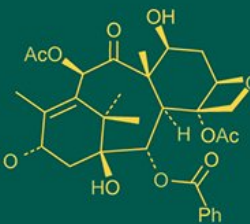
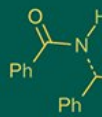
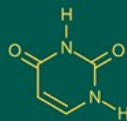
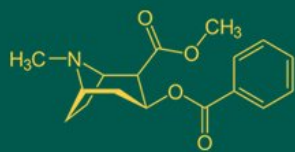


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Incidence of jassid population on soybean and their correlation with weather parameters

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Abstract

An experimental trial was conducted at field of entomology, college of agriculture RVSKVV, Gwalior, M.P. The result revealed that during *Kharif* 2024 and 2025, jassid population observed from 30th standard meteorological week (SMW). Activity of jassid population reached the peak at 36th SMW during the cropping season 2024 and 2025. According to the correlation studies, incidence of jassid was found significant and positive correlation with maximum temperature during both the years and in the year 2025 jassid population was found significant positive impact with, minimum temperature, morning relative humidity and evening relative humidity.

Keywords: Correlation, Jassid, population, significant, standard meteorological week

Introduction

Soybean (*Glycine max* L.) is a wonder crop of twentieth century. Native of soybean is in Asia and the first known records, indicated that it was a domesticated crop in China since the 11th century (Hymowitz, 1970) [4]. It is referred to as the "miracle bean" or the "golden bean" since it is one of the most affordable and beneficial sources of protein, vitamins, minerals, salts and other components in the world (Nannaware *et al.*, 2018) [7]. Soybean is the world's first rank crop as a source of vegetable oil. About more than 150 insect pests have been reported on soybean crop in various parts of Madhya Pradesh. Out of which about a dozen of insect pests cause serious damage to the crop from sowing to the harvest (Singh and Singh, 1992) [12]. Among them, girdle beetle, *Obereopsis brevis* (Swedenbord); stem fly, *Melanagromyza sojae* (Zehntner); tobacco caterpillar, *Spodoptera litura* (Fab.); green semilooper, *Chrysodeixis acuta* (Walker); white fly, *Bemisia tabaci* (Gennadius) and jassid, *Empoasca kerri* (Pruthi) are the major pests in Madhya Pradesh as well as Bundelkhand region. *Spodoptera litura* (Fab.), *Chrysodeixis acuta* (Walker) and *Helicoverpa armigera* (Hubner) are feeding on foliage, flower and pods causing significant yield loss in India. Jassid (Figure 1 and 2) is major sap feeder insect of soybean (Meena *et al.*, 2017) [6].

Material and Methods

Soybean variety JS 20-29 was sown in a plot size of 10.35×9m² with spacing of 45 cm×10 cm. Normal agronomical practices were followed for raising the crop except application of the insecticide.

The population of jassid was recorded at weekly interval in a compact plot under insecticide free condition.

Observation on jassid population was recorded on three leaves (upper, middle, and lower) on randomly selected ten plants.

Statistical analysis

Correlation and regression of the abiotic factors on jassid population was worked out by using the formula as suggested by Snedecor and Cochran (1967) [13].

Analysis of data

Correlation and regression studies

Correlation and regression of the abiotic factors on jassid population was worked out by using the formula as suggested by Snedecor and Cochran (1967) [13].

$$\text{Correlation 'r'} = \frac{\sum XY - \frac{\sum X \cdot \sum Y}{n}}{\sqrt{\left\{ \sum X^2 - \frac{(\sum X)^2}{n} \right\} \left\{ \sum Y^2 - \frac{(\sum Y)^2}{n} \right\}}}$$

Where,

X = Mean of first factor

Y = Mean of second factor

n = Total no. of observations

r = Correlation coefficient

Regression $\hat{Y} = a + bx$ (R^2)

a = Intercept

b = Regression coefficient

R^2 = Coefficient of multiple determination

Test of significance 't'

$$t = \frac{r}{\sqrt{1-r^2}} \sqrt{N-2}$$

Results

Seasonal incidence of jassid on soybean

The obtained data recorded on seasonal incidence of jassid on soybean during *Kharif* season 2024 and 2025 are presented in table 1 while depicted in figure 3.

