P: ISSN NO.: 2321-290X RNI : UPBIL/2013/55327 Shrinkhla Ek Shodhparak Vaicharik Patrika
E: ISSN NO.: 2349-980X Vol-III * Issue-II* October -2015

Study of Economic Characters of Samia Ricini Donovan Reared on *Mikania Micrantha* and *Ricinus Communis* in Combination

Mainu Devi
Assistant Professor,
Deptt. of Zoology,
Diphu Govt. College,
Diphu, Karbi Anglong, Assam

Abstract

Impact of feeding of Japanese weed leaves *(Mikania micranhta)* and Castor leaves *(Ricinus communis)* on larval and grainage parameters of eri silk worm, *Samia ricini* Donovan has been investigated. The larvae were reared on four experimental treatments (Ex tr. 1 – host plant. *Mikania micrantha* from 1st instar till maturity; Ex tr. II – host plant - *Ricinus communis* from 1st to 4th instar larva, the 5th instar larva fed on *Mikania micrantha & Ricinus communis* in equal proportion till maturity; Ex tr. III – the host plant *Ricinus communis from* I to II instar larvae. III instar larvae fed on *Mikania micrantha* till maturity*;* Ex tr.IV – the host plant *Ricinus communis* - the control) and the Larval duration, Effective Rate of Rearing (ERR), Fecundity, Hatching, Larval Survivability and Moth Emergence were recorded. In spite of heavy mortality (90%) of 1st instar larva in Ex tr.- I, the survivors (10%) were highly adapted to the new environment of food plant *Mikania micrantha*. Among the four experimental treatments the larvae treated under Ex tr. III exhibited significant improvement in Fecundity (370.70±0.32 eggs), Effective rate of rearing (98.03±0.31), and Larval duration (6.23±0.30 days) over control (329.28±058 eggs, 98.02±0.32, 6.22±0.29 days). The larvae fed with *Ricinus communis* has shown shortest larval duration (18.00±1.15). However, no significant effect on moth emergence and hatching were exhibited by the larvae treated with both the leaves. Thus, there is a great scope in feeding of *Mikania micrantha*, a widely available weed for rearing the worm for silk production commercially.

Keywords: *Mikania micrantha*, Samia ricini, *Ricinus communis* Larval and Grainage parameter.

Introduction

The nutritional value of leaf has been implicated as a major factor in the survival of non-mulberry silkworms (Pandey,1995).There are number of plants which are having insect growth regulatory (IGR) activity, when used in higher concentration they are detrimental to the insects but useful at lower concentrations particularly for productive insects (Mane and Patel, 2000b). The weed plants are being tried to increase the silk and egg production in mulberry silk worm *Bombyx mori*L. Shivkumar *et al*, 1995 reported weed plant Cassiatora extracts in accelerating the maturity of *Bombyx mori*. Further, dusting of *Lantana camara* and *Clearodendron inermae* at 5% has increased silk and fecundity by eri silk worm (Mamadapur, 1994 and Santosh Kumar, 1997). The leaves of weed plant *Mikania micrantha* had been found to have significant effect on growth, development and yield of eri silk worm, *Samia ricini* Donovan (Devi, M., 2010). In the present investigation, an attempt has been made to know the effect of *Mikania micrantha* and *Ricinus communis* leaf on the larval and grainage parameters of *Samia ricini* Donovan.

