

IMPACT OF IMPROVED MULBERRY GENOTYPES ON COCOON PRODUCTION IN ACIDIC SOILS OF HILLS AND FOOT HILLS

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In order to screen /identify mulberry variety with high leaf productivity and quality suitable for cultivation in acidic soils of hill/ foot hills of West Bengal nine short listed improved genotypes and BC₂59 as check were grown at two locations viz. Matigara-Siliguri (foot hills) and Kalimpong (hills) with soil pH ranging from 4.6 to 5.8 were evaluated by conducting silkworm rearing. Yield of 10,000 larvae by number and weight, single cocoon weight, shell weight and shell % were found significantly superior in Tr-23, with an yield potential of 24 and 14 mt/ha/year at Matigara and Kalimpong, respectively.

Key word : Mulberry, feeding experiment, bioassay evaluation, acidic soil.

INTRODUCTION

Soil acidic is one of the major problems in the sericulture as it limits mulberry growth, leaf productivity and quality in many parts of the hill and foothills. Larger areas are become progressively unproductive due to accumulation of acidic salts in the regions where the silkworm rearing is an age-old practice. As the soil acidity in this region is a natural phenomenon, so amelioration of soil through application of dolomite/ lime s a recurring expenditure for the poor farmers. The long term and cost effective strategy for maintaining the sericulture production at the optimum level in such areas could be use of mulberry genotypes with comparatively high soil acidity tolerance. In the process of development of few mulberry varieties specific to different agro-climatic zones of Eastern India, a number of varieties have been evolved and recommended (Sarkar & Ghosh, 2005).

Researches on sericulture are now-a-days concentrated in evolution and evaluation of promising new mulberry genotypes and silkworm breeds. The quality of mulberry leaves as food for silkworm greatly influences the economy of sericulture industry (Das *et al.* 1988). The influence of mulberry leaf of different genotypes on silkworm larval behaviour and its cocoon traits was studied by Nataraju *et al.* (1981), Pillai *et al.* (1981), Raju *et al.* (1990) and Giridhar & Reddy (1991) in tropical zone of India.

To identify acidic soil tolerant superior mulberry genotype with better leaf productivity and quality over the ruling check, BC₂59, a project undertaken from 2004-08. Initially, the laboratory at the institute, screening of 22 improved mulberry genotypes was conducted (at the Institution lab.) in the acidic environment in the sand cultures with nutrient medium (Knop's solution) at pH levels ranging from 2.0 to 7.0 to short list promising genotype for further evaluation in acidic soils in the hot spot. It was observed that some of the genotypes could tolerate the pH level upto 4.0 without showing any deterioration in the shoot length, leaf area, root volume and fresh and dry weight root, shoot and leaf. On the basis of selection indexing nine acidic medium tolerant mulberry genotypes were identified viz. Tr-4, Tr-8, Tr-10, Tr-12, Tr-20, Tr-23, C-1735, C-2028, S-

146 which were evaluated alongwith BC₂59 as ruling check at two hot spot locations, Matigara Sericulture Complex, Siliguri, Govt. of West Bengal (pH 5.2) and Regional Sericultural Rearch Station, Central Silk Board, Kalimpong, West Bengal (pH 4.6).

The present investigation was undertaken to evaluate nine short listed improved mulberry genotypes/ varieties against BC₂59, recommended check variety, through silkworm feeding experiment for identifying the best one for commercial exploitation under rain fed condition in the acidic soils of foot hills and hills of West Bengal.

MATERIALS AND METHODS

The experiment was conducted at two locations viz. at Matigara Sericultural Complex, Siliguri and at Regional Sericultural Research Station, Kalimpong, West Bengal. ,nine improved mulberry genotypes viz. Tr-4, Tr-8, Tr-10, Tr-12, Tr-20, Tr-23, C-1715, C-2028 and S-146 were listed in comparison to BC₂59. The leaves of the above genotypes were fed to Bi x Bi silkworm hybrid NB18 x P5 at RSRS, Kalimpong and Multi x Multi hybrid N x M12W at DOS, Matigara Farm during April crop season 2007 and 2008. The leaves wee fed four times a day and rearing was carried out as per the standard procedure suggested by Krishnaswamy (1978). After second moult, 100 silkworm larvae were taken in each treatment and replicated five times. The larvae were fed with equal quantity of leaves for all the treatments and continued till the maturity of the larvae. The important economic characters viz. effective rate of rearing by number and weight, weight of 10 matured larvae, single cocoon weight, single shell weight, shell % and cocoon yield were recorded and the data were analyzed statistically.

