

MODEL ANSWERS

B.Sc. –Rural Technology (Third Semester)

Examiantion ,2013

RT- 308 :Sericulture

Q.1 Multiple choice questions

1. (a)

2. (a)

3. (c)

4. (c)

5. (c)

- 6 (b)

7. (c)
8. (b)

9. (b)
- 10 (a)

SEC-B

(1) Tasar (Tussah) is copperish colour, coarse silk mainly used for furnishings and interiors. It is less lustrous than mulberry silk, but has its own feel and appeal. Tasar silk is generated by the silkworm, *Antheraea mylitta* which mainly thrive on the food plants Arjun. The rearing are conducted in nature on the trees in the open. In India, tasar silk is mainly produced in the states of Jharkhand, Chhattisgarh and Orissa, besides Maharashtra, West Bengal and Andhra Pradesh. Tasar culture is the main stay for many a tribal community in India. The Tasar silkworm belong to family Saturniidae and they are all wild silkworm.

(2) The name Lepidoptera, derived from the Greek words "*lepid*" for scale and "*ptera*" for wings, refers to the flattened hairs (scales) that cover the body and wings of most adults. In this larva are cruciform pupae are generally enclosed in an earthen shell or cocoon. Two pairs of membranous wings bear few cross veins. In adults mouth parts are sucking type but in larval forms these are of mandibulate type.

(3) This is the popular and easiest method of propagation because it maintain the particular character of plant and gives large number of saplings in shortest duration. In tropical and subtropical regions this is the common method of mulberry propagation. The rooting ability of cuttings depend on the mulberry variety, time of planting, texture of soil, and climatic condition. Mulberry shoot 12-15 cm long with minimum three buds are cut from 5 to 8 months old plants with a sharp knife without any split. In temperate areas, cuttings do not root easily and are induced to root with the application of requisite quantity of growth stimulating hormones. Different propagation methods are grafting it is adopted when cutting is difficult. Propagation through layering there are three types of layering viz simple, trunch, air layering.

(4) Temperature plays a vital role on the growth of the silkworms. As silkworms are cold-blooded animals, temperature will have a direct effect on various physiological activities. In general, the early instar larvae are resistant to high temperature which also helps in improving survival rate and cocoon characters. The temperature has a direct correlation with the growth of silkworms; wide fluctuation of temperature is harmful to the development of silkworm. The optimum temperature for normal growth of silkworms is between 20°C and 28°C and the desirable temperature for maximum productivity ranges from 23°C to 28°C. Temperature above 30°C directly affects the health of the worm. If the temperature is below 20°C all the physiological activities are retarded, especially in early instars; as a result, worms become too weak and susceptible to various diseases. Humidity also indirectly influences the rate of withering of the leaves in the silkworms rearing beds. Under dry conditions especially winter and summer the leaves wither very fast and consumption by larvae will be less. This affects growth of the larvae and results in wastage of leaf in the rearing bed. Retarded growth of young larvae makes them weak and susceptible to diseases. At a humidity of 90 percent or higher, if temperature is maintained at

26°C–28°C, they can grow without being greatly affected. Humidity should range from 70 - 85; high for the younger worms and low for the older worms.

(5) Chhattisgarh State was constituted by the division of Madhya Pradesh on 1st November-2000. In this state handloom industries play an important role in the rural economy. Tasar fabric of Chhattisgarh is known all over the world for its special structure and design. There are 14000 handlooms working in the state and 42000 weavers are getting employment directly or indirectly through weaving every year annual production of handloom cloth is worth about Rs.114 crores. While tasar cloth worth Rs. 80 crores is exported every year to different foreign countries Main districts which are producing tasar cloth, cotton cloth and herbal colour cloth on handloom are detailed below -

A. Tassar Cloth weavers: Janjgir-Champa, Raigarh, Bilaspur and eastern part of Raipur

B. Cotton Cloth weavers: Durg, Rajnandgaon, Mahasamund, Dhamtari & Kabirdham

C. Natural Colour dying cloth Jagdalpur work.

(6) The mulberry plant which is the main stay of silk worm moth has a number of uses.

(i) The fruits are edible; can also be used in the manufacture of alcoholic drinks

((iii) Mulberry leaves constitute a good cattle feed. It is known that this feed increases the milk yield.

(iv) Various parts of the plant body have a high medicinal value and are used in the Ayurvedic system of medicine.

(a) The fruit is aromatic, cooling, laxative, removes thirst and good in the treatment of fevers.

(b) Bark is anthelmentic and purgative.

(c) Leaves in the form of decoction are used to gargle in the treatment of inflammation of the vocal cards.

(d) Roots are anthelmentic and astringent (acts as a binding agent) and useful in the treatment of diahhroea.

SEC-C

(8)The art of silk production is called sericulture that comprises cultivation of mulberry, silkworm rearing and post cocoon activities leading to production of silk yarn. Sericulture provides gainful employment, economic development and improvement in the quality of life to the people in rural area and therefore it plays an important role in anti poverty programme and prevents migration of rural people to urban area in search of employment. Following are the importance and scope of sericulture.

