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Influence of some castor genotypes on larval, cocoon and grainage traits of eri silkworm, (*Samia cynthia ricini* Boisduval)

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ABSTRACT

Twelve castor genotypes raised under rainfed condition were used as source of food to eri silkworm to record their effect on larval growth and development, cocoon and graingae parameters. Longer total larval duration and higher mature larval weight were recorded in larvae fed on Aruna (22.20 days and 66.98 g/10) and RC-8 (22.20 days and 67.53 g/10) castor genotypes with no significant differences between them. Likewise, higher shell weight (0.338 and 0.334 g) and fecundity (346.67 and 343.00 eggs/laying) were registered in the cocoons and the moths emerged from the cocoons formed out of larvae fed on the above castor genotypes, respectively with negligible difference between them. On the other hand, higher cocoon weight (2.228 g), pupal weight (1.893 g) and egg hatchability (99.90%) were recorded in larvae fed on RC-8 genotype, while the shell ratio was higher in cocoons formed from the larvae fed on Aruna genotype (15.82%).

Key words : Castor, *Samia cynthia ricini*, Rainfed, Larval, Cocoon and Grainage traits.

INTRODUCTION

The eri silkworm, *Samia cynthia ricini* Boisduval is a polyphagous, multivoltine, completely domesticated non-mulberry silk yielding insect. Over 29 plant species have been reported as hosts of eri silkworm (Reddy *et al*., 2002). However, the degree of preference with regard to the acceptance of the host, growth of the worm, development and cocoon yield vary. Among the hosts, castor, *Ricinus communis* L. is the primary food plant of eri silkworm and castor also plays an important role in the country's vegetable oil seed production as India is one of the world's principal producers of castor presently covering an area of over seven lakh hectares with 8.5 MT of castor bean production besides having the potentiality of producing 55,252 tones of total leaf yield (Krishna Rao, 2003). Castor is rich in varietal composition and many local and high yielding genotypes / hybrids are widely grown in Assam and the rest of India. The selection of castor genotypes is an important criterion for better growth and development of eri silkworm for higher productivity in terms of cocoon and egg production. Castor is a minor oilseed crop can be linked with ericulture to maximize the revenue if right choice of the castor genotype is made.

MATERIALS AND METHODS

White-plain eri silkworm breed was reared separately on 12 castor genotypes viz., Local, GCH-4, Aruna, RC-8, SH-41, SHB-145, DCS-9, DCS-72, DCS-73, PCS-121, MHC-17 and SL-1. These genotypes were raised in small plots during 2003-04 as per the package of practices recommended for raising raifed castor (Anonymous, 2000). The eri silkworms were reared on respective castor genotypes following the method of Dayashankar (1982). During rearing the worms are grouped into three batches each with 250 larvae. Observations were made on larval (total larval duration, mature larval weight and larval survival), cocoon (cocoon weight, shell weight and shell ratio) and grainage parameters (pupal weight, rate of moth emergence, fecundity and egg hatchability). The data was analyzed statistically as outlined by Sundararaj *et al.* (1972) at 5% level of significance.

RESULTS AND DISCUSSION

The results of the experiments carried out on the evaluation of some castor genotypes for eri silkworm culture are presented in Table 1 and are discussed in the light of earlier work hereunder.

Larval parameters

Significantly shorter total larval was recorded in the worms fed on PCS-121 genotype (19.90 days) and was found on par with DCS-9 (19.92 days), SL-1 (19.96 days), Local (20.04 days), DCS-72 (20.18 days) and MHC-17 (20.18 days), while larval duration was longer with Aruna and RC-8 genotypes (22.20 days). Worms fed on leaves of RC-8 castor genotype recorded significantly higher mature larval weight (67.53 g/10) closely followed by worms fed on Aruna genotype (66.98 g/10), whereas significantly lower mature larval weight was in worms fed on DCS-9 (47.98 g/10) and it was on par with worms fed on DCS-73 (48.35 g/10) and MHC-17 (48.66 g/10) genotypes. However, castor genotypes fed to the worms had no influence on the per cent survivability of the worms.

These results are in agreement with the observations of Basavaiah (1988), Patil *et al.* (2000), Jayaramaiah and Sannappa (2000a), Sannappa *et al*. (2002) who observed variations in larval traits when eri worms were fed with different castor genotypes. The variation noticed among the genotypes might be attributable to the fact that these genotypes vary in the composition of foliar constituents which inturn contribute for differences in larval characters.