Jassid, *Empoasca kerri* (Pruthi)

Kharif 2024

Jassid population observed from 30th SMW (23rd-29th July) with 2.00/3 leaves and its peak was observed at 36th SMW (3rd-9th September) i.e., 5.90/3 leaves when minimum and maximum temperatures were 37.6 °C and 25.8 °C respectively, morning and evening relative humidity was 83.1% and 70.6% and rainfall was 3.2 mm. Afterwards, jassid population declined and reached the minimum population of 1.70/3 leaves in the 43rd SMW (22nd-28th October).

Kharif 2025

Activity of jassid population recorded from 30th SMW (23rd-29th July) with 2.20/3 leaves and reached the peak at 36th SMW (3rd-9th September) i.e., 5.40/3 leaves when minimum and maximum temperatures were 33.7 °C and 25.2 °C respectively, morning and evening relative humidity was 88.3% and 65.0% and rainfall was 32.0 mm. Afterwards, jassid population declined and reached the minimum population of 1.60/3 leaves in the 43rd SMW (22nd-28th October). Effect of weather parameters on whitefly of soybean

Effect of weather parameters on jassid of soybean

Jassid, *Empoasca kerri* (Pruthi)

Kharif 2024

According to the correlation studies, (table 2) incidence of jassid was found significant and positive correlation with maximum temperature ($r = 0.61$).

The regression equation being as:

$$y = -9.67 + 0.40x$$

Above equation, may be expressed that with every unit increase in maximum temperature, there was an increase of 0.40 jassid population (figure 4).

While, the minimum temperature ($r = 0.40$), morning relative humidity ($r = 0.38$), evening relative humidity ($r = 0.40$) and rainfall ($r = 0.45$) had non-significant positive correlation on the jassid population.

Kharif 2025

According to the correlation studies, (table 2) jassid population was found significant positive impact with maximum temperature ($r = 0.53$), minimum temperature ($r = 0.61$) morning relative humidity ($r = 0.62$) and evening relative humidity ($r = 0.58$).

The regression equations being as:

$$y_1 = -8.89 + 0.36x, y_2 = -1.41 + 0.21x, y_3 = -11.75 + 0.18x \text{ and } y_4 = -0.37 + 0.07x \text{ respectively}$$

Where,

y_1 = Maximum temperature

y_2 = Minimum temperature

y_3 = Morning relative humidity

y_4 = Evening relative humidity

From the above equations, it may be expressed that with every unit increase in maximum and minimum temperature, morning and evening relative humidity, there was an increase of 0.36, 0.21, 0.18 and 0.07 jassid population respectively (figure 5 and 8).

However, rainfall ($r = -0.29$) found non-significant negative correlation with jassid population.

Discussion

Seasonal incidence of jassid

Jassid, *Empoasca kerri* (Pruthi)

During the cropping season 2024 and 2025, jassid population observed from 30th SMW with 2.00/3 leaves and 2.20/3 leaves respectively. Similar finding is also observed by Tomar and Bhargawa (2018) [15] reported that the incidence of jassid started in last week of July. Present findings are fully in agreement with the Parmar *et al.* (2023) [9] who concluded that the incidence of jassid population started in soybean crop at last week of July.

Activity of jassid population reached the peak at 36th SMW i.e., 5.90/3 leaves and 5.40/3 during the cropping season 2024 and 2025 respectively. Present finding is similar to that of Tomar and Bhargawa (2018) [15] who reported that the pest marked its peak population during 36th SMW. The present study is fully in agreement with the Chaudhari *et al.* (2020) [2] who reported that the peak of jassid population touched during the month of September.

