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***TECHNICAL BULLETIN No.24***  
***A simple guide to identification of  
rangeland plants***



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## FOREWORD

This technical bulletin titled “*A simple guide to identification of rangeland plants*” is the 24<sup>th</sup> in a series produced by the Ethiopia Sheep and Goat Productivity Improvement Program (ESGPIP). The ESGPIP is a USAID funded Project with the objective of improving the productivity of sheep and goats in Ethiopia.

People and livestock in rangeland areas depend on rangeland plants for their livelihoods. The management of these resources needs to be optimized to maximize benefits. Identification of range plants is important for management strategies, as well as recognizing the positive and/or negative characteristics of different species. This can be done with varying degrees of accuracy and sophistication ranging from identifying a species by common name to identifying a plant by its scientific name.

Guidelines for simple identification of range plants are outlined in this bulletin. The information contained in this bulletin is useful for development agents to identify range plants to base management decisions.

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# A SIMPLE GUIDE TO IDENTIFICATION OF RANGELANDS PLANTS

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## 1. INTRODUCTION

Rangeland plants in Ethiopia provide various benefits to pastoral and agro-pastoral communities. These plants are sources of food, medicine and shelter for the communities and livestock.

Identification of range plants is important for management strategies, as well as recognizing the positive and/or negative characteristics of different species. Whenever possible, identifying a plant by its scientific name is preferred. If that is not possible, common names can be used with caution. Quite often, common names for the same species vary from place to place, and the same common name may refer to totally different species. Local people identify plants by their common names. Thus, inclusion of common names has practical applications.

## 2. RANGELAND VEGETATION

The rangelands of Ethiopia comprise different genera of plants; mainly bush land, grassland, bushed and wooded grassland. These species may be annuals, biennials and perennials with different degrees of palatability and uses. However, they are valuable feed resources and are the basic assets for the production of existing livestock. Plants are normally classified and categorized according to their characteristics and similarities.

Plants with the same genus have similar characteristics and can be easily distinguished from those of other genera. The scientific name of plants consists of two words making up a botanical binomial. For example, in the scientific names *Chloris gayana* and *Cynodon dactylon*, *Chloris* and *Cynodon* are genus names while *gayana* and *dactylon* are the species names.

### 2.1. GRASSES

Grasses in the world are grouped into 620 genera with nearly 10,000 species (Willis, 1973). They have a wider range of adaptation than any other family of flowering plants grown in different agro-ecological zones. Similarly, annual or perennial grasses in the rangelands of Ethiopia are grown widely providing good sources of animal feed at all times of the year.

Based on the embryo structure within the seed, grasses are classified as monocotyledons while legumes as dicotyledons. The organs of grasses are stems, roots and leaves. The inflorescence (flower) and fruits are made from modified stems and leaves. Leaves are borne on the stem, one at each node, but are projected alternately in two rows on opposite sides of the stem. The leaf consists of a sheath, blade and ligules. The unit of a grass inflorescence is the spikelet. Spikelets occur in groups or clusters, collectively termed the inflorescence.

