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RESEARCH NOTE

Impact of weather parameters on incidence of chrysomelid beetles (*Zygogramma bicolorata* Pallister) in gajar-ghas (*Parthenium hysterophorus* Linn.)

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SUMMARY : Field survey experiments was conducted during 2008-09 and 2010 years in different areas of Agra region to study the impact of weather parameters on incidence of chrysomelid beetles (*Zygogramma bicolorata* Pallister) in gajar- ghas (*Parthenium hysterophorus* Linn.) growing areas. The incidence observed to start in March months but the maximum incidence (87.27%, 87.09% and 76.19) was recorded in August months of 2008 and 09 and September month of 2010 which was highly positive significant correlation with temperature (max. and min.) and rainfall (mm) while it was positive non-significant correlation with relative humidity (max. and min.) but no incidence recorded in December and January months due to cold and foggy weathers.

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Key **W**ords **:**
Zygogramma bicolorata, *Parthenium hysterophorus*, Weather parameters, Correlation, Regression equation

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Chrysomelid beetles is a natural biological controlling agent of gajar- ghas (*Parthenium hysterophorus* Linn.), is widely distributed in India. It causes health hazards in livestock and also poses a human health problem causing fever, skin problem and nasobrochial allergy *viz.*, asthma,rhimitis or asthma with rhimitis formed the longest groups of patient (Shaikh and Shaikh 2008, Cheney 1998, Jayanth and Bali 1993, Visalakshy *et al*., 1998, David 1998). Besides other hazards and polluting the ecosystem. It mostly to notice with prolific plant growth height of 4.5' in Agra region especially on roadside, railway track sides and along with drainage channels. The chrysomelid beetles observed to reducing weed density biologically under moderate weather condition of this region. Therefore the present investigation was under taken to find out correlation between abiotic factors and incidence.

EXPERIMENTAL METHODOLOGY

Different areas of Agra region were surveyed throughout years for three consecutive years (2008, 2009 and 2010) to record % incidence by chrysomelid beetles in randomly selected areas of gajar-ghas growing plants.The data was taken week wise and pooled on monthly basis. Simple correlation and regression was adopted to obtain direct and indirect effects of different weather parameters on % incidence.

EXPERIMENTAL FINDINGS AND DISCUSSION

During 2008 year, the incidence (19.35%) by chrysomelid beetles started in March and maximum incidence (87.27%) was observed in August months. The average monthly temperature (max. and min.), relative humidity (max. and min.) and rainfall (mm) have been recorded 30.86°C and 22.50°C, 52.8% and 38.92% and 10.60 mm

Table 1 : Simple correlation matrix of Chrysomelid beetle incidence with weather parameters in gajar-ghas

Years	Max. Temp. (^{0}C)	Min. Temp. (^{0}C)	Max. R.H. (%)	Min. R.H. (%)	Rainfall (mm)
2008	0.756**	0.839***	0.068	0.060	0.623*
2009	0.875***	0.906***	0.211	0.344	0.783***
2010	0.828***	0.864**	-0.098	-0.230	0.046*

*, ** and *** indicates significance of values at P=0.05, 0.01 and 0.1, respectively

during March while it was 34.4°C and 30.80°C, 87.19% and 66.21 % and 420 mm during August month.

The incidence was observed to start March months of 2009 and10. The incidence was observed maximum (87.09% and 76.19%) in August months. The average temperature (max. and min.), relative humidity (max. and min.) and rainfall(mm) during August, 2009 was recorded 36.18° C and 32.16°C, 72.19% and 60.29% and 1738 mm, while it was recorded 34.18°C and 30.54°C ,85.38% and 66,61% and 61.34mm during August, 2010. Dhiman and Bhargava (2005) reported maximum incidence (90%) in August months.

Correlation and regression of chrysomelid beetle incidence with weather parameters :

Chrysomelid beetle incidence showed highly positive significant correlation with temperature (max. and min.) and rainfall (mm) but positive non-significant correlation with relative humidity (max. and min.) in 2008 and 09 and negative non-significant correlation with relative humidity (max. and min.) in 2010.

Chrysomelid beetle incidence increased at rate of 2.17% 2.43% and 0.07% with 1°C increase in temperature (max.) during 2008, 2009 and 2010, respectively and 2.4%, 2.89% and 2.33% with 1°C increase in temperature (min.) but incidence decreased at rate of 0.30%, 0.28% and 0.09% with 1% relative humidity(max.) increases and 0.03%, 0.44% and 0.22% with 1% relative humidity increase in respective years. The % incidence increased at rate of 0.07%, 0.05% and 0.02% with 1 mm increases in rainfall.

Weather parameters *viz.*, temperature (max. and min.), relative humidity (max. and min.) and rainfall (mm) exhibited positive association with beetle incidence while negative with relative humidity (max. and min.) during year of 2009 only.

Table 2 : Simple regression equation between Chrysomelid beetle incidence and weather parameters

Years	Weather parameters (independent variables)	Regression equation
2008	Min. Temp. (X1)	Y=27.10 + 2.17 X1
	Min. Temp. (X2)	Y=–22.28 + 2.4 X2
	R.H. (Mix.) (X3)	Y=38.88 – 0.03 X3
	R.H. (Min.) (X4)	Y=38.88 – 0.03 X4
	Rainfall (mm) (X5)	Y=22.69 + 0.07 X5
2009	Min. Temp. (X1)	Y=-32.67+2.43 X1
	Min. Temp. (X2)	Y=-32.13+2.89 X2
	R.H. (Mix.) (X3)	Y=55.85-0.28 X3
	R.H. (Min.) (X4)	Y=60.39-0.44 X4
	Rainfall (mm) (X5)	Y=18.42+0.05 X5
2010	Min. Temp. (X1)	Y=34.29+0.07 X1
	Min. Temp. (X2)	Y=-21.82+2.33 X2
	R.H. (Mix.) (X3)	Y=42.41-0.09 X4
	R.H. (Min.) (X4)	Y=47.06-0.22 X4
	Rainfall (mm) (X5)	Y=35.68+0.02 X5

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