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## RESEARCH ARTICLE

## STUDIES ON THE MODE OF PLANTATION OF MULBERRY FOR SILKWORM REARING.

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**Abstract**

The present study was conducted to evaluate the plantation system of mulberry suitable for larval growth of silkworm, which ultimately influences the cocoon traits such as cocoon yield, cocoon weight, shell weight, silk percentage etc. Three plantation systems namely TR-10 bush, TR-10 cultivated tree and wild tree of same age were selected to feed on the ruling silkworm hybrid of Jammu SH6 × NB4D2 during the spring season to find out the varietal influence on silkworm hybrid.

Three replications each containing 250 larvae were retained after 3<sup>rd</sup> instar. Different larval and cocoon parameters are recorded. From the results obtained, it is evident that the cultivated TR-10 tree should be grown for sericulture purpose in Jammu region.

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**Introduction:-**

Mulberry is perennial, deciduous, deep rooted, fast growing and high biomass producing plant. Mulberry silk is known to be the most luxurious, elegant, tender and soft yarn in nature. The quantity and quality of the silk is directly proportional to the quality of mulberry leaves fed to the silkworm larvae thereby positively affecting the overall cocoon production. The nutritional quality of mulberry leaves play an important role in the nutrition of silkworm and in turn cocoon/ silk production (Choudhary et al., 1991; Krishnaswami, 1978; Liaw, 1991; Gowade and Mendhe, 2010). For a successful silkworm crop, the first important step is to select the excellent variety of the mulberry. The selection of variety for cultivation should be made by carefully considering the suitability of the plant to the existing weather conditions.

Machii and Katagiri (1991) emphasized that the duration of larval development of *Bombyx mori* L. differs with the mulberry varieties. Different factors responsible for successful rearing are as under:

Mulberry leaf	: 38.2%
Climate	: 37.5%
Rearing technique	: 9.1%
Silkworm race	: 4.1%
Other factors	: 11.2 %

Quality of mulberry leaves alone contributes 38.20 % for quality cocoon production (Miyashita, 1986). Keeping in view, the above mentioned importance the current study was designed to investigate the varietal influence of mulberry on silkworm rearing and cocoon yield in Jammu region.

### Material and methods:-

The present study was carried out to see the impact of feeding three different mulberry plantation systems TR-10 bush, TR-10 cultivated and wild tree on the post cocoon parameters of the ruling silkworm hybrid of Jammu SH6XNB4D2 during the spring rearing (March- April) of 2015 in the RSRS, Miran Sahib, Jammu.

This was taken up to find out the various parameters and suitability of these different types of planting systems to silkworm feeding for cocoon production. The silkworms were fed on leaves of TR-10 bush, TR-10 cultivated tree and wild tree. Three replications each containing 250 larvae were retained after 3<sup>rd</sup> instar. Silkworms were provided with four feedings per day. Fully mature larvae were transferred to the plastic collapsible mountages. The effect of different mulberry varieties were assessed based on the following parameters; pupation percentage, cocoon weight, shell weight, cocoon shell ratio, cocoon yield, filament length, denier, non breakable filament length etc.

### Result and discussion:-

It is well known fact that the quality of mulberry leaves differs among mulberry varieties and specific components of the mulberry leaves are responsible for the difference in rearing performances of the silkworm (Aruga, 1994; Machii and Katagiri, 1990; Minamizawa, 1997; Sarkar and Fujita, 1994). The quality of mulberry leaves directly influences the cocoon quality and production. Thangamani and Vivekanandan (1984) reported the significant varietal influence of different mulberry genotypes onto the growth and development of silkworms and cocoon production. In the present investigation effect of three different plantation systems was seen on the ruling silkworm hybrid of Jammu region i.e. SH6 X NB4D2. The various results obtained by rearing SH6 X NB4D2 are shown in Table 1 and 2.

By analyzing the Table 1. Which shows that the number and weight of good cocoons was found to be highest in silkworms fed with TR-10 cultivated tree (317.06) followed by Wild tree (273.44) and TR-10 bush tree (245.22).