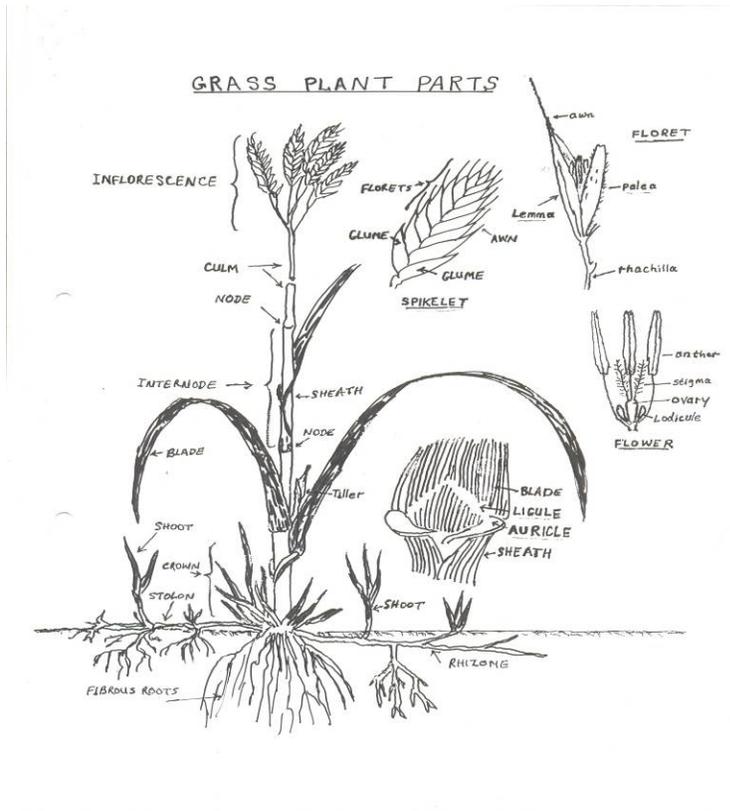


Figure 1. Typical parts of grass (*gramineae*) species

## 2.2. LEGUMES

There are nearly 600 genera and 12,200 species of legumes worldwide (Willies, 1973). Legumes have a narrower range of adaptation and usually require a higher management level than grasses. Leguminous plants are dicotyledons and may be annuals, biennials or perennials. Most legume plants grow symbiotically with rhizobium bacteria that form nodules on the roots. These bacteria use plant carbohydrates to reduce atmospheric nitrogen making it available to the plant. Legumes are valuable components in forage mixtures, as well as in crop rotations, to decrease dependence on nitrogen fertilizers. Legume leaves are arranged alternately and have large stipules or appendages located near the junction of the stem and petioles. Leaf blades connect to the stem by petioles. Stems of legumes vary greatly between species in length, size, amount of branching and woodiness.

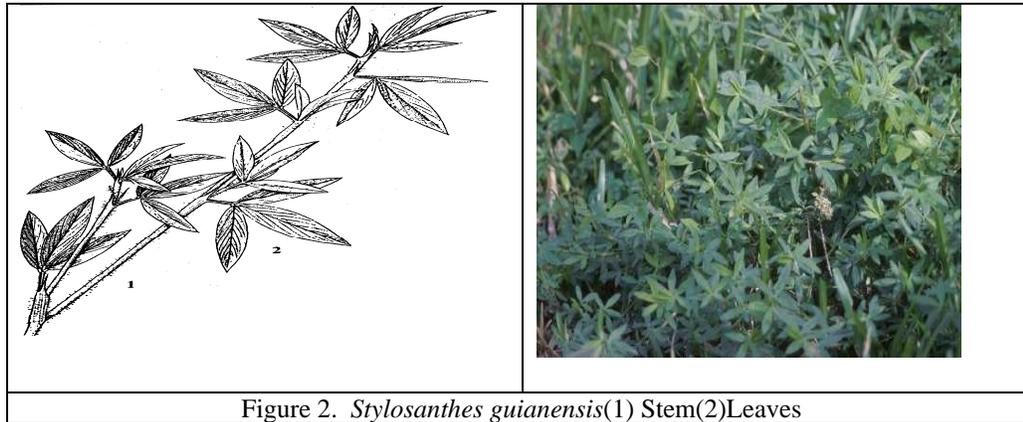


Figure 2. *Stylosanthes guianensis*(1) Stem(2)Leaves

### 2.3. BROWSE (Bushes and trees)

Browse is often considered to be leaves and twigs of shrubs and trees available for animal consumption. Most browse species are leguminous, thus browse is considered a good source of protein. Browse may be the natural growth of plants or the re-growth of sprouts after cutting near ground level. Woody branches can be cut or lopped from taller shrubs and trees, thus falling to the ground, where the twigs, seeds, pods and even the bark are eaten. Herbage from trees and shrubs plays multiple roles in rangeland environments exploited by man and his animals. Bushes and trees are becoming increasingly important as dry seasons grow longer and forage becomes scarce. In addition, browse stands offer a new opportunity for improving soil and microclimatic and livestock production conditions. Pastoralists use the existing bushes and trees for browse, fuel wood, constructing houses, corals, fences, food and medicines.



