International Journal of Early Childhood Special Education (INT-JECSE)
DOI: 10.48047/INTJECSE/V5I1.101 ISSN: 1308-5581 Vol5, Issue 01 2013

Oviposition deterrence in *Tricholyga bombycis* (Beck) on *Bombyx mori* L. larvae treated with *Gloriosa superba* L. leaf extract

Abitha Jasmine, M and Loviah Joseph, G
Department of Zoology, Scott Christian College, Nagercoil-629003 (Affiliated Manonmaniam Sundaranar University, Tirunelveli-627 012), Tamil Nadu, India

Abstract

Tricholyga bombycis (Beck) is an endo parasitoid of *Bombyx mori* L. is responsible for the loss of silk yield in certain pockets of south India. *T. bombycis* is a highly adapted larval parasite, preferring *B. mori* fourth and fifth instar larvae for their perpetuation. *T. bombycis* maggots are well adapted for an endoparasitic mode of life. Management of this pest by using dual curtain protection, hand picking method and administering uzicide do not yield 100 percent protection. More over, uzicides are chemical preparations which pollute the environment when used in excessive quantities. Thus there is a need for the development of efficient management strategies against uzifly. In this study, aqueous extract of *Gloriosa superba* L. is tried as oviposition deterrents for *T. bombycis.* The effectiveness of plant extracts increased with concentration. A gradual increase in oviposition deterrence was observed with an increase in the concentration of the plant extract.

Key words: Uzicides, *Bombyx mori*, *Tricholyga bombycis*, Eclosion, *Gloriosa superba*

Introduction

Management of Indian uzifly *Tricholyga bombycis* (Beck) is a major challenge for Sericulturists operating in areas prone to this larval parasite which is a dreaded pest of *Bombyx mori* in areas around Western Tamilnadu (Vithalrao and Abijith 2014). To control uzifly, the application of insecticides is not possible because silk worm is highly susceptible to insecticides and they can be harmed by chemicals deposited on mulberry leaves supplied as feed (Kordy, 2014). Use of Uzicides and Uzitraps are practised extensively (Kumar *et al*., 1987), with limited success.

In the present study, aqueous leaf extract of a common medicinal plant was tried as an oviposition deterrent for *T. bombycis*. The effectiveness of treating *B. mori* larvae with plant extracts to manage *T. Bombycis* was tested by a number of authors. Veeranna and Nirmala (2001) studied the effect of plant extracts on different life stages of uzifly, on *B. mori* larvae. Narayanaswamy (1998) found that volatiles of *Eucalyptus citriodora* (Hook) are highly effective in killing the eggs deposited by *T. bombycis*. Murugesh *et al*. (2010) studied the effectiveness of the extracts of eight different plants on the eggs of *T. bombycis.*

Murugesh and Bhaskar (2011) studied the maggoticidal property of the leaf extracts of *Eucalyptus citriodora* Hook, *Tridax procumbens* L. and *Tribulus terrestris* Linn. Murugesh (2012) studied the effect of leaf extracts as ovipositional deterrents, ovicides and maggoticides against uzifly. Chinnamma (2017) studied the influence of neem oil on oviposition deterrence in uzifly. Rahman *et al*. (2016) assessed the effectiveness of the petroleum ether extract of *Catheranthus rosesus* L., *Ocimum sanctum* L. and *Ageratum conyzoides* L. in the management of uzifly in sericulture.

Materials and methods

Procurement and culture of *T. bombycis*

T. bombycis larvae were captured from the cocoon markets in Coimbatore and brought to the laboratory in large plastic containers. Pupation occurred within 6 hours and the pupae were allowed to eclose in 500ml transparent plastic containers, fastened with wire netting.

