

## Biological control of *Parthenium hysterophorus*

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*Parthenium hysterophorus* L., commonly known as carrot weed or congress grass in India has been considered as one of the worst weeds responsible for causing health problems in human and animals besides loss to crop productivity and plant biodiversity (kumar 2005). The weed has infested about 35 million hectares of land in India since it was first noticed in 1955. Now it has become one of the main weeds in almost all types of agricultural lands besides infesting wasteland, community land, road and railway track sides and forests. Biological control of *Parthenium* through insects, pathogen and competitive plants gained momentum in India in 1980s with publication of more reports about the indigenous bioagents infesting *Parthenium*. The classical biological control was started with the introduction of a host-specific leaf-feeding beetle *Zygotramma bicolorata* Pallister (Coleoptera: Chrysomelidae) from Mexico (Jayanth 1987).

### METHODOLOGY

A huge number of *Zygotramma bicolorata* Pall. (Coleoptera: Cyrsomilidae) insects were collected from natural abode. Three sites were selected randomly in the vicinity of Malinagar High

School (Samastipur), Balua Basic School (Muzaffarpur) and Mirapur Middle School (Muzaffarpur) to release in areas heavily infested areas with exotic and noxious weed *Parthenium* and the effectiveness of beetle was as curtailed with regard to management of *Parthenium*. Three random samples of 1m<sup>2</sup> of *Parthenium* density were selected in each from the site. 500 adult beetles were released at one site distributed evenly on the entire site during rainy season. Eggs, Larvae and adults were counted from each plant and the data were presented on average basis.

### RESULTS

The area as mentioned in Table 1, Mexican beetles were seen emerging from soil after breaking hibernation, cause and defoliate the *Parthenium* largely from July, increased gradually upto September and drastically decreased thereafter: Similar trends were observed in case of egg, larva and adult population. They remained active between July to September at the three sites under reference. The emergence of beetle was not continuous, as it depends on rain fall, environment and the extent of damage was also not too similar. A

**Table 1. Egg, larvae and adult population of *Zygotramma bicolorata* for plant and per cent damage to *Parthenium* of the three sites during Kharif 2012**

Month	Site I (Mirapur Middle School-Muzaffarpur)					Site II (Malinagar High School-Samastipur)					Site III (Balua Basic School- Muzaffarpur)				
	Eggs	Larvae	Adults	Damage (%)	0-5 scale	Eggs	Larvae	Adults	Damage (%)	0-5 scale	Eggs	Larvae	Adults	Damage (%)	0-5 scale
May, 12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
June, 12	0	0	2	11	1	0	1	1	8	1	0	0	0	0	0
July, 12	20	0	3	24	1	11	2	3	24	1	0	0	2	7	1
August, 12	37	14	10	63	3	24	10	10	68	3	16	3	8	16	1
Sept. 12	31	20	16	73	3	30	13	14	76	4	12	10	14	46	2
Oct. 12	0	10	13	61	3	0	12	12	63	3	3	6	9	38	2
Nov. 12	0	0	5	43	2	0	6	6	40	2	0	0	6	37	2
Dec. 12	0	0	0	20	1	0	2	2	38	2	0	0	0	26	2
Average	11.0	5.5	6.12	36.87	1.75	8.12	5.75	6.0	39.62	2.0	3.87	2.37	4.87	21.25	1.25

**Table 2. Details of *Parthenium* morphology and relation of Mexican beetles at three selected sites for management of *Parthenium* by Mexican beetle in north Bihar**

Particulars of <i>Parthenium</i> and Mexican beetle	Site I (Mirapur Middle School-Muzaffarpur)	Site II (Malinagar High School-Samastipur)	Site III (Balua Basic School- Muzaffarpur)
Plant population/m <sup>2</sup> area	08-13	09-13	8-12
Plant height (Meter)	0.52-0.82	0.54-0.81	0.47-0.79
Fresh biomass of plant (kg/m <sup>2</sup> )	0.65-0.94	0.70-0.92	0.68-0.91
Adult population per plant (average)	6.12	6.00	4.87
Grubs (larvae) (AV)/plant	5.50	5.75	2.37
Eggs (AV)/plant	11.00	8.12	3.87
Per cent damage (%)	36.87	39.62	21.25

critical perusal of data revealed that at site I, damage varied between 11-73%, at site-II between 8.0-76.0% and Site-III between 7.0-46.0 % with an average of 36.87, 39.62 and 21.25%, respectively.

### CONCLUSION

Mexican beetles were seen emerging from soil after breaking hibernation and defoliate the *Parthenium* largely from July, increased gradually upto September and drastically decreased thereafter.

### REFERENCES

- Sushil kumar. 2005. Biological control of parthenium through Mexican beetle (*Zygotramma bicolorata*), National Research Centre for Weed Science, Jabalpur: 87p.
- Jayanth KP. 1987. Introduction and establishment of *Zygotramma bicolorata* on *Parthenium hysterophorus* at Bangalore, India. *Current Science* **56**: 310-311.