Figure 3. Goats browsing (Picture by Aster Abebe)

### **3. PRINCIPLES OF IDENTIFYING RANGELAND PLANTS**

The science of plant classification includes the identification, nomenclature and classification of objects of biological origin often referred to as systematic Botany. Before man could study the structures of plants and their growth or could accurately record data about plants, he had to know the names and characteristics of those plants. For differentiating and naming plants, man has grouped plants together according to their similarities.

Today, any one dealing with plants in any way depends on the identification efforts of taxonomists. A range manager in the pastoral areas is not expected to be a grass or legume specialist; however, he should be able to recognize different forage species and know their similarities, differences, common names and uses. In order to understand plant taxonomy, one must know what is meant by identification, nomenclature and classification.

#### **3.1. Identification:**

Identification is the determination of taxonomy as being identical with or similar to another already known plant. If someone tells you the common name of a plant, then he has identified it with some degree of accuracy. A plant may be identified with the aid of books, manuals, or by comparing it with previously identified plants or specimens. These could be herbarium specimens or living plants.

#### **3.2. Nomenclature:**

Nomenclature is the determination of the correct name of a known plant according to the nomenclature system. It is the part of taxonomy that tells us how to go about the determination of what name is correct, whether a particular name is only a synonym, or whether it has no standing at all. Botanical nomenclature deals only with the Latin names of plants. Therefore, nomenclature is the correct naming of the plant that has been identified.

#### **3.3. Classification:**

Classification is the placing of a plant (or group of plants) in categories according to a particular system, and in conformity with a nomenclatural system. A simple system of classification is that which divides plants into groups such as trees, shrubs and herbs. Classification is a grouping together of those plants whose similarities are greater than their differences. Modern systems of classification attempt to align the various groups of plants in accordance with their presumed relationships.

## 4. METHODS AND PROCEDURES OF IDENTIFYING RANGELAND PLANTS

### 4.1. Uses of plant specimen collection

The prime purposes of plant specimen collection in the field are the following:

- To preserve them in a herbarium with relevant notes. The attached note will provide maximum information about the plants.
- To identify and get information about the plant/plants for different purposes.

### 4.2. How to collect and preserve plant specimen

#### 4.2.1. Materials required

The essential items needed for plant specimen collecting in the field are few and can be modified to meet different field conditions and individual requirements.

*Plant press* – consists of two frames in which fresh specimens are pressed flat and quickly dried. The top and bottom frames of the press are usually 30 by 45 cm composed of thin strong pieces of wood laid at right angles to one another.

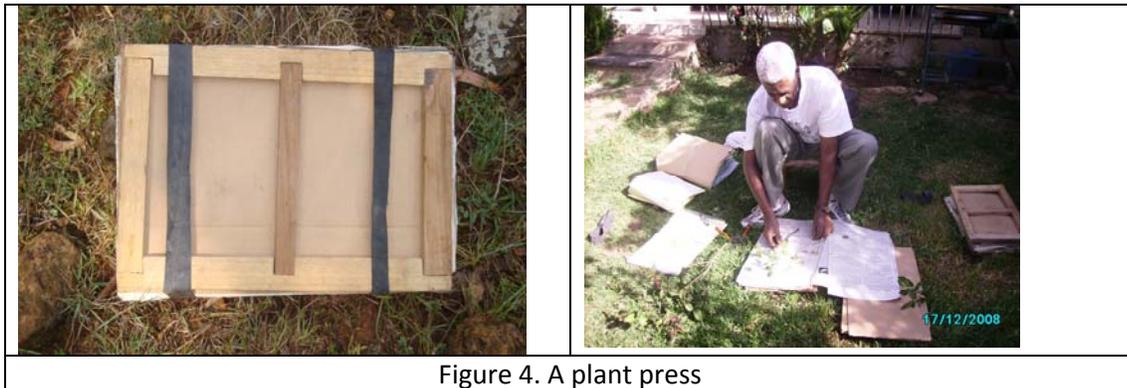


Figure 4. A plant press

*Cutter or sheath knife* – Used to cut and shape the desired part of grass, bush and tree specimens collected from the field.

