22/10/2018 (14)

प्रति,
मा. प्राचार्य,
गोपाळ कृष्ण गोखले कॉलेज, कोल्हापूर

विषय - बी. एस्सी भाग - 3 प्राणीशास्त्र शैक्षणिक सहली बाबत

महोदय -

आपल्या पूर्व परवानगीने बी. एस्सी भाग - 3 प्राणीशास्त्र विभागाची एक दिवसाची शैक्षणिक सहल मंगळवार दिनांक 23/10/2018 रोजी "रेशीम अंडीपुंज निर्मिती केंद्र" मार्केट यार्ड गडहिंग्लज येथे जाणार आहे.

शैक्षणिक सहलीचा प्रोग्राम खालील प्रमाणे आहे.

दिनांक 23/10/2018 रोजी सकाळी ठिक 9.00 वाजता गोपाळ कृष्ण गोखले कॉलेज येथून खाजगी बसने संकेश्वर मार्गे गडहिंग्लज येथील रेशीम अंडीपुंज निर्मिती केंद्र येथे 11.30 वाजेपर्यंत पोहचणे 11.30 ते 2.30 पर्यंत निरिक्षणे व अभ्यास मार्गदर्शन. दुपारी 2.30 ते 3.30 पर्यंत जेवण व 4.00 नंतर कोल्हापूरकडे प्रयाण सायंकाळी 6.30 पर्यंत गोखले कॉलेज येथे पोहचणे.

विद्यार्थी व स्टाफ यांच्या नावाची यादी सोबत जोडली आहे.

Head of the Zoology Department
GOPAL KRISHNA GOKHALE COLLEGE
KOLHAPUR.

22/10/2015

गोपाळ कृष्ण गोखले कॉलेज, कोल्हापूर

बी.एस्सी भाग - 3 प्राणिशास्त्र विभाग

दि. 23/10/2015 रोजी "रेशिम अंडीपुंज निर्मिती केंद्र" गडहिंग्लज येथे शैक्षणिक सहलीस जाणाऱ्या विद्यार्थी व स्टाफ यांच्या नावाची यादी खालील प्रमाणे

अ.नं	विद्यार्थी नाव	रोल नंबर	वय	फोन नंबर
1)	श्री भावे सारंग अविनाश	121	21	9404073790
2)	कुमारी बुगाडे प्रमिला हिंमत	122	22	8625829585
3)	श्री चौगुले ओंकार बाबुराव	123	21	9767812636
4)	कुमारी चौगुले भक्ती प्रकाश	124	19	8208001102
5)	कुमारी कांबळे मनाली बाबुराव	125	21	9112498703
6)	कुमारी कामते आरती सुनिल	126	21	8378093724
7)	कु. ओगांडुरी मंजुळा चंद्रशेखर	127	21	9422048923
8)	कुमारी पाटील ऐश्वर्या मारुती	128	21	7887752758
9)	कुमारी पाटील प्रियांका चंद्रकांत	129	26	9284532160
10)	कुमारी जैन मानसी मदनलाल	130	21	8149851963
11)	कुमारी सालपुते वैष्णवी भगवंत	131	19	8421478473
12)	कुमारी सावतेकर श्रुतिका हिंदुराव	132	20	9689894318
13)	कुमारी सूर्यवंशी राजश्री भगवान	133	20	9850136595
14)	प्रा. सौ. शितल महादेव जौंगाळ	प्राध्यापिका	31	9890108047

Head of the Zoology Department
GOPAL KRISHNA GOKHALE COLLEGE
KOLHAPUR.

REPORT ON FIELD VISIT TO SERICULTURE

(Silk Production By Silkworm)

Department :- ZOOLOGY

Academic Year :- 2018-19

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DATE / /

* ACKNOWLEDGEMENT *

We would like to express our special thanks of gratitude to Dr. Mrs. Manjiri A. More. Head of the department of "ZOOLOGY" for arranging this steady tour. Furthermore we like to acknowledge to Mrs. S. M. Jamjal madam, who successfully handed Steady tour.

At the last but not least we would like to thanks all who are involve in this steady tour which was one of the amazing experience for all of us.

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Aim :- To visit silkworm seed production centre, gadhinglaj and study of "Sericulture Production".

- Event Title :- Sericulture Visit.
- Event Date :- 23rd October, 2018.
- Event Conduction Duration :- 3-4 hour.
- Event Venue :- Silkworm Seed Production Centre.
- Event Location :- Gadhinglaj (16°23'N 74°35'E) 57 km.
- Time Of Departure :- 9:00 am
- Time of Arrival :- 7:00 pm
- Event Resource Person Details

Speaker Name :- Shri. Prakash Patil
Designation :- Project Officer (Expert from Gadhinglaj)
Company name :- Sericulture Department (Maharashtra).

