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Short Note

Impact of *Quercus leucotricophora* (Banj-Oak) on oak tasar seed crop

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Abstract

Oak tasar in India is a forest -agro based activity and practised in Himalayan states from North-east to North-west due to availability of the food plant of oak mainly *Quercus* spp. Although this segment in the silk industry is small but it can be useful for gainful economy and employment for rural populace in the fringe areas of Himalayan states.The Oak tasar industry is used to face crunch of silkworm seed due to environmental and topographical restriction coupled with voltinism of the silkworm race *Antheraea proylei* J. To tackle the seed demand, trials of rearing were taken in different species of *Quercus* in respect of different altitudes. Trial taken in the lower altitude with *Q.leucotricophora* syn. *Q. incana* (Banj) has shown promising results with the productivity and subsequently processing the cocoons for grainage purposes. Present communication deals with the silkworm seed rearing taken on the *Q.leucotricophora* plants and its impact on organising seed demand in North-west Himalayan states of India

Keywords: Oak Tasar, food plant, rearing and seed production.

Oak tasar silk industry in India under Vanya silk segment although established as an additional income generation venture but is still facing the tough challenge to establish itself as a commercial venture. The Oak tasar silkworm thrives on Oak (*Quercus* spp.). There is restricted cropping pattern which attributes to climatic condition and season suitable to silkworm rearing. The rearing is undertaken in different altitudes with different *Quercus* spp. Further, as the cocoons after high altitude rearing used to undergo 8-9 months pupal diapause, loss during diapause period is about 15 to 35%. So there is paucity of oak tasar silkworm seed. The present silkworm breed used in the oak tasar sector is *Antheraea proylei* J. and its taxonomic status was reviewed by Jolly (1976). As the seed sector is very important linkage to provide quality and optimum seed for multiplication of seed stock and use by stake holders and to overcome the problem of scarcity of seed, the trial has been taken up from time to time in all altitudes with available food plants species of genus *Quercus*. The trial results of Oak sector ruling silkworm genotype *Antheraea proylei* indicated that to counter the paucity of oak seed a crop is beneficial to be taken in the *Q. semicarpifolia* which is natural grown in the higher altitude Himalayan ranges starting from 8000 feet asl. However, *Q. leucotricophora* which is predominately available at low and middle altitude areas needs to be exploited for raising seed crop at low altitude areas or commercial crop at middle altitude depending upon availability of suitable foliage.

For the trial of seed crop was taken out at a location Draman (Shahapur) at the height of 1500 feet asl. The trial was taken with ruling silkworm genotype of Oak tasar sector *Antheraea proylei.* The rearing was conducted indoor. Only the foliage of *Q.leucotricophora* natural vegetation was utilized during trial. The chawki silkworm rearing for first ten days up to first two instars /stages of genotype

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Antheraea proylei conducted in trays and adult rearing conducted from third instars/stage to final stage on floor in raised beds. The brushing period was kept between February last week to March first week. Defoliation schedule of food plant foliage was followed by plucking mechanically to initiate early sprouting of leaf. The defoliation was done in the last week of November to first week of December .The chawki (early stage) was conducted with the foliage from defoliated *Q.leucotricophora* plants. For the late age of silkworm rearing, foliage was taken from the forest patches of natural vegetation.The data of productivity (production/100 dfls) and economic parameters of cocoons (cocoon weight, shell weight and shell ratio %) were recorded for consecutive three years starting from the year 2007.

During the year 2007, a rearing of 175 disease free layings (dfls) were taken. A total of 8708 cocoons were harvested at the tune of 4976 cocoons per 100 dfls, average cocoon weight found 5.46 grams, shell weight 0.62 grams and shell ratio percentage (SR%) was found 11.35 %. During the year 2008, rearing of 220 dfls were taken. A total of 9890 cocoons were harvested at the tune of 4495 cocoons per 100 dfls, average cocoon weight found 9.66 grams , shell weight 0.80 grams and SR % was found 7.92 % . During the year 2009, 250 dfls were taken and brushed. A total of 11740 cocoons were harvested at the tune of 4400 cocoons per 100 dfls, average cocoon weight found 5.20 grams, shell weight 0.60grams and SR % was found 11.53 % (Table 1). From perusal of the data, it is observed that average cocoon productivity was 4703 cocoons/100 dfls and average shell ratio was found 9.89 % which is considered a good productivity and economic parameters in Oak tasar. During rearing, indoor maximum temperature ranged (20^{0}C to 25^{0}C±2) and minimum (12^0 C to 21^{0}C ±2) and relative Humidity 69 to78 % were maintained.

The cocoons harvested from *Q.leucotricophora* food plant during spring have given better grainage performance, i.e.,70-80 % emergence, 75-80 % coupling efficiency and cocoon dfls ratio of 4 to 5:1.

These results are in conformity with the earlier studies taken by the Bahl *et al.* (1985) that indicated that after conducting preponed first crop at low altitude on *Q. incana*, second crop rearing can be successfully conducted at high altitude on *Q.semicarpifolia*. Altitude and food plants effect is also observed in North-west (Suryanarayana *et al.*, 2006). In Jammu and Kashmir state the preponed spring crop is taken for seed purpose on natural grown *Q. incana/ Q. gluaca* in lower altitude (Baksh, 2010).

Through the present study, it is inferred that preponed spring crop silkworm rearing at the height of 1500 feet asl with *Q. leucotricophora* syn. *Q.*

Table 1. Rearing details of *Antheraea proylei* Jolly on *Q.leucotricophora*

Season / year	No. of dfls	Fecundity	Date of hatching/ period	Hatching %	Cocoons harvested	Cocoons / 100dfls ratio	ERR %	Cocoon wt(g)	Shell wt (g)	SR %
1	2	3	4	5	8	9	10	11	12	13
Spring/2007	175	105	28/02/07 to 05/03/07	53.90	8708	4976	87.92	5.46	0.62	11.35
Spring/2008	220	258	04/03/08 to 14/03/08	61.30	9890	4495	28.42	9.66	0.80	8.28
Spring/2009	250	176	24/02/09 to 04/03/09	44.27	11740	4400	60.27	5.20	0.60	11.53
Total/Av.	645	180	24 Feb. to 14 March	53.15	10112	4703	49.24	6.77	0.67	9.89

incana food plant is stable and can be used as seed crop for better management of seed production programme in Himachal Pradesh. The crop can be taken between third/ last week February to March month. Further precaution is needed for synchronization of rearing period as per foliage availability as the *Q.leucotricophora* is fast maturating plant. *Q. leucotricophora* is highly fodder plants in the low and middle altitude but it can also be used easily for the silkworm feed with judicious brushing dates as per climatic condition and leaf availability to avoid the leaf maturity (Goel, 2004).

Seed sector is important driver in silk industry. Oak tasar having limited crop pattern and paucity of the oak tasar silkworm seed is always felt. So this silkworm crop at lower altitude with *Q.leucotricophora* food plant can prove as a boon for oak seed sector.

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