High employment potential

- 60 lakh persons are engaged in various sericulture activities in the country
- It is estimated that Sericulture can generate employment @ 11 man days per kg of raw silk production (in on-farm and off-farm activities) throughout the year. This potential is par-excellence and no other industry generates this kind of employment, specially in rural areas, hence, sericulture is used as a tool for rural reconstruction.

Provides vibrancy to village economies

- About 57 % of the gross value of silk fabrics flows back to the cocoon growers with share of income to different groups.
- 56.8 % to cocoon grower
- 6.8% to the reeler
- 9.1% to the twister
- 10.7% to the weaver
- 16.6% to the trade

Thus, large chunk of income goes back to the villages from the cities

- Low Gestation, High Returns
 - Mulberry takes only six months to grow for commencement of silkworm rearing. Mulberry once planted will go on supporting silkworm rearing year after year for 15-20 years depending on inputs and management provided.
 - Five crops can be taken in one year under tropical conditions.
 - By adopting stipulated package of practices, a farmer can attain net income levels up to Rs.30000 per acre per annum.

Women friendly Occupation

- Women constitute over 60 % of those employed in down-stream activities of sericulture in the country. This is possible because sericulture activities starting from mulberry garden management, leaf harvesting and silkworm rearing is more effectively taken up by the women folk. Even silk reeling industry including weaving is largely supported by them.

Eco-friendly Activity

- As a perennial crop with good foliage and root-spread, mulberry contributes to soil conservation and provides green cover.
- Waste from silkworm rearing can be recycled as inputs to garden.
- Dried mulberry twigs and branches are used as fuel in place of firewood and therefore reduce the pressure on vegetation/forest.
- Being a labour intensive and predominantly agro-based activity, involvement of smoke-emitting machinery is minimal.
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Satisfies Equity Concerns

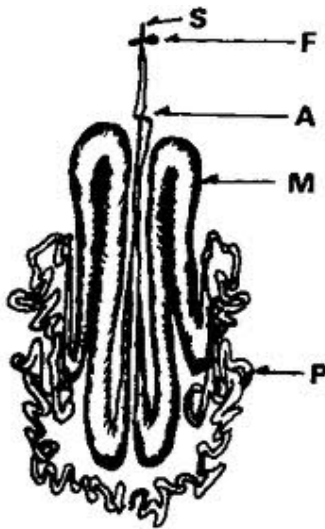
- Benefits of sectoral value-addition primarily accrue to rural households. As the end-product users are mostly from the higher economic groups, the money flows from high end groups to low end groups.
- Cases of landless families engaged in cocoon production using mulberry contracted from local farmers are common in some states.

(9) Silk gland- These are tubular structure found just below the alimentary canal. In fifth instar larva they occupy almost the entire body cavity ventral to the alimentary canal and account for about fifty percent of the weight of larva . Silk producing apparatus is a paired organ (transformed labial gland) situated on the ventro lateral side of the body It is the second largest organ of the body. Morphologically the silk gland has three distinct region Posterior middle and anterior region.

Anterior region - is straight and small composed of about 250 secretary cells. The anterior end of anterior division of the gland open into mouth through a spinneret.

Middle region- is thick and divided in to three parts fore, mid , hind and produce sericin.

Posterior region – it is highly coiled curved and secret fibronine. Fibronin is a non soluble scleroprotein where is sericin is soluble in hot water.



(s-spinneret, F- Lyonnet's gland , A-anterior, M-middle part, P- posterior region)

(10)Silk reeling is the process by which a number of cocoon baves are reeled together to produce a single thread. This is achieved by unwinding filaments collectively from a group of cooked cocoons at one end in a warm water bath and winding the resultant thread onto a fast moving reel. Raw silk reeling may be classified by direct reeling method on a standard sized reel, indirect method of reeling on small reels, and the transfer of reeled silk from small reels onto standard sized reels on a re-reeling machine. The last technique is primarily applied in modern silk reeling processes.

Various silk reeling devices

There are many types of silk reeling machines in use.

1. Hand spinning wheel

This primitive spinning apparatus is operated by two hands – one to drive the wheel and the other to feed in cocoons. One end of the reeling thread is wound onto each wheel, while cocoons are boiled in a separate pot.

2. Charka type reeling machine

The Charka type is in use in India. This machine is operated with separate work motions in reel driving and cocoon feeding to reeling ends by two men per machine. Each machine has 3 ends or more to a reel, which is the same size as the large wheel of the Re-reeling machine in order to save the re-reeling process (direct reeling method).

3. Sitting type reeling machine

There are two kinds of sitting type reeling machines, foot operated and motor-driven .The motor-driven reeling machine is not equipped with the stop motion attachment .There are obstacles to the production of good quality raw silk as the raw silk thread is wound too rapidly to maintain good quality control.