- Outline :- Department of Zoology has organized a field visit to demonstrate "SERICUITURE"- Cultivation of silkworms to produce silk. The event was held on 23rd Oct. 2018, within Gadhinglaj.

Project officer from sericulture department in association with farmers were there to demonstrate.

The event was organized after theoretical lectures on respective topic by faculties of Zoology Department.

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- Objective :- The objective of this field visit to demonstrate the life cycle of Silkworm (Bombyx Mori).

1) Practical exposition of agriculture of this field visit to of mulberry to obtain its leaves, on which silkworm caterpillar feeds.
2) Observe the life cycle of Bombyx Mori - hundreds of eggs were laid on leaves, caterpillar feeding on leaves of mulberry, cocoon collected to extract silk, Adults collected in jars.
3) Illustrations of equipments used in rearing silkworms.
4) Cost effective methods and material required to establish sericulture.
5) Application and Economic importance of Silk Culture.
6) Funding and compensation provided to farmers / owners by government to establish Sericulture farm.

- Outcome :- This field visit was of great use for Students after theoretical knowledge they obtained in lectures, Students were exposed to the practical and financial aspects to establish their own sericulture and silk production units. Furthermore Students collected life cycle stages (Eggs, Caterpillar, cocoon and adults) of Bombyx mori. Understanding towards the concept and its application of sericulture was clearer to Students after this visit.

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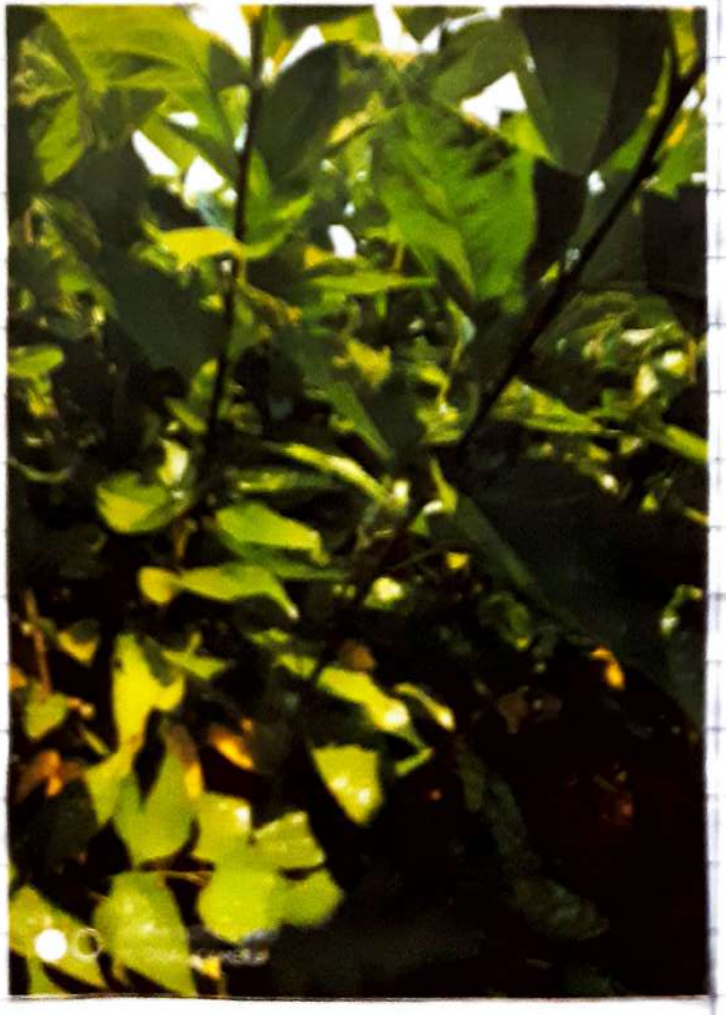
Mulberry Production :-

Mulberry leaves product under recommended fertilisation are known to be nutritions for silkworm. Nitrogen fertilization significantly increased mulberry leaf and shoot yield.

Harvesting of tender and succulent leaves are done in cool weather so as to maintain the nutritive quality and freshness of the leaves.

Growth of mulberry and quality of the leaves are effected by various environmental factors such as as temp. Humidity, Sunshine & rainfall.

A basal dose of organic manure like Compost or cattle manure should be applied at the rate of 20 tonnes per hectare for irrigated mulberry 15 to 20 days before planting.



