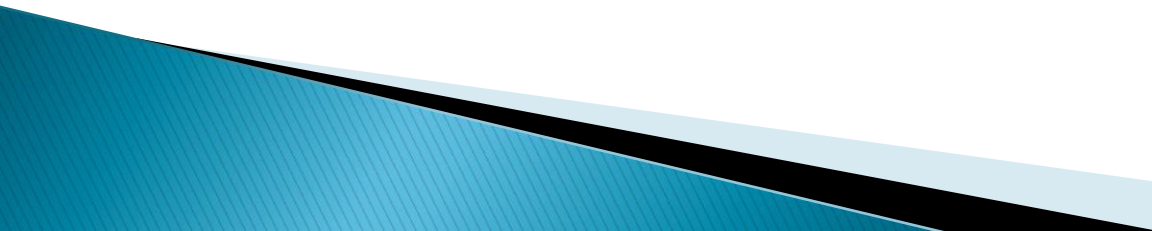


FACTORS AFFECTING ON CULTIVATION OF MEDICINAL PLANTS

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FACTORS AFFECTING ON CULTIVATION

- ALTITUDE, TEMPERATURE AND HUMIDITY
 - RAINFALL OR IRRIGATION
 - SOIL AND SOIL FERTILITY
 - FERTILIZERS
 - PEST & PEST CONTROL
 - PLANT HORMONES
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ALTITUDE, TEMPERATURE AND HUMIDITY


- ❖ THE ALTITUDE IS THE MOST IMPORTANT FACTOR INFLUENCING OF CULTIVATION OF MEDICINAL PLANTS.
- ❖ THE INCREASE THE ALTITUDE, THE TEMPERATURE AND ATMOSPHERIC PRESSURE DECREASES WHILE THE WIND VELOCITY, RELATIVE HUMIDITY AND LIGHT INTENSITY INCREASES.
- ❖ THUS AS THE CLIMATIC CONDITIONS CHANGE WITH HEIGHT, THEY ALSO PRODUCE CHANGE IN THE VEGETATION PATTERN.
- ❖ TEA, CINCHONA AND EUCALYPTS ARE CULTIVATED FAVOURER AT ON ALTITUDE OF 1000-2000 METERS.
- ❖ CINNAMON AND CARDAMOM ARE GROWN AT A HEIGHT 1000 METERS WHILE SENNA CAN BE CULTIVATED AT SEA LEVEL.
- EXAMPLES
 - CLOVE UP TO 900 meter
 - CAMPHOR 1500-2000 meter
 - CINCHONA 1000-2000 meter

- ❖ TEMPERATURE AND HUMIDITY ARE THE ANOTHER MAJOR FACTORS FOR THE CULTIVATION OF THE MEDICINAL PLANT.
- ❖ SUDDEN DECREASES IN TEMPERATURE CAUSED THE FORMATION OF THE ICE CRYSTALS IN INTERCELLULAR SPACES OF THE PLANTS AS A RESULT WATER COMES OUT OF THE CELLS AND ULTIMATELY PLANTS DIE DUE TO DROUGHT AND DESICCATION.
- ❖ THE RATE OF PHOTOSYNTHESIS IS AFFECTED BY CHANGE IN TEMPERATURE.
- ❖ THE RATE OF RESPIRATION INCREASES WITH INCREASE IN TEMPERATURE.
- ❖ HUMIDITY IS PRESENT IN THE FORM OF WATER VAPOURS. THIS IS CALLED ATMOSPHERIC HUMIDITY. CLOUDS AND FOG ARE THE VISIBLE FORMS OF HUMIDITY.
- ❖ HUMIDITY AFFECTS STRUCTURE, FORM AND TRANSPIRATION IN PLANTS.
- ❖ **EXAMPLES: 1. CINCHONA 60-75 F 2. COFFEE 55-70 F 3. TEA 70-90 F**
- ❖ **CAMPHOR AND COFFEE CANNOT WITHSTAND FROST; SAFFRON REQUIRE COLD CLIMATE**
- ❖ **WHILE PYRETHRUM NEED DRY WEATHER.**

