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SEASONAL AND FOODPLANT-DETERMINED DIFFERENCES IN PRODUCTIVITY AND REPRODUCTIVE SUCCESS OF THE INDIAN TASAR SILK MOTH, *ANTHERAEA MYLITTA* (SATURNIIDAE)

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The Indian tasar silk moth, *Antheraea mylitta* (Drury), is a semi-domesticated species used in silk production. It is polyphagous and is reared commercially during three seasons per year: (1) rainy season (July–August), (2) autumn (September–October), and (3) winter (November–December). Seasonal factors and foodplants have considerable influence on the life cycle of other silk producing species. Joshi (1985) reported that the type of larval foodplant affects fecundity of the eri silk moth, *Philosamia ricini* Hutt. (Saturniidae), and Bari and Islam (1985) observed that different varieties of mulberry influence cocoon weight and fecundity of the mulberry silk moth, *Bombyx mori* L. (Bombycidae). Owing to the economic importance of *Antheraea mylitta* in India, information on these features as they relate to the productivity and reproductive success of the tasar silk moth are of considerable importance. Hence, we conducted experiments to evaluate the effects of larval foodplant and rearing season on *A. mylitta*. We report on percent emergence, percent coupling success, fecundity, and percent egg hatching of *A. mylitta* reared on three different foodplants—asan (*Terminalia tomentosa* Wt. & Arn., Combretaceae), arjun (*Terminalia arjuna* Wt. & Arn., Combretaceae), and sal (*Shorea robusta* Gaertn, Dipterocarpaceae)—during three rearing seasons.

Five thousand cocoons of *A. mylitta* were collected at random from each of three different foodplant lots at the Tasar Research Farm, Durgapur, Orissa, India. Each batch of 5000 cocoons was divided into five replicates, each containing 1000 cocoons. The replicates were kept in the grainage, a house specially designed for storage of cocoons, for observations. Percent emergence of adults, percent coupling success, fecundity, and percent hatching of subsequent eggs were noted. The experiment was repeated in each of the three rearing seasons in 1988 (i.e., rainy, autumn, and winter) for each of the three hostplants. The differences in mean values for each of the four parameters studied were analyzed statistically using Student's *t*-test (Snedecor & Cochran 1967). The results of the rearing experiments are presented in Table 1.

Percent cocoon emergence. Larvae reared on asan and arjun during autumn exhibited the highest percent cocoon emergence, 94.4 and 90.5% respectively. In general, percent cocoon emergence was highest in autumn, second highest in the rainy season, and lowest in winter. None of the foodplants tested produced the highest percent emergence in all three seasons.

Percent coupling success. Highest percent coupling success was achieved during the autumn rearing season by moths reared on asan (87.8%). Second highest also was achieved during the autumn, by moths reared on arjun (80.5%). In general, greater coupling success occurred in the autumn generation, second highest in the rainy season, and lowest in winter. Moths reared on asan had the highest coupling success in each season; those reared on arjun exhibited the second highest percent in each season, and those on sal the lowest.

Fecundity. Number of eggs laid per female was highest in the winter by females reared on sal (220.8 eggs/female). Second highest fecundity was achieved in the autumn season by females reared on sal (215.7 eggs/female). In general, fecundity was highest in the winter, second highest in autumn, and lowest in the rainy season. For the foodplants tested, moths raised on sal consistently produced the greatest number of eggs, regardless of rearing season; those on asan produced the second highest, and those on arjun the lowest.

Percent hatching. Eggs from females of the winter generation reared on asan had the highest percent of egg hatching (86.8%). Eggs from females of the autumn generation reared on asan had the second highest percent egg hatching (81.2%). In general, percent egg hatching was highest during the winter generation, second highest in the autumn generation, and lowest in the rainy season generation. Eggs from females reared on asan consistently produced the highest percent hatching regardless of the season; eggs from

TABLE 1. Mean percent emergence, percent coupling success, fecundity, and percent egg hatching of *A. mylitta* reared on asan, arjun and sal in three different seasons.

Season	Food plant	Mean percent emergence (±standard deviation)	Mean percent coupling success	Mean number of eggs laid per female (fecundity)	Mean percent egg hatching
Rainy	Asan	75.23 ± 15.48	68.34 ± 10.41	195.73 ± 26.54	77.65 ± 3.84
	Arjun	66.42 ± 1.78	63.68 ± 12.14	174.43 ± 32.37	72.31 ± 5.63
	Sal	78.67 ± 16.83	55.42 ± 10.43	208.47 ± 2.67	71.46 ± 4.41
Autumn	Asan	90.37 ± 6.66	87.82 ± 5.74	198.87 ± 10.85	81.18 ± 2.67
	Arjun	90.54 ± 8.36	80.50 ± 8.64	185.76 ± 15.84	77.62 ± 3.82
	Sal	80.74 ± 8.44	60.62 ± 7.46	215.75 ± 26.75	75.73 ± 2.27
Winter	Asan	70.49 ± 8.32	65.33 ± 8.32	205.66 ± 10.54	86.77 ± 2.46
	Arjun	63.67 ± 9.46	60.54 ± 9.53	200.05 ± 11.76	80.71 ± 4.66
	Sal	55.62 ± 9.62	42.40 ± 8.52	220.84 ± 20.35	76.46 ± 2.84

females reared on arjun achieved the second highest percent hatching, and those raised on sal lowest.

The probability values ($P < 0.05$) of *t*-tests demonstrated a statistically significant difference in percent emergence, percent coupling success, and percent egg hatching among the rearing seasons, irrespective of host. The difference in mean fecundity among generations was not statistically significant.

Analysis by foodplant type showed that the highest percent emergence, percent coupling success, and percent egg hatching were achieved by cocoons from asan, followed by those from arjun and sal plants. The highest average fecundity was achieved by cocoons from sal, followed by those from asan and arjun. The probability values ($P < 0.05$) of *t*-tests showed a statistically significant difference in percent emergence, percent coupling success, fecundity, and percent egg hatching of *A. mylitta* reared on different foodplants during the autumn and winter seasons. However, differences were not statistically significant for these parameters on different hosts during the rainy season.

Opender and Tikku (1979), Sharma and Badan (1986), Govindan and Magadum (1987), and Haniffa and Punitham (1988) all reported that the variety of mulberry used has considerable influence upon fecundity and cocoon weight in the mulberry silk moth, *Bombyx mori*. Our studies demonstrate that significantly different percent emergence, percent coupling success, and percent egg hatching can be achieved by *A. mylitta* during different seasons; and significantly different percent emergence, percent coupling success, fecundity, and percent egg hatching can be achieved by rearing *A. mylitta* on different foodplants during the autumn and winter generations.

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