← Mulberry Plants

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Egg Production :-

Seed cocoons should be preserved at an optimum temp. of 23°C to 25°C and optimum humidity of 75 to 80%. Coupling pairs are to be kept in semi-dark condition & preferably at a temp. of 24°C to 25°C.

The moths usually lay maximum eggs from the afternoon emirads and reach the peak of oviposition for 18 to 12 hrs. loose eggs are washed with a salt solution of 1.06 to 1.10 specific gravity to separate out the un-fertilised and dead eggs which float on the surface of saline solution.

The hydrochloric acid used for egg treatment must be absolutely pure and should have a sp. gravity of 1.064 to 46.1°C when the acid treatment is conducted for 4 to 6 min.

The cocoons of 5th day of spinning can be stored at 5°C for a maximum period of 3 days and the male moths can be stored at 7°C for 7 days.

Cold storage of first emerging moths can also be done at a temp. of 7° to 8°C for about 3 days. A temp. of 23 to 25°C and related humidity of 70 - 80% should be maintained in the grainage for easy emergence of moths & egg laying.

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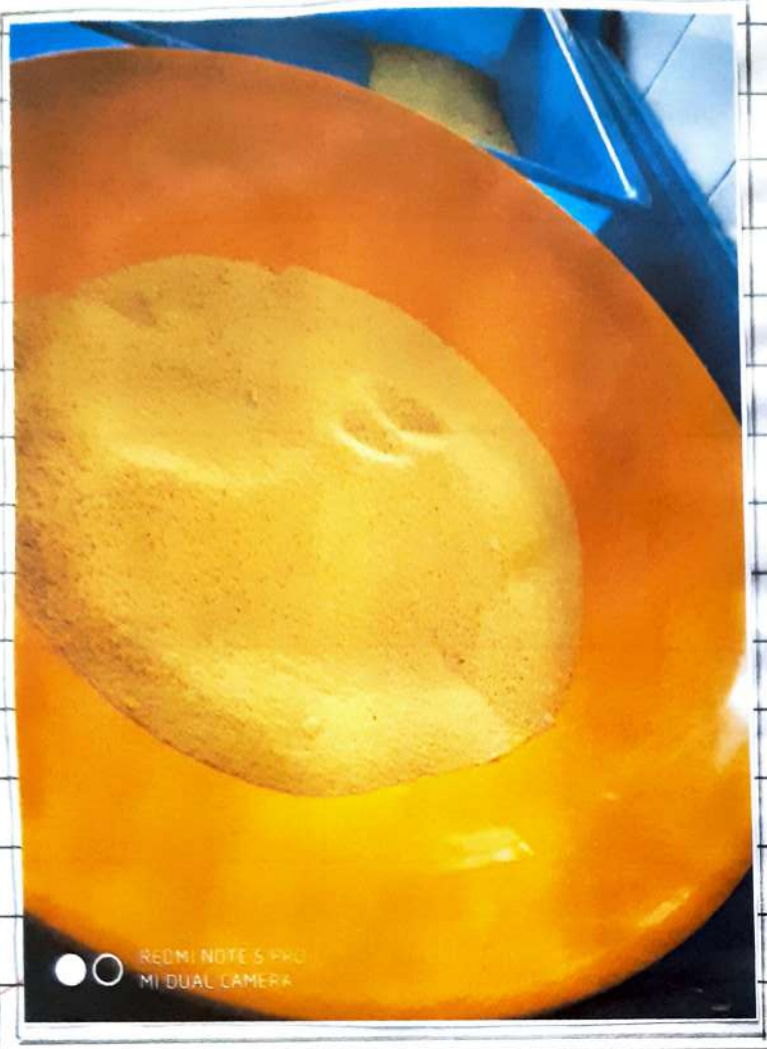

← FC-1 eggs.
(pure yellow)

FC-2 →
(blackish yellow)

