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INFLUENCED OF DIFFERENT ORGANIC MULCHES IN RAINFED MULBERRY GARDEN ON MICRO ARTHROPODS POPULATION

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ABSTRACT

The present study was conducted in department of sericulture, University of Agricultural Sciences, Bangalore. The main aim of the study is to know the effect of different organic sources on soil arthropods under rainfed condition. The treatment T6 recorded the maximum abundance of 14.67 arthropods per 400 gm of soil which was on par with T3 (13.67 arthropods/ 400 gm of soil). T5, T4 and T7 recorded on par results. T8 gave lower abundance of below ground arthropods with 5.67 arthropods per 400 gm of soil respectively.

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INTRODUCATION

SILK - The Queen of Textiles, is the natural fibre, spells luxury, elegance, class and comfort, which is secreted by silkworm, *i.e.,* mulberry and non-mulberry silkworm (Eri, Muga, Tasar & Oak tasar). Geographically Asia is the main producer of silk in the world and produces over 90per cent of the total global output. India is the second largest producer of silk and also the largest consumer of silk in the world. Currently, Karnataka accounts for about 45 per cent (7360MTs) of the total silk production in India. The area under mulberry in India is increased to (3.17%) 1, 83,773 ha and mulberry raw silk production was increased to (3.17%) 7360MTs in 2009-10. In Karnataka, there is an increase of (5.87%) area from 77,329 to 82,098 ha and mulberry silk production to (1.66%) from 7238 to 7360MTs in 2009-10 (Anonymous, 2010). In Karnataka, 40 per cent of the mulberry area is under rainfed condition. Most of the traditional sericulture (mulberry growing) regions have been facing a chronic shortage of water for successful mulberry cultivation. Mulberry leaf forms the basic food material for silkworm and bulk of the silk produced in the world comes from mulberry sector.

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Soil and water are the most important natural resources in rainfed sericulture. Dry lands are inherently poor in fertility and moisture retention. Apart from the low and erratic behavior of rainfall, high evaporative demand and limited water holding capacity of the soil constitute the principle constraint in the crop production in rainfed area. Yield fluctuations are high mainly due to vagaries of weather, often much behind the risk bearing capacity of the farmers. Mulch is any material applied on the soil surface to check evaporation losses, to conserve soil and water and to regulate soil temperature in favor of crop production. About 60-75 per cent of the rainfall is lost through evaporation. Evaporation lose can be reduced by applying mulches. Beside this, application of mulches result in additional benefits like reduction in soil salinity, weed control and improvement in soil structure. By way of these benefits, mulches play an important role in improving crop productivity under dry land and rainfed farming. Surface mulches are used to prevent soil from blowing and beating action of rainfall, reduce run-off & evaporation, increase infiltration, keep down weeds, improve soil structure and eventually increase yield. Mulches with a low C:N ratio such as composted yard waste can increase tree growth by increasing soil organic matter content, microbial biomass activity and plant available nitrogen. On the other hand, mulches with a high C:N ratio such as those derived

Table 1. Soil arthropods population as influenced by different organic mulches under UAS Seri Suvarna Technology (Trenching and Mulching) under rainfed condition after 60th DAM Treatment before mulching 60th Day After Mulching Ridge Trench

Treatment	Before mulching	60th Day After Mulching	
		Ridge	Trench
T1 - UAS Seri Suvarna Technology with combination of different mulches	6.00	7.33	10.00
T2 - UAS Seri Suvarna Technology with Mulberry leaves and twigs.	6.00	7.00	9.33
T3 - UAS Seri Suvarna Technology with Glyricidia leaves and twigs.	7.00	10.00	13.67
T4 - UAS Seri Suvarna Technology with Neem leaves and twigs.	6.33	8.33	12.33
T5 - UAS Seri Suvarna Technology with Pongamia leaves and twigs.	6.33	9.67	12.67
T6 - UAS Seri Suvarna Technology with Subabhul leaves and twigs.	7.00	11.33	14.67
T7 - UAS Seri Suvarna Technology with Simoruba leaves and twigs.	6.67	7.67	11.33
T8 - Control (Without trenching and mulching)	6.33	5.67	5.67
F Test	NS	*	*
S. Em±	-	0.60	0.50
CD at 5%	-	1.86	1.55

