CHAPTER: 9 : PLANT BREEDING

2 Marks: (Book Back)

1. Differentiate primary introduction from secondary introduction.

Primary introduction	Secondary introduction
The introduced variety is well adapted to the new environment without any alternation to the original genotype	The introduced variety is subjected to selection to isolate a superior variety.

Additional Questions & Answers

2. Define economic botany.

Economic botany is the study of the relationship between people and economically important plants.

3. Define the origin of agriculture.

Agriculture is found in the fertile crescent region in and around Tigris and Euphrates river valleys, approximately about 12,000 years ago.

4. Define biofertilizers. Write their uses.

Biofertilizers are defined as preparations containing living cells of efficient strains of microorganisms. It helps crop plants uptake of nutrients by their interactions in the rhizosphere when applied through seed or soil.

5. Mention some of the P solubilizing biofertilizer.

Bacteria: Bacillus subtilis,Pseudomonas striata Fungi: Penicillium, Aspergillus

6. Mention some of the P mobilizing biofertilizers.

Arbuscular: Mycorrhiza Glomus, Scutellospora, Ectomycorrhiza Amanita.

7. Define green manuring.

The growing of green manure crops and use of these crops directly in the field by ploughing is called Green manuring.

8. What is meant by plant breeding ?

The science of improvement of crop varieties with higher yield, better quality, resistance to diseases and shorter durations which are suitable to particular environment are called Plant breeding

9. What is plant introduction?

The introduction of genotypes from a place where it is normally grown to a new place or environment are called Plant introduction.

10. What is acclimatization?

The adjustment or adaptation of the introduced plant in the changed environment is called acclimatization.

11. What is meant by bio-pesticides ?

• Bio-pesticides are biologically based agents used for the control of plant pests.

• They are in high use due to their non-toxic, cheaper and eco-friendly.

12. Define selection.

Selection is the choice of certain individuals from a mixed population for a one or more desirable traits. Selection is the oldest and basic method..

13. What is meant by hybridization?

The method of producing new crop varieties in which two or more plants of unlike genetically constitution is crossed together is called Hybridization.

14. What is emasculation ?

The removal of anthers to prevent self pollination before anthesis is called emasculation.

15. What is bagging ?

The stigma of the flower is protected against any undesirable pollen grains, by covering with a bag is called bagging.

16. What is crossing ?

This transfer of pollen grains from selected male flower to the stigma of the female emasculated flower is called crossing.

17. Describe heterosis.

The superiority of the F1 hybrid in performance over its parents is called heterosis or hybrid vigour. Vigour refers to increase in growth, yield, greater adaptability of resistance to diseases, pest and drought.

18. What is meant by polyploids ?

The plants which possess more than two sets of chromosome are called polyploids.

19. What is mutation ?

The sudden heritable changes in the genotype or phenotype of an organism is called mutation.

20. Write the advantage of mutation breeding.

The advantage is to improving the defect without losing agronomic and quality in agriculture and crop improvement.

21. What is meant by biofortification ?

The breeding crops with higher levels of vitamins and minerals or higher protein and healthier fats is the most practical means to improve public health is called biofortification.

22. Define quarantine.

• All the introductions must be free from weeds, insects and disease causing organisms.

• This carefully examined process is called quarantine.

3 Marks: (Book Back)

1. How are microbial innoculants used to increase the soil fertility?

• Microbial innoculants also called biofertilizers.

• Bio-fertilisers containing rhizobium bacteria are called rhizobium bio-fertilizer culture.

• Symbiotic bacteria that reside inside the root nodules. It convert the atmospheric nitrogen into a bio available form to the plants.

• Rhizobium is best suited for the increase the soil fertility in paddy fields.

Additional Questions & Answers

2. Write the importance of biofertilizers

• They are efficient in fixing nitrogen, solubilising phosphate and decomposing cellulose.

• They are designed to improve the soil fertility, plant growth and biological activity.

• They are eco-friendly organic agro inputs.

• They are more efficient and cost effective than chemical fertilizers.

3. Mention some of the N2 fixing biofertilizer.

• Free-living: Azotobacter, Clostridium, Anabaena, Nostoc,

• Symbiotic: Rhizobium, Anabaena azollae

• Associative Symbiotic: Azospirillum

4. Describe rhizobium bio-fertilizer culture.

• The bio-fertilisers containing rhizobium bacteria are called rhizobium bio-fertilizer culture.

• The symbiotic bacteria that reside inside the root nodules.

