

M.Sc. 1st Semester, 2013. Model Ans.

Rural Technology, AS-2277.

"Production Technique of Natural Products"

Section A Objective Types Questions.

- ① i ——— d
- ② ii ——— c
- ③ iii ——— a
- ④ iv ——— a
- ⑤ v ——— a
- ⑥ vi ——— b
- ⑦ vij ——— c
- ⑧ viii ——— a
- ⑨ ix ——— c
- ⑩ x ——— a

Section (B)

(2) Lac production Technique.

Rearing, care & management of lac insect for gaining lac is known as Lac cultivation.

For better production of lac it is required to cultivate it by following suitable Technique.

— Lac production Technique is important for Production of lac and also for a source of economic growth of rural peoples.

Lac is a non-wood forest product producing by a animal source (insect).

Characters of lac are

- ① It is a resinous product of lac insects.
- ② Biodegradable products.
- ③ It is red brown in colour.
- ④ It is a minor forest product from animal sources.
- ⑤ Important for generation of income.
- ⑥ It is cultivated on many plants known as host plants.
- ⑦ Lac insect showing sexual dimorphism. (2)
- ⑧ Around 75 sps. of lac insects are found in our Country.

Requirements. / Better production basic needs.

- ① Host
- ② Insects variety.
- ③ Soil -
- ④ Temperature
- ⑤ water
- ⑥ light
- ⑦ Diseases control.
- ⑧ cultivation method.
- ⑨ Market demand
- ⑩ Care/management
- ⑪ storage etc.

Lac production can be done with agriculture by following suitable technique.

Insect variety & Host plants health etc. are important part of the cultivation of lac.

Proper care & management of both Host & insects are necessary for much production of lac. It is a source of economic growth & employment generation among rural peoples.

Some problems associated with production of Lac

- ① Field for cultivation.
- ② Insect variety & Host plant
- ③ Climatic changes / condition.
- ④ Grazing animals
- ⑤ Better condition for Host plant
- ⑥ Protection from living & Nonliving agents
- ⑦ Economic problems
- ⑧ Lack of Technical knowledge related to its cultivation.

③ Silent features of mushroom.

- ① These are fungi of much importance.
- ② It is known as white meat, Boneters meat, Tode stool etc.
- ③ These are natural products.
- ④ It is rich source of Protein. fat absent.
- ⑤ Suitable condition for its production is low Temperature & high humidity.
- ⑥ Pin head develop on mature mycelium which further convert into fruiting body of mushroom.
- ⑦ Mostly mushrooms are upside of soil layer but some are also found inside of soil layer.
- ⑧ Mushrooms may be of two types ~~④~~
 - ① Poisonous mushroom & ② Non poisonous mushroom
- ⑨ Mostly beautiful mushrooms are poisonous in nature
- ⑩ Around 90% water contents found in mushroom
- ⑪ Mushrooms are fleshy, spore bearing fruiting body of fungus.
- ⑫ Macroscopic, gilled & soft in nature

- ⑬ Saprophytic in nature
- ⑭ Mostly mushrooms belonging to Basidiomycotina and some are also Ascomycotina
- ⑮ Mushroom, like of all fungus do not have chlorophyll, so, these are not capable for photosynthesis & for food depending on organic matters.
- ⑯ Some mushrooms are also useful in diabetes B.P. etc.
- ⑰ mushrooms showing variation by their size, shape, colour, & smell etc.
- ⑱ The better Temperature range for growth of mycelium is 22-25°C.
- ⑲ Types of mushroom - ① Paddy straw mushroom.
② Oyster mushroom ③ Button mushroom etc.
- ⑳ It can be cultivated in suitable culture media.
- ㉑ It may be single, small / large or in a group.
- ㉒ It can be produced in artificial medium.

⑳

(4)

Api.culture It is a branch of science deals with the study of rearing, care & management of bees for production of honey.

→ It may be in small or large scales.

→ Scientific study on bees, host plants etc are done in apiculture.

→ The modern Techniques of apiculture includes advanced technique for rearing of bees.

→ In ancient period there are old methods followed for production of honey.

Honey bee showing social organization, where works are distributed among the bees of a hive.

