SUMMARY AND CONCLUSION

Sericulture is an agro base, industry; India has the distinction of cultivating all the five commercially known verities of silk, namely Mulberry, Eri, Muga and Tasar (Tropical and Temperate).The temperate tasar silk is produced by silkworm *Antheraea proylei* **Jolly.** In India in Jammu and Kashmir, Himachal Pradesh, Uttarkhand in Northwestern and Assam, Arunachal Pradesh, Manipur, Mizoram and Nagaland in North eastern India in sub-himalayans belt.

China is the homeland of sericulture, the technique of silk production was first introduced in China by Hoshomin the Queen of China. In India silk was treated as pure material used for sacred and ritual purpose. The temperate tasar silkworm feds on *Quercus serrata .Q.accustisima, Q.graffthii, Lithocarpus dealbata* in Northeastern Himalayas and *Quercus serrata* is used for Oak tasar silkworm rearing and is considered to be the primary host plant of *Antheraea proylei* **J.** in Northeastern India. Its leaves provide a unique environment to their surfaces occupants and the typical leaves exudates influence the growth and development of the varieties of micro-organisms. These micro-floras play an important role in supplying different types of nutrients to the plants as well as the silkworms.

It is an evident numbers of fungi do not exist in nature individually but the microorganisms are present in the rhizosphere and phyllosphere and in other habitats in the host or in close proximity of the host and root exudates of the host stimulate the growth and sporulation of the different types of microorganisms which on the other hand influence in developments of the phylloplane of the host by providing type of nutrition. The leaves constituent the major part of exposed plant surface and which are open to infection or spprotrophic colonization by air dispersed or splash dispersed microflora. These micro-organisms of the leaf surface play a very important role in supplying micronutrients to the plant and in protecting the leaf surface from the pathogenic infections.

In the present investigation the following observation were deals with the isolation of fungi on phylloplane, rhizosphere, non-rhizosphere and rhizoplane.

Sixteen fungal species in spring season and eighteen in autumn season were isolated from the soil of mature *Quercus serrata* plant. Ten fungal species were

isolated from seedling soil. *Aspergillus* species was most dominant and *Fusarium* species co-dominant in both seedling and mature plant soils. *Aspergillus niger* was found most dominant species among *Aspergillus. Alternaria alternata, Fusarium* sp *Penicillum* sp and *Trichoderma* sp were also found abundant in seedlings soil in spring season, but in autumn season *Alternaria alternata, Aspergillus flavus, Aspergillus niger, Cladosporium* sp, *Colletotrichum* sp, *Penicillum* sp, and *Trichoderma* sp.

During spring season in rhizosphere soil *Alternaria alternata, Aspergillus flavus, Aspergillus niger, Fusarium solani. Fusarium oxysporium, Penicillum* sp and *Trichoderm* sp were isolated and non-rhizosphere soil *A.alternata, Aspergillus. flavus ,A.niger, Fusarium oxysporium, Penicillum* sp *,Trichoderma* sp were isolated. *A.niger was* dominant *Fusarium* spp co-dominant. In non-rhizosphere soil *A.alternata. A.flavus, A.niger, Cladosporium, Colletotrichum, F. oxysporium, Penicillum, Trichoderma. Aspergillus* spp dominant, and co-dominant. *A. alternata, Penicillum, Trichoderma* sp followed by *Cladosporium, F. oxysporium* and *Colletotrichum. But Fusarium solani, Mucor* sp were not found.

The rhizosphere soil harbors maximum diversity of fungi comparison to rhizoplane and non-rhizophere. The diversity of fungi also increased with increase in age of the plant. Higher fungal diversity was observed during autumn season September-October and lower during the spring season March-April. Soil moisture content, pH of soil, age of the plants, nature of exudates from the roots, status of nutrient availability, cultural practices in the plantation, location of study area as well as environmental conditions governing the seasons may have influenced the occurrence of the fungal species. Soil of the area is acidic in nature and observed more fungi species in autumn season it may be due to more rainfall in autumn season. The soil characteristics and the nutritional status of the soil, presumably influence the microbial composition of the soil during this investigation.

Eleven fungal species were isolated from the leave surface *Aspergillus* spp dominated in the both season *i.e.*. Spring and Autumn. *Alternaria alternata,* co-dominant. *Aspergillus niger, A.flavus, A.fumigatus, Alternaria alternata, Mucor* sp, *Curvularia* sp and *Fusarium* sp in the Spring season, but in Autumn season in addition to *Penicillum* sp, *Verticillium* sp.