Methodology

Fresh disease free layings (dfls) of Eri silkworm were reared in the laboratory at temperature 22 ± 3 and 78 ± 4% RH. The egg incubation and rearing was undertaken as per the recommended method of Choudhury (1982a). Four experimental treatments were developed with different food plants of *Mikania micrantha* and *Ricinus communis*; Experimental tr-I- (Host plant *Mikania micrantha)*; Experimental tr- II (Host plant *Ricinus communis from* I to IV instar larvae. The V instar larvae fed with *Ricinus communis* and *M. micrantha* in

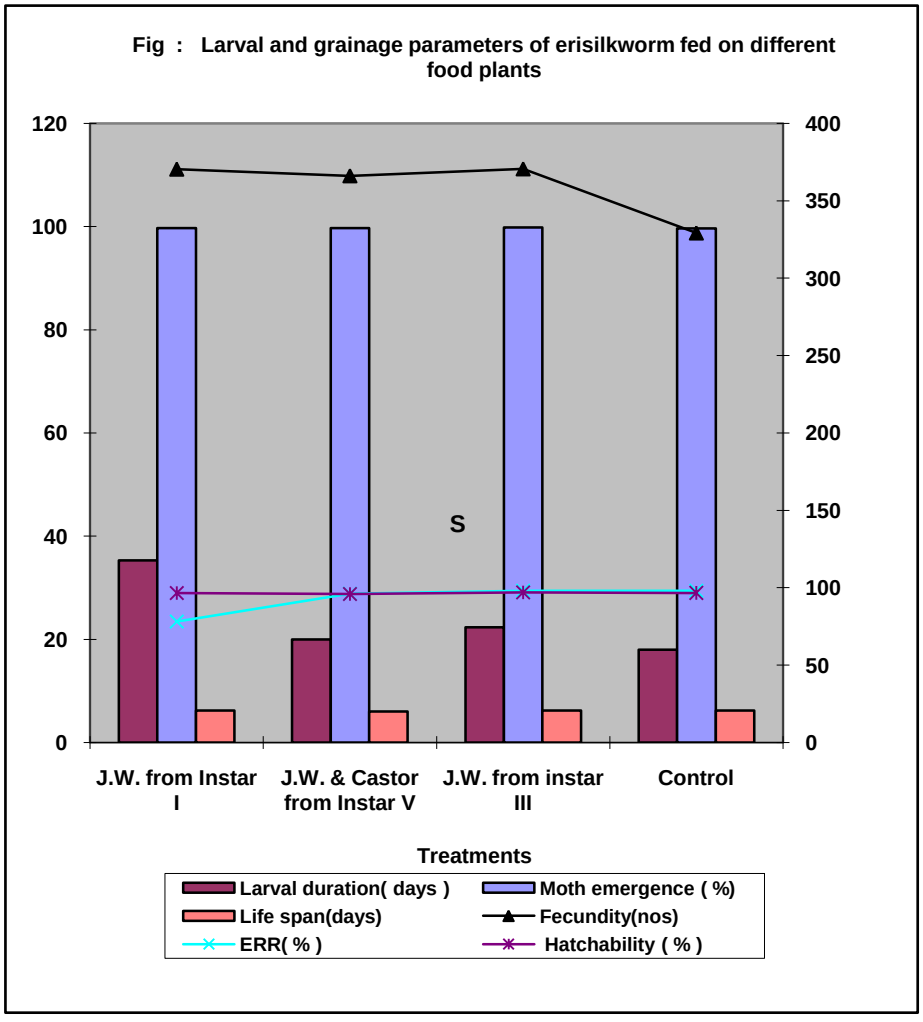
equal proportion); Experimental tr-III (Host plant plant *Ricinus communis from* I to II instar larvae. III instar larvae fed with *Mikania micrantha* till maturity). Experimental tr-IV (Host plant *Ricinus communis* considered as control). Larval duration, Effective Rate of Rearing (ERR), Fecundity, Hatching, Larval Survivability and Moth Emergence were recorded and subjected to statistical analysis.