• It convert the atmospheric nitrogen into a bio available form to the plants.

• This nitrogen fixing bacterium applied it multiplies and fixes the atmospheric nitrogen in the soil.

5. Describe Azolla.

• Azolla is a free-floating water fern.

• It fixes the atmospheric nitrogen in association with Anabaena azolla (nitrogen fixing blue green alga) .

• It is used as a bio-fertilizer for wetland rice cultivation.

• Azolla increasing the yield of rice crop.

6. Describe arbuscular mycorrhizae.

• The symbiotic association between certain phycomycetous fungi and angiosperm roots.

• They have the ability to dissolve the phosphates found in abundance in the soil.

• It increasing the availability of phosphorus.

• It also assures water availability.

7. Mention the main objectives of green manuring.

• To increase the content of nitrogen in the soil.

• It helps in improving the structure and physical properties of the soil.

• Example: Crotalaria juncea, Tephrosia purpurea, Indigofera tinctoria

8. Describe artificial selection. Write their types.

• It is a human involved process.

• They selected better crop from a mixed population where the individuals differ in character.

• Three main types of artificial selection. They are

a. Mass Selection b. Pureline selection c. Clonal Selection

9. Explain polyploid breeding.

The plants which possess more than two sets of chromosome are called polyploids. It is a major force in the evolution of both wild and cultivated plants. It is often exhibit increased hybrid vigour increased both biotic and abiotic stresses, buffering of deleterious mutations. It often reduced fertility due to meiotic error allowing the production of seedless varieties.

10. Expain autopolyploidy.

• When chromosome number is doubled by itself in the same plant, is called autopolyploidy.

• Example: A triploid condition in sugar beets, apples and pear has resulted in the increase in vigour and fruit size, large root size, large leaves, flower, more seeds and sugar content in them.

• It also resulted in seedless tomato, apple, watermelon and orange.

11. What is meant by allopolyploidy ? Give examples.

• The multiplication of chromosome sets are derived from two different species are called allopolyploidy.

• Example: Triticale (Triticum durum x secale cereale)

• Raphanobrassica (Brassica oleraceae x Raphanus sativus).

12. Describe clonal selection.

• In asexually propagated crop, progenies derived from a plant resemble in genetic constitution with the parent plant as they are mitotically divided.

• Based on their phenotypic appearance, clonal selection is employed to select improved variety from a mixed population (clones).

• The selected plants are multiplied through vegetative propagation to give rise to a clone.

• The genotype of a clone remains unchanged for a long period of time.

13. Describe hybridization.

• The method of producing new crop varieties in which two or more plants of unlike genetically constitution is crossed together is called Hybridization.

• Hybridization results a progeny called hybrid.

• Hybridization offers improvement in crop.

• It is the combining together the desirable characters of two or more varieties or species.

• The first natural hybridization was observed by Cotton Mather in maize.

5 Marks: (Book Back)

1. What are the different types of hybridization?

The different types of Hybridization are

i. **Intravarietal hybridization:** The cross made between the plants of same variety is called intravarietal hybridization. This crosses are useful only in the self-pollinated crops.

ii. **Intervarietal hybridization:** The cross made between two different varieties of the same species is called intraspecific hybridization. This improving self-pollinated and cross pollinated crops

iii. **Interspecific hybridization:** The cross made between two different species belongs to the same genus is called intragenic hybridization. It is commonly used for transferring the genes of disease, insect, pest and drought resistance from one species to another. **Example:** Gossypium hirsutum x Gossypium arboreum – Deviraj.

iv. **Intergeneric hybridization:** The crosses are made between the plants belonging to two different genera is called intergeneric hybridization.

Disadvantages: Hybrid sterility, time consuming and expensive procedure. **Example:** Raphanobrassica, Triticale.

2. Explain the best suited type followed by plant breeders at present?

The best suited type followed by plant breeders at present is hybridization

Steps involved in hybridization are as follows.

1. Selection of Parents 2. Emasculation 3. Bagging 4. Crossing

5. Harvesting seeds and raising plants

i. **Selection of Parents:** Male and female plants of the desired characters are selected.It should be tested for their homozygosity.

ii. **Emasculation:** The removal of anthers to prevent self pollination before anthesis is called emasculation.

iii. **Bagging:** The stigma of the flower is protected against any undesirable pollen grains, by covering it with a bag.

iv. **Crossing:** Transfer of pollen grains from selected male flower to the stigma of the female emasculated flower.

v. **Harvesting seeds and raising plants**: The pollination leads to fertilization and finally

seed formation takes place. The seeds are grown into new generation which are called hybrid.