Cocoon characters

The cocoons spun by the worms fed on RC-8 genotype recorded significantly superior cocoon weight (2.228 g) and

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Table 1: Influence of some castor genotypes on larval, cocoon and grainage parameters of eri silkworm

Genotypes	Larval parameters			Cocoon parameters			Grainage parameters			
	Total larval duration (days)	Mature larval weight (g/10)	Larval survival (%)	Cocoon weight (g)	Shell weight (g)	Shell ratio (%)	Pupal weight (g)	Rate of moth emergence (%)	Fecundity (Eggs/ laying)	Egg hatchability (%)
1. Local	20.04	49.54	98.93 (83.95)	1.859	0.249	13.04 (21.16)	1.611	97.71 (83.80)	303.00	98.22 (82.42)
2. GCH-4	21.31	64.18	99.20 (84.67)	2.056	0.290	14.14 (22.09)	1.764	97.71 (83.80)	316.33	98.64 (83.36)
3. Aruna	22.20	66.98	99.73 (86.88)	2.135	0.338	15.82 (23.44)	1.797	99.90 (88.19)	346.67	98.92 (84.14)
4. RC-8	22.20	67.53	99.73 (86.88)	2.228	0.334	15.01 (22.80)	1.893	99.90 (88.19)	343.00	99.90 (88.19)
5. SH-41	21.49	63.30	99.20 (84.98)	2.015	0.277	13.76 (21.78)	1.738	97.71 (83.80)	311.33	98.60 (83.26)
6. SHB-145	21.68	65.11	99.47 (85.77)	2.086	0.304	14.57 (22.44)	1.782	99.90 (88.19)	322.00	98.86 (83.97)
7. DCS-9	19.92	47.98	98.67 (83.16)	1.826	0.237	12.95 (21.09)	1.589	95.52 (79.42)	274.00	98.05 (82.08)
8. DCS-72	20.18	49.10	99.47 (85.77)	1.855	0.245	13.22 (21.32)	1.610	99.90 (88.19)	296.33	98.67 (83.43)
9. DCS-73	20.09	48.35	98.93 (83.87)	1.841	0.241	13.10 (21.22)	1.599	95.52 (79.42)	279.33	98.32 (82.55)
10. PCS-121	19.90	51.52	98.40 (82.45)	1.804	0.227	12.52 (20.72)	1.577	97.37 (77.33)	257.33	97.92 (81.76)
11. MHC-17	20.18	48.66	98.93 (83.95)	1.847	0.243	13.17 (21.28)	1.604	97.17 (83.80)	285.67	98.53 (83.05)
12. SL-1	19.96	46.93	98.67 (83.16)	1.822	0.233	12.79 (20.95)	1.589	95.52 (79.42)	264.33	98.35 (82.63)
F-test	*	*	NS	*	*	*	*	NS	*	*
S.Em ±	0.100	0.326	1.042	0.005	0.003	0.113	0.005	3.735	4.329	0.644
C.D. at 5%	0.295	0.912	-	0.014	0.005	0.330	0.011	-	12.63	1.878

* Significant at P = 0.05 NS = Non-significant Figures in the parentheses are angular transformed value

was parity with Aruna genotype (2.135 g). While higher shell weight and shell ration were recorded in cocoons spun by worms nourished with Aruna (0.338 g and 15.82 %) followed by RC-8 (0.334 g and 15.01 %). However, cocoon weight, shell weight and shell ratio were lower in cocoons spun by worms fed on PCS-121 genotype (1.804 g, 0.227 g and 12.52 %, respectively). These observations are supported by the findings of Sannappa and Jayaramaiah (1999) and Patil *et al.* (2000) for cocoon characters. Further, varied shell ratio in different genotypes in the present study is in conformity with those of Hazarika and Hazarika (1996) and Pandey (2003). The noticed variation in respect of cocoon characters may be a reflection of the nutritional status of the castor genotypes as evidenced by the correlation co-efficients worked out for foliar constituents with cocoon traits (Jayaramaiah and Sannappa, 2000b and Chandrappa *et al*., 2005)

Grainage parameters

Significantly higher weight was recorded in pupae formed from the worms fed on RC-8 genotype (1.893 g) followed by Aruna genotype (1.797 g). The worms fed on PCS-121 genotype formed the pupae with lighter weight (1.577 g). Non-significant differences were found with regard to moths emerged from pupae resulted from feeding of worms with different castor genotypes separately. Similarly, Basaiah (1988) and Chandrappa (2003) found significant positive relation between foliar constituents of castor genotypes and grainage traits of eri silkworm. The present results corroborate with the observations of Sannappa and Jayaramaiah (1999), Patil *et al*. (2000) and Pandey (2003) who found variation in grainage traits due to the castor genotypes when used for rearing eri silkworm. The study revealed that castor genotypes Aruna and RC-8 were found to be well accepted by the eri silkworms with positive improvement in larval, cocoon and grainage parameters.

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