread in tropical Africa, South Africa, Egypt and Madagascar. The tender leaves are eaten cooked as a vegetable. Only in times of drought it is grazed by livestock. The plant is also used as a veterinary medicine in Madagascar and elsewhere. In Tanzania a black dye is prepared from the roots It occurs in damp places near and in water by dams, lakes and rivers.

 **Scientific name:** *Achyranthes aspera*	**Description of the species:** *Persicaria senegalensis* is an erect or spreading long-lived (perennial) herb which can grow up to 2 m tall. Its stems become woody at the base. It short-stalked leaves (dark green above and paler below) are opposite, simple and egg-shaped. The small greenish-white flowers form narrow, elongated terminal spikes up to 60 cm long. It occurs in most countries in the tropics and sub-tropics. Introduced, naturalised or invasive in East Africa The juice of this plant is a potent ingredient for a mixture of wall plaster.
 **Scientific name:** *Ageratum conyzoides*	**Description of the species:** *Ageratum conyzoides* is an erect, branching, soft, slightly aromatic, annual herb with shallow, fibrous roots. It grows to approximately 1 m in height. The stems and leaves are covered with fine white hairs; the leaves are egg-shaped with broad end at base (ovate) up to 7.5 cm long. The flowers are purple, blue, pinkish or white, less than 6 mm across, with around 30 to 50 flowers and arranged in close terminal flower-heads. The fruits are small brown one-seeded achenes fruits.
 **Scientificname:***Cardiospermum halicacabum*	**Description of the species:** *Cardiospermum halicacabum* is annual climber. Stems with minutely puberulous, sometimes slightly woody; tendrils present. Leaves biternate, essentially 3-foliolate with each part divided again into 3 leaflets; leaflets with coarse serrate teeth. Flowers in axillary heads, usually 3-flowered by abortion, white with a yellowish centre. Fruit a membranous, inflated capsule, green, drying to brown, more than 2 cm long. Seeds round and black with a broadly heart-shaped or kidney-shaped spot. Occurs in tropical and subtropical Africa and Asia Its habitat is moist deciduous forests, also in scrub jungles Whole plant infusion of seedling is used to clear the uterus after childbirth. Root infusion is used as a stomachic and diuretic

 **Scientific name:** *Casuarina cunninghamaina*	**Description of the species:** *Casuarina cunninghamaina)* is an attractive evergreen tree with fine greyish green needle-like foliage that grows to a height of 10–35 m.The trunk is usually erect, with dense rough bark. Flowers are reddish-brown in the male and red in the female. Cones are small, nearly round to elongated and about 10 millimetres across. The native range in Australia extends from Daly River in the Northern Territory, north and east in Queensland and eastern New South Wales Trees are usually found in sunny locations along stream banks and swampy areas. It's widely recognised as an important tree for stabilising riverbanks and for soil erosion prevention accepting wet and dry soils. The foliage is quite palatable to stock. Used as nitrogen fixing tree suitable for cultivation across a wide range of climates, extending from cool temperate areas to the seasonally dry tropics. It is considered relatively slow growing but produces outstanding fuel wood.
 **Scientific name:** *Cestrum nocturum*	**Description of the species:** *Cestrum nocturum* is an evergreen woody shrub growing to 4 m tall. The leaves are simple, narrow lanceolate, 6–20 cm long and 2–4.5 cm broad, smooth and glossy, with an entire margin. The flowers are greenish-white, with a slender tubular corolla 2–2.5 cm long with five acute lobes, 10–13 mm diameter when open at night, and are produced in cymose inflorescences. A powerful, sweet perfume is released at night. The fruit is a berry 10 mm long by 5 mm diameter, either marfil white or the color of an aubergine. There is also a variety with yellowish flowers. It is native to the West Indies, but naturalized in South Asia. it is grown in subtropical regions as an ornamental plant for its flowers that are heavily perfumed at night. It grows best in average to moist soil that is light and sandy, with a neutral pH of 6.6 to 7.5, and is hardy to hardiness zone. it can be fertilized biweekly with a weak dilution of seaweed and fish emulsion fertilizer.

 **Scientific name:** *Crotalaria spinosa*	**Description of the species:** *Crotalaria spinosa* is erect or spreading annual or short-lived perennial, 0.2–0.8 m tall. Leaflets mostly 4–15 × 1–4 mm, oblanceolate to obtriangular, truncate or emarginate; petioles c. 2–8 mm long. Calyx 2.5–3 mm long. Keel 4–6 mm long. Pods 7.5–9 × 3.5–5 mm, oblong-obovoid, c. 6–8-seeded. Principally along and between the Western and Great Rift Valleys northwards to Ethiopia, but also in Angola, and with scattered modern records in other parts of tropical Africa. Grassland and disturbed places, usually in sites with a high water-table or catchment areas of local run-off
 **Scientific name:** *Datura stramonium*	**Description of the species:** *Datura stramonium* is a foul-smelling, erect, annual, freely branching herb that forms a bush up to 60 to 150 cm tall It is native to North America, but was spread to the Old World early. Today, it grows wild in all the world's warm and moderate regions, where it is found along roadsides and at dung-rich livestock enclosures. It is found as a weed on wastelands and in garbage dumps.
 **Scientific name:** *Eucalyptus tereticornis*	**Description of the species:** *Datura stramonium* tree grows to a height of 20 to 50 m with a girth of up to 2 m. The trunk is straight and is usually un-branched for more than half of the total height of the tree. The species has a wide distribution, occurring over the widest range of latitudes of any Eucalyptus species: from southern Papua New Guinea at latitude 15°S, to southeastern Victoria at latitude 38°S. The forest red gum is one of the key canopy species of the threatened Cumberland Plain Woodlands. The tree has a strong, hard and durable heartwood. It is used for construction in heavy engineering, such as for railway sleepers. The leaves of E. tereticornis are used in the production of cineole based eucalyptus oil.