Species of honey bees

① *Apis dorsata*

② *Apis indica*

③ *Apis mellifera*

④ *Apis florea*

(7)

Honeybee Classification

Phylum — Arthropoda

Class — Insecta

Order — Hemiptera

Genus — Apis

Sp. — indica

Importance

- ① It is useful for study of use of bees
- ② It focused on honey production, rich source of energy
- ③ wax production
- ④ Bees are important for pollination in plants
- ⑤ honey can be used as a multifold directions like — as a source of minerals proteins and other health benefits
- ⑥ wax is important for preparation of wax paint etc.

⑤ Sericulture

→ mass rearing of silkworm for production of silk is called sericulture

→ Silk was investigated in China.

→ In India 1st started sericulture in Pusa institute New Delhi

→ Based on the host plant it is of two types

① Mulberry sericulture → Host plant mulberry

② Non-mulberry sericulture → Host plant other than mulberry-plant.

→ Non mulberry silkworms are - Eri, Tassar, Mung

① Eri silkworm

→ Zoo. Name → Attacus ricini

→ found in Assam, Bengal, Bihar, Odisha etc

→ Each year 5 generations

→ Food / Host plant → Castor, Papaya etc.

→ Caterpillar green in colour

→ Silk milky in colour.

② Tassar silkworm

→ Zoo. Name → Antheraea papia

→ Cannot be domesticated

→ Caterpillar collected from forest

→ Host plant → Sal, Arjun, Ber etc.

→ Cocoon hand reeable

②

- ③ Munga → 20. Name → Antheraea assamensis
- These are semidomesticated variety
 - mostly found in assam.
 - Host plant - : Son - Machilus borbycina
 - Cocoon - : white - yellow in colour.

→ Stages for rearing / cultivation of Non-mulberry silkworm

- ① Field selection
- ② Field preparation
- ③ Selection of suitable host plant
- ④ Early feeding of larvae.
- ⑤ Plantation of host plant in the field.

⑥ Management

- ① water
 - ② Temperature
 - ③ light
 - ④ weed
 - ⑤ Diseases
 - ⑥ nutrients etc.
- ⑦ Pruning of Host plant
 - ⑧ Inoculation of larvae
 - ⑨ larval growth
 - ⑩ Cocoon formation
 - ⑪ Harvesting ⑫ collection ⑬ Storage ⑭ marketing. ⑮

⑥ Earthworm.

- ① It is Non chordata belonging to phylum annelida with many segmented body (100-120)
- ② Body movement both sided
- ③ Regeneration capacity present
- ④ ♂ & ♀ reproductive parts in same body.
- ⑤ Absence of eye, ear, sense organ etc.
- ⑥ Heart 5
- ⑦ Breathing by skin
- ⑧ Locomotion by setae
- ⑨ first segment mouth & end segment Anus present
- ⑩ ♀ genital pore present in 14th segment &
♂ genital pore present in 18th segment of body
- ⑪ Mouth sucking type
- ⑫ Body Cylindrical, segmented.

Classification

Phylum - : Annelida
Class - : ~~Phylum~~ Oligocheta
Order -
Genus - : Pheretima / Eisenia
sp. - - Pectis etc.

⑦ Host plant cultivation for lac

Host plant is a plant which provide food & shelter to the insect of lac.

→ There are many host plants are available for cultivation of lac or rearing of lac insects.

like :- Butea monosperma, Acacia catechu, Sesbania
indica, etc.

→ Rearing of lac insects on particular host plant is important aspects for better production of lac.

→ mostly Butea monosperma is used for rearing of lac insect (Laccifer lacca).

→ Butea monosperma is a woody plant and also known as flame of the forest.

→ Host plant cultivation: Requirements

① Climate —: Better climatic condition provides better chance for growth & development of host plant.

② Soil quality → Each host plants requirements may be differ so, based on soil quality host should be selected for cultivation.

③ Water facility → In host plant cultivation field there should be better water facility & water drainage system ②

④ Sunlight → In cultivated field proper sunlight should be available.

⑤ Planting Technique → Scientific Plantation Technique should be followed.
→ Properly as per growth of plant their distance should be decided.

⑥ Management

① weed

② water

③ Nutrients

④ Diseases

⑤ Insect, Pests etc. - these should be managed during cultivation.

⑦ Protection → Protection from living & non-living agents should be done.

