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Research Paper

STUDY ON THE FECUNDITY AND FERTILITY OF MULEBERRY AND NON-MULBERRY SILKWORMS

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Abstract

The paper accounts for the relative variation in respect of fecundity and fertility of ***Bombyx mori*** L. (Mulberry silk worm) and ***Antheraea mylitta*** D. (Non-mulberry tasar silk worm). Results obtained are indicative of the fact that the percentage of egg laying (fecundity) and hatching of eggs (fertility) of mulberry silk moths are evidently and significantly greater than the non-mulberry tasar silk moths. The said observations appear to be on account of different physio-genetic makeup as well as two different domesticated and wild conditions of silk moths.

Key words: *Bombyx mori* L , *Antheraea mylitta* D, Bombycidae, fecundity, *Morus alba, Terminalia arjuna*, *Terminalia tomentosa* and *Shorea robusta*.

INTRODUCTION

India enjoys the unique distinction of being the only country which produces all the four important varieties of natural silks viz; mulberry, tasar, eri and muga (Jolly, 1973). Among these ***Bombyx mori*** L. belonging to family Bombycidae and ***Antheraea mylitta*** D. belonging to famaily saturniidae of order Lepidoptera are famous for producing mulberry and non-mulberry tasar silks of great commercial importance under the domesticated and non-domesticated wild conditions respectively. ***Bombyx mori*** L. Known for producing shining and cream colour silk of superior quality is reared on the chopped leaves of mulberry host plant, ***Morus alba*** under indoor and ***Antheraea mylitta*** D. producing coppery and golden colour tasar silk is reared on the foliages of tasar plants such as ***Terminalia arjuna***, ***Terminalia tomentosa*** and ***Shorea robusta*** under outdoor conditions of forest areas. Larval culture of these silkworms are carried out during the seed crop and commercial crop seasons. Ahsan, et al. (1975) revealed the significant impact of temperature and relative humidity on the egglaying behaviour of

Antheraea mylitta D. and developed reciprocal relationship between fecundity and fertility of tasar moths. Joshi, et al. (1983) observed significant effect of photoperiodic conditions on the egg laying and hatching performances of eri-silk worm, ***Philosamia ricini***. Mathur, et al. (2005) mentioned the adverse effects of prolonged high temperature and low humidity on the fertility and fecundity of tasar moths. Sidhua, et al. (1969) considered the fecundity and fertility of sericigenous insects as their hereditary characters. Singh, et al. (1990) found a reciprocal relationship between the fecundity and fertility among the indigenous tasar moths in course of co-relation and regression studies. Srivastava (2011) developed the relationship of tasar moth colour to fecundity and hatching and found that the yellow colour moths enhance the grainage efficiency in ***Antheraea mylitta*** D. Lokesh, et al. (2016) observed evident impact of seasonal and climatic changes on the breeding manifestation of Laria eco-race of ***Antheraea mylitta*** D. Kumar, et al. (2017) observed significant impact of coupling duration on the oviposition and hatchability of eggs among the tropical tasar moths.

MATERIALS AND METHODS

Healthy mulberry moths of ***Bombyx mori*** L. and non-mulberry tasar moths of ***Antheraea mylitta*** D. were collected form their respective grainage rooms. Ten pairs male and female moths of mulberry and non-mulberry each were kept for coupling at normal laboratory conditions. Each pair of moths were allowed coupling in monias (bamboo basket) of 6" x 6" x 4" size under dark conditions for 12 hours. Further moths were decoupled and five mulberry and five non-mulberry female moths were put in paper box 3" x 2" x 2" size under dark condition for egg laying. The egg laying was maintained for three days. The eggs were carefully collected separately from mulberry and non-mulberry moths. The collected eggs in equal number of mulberry and non-mulberry female moths were kept in specially designed egg boxes having transparent top to permit light and perforated sides for aeration. The eggs were incubated at 28-30^{0}C for hatching. The entire grainage operations were carried out as per the methods suggested by Krishnaswamy, et al. (1973). The data in respect of fecundity and fertility of mulberry and non-mulberry moths were compared, analysed and presented in table 1. The experiments were carried out during the seed crop and commercial crop seasons.

RESULTS AND DISCUSSION

Results obtained in relation to relative variation in fecundity and fertility of mulberry (***Bombyx mori***) and non-mulberry (***Antheraea mylitta***) silk moths are recorded in table 1. The table clearly indicates that the mulberry and non-mulberry silk moths differ among themselves in respect of their respective fecundity and fertility. Table shows that the average number of eggs laid by the mulberry female moth, ***Bombyx mori*** L. during the seed crop and commercial crop seasons are in the tune of 522 and 581 as compared to non-mulberry female moth, ***Antheraea mylitta*** D. Which are in tune of 262 and 295 respectively. Further table reveals that the average hatching percentage of ***Bombyx mori*** female mulberry moth during seed crop and commercial crop seasons are 72% and 82% as compared to hatching percentage of ***Antheraea mylitta*** D. non-mulberry tasar female moth during the seed crop and commercial crop seasons which account for 63% and 70% respectively.