3. Write a note on heterosis.

G.H. Shull first to use the term heterosis (1912). The superiority of the F1 hybrid in performance over its parents is called heterosis or hybrid vigour. Vigour refers to increase in growth, yield, greater adaptability of resistance to diseases, pest and drought. Depending on the nature, origin, adaptability and reproducing ability heterosis can be classified as:

i. **Euheterosis-** This is the true heterosis which is inherited

a. **Mutational Euheterosis-** Simplest type of euheterosis. It results from the sheltering or eliminating of the deleterious, unfavourable often lethal, recessive, mutant genes by their adaptively superior dominant alleles in cross pollinated crops.

b. **Balanced Euheterosis-** Well balanced gene combinations which is more adaptive to environmental conditions and agricultural usefulness.

ii. **Psuedoheterosis-** Also termed as luxuriance. Progeny possess superiority over parents in vegetative growth but not in yield and adaptation These usually sterile or poorly fertile.

4. List out the new breeding techniques involved

In developing new traits in plant breeding.

• New breeding techniques (NBT) are a collection of methods that could increase and accelerate the development of new traits in plant breeding.

• These techniques often involve genome editing, to modify DNA at specific locations within the plants to produce new traits in crop plants.

The various methods of achieving these changes in traits include the following.

• Cutting and modifying the genome during the repair process by tools like CRISPR /Cas.

• Genome editing to introduce changes in few base pairs using a technique called Oligonucleotide-directed mutagenesis (ODM).

• Transferring a gene from an identical or closely related species called cisgenesis.

• Organising processes that alter gene activity without altering the DNA itself(epigenetic methods).

Additional Questions & Answers

5. Write the possible changes in the plant species due to domestication.

• Adaptation to a greater diversity of environments and a wider geographical range.

• Simultaneous /uniform flowering and fruiting.

• Lack of shattering or scattering of seeds.

• Increased size of fruits and seeds.

• Change from a perennial to annual habit.

• Change in breeding system.

• Increased yield.

• Increased resistance for disease and pest.

6. Enumerate the objectives of plant breeding.

• To increase yield, vigour and fertility of the crop

• To increase tolerance to environmental condition, salinity, temperature and drought.

• To prevent the premature falling of buds, fruits etc.

• To improve synchronous maturity.

• To develop resistance to pathogens and pests.

• To develop photosensitive and thermos-sensitive varieties.

7. Explain mass selection and add disadvantage of mass selection

• A large number of plants of similar morphological characters are selected.

• Their seeds are mixed together to constitute a new variety.

• The population obtained are more uniform than the original population.

• The population are not individually tested.

• After repeated selection for about five to six years.

• The selected seeds are multiplied and distributed to the farmers.

Disadvantage : It is difficult to distinguish the hereditary variation from environmental variation.

8. Explain mutation breeding.

• Muller and Stadler (1927- 1928) coined the term mutation breeding.

• It is a new method of conventional breeding procedures.

• The advantage is to improving the defect without losing agronomic and quality in agriculture and crop improvement.

• Mutation means the sudden heritable changes in the genotype or phenotype of an organism.

• Gene mutations are of considerable importance in plant breeding.

• They provide essential inputs for evolution, re-combination and selection.

• It is the only method for improving seedless crops.

• Mutation induces by radiation such as UV short wave, X-ray, Alpha (α), Beta (β), Gamma waves.

• Many chemicals such as cesium,EMS (ethyl methane sulfonate), nitromethyl, urea induces mutation.

• **Example**: Triple gene dwarf wheat with increase in yield and height. Atomita 2 - rice with saline tolerance and pest resistance.

9. Plant Breeding for Developing Resistance to Insect Pests.

• Insect resistance in host crop plants may be due to morphological, biochemical or physiological

characteristics.

• Hairy leaves resistance to insect pests.

• Example: resistance to jassids in cotton and cereal leaf beetle in wheat.

• In wheat, solid stems lead to non-preference by the stem sawfly.

• Smooth leaves and nectar-less cotton varieties do not attract bollworms.

• High aspartic acid, low nitrogen and sugar content in maize leads to resistance to maize stem borers.

