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NOTE

Influence of Pitcher Irrigation and Mulching on the Summer Season Iac Crop Production

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Abstract

A study to assess the impact of pitcher irrigation with mulching on summer season iac crop production i. e., *jethwi* and *baisakhi* was carried out for two years (2006-07 and 2007-08). Four pitchers of liter capacity each with a hole at bottom and inserted with a cotton wick were provided for each tree at a radial distance of 75 cm from the main trunk. Water was filled in the pitchers up to its neck level at weekly interval. The seepage rate through pitchers was found to be 0.05 liter per hour. Pitcher irrigation resulted in 3.1 and 5.2 times higher sticklac yield over control for 2006-07 and 2007-08 jethwi crop, respectively with no additional advantage of mulching.

Key words : Pitcher irrigation, Mulching, Sticklac yield, Jethwi, Baisakhi.

Lac is a natural non-toxic resinous produce of an insect belonging to genus *Kerria* (Homoptera : Tachardiidae). The important lac insect of India, Kerria lacca (Ker), has two strains, *kusmi* and *rangeeni*, which are mainly cultured on palas (*Butea monosperma*), kusum (*Schleichera oleosa*) and ber (*Zizyphus mauritiana*). *Kusmi* strain thrives well on kusum and has two generations in a year (bivoltine). The summer generation maturing during June-July is commonly known as *jethwi* whereas the winter one maturing during December-February is called *aghani.* The *rangeeni* strain on the other hand, does not survive on *kusum* and grown on other lac hosts namely palas and ber. This strain is also bivoltine;the rainy season generation maturing during October —November is known as *katki* and that maturing during June—July is called *baisakhi* (1).

Out of the three conventional commercial hosts, ber occupies an important position with regard to its susceptibility to lac insects and productivity of lac. Both the strains of lac insects can thrive and complete their life cycle on this host with highest sticklac productivity (per day/m shoot length) amongst all the lac host trees in practice (2). Thus, it has an important role to play in boosting *kusmi* lac production. Although this host supports both crops of *rangeeni* strain to a greater extent, it supports only the winter crop in *kusmi* strain of lac insects and the summer season (*jethwi*) crop fails miserably on this host probably due to high temperature and soil moisture stress leading to crop mortality. The summer mortality of *kusmi* insects during summer may be attributed to death of thinner shoots and direct exposure of sunlight to lac insects and Mishra et al. (3) has also reported delay in male emergence during summer on *Zizyphus mauritiana* and *Flemingia macrophylla* due to low physiological activity as compared to *Schleichera oleosa.*

Providing irrigation to the host plant during summer could help in supply of moisture and nutrients to desiccating shoots and triggering leaf initiation and metabolic activities in plant tissues. Thus, applying irrigation water to the ber plants and keeping the root zone saturated for longer period may be one of the solutions, which could help in keeping the lac mortality in check. This necessitated taking up a study with pitcher irrigation method, where water can be saved substantially and which keeps the root zone moist for longer duration with an objective to see the effect of pitcher irrigation with mulching on lac crop mortality.

The study was conducted at the Research Farm

Table 1. Effect of pitcher irrigation on lac production during summer season (*jethwi)* crop on unpruned ber trees during 2006-07. * P+M—Pitcher with mulching; * P—Pitcher only.

Treatments (number of trees)	Mean weight (g) Inoculated sticklac (broodlac)	Sticklac (harvested lac stick)	Yield ratio of sticklac used : obtained
*P + M (2)	150 (375)	290 (725)	1 : 1.9
* P (2)	150 (375)	220 (545)	1 : 1.5
Control (4)	150 (375)	72.0 (180)	1 : 0.48

Table 2. Effect of pitcher irrigation on lac production during summer season (*jethwi*)crop on pruned ber trees during 2007-08.

