

**SUITABILITY OF MEXICAN BEETLE (*ZYGOGRAMMA BICOLORATA*) FOR THE MANAGEMENT OF *PARTHENIUM HYSTEROPHORUS* AS INFLUENCED BY WEATHER PARAMETERS IN WEST BENGAL**

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**ABSTRACT**

Although the density and acreage of congress grass (*Parthenium hysterophorus*) have been gradually increasing since last decade, there is still no such recommendation for the eco-friendly management of this prolific weed in West Bengal. Hence, a survey work was undertaken in the district of Nadia in New Alluvial Zone of the state during *rabi* season of 2007. *Parthenium* density was found to be more (62.5%) in non-cropped areas than in cropped areas, which showed that *Parthenium* invasion had already been started in cropped areas indicating an alarming situation in future. A subsequent field experiment was conducted at the Bidhan Chandra Krishi Viswavidyalaya, Kalyani in 2008 to identify the suitability of Mexican beetle (*Zygodramma bicolorata*) as a biological control agent against the deadly weed *Parthenium* under the changing climatic situation of West Bengal. Average values of percent moisture content in *Parthenium* and number of bio-agents (insects) plant<sup>-1</sup> in different months showed that infestation of egg laying grubs which actually fed *Parthenium* was negligible in winter season and under high humid condition (5.0 in November, 1.2 in December, 1.6 in January and 3.6 in February). As per recorded data on temperature and relative humidity in the said season / condition, it was not congenial for hatching as well as establishment of *Z. bicolorata* to the level of infestation desired for controlling *Parthenium*. The study revealed that *Z. bicolorata* might be suitable for some other seasons or conditions in West Bengal, for which further study needs to be taken up.

**Keywords:** Management, Mexican beetle, *Parthenium*, Weather Parameters

**INTRODUCTION**

Congress grass or carrot weed (*Parthenium hysterophorus* L.) is a native of tropical North and South America (Mexico, U. S. A.) and West Indies. The weed has now become a major one having regional, national or international importance because of its huge seed producing ability with small and lighter seeds that can travel a long distance through wind, water, birds, other animals, traffic and transported goods (Das, 2008). The weed was introduced first with milo grain seed in India and was first noticed in Pune in 1955. Now, it has been spreading over most of the cropped as well as non-cropped areas of the country, thereby posing a serious concern owing to its hazards. Likewise, its density and acreage have also been gradually increasing since last decade in West Bengal. There is still no such recommendation for its eco-friendly management. Keeping this background in view, the present study was initiated.

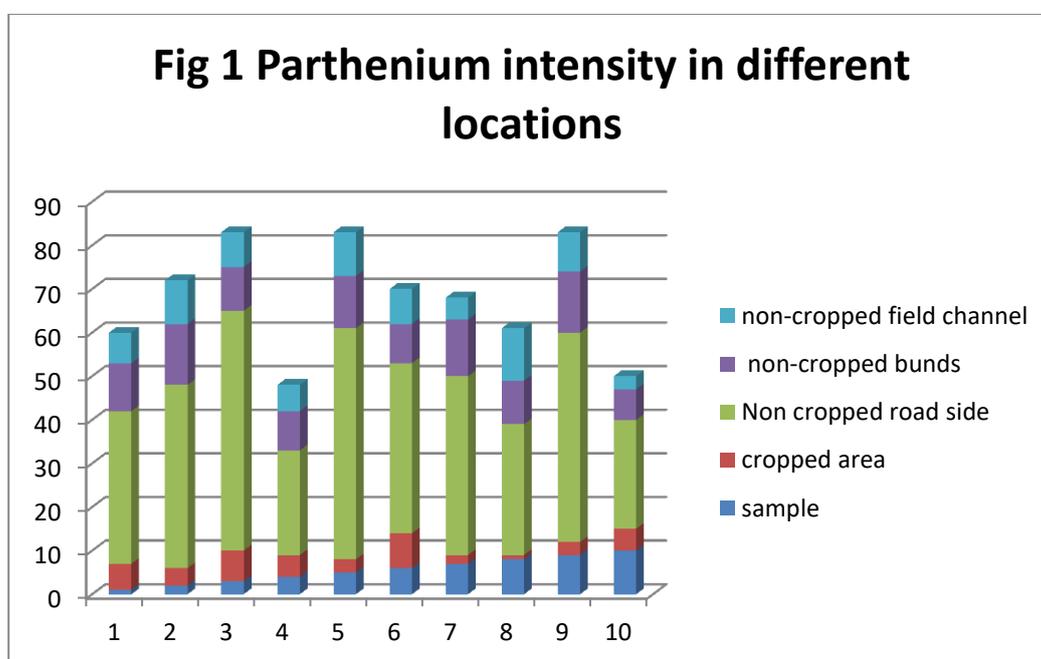
## MATERIALS AND METHODS

A survey work was undertaken during *rabi* season (Oct.-Dec., 2007) to determine the *Parthenium* density at six different spots *viz.* In check Farm (Kalyani), Saguna, Ghoragacha, Chandamari, Kampa and Bijpur of Nadia district in New Alluvial Zone of West Bengal. A quadrat method was adopted to measure weed density on selected spots. Care was taken that survey spot should not be located nearby any building or permanent structure. At every 5 km distance, on an average, each survey spot was selected.