BOTANY LONG VERSION QUESTIONS AND ANSWERS

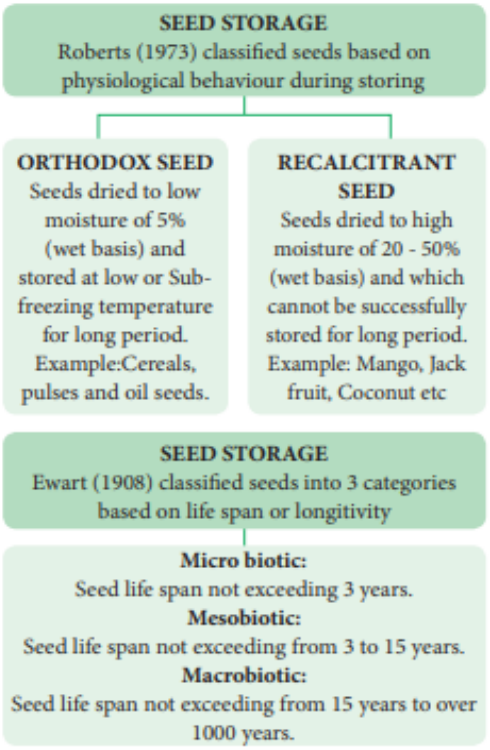
2 Marks (Book Back)

1. **Discuss the importance of neem in seed storage?**

   Seeds are coated with Neem leaf powder and stored for short duration as a traditional way of seed protection.

3 Marks (Book Back)

1. **List the ways by which seeds can be stored for longer duration.**



5 Marks : Additional Questions & Answers

1. **Mention the various modern methods of seed protection.**

I. Seed storage in cryopreservation :

It is the technique of germplasm conservation (storage of cells, tissue, embryo or seeds) by ultra-low temperature in liquid nitrogen at -196°C. It is not practical for commercial seed storage purpose, but is useful to store the valuable germplasm for use in future which cannot be preserved by conventional methods.

II. Seed storage in gene bank:

In gene bank, seed storage is the preservation of seed under controlled environmental condition which will prolong the viability of the seeds for long periods. The temperature, relative humidity and seed moisture content. Containers and distribution a r r a n g e m e n t vary for each and every type of seed.

III. Svalbard seed bank:

The seeds are stored in four ply sealed envelopes, and then placed into plastic tote containers on metal shelving racks. The storage rooms are kept at -18°C. The low temperature and limited access to O2 will ensure low metabolic activity and delayed seed ageing. The permafrost surrounding will help to maintain low temperature of the seed when the electricity supply fails.

2. **Explain the traditional methods of seed protection.**
    - In traditional method seeds are coated with fine red soil, Guntur Chilli Powder, Neem leaf Powder, Powder of Bitter Gourd, Drumstick extract, Pongamia leaf extract and stored for short duration.
    - Paddy Seeds are immersed in salt water in the ratio of 1:10 to remove the floating chaffy seed and then dried in shade for one -two years of storage.
    - Sorghum seeds were treated with lime water (1 kg of lime in 10 litres of H20) for 10 days and then the seeds are dried and stored.
    - Chickpea were treated with citronella leaf oil, cotton seed oil, soya bean oil, castor seed oil (500 ml of oil for 100 kg of seed).
    - Sunflower seeds were kept inside the dried fruit of sponge gourd after removing the seeds. These fruits were kept in an airtight container.

CHAPTER: 10: ECONOMICALLY USEFUL PLANTS AND ENTREPRENEURIAL BOTANY

2 Marks: (Book Back)

1. What is pseudo cereal? Give an example.

Pseudo-cereal is one of any non -grasses that are used in much the same way as cereals.
Example: quinoa

2. Discuss which wood is better for making furniture.

• Teak wood is better for making furniture.

• The heartwood is golden yellow to golden brown when freshly sawn, turning darker when exposed to light. Known for its durability as it is immune to the attack of termites and fungi.

• The wood does not split or crack and is a carpenter friendly wood.

3. Give definitions for organic farming?

• The organic farming is an alternative agricultural system.

• The plants/crops are cultivated in natural ways by using biological inputs.

• This maintain soil fertility and ecological balance thereby minimizing pollution and wastage.

4. Which is called as the "King of Bitters"? Mention their medicinal importance.

• Nilavembu (Andrographis paniculata) is known as the King of Bitters.

The medicinal importance of nilavembu

• Andrographolides is the major chemical component.

• Andrographis is a potent hepatoprotective.

• It is widely used to treat liver disorders.

• Concoction of Andrographis paniculata and eight other herbs (Nilavembu Kudineer) is effectively used to treat malaria and dengue.