RAINFALL OR IRRIGATION

- ❖ EXCEPT THE XEROPHYTES MOST OF OTHER PLANTS NEED WATER AND PROPER IRRIGATION AND SUFFICIENT RAIN FALL FOR THERE DEVELOPMENT.
- ❖ THE MAIN SOURCE OF WATER FOR THE SOIL IS RAIN WATER.
- ❖ RAINFALL AND SNOWFALL HAVE A LARGE EFFECT THE CLIMATE CONDITION.
- ❖ THE MINERALS IN THE SOIL GET DISSOLVED IN WATER AND ARE THEN ABSORBED BY PLANTS. WATER INFLUENCES MORPHOLOGICAL AND PHYSIOLOGY OF PLANT.
- ❖ **EXAMPLES: CONTINUOUS RAIN CAN LEAD TO A LOSS OF WATER- SOLUBLE SUBSTANCE FROM LEAVES AND ROOT**
 - ▶ **BY LEACHING.**
- ❖ **THIS IS KNOWN TO APPLY TO SOME PLANTS PRODUCING GLYCOSIDE AND ALKALOIDS.**

SOIL AND SOIL FERTILITY

- ❖ SOIL IS THE MOST IMPORTANT NATURAL RESOURCE AS IT SUPPORTS GROWTH OF ALL PLANTS.
 - ❖ SOIL PROVIDE MECHANICAL STRENGTH , ANCHORAGE AS WELL AS THE ESSENTIAL PLANT FOOD ELEMENTS FOR PLANT.
 - ❖ ***THE CAPACITY OF SOIL TO SUPPLY PLANT NUTRIENT QUANTITIES AND PROPORTION REQUIRED AND TO PROVIDE SUITABLE MEDIUM FOR PLANT GROWTH IS KNOWN “SOIL FERTILITY”.***
 - ❖ PROVIDE CHEMICAL MAKE UP AND NUTRIENTS FOR GROWTH.
 - ❖ COMMONLY KNOW SOIL IS ***SHALLOW UPPER LAYER***; IS THE FRIABLE MATERIAL IN WHICH PLANTS FIND FOOT HOLD AND NOURISHMENT.
 - ❖ ***CLAY IS ONE OF THE HIGHLY WEATHERED PORTION OF THE SOIL ; CONSISTS OF FINEST PARTICLES, WHICH PROVIDE COHESIVE AND ADHESIVE PROPERTIES AND HOLD THE NUTRIENTS FOR THEIR GROWTH WHICH HAS BEEN LOST DUE TO LEACHING.***
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- ❖ **SOIL CONSISTS OF MINERAL MATTER, AIR, WATER AND ORGANIC MATTER**
- ❖ **WHERE MINERAL MATTER RESPONSIBLE FOR THE MAKING DIFFERENCE IN THE VARIETY OF SOIL FORMS.**
- ❖ **AIR AND WATER GIVE RISE TO PORES IN WHICH IF HALF OF THE PORES ARE FILLED WITH WATER AND REST OF WITH AIR THEN IT PROVIDES GOOD AERATION FOR THE ROOT NOURISHMENT.**
- ❖ **PURIFIED AND DECAYED PLANT AND ANIMALS PARTS CONSTITUTE ORGANIC MATTER;**
- ❖ ANY TYPE OF SOIL **CONTAINING LESS THAN 0.5 % ORGANIC MATTER IS DESCRIBED AS POOR SOIL.**
- ❖ ANY TYPE OF SOIL CONTAINING **1.5-5 % ORGANIC MATTER IS DESCRIBED AS RICH SOIL.**
- ❖ ANY TYPE OF SOIL **CONTAINING 0.5-1.5% ORGANIC MATTER DESCRIBED AS INTERMEDIATE SOIL .**
- ❖ PH RANGE OF 6.5-7.5. TO GET NEUTAL SOIL, ACIDIC SOILS CAN BE LIMED OR ALKALINE SOILS CAN RECLAIMED BY GYPSUM .
- ❖ ACIDIC SOILS ARE NOT SUITABLE FOR LEGUMINOUS PLANTS DUE TO POOR DEVELOPMENT OF NODULE BACTERIA.