RESULTS AND DISCUSSION

Data on important cocoon characters, as influenced by feeding with different genotypes are presented in Table I.

The pooled data revealed that the difference observed for 10 matured larvae, ERR by

Table I : Rearing performance of 09 improved mulberry genotypes alongwith BC₂59 as check by using NB18 x P5 at RSRS, Kalimpong and N x M12W at DOS, Matigara Sericultural complex.

Mulberry genotype	Wt. of 10 mature Larvae (g)		Yield / 10000 Larvae (no.)		Yield / 10000 Larvae (wt.)		Single cocoon wt. (g)		Single Shell wt. (g)		Shell %	
	K	M	K	M	K	M	K	M	K	M	K	M
Tr-4	41.49	28.95	8267	8300	14.80	9.17	1.85	1.29	0.35	0.17	18.95	13.47
Tr-8	41.24	30.14	8000	8200	15.07	9.50	1.96	1.29	0.37	0.17	18.99	13.44
Tr-10	47.11	27.93	7867	7500	14.80	9.47	1.98	1.29	0.37	0.18	18.75	13.70
Tr-12	45.32	30.65	7467	7700	13.87	9.37	1.96	1.27	0.36	0.15	18.58	12.07
Tr-20	42.79	29.84	8133	7500	13.20	9.30	1.99	1.28	0.38	0.17	18.95	13.06
Tr-23	49.48	30.94	8800	8100	16.53	9.93	2.00	1.30	0.39	0.19	19.62	14.58
C-1735	41.43	28.73	7733	7900	14.00	9.07	1.97	1.28	0.36	0.16	18.21	12.27
C-2028	37.13	30.26	8267	7800	13.60	9.37	1.99	1.27	0.38	0.16	18.99	12.59
S-146	41.19	26.41	7600	8000	13.20	9.20	1.92	1.25	0.35	0.15	18.09	12.00
BC259	43.08	27.76	8000	8100	15.20	9.50	1.99	1.28	0.38	0.17	18.90	13.31
CD at 5%	3.64	0.18	612.3	405.13	0.78	0.32	0.07	0.01	0.01	0.01	0.72	1.06
CV%	4.93	0.37	4.45	2.99	3.17	1.98	1.98	0.60	0.80	4.64	2.25	4.72

number and weight, single cocoon weight, single shell weight and shell % amount different genotypes was significant. Highest larval weight was recorded in Tr-23 (49.48 g at Kalimpong and 30.94 g at Matigara) and it was significantly higher over check BC₂59 (43.08 g at Kalimpong and 27.76 g at Matigara) and other test genotypes. The ERR of 10,000 larvae by number (8800 at Kalimpong and 8100 at Matigara) and weight (16.53 kg at Kalimpong and 9.93 kg at Matigara) were also found significantly higher in Tr-23 than BC₂59. The single cocoon weight (2.00 and 1.30 g at Kalimpong and Matigara, respectively), single shell weight (0.39 g at Kalimpong and 0.19 at Matigara) and shell % (19.62 at Kalimpong and 14.58 at Matigara) were also recorded highest in Tr-23.

Data on leaf yield revealed that Tr-23 showed higher yield (24558.77 kg/ha/year at Matigara under 60 x 60 cm spacing and 14429.48 kg/ha/year under 90 x 90 cm) compared to other test genotypes and BC₂59 (15738.41 and 8130.90 kg/ha/year at Matigara and Kalimpong, respectively). It was found that Tr-23 is superior in physiological and nutritional levels as compared to other improved test genotypes and BC₂59 (Ghosh *et al.*, 2008).

Thus, from the feeding experiment rearing of silkworms it could be concluded that Tr-23 is superior and best performer over all other genotypes in the acidic soils of hills and foot hills of West Bengal under rain fed condition.

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