KRISHNENDU DAS

SEMESTER – II

MULBERRY CROP PROTECTION (UNIT 3)

VERMICOMPOST:

Vermicompost (**vermi-compost**, **vermiculture**) is the product of the decomposition process using various species of worms, usually red wigglers, white worms, and other earthworms, to create a mixture of decomposing vegetable or food waste, bedding materials, and vermicast.

Vermicast (also called worm castings, worm humus, worm manure, or worm faeces) is the end-product of the breakdown of organic matter by earthworms.[1] These castings have been shown to contain reduced levels of contaminants and a higher saturation of nutrients than the organic materials before vermicomposting.

Vermicompost contains water-soluble nutrients and is an excellent, nutrient-rich organic fertilizer and soil conditioner.It is used in farming and small scale sustainable, organic farming.

Vermicomposting can also be applied for treatment of sewage.A variation of the process is vermifiltration (or vermidigestion) which is used to remove organic matter, pathogens and oxygen demand from wastewater or directly from blackwater of flush toilets.

Small-scale or home systems

Such systems usually use kitchen and garden waste, using "earthworms and other microorganisms to digest organic wastes, such as kitchen scraps".This includes:

- All fruits and vegetables (including citrus, in limited quantities)
- Vegetable and fruit peels and ends
- Coffee grounds and filters
- Tea bags (even those with high tannin levels)
- Grains such as bread, cracker and cereal (including moldy and stale)
- Eggshells (rinsed off)
- Leaves and grass clippings (not sprayed with pesticides)
- Newspapers (most inks used in newspapers are not toxic)
- Paper toweling (which has not been used with cleaners or chemicals)

Large-scale or commercial

Such vermicomposting systems need reliable sources of large quantities of food. Systems presently operatinguse:

- Dairy cow or pig manure
- Sewage sludge
- Brewery waste
- Cotton mill waste
- Agricultural waste
- Food processing and grocery waste
- Cafeteria waste
- Grass clippings and wood chips

Properties

Vermicompost has been shown to be richer in many nutrients than compost produced by other composting methods.It has also outperformed a commercial plant medium with nutrients added, but levels of magnesium required adjustment, as did pH.

However, in one study it has been found that homemade backyard vermicompost was lower in microbial biomass, soil microbial activity, and yield of a species of ryegrassthan municipal compost.

It is rich in microbial life which converts nutrients already present in the soil into plant-available forms.

Unlike other compost, worm castings also contain worm mucus which helps prevent nutrients from washing away with the first watering and holds moisture better than plain soil.

Increases in the total nitrogen content in vermicompost, an increase in available nitrogen and phosphorus, as well as the increased removal of heavy metals from sludge and soil have been reported.The reduction in the bioavailability of heavy metals has been observed in a number of studies.

Benefits

Soil

- Improves soil aeration
- Enriches soil with micro-organisms (adding enzymes such as phosphatase and cellulase)
- Microbial activity in worm castings is 10 to 20 times higher than in the soil and organic matter that the worm ingests
- Attracts deep-burrowing earthworms already present in the soil
- Improves water holding capacity

Plant growth

- Enhances germination, plant growth, and crop yield
- Improves root growth and structure
- Enriches soil with micro-organisms (adding plant hormones such as auxins and gibberellic acid)

Economic

- Biowastes conversion reduces waste flow to landfills
- Elimination of biowastes from the waste stream reduces contamination of other recyclables collected in a single bin (a common problem in communities practicing single-stream recycling)
- Creates low-skill jobs at local level
- Low capital investment and relatively simple technologies make vermicomposting practical for less-developed agricultural regions

Environmental

- Helps to close the "metabolic gap" through recycling waste on-site
- Large systems often use temperature control and mechanized harvesting, however other equipment is relatively simple and does not wear out quickly
- Production reduces greenhouse gas emissions such as methane and nitric oxide (produced in landfills or incinerators when not composted).

