Environment & Ecology 27 (4) : 1635—1637, 2009
 ISSN 0970-0420

Use of Japanese Weed (*Mikania micrantha*) as Food Plant of Eri Silkworm (*Samia ricini* Donovan)

M. DEVI[1]* AND J. KALITA[2]

[1]*Department of Zoology, Diphu Government College, Diphu 782460, Karbi Anglong, Assam, India*
[2]*Department of Zoology, Guwahati University, Guwahati 781014, India*
**Correspondence*

Abstract

Impact of feeding of Japanese weed leaves (*Mikania micrantha*) on the larval duration, larval growth, cocoon parameter and fecundity of eri silk worm, *Samia ricini* Donovan was investigated. The rearing was conducted at laboratory condition. The larvae were reared on three experimental treatments (Ex tr I—host plant. *Micania micranta* from 1st instar till maturity; Ex tr II—host plant-mixed-*Ricinus communis* from 1st to 4th instar larva, the 5th instar larva fed with *Mikania micrantha* and *Ricinus communis* in equal proportion till maturity; Ex tr III—the host plant *Ricinus communis*- the control). In spite of heavy mortality (90%) of 1st instar larva shown by Ex tr-I, the survivors (10%) were highly adapted to the new environment of food plant *Mikania micrantha.* The larval and cocoon parameters studied in the first set of experiment were superior over the other two sets of experiment. The larval, pupal, cocoon, shell weight and fecundity were recorded to be highest in Ex tr-I (88.54 g/10, 24.57g/10, 20.50 g/10, 3.63 g/10 and 250 eggs) respectively followed by Ex tr—II and III (77.39 g/10, 24.52 g/10, 27.53 g/10, 2.71 g/10 and 248 eggs; 77.58 g/ 10, 23.89 g/10, 27.68 g/10, 3.48 g/10 and 248 eggs respectively). Further, the highest shell ratio (12.63%) was recorded in the larva treated with Japanese weed from 1st instar till matuity.
Key words : *Mikania micrantha, Samia ricini,* Rearing performance, Food plant.

Eri silkworm, *Samia ricini*, Donovan is the source of eri silk (also known as erandi) belongs to the family Saturniidae, a multivoltine, domesticated form of non-mulberry silkworm being reared by the rural folk in North East India,specially in Assam as a source of additional income. It is polyphagus in nature having a wide range of host plant index (Chaudhari 1982, Chaudhury 1964). Nutritional value of food plants either alone or in combination plays an important role in the larval growth and silk productivity. The weed plants are being tried to increase the silk and egg production in mulberry silkworm *Bombyx mori* as well as in eri silkworm (Mamadapur 1994, Biswas and Das 2001, Pathak 1988, Reddy et al. 1989, Walbdauer 1968). Further, exogenous dusting of *Lantana camara, Clearodendron inermai* and *Cassia sericea* has significantly increased the weight of cocoon, silk shell ratio and fecundity by eri silkworm (Rao and Patil 1998) providing clues to the use of other weed plants in sericulture to increase the egg and silk yield. According to the informations provided by the rearers *Mikania micrantha*, known as Japanese weed in Assam is used by a rearers in Karbi Anglong district for want of host plants particularly at the latter larval stages when the larva starts to eat voraciously. They use to feed the leaves of Japanese weed along with the castor leaves at the fifth instar larva with a hope of good quality yarn. The literature in this regard is absent and no earlier investigation was done on it. Hence the present study aims to known the impact of Japanese weed plant on the growth, development and economic traits of eri silkworm *Samia ricini* Donovan.

(The authors are grateful to the Principal, Diphu Government College, Assam, India for providing immense help and inspiration to undertake the research work on eri silkworm).

Methods

The rearing was undertaken during February 2007. The temperature and humidity ranges were between 22 to 24 C and 77—83% repectively. Disease free laying (eggs) of eri silkworm were collected from Research Extension Center, Central Silk Board, Diphu, Assam.The egg incubation and rearing was under-

Table 1. Larval and cocoon parameters in different host plants. *Values having different superscripts (a, b, c, d) differ significantly between host plants.

Experimental treatment	Larval duration in days Mean	SD	Larval weight (g/10) Mean	SD	Single larval weight (g) Mean	SD	Cocoon weight (g/10) Mean	SD	Single cocoon weight (g) Mean	SD
Japanese weed	36.6667[b]	± 1.1547	88.5467[b]	± 0.1617	8.8547 [b]	± 0.0162	28.5067[b]	± 0.4100	2.8500[b]	± 0.0400
Mixed	25.3333[a]	± 0.5774	77.3900[a]	± 0.1473	7.7390[a]	± 0.0147	27.5300[a]	± 0.1992	2.7500[a]	± 0.0173
Castor	24.3333[a]	± 0.5774	77.5833[a]	±0.4475	7.7583 [a]	± 0.0447	27.5867[a]	± 0.2501	2.7567[a]	± 0.0231

taken following the recommended method of Chaudhari (1982). Three sets of experimental treatments were carried out which consisting of : Ex tr–I–Host plant *Mikania micrantha* from first instar till maturity. Ex tr—II-Host plant-mixed-*Ricinus communis* from first to fourth instar larva, the fifth instar fed with *Ricinus communis* and *M. micrantha* in equal proportion till maturity. Ex tr–III—Host plant-*Ricinus communis* (control).

