



## **PRODUCTION MECHANISMS OF MUGA AND ERI OF ASSAM - A CASE STUDY**

**Narendra Kumar Das**

Assistant Professor, Department of Geography, Digboi College,  
Digboi, Assam

### **Abstract:**

*Muga the golden silk is a wonderful gift of nature, known for its glossy fine texture and durability. The muga mkhela chador is a traditional dress of assamese women for bihu dances and weddings. It is in demand in Japan to make kimonos, and in countries such as the U.S. Greece, Germany, South Africa and France. The Golden yellow Muga silk of Assam has been granted Geographical Indication (GI) registration by the GI registry in Chennai.*

*North-Eastern region of India with tropical to temperate climate holds indomitable positions in the global sericulture map having all the four varieties of silk i.e., Mulberry, Oak Tassar and Muga. The prime aim of the study is to gather knowledge on the muga culture right from its rearing till yarn production. Moreover to draw a micro level study step by step with different technologies and to protect the culture for future by updating ourselves and to bring the culture worldwide. The topic has been selected for the study as because this precious culture of Assam is now on the way of extinction due to industrial setup and job orientation in the minds of the youth. Assam has every potentiality to grow such kind of local industries because of the availability of all the factors for its production. In near future it may increase the employment conditions for educated youths. It may also decrease the unemployment conditions and hence step towards the overall development of the economy.*

### **Introduction:**

North Eastern region of India with tropical to temperate climate holds indomitable position in the global sericulture map having all the four varieties of silk, viz. Mulberry, Oak Tasar, and Eri & Muga. Sericulture in this region provides gainful occupation to nearly 1.80 lakh families. However the strength of the region lies mainly with Muga and Eri culture. Sericulture is mainly practical in Assam, Meghalaya, Arunachal Pradesh, Nagaland and Manipur of N.E. India. Of course nowadays this culture is spreading to certain non-traditional states of India viz, Andhra Pradesh, Gujarat, Madhya Pradesh, Chhattisgarh, Tamil Nadu, Karnataka, Maharashtra, Uttaranchal, Uttar Pradesh, Jharkhand, Bihar West Bengal Orissa and Sikkim. The north east India shares 77% of the total non-mulberry raw silk produced in the country. The producing golden yellow unique distinction though wild counterpart of Muga silk worm in found available in nature in the foothills of Meghalaya, Nagaland and Arunachal Pradesh.

In order to provide R&D support in Muga and Eri silk industry in North east India. Central silk board (CSB), Ministry of Textile, Govt. of India established central Muga Eri Research Station at Titabor , Assam in 1972, which was later bifurcated into regional Seri cultural research station, Titabor for mulberry research and regional Muga research station ( shifted to Boko) during 1982 for Muga. Again during 1987, CSB established on exclusive research and training institute for Muga and christened as central Muga research & Training institute at lahoigarh, Jorhat. It come into being as full fledged institute in 1999 and was renamed as central Muga Eri research and training institute (CMER&TI)

Muga the golden silk wonderful gift of nature, known for its glassy fine texture and durability. Due to its low porosity the muga yarn can neither be bleached nor dyed

and its natural golden colour is retained. This silk can be hand washed with its luster increasing after every wash. Muga silk is obtained from semi-domesticated silk worm called *Antheraea Assamensis*. The muga mekhela chador is a traditional dress of Assamese women for bihu dances and weddings. It is in demand in Kimonas, and in countries such as the U.S. Greece, Germany, South Africa and France. The Golden yellow muga silk of Assam has been granted Geographical indication (GI) registration by the GI registry in Chennai. It has been identified as a silk of given quality, reputation and characteristic, attributable to the geographical area of Assam since time immemorial.

**Objective:**

The main objectives of the study are as follows:-

- To know about the most precious culture of Assam.
- To study the production and processing of Muga.
- To access the contribution of this culture towards the socio-economic development.
- To access the future prospects of muga culture.

