

A STUDY OF ADULT EMERGENCE PERCENTAGE AND EGG LAYING BEHAVIOR OF *Zygogrammabicolorata* IN FAVOR OF ITS MASS MULTIPLICATION

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ABSTRACT

The present research work had been carried out to recognize mass multiplication activities of Mexican beetle *Zygogramma bicolorata*. To observe the adult emergence percentage of *Z. bicolorata* in the laboratory conditions, experiments were carried out and the result showed that the percentage of emerged females (33.33%) was higher than the emerged males (15%). In the other experiment, the egg laying behavior of a female *Zygogramma* was noticed on different substrates which was significantly higher on muslin cloth (55.52%) due to its sticky and roughness of the substrate in comparison to the upper surface covered leaf of *Parthenium* (22.39%), lower surface covered leaf of *Parthenium* (13.49%) and glass (8.58%).

Keywords: Mass multiplication, *Parthenium hysterophorus*, *Zygogramma bicolorata*

1 INTRODUCTION

The beetle *Zygogramma bicolorata* Pallister is an effective bio control agent of *P. hysterophorus*. The insect was imported from Mexico in 1983. Biological control efforts were initiated in India with the introduction of *Zygogramma bicolorata* Pallister in 1983 (Jayanth and Nagarkatti, 1987) and field releases were initiated in India in 1984. Since then the beetles have brought about considerable reduction in *Parthenium* flower production and enabling local vegetation that had been suppressed by the weed to grow again. *Parthenium* has been considered as one of the greatest sources of dermatitis, asthma, nasal-dermal and nasal-bronchial types of diseases resulting from Parthenin (Nabum Yadi and Mandal, 2008). Parthenin, a glucoside is said to produce a depressant effect on the nervous system (Chandra and Vartak, 1970). The adult *Zygogramma* beetles feed and oviposit on *Parthenium* leaves while the newly hatched larvae feed voraciously on the terminal and axillary buds, leaves, stem parts etc. It is estimated that about 35 million hectares of land has been invaded by *Parthenium* in India (Sushilkumar and Varshney, 2007). Among various control measures, the Mexican beetle, *Zygogramma bicolorata* Pallister

(Coleoptera : Chrysomelidae) is a biological control agent of *Parthenium* (McFadyen, 1992; Dhileepan et al., 2000; Dhileepan, 2001). Both the adults and larvae of *Z. bicolorata* feed on *Parthenium* leaves. After host specificity and biological studies (McClay, 1980;McFadyen, 1980; Jayanth and Nagakatti, 1987; Jayanth and Bali, 1993a, 1994b; Bhoopati and Gautam, 2006) the beetles were released in various parts of the world suffering *Parthenium* invasion including India (McFadyen and McClay, 1981; Jayanth and Bali, 1995). *Z.bicolorata* has shown its biocontrol potential in different parts of the country ranging from negligible to excellent under different field condition while use of herbicides against the weed has always given temporary but good results (Sushilkumar, 2005). The present research work had been done to this beetle in and around Kota region for managing the world seventh hazardous weed *Parthenium* through multiplying the number of beetles in laboratory conditions.

Material and Method :

The experiment to notice the adult *Zygommatra* emergence percentage was held in six net covered containers A suitable temperature was also maintained in containers (25-28C°) for feeding the instars, *Parthenium* leaves were given in sufficient amount in the net covered containers. In each container ten 4th instars were released and to make soil spongy for pupation purpose, sufficient amount of water also been given in the soil at regular interval. Next experiment was carried out to find egg laying behavior of a female *Zygommatra bicolorata* for this purpose muslin cloth upper surface covered leaf of *Parthenium*, lower surface covered leaf of *Parthenium*, and glass substrate were utilized.

Table:1

Pupation and emergence of adults *Z. bicolorata*, collected from containers

S.No.	No. released larvae	No. Pupated	Adult emergence		
			Female	Male	Total
1	10	10	6	2	8
2	10	10	5	3	8
3	10	8	4	2	6
4	10	9	4	1	5
5	10	7	1	1	2
6	10	Due to fungal attack no pupation accurs	0	0	0

II RESULTS

In the study of the adult emergence percentage (male and female) the results have shown that 73.33% larvae pupated and 48.33% adult emerged out, in which the percentage of female emerged (33.33%) was higher than male (15%).

The other result had been carried out for the purpose of egg laying behavior of a female on different given substrate, which clearly indicates there is a significant variation in the total egg output in females of *Z. bicolorata*. Maximum mean eggs output was obtained on muslin cloths (55.52%), > followed by upper surface covered leaf of *Parthenium* (22.39%), > lower surface covered leaf of *Parthenium*(13.49%)> and glass (8.58%) out of all the four substrates provided for egg deposition. The highest egg output by the beetles on muslin cloths was due to the roughness of muslin cloth where the hatched eggs can stick properly.

III CONCLUSION

Through the present research work the mass multiplication of *Z. bicolorata* had been done in laboratory condition. Here the female ratio of emergence was higher than male which is beneficial for productivity of *Zygogramma bicolorata* and the other experiments prove that egg laying behavior of female *Zygogramma bicolorata* was higher on the rough surface of muslin in comparison to other substrates because muslin cloth give same nature as *Parthenium* leaf to attach eggs easily.

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