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PERFORMANCE OF BIVOLTINE SILKWORM HYBRID ON DIFFERENT MULBERRY CULTIVARS UNDER RAINFED CONDITIONS

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ABSTRACT

The studies on Disease free eggs of silkworm hybrid CSR 2 x CSR 4 were utilized. to evaluate the performance of bivoltine mulberry silkworm (*Bombyx mori* L.) hybrids under rainfed condition during November-December, 2014.The 10 mature larvae weight (33.69 g), lower larval duration (22.09 days) higher single shell weight (0.40 g) single cocoon weight (1.73 g), cocoon yield/10000 larvae brushed (17.38 kg), and lowest disease percentage (6.75 per cent) was observed in mulberry variety V-1 among tested varieties and larvae fed on leaves of BER-779 (27.54 g) shown 10 mature larvae weight lowest among all the other variety of mulberry tested, respectively. Based on overall performance it can be conclude that the bivoltine hybrid CSR2 x CSR4 reared on mulberry variety V-1 is the most suitable for rearing under Marathwada under rainfed conditions.

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INTRODUCTION

Silkworm (Bombyx mori L.) is essentially monophagous insect feeds solely on mulberry leaves (*Morus spp.*). Its growth and development as well as cocoon and silk production entirely depends upon the quantity and quality of mulberry leaves (Nagaraju, 2002). Leaf quality is an important parameter used for evaluation of varieties aimed at selection of superior varieties for rearing performance (Bongale *et al.,* 1997). It is well established fact that, in sericulture, more than 60% of the total cost of cocoon production goes towards mulberry production alone. Hence, in recent years maximum attention has been given for the improvement of mulberry in terms of both quality and quantity. About 92.20% of silk produced in the world is obtained from mulberry silkworm Bombyx mori L. reared solely on mulberry leaves (*Morus spp.*). Growth and development of silkworm Bombyx mori L. and cocoon crop yield are mainly influenced by yield and nutritional quality of mulberry leaf used as feed (Yokoyama, 1963; Bongale and Chaluvachari, 1994). Superiority of different mulberry varieties used as food for silkworm larvae greatly affects the economy of sericulture industry (Das and Sikdar, 1970). Nutritive value of mulberry (*Morus spp.*) leaf is a key factor besides environment and technology adoption for better growth and development of the silkworm larvae and cocoon production (Purohit and Pavankumar, 1996; Seidavi *et al.,* 2005). Matsumara (1951) and Bose (1989) reported that, among the various factors influencing silkworm growth and cocoon production, leaf quality plays a major role. It is a confirmed fact that, leaf quality differs among mulberry varieties which in turn responsible for the difference in silkworm rearing performances (Aruga, 1994; Bongale *et al.,* 1997). Leaves of superior quality enhance the chances of good cocoon crop (Ravikumar, 1988). In the present study an attempt has been made to evaluate better performing mulberry variety through silkworm rearing experiment for rained condition.

MATERIALS AND METHODS

The present investigation was undertaken during November to December, 2014 to evaluate the effect of different mulberry varieties on rearing performance and economic traits of silk worms (Bombyx mori). Krishnaswami (1978) described the improved technology of silkworm rearing and it was adopted in this investigation. The newly hatched larvae were fed with chopped pieces of fresh mulberry leaves of ten different varieties viz., V-1, S-13, Kanva-2, BER-763, S-36 and Ananta. The leaves were chopped into small pieces of 0.5 cm and sprinkled over the newly hatched worms for their feeding. The feeding was given four times in a day. The rearing trays were cleaned daily as per recommended times.

After full development, the ripe worms were identified, as they looked translucent with creamy colour. The ripe worms ceased to eat, crawled towards periphery of the trays and tried to spin the cocoons, were handpicked and put on the Chandrika. The worms spun the cocoons within 48 to 72 hours. The pupae remained inside the cocoons till emergence.

The harvesting of cocoon was carried out on fifth day of release of worms on Chandrika. Randomly selected ten cocoons of each treatment were used for

recording cocoon parameters. The observations were recorded on larval weight of 10 matured larvae, larval period, disease incidence, single shell weight, and yield per 10,000 larvae brushed and singal cocoon wight. The data thus collected were statistically analysed and the results were recorded.

RESULTS AND DISCUSSION

The perusal of literature revealed that very meager information is available on the mulberry silkworm hybrids under Marathwada region renfed conditions. Hence, the results obtained are discussed in the light of available literature on the other related hybrids.