TYPES OF SOIL

- a) **CLAY – MORE THAN 50% OF CLAY**
- b) **LOAMY – 30-50% WITH CLAY**
- c) **SILT LOAMY- 20-30 % CLAY**
- d) **SANDY LOAMY – 10-20%CLAY**
- e) **SANDY SOIL- MORE THAN 70% SAND**
- f) **CALCAREOUS SOIL –MORE THAN 20 % LIME.**

DEPENDING UPON THE SIZE OF MINERAL MATTER:

PARTICE SIZE (DIAMETER)

LESS THAN 0.002 MM

0.002 TO 0.02 MM

0.02 TO 0.2 MM

0.2 TO 2.00 MM


TYPES OF SOIL

FINE CLAY


COARSE CLAY OR SILT

FINE SAND

COARSE SAND

- ❖ SOIL FERTILITY: IT IS THE CAPACITY OF SOIL TO PROVIDE NUTRIENTS IN ADEQUATE AMOUNTS AND IN BALANCED PROPORTION TO PLANTS.
 - ❖ IF CROPPING IS DONE WITHOUT FORTIFICATION OF SOIL WITH PLANT NUTRIENTS, SOIL FERTILITY GETS LOSTS.
 - ❖ SOIL FERTILITY CAN BE MAINTAINED BY ADDITION OF **ANIMAL MANURES, NITROGEN-FIXING BACTERIA OR BY APPLICATION OF CHEMICALS OF CHEMICAL FERTILIZERS.**
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FERTILIZERS

- ❖ A FERTILIZER OR FERTILISER IS ANY MATERIAL OF NATURAL OR SYNTHETIC ORIGIN(OTHER THAN LIVING MATERIALS THAT IS APPLIED TO SOILS OR TO PLANT TISSUES (USUALLY LEAVES) TO SUPPLY ONE OR MORE PLANT NUTRIENTS ESSENTIAL TO THE GROWTH OF PLANTS.
 - ❖ FERTILIZER IS NUTRIENTS WHICH ARE NECESSARY FOR DEVELOPMENT & GROWTH OF THE PLANT.
 - ❖ THE SECOND MODE BY SOME FERTILIZERS ACT IS TO ENHANCE THE EFFECTIVENESS OF THE SOIL BY MODIFYING ITS **WATER RETENTION AND AERATION.**
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- ❖ BIOLOGICAL ORIGIN FERTILIZER MANURES: MANURE IS MATERIALS WHICH ARE MIXED WITH SOIL
- ❖ SUPPLY ALMOST ALL THE NUTRIENTS REQUIRED BY THE CROP PLANTS. THIS RESULTS IN THE INCREASES IN CROP PRODUCTIVITY.

❖ MANURES ARE THREE TYPES:

1.FARMYARD MANURE –FYM (COW DUNG MANURE , POULTRY MANURE.)

2.COMPOSITED MANURE-(ORGANIC NITROGEN SUPPLEMENTS, BONE MEAL , FISH MEAL.)

3.GREEN MANURE- NEEM SEED CAKE , VERMI COMPOST, OIL CAKE.

BIO FERTILIZER: CAN BE DEFINED AS BIOLOGICALLY ACTIVE PRODUCTS OR BACTERIA, ALGAE AND FUNGI, WHICH

USEFUL IN BRINGING ABOUT SOIL NUTRIENT ENRICHMENT.