5. Differentiate bio-medicines and botanical medicines.

Biomedicines	Botanical medicines
The medicinally useful molecules obtained from plants that are marketed as drugs are called Biomedicines	Medicinal plants which are marketed as powders or in other modified forms are known as Botanical medicines.

6. If a person drinks a cup of coffee daily it will help him for his health. Is this correct? If it is correct, list out the benefits.

Yes correct. Drinking coffee in moderation provides the following health benefits:

• Caffeine enhances release of acetylcholine in brain, which in turn enhances efficiency.

• It can lower the incidence of fatty liver diseases, cirrhosis and cancer.

• It may reduce the risk of type 2 diabetes.

7. Write the uses of nuts you have studied.

• Used for garnishing sweets or curries,

• Ground into a paste which forms a base of sauces for curries or some sweets.

• Roasted and raw kernels are used as snacks.

Additional Questions and Answers

8. How the economically useful plants are classified based on their utility?

They are classified into food plants, fodder plants, fibre plants, timber plants, medicinal plants, and plants used in paper industries, dyes and cosmetics.

9. What are classification of edible fruits ?

Edible fruits are classified into temperate (apple, pear, plum) and tropical fruits (mango, jack, banana).

10. What is meant by condiments ?

The condiments, are flavouring substances having a sharp taste and added to food after cooking. Example: curry leaves.

11. Turning back to natural products- Justify

• Today, cosmetics have a high commercial value and have become chemical based industrial products.

• In recent years, people have realized the hazards of chemical-based cosmetics and are turning back to natural products.

12. What is entrepreneurial botany ?

The study of how new businesses are created using plant resources are called entrepreneurial botany.

13. Write some of the entrepreneurship activities

Some of the activities of entrepreneurship are Mushroom cultivation, Single cell protein (SCP) production, Seaweed liquid fertilizer, Organic farming, Terrarium, Bonsai and Cultivation of medicinal and aromatic plants

3 Marks: (Book Back)

1. Write the cosmetic uses of Aloe.

• 'Aloin' (a mixture of glucosides) and its gel are used as skin tonic.

• It has a cooling effect and moisturizing characteristics.

• So used in preparation of creams, lotions, shampoos, shaving creams, after shave lotions and allied products.

• It is used in gerontological applications for rejuvenation of aging skin.

• Aloe vera gel is used in skin care cosmetics.

2. A person got irritation while applying chemical dye.What would be your suggestion for alternative?

• My suggestion for alternative is 'Henna' dye

• An orange dye 'Henna' is obtained from the leaves and young shoots of Lawsonia inermis.

• The principal colouring matter of leaves 'lacosone" is harmless and causes no irritation to the skin.

• This dye has long been used to dye skin, hair and finger nails.

3. Name the humors that are responsible for the health of human beings.

• Siddha is principally based on the Pancabūta philosophy.

• According to this system three humors namely Vātam, Pittam and Kapam.

• These are responsible for the health of human beings .

• If any disturbance in the equilibrium of these humors result in ill health.

4. What are millets? What are its types? Give example for each type.

• It is a variety of very small seeds.

• Originally cultivated by ancient people in Africa and Asia.

• They are gluten free and have less glycemic index.

Types and examples

• Finger Millet – Ragi - Eleusine coracana

• Foxtail Millet- Thinai - Setaria italic

• Kodo Millet- varagu - Paspalum scrobiculatum

5. Enumerate the uses of turmeric.

• It is one of the most important and ancient Indian spices.

• It is an important constituent of curry powders.

• It is used as a colouring agent in pharmacy, confectionery and food industry.

• Curcumin is a very good anti-oxidant which may help fight various kinds of cancer.

• It has anti-inflammatory, anti-diabetic, anti-bacterial, anti-fungal and anti-viral activities.

• It stops platelets from clotting in arteries, which leads to heart attack.

6. Give an account of active principle and medicinal values of any two plants you have studied.

Two plants we have studied is

1. Keezhanelli (Phyllanthus amarus) Family: Euphorbiaceae (Now inPhyllanthaceae)

- Active principle of Phyllanthus amarus: Phyllanthin is the major chemical component.

Medicinal values: Phyllanthus is hepato-protective plant used in Tamil Nadu for the treatment of Jaundice.

2. Nilavembu (Andrographis paniculata) Family : Acanthaceae

- Active principle of Andrographis paniculata : Andrographolides is the major chemical component.

Medicinal values: Andrographis is a potent hepatoprotective. It is widely used to treat liver disorders. Concoction of Andrographis paniculata and eight other herbs (Nilavembu Kudineer) is effectively used to treat malaria and dengue.