 **Scientific name:** *Heliotropium supinum*	**Description of the species:** *Heliotropium supinum* is a prostrate or decumbent, annual plant, usually with 4 main stems rising in a cross; the stems are up to 35cm long.The plant is harvested from the wild for local use as a medicine. Southern Europe; drier areas of Africa; eastern Mediterranean; E. Asia - Pakistan, India. On heavy black or brown soils in dried-up water holes and pools, at elevations from 250 - 1,350 metres.
 **Scientific name:** *Lagera crispate*	**Description of the species:** *Lagera crispate s*tout annual much-branched herb up to 2 m tall; stems and main branches often distinctly winged. Inflorescence in a large lax panicle, the involucral bracts with pointed scales; capitula pink. The whole plant is covered in sticky glands. Throughout tropical Africa and South Africa. A widespread species of various types of open woodland, also as a weed of cultivation and disturbed land.
 **Scientific name:** *Leucas martinicensis*	**Description of the species:** *Leucas martinicensis* erect annual herb, up to 1m. Usually unbranched stems, finely hairy. Leaves opposite, ovate to ovate-lanceolate, margins coarsely serrate-crenate. Inflorescence of several spaced, many-flowered verticils with long thistle-like calyx teeth. Flowers small, white. It occurs in Madagascar Africa & Madagascar - South Africa Asia – Burma Its habitat is tropical waste woodland growth
 **Scientific name:** *Nerium oleander*	**Description of the species:** *Nerium oleander is e*vergreen shrub or small tree with thick, gummy, clear sap; leaves opposite or whorled, simple, leathery, with smooth margins and conspicuous pinnate veins; flowers clustered at tip of twigs, 5-parted, funnel-shaped, white, pink, red, or yellow;

 **Scientific name:** *Plantago lanceolata*	**Description of the species:** *Plantago lanceolata* is a rosette-forming perennial herb, with leafless, silky, hairy flower stems (10–40 cm. The basal leaves are lanceolate spreading or erect, scarcely toothed with 3-5 strong parallel veins narrowed to short petiole. Grouping leaf stalk deeply furrowed, ending in an ovoid inflorescence of many small flowers each with a pointed bract. Each flower can produce up to two seeds. Its habitat is farmland and settlements. Plantago lanceolata, can live anywhere from very dry meadows to places similar to a rain forest It is native to Eurasia, but has been introduced to North America and many other parts of the world with suitable habitats.
 **Scientific name:** *Ricinus communis*	**Description of the species:** *Ricinus communis* is a fast-growing, suckering perennial shrub that can reach the size of a small tree (around 12 metres , but it is not cold hardy. **Its habitat is farmland and settlements**. Although castor is indigenous to the southeastern Mediterranean Basin, Eastern Africa, and India, today it is widespread throughout tropical regions.
 **Scientific name:** *Salix mucronata*	**Description of the species:** *Salix mucronata* is deciduous shrub or small tree. Leaves linear-elliptic when young, sometimes obovate-elliptic when mature, bright green above, whitish beneath; margin finely serrate. Flowers in catkin-like spikes, sexes separate on different trees. Fruit a capsule, splitting lengthwise to release tufted windborne seeds. The light, soft wood is used for making: rafters of houses mortars for grinding maize bowls and jugs, which are smeared with fat to prevent cracking musical instruments such as drums and fiddles brake-blocks for sleds. Its habitat is Riverine
 **Scientific name:** *Senna didymobotrya*	**Description of the species:** *Senna didymobotrya* is a hairy, aromatic shrub usually growing up to about five meters tall but known to reach nine meters at times. The plant flowers plentifully in racemes of bright yellow flowers, with some flowers also occurring in leaf axils. The plant is poisonous. It is native to Africa, where it can be found across the continent in several types of habitat. It has been introduced to many other parts of the world for use as an ornamental plant, a cover crop and a leguminous green manure. In some places it is now naturalized in the wild, for example, in parts of

	Indonesia, Australia, Mexico, and the United States in California, Florida, and Hawaii. Its habitat is farmland and settlements In Kenya, some cultures use it to prepare a special type of sour milk which is used mainly during festivities - being used for this purpose casts doubt on its toxicity
 **Scientific name:** *Solanum incanum*	**Description of the species:** *Solanum incanum* is a herb or soft wooded shrub up to 1.8 m in height with spines on the stem, stalks and calyces and with velvet hairs on the leaves. Spread from seed in dumped garden waste, and by birds and other animals. A species of nightshade that is native to Sub-Saharan Africa and the Middle East, eastwards to India Mostly as a weed of disturbed and overgrazed areas and road sides, but also found in various types of woodland, and along the margins of riverine and evergreen forest.
 **Scientific name:** *Sphaeranthus suaveolens*	**Description of the species:** *Sphaeranthus suaveolens* is widespread in East Africa over a range of altitudes. It occurs in farmland and settlements Leaf is lanceolate, up to 4 in. long by 1.5in wide, pointed at the tip, toothed margin, stalkless with blade continuing down into the wings of the stem. A weed invasive and often alien species of cultivated lands and waste areas.

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