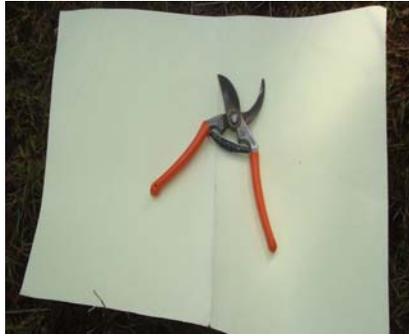


Figure 5. Plant pruning Scissors

**Field notebook** – It is a pocket sized note book used to record relevant data at the time of collection. The information gathered includes the field number of the specimen, locality, habitat, date of collection, name of the plant if known (common or scientific), flower, color, size of the plant (if it is too large to be preserved), its abundance, variations observed, altitude of the area, etc. A number series, once started, should be continuous throughout the life of the collector so that no confusion arises when specimens are referred to by the collector's number. Numbers corresponding to those in field notebooks should be written on the papers containing the specimens in the field and never on separate slips of papers as these may be lost or become detached from the specimens. Careful workers sometimes keep duplicate records using one book for field use with another book remaining at home in which the same data are copied from the field book as soon as possible after collection. Such a system ensures against loss of older records in case anything happens to the field book.

**Plastic bags** – Plastic bags make excellent containers for collecting fresh plants in the field. They prevent loss of moisture when closed securely until specimens are transferred to the plant press. It is not always convenient to press plants as they are collected.

**Digger** – During collecting of herbaceous plants, it is essential that the underground parts be made a part of the specimen. The kind of root system and the presence or absence of rhizomes, bulbs or other parts constitute valuable diagnostic characters for identification.

#### 4.2.2. Specimen collection procedures:

As discussed, plant specimen collection requires care and systematic procedures. Following these procedures will ensure consistent and complete plant specimen and relevant data collection.

		
Figure 6. Cutting browse plant sample for mounting	Figure 7. Cutting & Shaping the specimen	Figure 8. Mounting the specimen
		
Figure 9. Taking notes about the specimen	Figure 10. Pressing the specimen	Figure 11. Pressed specimen
		
	Figure 12. Specimen collected and mounted in 1972 (Around Yabello)	

- A good specimen should include flower, fruits/pods or thorns, and in some cases include bark or roots. In the case of grasses or herbaceous plants, the specimen should contain the full inflorescence and root of the plants.
- The minimum amount collected from each specimen should be sufficient to fill two herbarium sheets approximately about the size of a big Newspaper (e.g. Herald/Addis Zemen) folded in half (20cm × 41cm)
- In most cases, collect three samples from each plant as one will remain with the collector, one for a local herbarium (if one exists), and the third will remain at a verifying Herbarium.

After a specimen has been scientifically identified, mount it properly on hard paper (could be filing paper) with a label on the right side of the bottom, describing relevant information on the plant. A sample label is shown below:

<b>Sample Label</b>		No _____
Flora of _____	Region _____	
Botanical name _____		
Common name _____		
Locality _____	Woreda _____	
Altitude _____ meters above sea level		
Soil type _____		
Habitat		
_____		
_____		
_____		
Description		
_____		
_____		
_____		
Collector's Name _____		Date _____

## 5. ROLES OF DEVELOPMENT AGENTS

- Identify the pastoral/agro-pastoral leaders and progressive community members and create a close working linkage.
- Discuss their indigenous knowledge (without undermining) regarding the various uses of range plants and record the points for future use.
- Record names of valuable plant species, local names at a minimum, that are used for livestock feed and other purposes and have them identified scientifically (Addis Ababa University, Plant Taxonomists, Plant Identification books, and other possible references) in order to know their uses and problems.
- Conduct an assessment of dry and wet season grazing area vegetation types and resources to obtain a good picture of the potential and problems. Do this through repeated discussions with community representatives and, if possible, by visual assessment. Give emphasis to the following components:
  - Status of grazing and browsing resources.
  - Problems regarding the use of resources.
- Take appropriate action for the identified problems.
- Mobilize the community to clear undesirable plant species at early growth stages (e.g., *Parthenium*, *Prosopis*, etc.). Have elders and progressive pastoralists participate during the implementation.