The host plant species were local red and green variety of castor and normally available Japanese weed. The tender leaves were fed four times a day upto third instar and semi-tender and mature leaves were fed five times a day to fourth and fifth instar respectively. Bamboo Chandraki were used as mountanage during spinning of cocoons by the larva. Harvest was made on six day of spinning. For each set of experiments one hundred numbers of larvae were taken and three such replications were maintained. Anova (oneway) was performed on the data and then subjected to Duncan's muliple range test (DMRT) to find the subsets of the samples.

Results and Discussion

The ability of silkworm to adapt themselves to new environment is remarkable. In the present study the larva fed with *Ricinus communis* has shown shortest larval duration (24 days) followed by mixed food (25 days) and Japanese weed (36 days) as shown in Table 1. It was also observed that there was heavy mortality (90%) of 1st instar larva when fed with Japanese weed leave but the survivors (10%) were highly adapted to the new environment of food plant *M. micrantha* and the larva were seen consuming Japanese weed as voraciously as castor leaves. The larval and cocoon parameters studied in the first set of experiment, are superior over control (Tables 1 and 2). The larval, pupal, cocoon, shell weight and fecundity were recorded to be highest in Ex tr-1 are 88.54 g/10, 24.57g/10, 20.50 g/10, 3.63 g/10 and 250 eggs respectively followed by Ex tr—II and III (77.39 g/10, 24.52 g/10, 27.53 g/10,2.71g/10 and 248 eggs; 77.58g/10, 23.89 g/10,27.68 g/10, 3.48 g/10 and 248 eggs respectively). Further, the highest shell ratio (12.63%) was recorded in the larva treated with Japanese weed from 1st instar till maturity. No significant difference lies regarding adult longevity. It was noticed that adult female emerged with a full compliment of mature ova and the average life span of adult moth was around 6.3—9.0 days for female and 5.0–6.0 days for males. The fertilized female continued laying eggs for 4–8 days with an average of 6.1 days. The ratio of male female is 1.4 : 1.1.

Therefore, it is assumed that there mights be

Table 2. Larval and cocoon parameters in different host plants.* Values having different superscripts (a, b, c, d) differ significantly between host plants.

Experimental treatment	Shell weight (g/10) Mean	SD	Single shell weight (g) Mean	SD	Shell ratio (%) Mean	SD
Japanese weed	3.6367[a]	± 0.0709	0.3600 [a]	± 0.0100	12.6300[a]	± 0.1736
Mixed	2.7167[b]	± 0.2309	0.2667[b]	± 0.0231	9.6937[b]	± 0.7816
Castor	3.4833[a]	± 0.0289	0.3467 [a]	± 0.0058	12.5750[a]	± 0.1046

something in *Mikania micrantha* a widely available weed all over which accelerate the growth rate at later larval stage and thereby improves the cocoon characters of eri silkworm.

References

Biswas N. and P. K. Das 2001. Effect of food plant species on rearing performance of eri silkworm, *Samia ricini,* Donovan. *Bull. Ind. Acad. Seri.* 5 : 36—39.

Chaudhary S. 1982. *Eri silk industry.* 16—25 pp. Direct. of Seri & Weaving, Govt of Assam, India.

Chaudhury S. N. 1964. Indian research scholar's studies on eri silkworm. *Indian Silk* 2 : 10

Mamadapur B. B. 1994. *Botanicals with IGR activity on Bomyx mori*. M. Sc. (Ag.) thesis. Univ. Agric. Sci. Dharwad , India. 147 pp.

Pathak A. K. 1988. *Studies on nutrition, growth and cocoon characters of eri silkworms (Philosamia ricini Hutt.) fed on different varieties of leaves*. M. Sc. thesis. Assam Agric. Univ., Jorhat, Assam, India.

Rao J. and G. M. Patil. 1998. Effect of botanicals having IGR activity on growth and development and economic traits of eri silkworm, *Samia cynthia ricini* Boisd. Int. J. Wild silkmoth and Silk. 5 : 200—203.

Reddy D. N. R., Y. K. Kotika and M. Vijayendra. 1989. Development and silk yield of eri silkworm *Samia cynthia ricini* Boisduval (Lepidoptera : Satumiidae) as influenced by the food plants. *Mysore J. Agric. Sci.* 23 : 506—508.

Walbdauer G. P. 1968. Consumption and utilization of food by insects. *In* J. W. L. Beatment, J. W. Trecherne and V. B. Wigglesworth (eds). *Advance insects physiology.* Academic Press, London, UK.