⑧ Lac cultivation practices

→ Rearing of lac insects on suitable host for production of lac is known as lac cultivation.

→ Lac cultivation practices classified in three categories.

① Stages Before cultivation

① Field Selection ⇒ It is first stage of lac cultivation to select the suitable place or field.

② Host plant Selection ⇒ Host plant providing food & shelter to the lac insects, so, it should be selected carefully.

③ Selection of suitable lac insect species ⇒ As per climatic conditions & available host plants the variety of lac insects for cultivation should be selected.

④ Climatic condition ⇒ It is also an important factor for cultivation of lac insects.

⑤ Soil quality ⇒ Soil for cultivation of host plants should be rich in nutrients, water holding capacity, fertile etc.

⑥ Water facility ⇒ There should be better water supply & drainage facility.

⑦ Economic sources ⇒ It plays also an important role in lac cultivation.

(B) During cultivation

① Management

- ① After inoculation of lac insects on suitable host plant there should be better management of weeds, nutrients, water, ^{streams}, etc.
- Protection from living & non living agents is also required during of cultivation of lac.

(C) After cultivation

- Harvesting ⇒ mature lac should be harvested carefully by following suitable techniques.
- Collection ⇒ Harvested lac should be collected carefully.
- Storage ⇒ after removing of impurities of lac there should be stored in dry places.
- Marketing ⇒ It is last stage of lac cultivation. During rich market value it should be sold in market.

- ② Some problems associated with lac cultivation practices are -:
- ① Selection of better field / better host plant
 - ② Protection against grazing animals (Host).
 - ③ Control of lac insect / host diseases
 - ④ Climatic condition variability.
 - ⑤ Economic problems
 - ⑥ Lack of Technical knowledge.

Importance of lac

- ① Useful for preparation of sealing materials.
- ② for medicine coating.
- ③ Cosmetics preparations
- ④ Dye preparation
- ⑤ for electronic insulator
- ⑥ Preparation of Button, Toys etc.
- ⑦ Preparation of Paint, varnish etc
- ⑧ Ink preparation
- ⑨ Preparation of ornamental materials
- ⑩ In gramophone.

⑨ Cultivation Techniques of mushrooms -:

- Mushrooms are also known as Vegetable meat, White meat, Boneless meat, fruiting body of fungus. Toadstool etc.
- It is fleshy, spore bearing fruiting body of fungus. microscopic & soft in nature.
- Lacking of chlorophyll, depending for food on organic matter.

Some important steps for cultivation of mushroom are

- ① Selection of the field/area ⇒ This is prime need for cultivation of mushroom. Field for this purpose should be with proper aeration, shady place (low Tem. & high moisture level)
- ② Selection of mushroom variety ⇒ As per climatic condition & available resources the variety of mushroom should be selected.
- ③ Arrangement of raw materials.
 - Spawn - mushroom seeds.
 - Straw - Paddy
 - Mycelium growth
 - Poly bags
 - Bamboo sheets
 - Nylon, threads
 - Tub, water etc. are raw materials required for proper arranging.

④ Experimental setup

+ spawn - 01 packet - 200 gm + each packet used for spawning in three poly bags of 5 kg capacity. (Paddy straw)

+ each materials used for experimental setup should be sterilized.

→ Straw - deep in solution of 125 Liter water including 7 gm Bavestins, ~~rest of~~ etc. till over the night.

→ Sterilization of straw is done with formaldehyde.

→ Remove straw from tub + spread ardy in wet place till that are not clamping.

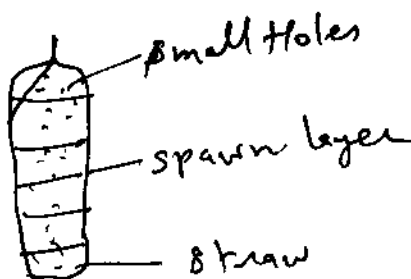
→ fill straw in poly bags. or

→ spread straw in specific place - Regular spawning

Spawning

① In Poly Bags

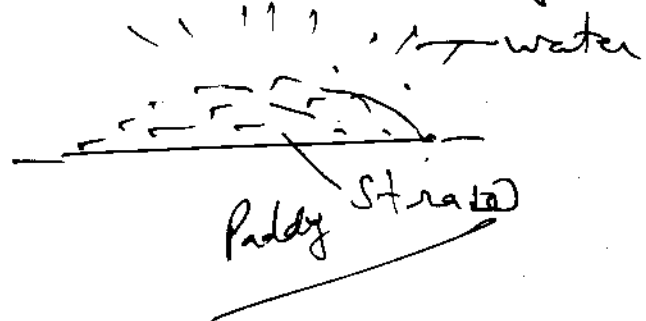
↓
layer spawning



② In Free Area

→ spread of straws

→ Regular spawning



Hanging the polybags with proper support.