Colletotrichum sp, *Cladosporium* sp. The presence of different fungal species on the surface in this investigation, probably, were influenced by factors such as leaf surface morphology, nutrient exudates of the leaves. local environmental factor viz. temperature, humidity and precipitation, moisture and nutrient content of the leaves, competition between the different microbes, cultural practices like pruning to suit Oak tasar silkworm rearing during spring and autumn season, abundance of spore load in the air over the plantation field, intensity of ultraviolet radiation etc. More fungal species were observed on the lower surface than upper surface of leaves.

The seasonal variation of chemical constitution of *Quercus serrata* leaves showed higher leaf moisture, crude protein and ERR% in Spring season while in Autumn season less leaf moisture, crude protein and ERR% but higher carbohydrates % in Autumn season were recorded. Higher carbohydrates in mature leaves in Autumn season may be impact on higher fungal population on *Q.serrata* mature leaves.

Eleven fungal species was isolated from air over *Q.serrata* plantation during the investigation. *Aspergillus* species were dominant among them *Aspergillus .niger* was the most dominant in the both season *i.e.* Spring and Autumn, *Alternaria alternata, Aspergillus .flavus, A. fumigatus, A.niger, Cladosporium* sp, *Colletotrichum* sp, *Curvularia* sp, *Fusarium* sp, *Mucor* sp, *Penicillum* sp and Sterile mycelia were observed.

Average leaf yield of per plant and per hectare in Spring season was recorded more than Autumn season (Table:3). By application of Farm Yard Manure and Chemical fertilizer Nitrogen, Phosphate and Potash gave better leaf yield and ERR%. It is also observed that higher ERR% in Spring season than Autumn season. Crude protein 10.28%, leaf per plant1.53kg, ERR64.5%. *Aspergillus niger* 70.50-72.50%, 61.5-60.5% and54.0-55.5% respectively found on upper surface of tender, semi-mature and mature leaf. Like that 66.5-66.5%, 57.5-58.0% and54.0-55.5% (Table: 10, 11). *Aspergillus niger* were observed on lower surface of *Quercus serrata* leaf and found that dominant in spring season which may help the growth of oak tasar silkworm. The reeling parameter of *Antheraea proylei* cocoons showed better performance cocoons were harvested from where rearing was conducted on plants where recommended FYM and NPK applied to got quality and quantity leaves. Supply of chawki worm to farmer also encouraging which may required motivating in new area of Oak tasar culture.

The fungal population were isolated from leaf, soil and air in the present investigation, indicates that mycoflora present in a cyclic pattern of appearance in air, phylloplane and soil. The mycoflora population density observed highest in rhizosphere soil and lowest in air of *Quercus serrata* plantation.

The present investigation deal with fungal population of rhizosphere and phylloplane of (*Quercus serrata)* host plant of temperate tasar silk worm and their effect on the growth and development of *Antheraea proylei* **Jolly.** at Umrangso, District Dima Hasao, Assam. By adaptation of Oak tasar culture in the hilly region may be prevent the Jhum cultivation, in forest area by deforestation of Oak trees has led to the erosion of top soils, landslides and ecological imbalance. Lot of plantation of *Quercus* species for proction of fragile, Himalayan ecosystem. Now it is very most essential to popularized oak tasar culture for the economic upliftment of hilly people, because jhum cultivation being less remunerative as compared to Oak tasar culture. At present it has been realized that replacement of Oak forest with pine in the Himalayas affects the nitrogen cycle (Singh *et al.*,1984) and caused heavy landslides to heavy toll and damage. Pine trees have less soil holding capacity and no coppicing capacity. Oak trees hold soil more strongly than pine and having more coppicing power which is required to publicized in order to encourage plantation of more and more oak trees by Non-Government Organizations, Central Silk Board and Forest departments. An appropriate project should be required to prepared to popularize and development of oak tasar culture. Attempts being made by Appropriate Technology of India in Uttarkhand needs to be appreciated and it should be copied by other government and non-government organization. Regional Tasar Research Station, Imphal, Manipur. Evolved of superior breeds of Oak Tasar Silkworm is one of the most important areas of breeding of research for the development of Oak Tasar Industry in India. A new breed having Blue colour in the larvae is isolated from the segregating progenies of the backcross involving the parents *Antheraea roylei* and *Antheraea proylei* has shown improvement in most of the yield contributing characters over that of *A.proylei* (Singh, *et al.*, 2008). The superior breed cocoons yield range 44 to 92 cocoons per dfl ,ERR ranges 48.85% to 80.84%, cocoon weight ranges 6.43gm to 7.03gm: cocoon shell weight ranges 0.65 to 0.75 gm and filament length ranges 657 meters to 755 meters . The superior breeds may be exploited for commercial production of Oak tasar raw silk. Singh *et*

al., (2010) suggested to supply chawki-worms to popularized of oak tasar culture. One hectare of *Quercus serrata* (oak) plantation can support a rearing of 1.0 Kg dfl (disease free laying) of this worm producing 25000-30,000 cocoons thus earning a revenue of Rs.30,000-40,000 within 50days in the Spring crop. The reelers and weavers can engaged to reeling Oak tasar cocoons and diversity product fabrics to get additional income for their family.

