

ORIGINAL ARTICLE

Rearing Performances of PM X CSR₂ Fed With Mulberry Raised Through Different Organic Manures

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ABSTRACT

A field experiment was conducted to study the rearing performances of PM X CSR₂ fed with mulberry raised through different organic manures conducted at Krishi Vigyan Kendra, Chamarajanagar during 2013-14. The experiment was conducted with seven treatments and four replication in Randomized Block Design. The silkworm (PM x CSR₂) fed on mulberry grown by supplying with different types of organic manures exhibited notable influence on cocoon traits. The data of two rearings revealed that, significantly higher matured larval weight (39.09 and 39.33 g/10), shorter fifth larval duration (7.22 and 7.18 days), good ERR (95.28 and 96.30 %), lower disease incidence (4.10 and 3.25 %), maximum cocoon yield (75.32 and 76.03 Kg/100 dfls), highest cocoon weight (1.89 and 1.91 g), shell weight (0.365 and 0.371 g), shell percentage (19.32 and 19.42 %), longest silk filament length (924.22 and 938.91 m) and finer denier (2.290 and 2.266) in first and second crops, respectively were recorded when silkworm fed with V₁ mulberry grown by the application of 5.88 tonnes of Vermicompost + recommended N, P & K @ 350: 140: 140 kg / ha / year (T₆).

Keywords: Vermicompost, Inorganic fertilizers, V₁ mulberry variety, PM x CSR₂ silkworm hybrid.

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INTRODUCTION

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) [1]. India is the second largest producer of silk and also the largest consumer of silk in the world. This was due to development of new technologies in mulberry cultivation and silkworm rearing [2]. 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 [3]. The highly intensive mulberry cropping system causes depletion of nutrients in soil and excess usage of inorganic fertilizers and pesticides caused deleterious effect on soil health and also leaf quality. Hence, nutrition of silkworm, *Bombyx mori* L. is of primary importance as the cocoon production is directly influenced by the quality of mulberry leaves [6]. In this context, the effect of organic manures (FYM, hongecake, neemcake, *Jatropha* cake, vermicompost and cowpea as intercrop along with chemical fertilizers were applied in equal split doses) on mulberry growth and quality as well as its subsequent effect on growth and yield and cocoon productivity of mulberry silkworm (PM X CSR₂) was investigated.

MATERIAL AND METHODS

The present experiment was conducted at Krishi Vigyan Kendra, Chamarajanagar during 2013-14. The PM × CSR₂ silkworm hybrid (*Bombyx mori* L.) was reared on V₁ mulberry leaf raised through the application of different kinds of organic manures. During rearing 100 worms were maintained in each replication and fed with V₁ mulberry leaves. The treatments were as follows,

T₁: Recommended 20 tonnes of FYM / ha / year +Recommended N, P and K @ 350: 140: 140 kg / ha / year through chemical fertilizers (control)

T₂ : 2.56 tonnes of Honge cake / ha / year + Recommended N, P and K @ 350: 140: 140 kg / ha / year through chemical fertilizers

T₃ : 1.92 tonnes of Neem cake / ha / year + Recommended N, P and K @ 350: 140: 140 kg / ha / year through chemical fertilizers

T₄ : 2.32 tonnes of Jatropha cake / ha / year + Recommended N, P and K @ 350: 140: 140 kg / ha / year through chemical fertilizers

T₅ : Cowpea as green manure + Recommended N, P and K @ 350: 140: 140 kg / ha / year through chemical fertilizers

T₆ : 5.88 tonnes of Vermicompost / ha / year + Recommended N, P and K @ 350: 140: 140 kg / ha / year through chemical fertilizers

T₇ : Recommended N, P and K @ 350: 140: 140 kg / ha / year through chemical fertilizers

The silkworm rearing practices were carried out as per the recommendations [4]. The all observations were recorded treatment wise. The data was analyzed statistically by adopting two way factorial CRD [5].

RESULTS AND DISCUSSION

The results of the experiments carried out on the rearing performances of PM x CSR₂ influenced by feeding on mulberry leaf grown with different types of organic manures (Table 1 & 2 and figure 1, 2 & 3). The data of two rearings revealed that, significantly higher matured larval weight (39.09 and 39.33 g/10), shorter fifth larval duration (7.22 and 7.18 days), good ERR (95.28 and 96.30 %), lower disease incidence (4.10 and 3.25 %), maximum cocoon yield (75.32 and 76.03 Kg/100 dfls), highest cocoon weight (1.89 and 1.91 g), shell weight (0.365 and 0.371 g), shell percentage (19.32 and 19.42 %), longest silk filament length (924.22 and 938.91 m) and finer denier (2.290 and 2.266) in first and second crops, respectively were recorded when silkworm fed with V₁ mulberry grown by the application of 5.88 tonnes of Vermicompost + recommended N, P & K @ 350: 140: 140 kg / ha / year (T₆). It may be due to different sources of organic manures and inorganic fertilizers when applied to mulberry might have increased the crude protein content, potassium and sulphur content in leaves which inturn influenced the cocoon and post cocoon parameters. These results are in agreement with results obtained by Ramakrishna Naika [8] who reported that, application of nitrogen to mulberry significantly influenced the rearing performances of silkworm as nitrogen promotes protein content in mulberry leaf. Significantly better performance of silkworms with respect to larval weight, larval duration were obtained by feeding the silkworms with leaves fertilized by different sources of organic manures, which may be due to enhanced leaf quality through better uptake of nutrients induced by mineralization caused by the release of various organic acids during the process of decomposition [7].