7. Write the economic importance of rice.

• Rice is used as a staple food in Southern and North East India.

• Flaked rice (Aval), Puffed rice / parched rice (Pori) are used as breakfast or as snack food.

• Rice bran oil is used in culinary and industrial purposes.

• Husks are used as fuel, and in packing material and fertilizer.

Additional Question and Answers

8. Write the uses of finger millet – Ragi

• Used as a staple food in many southern hilly regions of India.

• Ragi grains are made into porridge and gruel.

• Ragi malt is the popular nutrient drink.

• It is used as a source of fermented beverages.

9. Why do we need to eat vegetables and what do they provide us?

• It is an important part of healthy eating and provide many nutrients.

• They provide potassium, fibre, folic acid and vitamins A, E and C.

• The nutrients in vegetables are vital for maintenance of our health.

10. Mention the uses of groundnut / peanut

• Nuts contain about 45% oil.

• The kernels are rich sources of phosphorous and vitamins, particularly thiamine, riboflavin and niacin.

• It is premium cooking oil because it does not smoke.

• Lower grade oil is used in manufacture of soaps and lubricants.

5 Marks: (Book Back)

1. What is TSM? How does it classified and what does it focuses on?

TSM means Traditional Systems of Medicines

• India has a rich medicinal heritage.

• A number of Traditional Systems of Medicine (TSM) are practiced in India

• some of which come from outside India.

Traditional systems classification

• Traditional Systems of Medicine (TSM) in India can be classified into

- 1.institutionalized or documented
  2.non-institutionalized or oral traditions.

Institutionalized Indian systems:

• Institutionalized Indian systems include Siddha and Ayurveda.

• These are practiced for about two thousand years.

• These systems have prescribed texts in which the symptoms, disease diagnosis, drugs to cure, preparation of drugs, dosage and diet regimes, daily and seasonal regimens.

Non- institutional systems:

• This do not have such records and or practiced by rural and tribal peoples across India.

• The knowledge is mostly held in oral form.

• The TSM focus on healthy lifestyle and healthy diet for maintaining good health and disease reversal.

2. Which TSM is widely practiced and culturally accepted in Tamil Nadu? - explain.

• Siddha is the most popular, widely practiced and culturally accepted system in Tamil Nadu.

• It is based on the texts written by 18 Siddhars.

• There are different opinions on the constitution of 18 Siddhars.

• The Siddhars are not only from Tamil Nadu, but have also come from other countries.

• The entire knowledge is documented in the form of poems in Tamil.

• Siddha is principally based on the Pancabūta philosophy.

• According to this system three humors namely Vātam, Pittam and Kapam.

• These are responsible for the health of human beings .

• If any disturbance in the equilibrium of these humors result in ill health.

• The drug sources of Siddha include plants, animal parts, marine products and minerals.

• This system specializes in using minerals for preparing drugs with the long shelf-life.

• This system uses about 800 herbs as source of drugs.

• Great stress is laid on disease prevention, health promotion, rejuvenation and cure.

3. What are psychoactive drugs? Add a note Marijuana and Opium

• The phytochemicals / drugs from some of the plants alter an individual's perceptions of mind by producing hallucination are known as psychoactive drugs.

• These drugs are used in all ancient culture especially by Shamans and by traditional healers.

Origin and area of cultivation of Cannabis / Marijuana:

• It is native to China. States of Gujarat, Himachal Pradesh, Uttarkand, Uttarpradesh and Madhaya Pradesh have legally permitted to cultivate this.

Medicinal properties of Cannabis / Marijuana:

• The active principle in marijuana is trans-tetrahydrocanabinal (THC). It is an effective pain reliever and reduces hypertension. THC is used in treating Glaucoma a condition in which pressure develops in the eyes. THC is also used in reducing nausea of cancer patients undergoing radiation and chemotherapy. THC provides relief to bronchial disorders, especially asthma as it dilates bronchial vessels.

Origin and area of cultivation of opium poppy:

• It is native to South Eastern Europe and Western Asia. Madhya Pradesh, Rajasthan and Uttar Pradesh are the licenced states to cultivate opium poppy.

Medicinal properties of poppy:

• Opium was traditionally used to induce sleep and for relieving pain. Opium is derived from the exudates of fruits of poppy plants. Opium yields Morphine, a strong analgesic which is used in surgery.

4. What are the King and Queen of spices? Explain about them and their uses.

• Pepper is referred to as the "King of Spices".

• Cardamom is called as "Queen of Spices".