## 6. SUMMARY

This technical bulletin focuses on the principles, methods and procedures of identifying rangeland plants. Identification of rangeland plants is important in the improvement of rangeland areas.

## 7. GLOSSARY OF TERMS

**Annual:** A plant whose life cycle is complete in a single growing season

**Biennial:** A plant that ordinarily requires two years, or at least part of two seasons, with a dormant period between growth stage, to complete its life cycle.

**Binomial:** The naming of plants by two names, one for genus and the other for species.

**Blade:** The broad expanded part of a leaf.

**Browse:** Young twigs, leaves and shoots of woody species that are eaten by animals.

**Bush:** A general term for low tree-high grass vegetation occurring in semi-arid or seasonally arid regions.

**Dicotyledon:** Flowering plants with two seed leaves (cotyledons).

**Dominant:** The chief constituent or controlling specie of a plant community.

**Family:** A category of classification in grasses and legumes, above a tribe and below an order.

**Genus:** A category of classification above a species and below a family.

**Grass:** Member of the Gramineae family.

**Habitat:** The place or environment where a plant or animal naturally or normally lives and grows.

**Herb (herbaceous):** Non-woody plants (as grasses).

**Inflorescence (head):** A group of flowers usually set apart from the foliage leaves.

**Legume:** A pod-bearing and nitrogen fixing member of the Leguminosae family, one of the most important and widely distributed plant families. Included are many valuable food and forage species.

**Ligule:** Small outgrowth from the top of the leaf sheath.

**Monocotyledon:** Any flowering plant having an embryo containing only one seed leaf.

**Node:** The origin of the stem where one or more leaves are attached.

**Nodule:** A small knot or joint on a stem or root containing nitrogen fixing bacteria.

**Panicle:** An open, branching inflorescence bearing several flowers.

**Perennials:** Plants that lives for three or more years and that normally flowers and fruits at least in its second and subsequent years.

**Petiole:** A stalk that supports a leaf

**Pod:** A dry fruit or seed vessel developed from a single carpel enclosing one or more seeds and splitting usually along two sutures at maturity.

**Rhizome:** An underground stem of root-like appearance, distinguished from roots by the presence of nodes and inter-nodes.

**Species:** A unit of classification consisting of a group of closely related individuals.

**Spike:** An inflorescence with the flowers of spikelet sessile on an undivided, long axis.

**Spikelet:** The ultimate unit of the compound inflorescence of grasses and sedges; composed of a cluster of one or more flowers.

**Stem:** The main upward growing axis of a plant, having nodes and bearing leaves.

**Taxonomy:** The science of classifying living things (animal & plants) according to their relationships with other organisms.