A comparative analysis of results are indicative of the fact that the mulberry female moth has relatively better fecundity and fertility than the non-mulberry female moth during the seed crop and commercial crop season. The commercial crop season has registered its supremacy over seed crop season in respect of number of eggs laid and percentage of hatching with both the mulberry and non-mulberry female moths in spite of relative variation among themselves. Table also indicates that the fecundity and fertility of silk moths have reciprocal relationship with each other.

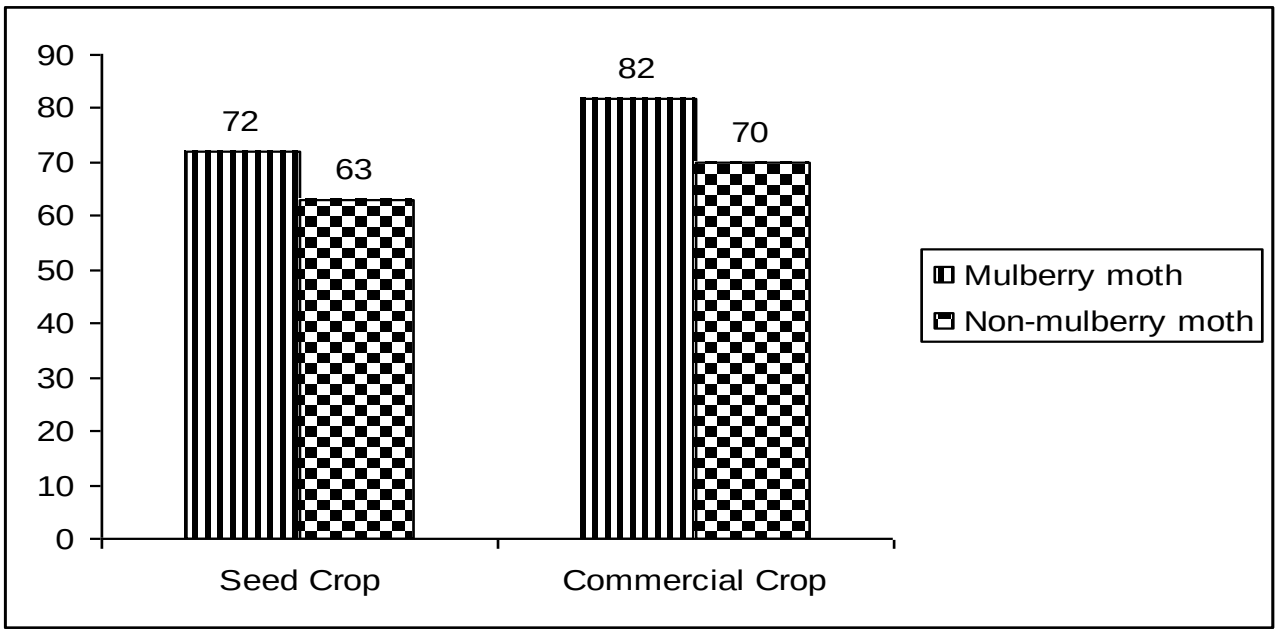
The aforesaid findings appear to be the logical outcome on account of species diversities of mulberry and non-mulberry moths because these moths have different genetic architecture and differ among themselves in their physio-genetic makeup as well as the domesticated (mulberry) and wild (non-mulberry) conditions of existence. The superiority of commercial crop season over the seed crop season in respect of fecundity and fertility of both categories of silk-moths is probably owing to the fact that the commercial crop season provides relatively better and conducive environment to silk moths than the seed crop season for desired biological manifestations. Thus the results obtained stand to logical and meaningful conclusion and very much in conformities with the earlier investigations carried out by several sericologists cited there in.

TABLE-I

Table showing relative Variation in relation to fecundity and fertility among the mulberry and non-mulberry silkworms.

Sl. No	Crops	Silk moths	Total No of eggs laid (AV)	Av Hatching (%)	Co-rrelation Co-officient
1	Seed Crop (July-Aug)	Mulberry silk moth B.moril	522	72.0	*
		Non-Mulberry silk moth A.mylittaD.	262	63.0	*
2	Commerical Crop (Sep-Oct)	Mulberry silk moth B.moril	581	82.0	*
		Non-Mulberry silk moth A.mylittaD.	295	70.0	*
C.D. at 0.5% level for charaters . = Significant .. = Highly Significant			**	**	

Histogram showing relative variation in the hatching percentage of mulberry and non-mulberry silkworms in relation to two different seasons of cropping.



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