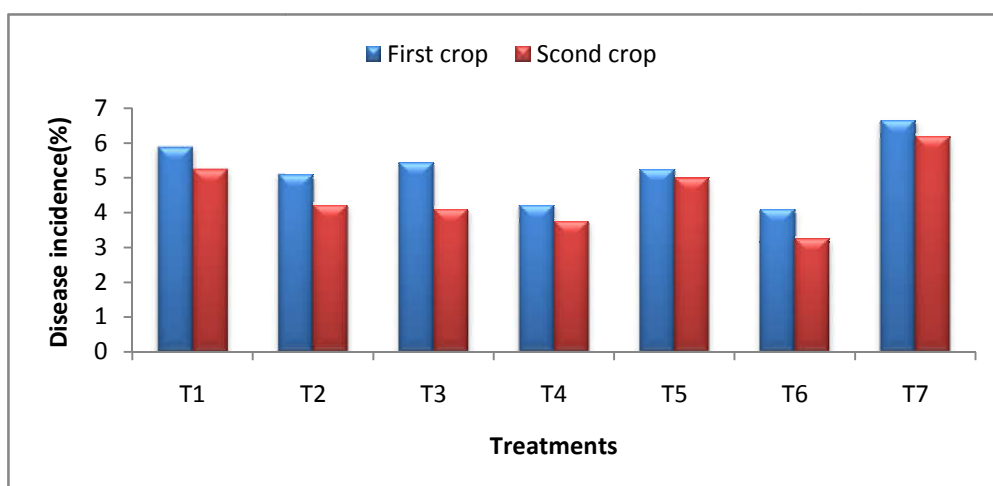


Fig. 1: Disease incidence of silkworms (%) as influenced by different organic manures