Table- 1

Effect of Feeding of Different Types of Food Plants (*Mikania Micrantha, Ricinus Communis* and Their Combination) on The Larval and Grainage Parameters of Eri Silkworm *Samia Ricini* Donovan

Treatments		Larval duration (days)	Moth emergence (%)	Life span (days)	Fecundity (nos)	ERR (%)	Hatchability (%)
Ex. Tr.- I	Mean	35.33	99.72	6.19	370.52	78.10	96.55
	SE±	5.78	0.08	0.33	0.52	4.95	0.28
Ex. Tr.- II	Mean	20.00	99.69	6.02	366.23	96.16	96.01
	SE±	1.15	0.23	0.28	3.92	2.68	0.49
Ex.Tr.- III	Mean	22.33	99.84	6.23	370.70	98.03	97.01
	SE±	2.33	0.03	0.30	0.32	0.31	0.16
Ex.Tr.IV (control)	Mean	18.00	99.66	6.22	329.28	98.02	96.71
	SE±	1.15	0.16	0.29	0.58	0.32	0.20
Average	Mean	23.92	99.73	12.08	349.27	9.07	96.46
	SE±	2.46	0.07	0.27	6.50	2.82	0.19
CD at 5%		14.49	NS	0.14	8.38	11.01	NS
CD at 1%		21.06	NS	0.19	12.18	16.01	NS

NS : Non significant



Result and Discussion

Larval Duration

Statistical analysis of data revealed significant difference (P<0.05) of host plants on larval duration as shown in the table and figure. In the present study the larvae fed with *Ricinus communis* (control) has shown shortest larval duration (18.00) followed by Ex.tr-II (20.00), Ex.tr-III (22.33) and longest larval duration (35.33) was exhibited by the

larvae fed on Japanese weed from I instar till maturity (Ex.tr-I).

Moth Emergence

No significant effect on moth emergence was exhibited by the larvae treated with different food plants. However, the data recorded in four different treatments were 99.72%, 99.69%, 99.84%, 99.66% in Ex.tr-I, Ex.tr-II, Ex.tr-III and Ex.tr-IV respectively.

Fecundity

Significant effect (P<0.01) of host plants on oviposition by *Samia ricini* was observed. Adult females of *Samia ricini* fed on *Mikania micrantha* leaves from III instar onward laid as many as 370.70 eggs followed by the larvae fed with *Mikania micrantha* throughout (370.52eggs) which did not differ significantly. The larvae reared on *Ricinus communis* (329.28), and mixed food i.e. *Mikania micrantha* and *Ricinus communis* during V instar (326.57eggs) placed third and fourth position respectively.

Effective Rate of Rearing

Different treatments of food plants significantly affected (P<0.01) the effective rate of rearing of *Samia ricini* Donovan. Highest value of Effective rate of rearing was recorded in Ex. tr-III (98.03±0.31) followed by control (98.02±0.32), Ex.tr-II (96.16±0.54) and Ex.tr-I (78.10±4.950)

Hatching

Statistical analysis of data revealed no significant effect of host plants on larval hatchability. However, the higher value of hatchability (97.01±0.16) was recorded in Ex.tr-III followed by control (96.71±0.20), Ex.tr-I (96.55±0.28) and Ex.tr-II (96.01±0.28).

Larval Duration

The data revealed significant effect (P<0.05) of host plants on longevity of *Samia ricini* Donovan. The average life span of adult eri moth came out from each experimental treatment is 6.19±0.33 (Ex.tr-I), 6.02± 0.28(Ex.tr-II), 6.23±0.30 (Ex.tr-III) and 6.22±0.29 (control) days.

In the present investigation extended larval duration (35.33 days) and the high rate of mortality of first instar *Mikania micrantha* fed larvae (Ex. tr.-I) may be attributed to the antifeedent and repellent activity of *Mikania micrantha* on *Samia ricini* Donovan due to the presence of terpene, a secondary metabolite. However, the survivors were adapted to the new environment of food plant *Mikania micrantha* and the larvae were seen consuming Japanese weed as voraciously as castor leave. Similar findings by Mallick and Benerji (1989) who evaluated the antifeedent and repellent activity of *Osimum sanctum*, on the last instar larvae of *Samia ricini* Donovan is very significant.