Preparation of plant extract

Leaves of *G. superba* were dried in the shade and powdered in an electric blender. The leaf powder was sifted in a fine mesh and stored in glass jars, in temperature around 20°C. Exactly 20g of each leaf powder were soaked for about 24 h, in 100ml of distilled water in a 250ml conical flask . The soaked extract was then filtered through Whatman No.1 filter paper and the stock extract was stored in a cooling chamber at 20°C. From the stock, dilutions were made to obtain 2,4,6,8 and 10 percent spray solutions.

Oviposition deterrence studies

Each of the five mating pairs of *T. bombycis* were allowed into five separate cages, forming five replicates and fed with one of the five feed types. Thus for each of the five feed materials, five replicates were maintained. *G. superba* stock leaf extract was diluted to obtain five solutions of different concentrations and sprayed on the fifth

DOI: 10.48047/INTJECSE/V5I1.101 ISSN: 1308-5581 Vol5, Issue 01 2013

instar *B. mori* larvae until wet and the larvae were allowed to dry over a filter paper surface for about 2 h, before allowing *T. bombycis* to oviposit on their body surface. The concept is based on the basic fact that *B. mori* are not affected by *G. superba* aqueous extract even at its highest concentration (10percent) *T. bombycis* feed types.

T.bombycis used in the study were raised on five different feed types, glucose, honey, sucrose, palm candy solution and mixed diet. Wild *T. bombycis* siphons out plant nectar. In the laboratory, different feed types were employed, to test whether any particular feed type specifically makes the uzifly to defy the deterrence action of *G. superba* leaf extract.

Eggs were counted on the 3rd 4th 5th 6th and the 7th days in all the replicates maintained. Control *T. bombycis* were allowed to oviposit on untreated *B. mori* larvae, on which clean water was sprayed.

Result

T. bombycis fed with honey were allowed to lay eggs on *B. mori* larvae treated with 2,4,6,8 and 10percent leaf extracts of *G. superba*. The maximum oviposition (38.8±3.5) was recorded at 2 percent concentration on the 7th day of oviposition. The minimum oviposition (12±1.4) was noted on 10 percent treated *B.mori* larvae on the third day of oviposition.

T. bombycis flies fed with glucose were introduced on *B. mori* larvae treated with 2,4,6,8 and 10 percent concentrations of *G. superba*. Oviposition is higher (37±21.8) on the 7th day in *B. mori* larvae at 6 percent concentration. Eggs were less (11.6±2) on *B. mori* larvae sprayed with 10 percent on the 3rd day of oviposition.

T. bombycis fed with sucrose syrup were allowed to lay eggs on *B. mori* larva treated with 2,4,6,8 and 10 percent concentrations of *G. superba.* The maximum oviposition (40.6±3) was recorded at 4percent concentration on 7th day of oviposition. The minimum oviposition (7±2.28) was observed on 10 percent on the 3rd day of oviposition.

T. bombycis fed with palm candy solution were allowed to oviposit on *B. mori* larvae treated with 2,4,6,8 and 10 percent concentrations of *G. superba.* The maximum oviposition (36±2) was noted at 2 percent concentration on 7th day of oviposition. The minimum (9.1±1.6) was noted on 10 percent of *G. superba* at 3rd day of oviposition.

T. bombycis fly fed with mixed diet were allowed to lay eggs on *B. mori* larvae treated with *G. superba* with 2,4,6,8 and 10 percent concentrations of *G. superba.* The maximum oviposition (43.5±5.7) was recorded at 2 percent concentration on 7th day oviposition and minimum oviposition (11±2.4) at 10 percent on 3rd day oviposition.

Discussion

Management of *T. bombycis* with chemicals like uzicide is less economical compared to the farmer friendly management using extracts of commonly available plants (Murugesh *et al*., 2011). The plant, *G. superba* is very effective in preventing oviposition by *T. bombycis* on *B. mori* larvae. Single *T. bombycis* female laid about 182 eggs over a period of 7 days on 10 untreated *B. mori* 4th day instar larvae. Thus about 18-20 eggs were deposited on a single *B. mori* larva. In the case of spray treatment with plant extracts oviposition decreased significantly.

