

CLASS- B-PHARM II YEAR

SUBJECT- PHARMACOGNOSY AND PHYTOCHEMISTRY-I

SUB. CODE: BP-405T

UNIT-II

FACTORS INFLUENCING THE CULTIVATION OF MEDICINAL PLANTS:

There are various factors which influence the cultivation of medicinal plants. Some are briefly given below:

1. **LIGHT**: Light is needed for:

- Continuation of life in plants
- Regulation of carbondioxide and oxygen exchange between plants and atmosphere.
- Plant movements
- Seed germination
- Flowering
- Photosynthesis

For eg. Dry sunny weather increases the proportion of:

- (i) Glycosides in Digitalis
- (ii) Alkaloids in Belladonna.

2. **TEMPERATURE**:

- Affects the growth of plant and metabolism.
- Affects the rate of transpiration.
- Regulates the physiological processes by regulating the activity of enzymes.

For eg. (i) camphor and coffee cannot withstand frost whereas saffron needs only cold climate.

(ii) Pyrethrum requires dry weather for cultivation.

3. **ALTITUDE**:

- Is important factor influencing the cultivation of medicinal plants.
- Also affects the chemical composition of medicinal plants. For eg: at high altitudes Pyrethrum provides the better yield of flowe heads and pyrethrins.

For eg:

<u>Plant</u>	<u>Altitude(metres)</u>
Cinchona	1000-2000
Coffee	1000-2000
Camphor	1500-2000

4. **RAINFALL:**

Most plants require:

Either proper arrangements for irrigation or sufficient rainfall for their development . Few exceptions are there like xerophytic plants like aloe, acacia etc.

No doubt rainfall is essential factor influencing the cultivation of medicinal plants but there can be loss of water soluble substances from leaves and roots due to continuous rainfall.

Rainfall also has affect on constituents of plants.

Like in *Cassia angustifolia*, the main constituents is sennosides A and B, if there is short term drought, it increases the concentration of sennosides Aand B but in longer terms it causes the loss of biomass.

5. **SOIL:**

- a. Supports the growth of all plants
- b. Provides- (i) mechanical anchorage
(ii)water and essential plant food elements
- c. Mainly soil is of 5 types:
 - clay
 - Sand
 - Loam
 - Chalk
 - Peat

Among these soil , Loam is generally considered best type of soil for large number of plants.

6. **FERTILIZERS AND MANURES:**

- (i) Promote plant growth
 - (ii) Helps the plant grow faster and stronger
- For their growth and metabolism, plants need 16 nutrient elements.
- a. Macronutrients-needed in large quantities. Eg: carbon, hydrogen, nitrogen, oxygen, calcium, potassium, phosphorous, sulphur and magnesium.
 - b. Micronutrients-needed in traces. Eg: copper, zinc, boron, molybdenum, iron, manganese, chlorine.
- These macro and micro nutrients are supplied to plants through soil. These can also be made available to plants through manures and fertilizers.

Chemical fertilizers: eg. NPK, DAP

Manures: eg. farm yard manure, castor seed

Biofertilizers: eg. rhizobium, blue green algae

7. **PEST AND PEST CONTROL:**

Pest damages the agriculture through-

- (i) Feeding on crops

(ii) Parasitizing livestock

Types of pests:

- a. Fungi
- b. viruses
- c. Insects
- d. Weeds

Non-insect pest:

- i. Vertebrates like rabbit, monkey, pigs, hares, squirrel, deer etc.
- ii. Invertebrates like crabs, snails, mites etc.

Pest control:

(a) Mechanical method:

- i. Hand picking
- ii. Burning
- iii. Trapping of pests

(b) Agricultural method:

- i. Plant breeding techniques
- ii. Deep ploughing
- iii. Changing the environment

(c) Biological control:

- i. Sex pheromones

(d) Chemical control:

- i. Insecticides eg. DDT
- ii. Fungicides eg. boredeaux mixture
- iii. Herbicides eg. sulphuric acid
- iv. Rodenticides eg. Warfarin

8. POLYPLOIDY:

A condition where in the nucleus contains more than its normal complement of chromosomes is known as polyploidy.

Changes takes place due to increase in chromosome complement of nucleus like size of plant or organ and some physiological changes.

Typical effects of polyploidy:

- i. Large flowers
- ii. Pollengrains and stomata

9. MUTATION:

Variation in characters of species is known as Mutation.

It is due to:

- i. Environmental changes or
- ii. Changes in hereditary constitution.

Radiation can induce mutation which develops new variety of crops.

10. HYBRIDIZATION:

- a. Process through which hybrids are produced.
- b. Helps in inducing in a single variety the favourable characters of other varieties.
For eg: in hybridization of Digitalis species, lanatoside and purpurea glycoside are formed in which lantoside formation is dominant to purpurea glycoside formation.

11. PLANT HORMONES:

Are naturally occurring growth regulators which in low concentration control physiological processes in plants.

Classification:

a. Plant growth promoter:

- i. Auxins
Natural auxins eg. Indole-3-acetic acid
Synthetic auxins eg. Indole-3-butyric acid
- ii. Cytokinins
Eg: kinetin, zeatin
- iii. Gibberellins
Eg: GA₁, GA₂

b. Plant growth inhibitor:

- i. Ethylene
- ii. Abscisic acid
Functions:
 - 1. Regulating cell enlargement
 - 2. Cell division
 - 3. Cell differentiation
 - 4. Organogenesis
 - 5. Senescence
 - 6. Dormancy
 - 7. Achieve earlier growth and root development.