A subsequent field experiment was conducted in 2008 at the Incheck Farm, Bidhan Chandra Krishi Viswavidyalaya, Kalyani, Nadia to identify the suitability of Mexican beetle (*Zygogramma bicolorata*) as a biological control agent against the deadly weed *Parthenium* under the changing climatic situation of West Bengal. Average values of percent moisture content in the weed and number of bio-agents (insects) plant<sup>-1</sup> in different months were recorded. Meteorological data pertaining to the period of experimentation were also recorded.

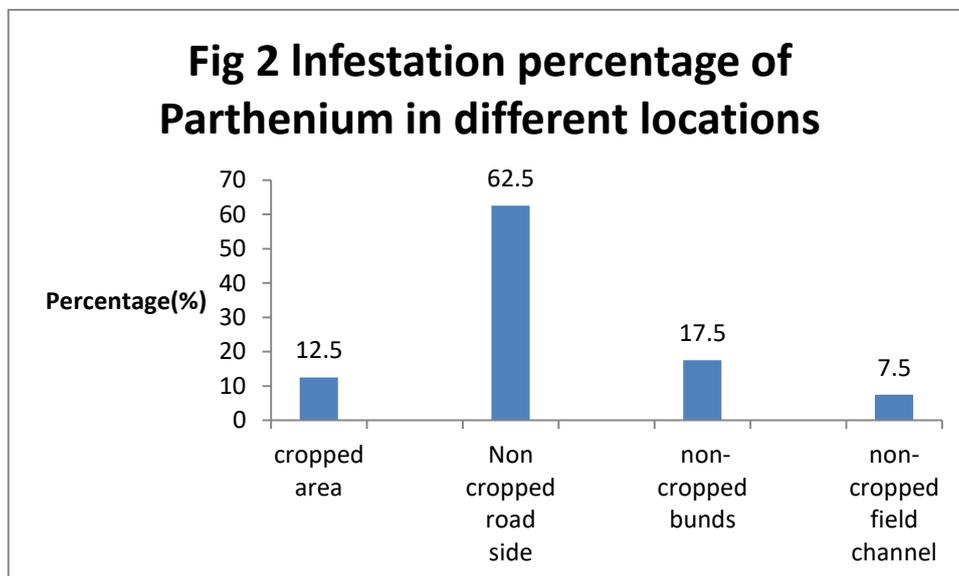
## RESULTS AND DISCUSSION

The survey report showed that *Parthenium* had the potentiality to invade both the cropped as well as non-cropped areas including road sides, bunds and field channels, of which maximum density was noted in road side areas. Survey also revealed that the non-cropped areas were more heavily infested (62.5%) than the cropped one (Figure 1&2). This showed that *Parthenium* invasion had already been started in cropped areas indicating an alarming situation in future, thereby suggesting that weed spread in crop field would be checked to a great extent by controlling it first in non-cropped areas. Das (2008) reported in the same way. Bhowmick (1999) called earlier it as a prolific weed of West Bengal.



Average values of percent moisture content in *Parthenium* and number of bio-agents (insects) plant<sup>-1</sup> in different months showed that infestation of egg laying grubs which actually fed *Parthenium* was negligible in winter season and under high humid condition (5.0 in November, 1.2 in December, 1.6 in January and 3.6 in February). As per recorded data on temperature and relative humidity in the said

season / condition (Table 1), it was not congenial for hatching as well as establishment of *Z. bicolorata* to the level of infestation desired for controlling *Parthenium*. Ghosh (2009 and 2010) suggested an integrated approach for the management of this invasive weed.



## CONCLUSION

The present study showed that *Parthenium* should immediately be managed in non-cropped areas and subsequently in cropped areas of West Bengal. The Mexican beetle (*Zygodramma bicolorata*) may be a suitable bio-control agent for controlling the weed in seasons other than winter or high humid conditions in the state. Further study needs to be taken up for having a decisive conclusion.

## REFERENCES

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**Table 1 Moisture content in *Parthenium* and incidence of bio-agents (insects) plant<sup>-1</sup> in different months of 2008 as influenced by weather parameters**

Months	Temperature (°C)		Relative Humidity (%)		Rainfall (mm)	% moisture content in <i>Parthenium</i>	No. of insects released plant <sup>-1</sup>	No. of insects observed plant <sup>-1</sup> at different times				
	Max.	Min.	Max.	Min.				7.00 AM	9.00 AM	11.00 AM	1.00 PM	3.00 PM
Jan.	30.45	9.25	99.50	31.0	30.25	61.25	20	2	1	2	2	1
Feb.	30.75	9.25	100.0	31.5	13.90	67.54	20	3	6	5	2	2
Mar.	36.40	17.80	98.50	27.5	8.10	70.65	20	8	14	15	18	19
Apr.	39.30	22.55	95.50	31.0	16.10	74.77	20	10	19	19	19	19
May	38.05	22.45	96.00	42.5	60.00	70.31	20	11	18	19	19	19
June	36.50	23.00	99.00	60.0	132.95	73.61	20	12	18	18	19	19
July	34.15	25.30	98.00	65.5	137.25	81.16	20	8	13	14	16	16
Aug.	34.85	25.25	99.00	63.5	76.90	82.66	20	9	14	14	15	15
Sept.	35.90	23.85	98.00	59.5	117.25	76.33	20	7	13	14	14	14
Oct.	35.00	20.85	99.00	54.5	66.40	70.33	20	7	11	13	14	14
Nov.	31.60	18.02	93.00	51.5	0.00	68.23	20	6	6	5	5	3
Dec.	26.63	14.65	94.90	59.9	0.00	66.47	20	1	2	1	1	1