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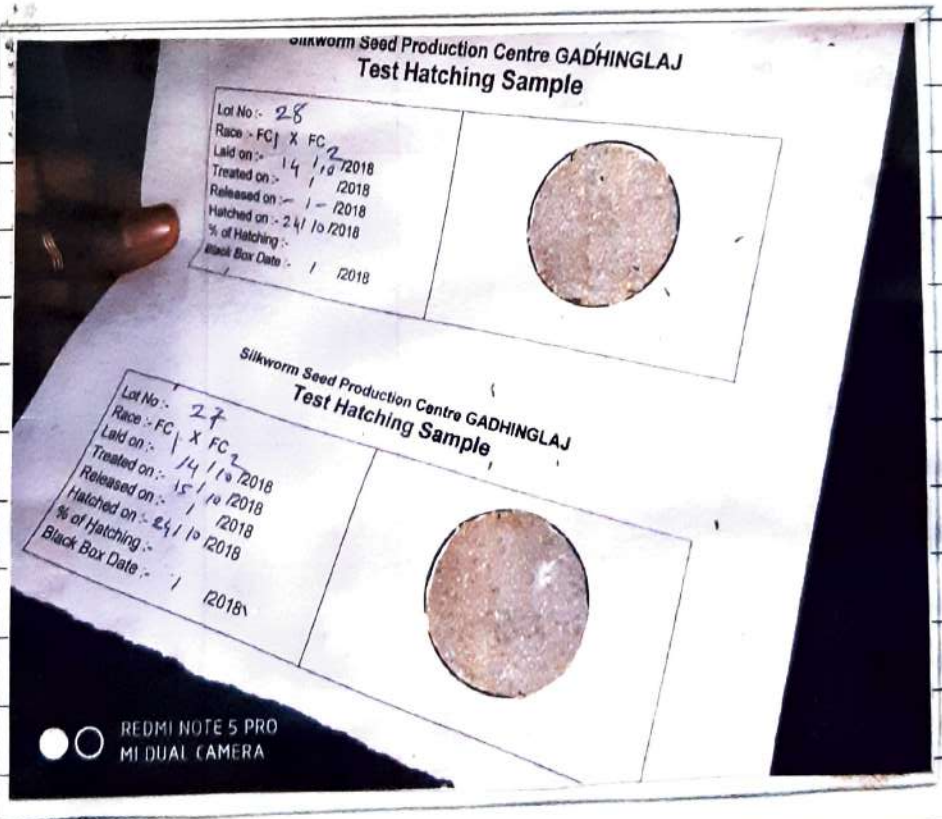
← Hatched eggs of Silkworm

Test Hatching Sample →



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Silkworm Rearing :-

The egg cards with the new emerged silkworm larvae are placed in the trays or bares and tender mulberry leaves cut into small bits of size 0.5 cm^2 are sprinkled over the egg cards. Thus making silkworms to crawl to feed on the tender leaves. The egg cards are removed and only worms still left on the cards are tapped gently on to the rearing seat and brushing is done.

Feeding silkworms with the top tender leaves of mulberry leaves was found nutritionally richer to the Chawki worms and mature leaves to the late age worms was most important from the view point of good health and vigour of the leaves and reeling quality of the cocoons.

A temp. of 25 to 26°C was to be maintained during the incubation and till hatching of eggs. Humidity of the room atmosphere was to be maintained at 75 to 80%.

Optimum development of silkworms larvae as well as the eco. characters of their cocoons were greatly influenced by the nutritional states of mulberry leaves.

Considerable extent of leaf moisture to be lost during storage of mulberry leaves consequently making the mulberry leaves less acceptable to the silkworms. The loss of moisture was low under cultivation alkathene covers and gunny cloth storage, where in the leaves remained succulant even after 24 hrs. of storage and both the methods of storage were found to be cheap and practicable and acceptable by most farmers.

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↑

Silkworm feeding on mulberry leaves.

↓

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It is concluded that optimum temp. for rearing silkworms of different instars is as follows :-

Instars	Temperature (°C).
I	26 - 28
II	26 - 28
III	24 - 25
IV	24 - 25
V	23 - 24

The mulberry leaf chopped for different ages of silkworms is 0.5 cm^2, 2 to 4 cm^2, 4 to 6 cm^2 and entire leaves for 1st, 2nd, 3rd, 4th & 5th instar larvaes, respectively.

Observing feeding of silkworms

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Stages of Production :-

1) The silk moth lays 300 to 500 eggs.

2) The silk moth eggs hatch to form larvae or caterpillars, known as silkworms.

3) The larvae feed on mulberry leaves.

4) Having grown and moulted several times, the silkworm extrudes a silk fibre and forms a net to hold itself.

5) It swings itself from to side in a figure '8' distributing the saliva that will form silk.

6) The silk solidifies when it contacts the air.

7) The silkworm spins approximately one mile of filament and completely encloses itself in a cocoon in about two or three days. The amount of usable silk in each cocoon in about two to three days. The amount of usable quality silk in each cocoon is small. As a result, about 2500 silkworms are required to produce a pound of raw silk.

8) The intact cocoons are boiled, killing the silkworm pupa.

9) The silk is obtained by brushing the undamaged cocoon to find the outside end of the filament.

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10) The silk filaments are then wound on a reel. One cocoon contains approximately 1,000 yards of silk filament. The silk at this stage is known as raw silk. One thread comprises up to 48 individual silk filaments.

