Scope of Agro-textiles in tasar Sericulture

[Article ID: SIMM0229]

Rathore M.S. [1,2]*, Chandrashekharaiah M[3], Vishaka G.V[1]., Hasansab Nadaf[1], Chowdary N.B.[1] and Venugopal A[1]

[1]Basic Tasar Silkworm Seed Organization (BTSSO-1st Floor)

[2]Basic Seed Multiplication and Training Centre (BSM&TC- Ground floor), Central Silk Board, (Ministry of Textiles, Govt. of India), Pendari, Post office-Bharni, Via-Ganiyari, Bilaspur-495 112 (Chhattisgarh)

[3]Silkworm Seed Production Centre, National Silkworm Seed Organization, Manandavadi road, Vidyaranyapuram, Mysuru-570008, Karnataka

*Corresponding Author; e-mail: mahendersr@yahoo.co.in

INTRODUCTION

The tropical tasar (*Antheraea mylitta* D.) silkworm is susceptible to abiotic and biotic hassles at all stages. Mortality inflicted by these hassles incurs a huge loss of DFLs and cocoon yield, and these factors are important researchable issues in the tasar seed sector. The non-feeding stages of tasar-silkworm *i.e.,* egg, pupae and adults are confined under controlled conditions. Whereas, the feeding stage *i.e.,* silkworm larvae are reared in outdoor conditions. The impact of biotic pressure on non-feeding stages may be managed considerably using modern techniques compared to feeding stage. Regulation of abiotic factors is quite difficult under open rearing environments when compared to controlled conditions. In the recent years, in agriculture and allied fields using advanced technologies have proven the possibilities of alteration of abiotic factors under field conditions. Utility of such technologies in tasar sericulture is still eluding subject.

New technologies are required to curtail the influence of both abiotic and biotic stress on the growth and development of tasar silkworm under open rearing environments. One such new technology gaining attention in recent years is the integration of agro-textile in tasar culture. This article gives an insight of impact of integration of Agro-textile technologies *i.e.,* shade net with drip irrigation, ground cover, hail protection nets, bird protection nets and vermicompost on Tasar silkworm productivity.

AGROTEXTILES

To control the environment, eliminate the climatic variations and also the ill effects which are linked with changes in weather and to enhance the uptake of nutrients by plants and help in the process and post-harvest operations the textiles are used in different sectors of farming *viz.,* agriculture, sericulture, horticulture and animal husbandry etc. These textiles are termed agro-textiles. The use of agro-textiles is increasing day by day world-wide due to technological advantages.

Currently, agro-textile produces *viz.,* shade nets, protective nets, mulch mats and soil covers are found to be used in different parts of the world. Recent advances in agrotextiles have been marvelous. There is artificial soil prepared of polymers to support the vegetation even in arid regions. It is known that use of a large amount of fertilizers, pollute the soil. Eco-friendly polymers have been developed to free the soil from these toxins. This has helped to surge the Agro-produce remarkably. Water is precious natural resources, without which survival of vegetation and life is difficult. Agrotextiles with Superabsorbent Polymers can create a new era of Agriculture. Developments in areas *viz.,* irrigation, artificial climate for cultivation, etc. have been directed towards this end. These new areas of application of Agrotextiles will help to boost and enhance the agricultural growth to meet the future targets.

BRIEF DESCRIPTION OF DIFFERENT AGRO-TEXTILE AND THEIR USAGES

1. Shade net: Light and temperature play a significant part in vegetative and productive phase of all crops. Shade net regulates the light and temperature which is required to control growing conditions. It manipulates growth pattern and safeguards crops from excess sun rays and wind. By giving the accurate equilibrium with the right grade of shade net, the optimum climatic conditions are formed under which the plant's productivity is maximized. Under these optimal situations, photosynthesis is enhanced and extremes of air and soil temperatures are reduced and moderated. Even more importantly, plant leaf temperatures are lowered to the same level as surrounding air temperature and this mechanism that accounts for the improved productivity of the plant.