4. Multi-ends reeling machine

This machine eliminates the disadvantages of the Sitting type reeling machine by increasing the number of reeling thread ends per basin and reducing the reeling speed. The operator must stand when running this machine as the number of reeling threads per basin increases by twenty-fold. This is also called a "Standing type reeling machine". Reeling efficiency is unchanged. Quality is better due to reduced speed.

5. Automatic reeling machine

The Automatic reeling machine mechanizes the processes of groping ends, picking ends; cocoon feeding to reeling thread and separation of dropped end cocoons during the reeling

process. The efficiency of the Automatic reeling machine compares favourable with the manual Multi-ends reeling machine.

(11) Powdery mildew :

Causal organism: *Phyllactinia corylea*

Symptom:

White powdery patches appear on the lower surface of leaf which is gradually increased and cover whole leaf surface.

Affected leaves turn yellowish and defoliate prematurely. Peak season: October-November

Control measure: Foliar spray of 0.2% Sulfex 80 WP 2 g/l. Lower surface of the leaves should be thoroughly drenched

• **Leaf rust :**

Causal organism: *Peridiospora mori*

Symptom:

Several small pin head shaped brown postules appear on the lower surface of mature leaves

Reddish brown spot appear on the upper surface of the infected leaves.

Severely infected leaves turn yellowish and margin of the leaves become dry.

Peak season: February-March

Control measure: Foliar spray of 0.2% Blitox 50 WP or 0.2% Bavistin 50 WP.

2. **Leaf spot :**

Causal organism: *Cercospora moricola*

Symptom:

- Circular light brown spots appear on both sides of the leaves.
- The adjacent spots unite together to form a larger spot
- The necrotic tissues of such spots drop out and form the characteristics
- Highly infected leaves defoliate prematurely

Peak season: Rainy and winter season.

Control measure:

- Avoid dense planting.
- Collect and burn unused infected leaves after pruning.
- Spray 0.1% Bavistin when disease symptom appear 2-3 times at ten days interval. Safe period: 7 days.

3. **Sooty mould:**

Causal organism : A group of ascomycetes and deuteromycetes fungi.

Symptom : Thick black coating developed on the upper surface of the leaves.

Peak Season: August-December.

Bacterial blight :

- Foliar spray of 0.02% Monocrotophos on 15th and 30th day of pruning to control.
- Spray 0.2% Indofil M-45 75 WP to check the growth of saprophytic fungi.

Foliar diseases of mulberry reduce the yield and quality of leaf thereby affecting silkworm rearing especially during rainy and winter seasons. The cumulative loss due to major foliar diseases is upto 15-18%, besides deteriorating the leaf quality. The following technologies were developed for the control of major foliar diseases to avoid the leaf yield loss.

Leaf spot : The disease caused by a fungus, *Cercospora moricola* is more prevalent during rainy and winter seasons. The symptoms are brownish necrotic, irregular spots on the leaf surface which enlarge, coalesce and leave the characteristic.. Foliar spray of 0.2% Bavistin (Carbendazim 50% WP) solution (2 g Bavistin in 1 litre water) has been found effective.

4. Root knot Disease

It is caused by a bacteria, *Pseudomonas syringae* pv. *mori*/*Xanthomonas campestris* pv. *mori* and is common during rainy season when there is high humidity and temperature. It shows numerous blackish brown irregular water soaked patches on the leaves resulting in curling and rotting of leaves. Step-up pruning (30 cm above the ground) during rainy season in high rainfall areas and spraying 0.2% Streptomycin or Dithane M45 (Mancozeb 75% WP) with safe period of 2-3 days are recommended.

Methodology:

- 150-180 litres of fungicide solution is required for one-acre garden. The quantity is obtained by dissolving 300-320 g/ml of chemicals in 150-180 litres of water.
- 1st spray is to be given 30-35 days after pruning/leaf harvesting. 2nd spray has to be given 10-15 days after first spray, if the disease is not controlled. Safe period is 5 days.

Root knot is one of the major diseases limiting crop production throughout the world. It can occur any time of the year mainly in sandy soils low in organic matter. The severity of the disease increases with increased age of the garden. The estimated yield loss due to the disease is 15-30%. Infected plants become weak and predisposed to other diseases while severely infected plants ultimately die.

Causative organism: The organism causing root knot disease is a nematode *Meloidogyne incognita*, an endoparasite inhabiting mulberry roots.

Symptoms:

- Stunted growth
- Poor and delayed sprouting
- Reduced leaf size and yield

- Chlorosis and marginal necrosis of leaves, yellowing and wilting of leaves in spite of adequate soil moisture availability
- Death of plants in severe cases

Symptoms on the underground parts :

- Formation of gall/knots on roots
- Reduced and stubby root system.
- Retarded root growth.
- Necrotic lesions on the root surfaces and death of active rootlets.

Chemical control : Chemical methods of nematode management become necessary in sick soils and heavily infested gardens as they give quick results. Furadon 3 G (40 kg/ha) can be applied either in furrows or broadcast to the soil after light harrowing followed by irrigation. The leaves from treated plots can be fed to silkworms after 45 days.