Male Pupa.

← Male & Female Silkmoths

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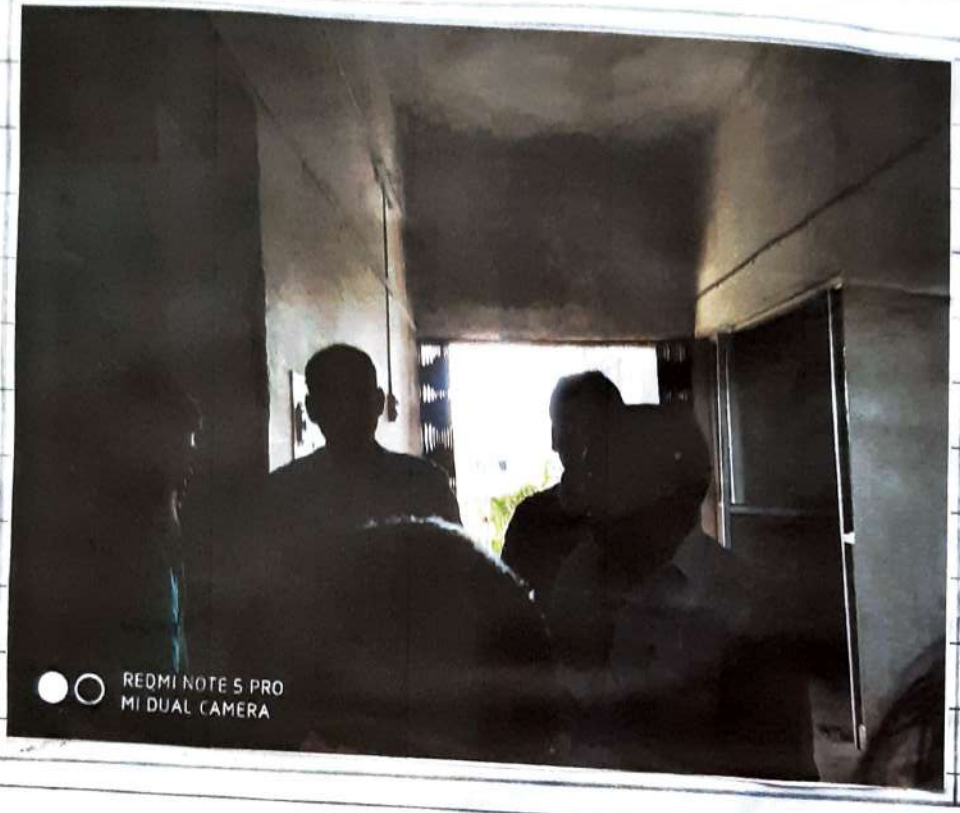

Discussion about sericulture.

Observation of Cocoons.

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* MERITS OF SERICULTURE

1) High employment potential.
2) Low gestation, high returns.
3) Provides vibrancy to village economics.
4) Women friendly occupation.
5) Ideal programme for weaker Sections of the Society.
6) Eco-friendly activity.
7) Satisfies Equity Concerns.

• Uses of Silk

1) Mainly in textile industry for manufacturing garments
2) Bags, telephone cable insulations, dyeing and screen printing.
3) Silk threads is used as a non-absorbable surgery sutures.
4) It is also occasionally used to make the casing of bicycle tires, cotton and nylon are also used for this purpose.
5) It is also used in skiing garments because of its ability to keep body warmth contained and because it is lightweight.

* Disease :

1) Pebrine Disease :-

Caused by "Nosema Bombycis" which is a protozoan. Larvae become pale yellow, size reduces and no yield.

• Control measures of pebrine disease.

1) Carry out surface sterilization of disease free layings by dipping egg cards in 2% formalin solution for 10 minutes followed by washing in running water.