**Tree:** A woody plant that produces one main trunk or bale and a more or less distinct and elevated head.

**Tribe:** Sub-division of a family, superior to a genus.

**Twig:** A small shoot or branch.

### Appendix 1. Major plants of the rangelands of Ethiopia (Afar, Somali and Borena)

Botanical name	Vernacular/Common Name			Habitat	Degree of palatability/uses
	Afar	Somali	Borena		
<b>Grasses</b>					
<i>Andropogon canaliculatus</i>	Melif	-	Gaja	Seasonally flooded areas up to 1500m.a.s.l	Medium to low grazing value
<i>Aristida spp.</i>	Halbaito	-	-	Poor sandy soils	Low grazing value
<i>Cymbopogon pospischilii</i>	Issusu	-	-	Stony soils	Less palatable
<i>Chrysopogon aucheri</i>	Durfu	Daremo	Sumaro	Open grassland	Very palatable grass
<i>Chrysopogon plumulosus</i>	Durfu	Daremo	Sumaro	Dry grassland up to 1700m.a.s.l	Medium grazing value
<i>Cynodon spp</i>	Irareyta	Serdi	Sardo	Arable land up to 2400m.a.s.l	Good to excellent forage
<i>Dactyloctenium aegyptium</i>	Afar-amule	Medhabur	Makwalla	Sandy soils of bushed areas	Palatable grass of seasonal importance
<i>Eragrostis cylindriflora</i>	Denikto	Harfu burmedo	-	Dry soils up to 1500m.a.s.l	Low grazing value
<i>Sporobolus consimilis</i>	Hamilto	-	Sampille	Wet grassland on alkaline or saline soils	Low grazing value
<i>S. pyramidalis</i>	Hamilto	-	Sampille	Grassland, bush and forest edge	Low grazing value
<b>Herbs</b>					
<i>Blepharis persica</i>	Yamarukta	Yamaruk	Kurumshit	Dry and moist Kolla	Valuable seasonal feed for camels & sheep and goats
<i>Tribulus terrestris</i>	Bunket	-	Kumudo	Dry & moist Kolla up to 1500m.a.s.l	Valuable seasonal herbage for all grazing species
<b>Bushes and trees</b>					
<i>Acacia etbaica</i>	-	Sogsog	Alakabes	Dry & moist Kolla 800-1800m.a.s.l	Firewood, charcoal, timber and fodder
<i>Acacia nilotica</i>	Keselto	Agabo/Dugar/Harah	-	River valleys of dry & moist Kolla 600-1700m.a.s.l	Use firewood, charcoal, fodder (leaves & pods)
<i>Acacia bussie</i>	-	Galol	Hallo	Dry, moist Kolla & woina dega	Firewood, charcoal & fodder
<i>Acacia oerfota (A. nubica)</i>	Gerento	Gumaro	Wangay	Dry, moist Kolla & bereha 100-1600m.a.s.l	Fodder, gum & firewood
<i>Acacia mellifera</i>	Merkato	Bilel/Hadad	Sebensa/Sebensa Gurach	Up land wood land & scrub	Firewood & fodder
<i>Acacia Senegal</i>	Adado	Adad	Idado/Sebensedima	Well drained soils of dry & moist	Fodder, gum & fire wood

				Kolla 600-1700m.a.s.l	
<i>Acacia seyal</i>	-	Fulay/Gek	Wosiyawayo/wakodimo	River valley & wooded grassland of dry & woina dega	Firewood, charcoal & fodder
<i>Acacia tortilis</i>	Eibeto	Kura	Lotoba/Tedecha	Dry & moist Kolla & woina dega 600-1900m.a.s.l	Firewood, charcoal, posts & fodder (leaves & pods)
<i>Balanites aegyptiaca</i>	Udda	Gut	Bedena	Dry & moist Kolla, 700-1800m.a.s.l	Firewood, medicine (root, fruit & bark) fodder (shoots & fruits)
<i>Cadaba farinosa</i>	Ududo	Tuch	Kadi	Dry & moist Kolla,	Medicinal value & fodder
<i>Dobera glabra</i>	Gersa	Geres	Gerse	Rocky hill sides in dry areas & saline, heavy, or calcareous loam soils of dry & moist Kolla, 400-1300m.a.s.l	Firewood, timber & fodder
<i>Grewia villosa</i>	Habeli/Garounaito	-	Ogumdi	River banks liable to flooding 800-1800m.a.s.l	Firewood, food (fruit), fodder & fiber (bark)
<i>Tamarix aphylla</i>	Segento	Dur	-	Dry & moist Kolla	Low forage value
<i>Terminalia brownii</i>	-	Bires	Baressa	Wood land, bush land, grassland & riverine forest, 700-2000m.a.s.l	Firewood, charcoal & fodder
<i>Ziziphus mucronata</i>	Kusratio	Edi-shbel/Gobyer	Ado-kurkura	Dry & moist Kolla 400-1600m.a.s.l	Firewood, charcoal, food (fruit), fodder (fruit & leaves)