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EFFECT OF STARVATION AFTER HATCHING ON THE REARING PERFORMANCE OF BIVOLTINE SILKWORM

S. DAS, A. K. SAHA, M. SHAMSUDDIN AND S. K. SEN
SILKWORM PHYSIOLOGY SECTION, CENTRAL SERICULTURAL RESEARCH AND TRAINING INSTITUTE, BERHAMPORE - 742101, INDIA.

In the present investigation an attempt was made to study the effect of food deprivation (starvation) upto some extent on the newly hatched larvae of bivoltine silkworm KPG - B x P5. Rearing data from five consecutive rearings revealed that starvation upto 24 hours do not hamper or deteriorate the rearing performance significantly except for a few parameters in unfavourable season (August - September).

INTRODUCTION

In general practice of silkworm rearing the first feeding is given after 2-3 hours of initiation of hatching, *i. e.* at or around 10A.M., when almost all the worms hatch out of their egg shells. But sometimes in field or extension centres the eggs may hatch before expected date of hatching due to improper incubation and or bad transportation of eggs, and the extension workers face difficulties as the rearers refuse to take the already hatched or just hatched eggs with the assumption of crop failure or poor rearing performance. Although preservation of silkworm eggs and newly hatched larvae by refrigeration, for a limited period, is a common practice (Mizuno, 1920; Watanade, 1931; Narashimhamurthy 1939a, b & 1943 a, b; Katsukake, 1952; Jolly 1958 & 1983; Tajima, 1962; Tanaka, 1964; Dutta *et al.*, 1972; Visweswara *et al.*, 1987; Benchamin *et al.*, 1989) but it is hardly possible at field at a large scale. Little information is available on whether the delayed feeding or starvation after hatching at normal room temperature has any adverse effect on the rearing performance of bivoltine silkworm. Hence the present investigation was carried out with the aim to determine the same.

MATERIALS AND METHODS

The experiment rearing was conducted in five seasons-October-November 92, January 93, February-March 93, April-May 93 and August-September 93, with bivoltine hybrid KPG-B x P5. The silkworms were fed mulberry leaves of S_1 variety. The dfls. were incubated in the rearing room and just after hatching approximately equal number of worms were separated in five groups A,B,C,D & E. Worms under group A were considered as control and normal feeding was given in time *i.e.* within 10 A.M. of the date of hatching. Worms under group B,C,D,E were given feeding after starving for 12, 24, 36 and 48 hours, respectively, at normal room temperature. During the period of starvation optimum temperature and humidity of the rearing beds was maintained. After starvation the worms were given feeding as usual and after 2nd moult each group was replicated 5 times with 100 worms in each replication. During entire rearing periods the recommended rearing technology (Benchamin & Nagaraj, 1987; Krishnaswami, 1988; Sengupta, 1989) was followed.

Although the silkworms were starved upto 48 hours during 1st rearing but in subsequent rearings starvation period was restricted to 24 hours because survivability of silkworms was found to be affected adversely beyond 24 hours *i.e.* at 36 hrs and 48 hrs (Table I).

Before mounting weight of 10 mature larvae of all replications was recorded. Following harvest cocoons were deflossed, assorted, counted and weighed carefully for each of the replication to find out the effective rate of rearing (ERR No.) calculated over the number of larvae separated after 2nd moult. 20 cocoons from each replication (10 male and 10 females) were selected at random for calculation of single cocoon weight, single shell weight and shell ratio (S.R.%). Other related data like ERR weight, absolute silk content, filament length and denier were also recorded. Data were subjected to statistical analysis to determine the nature of significance in the difference of mean value by analysis of variance.

Tabie I : Effect of starvation after hatching on bivoltine silkworm (KPG-B x P5) rearing.

