Study of Larval and grainage parameters of *Samia ricini* Donovan reared on different concentrations of *Mikania micrantha* leaf extracts

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ABSTRACT

The larvae of Eri Silkworm *Samia ricini* Donovan were fed on Castor leaf (*Ricinus communis*) fortified with different concentrations of *Mikania micrantha* leaf extracts (T_{10}-T_{100}) from first instar till maturity at the rate of 4ml./sq.cm. leaf area and the Larval duration, Effective Rate of Rearing(ERR), Fecundity, Hatching, Larval Survivability and Moth Emergence were recorded. Among the ten different concentrations evaluated, the treatment with 40% extracts of Japanese weed were found to be superior in all the parameters studied (Larval duration -19±0.58; ERR- 98.04±0.77; Fecundity-379±1.73 ; Hatching-96.69±0.65 ; Larval Survivability-99.84±0.01 and Moth Emergence -99.85±0.01) as compared to the untreated larvae (19±0.8, 97.69±1.06, 331.33±3.38, 96.69±0.64, 99.79±0.03 and 99.85±0.03 respectively. Further, disease incidence, total mortality, non-spinning worms were found to be non-significant.

Key words: *Mikania micrantha, Samia ricini, Larval and Grainage parameter, Leaf extract.*

Subtitle: Study of economic characters of eri silkworm *Samia ricini* Donovan reared on different concentrations of *Mikania micrantha* leaf extracts extrafoliated on castor leaves

Introduction

Plants act as the richest source of organic chemicals on earth. 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 Japanese Weed (*Mikania micrantha*) leaf extracts on the larval and grainage parameters of *Samia ricini* Donovan.

1. Materials and Methods:

Disease free laying (eggs) of eri silkworm were collected from Research Extension Centre, Central Silk Board, Diphu, Assam.

The temperature and humidity was between 22ºC to 24ºC and 77-83% respectively. A total twelve (12) treatments including absolute and water control were fixed as shown in the table and replicated thrice with 100 larvae in each replication. Japanese weed extracts of different concentrations were prepared in distilled water and sprayed on castor leaves at the rate of 4ml/sq.cm. leaf area. The treated leaves were fed 4 times up to III instar and 5 times till maturity and the Larval duration, Effective Rate of Rearing(ERR), Fecundity, Hatching, Larval Survivability and Moth Emergence were recorded and subjected to statistical analysis as shown in the table and figure.

Results and Discussion :

Larval Duration

The data on the developmental days or larval duration of *Samia ricini* revealed highly significant effect (P<0.01) on different concentration of *Mikania micrantha* extracts fortified on castor leaves. In the present investigation shorter larval durations (19 days) were recorded in the larvae treated with lower concentrations (10%-40%) and absolute control. However, longer larval durations were recorded in 60% (20.33), 70% (20.33), 80% (20.67),, 90% (21.00),and 100% (21.00) treated larvae as shown in the table and figure.

Table : Larval and grainage parameters of *Samia ricini* Donovan reared on different concentrations of *Mikania micrantha* leaf extracts extrafoliated on castor leaves.

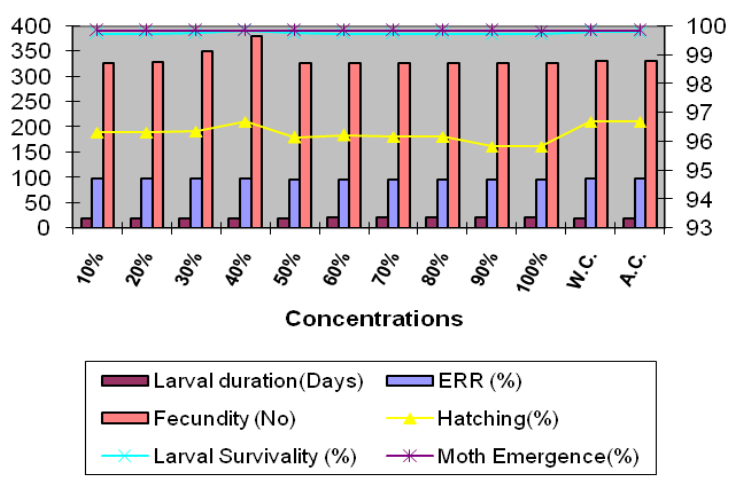
Concentrations		Larval duration (Days)	ERR (%)	Fecundity (No.)	Hatching (%)	Larval Survivability (%)	Moth Emergence (%)
10%	Mean	19	97.34	325.67	96.31	99.73	99.84
	SE±	0.58	1.38	0.88	0.97	0.01	0.01
20%	Mean	19	97.35	329	96.32	99.73	99.85
	SE ±	0.58	1.37	0.58	0.97	0.01	0.01
30%	Mean	19.33	97.36	350	96.35	99.75	99.85
	SE ±	0.88	1.38	0.58	0.99	0.01	0.03
40%	Mean	19	98.04	379	96.69	99.84	99.85
	SE ±	0.58	0.77	1.73	0.65	0.01	0.01
50%	Mean	19.67	96.37	327	96.14	99.75	99.85
	SE ±	0.67	1.38	0.58	1.07	0.02	0.01
60%	Mean	20.33	96.37	327.67	96.22	99.74	99.84
	SE ±	0.33	1.37	1.45	1.12	0.02	0.03
70%	Mean	20.33	96.32	327	96.16	99.74	99.84
	SE ±	0.33	1.37	0.58	1.1	0.01	0.03
80%	Mean	20.67	96.32	327	96.17	99.73	99.84
	SE ±	0.33	1.37	0.58	1.11	0.01	0.04
90%	Mean	21	96.31	326.67	95.83	99.72	99.84