Treatments (number of trees)	Mean weight (g) Inoculated sticklac (broodlac)	Sticklac (harvested lac stick)	Yield ratio of sticklac used : obtained
*P + M (2)	90 (225.0)	658 (1645.0)	1 : 7.3
*P (2)	95 (237.5)	692 (1730.0)	1 : 7.3
Control (4)	72.5 (181.0)	102.5 (256.0)	1 : 1.4

of Indian Institute of Natural Resins and Gums, Namkum, Ranchi ($23^0 23'$ N longitude, $85^0 23'$ E latitude and 650 m above mean sea level during April 2006-March 2008. Sixteen ber plants (8 each pruned and unpruned) of nearly uniform size were selected for the study. Thirty two pits were dug to accommodate the unglazed pitchers of 10 liter capacity each at the plant periphery.

Out of eight plants under one crop, two plants were provided with pitchers, two plants were equipped with pitcher with mulching, while four plants were kept under control (no pitcher and no mulching). Four pitchers with a circular hole at the bottom and inserted with cotton wick, per plant were buried in the soil at a radial distance of 75 cm from the plant trunk. The mouth openings of the pots were left above ground. The pots were filled with water and covered with clay lids in order to avoid evaporation. Mulches were applied in form of dried akashmani leaves at 15kg/plant in the periphery (one meter radius) of plants under mulch treatments. Water was filled in the pitchers up to its neck at weekly interval. For the year 2007, the experiment was repeated as that of 2006 with a difference that the jethwi crop was inoculated on the pruned ber plants.

Water requirement was determined by quantifying the amount of water applied at each irrigation cycle. A measuring cylinder was used to measure the quantity of water required to replenish the existing level for pitchers at each irrigation cycle. The depleted amount of water was added to fill up the pots.

For raising the summer season (*jethwi*) 2006 lac crop, *kusmi* broodlac was inoculated at 375 g/plant to all the unpruned treatment and control plants in April 2006.The lac crop was harvested in August 2006. Since, the larvae did not emerge even after 15 days of its harvesting, the data of lac stick/scrapped lac was taken. For 2007 *jethwi* crop, eight trees were pruned in early September of 2006 and the *kusmi* broodlac was inoculated at 5 g/m shoot length in February 2007. The lac crop was harvested in August 2007. The larval emergence was not found this year also, so data on stick/scrapped lac weight was taken. For raising *baisakhi* crop of the *rangeeni* strain the plants were pruned in February-March and the broodlac was inoculated during October, both the years. The data were stastically analyzed.

For summer season (*jethwi*) crop 2006-07, the sticklac yield ratio in pitcher irrigation with mulching and pitcher alone was found to be 1 : 1.9 and 1 : 1.5 respectively. On the other hand, sticklac yield ratio was found to be 1 : 0.48, where no water was applied (control) (Table 1). It appears that lac crop has been adversely affected by the moisture stress on the plants during summer, yielding less than the input level in control, whereas those plants provided with irrigation through pitchers yielded a good crop with high yield ratio.

For summer season (*jethwi*) crop 2007-08, the sticklac yield ratio in pitcher irrigation was 1: 7.3, which was at par with pitcher irrigation with mulching and five times higher than the control. The yield ratio in control was 1 : 1.4 (Table 2) only, which has indicated the moisture stress and role of irrigation in growth and development of lac crop. The data revealed that application of pitcher irrigation has improved the sticklac yield in *jethwi* crop as compared to control.

The data were analyzed statiscally in completely randomized design and the variations in the mean treatment effects were found to be significant (P=0.05). The lower stick lac production during 2006 compared to 2007 may be due to the late inoculation of broodlac on unpruned ber plants.

Baisakhi crop *rangeeni* strain was inoculated on the remaining eight pruned ber plants (pruned in February-March 2006) in October 2006 with the imposition of same treatments. Total mortality was observed in March 2007. The same process was repeated for 2007 crop maintaining the same time cycle, but total mortality was observed once again. Seepage rate through pitchers was found to be 0.05 lph (liter per hour).

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