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RESEARCH ARTICLE

POST-COCOON PARAMETERS OF SILKWORM AS INFLUENCED BY FEEDING OF MULBERRY LEAF OBTAINED BY APPLICATION OF N THROUGH DIFFERENT SOURCES OF ORGANIC MANURES AND INORGANIC FERTILIZERS

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ABSTRACT

An experiment was conducted out to study the post-cocoon parameters of silkworm, *Bombyx mori* L. as influenced by feeding of leaf obtained by the application sources of N through organic manures and inorganic fertilizers. Significant differences were excerted with respect to feeding schedules, treatments and interactions. Among FS_2 (Chawki worms fed with S_{36} leaf + Late age worm fed with M_5 leaf) T_{12} (recommended 20 tonnes of compost + 300: 120: 120 kg of NPK / ha / year through fertilizer) contributed maximum with respect to filament length (937.25 and 948.39 m) and lower denier was accounted as (2.65 and 2.62). However, the interaction effect was found to be significant towards filament length in FS_2T_{11} (FS_2- chawki worms fed with S_{36} leaf + Late age worm fed with M_5 leaf, T_{11} combination of Bio-fertilizers 10 kg each of *Azospirillum* + *Aspergillus awamori*/ha/yr + 20 % recommended N through each of Compost, Green manure (*Glyricidia maculata*), Oil cake (Castor cake), vermicompost and fertilizer remaining PK through fertilizer) (1045.62 m) and lower denier recorded in FS_2T_{11} (2.39) respectively.

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INTRODUCTION

Mulberry leaf is the exclusive food for silkworm, *Bombyx mori* L. The quality of leaves fed to the worms is considered to be the prime factor for good cocoon crop production. Better the quality of leaves, greater would be the possibilities of getting good cocoon harvest (Ravikumar, 1988). The crop responses are known to vary with sources of nitrogen. The nutrition of mulberry crop is governed by soil fertility and manurial practices adopted. Pain (1961) observed that application of FYM or compost 30 t/ha increased the silk content and filament length per cocoon in addition to foliage yield. Similarly, Sidhu *et al.* (1969) reported that application of 100 kg of N and 50 kg of P and K /ha/yr improved the filament length and denier. Hence, a study was carried out in this line and the results are reported in this paper.

MATERIALS AND METHODS

The research study on influence of organic manures and inorganic fertilizers, which are applied to mulberry, and its influence on post-cocoon parameters of silkworm was carried out at Main Research Station, Hebbal, UAS, Bangalore. Four feeding schedules were maintained with therteen treatments of three replications each with two different mulberry varieties (S_{36} and M_5) were maintained, viz., FS_1 (chawki worms fed with S_{36} leaf + late age worms fed with M_5 leaf), FS_2 (chawki worms fed with S_{36} leaf + late age worms fed with S_{36} leaf), FS_3 (chawki worms fed with M_5 leaf + late age worms fed with S_{36} leaf) and FS_4 (chawki worms fed with M_5 leaf + late age worms fed with M_5 leaf) respectively. The leaves of two different mulberry varieties grown under different treatments, i.e. S_{36} and M_5 were fed to silkworm breed CSR_2 in both young-age and late-age rearing period. The rearing practices were followed according to the recommendations (Dandin *et al.*, 2014). Filament length and denier were recorded in each schedule of every treatment replication wise and data were analyzed statistically by using two way factorial RCBD as outlined by Cochron and Cox (2000).

RESULTS

Among various treatment combinations, the treatment T_{12} Recommended 20 tonnes compost + 300: 120: 120 kg N, P and K / ha / year through fertilizer enhanced maximum filament length (948.39 m) followed by T_{11} Bio-fertilizers 10 kg each of *Azospirillum* + *Aspergillus awamori*/ha/yr + 20 % recommended N through each of Compost, Green manure, Castor oil cake, vermicompost and fertilizer + remaining P, K

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Treatment details

T_1	:	100 % recommended N through Compost
T_2	:	50 % recommended N through Compost + 50 % recommended N and remaining P, K through fertilizer
T_3	:	100 % recommended N through Green manure (*Glyricidia maculata*)
T_4	:	50 % recommended N through Green manure + 50 % recommended N and remaining P, K through Fertilizer
T_5	:	100 % recommended N through Castor oil cake
T_6	:	50 % recommended N through Castor oil cake + 50 % recommended N and remaining P, K through Fertilizer
T_7	:	35 % recommended N through Compost + 30 % recommended N through Castor oil cake + 35 % recommended N through Green manure
T_8	:	100 % recommended N through Vermicompost
T_9	:	50 % recommended N through Vermicompost + 50 % recommended N and remaining P, K through Fertilizer
T_{10}	:	Bio-fertilizers 10 kg each of *Azospirillum* + *Aspergillus awamori*/ha/yr + 25% recommended N through each of Compost, Green manure, Castor oil cake and vermicompost
T_{11}	:	Bio-fertilizers 10 kg each of *Azospirillum* + *Aspergillus awamori*/ha/yr + 20 % recommended N through each of Compost, Green manure, Castor oil cake, vermicompost and fertilizer + remaining P, K through fertilizer
T_{12} (control)	:	Recommended 20 tonnes compost + 300: 120: 120 kg N, P and K / ha / year through fertilizer
T_{13} (control)	:	Only fertilizer 300: 120: 120 kg of N, P and K / ha / year