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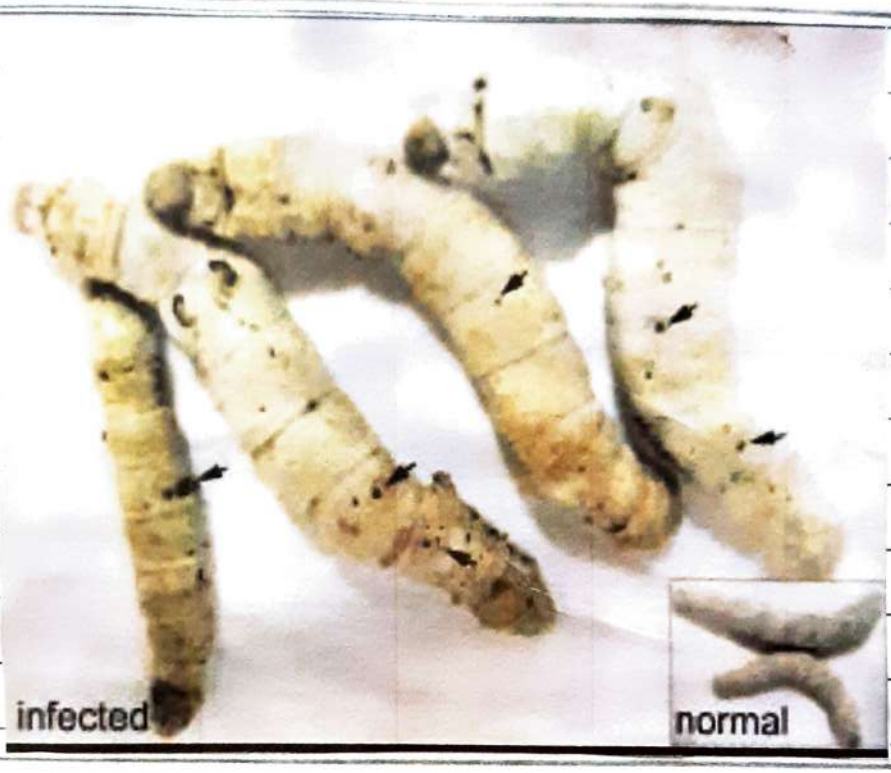
ii) Follow steict disinfection of rearing room, appliances and surroundings of rearing area.



← Pebrine infected silkworms

2) Grasserie :-

Grasserie is a viral disease in silkworm caused by Nuclear Polyhedrosis (NPV), Cytoplasmic Polyhedrosis (CPV) and Infectious flacherie.

Nuclear Polyhedrosis (NPV) :- It is a major viral disease in silkworm. It is caused due to the presence of high of high temperature, high humidity and feeding of poor quality mulberry leaves.

Control measures of grasserie :

i) Rear the larvae under clean & hygienic condition.
ii) Pick out diseased, weak and injured larvae and destroy

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them properly.

iii) Provide suitable and timely feed during rearing.

← Grasserie infected silkworms.

3) Muscardine (Fungal disease) :-

Due to fungi, mortality occurs due to heavy rainy and unhygenic. The white muscardine in silkworm is caused by a fungus, Beuveria Bassiana. The disease is caused due to body contamination by the fungus. The fungus grows well in under low temperature.

- Control measures for muscardine disease.

i) Infected larvae should be picked up and burnt.

ii) Provide quality leaves and maintain proper spacing during rearing. Avoid dusty leaves.

iii) As a specific measure, dust Diathene - M-45 in kaolin or Captan in slaked lime on silkworm body immediately

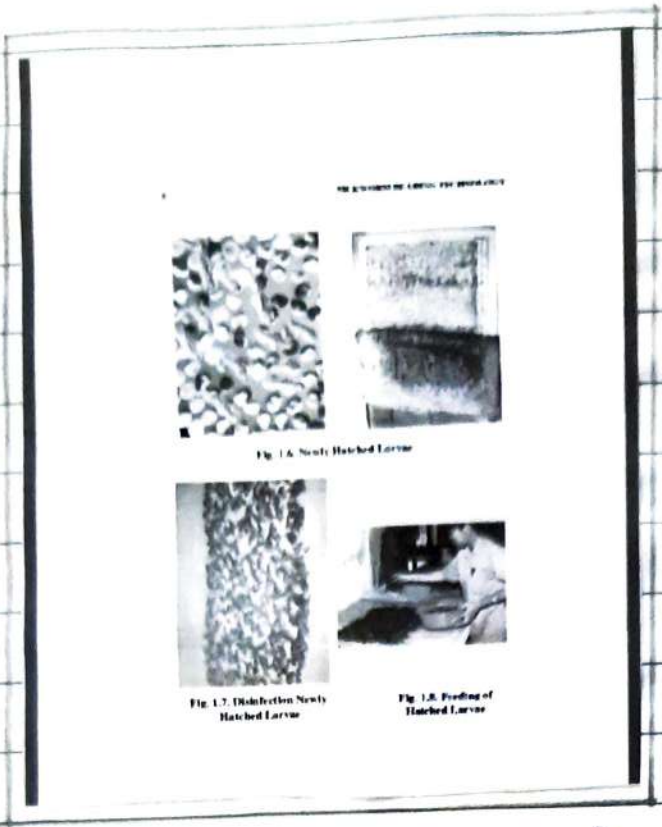

Fig. 1.6. Newly Hatched Larvae

Fig. 1.7. Disinfection Newly Hatched Larvae

Fig. 1.8. Feeding of Hatched Larvae

a) Newly Hatched larvae b) Disinfection newly hatched larvae

c) Feeding of Hatched larvae.