Uses

Soil conditioner

Vermicompost can be mixed directly into the soil, or mixed with water to make a liquid fertilizer known as worm tea.

The dark brown waste liquid, or leachate, that drains into the bottom of some vermicomposting systems is not to be confused with worm tea. It is an uncomposted byproduct from when water-rich foods break down and may contain pathogens and toxins. It is best discarded or applied back to the bin when added moisture is needed for further processing.

The pH, nutrient, and microbial content of these fertilizers varies upon the inputs fed to worms. Pulverized limestone, or calcium carbonate can be added to the system to raise the pH.

WEEDING:

A **weed** is a plant considered undesirable in a particular situation, "a plant in the wrong place". Examples commonly are plants unwanted in human-controlled settings, such as farm fields, gardens, lawns, and parks. Taxonomically, the term "weed" has no botanical significance, because a plant that is a weed in one context is *not* a weed when growing in a situation where it *is* in fact wanted, and where one species of plant is a valuable crop plant, another species in the same genus might be a serious weed, such as a wild bramble growing among cultivated loganberries. In the same way, volunteer crops (plants) are regarded as weeds in a subsequent crop. Many plants that people widely regard as weeds also are intentionally grown in gardens and other cultivated settings, in which case they are sometimes called beneficial weeds. The term *weed* also is applied to any plant that grows or reproduces aggressively, or is invasive outside its native habitat. More broadly "weed" occasionally is applied pejoratively to species outside the plant kingdom, species that can survive in diverse environments and reproduce quickly; in this sense it has even been applied to humans.

Weed control is important in agriculture. Methods include hand cultivation with hoes, powered cultivation with cultivators, smothering with mulch or soil solarization, lethal wilting with high heat, burning, or chemical attack with herbicides.

Plants often considered to be weeds

Weed Flora

The common weed flora in the mulberry garden is given below.

Botanical name	Tamil name	English name
1. MONOCOTYLEDONOUS WEEDS (Grassy weeds)		
Cyperus rotundus	Korai	Nut grass
Cynodon dactylon	Arugampull	Bermuda grass
2. DICOTYLEDONOUS WEEDS (Broad leaves)		
Abutilon indicum	Thuthi	Velvet leaf
Amaranthus viridis	Kuppaikeerai	Pig weed
Acalypha indica	Kuppaimeni	Copper leaf
Boerhaevia diffusa	Mookaratai	Hog weed
Croton sparsiflorus	Milakai poondu	Croton
Parthenium hysterophorus	Vizhachedi	Carrot grass
Trianthema portulacastrum	Saranai	Carpet grass
Tridax procumbens	Manjapoo	Tridax

Integrated Weed Management
Cultural method

- Remove the stubbles and roots of weeds while preparing the land
- Use well decomposed manure to avoid dissemination of weeds
- Clean the implements before use

Mechanical method

- Operate country plough after pruning in the interspace
- Remove the weeds by hand hoe

Chemical method

- As post-emergence application, use Paraquat (Grammoxone) @ 2-3 lit/ha.
- Spray Glycel 7.5 ml with 10 grams of ammonium sulphate per litre of water as post-emergence application. A total of 600 litres of spray fluid is required/ha.
- Use flooding / deflector / fan type nozzle for spraying weedicide. Apply the weedicide immediately after pruning or within 2-3 days after pruning.

Cultural methods

Stale seed bed

Another manual technique is the 'stale seed bed', which involves cultivating the soil, then leaving it fallow for a week or so. When the initial weeds sprout, the grower lightly hoes them away before planting the desired crop. However, even a freshly cleared bed is susceptible to airborne seed from elsewhere, as well as seed carried by passing animals on their fur, or from imported manure.

Buried drip irrigation

Buried drip irrigation involves burying drip tape in the subsurface near the planting bed, thereby limiting weeds access to water while also allowing crops to obtain moisture. It is most effective during dry periods.