**Table 1:-** Table showing details of defective and good cocoons number and weight.

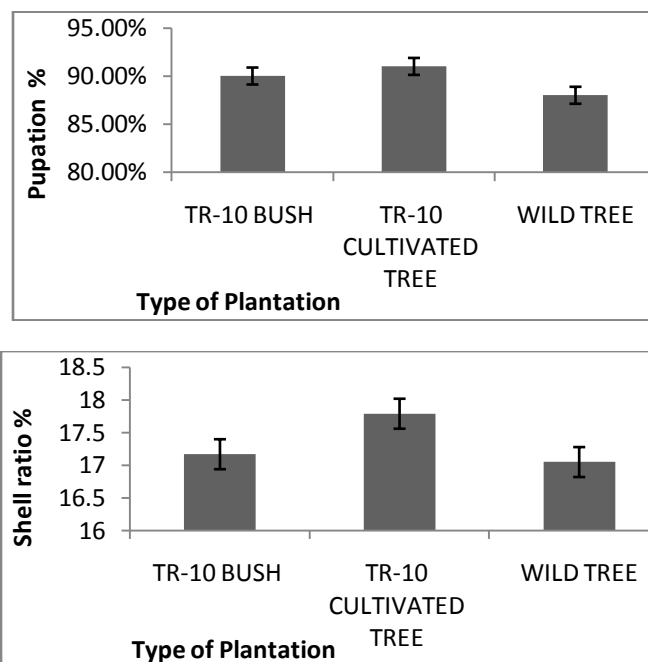
S.N O	Replication	Race	Double cocoons		Flimsy cocoons		Malformed cocoons		Urinated cocoons		Good cocoons	
			Num ber	Wei ght	Num ber	Wei ght	Num ber	Wei ght	Num ber	Wei ght	Num ber	Wei ght
1	TR-10 BUSH	SH6×N B4D2	2.66	11.3	8	11.2 5	11.66	18.2 5	23	38.9 1	145.3 3	245. 22
2	TR-10 CULTIVAT ED TREE	SH6×N B4D2	5	16.9 1	9	15.2 5	12.33	16.1 9	29.66	47.6 9	190.6 6	317. 06
3	WILD TREE	SH6×N B4D2	4	13.2 5	17	29.0 2	6	16.1 9	18	32.1 8	159.3 3	273. 44

In general the average values of various post cocoon parameters like single cocoon weight, shell weight, filament length, non breakable filament length etc. were found to be higher in silkworms fed with TR-10 Cultivated tree, followed by TR-10 Bush and wild tree (Table2).

**Table2:-** Average table showing Assessment Report of Average cocoon weight, Average cocoon shell weight, filament length, non breakable filament length and denier.

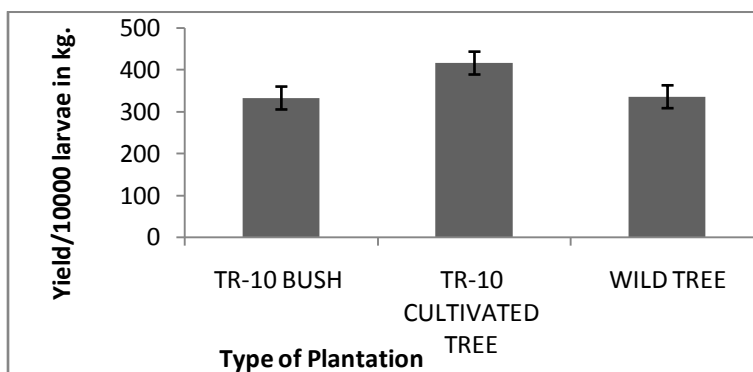
S. No.	Race	Replication	Av wt of single cocoon (gm)	Wt of single cocoon shell (gm)	Filament length (06 cocoons (avg) in meter.	Non breakable length (06 cocoons) avg in meter.	Denier(06 cocoons avg)
1.	SH6×NB4D2	TR-10 BUSH	1.72	0.29	680	567.33	2.68
2.	SH6×NB4D2	TR-10 CULTIVATED TREE	1.72	0.30	770.66	611	2.66
3.	SH6×NB4D2	WILD TREE	1.69	0.29	670.66	530.66	2.68

Pupation percentage was found to be highest in silkworms fed with TR-10 cultivated tree followed by TR-10 bush and wild tree (Fig.1). The highest shell ratio percentage was observed from cocoons produced by larvae fed on TR-10 cultivated tree than TR-10 bush and wild tree.



**Figure 1:-** Shows the effect of three plantation systems on the pupation percentage and shell ratio %. Bar shows  $\pm$  standard deviation.

In case of Yield/ ten thousand larvae the value was highest in silkworms fed with cultivated tree followed by wild tree and bush tree. Although the yield in case of wild tree was also found to be high, this might be due to good rainfall during the period of rearing which rendered the leaves of wild tree with suitable moisture % and has good moisture retention capacity. However, in general the leaves of wild trees are of bad quality with dust and pollutants due to road sides (Tariq et al. 2011). The rain helped to remove the dust etc and thus results are at par with bush and tree.



**Fig. 2:-** Shows Yield of Cocoons per 10,000 larvae. Bar shows  $\pm$  standard deviation.

Thus, we can conclude from the results obtained from the present investigation that the cultivated mulberry TR-10 variety should be grown for sericulture purpose in the Jammu region as these can be grown on the bunds and periphery of farmer's field. The farmers in this region do not have enough land and there are only two crops of 25 days in each season and hence bush type of plantation with closer spacing will not be suitable. Bush type of plantation will encroach their full land and they will not be able to take other crops whereas the cultivated tree on bunds/periphery besides providing them leaves for silkworm rearing in spring and autumn season also allow them to

carry intercropping activities and will fetch them handsome additional income. On the other hand the wild tree of local variety should be discouraged as the leaves of local variety are poor in quality and huge wild trees will affect the intercropping pattern of farmers.

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