Separating of Infected and non-infected cocoons.

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* FLOWCHART FOR LOOSE EGG PREPARATION *

Preparation of starched sheets.

⇓

Pairing, depairing in separate trays.

⇓

Ovipasition on starched sheets.

⇓

BIVOLTINE EGGS

⇓

Soaking in water for 10-15 min.

⇓

washing and collection in trays.

⇓

Eggs for Chilling Cold Store for 30-115 days	For Common acid treatment	Eggs contemplated for hibernation
⇓	⇓	⇓
Release from Cold storage through 15°C	ACID TREATMENT	Degumming with 0.2 to 0.3 % bleaching powder Sol.n for 10-15 mins.
⇓	Sp. Gr. 1.075 1:10 HCl	⇓
Acid Treatment HCl 1:10	Temp. 46.1°C · 25°C HCl	washing & drying
Sp. Gr. Temp. 47.8°C	Dipping - 5.1/2 min	and preservation
Duration - 5-6 min	60-90 min	in trays.
⇓	⇓	⇐
Washing	Cold storing for 4/6/10 months.	
Drying	After termination of schedules	
Winnowing	release from Cold Storage.	
Packing ⇒	If req.d Cold store for postponement of brushing.	
Incubation ⇒	Release through 15°C.	
Brushing		

Male & Female Silkmoth mating.

Mating of moths.

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* LIFE CYCLE OF SILKWORM *

Hatching of the eggs

⇓

Newly hatched silkworms feeding on mulberry leaves.

⇓

Second day silkworms.

⇓

Youngs silkworms setting for 1st moult.

⇓

First Moulting :-

⇓ 6th day of silkworm - getting ready for 2nd moult.

Second Moulting :-

⇓ 10th day of silkworm - getting ready for 3rd moult.

Third Moulting :-

⇓ 12th day of silkworms.
14th day of silkworms.

Fourth Moulting :-

21st day of silkworms.
22nd day of silkworms.

⇓

Cocoon making by silkworms.

⇓

Pupation - silkworm transforming itself to a pupa.

⇓

Transformation of pupa into moth.

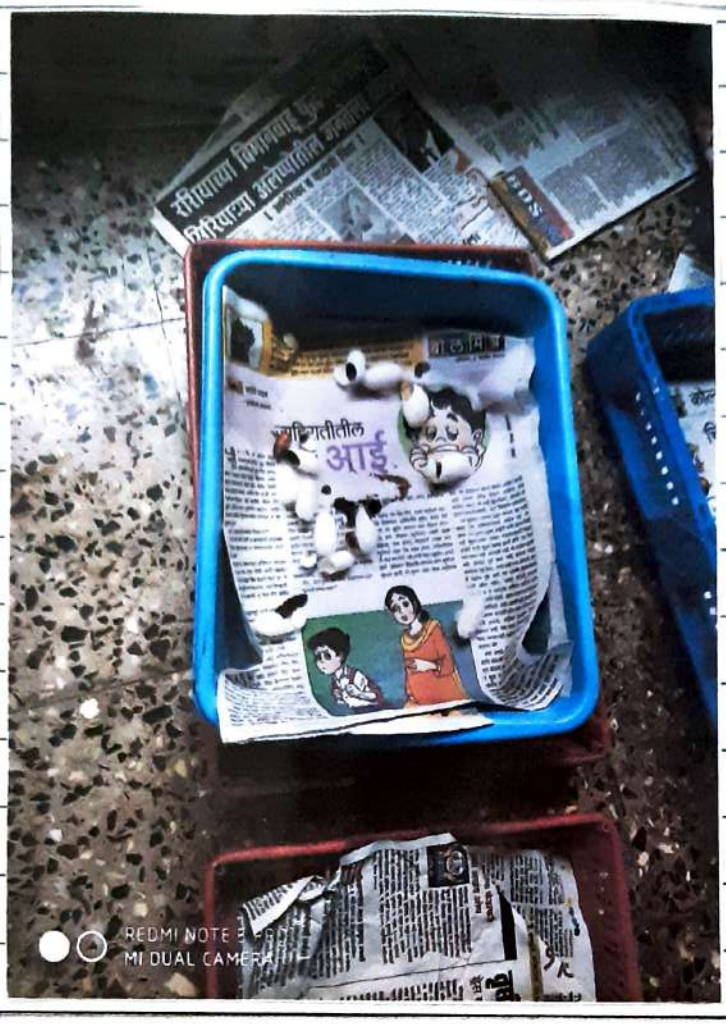
⇓

Silkworm moth emergence from cocoon.