Crop rotation

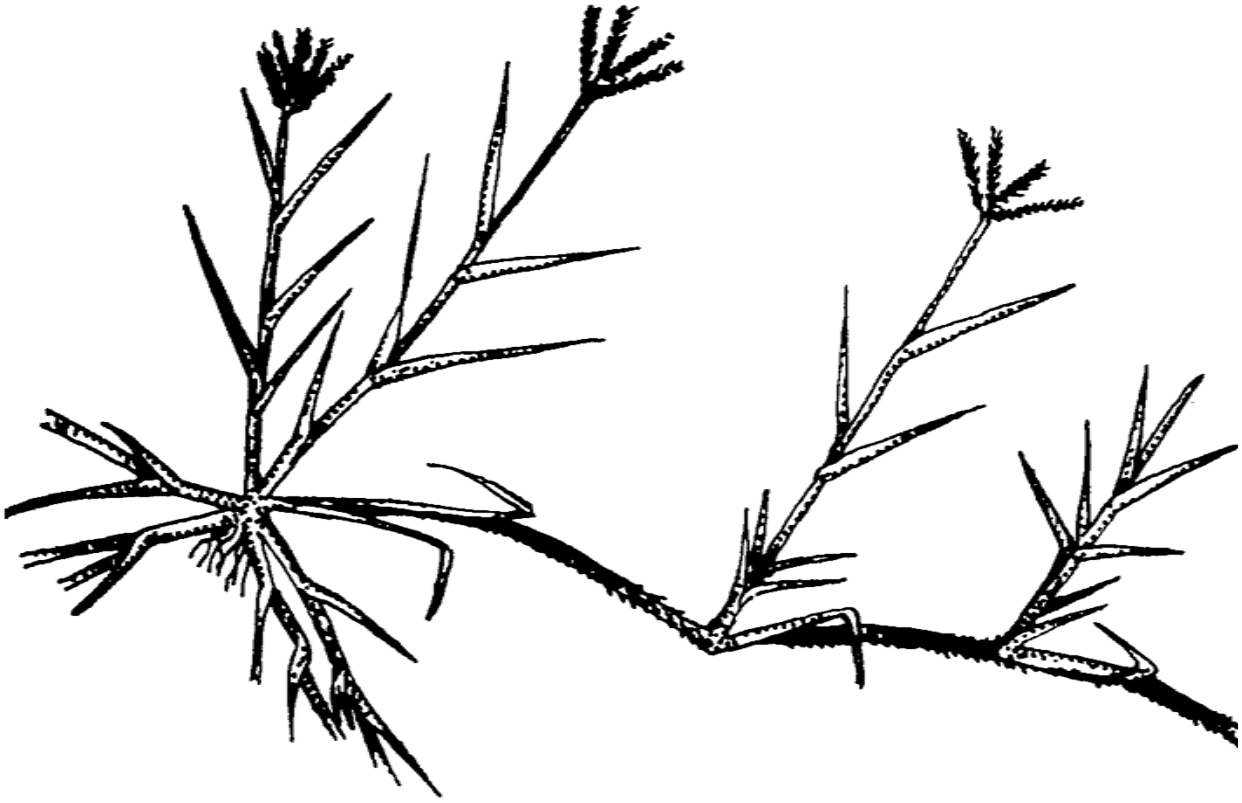
Rotating crops with ones that kill weeds by choking them out, such as hemp, Mucuna pruriens, and other crops, can be a very effective method of weed control. It is a way to avoid the use of herbicides, and to gain the benefits of crop rotation.