E.G :RHIZOBIUM, AZOTOBACTOR , AZOLLA

- MAJOR NUTRIENTS: NITROGEN (N), PHOSPHORUS (P), AND POTASSIUM (K) SECONDARY NUTRIENTS: CALCIUM (CA), MAGNESIUM (MG), AND SULFUR (S) MICRONUTRIENTS OR TRACE ELEMENTS: BORON (B), CHLORINE (CI), COPPER (CU), IRON (FE), MANGANESE (MN), MOLYBDENUM (MO), AND ZINC (ZN)
- 1.CARBON (C) 2. HYDROGEN (H) 3. OXYGEN (O) 4. NITROGEN (N) 5. PHOSPHORUS (P) 6. POTASSIUM (K) 7. CALCIUM (CA) 8. MAGNESIUM (MG) 9. SULFUR (S) 10. BORON (B) 11. CHLORINE (CI) 12. COPPER (CU) 13. IRON (FE) 14. MANGANESE (MN) 15. MOLYBDENUM (MO) 16. ZINC (ZN) FROM AIR AND WATER FROM AIR AND SOIL FROM SOIL AND FERTILIZERS


- ❖ MAJOR NUTRIENTS NITROGEN (N) IS THE MAIN NUTRIENT FOR STRONG, VIGOROUS GROWTH, GOOD LEAF COLOR, AND PHOTOSYNTHESIS. PLANTS THAT ARE ALMOST ALL LEAF (SUCH AS LAWN GRASSES)
- ❖ NEED PLENTY OF NITROGEN, SO THE FIRST NUMBER IN FERTILIZERS FOR LAWNS IS ESPECIALLY HIGH BECAUSE GRASS MUST CONTINUOUSLY RENEW ITSELF AFTER MOWING. THE HIGHER THE NUMBER, THE MORE NITROGEN THE FERTILIZER PROVIDES.
- ❖ PHOSPHOROUS (P) PROMOTES ROOT DEVELOPMENT WHICH HELPS STRENGTHEN PLANTS. IT ALSO INCREASES BLOOMS ON FLOWERS AND THE RIPENING OF SEEDS AND FRUIT. LOTS OF PHOSPHOROUS IS GREAT FOR BULBS, PERENNIALS, AND NEWLY PLANTED TREES AND SHRUBS. THEY DEPEND ON STRONG ROOTS, SO FERTILIZERS MEANT FOR THESE PLANTS OFTEN HAVE HIGH MIDDLE NUMBERS.
- ❖ POTASSIUM (K) IMPROVES THE OVERALL HEALTH OF PLANTS. IT HELPS THEM WITHSTAND VERY HOT OR COLD WEATHER, DEFEND AGAINST DISEASES, HELPS FRUIT FORMATION, PHOTOSYNTHESIS, AND THE UPTAKE OF OTHER NUTRIENTS. POTASSIUM WORKS ALONG WITH NITROGEN SO IF YOU ADD NITROGEN TO THE SOIL, IT IS IMPORTANT TO ADD POTASSIUM AT THE SAME TIME.

- ❖ SECONDARY NUTRIENTS CALCIUM (CA) IS IMPORTANT FOR GENERAL PLANT VIGOR AND PROMOTES GOOD GROWTH OF YOUNG ROOTS AND SHOOTS. CALCIUM ALSO HELPS TO BUILD CELL WALLS.
- ❖ MAGNESIUM (MG) HELPS REGULATE UPTAKE OF OTHER PLANT FOODS AND AIDS IN SEED FORMATION. AS IT IS CONTAINED IN CHLOROPHYLL, IT IS ALSO IMPORTANT IN THE DARK GREEN COLOR OF PLANTS AND FOR THE ABILITY OF A PLANT TO MANUFACTURE FOOD FROM SUNLIGHT.
- ❖ SULFUR (S) HELPS MAINTAIN A DARK GREEN COLOR WHILE ENCOURAGING MORE VIGOROUS PLANT GROWTH.
SULFUR IS NEEDED TO MANUFACTURE CHLOROPHYLL. TRACE ELEMENTS
- ❖ BORON (B) HELPS IN CELL DEVELOPMENT AND HELPS TO REGULATE PLANT METABOLISM.