**Collection of Data and Methodology:**

This study involves the observation and learning the culture of Muga regarding its production and processing to produce finish products. Here the primary and secondary data collection methods are used to fulfill the field work the data relating to the rearing, research and spinning to threads are taken from the central Eri Muga Research and training Institute Lahdoigarh, Jorhat. Other information like climate conditions for rearing of Muga and its processing are also taken from the institute. The electronic media camera is used intensively for capturing different photographs of the cycle from rearing to processing.

**Physical Background of the Study Area:**

CMER and TI are located at Lahdoigarh, adjacent to Gajporia village under central Jorhat Development Block, Chipahikhola. It takes only half hour journey by road both from Jorhat ASTC bus stop, Jorhat Railway station and one hour from Airport. Jorhat city is approachable easily from Guwahati, the capital of Assam, by air/bus/train. It is a strategically located district of Assam in the North Eastern part of India, which is famous for tea, timber and the world's biggest riverine island "Majuli".

Latitude: 27° 35' to 26° 30' N. Longitude: 93° 45' to 94° 30' E

Altitude: 90-100 m above Mean Sea Level

In respect of the topography of the study area it is plain.

The drainage pattern of the region is comparatively good in condition. Although the Brahmaputra River is far away from the region it is endowed with two other small rivers namely Meleng and Bhogdoi. So the rich in drainage pattern contributes more to the agricultural productivity of the region, and other drainage related aspects.

Climate is moderate with 6°-36° temp., 51-100 percent, relative humidity and 1200-1500 mm of average annual rainfall. Seasons are divided into four groups-

Summer: April-June. It is usually hot and humid.

Monsoon: July-September. It is favorable, but sometimes creates problems like water logging.

Autumn: October-November. It is extremely pleasant.

Winter: December-February. It has typical characteristics like scanty rainfall and foggy as misty morning s and evenings.

It is already mentioned that the region is endowed with two small rivers and for that region the soil contains young alluvium. The soil is rich in alluvium deposits. So in simple word we can say that the soil is alluvial soil.

The vegetation is primarily of tropical type covering areas of evergreen, semi-evergreen, deciduous forest and grasslands. The area is endowed with quite a good no of medicinal plants including several rare, endangered and endemic species. A comprehensive list has been presented in the report. The list includes indigenous and wild plants which have certain medical uses.

**Flora Stock of the Study Area**

<b>S.No</b>	<b>Botanical Name</b>	<b>Family</b>	<b>Local Name</b>
1	Abelmoschus	Malvaceae	Gorokhia koroii
2	Abrus precatorious	papilionaceae	Latumoni
3	Acacia catechu	Mimosaceae	Khair
4	Aegle Marmelos	Rutaceaea	Bel.
5	Ajuga Dracteosa	Lamiaceae	Nilakantha.
6	Allium Sativnm	Liliaceae	Naharu
7	Aloe barbadensis	Liliaoceae	Salkonwori
8	Alstonia Scholaris	Apocynaceae	Satiana
9	Alternanthera	Amaranthaceae	Mati Kanduri
10	Amaranthus Spinosus	Amaranthaceae	Khutora
11	Areca Catechu	Arecaeae	Tamul
12	Azadirchta Indica	Meliaceae	Mahanim
13	Bacopa Monieri	Scoophulariaceae	Bhahmi
14	Blackmum Orientale	Blechnaceae	Dhekia
15	Brassica Suncea	Brassicaceae	Lai
16	Butea Monosperma	Fabaceae	Palas
17	Camellia Chinensis	Theaceae	sahgos
18	Centella Asiatica	Aplaceae	Manimuni
19	Chenopodium Album	Chenopodiaceae	Jilmilsak
20	Cinamonum Tamala	Lauraceae	Tejpat
21	Coriandrum sativum	Apiaceae	Dhania
22	Costus Speciusus	Ziongiberaceae	Jomlakhuti
23	Curcuma Domestica	Zingiberaceae	Haladhi
24	Datura Fastuosa	Silanaceae	Dhatura
25	Dioscorea Bulbifera	Disscoriaceae	Bathalu
26	Sclipta Alba	Asteraceae	Kenharaj
27	Erythrima Staicta	Fabaceae	Madar
28	Hedyotis Scandens	Rubiceae	Bhedelilata
29	Ipomia Batatas	Convolvulaceae	Mithaalu
30	Ipomea Criocarpa	Convolbulacea	Kalmow
31	Lagenaria Siceraria	Suphorbiacea	Amlokhi
32	Lagenaria Siceraria	Cucurbitaceae	Jatilaw
33	Laqerstroemiaspeciosa	Lythraceae	Azar
34	Laportea Genulata	Urticaceae	Soratgos
35	Leucas Linifolia	Lamiaceae	Droonbon
36	Lawsonia Inermis	Lythraceae	Jetuka
37	Litsea Snlicifolia	Lauraceae	Disheole
38	Macrosolen Cochinchensis	Lorantnaceae	Roghumola
39	Messua ferrea	Clusiaceae	Nahor
40	Mimosa Pudica	Mimosaceae	Nilajiban