Biological methods

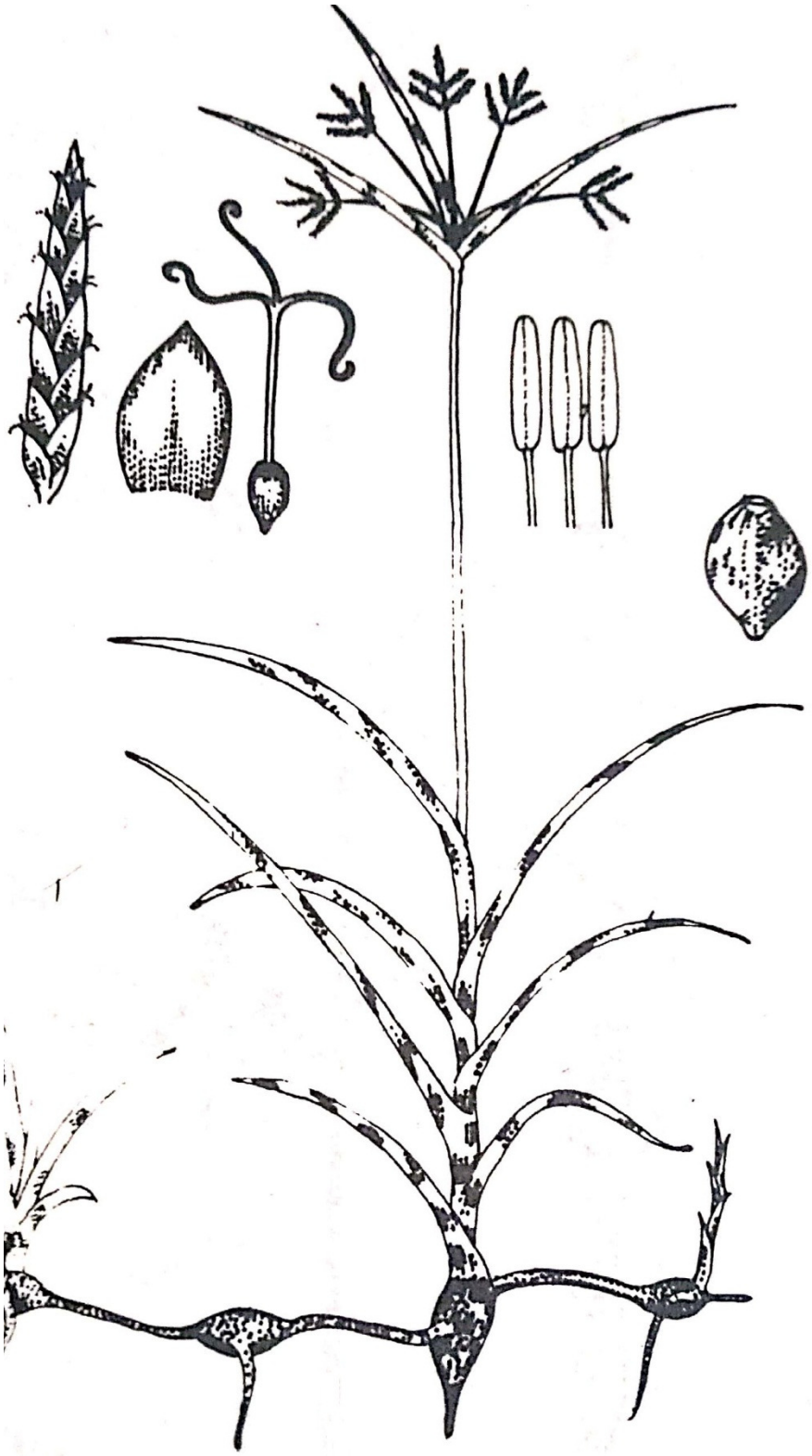
A biological weed control regiment can consist of biological control agents, bioherbicides, use of grazing animals, and protection of natural predators.Post-dispersal, weed seed predators, like ground beetles and small vertebrates, can substantially contribute to the weed regulation by removing weed seeds from the soil surface and thus reduce seed bank size. Several studies provided evidence for the role of invertebrates to the biological control of weeds