⇓

Mating of the silkworm moths.

laying of the eggs by a silkworm moth.



Infected cocoons

Silkmoth discharging fecal matter

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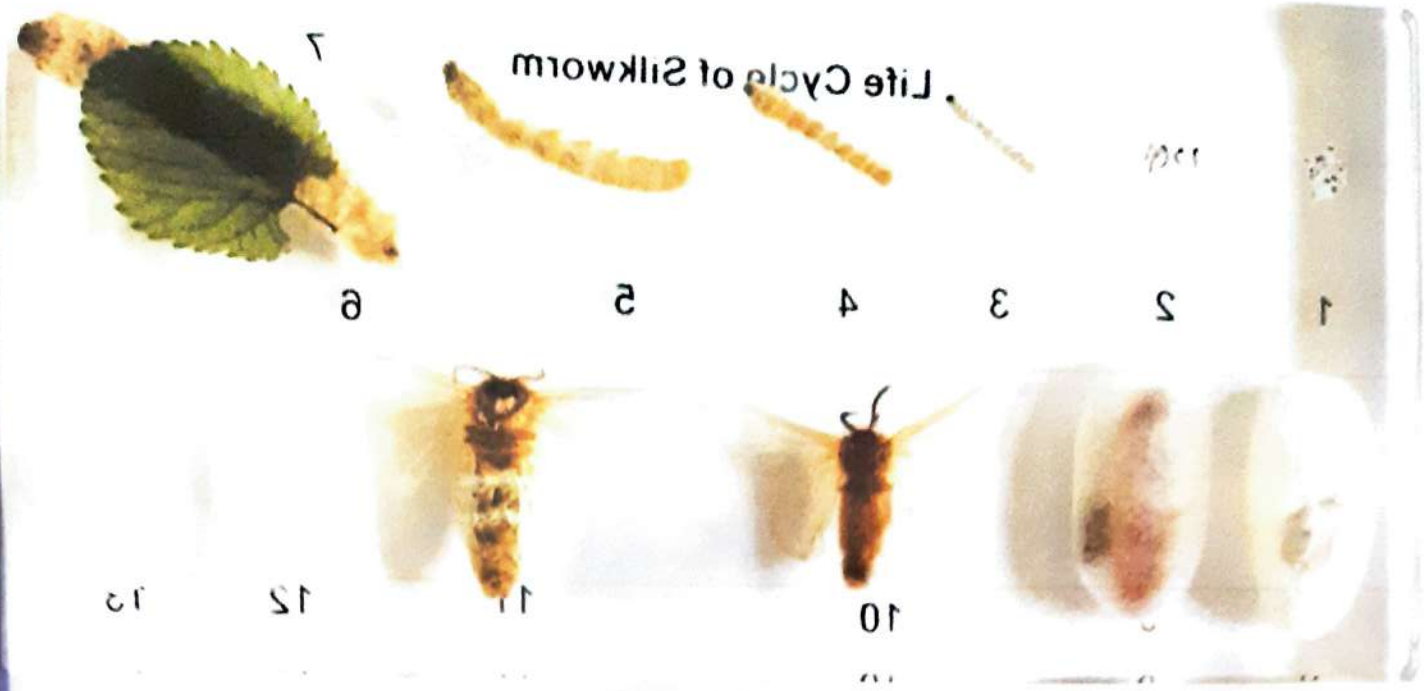
Women working

Separation of cocoons.



Life Cycle of Silkworm.

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* CONCLUSION *

Sericulture biologically means that the cultivation of silkworm. Mulberry plants are typically used as cultivating plant. "Bombyx Mori" is the most important silkworm. Sericulture is the production of raw silk by raising silkworms. The productivity and profitability of sericulture depends on the yield of mulberry crop. It is a cottage industry combining agriculture and industry. The end product of this agro-industry is silk. The production process of silk involves a long chain of inter dependent specialized operations such as mulberry cultivation, silkworm seed production, rearing of silk-worm, reeling, twisting and weaving of silk, etc. which provide employment to about 60 lakhs people in the villages of India through family labour and is the second largest employer in the country. Sericulture is an export oriented agro-industry. Indian silks are exported to more than 50 countries and gains about 800 crores of rupees each year from it. We have a unique position among the silk producing countries. Because India is the only country in the world producing all the four commercially important varieties of natural silk - Mulberry, Tasar, Eri, and Muga silk.

Mulberry 7-2-2019

T.Y. Students

Thank You

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