41	Mimuspops elemji	Sapotaceaea	Bokul
42	Moringa oleifera	Moringaceae	Sajina
43	Morus Alba	Moraceae	Nunigoss
44	Murragaon Koenigli	Rutaceae	Narasingha
45	Nerium Indicum	Apocynaceae	Karabui
46	Nyctanthu Orbor-Tristis	Oleaceae	Sewaliphul
47	Ocimum Basilicum	Lamiaceae	Tulasi
48	Ocimum Gratissimum	Lamiceae	Ram-Tulsi
49	Phologocanthusthysis Florus	Acanthoaceae	Titaphul
50	Piperbetle	Piperaceae	Pan
51	Piper Nigram	Piperaceae	Jaluk
52	Spomdias Pinnata	Anacardiaceae	Amora
53	Taramarindus India	Eaesalpinaceae	Jetuka

**Analysis & Discussion:**

The analysis part includes different stages right from keseru growing to thread spinning. In this chapter we will discuss all the stages

**Som and Soalo Production:**

frin and Muga culture is one of the popular cultures North-East India. The leaves of Som and Soalu are the best food for the Muga silks worms. The Som and Soslu were planted 3mx3m spacing and is preening at 6ft height to higher leaf yield and quality leaves for Muga silk worms. The best period for preening is just after jethua crop (Mar-June) during summer and Just Hotia crop (Dec- Jan) during winter. A fertilizer does for som, 87gm Urea, 125gm SSp and 33 gm MOP along with 10gm of EYm per plant is recommended which is to be applied in two split doses in ring method one metre away from the base of the plant.

**Grainage Technology for Quality Seeds Production of Muga Silk Worm:**

Graingge is the site of production of disease free laying of Muga silk worm. The intricate crop cycle of Muga comprises of 6 were lapping crops viz, jethua, Aherua, Bhadia, Katia, Jarua and Chatua. Among six crops Jethua and kotia are only commercial crops reared during favorable climate conditions while there maining 4 crops are rared as pre-seed and seed crops.

**Disinfection of Grainage Hall:**

Disinfection is the act of distractions of disease causing pathogens. In Muga culture proper disinfection and maintenance of good hygienic conditions are essential requirements for production of quality silk worms eggs. The grainage hall should be sealed 5-7 days prior to consignment of cocoons. The walls and appliances will be disinfection with 5% bleaching powder solution or 2% formaldehyde solution. The process of disinfection should be completed at least 2-3 days prior to grainage operation.

After the preparation of the grainage hall male and female cocoons have to be selected and preserved for coupling.

The newly formed and cover pact cocoons should be selected preferably from BHOR POK (day of max/peak ripening of worms) or from the 5th day of the spinning to the eight day as seed cocoons. The weight of the male cocoons should be 4-5 gm and the female should be 5.5-6.5 gms. The temperature and relative humidity in the graiage hall should be maintained between 26-280c and RH 75-85% respectively. The seed cocoons should be stored /preserved in a single layer in the cocoon cage. The male and female cocoons should be kept in 1:5:1 ration to ensure the maximum natural coupling.