FINAL CONCLUSION

The leaf yield of *Quercus serrata* showed highly significant differences among in the Spring and Autumn season and leaf yield was found to be much higher in Spring season than in Autumn season. The highest average leaf yield was recorded in plants where applied with input Farm Yard Manure (FYM) and NPK Chemical fertilizer(Urea, Single Super Phosphate and Murate of Potash).

The Effective Rate of Rearing%(ERR%) showed highly significant difference amongst in both Spring and Autumn crop rearing and ERR% was found much higher in Spring crop rearing than in Autumn crop rearing.

Eleven fungal species were isolated from the leaf surface of *Quercus serrata* .the types of fungi which colonized on the leaves at different stages of maturation viz. Tender. Semi-mature and mature leaves. In Spring season observed less nos of fungal species than Autumn season. *Aspergillus* species was dominant in the both season but *Penicillum* sp was found in Autumn season.

Ten fungal species were isolated from the soil (Rhizosphere and Nonrhizosphere) of *Quercus serrata* seedlings during Spring and Autumn season. Sixteen fungal species were isolated from the soil(Rhizosphere, Non-rhizosphere and Rhizoplane) of *Quercus serrata* plantation in Spring season in RS soil *Gliocladium* spp absent, *Fusarium solani* absent in NRS soil *Cladosporium herbarum, Gliocladium* spp were not found in RP soil.

Eighteen fungal species were found in soil(RS,NRS,RP) in Autumn season *Cladosporium clodosporides,* was not found in NRS, some *Aspergillus* spp and *Cladosporium herbarum* were not found in RP.

Eleven fungal species isolated from air over *Quercus serrata* plantation during Spring and Autumn season at 0.75m and 1.50m height. *Aspergillus* spp, *,Alternaria alternata, Cladosporium* sp, *Colletotrichum* sp, *Curvularia* sp, *Mucor* sp, *Penicillum* sp, Sterile mycelia were found in both season(Spring and Autumn) and addition *Fusarium* sp found in Autumn season. *Penicillum* sp and *Fusarium* sp were not found in Spring season but found in Autumn season at 1.50 metres height.

The foliar constitution of *Quercus serrata* in Spring season moisture %,crude protein, was found more and Autumn season carbohydrates % found more than Spring season.

In fertilized soil Organic Carbon and Nitrogen (ppm) was found more than unfertilized soil, but Phosphate(ppm) was a little more and Potash(ppm) was found double in unfertilized soil than fertilized soil at REC. farm of Umrangso. Hence, application of FYM and NPK fertilizer are required for production quality and quantitative of leaf in hectare better production oak tasar cocoons and yarns.

The reeling yarn of Oak tasar, Filament Length and Non-Breakable Filament Length was highly significance but Denair, Silk Recovery%, and Reelability% was not significant.

From the present study will help to production of Oak tasar silk production in Spring season *Aspergillus niger* was dominant on phylloplane of *Quercus serrata* and leaf moisture % , crude protein % was found more than Autumn season. As result the Effective Rate of Rearing of *Antheraea proylei* **Jolly.** was also found better ,which will be help to encouraging the Oak tasar industry in India.

By adaptation of Oak tasar culture in the hilly region may be prevent the jhum cultivation , because jhum cultivation being less remunerative as compared to Oak tasar culture. Systemic plantation of *Quercus* species for protection of fragile, Himalayan ecosystem and evolved more superior varieties of Oak tasar silkworm for rearing with technology for silkworm rearing and produce lot cocoons. Modernization of post-cocoon sector reeling, spinning weaving, dyeing etc and created market for domestic and international buyers.

Shed Oak dry leaves can be used for mulching of agriculture field, preparation of leaves compost and vermin-composting, wood for construction house, make wooden charcoal for cooking, branches can used for mushroom cultivation, The barks and leaves are used in the preparation of user friendly dyes. Oak tasar silk pupae are as food for poultry, fish and pigs, the oil extracted from the pupae can be utilized in the preparation of cream, soap, shampoo etc.

An appropriate project should be required to be prepared to popularize and development of Oak tasar culture by assistant of Government Organization through Nongovernment Organization, for employment generation and it will be help for the upliftment of rural hilly people.

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