Origin and area of cultivation of cardamom:

• It is indigenous to Southern India and Sri Lanka. Cardamom is called as "Queen of Spices". In India it is one of the main cash crops cultivated in the Western Ghats, and North Eastern India

Uses of cardamom

•The seeds have a pleasing aroma and a characteristic warm, slightly pungent taste.

• It is used for flavouring confectionaries, bakery products and beverages.

• The seeds are used in the preparation of curry powder, pickles and cakes.

• Medicinally, it as a stimulant and carminative.

• It is also chewed as a mouth freshener.

Origin and area of cultivation of black pepper:

• It is indigenous to Western Ghats of India. Pepper is referred to as the "King of Spices". It termed as "Black Gold of India". Kerala, Karnataka and Tamil Nadu are the top producers in India.

Uses of black pepper:

• The characteristic pungency of the pepper is due to the presence of alkaloid Piperine.

• Two types of pepper namely black and white pepper.

• It is used for flavouring in the preparation of sauces, soups, curry powder and pickles.

• It is used in medicine as an aromatic stimulant for enhancing salivary and gastric secretions. and stomachic.

• Pepper also enhances the bio-absorption of medicines.

5. How will you prepare an organic pesticide for your home garden with the vegetables available from your kitchen?

Preparation of Organic Pesticide

Mix 120g of hot chillies with 110 g of garlic or onion. Chop them thoroughly. ❶

Blend the vegetables together manually or using an electric grinder until it forms a thick paste. ❷

Add the vegetable paste to 500 ml of warm water. Give the ingredients a stir to thoroughly mix them together. ❸

Pour the solution into a glass container and leave it undisturbed for 24 hours. If possible, keep the container in a sunny location. If not, at least keep the mixture in a warm place. ❹

Strain the mixture. Pour the solution through a strainer, remove the vegetables and collect the vegetable-infused water and pour into another container. This filtrate is the pesticide. Either discard the vegetables or use it as a compost. ❺

Pour the pesticide into a squirt bottle. Make sure that the spray bottle has first been cleaned with warm water and soap to get rid it of any potential contaminants. Use a funnel to transfer the liquid into the squirt bottle and replace the nozzle. ❻

Spray your plants with the pesticide. Treat the infected plants every 4 to 5 days with the solution. After 3 or 4 treatments, the pest will be eliminated. If the area is thoroughly covered with the solution, this pesticide should keep bugs away for the rest of the season. ❼

Avoid spraying the plants during the sunny times of the day since it could burn plants. Many other plants possess insect repellent or insecticidal properties. Combinations of these plants can be fermented and used as biopesticide.

Additional Questions and Answers

6. Write the importance of cereals as food plants.

• Greater adaptability and successful colonisation on every type of habitat.

• The relative ease of cultivation

• Tillering property that produce more branches .

• It results in higher yield per unit area.

• Compact and dry grains that they can be easily handled, transported and stored without undergoing spoilage.

• High caloric value that provides energy.

7. Mention the uses of teak.

• It is one of best timbers of the world.

• The heartwood is golden yellow to golden brown when freshly sawn, turning darker when exposed to light. Known for its durability as it is immune to the attack of termites and fungi.

• The wood does not split or crack and is a carpenter friendly wood.

• It was the chief railway carriage and wagon wood in India.

• Ship building and bridge-building depends on teakwood.

• It is also used in making boats, toys, plywood, door frames and doors.

8. Discuss the ayurveda system of medicine.

• Ayurveda supposed to have originated from Brahma.

• The core knowledge is documented by Charaka, Sushruta and Vagbhata..

• Vatha, Pitha and Kapha which would exist in equilibrium for a healthy living.

• This system Uses more of herbs and few animal parts as drug sources.

• Plant sources include a good proportion of Himalayan plants.

• The Ayurvedic Pharmacopoeia of India lists about 500 plants used as source of drugs.

9. Write about the folk system of medicine

• Folk systems survive as an oral tradition among innumerable rural and tribal communities of India.

• A consolidated study to document the plants used by ethnic communities was launched by the Ministry of Environment and Forests, Government of India in the form of All India Coordinated Research Project on Ethnobiology.

• As a result about 8000 plant species have been documented which are used for medicinal purposes.

• The efforts to document in several under-explored and unexplored pockets of India still continue.

• Major tribal communities in Tamil Nadu who are known for their medicinal knowledge include Irulas, Malayalis, Kurumbas, Paliyans and Kaanis.

