

**EVALUATION OF MORPHOTYPES OF SOM, *PERSEA BOMBYCINA* KOST.
FOR THE REARING OF MUGA SILKWORM, *ANTHRAEA ASSAMENSIS*
HELPER (LEPIDOPTERA : SATURNIDAE)**

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The som, *Persea bombycina* Kost major food plant of muga silkworm shows various morphotypes within the species. Eight (PB 001, PB 002, PB 003, PB 004, PB 005, PB 006, PB 007, PB 008) morphotypes of som food plant maintained at Regional Muga Research Station, Boko were evaluated for rearing performance of muga silkworm, *Antheraea assamensis* Helfer during Kotia commercial (October - November 2012) and Chotua seed crop (February - March 2013) rearing seasons. Among the eight morphotypes higher moisture percent was recorded in the tender leaves of PB 003 (69.70%) followed by PB 006 (67.50%) and least in PB 002 (61.02%) during Kotia commercial crop rearing. The mature larva weight (11.30 g), effective rate of rearing (59.66%) and cocoon yield (61 cocoons/ g) recorded were highest in muga silkworm fed on PB 003 morphotype of som followed by batch of larvae fed on PB 006 morphotype and least in larvae fed on PB 002. Data of important cocoon characters like single cocoon weight, single shell weight and silk ratio of muga silkworm fed on different morphotypes were different. The single cocoon weight was ranged from 5.31g to 5.45 g, Shell weight 0.42 to 0.46 g and Silk Ratio percent 8.02 to 8.66%. The rearing parameters i.e mature larva weight, Effective rate of rearing and cocoon yield per/df and cocoon parameters i.e. single cocoon weight, single shell weight and silk ratio were observed higher during Kotia commercial crop than that of Chatua seed crop of muga silkworm fed on different morphotypes of Som. The score of evaluation index of rearing and cocoon parameters indicated that PB 003 was more suitable for muga silkworm rearing as received highest score of 411.21 which was followed by PB 006 having score 408.24 during Kotia commercial crop. Similar trend was observed during Chotua seed crop.

Key words : Som, *Persea bombycina*, morphotypes, Muga silkworm, *Antheraea assamensis*.

INTRODUCTION

The muga silk worm, *Antheraea assamensis* Helfer exploited commercially for production of muga silk is reared on primary food plant Som, *Persea bombycina* Kost and soalu, *Litsea monopettala* Juss. in outdoor. It is multi-voltine having 5-6 generations in a year and seasons affect the commercial characters. (Barah *et al.*, 1988). The farmers prefer som to offer food plant for muga silkworm rearing for silk production.

The leaf quality of food plants either alone or in combination plays an important role in the larval growth and silk productivity (Krishnaswami *et al.*, 1971). Dash *et al.* (1992) and Yadav & Mahobia (2010) reported that the leaf nutrition of tasar food plant can enhance the effective rate of rearing (ERR), health and growth of larvae and better crop yields as the feed quality has direct correlation with cocoon and shell weights, silk ratio and silk filament. Even if, the harvested cocoons are less in number, their quality can compensate the crop economics either with higher silk or egg productivity or quality (Muthukrishnan & Pandian, 1987; Rath, 2005). The larval development and their feeding status have impact on fecundity and egg fertility (Hajarika *et al.*, 2003; Saikia *et al.*,

2004; Behmer, 2006; Radjabi *et al.*, 2009). Reports on effect of different food plants and morphotypes of same species on rearing and grainage performance of tasar silkworm are available (Rajaram *et al.*, 2000; Reddy *et al.*, 2010). However, Information's on muga silkworm rearing performance on various morphotypes of som are scanty. Hence, the present study was undertaken to evaluate the various morphotypes of som for rearing of muga silkworm.

MATERIALS AND METHODS

The present study was conducted at Regional Muga Research Station, Boko, Kamrup, Assam to evaluate eight morphotypes of som food plant for rearing performance of muga silkworm, *Antheraea assamensis* during commercial (October – November 2012) and seed crop (February – March 2013) rearing seasons.

Eight morphotypes (PB 001, PB 002, PB 003, PB 004, PB 005, PB 006, PB 007, PB 008) of som planted in uniform piece of land were selected for the study. The selected plants of 8 morphotypes were pruned during same period *i.e.* last week of May for commercial crop rearing and 2nd week of October for seed crop rearing. Prior to brushing, the tender leaves of different morphotypes were collected separately in polythen bags and leaf moisture percent was estimated by fresh and dry leaf weight. The newly hatched muga silkworms were brushed on the leaves for rearing during the commercial and seed crop and reared up to spinning following the standard rearing methods. Three replications with 5.0 gram muga dfls each were maintained separately for 8 morphotypes. The meteorological data during rearing period were recorded from the weather station maintained at Regional Muga Research Station, Boko, Kamrup, Assam. The observations on different rearing parameters like larval weight, larval span, effective rate of rearing (ERR), cocoon yield and cocoon commercial traits like single cocoon weight, single shell weight and silk ratio percentage were recorded and analyzed statistically using Randomized Block Design (Snedecor & Cockron, 1995). The method suggested by Mano *et al.* (1993) was followed to decide the ranking of different morphotypes of som under study for leaf moisture percent, rearing and cocoon parameter of muga silkworm.