The effective rate of rearing ranged from 78 to 98.2 percent. The lower ERR in *Mikania micrantha* fed larvae (78%) throughout may be attributed to the inability of worm to digest *Mikania micrantha* leaf at initial stage due to the presence of allelopathic chemicals (phenolics, flavonoids, alkaloids and terpenes) and hence heavy mortality during this period. However, the survivors showed normal growth, development and other economic characters. Similar trend was observed in the findings of castor, the primary host plant of eri silkworm, as a potential new host for tropical tasar silkworm by Patil in the year 2000. In his experiment it was observed that there was heavy mortality of first instar *A. mylitta* worms when fed with stripped tender castor leaves, indoor; but the growth parameters and the cocoon characters of the tasar silkworm reared on castor leaves were normal that proved castor to be a potential new host for tropical tasar silkworm.

The improvement of fecundity (12.58% in Ex.tr-III and 12.52% in Ex.tr-I) observed in the present study may be due to accumulation of more reserve in larval stage, resulting in the formation of healthier pupae from which the moth emerged, that stimulated to lay more number of eggs. The present findings are in conformity with the findings of Mane and Patil (2000a) who reported that when castor leaves were dipped in aqueous extracts of the selected botanicals (*Parthenium hysterophours, Tridax procumbens, Amaranthus spinosus, Curcuma longa* and *Bambusa vulgaries)* and fed once during the V instar till cocoon spinning all the larval and cocoon parameters including fecundity increased significantly. This not only increases the rate of oviposition but also ensures higher larval survivability.

Conclusion

Thus, the present findings suggest that there was no much variation in larval development of eri silkworms reared on *Mikania micrantha* leaves compared to castor leaves and there is a great scope in feeding of *Mikania micrantha*, a widely available weed for rearing the worm for silk production commercially.

References

1. Chaudhury, S. N. (1982a) *Eri Silk Industry*, published by Directorate of Sericulture& Weaving, Govt. of Assam, pp. 16-114.
2. Devi, M. (2010). An Investigation on growth development and yield of silkworm *Samia ricini* reared on Castor and Japanese weed in Karbi Anglong District. Ph.D. Thesis, Gauhati University, Assam (India).
3. Mallick, R.N. and Benerji, A. (1989) Effect of methanol extracts of *Ocimum sanctum* Linn. on jute semilooper *Anomis sabulifera* Guen. *Indian J. Ent*. 15(1): 84-89.
4. Mane, J.R., Patil, G.M. (2000a). Effect of botanicals having phagostimulant properties on the economic traits of Eri silkworm, *Samia cynthia ricini*, Bois., International Journal of wild silkmoth and silk, 5 , 196-199.
5. Mane, J.R., Patil, G.M. (2000b). Effect of botanicals having IGR activity on growth & development and economic *Eri Silk worm, Samia Cynthia ricini boisd,* International Journal of wild silkmoth and silk, 5, 200-203.
6. Patil, G.M. (2000), Castor, *Ricinus communis*, L. A potential new host plant of tropicl tassar silkworm, *Antherea mylitta* Drury (Lepidoptera: Saturniidae) *Intl. j. wild silk-moth and silk.* 5 : 51-53.
7. Shivkumar, G.R. and Anantharaman, K.V. (1995). Identification of locally available plant rich in phytoecdysteroid and its extraction. Central

Sericulture Research and Training Institute, Annual Report for 1995-96, Mysore, 95-97.
8. Mamadapur, B.B. (1994) Botanicals with IGR activity on *Bombyx mori* L. M.Sc. (Agrl.) Thesis, University of Agricultural Sciences, Dhanwad.
9. Pandey, S.K. (1995) Do leaf tannin affect non-mulberry silkworm? *Indian Silk*, 34(8): 21-23.
10. Santosh Kumar, G. H. (1997) Large scale evaluation of insect growth regulatory (IGR) of *Lantana camara* M.Sc. (Agril) Thesis, University of Agricultural Science, Dharward, 1999