Effect of weather parameters on jassid

According to the correlation studies, incidence of jassid was found significant and positive correlation with maximum temperature during both the years (2024 and 2025). Similar finding is observed with Bhavasar and Kumar (2019) [11] revealed that the incidence of jassid shown significant positive correlation with maximum temperature. According to the Panwar *et al.* (2021) [8] jassid population shown significant positive correlation with maximum temperature. While, during *Kharif 2024* the minimum temperature, morning relative humidity, evening relative humidity and rainfall had non-significant positive correlation on the jassid population. However, rainfall found non-significant negative correlation with jassid population during *Kharif 2025*. Sapekar *et al.* (2020b) [11] observed that rainfall, morning and evening relative humidity was found positively non-significant with jassid population. The present finding was similar with the finding of Lodha *et al.* (2025) [5] who

observed that the jassid population was negatively non-significant with rainfall while positive non-significant with minimum temperature and morning relative humidity. In the year 2025 the jassid population was found significant positive impact with, minimum temperature, morning relative humidity and evening relative humidity. Sutaria *et al.* (2010)

^[14] who observed that the minimum temperature, morning and evening relative humidity was positively correlated with jassid population. According to Sable *et al.* (2018) ^[10] jassid population shown positive significant correlation with morning and evening relative humidity.

Table 1: Incidence of jassid during *Kharif* 2024 and 2025

SMW	During <i>Kharif</i> 2024	During <i>Kharif</i> 2025
	No. of jassid/3 leaves	No. of jassid/3 leaves
30	2.00	2.20
31	2.60	3.00
32	3.20	3.20
33	3.90	3.90
34	4.20	4.00
35	5.00	4.70
36	5.90	5.40
37	5.30	4.90
38	4.70	4.40
39	4.20	3.80
40	3.60	3.20
41	3.20	3.00
42	2.40	2.00
43	1.70	1.60

Table 2: Correlation (*r*) of abiotic factors on jassid population during *Kharif* 2024 and 2025

Weather parameter	During <i>Kharif</i> 2024	During <i>Kharif</i> 2025
	No. of jassid/3 leaves	No. of jassid/3 leaves
Maximum temperature	0.61*	0.53*
Minimum temperature	0.40	0.61*
Morning relative humidity	0.38	0.62*
Evening relative humidity	0.40	0.58*
Rainfall	0.45	-0.29

* Significant at 5% level



Fig 1: Jassid (nymph)



Fig 2: Jassid (adult)



Fig 3: Seasonal incidence of jassid population during *Kharif* 2024 and 2025

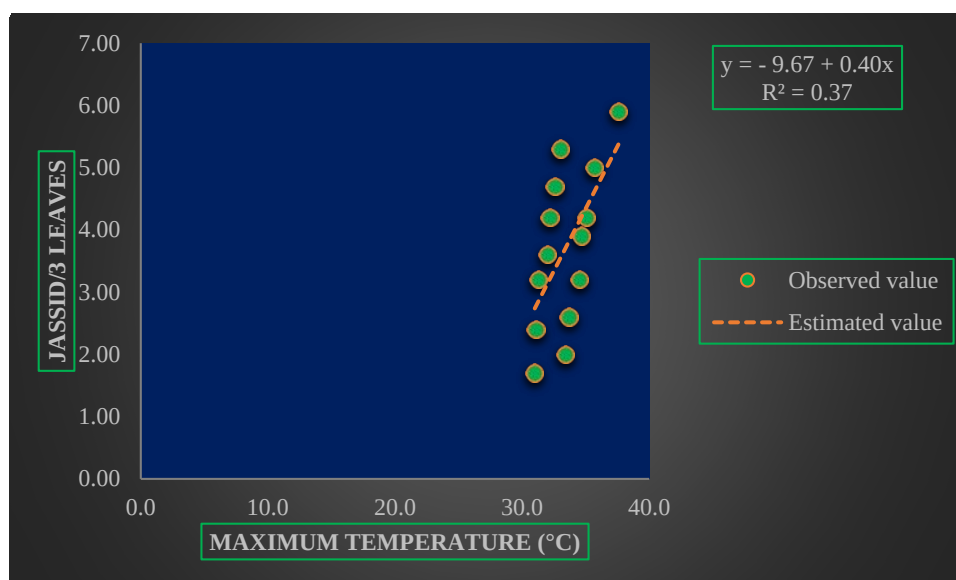


Fig 4: Regression between jassid population and maximum temperature (°C) during *Kharif* 2024