Providing water as per need.



Origination of fruiting bodies.



one Polybags of 5 kg, 1st Production of kg.



After 10-15 Days of setup mushroom production starts.



Collection $\left\{ \begin{array}{l} \text{Use} \Rightarrow \text{fresh mushroom as vegetable} \\ \text{store} \Rightarrow \text{dry mushrooms.} \end{array} \right.$



In Bamboo baskets



marketing

→ During of above process it is required to manage of water, Temperature, moisture, diseases, Rodents etc.

→ Protection against various Biotic and abiotic agents should be done carefully.

⑩ Honey bee colony organization.

→ "Living together of specific species in nature develop a social structure and is also called Social organization or colony organization".

→ There are some benefits & loss of being colonial/social organization.

Benefits

- ① Protection from enemies
- ② formation of well organized shelter place
- ③ for searching of food materials
- ④ providing better reproductive chances
- ⑤ Production of much products.

Loss

- ① Sometimes it creates problem for food, protection & for reproduction.
- ② if requirements are same it leads for struggle.

Colony organization

Colony → It is a association of / group of large no. of individuals of any species.

→ In a colony "Division of labour" is important characteristics

① Drone (male) :-

→ These are developed from unfertilized eggs.

→ Size is small than Queen. & large than workers.

→ These are not collecting food materials.

→ For food, these are dependent to workers.

→ Main function is mating

→ Stings are absent in male.

→ Abdomen part is dark black.

② Queen → (female) :-

→ These are developed by fertilized eggs.

→ Size largest in a colony.

→ These are not collecting food materials

→ For food, dependent to workers.

→ Main function is to participate in reproduction
Egg laying.

→ Sting converted into Ovipositor

②

③ workers -:

- size small than male + female
- developed from fertilized eggs.
- These are collecting food materials.
- Stings present.
- Egg not producing
- Important for protection of Colony.

① Lac Cultivation

- It is a process of proper rearing, care & management of lac insect on suitable host plant
- for maximum & qualitative production of lac scientific methods should be followed.
 - It leads to large scale production of lac in specified area.
 - lac is resinous product by insects. It is Biodegradable product, Red-brown in colour.
 - It is a non wood forest products
 - lac insects showing sexual dimorphism.
 - It is used as Sealing materials, in gramophone coating of medicine, preparation of cosmetics, as a electric insulator, paint, varnish etc.

Types

- ① Ami lac ⇒ It is immature lac so its use should be avoided.
- ② Phunki lac ⇒ It is mature lac with out alymph
- ③ Stick lac ⇒ It is mature lac in stick forms.

(4) Seed lac \Rightarrow After removing & washing of stick lac it is termed.

(5) Just lac \Rightarrow The lac obtained from graining of seed lac.

(6) Sheller lac \Rightarrow It is produced by heating of seed lac & just lac.

\Rightarrow Better lac production can be done by following various steps like

(1) Climatic condition \Rightarrow It should be better for host plant & for insects both.

(2) Better field should be selected

(3) Suitable host plant should be selected

(4) Rearing \Rightarrow Rearing should be done properly

(5) Management

————— (1) water \Rightarrow There should be better facility.

(2) Nutrients \Rightarrow For proper growth of host plants nutrients level in soil should be maintained.

③ weed → Carefully weeds should be removed from the field

④ Insect, Pest should be also managed / controlled.

⑤ Diseases of host & insects both required to control by following suitable methods.

⑥ Harvesting → mature lac should be harvested by suitable Technique.

⑦ Collection → Harvested lac should be collected properly

⑧ Storing & marketing → these are last stages of lac cultivation, which should be done carefully.