Murugesh *et al*. (2011) recorded the ovipositional deterrence and ovicidal activities of *Tridax procumbens* L., *Tribulus terrestris* L., *Parthenium hysterophorus* L., *Bougainvillea spectrabilis Willd, Menthra arvensis* L., *Eucalyptus citriodora, Hook, Tagete serecta* L. and *Pongamia glabra* L. Vent extracts on *Exorista bombycis* L.

The oviposition behaviour of the uzifly was very much affected due to spraying of plant extracts. According to Gajendran and Gopalan (1981) *P. hysterophorus* showed repellent activity ranging from 19.53 to 62.20 percent when sprayed on third instar larvae of *S. litura*. Veeranna and Nirmala (2001) reported significant repellent activity on the adult uzifly, when 20 percent. *Pongamia galbra* L. leaf powder with kaolin was dusted on the silkworm body. The two reports are being corroborated with the percent findings. The repellent deterrent effect of eucalyptus oil on oviposition of *E. bombycis* was observed by Barman *et al*. (1990).

Better management of uzifly is possible through the use of plant extracts which do not affect the silkworms but reduce the hatching of *T. bombycis.*

Oviposition record of differently fed *T. bombycis* on *B. mori* larvae treated with *G. superba* leaf extracts

Feed types	Conc. of *G. superba* leaf extracts (in percent)	Oviposition days				
		3	4	5	6	7
		No. of eggs x̄ ± SD				
Glucose	2	18.6±1.5 (-72)	22.6±2 (-79)	30±4 (-78)	36±4 (-77)	42±1.8 (-78)
	4	16±1 (-74)	21±2 (-81)	24.8±3.36 (-81)	33±4 (-79)	39±19 (-78)
	6	14.8±2 (-82)	19±23 (-82)	22.6±3 (-83)	30.6±3.9 (-81)	37±18 (-80)
	8	13±2 (-80)	17 ± 2 (-84)	21±2.8 (-84)	28±3.4 (-87)	84±2(-82)
	10	11.6±2 (-87)	15.5±2.5 (-86)	18.5±2.8 (-86)	25.6±3.26 (-84)	31.8±1.8 (-83)
Honey	2	16±1 (-76)	19.8±22 (-82)	26±4.4 (-81)	30.5±5.9 (-81)	38.8±3.5 (-79)
	4	16.8±1 (-75)	26.6±25 (-76)	28.6±3 (-79)	33±2.9 (-79)	40.6±3 (-78)
	6	15±0.8 (-79)	20±24 (-81)	26.8±3 (-80)	31.±24 (-80)	38.5±3 (-79)
	8	14±1.2 (-80)	17.8±3 (-83)	24.6±3.2 (-82)	28.8±2.3 (-82)	36.5±3 (-80)
	10	12±1.4 (-82)	16.3±2.6 (-85)	22±3.9 (-83)	27±2.5 (-83)	34±2.9 (-82)
Sucrose	2	13±28 (-80)	17.3±32 (-84)	23.5±32 (-82)	28.5±2 (-82)	38±2 (-80)
	4	14±23 (-79)	17.5±36 (-84)	23.6±2.6 (-81)	28±4.6 (-82)	38±3 (-80)
	6	12±23 (-82)	15±27 (-86)	21±26 (-84)	26±4 (-83)	36.5±3 (-81)
	8	10± 22.4 (-85)	13±2.6 (-88)	19.8±2.9 (-85)	24±4.3 (-85)	33±3 (-80)
	10	8.5±2 (-87.5)	11±2 (-90)	17±2.6 (-87)	21±3.7 (-87)	30±3 (-84)
Palm candy	2	14.8±6.9 (-78)	18.6±2 (-83)	25.5±3.8 (-81)	32±2.7 (-80)	36±2 (-81)
	4	13.6±2 (-80)	19±0.89 (-82)	23±1.7 (-83)	27±14 (-83)	34±2 (-82)
	6	12±1.9 (-82)	16.8±0.75 (-84)	21±1.3 (-84)	24.6±1.5 (-84)	31.6±24 (-83)
	8	10.5±1.8 (-84)	14.8±0.98 (-86)	19±1.6 (-86)	22.6±1.8 (-86)	28.6±2.06 (-85)
	10	9.1±1.6 (-86)	13±0.89 (-88)	17.5±1.6 (-87)	20.6±1.8 (-87)	26±2 (-86)
Mixed diet	2	16±0.8 (-76)	21±2.7 (-81)	26.5±3.3 (-80)	34±4 (-79)	43.5±5.7 (-77)
	4	16±2.5 (-75)	24.5±1.7 (-78)	32.5±4 (-76)	39±3.9 (-75)	42.5±6 (-77)
	6	14.5±2.5 (-79)	21.8±1.6 (-80)	29±3.5 (-78)	36.5±4.8 (-77)	39 ±5.8 (-79)
	8	12.6±2.5 (-81)	19.3±1.2 (-82)	27±3 (-80)	34±4 (-79)	36.6±5.2 (-80)
	10	11±2.4 (-83)	17±1.6 (-84)	24±3 (-82)	32±4.2 (-80)	35±5.8 (-81)
Control		70±7.9	100±9.5	130±6.2	167±8.8	197±12.3