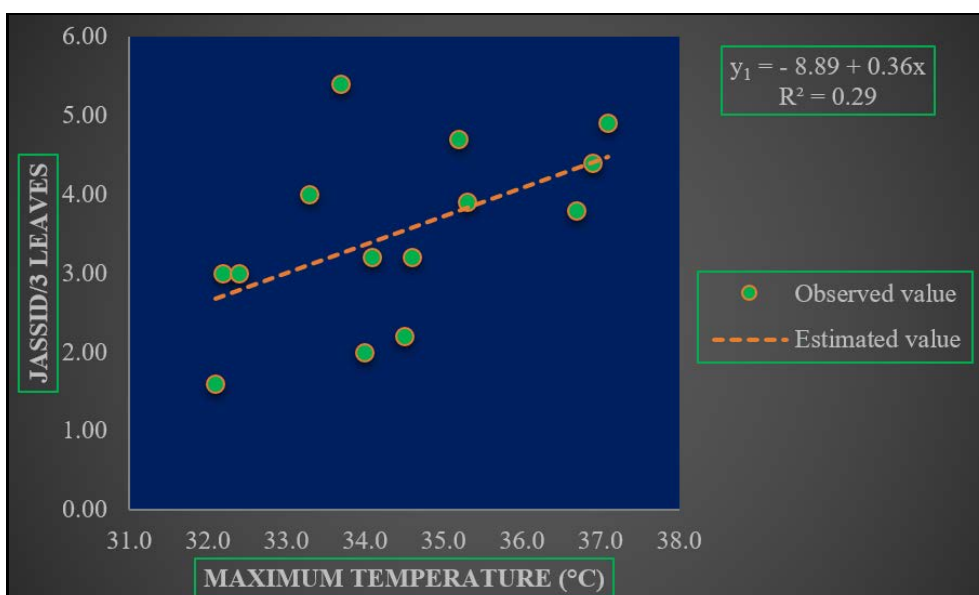


Fig 5: Regression between jassid population and maximum temperature (°C) during *Kharif* 2025

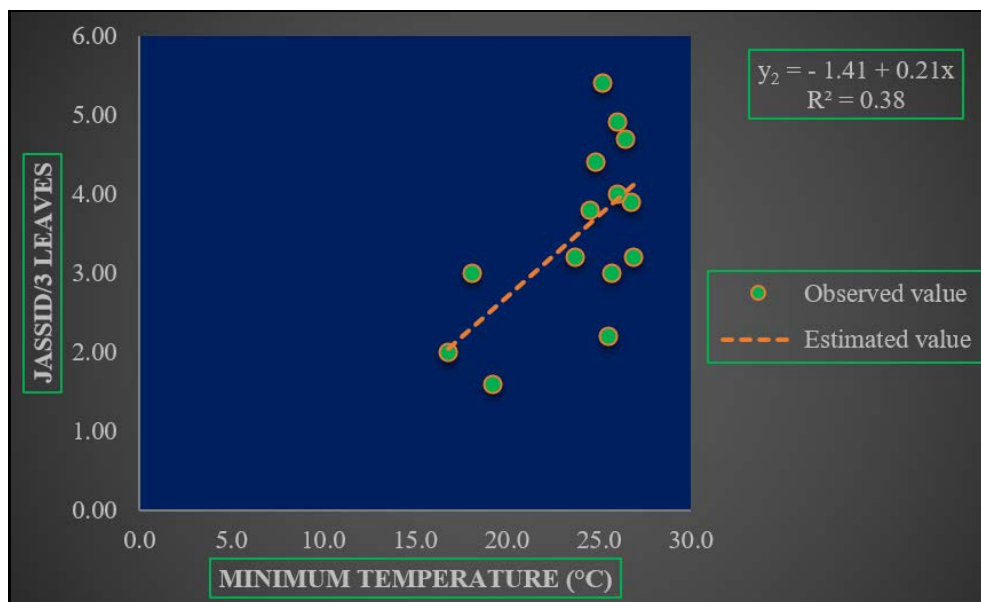


Fig 6: Regression between jassid population and minimum temperature (°C) during *Kharif* 2025