Table 1. Cocoon filament length (m) as influenced by feeding of leaf obtained by application of N through different sources of organic manures and inorganic fertilizers

Treatments (T)	Cocoon filament length (m)				Mean (T)
	Feeding Schedules (FS)				
	FS_1	FS_2	FS_3	FS_4	
T_1	827.50	882.50	818.75	826.87	838.90
T_2	834.37	897.46	828.75	830.00	847.64
T_3	810.62	882.50	811.87	825.00	832.50
T_4	846.87	909.37	838.75	840.62	858.90
T_5	811.33	900.00	816.87	813.75	835.48
T_6	881.87	951.25	892.50	865.41	897.76
T_7	843.75	881.87	860.62	848.12	858.79
T_8	821.87	887.50	825.62	818.12	838.28
T_9	891.25	1010.00	895.00	893.75	922.50
T_{10}	900.00	1030.62	901.87	897.50	932.50
T_{11}	923.42	1045.62	912.50	908.75	947.57
T_{12}	926.08	1042.50	913.12	911.87	948.39
T_{13}	788.33	863.12	797.50	790.00	809.74
Mean (S)	854.40	937.25	854.90	851.52	

	Feeding Schedules (FS)	Treatments (T)	Interactions (FS × T)
F-Test	*	*	*
SEm ±	1.170	2.109	4.218
CD at 5 %	3.242	5.845	11.691

Note: FS_1 : Chawki worms fed with S_{36} leaf + Late age worms fed with S_{36} leaf; FS_2 : Chawki worms fed with S_{36} leaf + Late age worms fed with M_5 leaf
FS_3 : Chawki worms fed with M_5 leaf + Late age worms fed with S_{36} leaf: FS_4: Chawki worms fed with M_5 leaf + Late age worms fed with M_5 leaf

Table 2. Denier as influenced by feeding of leaf obtained by application of N through different sources of organic manures and inorganic fertilizers

Treatments (T)	Denier				Mean (T)
	Feeding Schedules (FS)				
	FS_1	FS_2	FS_3	FS_4	
T_1	2.94	2.79	2.98	2.94	2.92
T_2	2.91	2.75	2.93	2.94	2.88
T_3	2.97	2.79	2.95	2.99	2.92
T_4	2.89	2.72	2.91	2.90	2.85
T_5	2.95	2.73	2.98	2.99	2.91
T_6	2.79	2.60	2.78	2.77	2.74
T_7	2.88	2.79	2.83	2.89	2.84
T_8	2.94	2.78	2.76	2.94	2.90
T_9	2.77	2.47	2.76	2.76	2.69
T_{10}	2.75	2.42	2.74	2.75	2.66
T_{11}	2.69	2.39	2.72	2.72	2.63
T_{12}	2.67	2.40	2.72	2.72	2.62
T_{13}	3.04	2.83	3.02	3.03	2.98
Mean (S)	2.86	2.65	2.87	2.87	

	Feeding Schedules (FS)	Treatments (T)	Interactions (FS × T)
F-Test	*	*	*
SEm ±	0.0023	0.0041	0.0082
CD at 5 %	0.0063	0.0114	0.0229

Note: FS_1 : Chawki worms fed with S_{36} leaf + Late age worms fed with S_{36} leaf; FS_2 : Chawki worms fed with S_{36} leaf + Late age worms fed with M_5 leaf
FS_3 : Chawki worms fed with M_5 leaf + Late age worms fed with S_{36} leaf; FS_4: Chawki worms fed with M_5 leaf + Late age worms fed with M_5 leaf

through fertilizer (947.57 m) and T_{10} Bio-fertilizers 10 kg each of *Azospirillum* + *Aspergillus awamori*/ha/yr + 25% recommended N through each of Compost, Green manure, Castor oil cake and vermicompost (932.50 m). Lower denier was registered in T_{12} (2.62) followed by T_{11} (2.63), whereas T_1 100 % recommended N through Castor oil cake and T_3 100 % recommended N through Green manure (*Glyricidia maculata*) were on par with each other (2.92) with respect to denier. Among four different feeding schedules, FS_2 expressed significantly higher single cocoon filament length (637.25 m) and lower denier of 2.65 (Table 1 and 2).

DISCUSSION

Significant improvement in single cocoon filament length and lesser denier might be due to feeding of worms with leaf obtained by application of organic manures and inorganic fertilizers, which were applied to mulberry. These results are in close conformity with those of Shankar (1990), who reported that maximum filament length and denier were obtained with the application of FYM and chemical fertilizers for mulberry. The importance of organic matter has been emphasized earlier by Pain (1961), who obtained increased silk content and filament length per cocoon through application of FYM at 30 tonnes/ha/yr. Similarly, Basvanna *et al.* (1974) reported that, application of 10 to 20 tonnes of FYM/ha/yr with 50 per cent recommended fertilizer levels increased the filament length, denier and other cocoon parameters. This might be due to influence of variety, spacing and nitrogen levels or chemical composition of mulberry leaves.

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