References

Barman, A.A., Pasha, K. and Nahar, A **1990**. A study on the control of uzifly, *E. bomycis* in Silkworm, *B.mori* Bull. *Seric, Res*; 1: 65-69.

Chinnamma, C.A **2017**. Influence of Neem oil on Oviposition Deterrence of Uzifly *Exorista bombycis*, *International Journal of Innovative Science and Research Tecnology*. Volume 2, Issue 4.

DOI: 10.48047/INTJECSE/V5I1.101 ISSN: 1308-5581 Vol5, Issue 01 2013

Kordy, A.M **2014**. Residual effect of certain pesticides on the mulberry silkworm *Bombyx mori* L.). *Journal of applied Sciences* 4(3):711-717.
Kumar, P **1987**. Cotribution to our knowledge on *T. bombycis*, a serious Parasite *B. mori* and its control, Ph.D. Thesis, Mysore University, Mysore, (India).
Murugesh KA **2010**. Ovicidal effect of botanicals against Indian uzifly, Exorista bombycis (Louis). Bulletin of Indian Academy of Sericulture 14 (1). 115-120.
Murugesh, K.A. Bhaskar R.S **2011**. Evaluation of Botanicals as maggoticides for the control of Indian uzi fly, *E. bombycis*; *Trends in Biosciences*. Volume: 4, Issue: 1: 79-81.
Murugesh. K.A **2012** Management of Uzifly, *Exorista bombycis* (Louis) with botanical insecticides. Madras Agricultural Journal 99 (7/9), 588-591.
Narayanaswamy, K.C and Dandi, S.B **1998**. Effect of Exposing eggs of uzifly *E. bombycis* (Diptera: Tachinidae) to volatiles of *Allium sativum* (Lilliaceae) Korean *Journal of Sericulture*. *Science.* 40(1): 23-26.
Rahman S, Biswas S.K, Barmab N.C, Ferdous.T,**2016**. Plant extract as selective Pesticide for Integrated Pest Management; *Biotechnology Research Journal;Vol*(1):6-10. ISSN 2395-6763.
Veeranna, G. and Nirmala M.R**. 2001**. Effect of plants extracts on different stages of uzi fly, *E. bombycis,* a pest of silkworm, *B. mori Natl. Sem.Seri, Res.* India. KSSRDI (Abs.) Nov.26-28;p-200.
Vithalrao S and Abijith S.D .**2014**. Economical and distributional status of Uzi fly *Exorista sorbillans* Wied (Diptera:Tachinid) in sericulture in India. *Indian Journal of Applied Res*. 4(8):10-13.