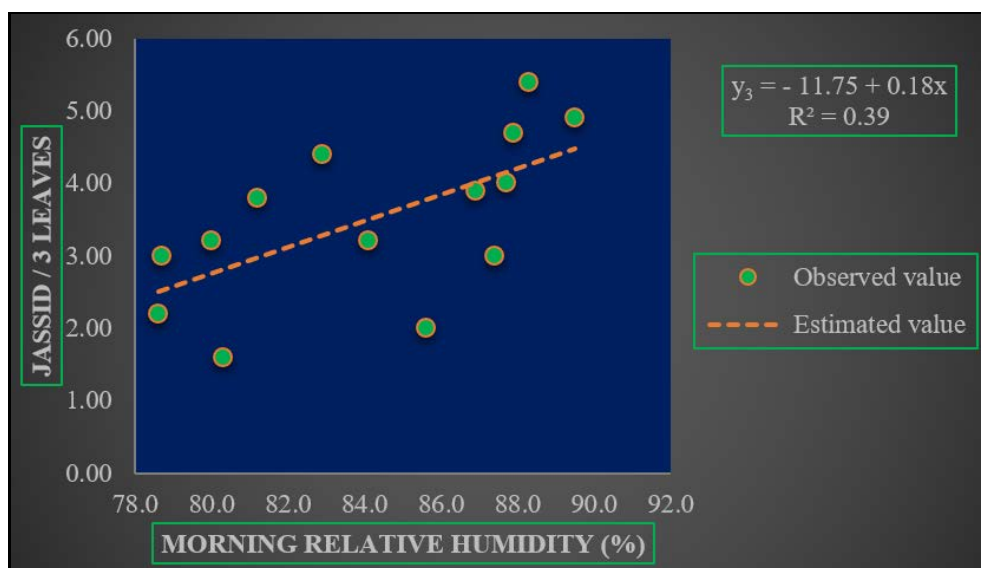


Fig 7: Regression between jassid population and morning relative humidity (%) during *Kharif* 2025

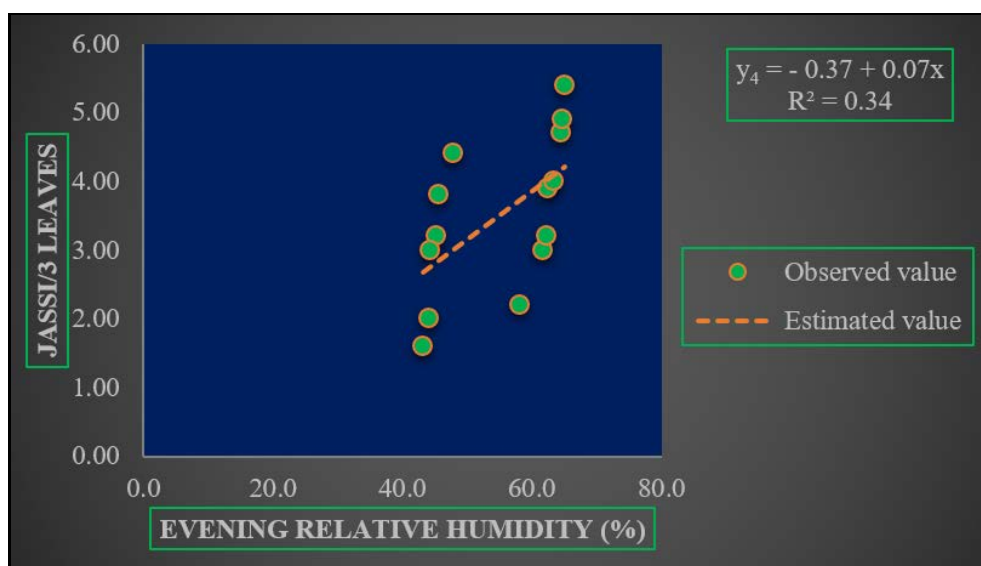


Fig 8: Regression between jassid population and evening relative humidity (%) during *Kharif* 2025

Conclusion

During the cropping season 2024 and 2025, jassid population observed from 30th SMW. Activity of jassid population reached the peak at 36th SMW during the cropping season 2024 and 2025. According to the correlation studies, incidence of jassid was found significant and positive correlation with maximum temperature during both the years (2024 and 2025) and in the year 2025 jassid population was found significant positive impact with minimum temperature, morning relative humidity and evening relative humidity.

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