Advantages & Applications

a) It enhances photosynthesis by manipulating the amount and quality of light by means of various densities of netting and hence growth and yield.

b) It improves productivity by moderating extremes of temperatures. Prevents sun burn and frost damage. The special knitted construction "breathes", allowing hot air to escape.

c) It restricts air movement thus reducing wind damage to the crop and evaporation of soil moisture

d) Air beneath the shade cloth stays humid which is of further benefit to the plant.

e) It provides a physical barrier against hail and heavy rain and keeps many birds and insects off the crop.

d) It saves water to a great extent by reducing evaporation, reduces fertilizers and insecticides costs (Fungicide still necessary).

e) It reduces wind, hail, and bird and insect damage to crops.

d) The usage of shade net in sericulture would provide shading to the tasar crops and protect the crops from excessive sun light, it will also protect the silk worms from the sun burn and provide conducive environment for growth of crops as well as seed cocoon. This will also monitor temperature and humidity in the shade net house and ultimately improve the quality of cocoon production with increase in yield.

f) In tropical tasar sericulture Diseases free layings (DFLs) are prepared by preserving the Daba bivoltine (DBV) and Daba Trivoltine (DTV) seed cocoons in different griange houses by maintaining abiotic factors mainly temperature and relative humidity. Green shade net grainage house is one of the grainage house where temperature and relative humidity are congenial for grainage operations compared to other grainage houses due to various advantages *viz.,* eco-friendly, farmers friendly, minimal maintenance of temperature and relative humidity, less cocoon preservation loss, synchronization in moth emergence, higher coupling rate, less Cocoon:DFL ratio, high oviposition rate and recovery rate is high.

2. Ground Cover: Ground Cover / Mulch is a type of protective covering placed on or spread over the soil surface. Mulches can be organic or inorganic and are available in many forms. Since decades, farmers are trying to use materials for moisture conservation, checking weed control growth and moderation of soil temperature.

These ground covers have excellent permeability to let air, water and nutrients through while blocking the light required for weed growth. It is the ideal choice for safe weed control and water conservation. The mulching favors the reduction of evaporation of water leading to higher soil moisture content/conservation of moisture and reduction in weed growth thereby increasing the supply of nutrients and moisture for overall increase in crop yields.

3. Hail Protection net: Protective nets termed as hail protection net (anti-hail nets)

above the crop can be appropriately utilized especially for high value crops. Hail protection nets are used to protect the crops from hails in hail prone areas. The hail protection nets are normally provided for each individual tree. The usage of hail protection nets in sericulture for tasar culture would provide protection from the hail storm to the host plants as well as to the silkworms and ultimately it will increase the yield of cocoons.

4. Bird Protection Net: Bird netting is the strongest and most versatile bird exclusion system in the world! Bird netting consists of high-density polyethylene or Polypropylene twine that is twisted and knotted to form a strong impenetrable bird barrier to pest birds. The coloring (Black, Beige & Milky White) and U.V. treatment is embedded in the composition, making the bird net more resistant to the effects of the sun with a more consistent coloring throughout.

Birds cause damage during silkworm rearing by eating the silkworm larvae and thus reducing the cocoon yield. The usage of bird protection nets in tasar culture reduces the extent of damage caused by birds.

5. Vermicomposting Bed: Vermicomposting is a technique of making enriched compost by using earthworms. This compost enriches the soil by improving physicochemical and biological properties. It is very helpful in crop production. Vermicompost plays a major role in organic farming.

Bed Method: In this method, compost is prepared in a readymade agrotextile bed as earthworms requires suitable temperature, moisture and ventilation. This agrotextile beds help to retain moistness and affords adequate conditions for worm growth. In this readymade agrotextile bed unused biological material is burred along with worms. These beds are placed under shade net to control the temperature within the desire limits and since, the availability of different shedding percentages in the shade net we can use different shade nets at different places based on the climatic conditions to control the temperature. Hence this method becomes easy to maintain and Practice in any part of the country.

6. Anti-Insect Net: Anti-Insect nets are found to be used in organic farming which are considered an ecological and human health-friendly substitute to pesticides. In tasar sericulture, Anti-Insect nets would protect the larvae during chawki rearing and it would reduce the mortality rate at this state due to insect pests.

Greater awareness of the drawbacks of conventional methods in crop production and soil conservation has prompted the scientific community to look for alternative approaches of crop production. The importance of achieving agriculture production through modern techniques has led to the use of textiles being realized more and more in the recent past.