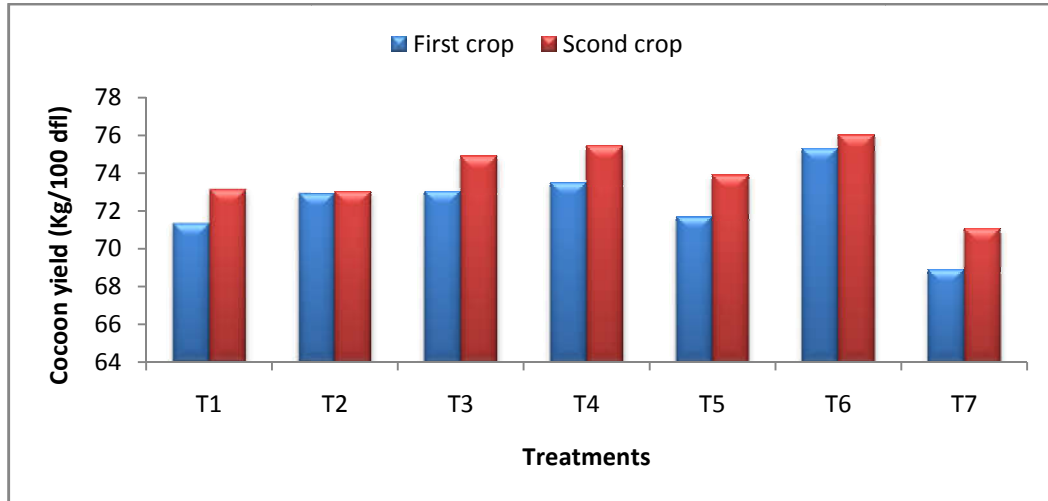


Fig. 2: Cocoon yield (kg/100dfl) as influenced by different organic manures

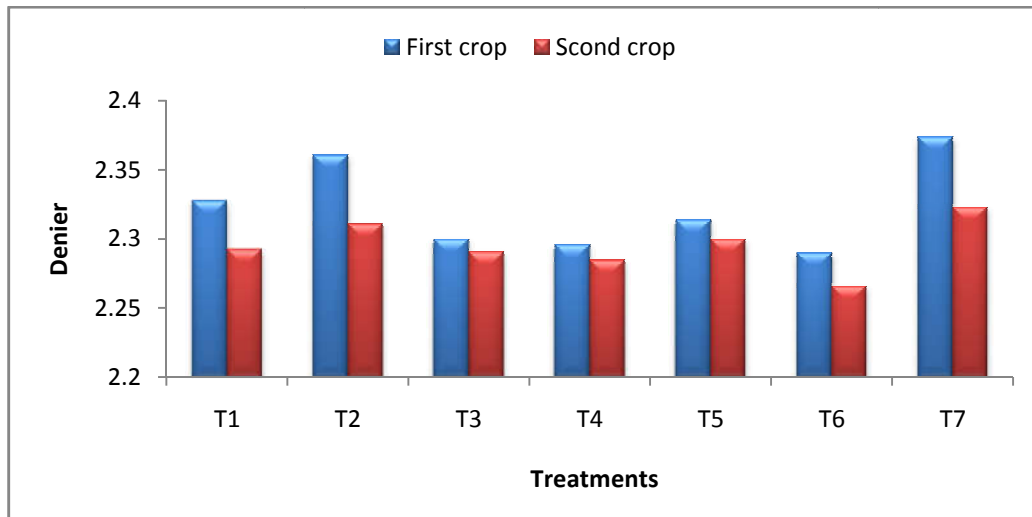


Fig. 3: Denier as influenced by different organic manures

Table 1. Larval performance of PM X CSR₂ fed with mulberry leaves raised through the application of organic manures

Treatments	Matured larval Weight (g)		Fifth instar larval duration (days)		Disease incidence (%)		Effective rate of rearing (%)	
	I crop	II crop	I crop	II crop	I crop	II crop	I crop	II crop
T ₁	38.40	38.48	8.08	8.00	5.88	5.25	93.48	94.28
T ₂	38.49	38.86	8.20	8.01	5.10	4.21	94.20	94.53
T ₃	38.23	38.90	8.10	8.04	5.44	4.10	93.21	95.50
T ₄	38.98	39.07	7.24	7.20	4.21	3.75	95.08	96.11
T ₅	38.31	38.42	8.21	8.10	5.25	5.00	94.00	94.59
T ₆	39.09	39.33	7.22	7.18	4.10	3.25	95.28	96.30
T ₇	36.76	36.89	8.24	8.23	6.66	6.20	92.91	93.25
F - Test	*	*	*	*	*	*	*	*
S. Em ±	0.06	0.014	0.01	0.02	0.05	0.10	0.34	0.09
C.D @ 5%	0.19	0.041	0.03	0.06	0.15	0.32	1.01	0.27

* Significant

Table 2. Cocoon and post cocoon parameters of PM X CSR₂ fed with mulberry leaves raised through the application of organic manures

Treatments	Single Cocoon weight (g)		Single shell weight (g)		Shell ratio (%)		Cocoon yield (Kg/100 dfl)		Silk filament length (m)		Denier	
	I crop	II crop	I crop	II crop	I crop	II crop	I crop	II crop	I crop	II crop	I crop	II crop
T ₁	1.80	1.84	0.340	0.350	18.88	19.02	71.32	73.12	858.57	884.43	2.328	2.293
T ₂	1.82	1.83	0.343	0.352	18.84	19.23	72.92	73.03	847.13	870.82	2.361	2.311
T ₃	1.84	1.89	0.345	0.356	18.75	18.83	73.06	74.91	911.35	919.38	2.300	2.291
T ₄	1.85	1.90	0.353	0.367	19.08	19.31	73.51	75.46	915.91	926.21	2.296	2.285
T ₅	1.81	1.86	0.340	0.352	18.78	18.92	71.69	73.92	868.50	893.78	2.314	2.300
T ₆	1.89	1.91	0.365	0.371	19.31	19.42	75.32	76.03	924.22	938.91	2.290	2.266
T ₇	1.78	1.80	0.332	0.337	18.65	18.72	68.91	71.08	841.77	865.86	2.374	2.323
F - Test	*	*	*	*	*	*	*	*	*	*	*	*
S. Em ±	0.01	0.01	0.003	0.004	0.045	0.049	0.88	0.91	5.005	4.1910	0.003	0.002
C.D @ 5%	0.03	0.03	0.009	0.011	0.132	0.144	2.61	2.69	14.72	12.326	0.009	0.006

*Significant at 5%

CONCLUSION

Among the rearing performances of PM X CSR₂, the maximum fifth instar larval duration, the shorter larval duration, matured larval weight, highest Effective rate of rearing, lower disease incidence were recorded in first and second rearing of silkworms fed on mulberry leaves raised by application of 5.88 tonnes of Vermicompost / ha / year + recommended N, P & K @ 350: 140: 140 kg / ha / year through chemical fertilizers (T₆). Among the cocoon and post cocoon parameters, the maximum cocoon yield, single cocoon weight, single shell weight, shell percentage, silk filament length and finer denier were recorded in first and second rearing of silkworms fed on mulberry leaves raised by application of 5.88 tonnes of Vermicompost / ha / year + recommended N, P & K @ 350: 140: 140 kg / ha / year through chemical fertilizers (T₆). Different types of organic manures and inorganic fertilizers are known to enhance growth and yield as well as quality of mulberry by providing the essential nutrients required by the plant, making available otherwise unavailable nutrients. The combined application of organic manures and inorganic fertilizers will not only sustain the soil fertility but also improve the mulberry productivity, nutrient use efficiency, biodiversity, soil and environmental quality. In turn such mulberry leaves are known to provide the required nutrients for better growth of the silkworm leading to better cocoon production in terms of qualitatively and quantitatively.

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