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Short Communication

Study of parameters of CSR-2 cocoon reared with V1 mulberry leaves irrigated by spentwash

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CSR-2 silkworm reared with V1 variety of mulberry plants irrigated by raw water, 50% PTSW and 33% PTSW. The different parameters such as raw silk (%), filament length (m), reelability (%), denier and shell ratio were determined at the maturity of cocoons. It was found that the parameters werebetter in cocoon irrigated with 33%PTSW compared to 50%PTSW and raw water irrigations. This concludes that the mulberry plants irrigated with 33%PTSW is enriched with more nutrients for the potential growth of mulberry plants which results in the potential cocoons.

Key words: silk worm, growth, mulberry plant, irrigation, cocoon parameters.

Sericulture or silk farming is the rearing of silkworms *Bombyx mori.* for the production of raw silk. Mulberry leaves, particularly those of the white mulberry, are ecologically important as the sole food source of the silkworm, the pupa/cocoon of which is used to make silk. Silk is a way of life in India. Over thousands of years, it has become an inseparable part of Indian culture and tradition. No ritual is complete without silk being used as a wear in some form or the other. Silk is the undisputed queen of textiles over the centuries. Silk provides much needed work in several developing and labor rich countries. Sericulture is a cottage industry par excellence. It is one of the most labor intensive sectors of the Indian economy combining both agriculture and industry, which provides for means of livelihood to a large section of the population i.e. mulberry cultivator, co-operative rarer, silkworm seed producer, farmer-cum rarer, realer, twister, weaver, hand spinners of silk waste, traders etc. It is the only one cash crop in agriculture sector that gives returns within 30 days. This industry provides employment nearly to three five million people in our country. India is the second largest silk producer in the World after China. Germany is the largest consumer of Indian silk. The sericulture industry is land based as silk worm rearing involves over 700,000 farm families and is concentrated in Karnataka, Tamilnadu and Andhra Pradesh (Southern states of India). Assam and West Bengal states are also involved to certain extent (Ishita Roy 2012).

Mulberry foliage is the only food for the silkworm (*Bombyx mori*) and is grown under varied climatic conditions ranging from temperate to tropical. Favorable soils for mulberry cultivation are sandy loam and clayey loam. Slightly acidic are ideally suitable. Mulberry leaf is a major economic component in sericulture, since the quality and quantity of leaf produced per unit area have a direct bearing on cocoon harvest. In India, most states have taken up sericulture as an important agro-industry with excellent results. The total area of mulberry in the country is around 2, 82,244 ha. Though mulberry cultivation is practiced in various climates, the major area is in the tropical zone covering

Karnataka, Andhra Pradesh and Tamil Nadu states, with about 90 percent. Area under mulberry in Karnataka is 166 000ha. (R. K. Datta, CSRTI, Mysore). As the civilization develops and economy of the people elevates, there is a lot of demand for silk based products. Hence there is a scope for increasing the production of silk products and in turn to increase the rearing of silkworms.

Diluted spentwash increase the uptake of nutrients, height, growth and yield of leaves vegetables (Chandraju et al., 2007; Basvaraju and Chandraju, 2008) and yields of condiments (Chandraju and Chidan Kumar, 2009), yields of some root vegetables in untreated and spentwash treated soil (Chidan Kumar et al., 2009), yields of top vegetables (creepers) (Chidan Kumar et al.,2009), yields of tuber/root medicinal plants (Nagendraswamy et al., 2010), yields of leafy medicinal plants (Nagendraswamy et al., 2010), yields of leafy medicinal plants in normal and spentwash treated soil(Chandraju et al., 2010), However, no information is available on the yields of cocoon parameters of silkworms CSR-2, reared using V1 mulberry leaves cultivated by irrigation with distillery spentwash. Therefore, the present investigation was carried out to study the influence of V1 mulberry leaves cultivated by irrigating with different proportions of spentwash on the cocoonparameters of silkworms CSR-2, reared using V1 mulberry leaves.

Materials and Methods

Mulberry plant selected for the present study was V1 variety. The land was ploughed repeatedly (3 to 4 times) to loosen the soil and all gravel, stones and weed were removed to get the fine soil. The ridges and furrows are made at a distance of 1.0 m, sets were planted at a distance of 0.6 m (set to set) along the row and irrigated (by applying 5-10cm^3/cm^2) with raw water (RW), 50% and 33% SW at the dosage of once in fortnight and rest of the period with raw water (depends upon the climatic condition), without the application of any external fertilizer (either organic or inorganic). Harvesting of the leaf is done by plucking individual leaf during cooling hours of the day which is 50-60 days old. These fresh leaves are used to rear silk worms.

Silkworm varieties selected for the present study were CSR-2, reared by shelf method. Trays rectangular in shape measuring 0.9m x 1.2m and depth of 7.5cm and are arranged in stands of 2.5m high 1.5m long and 1m wide and have 10 shelves with a space of 20 cm. using V1 mulberry leaves cultivated by irrigation of distillery spentwash. At the end of 5^{th} age i.e., 7^{th} day, the matured ready spinning worms are picked and mounted on bamboo mountages. The spinning of the cocoon starts immediately after mounting and completed in 48-72 hours. Then cocoons were collected after harvest and cleaned by removing litter. Trials were conducted thrice, cocoon parameters, such as raw Silk percentage, filament length, reelability, denier and shell ratio were determined (Sonwalkar, 1993) (Table 1).

Results

The cocoon parameters were very high reared using V1 variety mulberry plant leaves cultivated by 33% SW irrigation, and moderate in 50%, while comparatively poor in RW (Table-1). In our previous studies also found that 33% SW irrigation favors the growth, yield and nutrients of plants. This could be due to the maximum absorption of NPK by the plants at 33% dilution. In the case of 50% SW irrigation the yields were low.

Table 1. Parameters of CSR-2 cocoon reared with mulberry leaves with spentwash irrigation.

Cocoon Parameters	Irrigation Medium		
	RW	**50%PTSW**	**33%PTSW**
Raw silk (%)	21.33±0.022	22.40±0.015	25.70±0.012
Filament length (m)	1003.33±0.003	1040.00±0.009	1201.67±0.005
Reelability (%)	79.66±0.012	82.06±0.015	87.16±0.011
Denier	2.69±0.011	2.85±0.009	3.25±0.012
Shell ratio	24.24±0.016	24.80±0.019	26.52±0.014

Enrichment of nutrients in V1 mulberry leaves cultivated by 33% influence healthy growth of silkworms contains comparatively high proportion of natural protein fiber secreted by silkworms in the form a thread, Fibroin – inner core comprising 75% of silk, Sericin - outer gum comprising 25% of silk.

Conclusion

It was observed that the parameters of cocoons produced by rearing the silk worms using V1 variety of mulberry leaves cultivated by irrigation in 33% SW were maximum and moderate in 50% SW and minimum in RW irrigations. It concludes that, in 33% SW irrigation the plants are able to absorb maximum amounts of nutrients (NPK) both from the soil and the spentwash resulting high yield and enhance the nutrients in plants leaves which in turn influence the better growth of silk worms containing higher proportion of silk proteins yields spinning of long silk threads in cocoons resulting in increased weight of cocoons, minimizes the cost of cultivation, and increase the parameter values of cocoons resulting in high silk production, this elevates the economy of the farmers, since cultivation of mulberry is made without using fertilizer.

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