Animal grazing

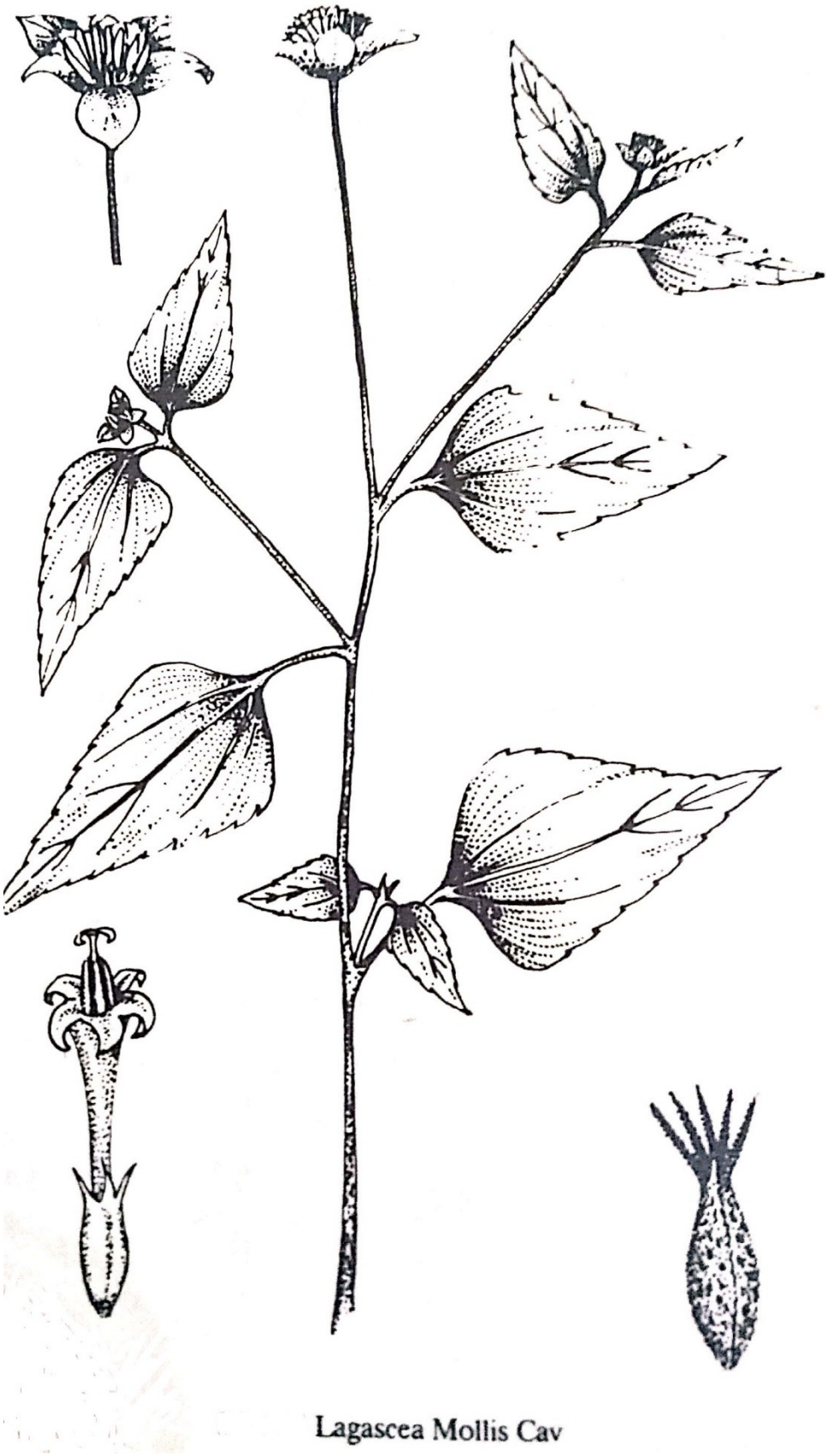
Companies using goats to control and eradicate leafy spurge, knapweed, and other toxic weeds have sprouted across the American West.