10. How to prepare the bio-pest repellent. Explain the steps ?

• Botanical pest repellent and insecticide made with the dried leaves of Azadirachta indica

• Pluck leaves from the neem tree and chop the leaves finely.

• The chopped up leaves were put in a 50-liter container

• Fill to half with water; put the lid on and leave it for 3 days to brew.

• Using another container, strain the mixture which has brewed for 3 days to remove the leaves, through fine mesh sieve.

• The filtrate can be sprayed on the plants to repel pests.

11. What are the precaution taking while using biopesticide?

• Avoid spraying the plants during the sunny times of the day since it could burn plants.

• Many other plants possess insect repellent or insecticidal properties.

• Combinations of these plants can be fermented and used as biopesticide.

• To make sure that the pest repellent sticks to the plants, add 100 ml of cooking oil and the same amount of soap water.

• (The role of the soap water is to break down the oil, and the role of the oil is to make it stick to the leaves).

• The stewed leaves from the mixture can be used in the compost heap or around the base of the plants.

BOTANY LONG VERSION QUESTIONS AND ANSWERS

2 Marks (Book Back)

1. **what is terrarium ?**

   A terrarium is a collection of small plants growing in a transparent, sealed container. Terrarium are easy to make, low maintenance gardens, and it can survive indefinitely with minimal water.

3 Marks (Book Back)

1. **What is NMBP?**

   Government of India has set up National Medicinal Plants Board (NMPB) on 24th November 2000. Currently this board is working under AYUSH Government of India. Developing an apt mechanism for coordination of various ministries and implementation of policies for overall growth of medicinal plant sector both at central / state and international level is the primary mandate of NMPB.

2. **How will you make a Bonsai tree?**

   Bonsai is a Japanese art form using miniature trees grown in containers that mimic the shape and scale of full size trees.

   Procedure :

   - Visualize the finished product of bonsai while selecting a plant species and the pot.

- Plug out the sapling and clean and prune the roots.
- Prepare the pot and position the tree in it.
- After re-potting leave the plant in a semi shaded area until the roots have re-established.

5 Marks (Book Back)

1. **Give an account on cultivaton of *Gloriosa superba / Cymbopogan cirates.***

I. Cultivation of Medicinal Plant - Gloriosa superba :

Soil and Climate: Red loamy soils are well suited for cultivation. Glory lily is cultivated in Tamil Nadu mainly in the parts of Tirupur, Dindigul, Karur and Salem districts covering an area of 2000 hectare.

Planting: Planting is distributed from June – July. Plough the field 2 -3 times and add 10 tons of Farmyard Manure during last ploughing. Trenches of 30 cm depth are formed and tubers are planted at 30 – 45 cm spacing. The vines are trained over support.

Irrigation: Irrigation should be given immediately after planting. Subsequent irrigation is given at 5 days intervals of time.

Harvest: Pods are harvested at 160 – 180 days.

II. Cultivation of Aromatic plant - Cymbopogon citratus(Lemongrass)

Soil and Climate: Lemongrass grow well in full sun, with plenty of water, in a rich, well draining soil.

Planting: This plant can thrive well all through the year. Fill planting holes with composted manure to improve fertility and enhance the soil's ability to hold water. If you're adding several lemongrass plants to planting beds, space plants 60 cm apart.

Irrigation: Water requirements for this plant will vary dependent upon the type of soil they grow. Sandy, loose soils require more frequent watering than silty loam.

Harvest: Start harvesting as soon as plants are 30 cm tall and stem bases are at least 1.5 cm thick. Cut stalks at ground level.

Additional Questions and Answers

2. **List out the steps involved in mushroom cultivation.**
    - The straw used for composting should be ripe and golden-yellow in colour. It should be cut into 2-4 inches and properly sterilized.
    - The culture space should be clean and the ventilators and windows should be covered with fine wire mesh to prevent the entry of flies and birds. The culture space should be sprayed with 0.1% Nuvan and 5% Formalin, two days prior to spawning and transferring to bags to cropping rooms.

- The spawn used for mushroom should be free from contaminations. Bags should be filled with 8 kg of wet straw.
- During spawning running temperature and relative humidity should be maintained 200 C to 300 C, 75 to 85% respectively.
- Proper watering should be done when the growth coverings are removed. There should not be dry patches on blocks. Excess watering must be avoided.
- About 20 cm gap should be maintained in between two bags or blocks.
- Picking must be done as their caps become 10 – 12 cm by twisting.
- Two kinds of mushrooms are cultivated namely button and oyster.