RESULTS AND DISCUSSION

Data of tender leaf moisture contents of 8 morphotypes of som, *Persea bombycina* during commercial crop (October - November 2012) and seed crop (February - March 2013) of muga silkworm, *Antheraea assamensis* are presented in Table I. The leaf moisture percent ranged 61.20 to 69.70% during the season of Kotia commercial crop rearing (October - November) and 54.50 to 63.00% during the season of Chotua seed crop rearing (February - March). The leaf moisture percent was recorded highest (69.70 and 63.00%) in PB 003 morphotype and lowest (61.20 and 54.50%) in PB 002 morphotype during Kotia commercial crop and Chotua seed crop rearing respectively. The leaf moisture percent in all 8 morphotypes was higher during commercial crop (October - November) than seed crop (February - March). This may be due to higher relative humidity (85.00 to 91.5%) and rain fall (27.900 mm) during October - November than February - March (51.58 to 73.25% and 6.299 mm, respectively) (Table II).

Table I : Tender leaf moisture percent in 8 morphotypes of som during commercial crop Kotia (Oct. - Nov) and Seed crop Chotua (Feb. - March).

Som Morphotype	Tender Leaf moisture %	
	Oct. - Nov	Feb. - March
PB 001	65.00	57.50
PB 002	61.20	54.50
PB 003	69.70	63.00
PB 004	66.50	60.30
PB 005	64.60	59.50
PB 006	67.50	60.00
PB 007	66.00	59.00
PB 008	66.00	58.20
Mean	65.81	58.72
SD	4.27	4.38
CD at 5%	3.05	3.26

Table II: Ecological parameters during rearing crop

Rearing season	Av. Temperature (°C)	Av Relative humidity (%)	Av. Rainfall (mm)
Commercial crop (Oct. - Nov.)	27.8 -15.7	91.5 -85.0	27.900
Seed Crop (Fe. - March)	31.90 - 15.25	73.25 - 51.58	6.299

The data presented in Table III indicate the comparative rearing performance of muga silkworm reared on different morphotypes of som food plant during commercial and seed cocoon crop. The mature larva weight, effective rate of rearing (ERR) and cocoon yield were observed different among the larvae fed on leaves of different morphotypes of som. The rearing parameters were observed higher during commercial crop than that of seed crop of muga silkworm fed on different morphotypes of Som. During Kotia commercial crop the mature larva weight (11.30 g), effective rate of rearing (59.66%) and cocoon yield (61 cocoons/ g) recorded were highest in muga silkworm fed on PB 003 morphotype of som followed by batch of larvae fed on PB 006 morphotype (11.16 g, 52.16% and 53 cocoons/g respectively) and least in larvae fed on PB 002 (10.23 g, 22.66% and 25 cocoons respectively). While, during Chatua seed crop the higher data of mature larva weight, effective rate of rearing and cocoon yield were recorded 9.93g, 38.33% and 38 cocoons per gram, respectively in muga silkworm fed on PB 003 morphotype. More or less similar trend of rearing parameters was noticed during seed crop rearing.

Data of important cocoon commercial characters like single cocoon weight, single shell weight and silk ratio are presented in table 4 were different in the muga silkworm fed on different morphotypes of som. Comparatively higher single cocoon weight, single shell weight and silk ration were ranged from 5.11g to 5.45g, 0.42 to 0.46g and 8.02 to 8.66% respectively during Kotia commercial crop than the chotua seed crop.

Table III : Comparative performance on rearing parameters of muga silkworm, *A. assamensis* fed on different morphotypes of som food plant.

Som Morphotype	Rearing parameters					
	Rearing Crop					
	Commercial crop (Oct. – Nov)			Seed Crop (Feb. – March)		
	Mature larva weight (g)	Effective rate of rearing (%)	Cocoon yield/dfi (No.)	Mature larva weight (g)	Effective rate of rearing (%)	Cocoon yield/dfi (No.)
PB 001	10.67	42.33	35	8.33	20.33	21
PB 002	10.23	22.66	25	7.66	18.33	15
PB 003	11.30	59.66	61	9.93	38.33	38
PB 004	10.72	49.16	45	8.66	29.33	27
PB 005	10.63	29.66	35	8.66	25.66	21
PB 006	11.16	52.16	53	9.33	32.66	31
PB 007	10.42	36.33	30	8.86	25.66	20
PB 008	10.40	45.66	41	8.76	30.33	26
Mean	10.69	42.20	40.63	8.77	27.58	24.88
SD	1.62	8.92	9.15	1.53	7.32	7.86
CD at 5%	0.92	2.95	4.52	0.28	3.85	3.18

Table IV : Comparative performance on cocoon characters of muga silkworm, *A. assamensis* fed on different morphotypes of som food plant.