PEST & PEST CONTROL

- ❖ PEST & PEST CONTROL A PEST IS AN ORGANISM THAT CAUSES AN EPIDEMIC DISEASE ASSOCIATED WITH HIGH MORTALITY.
- ❖ TYPES OF PEST- FUNGI AND VIRUSES INSECTS FLYING (ADULT MOTHS / FLIES & LARVAE) CRAWLING (BEETLES / WEEVILS / COCKROACHES) RODENTS MICE (FIELD / HOUSE) RATS (ROOF / NORWAY) BIRDS PIGEONS / CROWS / STARLING OTHER MAMMALS SNAKES / CATS & DOGS.
- ❖ METHODS OF PEST CONTROL
- ❖ **MECHANICAL METHODS:** IT EMPLOYS MANUAL LABOUR ALONG WITH DIFFERENT DEVICES FOR COLLECTION AND DESTRUCTION OF PEST. EXAMPLES INCLUDE: 1. HAND PICKING TO REMOVE INSECTS 2. PRUNING 3. BURNING 4. TRAPPING OF PESTS

- ❖ **AGRICULTURAL METHODS** IT COVERS ADVANCE PLANT BREEDING TECHNIQUES CAPABLE OF INDUCING GENETIC MANIPULATION RESULTING IN PRODUCTION HYBRID VARIETIES, WHICH ARE RESISTANT TO FUNGAL AND BACTERIAL ATTACK.
- ❖ ANOTHER ASPECT IN AGRICULTURAL CONTROL IS PLOUGHING WHICH SHOULD BE SUFFICIENTLY DEEP SO AS TO ERADICATE WEEDS, AS WELL AS EARLY STAGES OF INSECTS.
- ❖ **CHEMICAL METHODS:** PESTS ARE CONTROLLED BY USING CHEMICAL PESTICIDES.
- ❖ 1. INSECTICIDES: DDT, GAMMAXINE, PARATHIONE, MALATHIONE 2. FUNGICIDES: BORDEAUX MIXTURE, CHLOROPHENOLS, ANTIBIOTICS 3. HERBICIDES: TO CONTROL WEEDS (2, 4-DI CHLOROPHENOXY ACETIC ACID, SULPHURIC ACID) 4. RODENTICIDES: WARFARIN, STRYCHNINE, RED SQUILL

- ❖ **BIOLOGICAL CONTROL METHODS:** THIS METHOD IS PRACTICED BY COMBATING THE PESTS, MOSTLY THE INSECTS, WHICH OTHER LIVING ORGANISMS.
 - ❖ THE CHEMICAL SUBSTANCES PRODUCED AND RELEASED BY SOME FEMALE INSECTS ARE CAPABLE TO ELICITING (REACTION) A SEXUAL RESPONSE FROM THE OPPOSITE SEX, WHICH COULD BE EXPLOITED FOR BIOLOGICAL CONTROL OF PESTS CALLED SEX PHEROMONES. EXAMPLE: 7, 8-EPOXY 2- METHYLOCTADECANE FROM GYPSM MOTH.
 - ❖ **NATURAL PEST CONTROL AGENTS:** TOBACCO, NUX-VOMICA, NEEM
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PLANT HORMONES

- ❖ PLANT HORMONES :IT IS A HORMONE LIKE SYNTHETIC ORGANIC COMPOUND. IN SMALL AMOUNTS, IT MODIFIES THE GROWTH AND DEVELOPMENT EITHER BY PROMOTING OR INHIBITING THE GROWTH.
- ❖ GENERAL PLANT HORMONES: THE PHYTO-HORMONES ARE BROADLY GROUPED UNDER FIVE MAJOR CLASSES NAMELY
- ❖ (1) AUXINS (CELL ELONGATION) (2) GIBBERELLINS (CELL ELONGATION + CELL DIVISION - TRANSLATED INTO GROWTH) (3) CYTOKININS (CELL DIVISION + INHIBITS SENESCENCE) (4) ABSCISIC ACID (ABSCISSION OF LEAVES AND FRUITS) (5) ETHYLENE (PROMOTES SENESCENCE , AND FRUIT RIPENING)

Thank You