Larval weight of silkworm (g)

The data presented in Table 1. It revealed that the variety V-1 (33.69 g) observed significantly superior weight of 10 mature larvae among tested varieties, followed by Ananta (33.12 g), Kanva-2 (31.72 g). S-36 (29.14 g), S-13 (29.06 g). The lowest larval weight was recorded in larvae fed on leaves of BER-763 (27.54 g). Present study are in agreement with the findings Parihar (2012) reported that larval weight of ten mature larvae varied in the range of 27.07 g to 33.95 g. Variety V-1 (33.95 g) was observed significantly superior among the tested varieties. The results are also in agreement with Kakati and Kakati (2011)

Larval period of silkworm (days)

The data on the larval duration of silkworm *B. mori* are presented in Table 1. It revealed that the variety V-1 recorded significantly superior and lowest larval duration (22.09 days) than rest of the treatments. Next lowest larval duration was recorded from variety Ananta (22.13 days), S-13 (22.40 days) S-36 (22.60 days). The highest larval duration was recorded in the larvae fed on leaves of Kanva-2 (24.35 days) Which was at par with BER763 (24.02days). Present study are in agreement with the findings of Parihar (2012) reported that larval duration was observed in the range of 22.16 days to 23.81 days. Variety V-1 (22.16 days) was recorded significantly lowest larval duration over rest of the treatment. The results are also in agreement with Ray *et al.* (2010)

Disease incidence

The data recorded on disease incidence of silkworm (*B. mori*) are presented in Table 1. The disease percentage was observed in the range of 6.75 per cent to 15.25 per cent. Variety V-1 (6.75 per cent) was observed significantly superior among tested varieties followed by Ananta (7.75 per cent), S-36 (8.25 per cent), Kanva-2 (10.50 per cent), S-13 (12.00 per cent). The highest disease percentage was observed in the larvae fed on leaves of BER-763 (15.25 per cent). The present findings are in agreement with Parihar (2012) reported that disease percentage was observed in the range of 6.3 per cent to 14.66 per cent. Variety V-1 (6.3 per cent) reported significantly superior over the other treatments. Regarding the disease percentage lowest disease percentage was observed in the larvae fed on the leaves of BER-763 (14.66 per cent) variety of mulberry. The results are also in agreement with Singh *et al.,* (2012).

Single shell weight of silkworm

The data on single shell weight of silkworm *B. mori* are presented in Table 1. The results revealed that the single shell weight was observed in the range of 0.24 to 0.40 g. The significantly highest shell weight was recorded by larvae fed on leaves of V-1 (0.40g). These were followed by S-36 (0.38 g), Kanva-2 (0.36 g), Ananta (0.36 g), S-13 (0.30g). The minimum shell weight was recorded in the larvae fed on the leaves of BER-763 (0.24 g). Present study is in agreement with the findings of Pakhale (2008) resulted that the maximum shell weight was recorded by larvae fed on leaves of V-1 (0.36 g) and minimum shell weight was recorded in the larvae fed on leaves of BER-779 (0.30 g) variety.

Single cocoon weight of silkworm (g)

The data on single cocoon weight are presented in Table 1. The single cocoon weight was significantly highest in the larvae fed on leaves of V-1 (1.73 g) mulberry variety followed by S-36 (1.67 g) Kanva-2 (1.64g) and Ananta (1.62 g). The single cocoon weight was lowest in the larvae fed on leaves of BER-763 (1.32 g) variety of mulberry which was at par with S-13(1.56 g). Present study are in agreement with the findings of Parihar (2012) reported that Single cocoon weight of silkworm *B. mori* observed in the larvae fed on leaves of V-1 (1.43 g). The lowest single cocoon weight was recorded in the larvae fed on BER-763 (1.18 g) variety of mulberry.

Cocoon yield/10,000 larvae brushed by weight (kg)

The data on cocoon yield are represented in Table 1. The results indicated that the Cocoon yield / 10,000 larvae brushed varied between the range of 13.73 kg to 17.38 kg. The significant highest cocoon yield was obtained in the variety V-1 (17.38 kg) which was at par with S-36 (17.15 kg), K-2 (16.24 kg) and Ananta (15.85 kg). The lowest yield was obtained from larvae fed on leaves of BER-763 (13.73kg) which was at par with S-13 (14.98 kg) variety of mulberry. Present study are

Table 1: Performance of different biovoltine mulberry silkworm hybrids

Sr.No.	Treatment	Larval duration(days)	weight often maturelarvae (g)	Disease incidence (%)	single shell weight (g)	singlecocoon weight(g)	Cocoonyield /10000 larvae brushed(kg)
1	V1	22.09	33.69	6.75	0.40	1.73	17.38
2	Kanva 2	24.35	31.72	10.50	0.36	1.64	16.24
3	S 36	22.60	29.14	8.25	0.38	1.67	17.15
4	S 13	22.40	29.06	12.00	0.30	1.56	14.98
5	BER 763	24.02	27.54	15.25	0.24	1.32	13.73
6	Ananta	22.13	33.12	7.75	0.36	1.62	15.85
SE +		0.25	0.52	0.55	0.01	0.03	0.38
CD at 5%		0.76	1.56	1.64	0.03	0.09	1.13

*-Significant at 5 % level.

in agreement with the findings of Patil (2005) reported that the maximum yield was observed in the variety V-1 (22.24 kg). The lowest yield was obtained from larvae fed on leaves of P-16 (16.04 kg) variety of mulberry.