Month	Crop	Emergence of Moth From Cocoons
Oct-Nov	Katia	23 to 26 days
Dec-Jan	Jarua	40 to 45 days
Feb-March	Chatua	24 to 27 days
Apr-May	Jethua	20 to 22 days
Jun-July	Aherua	18 to 22 days
Aug-Sept	Bhadia	13 to 22 days

**Egg Laying Procedure:**

Emerged male and female moths in the cages should be kept in dark condition with well aeration to ensure natural coupling. The naturally paired moths are collected and lying during the night hours on the day of emergent. The coupled moths are tied on kharika. Kharika is an egg laying device made up of plant twig with hook. The size of kharika should be 8-10 inch long and ½ inch diameter.

The unpaired moths are kept in a separate cage for mechanical coupling. Manual coupling should be attended in the next day morning hours. The coupling should be allowed 8 to 12 hours for effective fertilization. After decoupling the female moths are allowed to lay eggs on “KHARIKA” for three days.

**Procedure of Mother Moth Examination for Pebrine Deiection:**

After oviposition the female moth should be tested on forth day for detection of pebrine. The abdomens of the moths are crushed by using mortar and pestle with 6-8 mi of 0.8% aonc.k2 Co3 solution. Then the homogenate is transferred to a test tube and allowed for setting. The bottom liquid of the test tube is filtered carefully through 2-3 layers of clear absorbent cotton. The filtrate is the centrifuged for 3 to 5 minutes at 3000 -5000 pm. In this process the supernatant solution is decanted off. The sediment is then dispersed in a few drops of 0.8% k2Co3 solution. Smears from each sample and fine fields per smear to be examined examination should be done 2 personnel for cross checking.

**Surface Sterilization of Eggs:**

The eggs should be harvested from kharika on 4th day after mother moth examination. The eggs should be kept in a single layer on blotting paper and dry under shade. The eggs are kept in 2% formation solution for 1-2 minutes and properly washed in cleared running water.

**Incubation:**

Incubation is a technique of providing a antiunion environmental condition for proper and uniform development of eggs. During incubation period (8-10 days). Provision of optimum temperature 25-20c and relative humidity of 5 \_ 5% should be maintained.

**Silk Worm Rearing:**

The new born worms are placed in the selected som plants in the opp. Direction of direct sunlight in the morning from 5 to 9 AM. The worms born within 3 days from the time of incubation are reared for best production. The last full grown worms are transferred to the selected Som plants for last stage. As an obstacle for the worm and other insects like ants a protection must be maintained by placing a piece of polythene tightening from both side of the tree.

**Silk Worm Protection:**

For proper growth and development of the worms according to the quantity of leaves the worms should be placed. The worm should not frequently be touched or transported from one to another place. During the time of the change of skin the worms should not be disturbed by transferring them. Refined bamboo nets should be used for transferring them. The infected worms are should be collected and destroyed. During the time of transfer the mixture of bleaching powder and lime powder must be sprayed on the worms.

#### **Full Grown/ Mature Worm Collection:**

The ripe worms are generally climbed down from the trees at the evening hours. And they should be catch and keep softly.

#### **Cocoon Formation:**

The collected worms are to be kept in refined and selected cocoon cage made up of bamboo. And the number of worms cage should be pre defined so that they could form a good quality cocoon. Otherwise if the numbers of worms are very high in the cocoon cage the production of cocoon will not be of good quality or sometime may form joint cocoons.

#### **Cocoon Collection:**

Generally in the cocoon cage the ripe worms takes 5 to 10 days to complete the formation of a full cocoon. The worms should be collected from the cocoon cage after 7 days in summer season and after 10 days winter season. The infected cocoons should be collected from the cage immediately after 4 to 6 days and should be properly destroyed.

#### **Preparing Cocoons for Spinning:**

After the collection of cocoons it should be processed to spinning threads. In the process the cocoons are boiled for a specified time and with using some chemicals into the water during boiling. After it has been boiled the cocoons are getting much softer than earlier which helps the workers to spin it using machines for the production of quality thread.