Som Morphotype	Cocoon parameters					
	Commercial crop (Oct. – Nov)			Seed Crop (Feb. – March)		
	Single cocoon weight (g)	Single shell weight (g)	Silk ratio (%)	Single cocoon weight (g)	Single shell weight (g)	Silk ratio (%)
PB 001	5.26	0.42	8.02	4.95	0.399	8.06
PB 002	5.11	0.44	8.66	4.85	0.430	8.86
PB 003	5.45	0.46	8.50	5.28	0.444	8.41
PB 004	5.46	0.45	8.24	5.30	0.440	8.30
PB 005		0.43	8.09	4.98	0.400	8.03
PB 006	5.39	0.46	8.55	5.15	0.455	8.83
PB 007	5.38	0.44	8.10	5.18	0.422	8.15
PB 008	5.45	0.45	8.18	5.15	0.430	8.35
Mean	5.35	0.44	8.29	5.11	0.427	8.37
SD	0.52	0.17	0.43	0.49	0.25	0.41
CD at 5%	0.25	0.02	0.52	0.75	0.12	0.85

Data of evaluation index of rearing and cocoon parameters and scores allotted to the different morphotypes of som are presented in Table V and VI. The morphotypes of som were ranked on the basis of scores allotted by evaluation index of different rearing and cocoon parameters to determine their suitability for muga silkworm rearing. The highest score (411.21 and 448.69 during Kotia commercial and Chotua seed crop respectively) was received by PB 003 morphotype ranked number one followed by PB 006 which ranked as number two receiving the score 408.24 and 406.33, respectively. PB 002

Table V : Scores allotted to eight som morphotypes by evaluation index of different rearing and cocoon characters during Katia crop (October – November) rearing season.

Som Morphotype	Leaf moisture %	Mature larva Wt.(g)	Effective rate of rearing (%)	Cocoon yield/dfl (No)	Single cocoon weight (g)	Single shell weight (g)	Silk ratio (%)	Total	Rank
PB 1	9.18	30.74	5.75	-0.68	94.42	96.78	110.0	346.19	7
PB 2	0.91	28.02	-16.30	-11.61	91.53	106.38	124.88	323.81	8
PB 3	15.66	33.76	16.77	18.98	96.92	106.80	122.32	411.21	1
PB 4	13.33	31.04	13.41	10.24	98.26	106.59	115.11	387.98	3
PB 5	8.87	30.49	-8.45	-0.68	95.19	106.17	111.62	343.21	6
PB 6	20.82	34.62	25.17	27.72	98.01	106.80	95.10	408.24	2
PB 7	12.15	29.19	-0.97	-6.15	96.73	106.38	111.58	348.91	5
PB 8	12.15	29.07	9.48	5.86	98.65	106.59	113.72	375.52	4

Table VI : Scores allotted to eight som morphotypes by evaluation index of different rearing and cocoon characters during Chatua seed crop (February - March) rearing season.

Som Morphotype	Leaf moisture %	Mature larva Wt.(g)	Effective rate of rearing (%)	Cocoon yield/dfl (No)	Single cocoon weight (g)	Single shell weight (g)	Silk ratio (%)	Total	Rank
PB 1	8.97	31.96	-3.07	1.42	98.77	110.48	114.39	362.92	7
PB 2	1.78	25.42	-5.80	-6.20	96.73	111.17	133.90	357.00	8
PB 3	21.52	40.26	21.51	23.05	105.51	111.48	125.36	448.69	1
PB 4	15.36	31.96	9.22	9.06	105.91	111.40	120.24	403.15	3
PB 5	13.19	29.80	4.20	1.42	99.38	110.51	113.65	372.15	6
PB 6	14.33	36.33	13.77	14.15	102.85	111.73	113.17	406.33	2
PB 7	12.05	33.26	4.21	0.15	103.46	111.00	116.58	380.71	5
PB 8	10.22	32.64	10.58	7.78	102.85	111.17	121.46	396.70	4

morphotype was ranked number eight as received minimum score of 323.81 and 357.00, respectively.

On the basis of leaf moisture contents, rearing and cocoon parameters of muga silkworm and score of evaluation index, PB 003 and PB 006 morphotypes of som food plant found more suitable for muga silkworm rearing. This may be due to the quality of leaf having higher moisture and other nutritional contents which are important for the development and survival of muga silkworm. Similar results were also observed by Jolly *et al.* (1979), Pathak (1988) Rahmathulla *et al.* (2006) and Baruah & Baruah (2007) in Tasar, Eri, mulberry and muga food plants respectively.

Diwedi (1992) and Basu *et al.* (1995) reported that feeding the silkworms with tender leaves containing high moisture contents in general gives better performance as compared to the other leaf qualities. Dash *et al.* (1992) and Yadav & Mahobia (2010) reported that the leaf nutrition of tasar food plant can enhance the effective rate of rearing (ERR), health and growth of larvae and better crop yields as the feed quality has direct correlation with cocoon and shell weights, silk ratio and silk filament. Effect of different food plants and morphotypes of same species on rearing and grainage performance of tasar silkworm have been reported by Rajaram *et al.* (2000) and Reddy *et al.* (2010), wherein they stated that the moisture contents of the leaves play an important role for the growth of the silkworm.

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