

Heterosis Studies on Hybrids of Cocoon Colour Sex-Limited Breed of the Silkworm, *Bombyx mori* L. Under Different Environments of Temperature

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ABSTRACT

The commercial exploitation of hybrid vigour in silkworms has already been introduced since the beginning of the century in most developed countries. Breeds when reared over a series of environment exhibit less variation are considered stable. One of the main aims of the breeders is to recommend to farmers new breeds that are stable under different environmental conditions and yield level. In light of the above, the present study was undertaken to determine the heterosis of the hybrids of the new sex-limited breeds under different environments of temperature. The bivoltine cocoon colour sex-limited breed, Nandi (CSR2-SL), polyvoltine breeds viz., Pure Mysore, Nistari and ND7 and their nine hybrid combinations were selected as materials for the study. The silkworm rearing was carried out following the standard method with recommended temperature and RH conditions (Young age : 27-28°C and 80-85 % RH; Late age : 24-25°C and 65-70 % RH) till 2nd day of 5th instar. On the third day of the fifth instar, 100 larvae each were separated for 36 ± 1°C and 50 ± 5 % RH and 36 ± 1°C and 80 ± 5 % RH temperature treatments. The remaining larvae served as control at 25 ± 1°C and 65 ± 5 % RH. For the thermal exposure, the larvae of 3rd day of the 5th instar were kept in plastic trays and reared in SERICATRON (environment chamber with precise and automatic control facilities for uniform maintenance of temperature and humidity) at 36 ± 1°C and 50 ± 5 % RH and 36 ± 1°C and 80 ± 5 % RH and fed with fresh mulberry leaves twice a day. The thermal exposure was given every day for 6 hr duration till spinning. After thermal treatment, the larvae were shifted to 25 ± 1°C and 65 ± 5 % RH till cocooning (Kato *et al.*, 1989; Suresh Kumar *et al.*, 2002). The results from the present study indicate that the expression of hybrid vigour is different in hybrids at different temperature treatments. The nine hybrids when compared with the parental values showed that all the hybrids excelled their parents in many characters with significant positive heterosis over mid parent value and better parent value except few. Thus, it is clear that the level of heterosis present in the hybrids can be influenced by the environmental factors.

Key words: Heterosis, heterobeltiosis, *Bombyx mori*, hybrid vigour, high temperature.

INTRODUCTION

In India, utilization of hybrid vigour came rather late during the 1920s, but could not be compared to the rapid progress achieved in sericulturally advanced countries such