NS-Non Significant, *Significant

from ground pallets can stimulate microbial growth without increasing the soil nitrogen pool, thereby inducing nutrient deficiencies that slow plant growth. The amount of nitrogen released from decomposing litter that is available for plants is determined by the net balance between nitrogen mineralization and immobilization by soil microbes (Johnson, 1992). Soil micro arthropods are also important components of food webs. Mesonfauna comprising of Enchytraeids, Collembola and mites plays a functional role for decomposition processes in the soil (Coleman and Crossley, 1996). Micro arthropods fulfill primarily two functions in the soil food web the first, as secondary decomposers that feed predominantly on fungi and in part litter, and the second, as strict carnivores or omnivores feeding on mixed fungal-carnivore diets.

MATERIALS AND METHODS

Estimation of arthropods population (below ground)

Sampling method: The soil samples were collected using the circular core sampler measuring12 cm diameter and 10 cm height. The core sampler was placed on the soil surface and pressed downwards and turned in clockwise direction to a depth of 10 cm. The quantity of soil samples taken was 400 g on dry weight basis. In each treatment, about 400 g of soil sample was collected. Such collected samples were immediately transferred to aluminium cans (15 cm height and 6cm diameter) and labels were placed into each can and closed with lid.

Extraction technique

The fauna were extracted from the soil samples using Berlese funnel operates. Soil samples were placed carefully along with the labels in to the funnel. The electric bulbs \ (25 W) fixed at the top in the baffle board served as the source of light and heat energy. The apparatus was allowed to run for 24 hours. The invertebrates including earthworms passing through 2 x 2 mm sieve of the sample holder were collected in vials containing 70 per cent ethyl alcohol fixed to the lower end of the funnel. These vials were periodically checked to keep the alcohol at desired levels. Labels were kept intact both in soil sample and fauna extracted vial.

Sorting procedure

A stereo binocular microscope (35 X magnification) was used for sorting out the extracted soil. They were separated into different taxonomic groups.

RESULTS AND DISCUSSION

The Micro Arthropods Population

The micro arthropods population influenced significantly by different organic mulches under UAS Seri Suvarna Technology (Trenching and Mulching) in rainfed condition. No significant differences were seen in the abundance of soil arthropods in the experimental plot before the implementation of treatments. The arthropods abundance varied from six arthropods per 400 gm of soil to seven arthropods per 400 gm of soil. At 60 days after mulching, treatment T6 recorded a maximum abundance of 11.33 arthropods per 400 gm of soil in ridges. This was on par with T3 (10.00 arthropods/ 400 gm of soil) and T5 (9.67). The treatments T4, T7, T1 and T2 on par with each other. In trenches the treatment T6 recorded the maximum abundance of 14.67 arthropods per 400 gm of soil which was on par with T3 (13.67 arthropods/ 400 gm of soil). T5, T4 and T7 recorded on par results. T8 gave lower abundance of below ground arthropods with 5.67 arthropods per 400 gm of soil respectively (Table 1). No significant differences were seen in the abundance of soil arthropods in the experimental plot before the implementation of treatments.

At 60 days after mulching, UAS Seri Suvarna Technology with subabhul leaves and twigs recorded a maximum abundance of 11.33 arthropods per 400 gm of soil in ridges. In trenches also subabhul leaves and twigs mulched plot recorded the maximum abundance of 14.67 arthropods per 400 gm of soil which was on par with plot mulched with gyricidea leaves (13.67 arthropods/ 400 gm of soil). It may be due to sufficient soil moisture, less disturbance and settlement of soil particles. Control gave lower abundance of below ground arthropods with 5.67 arthropods per 400 gm of soil respectively (Table 1). In the course of collecting soil samples some of the micro arthropods were commonly found belongs to following class Acari (cryptostigmata), Collembola, Hymenopterons-ants, centipedes, termites and beetles. These findings were supported with the findings of Adetola Badejo *et al*. (1995) reported that, the mean densities of micro arthropods in the experimental plots decreased in the following order: rice straw > *Leucaena* prunings > *Gliricidia* prunings > maize stalk > *Acioa* prunings > control 2 (90 kg N ha -I year -1) > fallow > control 3 (135 N) > control 1 (45 N) > bare fallow. Extremely low densities of micro arthropods were recorded in the bare fallow plots probably as a result of the combined effects of absence of plant residues and vegetation cover.

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