Muga silk plus is a technology to boil the cocoons in now a days. Traditionally cocoons are boiled using soda as a result of which the infected cocoons does not gets boiled equally and consequently the production of thread is very low i.e, 40-48%. If the process of boiling is not done minutely than along with the reduction of spinning intensity the cost of production of thread will increased following by rise in piece level of the finished products.

Keeping in view the above mentioned discussion a chemical composition have been developed which helps in boiling the sericin present in different layers of the cocoon equally that makes the thread spinning easy and increased the production of thread 4 to 7 percent.

#### **Merits of Muga Silk Plus:**

- Muga silk plus is a cheap and easily water soluble chemical.
- The production of Muga thread by using Muga silk plus, the quality may be attained to a desired extent.
- By using Muga silk plus the production may be increased and could be attain maximum profile.

#### **Problems and Prospects:**

In spite of having such an precious culture it was not free from problems. Muga and Eri culture of Assam is traditionally practiced right back from the Ahom rule. But with the invasion of modern technologies, the precious culture takes a new shape of processing of finished goods. And consequently it faces several problems as mentioned under.

- Lack of industrial awareness among the masses is the main problem of muga and eri culture in Assam.
- Lack of experience labourers
- Absence of proper marketing facilities like fairs, Expo, which makes it popular to the general masses.
- Lack of government initiation towards implementing training programmes, workshops etc. that popularize the importance of muga and eri in general masses.
- Lack of proper security system lowers down the profit in relation to its production cost.
- Expansion of western market and fashionable cloths the local industry of muga and eri is threatened in present day context.
- Although the Muga and Eri culture of Assam has enough problems and threatened day by day. It has some positive future prospects as mentioned under.
- Looking towards the training programmes organized by the government it may be assumed that the trained persons could contribute to the production and development of the Muga and Eri in near future.
- Looking from a futuristic vision this culture may intact the pride of Assam.
- With an effective bold step of the Government the establishment of such industries may contribute to the employment statistics of the state.

#### **Conclusion:**

As a base for the study the institute “Central Muga Research and Training Institute” has given a lot in understanding the precious culture and its processing towards the production of precious culture. Several trains program have been conduct for the development and popularity of Muga culture. Integrated skill development skill (ISDS) Institute organized training programme on Frey and post cocoon technology of Muga and Eri during Feb-March, 2012 under ISDS under ministry of Textile, Govt. of india. Beneficiary Empowerment under CPP and COP, REC, Kokrajhar agriculture a training programme to update the knowledge in modern technologies and to motivate the forums/ beneficiaries to adopt the new technologies. In context of Research programs, Sri B.B. singha, scientist of regional Eri Resarch station, medinipathar, Maghalaya, A new production breed of Eri sillk worm was development. For marketing and popularization of this precious culture among the general masses the Govt. has organized several “Krishimelas” PERS, midini pathar organized Reshom Krishimela at Jana, andir Hall, Dudnoi on 2nd march 2012.

So, we may here conclude the chapter as the precious culture of Assam. The Muga and Eri is now in a position to be exiting due to the influence of western culture. In this context the govt. has taken effective steps through training Research programme etc. and we the students and the young generation should year up our creativeness to intact our traditions for the all round development of the developing state like Assam i.e. economical, traditional etc. through such types of study tours for the students that encourages the youth to create interest towards industrialization, institutionalization etc.

#### **Acknowledgements:**

The author remains grateful to Mrs. Sangeeta Boruah Saikia faculty member of Geography Department, Digboi College for her field assistance and cooperation in the preparation of manuscript. The author also wishes to acknowledge Mr. Dipangka Dutta, rendered generous help during field investigation.

**References:**

1. Central Muga Eri Research & Training Institute, Ministry of Textile: Govt. of India, Jorhat, Assam
2. Developed Method for Muga Rearing: Central Silk Board, Ministry of Textiles: Govt. of India, Jorhat, Assam