REFERENCES

Ajantha and Rathore, R. R. S. 1998. Honey bee pollination of sunflower and their foraging behavior at Pantnagar region. Paper Presented at FAO Workshop on Sustainable Beekeeping Development, Dharwad, and 1-5 August, 1998.

Arug, H. 1994. Principles of sericulture. *Oxford and IBH publishing Co. Pvt. Ltd, 66 Janpath* New Delhi, India. p. 376.

Bongale, U. D., Chaluvachari, Mallikarjunappa, R. S. Narahari Rao, B.V. Anantharaman, M. N. and Dandin, S. B. 1997. Leaf nutritive quality associated with maturity levels in fourteen important varieties of mulberry (Morus spp.). *Sericologia*. **37(1):** 71-81.

Bongale, U. D., Chaluvachari, Mallikarjunappa, R. S. Narahari Rao, B. V. Anantharaman, M. N. and Dandin, S. B. 1997. Leaf nutritive quality associated with maturity levels in fourteen important varieties of mulberry (Morus spp.). *Sericologia*. **37(1)** 71-81.

Bose, P. C. 1989. Evaluation of mulberry leaf quality by chemical analysis. In: Genetic resources of mulberry and utilisation. Ed. by Sengupta, K. & Dandin, S.B. CSR&TI, Mysore. pp.189-190.

Chaluvachari and Bongale, U. D. 1994. Leaf quality evaluation of selected mulberry genotypes by biochemical and bioassay studies. Proceedings of the Fourth All India Conference on Cytology and Genetics held at Karnataka State Sericulture Research & Development Institute, Thalaghattapura, Bangalore, Karnataka, India, pp.121-124.

Das, B. C. and Sikdar, A. K. 1970. Evaluation of some improved strains of mulberry by feeding experiment. *Indian J. Seric.* **9(1):** 26-30.

Kakati, L. N. and Kakati, B. T. 2011. Seasonality of nutrient contents of different leaf types of two primary host plants of Antheraea assamensis Helfer. *The Ecoscan.***12:** 61-265.

Krishnaswami, S. 1978. The first decade of bivoltine revolution. *Indian Silk*. **18(7):** 7-11.

Matsumara 1951. On the functional difference of digestive amylase of different strains of the silkworm Bombyx mori L. Bull. Seric. Exp. Sta., Japan. 13 pp. 513-519.

Nagaraju, J. 2002. Application of genetic principles in improving silk production. *Current Science*. **83(4)**: 409-415.

Pawar, S. S. 2010. Evaluation of mulberry varieties for rearing performance and economic traits of silkworm *Bombyx mori* L. M.Sc. (Agri.) Thesis, MKV, Parbhani (M.S.).

Parihar, S. K. 2012. Evaluation of different mulberry varieties for Rearing performance and economic traits of mulberry silkworm hybrid PM × CSR_2. M.Sc. (Agri.) Thesis, MKV, Parbhani (M.S.)

Pakhale, S. G. 2008. Evaluation of some mulberry varieties for rearing performance and economic traits of silkworm *Bombyx mori* L. M.Sc. (Agri.) Thesis, MKV, Parbhani (M.S.).

Patil, S. N. 2005. Evaluation of some mulberry varieties for rearing performance and economic traits of silkworm Bombyx mori L. M.Sc. (Agri.) Thesis, MKV, Parbhani (M.S.).

Purohit, K. M. and Pavan Kumar, T. 1996. Influence of various agronomical practices in India on the leaf quality in mulberry. *A review. Sericologia*. **36(1):** 27-39.

Ravikumar, C. 1988. Western ghat as a bivoltine region prospects, challenges and strategies for its development. *Indian Silk*. **26(9)**: 39-54.

Ray, P. P., Rao, T. V. and Dash, P. 2010. Performance of promising ecoraces of Eri (Philosamia ricini) in agroclimatic conditions of Western Odisha. *The Bioscan.* **5(2):** 201-205.

Seidavi, A., Bizhannia, A. R., Sourati,R. and Mavvajpour, M. 2005. The nutritional effects of different mulberry varieties on biological characters in silkworm. *Asia. Pac. J. Clin Nutr, 14 (Suppl)* p.122.

Singh B. K., Bitopan Das, A., Bhattacharya, Nizora Bhuyan, P. Borpujari, J. C. Mahanta and Yayaprakash, P. 2012. Bio-resources of eri silkworm and its host plants of North East India, Utilization and need for their conservation. *The Ecoscan*. **1:** 473-478

Venkatesh, M. and Rayar, S. G. 2005. Rearing Performance of New Multivoltine x Bivoltine Hybrids of Silkworm,*Bombyx mori* L. on Two Mulberry Varieties Under Dharwad Conditions *Karnataka J. Agric. Sci.* **18(3):** 986-989.

Yokoyama, T. 1963. Sericulture. Annual Review of Entomology, 8 pp. 287-306.