	SE ±	0.58	1.37	0.33	1.42	0.02	0.03
100%	Mean	21	96.31	326.67	95.83	99.72	99.83
	SE ±	0.58	1.37	0.33	1.43	0.02	0.02
Water Control	Mean	19	97.7	330.67	96.69	99.81	99.85
	SE ±	0.58	1.06	0.88	0.65	0.03	0.03
Absolute Control	Mean	19	97.69	331.33	96.69	99.79	99.85
	SE±	0.58	1.06	3.38	0.64	0.03	0.03
Average	Mean	19.78	96.96	333.97	96.28	99.75	99.84
	SE±	0.19	0.33	2.55	0.25	0.01	0.01
CD at 5%		0.71	0.06	0.73	0.08	NS	NS
CD at 1%		0.92	0.08	0.95	0.11	NS	NS

Effective rate of rearing

Extrafoliation of aqueous extracts of *Mikania micrantha* on castor leaves with different concentrations had highly significant effect (P<0.01) on the effective rate of rearing which is depicted in Figure and Table. Highest ERR was observed in 40% treated larvae (98.04±0.77) followed by absolute control (97.69±1.06) and the least being in T_{90} and $T_{10\,0}$ (96.314±1.37)

Fig.: Effect of fortification of castor leaves with different concentrations of *Mikania micrantha* leaf extracts on larval and grainage parameters of eri silk worm



Moth emergence and Larval survivability

From the investigation it has been observed that the treatments of eri silk worms with different concentrations of *Mikania micrantha* extracts had no significant effect on moth emergence. However, the data ranged from 99.84% to 99.85%. Statistical analysis revealed no significant difference in larval survivability among different treatments. However, it ranges from 99.72 %±0.02 ($T_{90\,\&}$ T_{100}) to 99.84%±0.01 (T_{40}).

Fecundity

Data on the number of eggs laid by eri silkworm fed on different concentrations of *Mikania micrantha* leaf extracts showed significant effect (P<0.01) on oviposition or fecundity of eri silkworm *Samia ricini* Donovan. A maximum fecundity of 379.00eggs was observed in T_{40} followed by T_{30} (350.00eggs), control (331.33eggs) and other treatments. While the least being recorded in T_{90} and T_{100} (326.67 eggs).

Hatching

Data on the percentage of hatching of eri silkworm reared on different concentrations of *Mikania micrantha* leaf extracts differed significantly at P<0.01. The percentage of hatching recorded highest in T_{40} (96.69±0.65) and control (96.69±0.64) . However, the lowest hatching percentage was recorded in T_{100} (95.83±1.43).

In the present study, extrafoliation of 40% aqueous extracts of *Mikania micrantha* on castor leave significantly improved the larval and grainage parameters over absolute control. The gain in larval and grainage characters at a particular concentration (T_{40}) may be due to the presence of feeding stimulant factors results in phagostimulant properties in the aqueous extracts that increased the appetite of the larvae leading to better consumption and good growth of the eri silkworm. Similar finding were also reported by Mane and Patil, (2000a), when castor leaves extrafoliated with 10% aqueous extracts of *Amaranthus spinosus* significantly improved larval and pupal characters of eri silk worm *Samia cynthia ricini* .

Extrafoliation of *Mikania micrantha* at 40% elicited the moth to lay 14.39% more eggs compared to control. At 30% concentration, the percent improvement was 5.63**.** The increased fecundity observed in the present study may be due to the accumulation of more reserves in the larval stage, resulting in the formation of healthier pupae from which the moth emerged, that stimulated to lay more number of eggs.

Conclusion : Thus, there is a great scope in feeding of *Mikania micrantha*, a widely available weed for rearing the eri silk worm for silk production commercially.

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