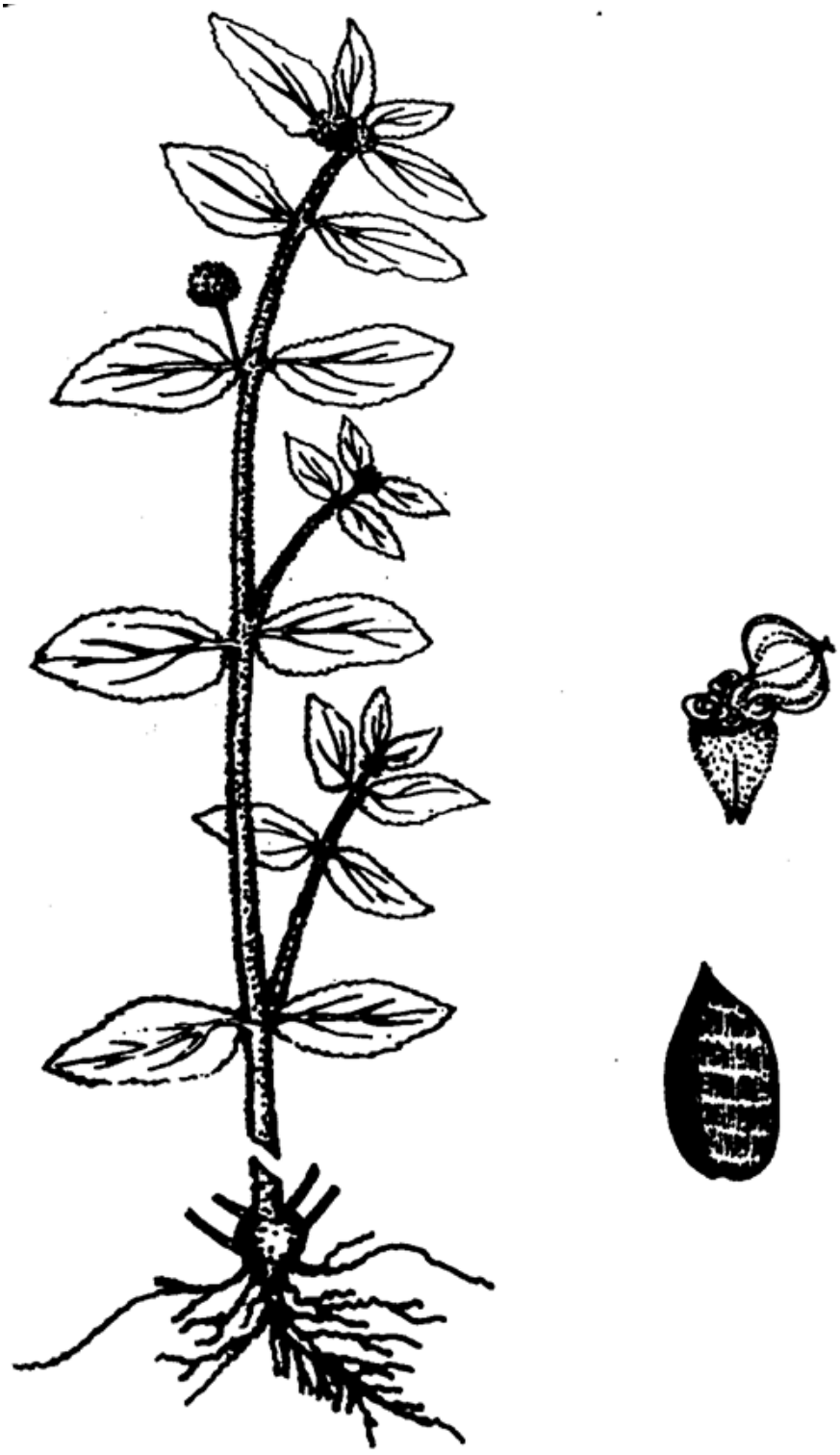
Cynodon Dactylon Pers Bahama Grass or Hariyali



Cyperus Rotundus Nutgrass Nutsedge



Lagascea Mollis Cav



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