Seasons	Treatment	Wt. of 10 Mature Larvae (g)	E.R.R. No.	E.R.R. Wt. (g)	Single Cocoon Wt. (g)	Single Shell Wt. (g)	S.R.%	Absolute Silk Content (g)	N.B.F.L. (mt)	Denier
Oct-Nov	Normal (Control)	45.33	4988.33	8486.00	1.72	0.340	19.80	1707.03	865	2.81
1992	12 Hrs	42.83	6489.00	10311.33	1.63	0.327	20.08	2116.47	901	2.65
	24 Hrs	41.00	4560.00	7448.67	1.66	0.333	20.02	1508.43	886	2.66
	36 hrs	41.33	1650.33	2655.33	1.71	0.340	19.90	564.60	-	-
	48 Hrs	40.83	1512.00	2635.67	1.87	0.377	20.16	568.80	-	-
	C.D.at 5%	2.90	1696.27	2693.53	0.12	NS	NS	596.26	NS	NS
Jan	Normal (Control)	44.90	9420.00	17079.60	1.85	0.370	20.12	3506.34	735	3.43
1993	12 Hrs	46.10	9900.00	17674.20	1.86	0.380	20.50	3766.12	709	3.62
	24 Hrs	46.95	9840.00	17883.40	1.87	0.380	20.18	3704.18	705	3.26
	C.D. at 5%	1.78	368.93	NS	NS	0.006	NS	164.78	NS	NS
Feb-Mar	Normal (Control)	44.00	9133.33	13366.67	1.49	0.306	20.50	2796.57	896	2.66
1993	12 Hrs	46.67	9633.33	14200.00	1.52	0.312	20.58	3006.07	882	2.78
	24 Hrs	44.33	8800.00	12316.67	1.51	0.312	20.65	2747.87	893	2.59
	C.D.at 5%	1.79	638.77	962.81	NS	NS	NS	222.32	NS	NS
Apr-May	Normal (Control)	33.80	9640.00	12569.60	1.36	0.230	17.17	2251.67	858	2.21
1993	12 Hrs	35.70	8980.00	11750.60	1.35	0.240	17.57	2135.31	689	2.32
	24 Hrs	35.60	9060.00	11377.00	1.30	0.230	17.47	2053.20	720	2.36
	C.D. at 5%	1.67	NS	891.90	NS	NS	NS	NS	NS	NS
Aug-Sep	Normal (Control)	37.83	6400.00	9627.00	1.61	0.292	18.56	1881.00	792	2.32
1993	12 Hrs	40.08	5667.00	9012.00	1.61	0.304	18.90	1719.00	823	2.34
	24 Hrs	37.83	3667.00	5464.00	1.57	0.311	19.93	1143.00	805	2.75
	C.D. at 5%	NS	1328.00	2295.00	NS	NS	0.54	536.00	NS	NS

Each value respresents the mean from 5 replications.

Recorded of temperature and humidity of the rearing room was done during rearing periods. As the ambient temperature was too low for rearing during winter months, room heater was used to heat up the rearing room. The maximum, minimum and average room temperature and humidity of five rearing periods have been presented in Table II.

Table II : Room temperature and room humidity recorded during rearing seasons.

Seasons	Temperature (°C)			Relative Humidity (%)		
	Maximum	Minimum	Average	Maximum	Minimum	Average
Oct-Nov, 1992	28	23	26	92	76	80
Jan, 1993	27	22	25	80	60	68
Feb-March, 1993	27	21	26	84	63	70
April-May, 1993	33	25	30	96	73	80
Aug-Sept, 1993	33	29	39	96	73	80

RESULTS AND DISCUSSION

The rearing data of 5 seasons have been presented in Table I.

In October-November'92 the rearing parameters exhibited no significant deterioration due to starvation of newly hatched larvae upto 24 hours except the weight of 10 mature larvae which decreased significantly at 24 hours starvation.

During silk content exhibited significant increment at both 12 hours and 24 hours starvation after hatching. Other parameters exhibited no change.

In February-March'93, significant increment in larval weight was noticed at 12 hours starvation but the ERR weight decreases at 24 hours starvation. Other parameters remained unaffected due to starvation stress.

During April-May'93, only the weight of 10 mature larvae increased significantly at both 12 hours and 24 hours starvation while the ERR weight decreased significantly at 24 hours starvation. There was no change in other economic parameters due to starvation.

In August-September'93 there was no significant change in any of the rearing parameters at 12 hours starvation but ERR number, ERR weight and absolute silk content decreased significantly at 24 hours starvation.

The above observation indicates that forced starvation of newly hatched larvae upto 24 hours has almost no adverse effect on the overall rearing performance of bivoltine silkworm. The important economic characters like ERR number, single cocoon weight, single shell weight, S.R.%, absolute silk content, filament length and denier exhibit no significant change due to starvation. In January, significant increase in ERR number, single shell weight and absolute silk content is noticed due to starvation of hatched worms for both 12 and 24 hours. The reason for this increment due to starvation is not known. It is also evident from the study that starvation of hatched worms for 36 and 48 hours adversely affect the growth and survivability of the worms and it is thus recommended not to starve the hatched worms beyond 24 hours, for avoiding lower cocoon yield and the farmers of the extension centres receiving hatched worms may consider rearing of the larvae by brushing the worms within 24 hours of hatching.

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