

## Occurrence of *Beauveria bassiana* (Bals.) Vuill. on the Redgram Podborer *Heliothis armigera* Hub.

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Redgram (*Cajanus cajan* L.) is subjected to the attack of various insect pests. The most serious insect pest is *Heliothis armigera* Hub., whose attack persists from vegetative upto pod formation stages. Being a polyphagous pest, it causes devastating losses in several other field crops like sunflower, fieldbean and bengalgram. Recent research on the management of this pest is concentrated on the biological control using entomopathogenic microbes, which finds a major role in the IPM.

Earlier workers like Atger (1970) reported that field-collected samples of *H.*

*armigera* attacking cotton were infected by *Beauveria* species, along with other entomopathogens. McCoy (1974) studied the virulence of *Beauveria bassiana* (Bals.) Vuill. collected from field populations of *H. armigera* and suggested evaluating its adaptability in the IPM schedule.

Surveys were conducted at the Gandhi Krishi Vignana Kendra (G.K.V.K.) campus of the University of Agricultural Sciences, Bangalore during kharif 1989, on *Cajanus cajan* (var : TDB-7) for the incidence of the fungus *B. bassiana* on the larvae of *H. armigera*. *H. armigera*-infested fields were

**Table 1. Incidence of *B. bassiana* on redgram podborer *H. armigera***

Date	No. of larvae examined per 100 plants	No. of larvae infected	Per cent larval infection	Mean Min. Temp (°C)	Mean Max. Temp (°C)	Mean Rainfall (mm)	Mean R.H. (%)
II wk. Aug. 89	73	9	12.32	17.9	26.9	0.23	74.5
III wk. Aug. 89	89	13	14.61	18.0	26.4	9.56	79.8
IV wk. Aug. 89	96	10	10.42	18.4	28.3	7.24	69.7
I wk. Sep. 89	108	12	11.12	18.1	29.8	6.13	83.0
II wk. Sep. 89	93	16	17.20	17.6	27.2	23.45	86.6
III wk. Sep. 89	125	17	13.60	18.7	26.1	18.36	76.3
IV wk. Sep. 89	116	15	12.93	19.1	25.4	8.37	71.6
I wk. Oct. 89	109	12	11.01	16.9	26.2	8.22	66.3
II wk. Oct. 89	142	10	7.04	17.4	27.7	0.32	62.4
III wk. Oct. 89	131	11	8.40	17.2	28.1	0.89	61.7
IV wk. Oct. 89	148	9	6.08	16.9	29.5	1.10	58.3
I wk. Nov. 89	152	15	9.86	16.4	28.8	6.45	75.6
II wk. Nov. 89	117	12	10.25	16.3	27.6	6.05	73.4
III wk. Nov. 89	105	8	7.61	16.1	26.2	0.72	59.9

randomly sampled once in 7 days from an area of 8000 M<sup>2</sup> during August to November, 1989. During each observation, 100 plants with larval infestation were observed. The larvae infected by *B. bassiana* were identified by the white powdery growth, which was easily dislodged by tapping, and by the hardened cuticle. Apparently-healthy larvae were also maintained on U.V. light-sterilised redgram pods, under ambient weather conditions in autoclaved glass vials for confirming the latent infection of *B. bassiana*, if any, till the next observation. Larval infection by NPV or protozoa (*Vairimorpha* spp.) was not considered for the study.

The observations revealed that infection percentage ranged from a minimum of 6.08 (IV wk. of Oct. 1989) to a maximum of 17.20 (II wk. of Sep. 1989). The correlation coefficients worked out between fungal infection percentage and weather parameters of the week prior to sampling, indicated that relative humidity had a high correlation ( $r = 0.7338$ ;  $p = 0.05$ ) with incidence of *B. bassiana* on larvae of *H. armigera*. The RH recorded during the highest per cent infection (17.20) was 86.60% in the II<sup>nd</sup> week of Sep. 1989, while it was 58.30% during the IV<sup>th</sup> week of Oct. 1989, with a lowest larval infection (6.08). Similarly, rainfall also exerted a positive correlation ( $r = 0.4422$ ;  $p = 0.05$ ) with the highest fungal infection (17.20) occurring during II<sup>nd</sup> week of Sep. 1989, when a maximum rainfall of 86.60 mm was recorded, whereas, the lowest fungal infection (6.08) occurred during IV<sup>th</sup> week of Oct. 1989, with a comparatively low rainfall of 1.10 mm, the lowest rainfall of 0.32 mm occurring during II<sup>nd</sup> week of Oct. 1989 registering a low fungal infection (7.04%).

The mean maximum temperature had a negative correlation ( $r = -0.5147$ ;  $p = 0.05$ ) with the fungal infection. The highest mean maximum temperature of 29.8°C during I<sup>st</sup> week of Sep. 1989 coincided with 11.12% infection of *B. bassiana* and the lowest mean maximum temperature of 25.4°C during IV<sup>th</sup>

week of Sep. 1989 led to a higher infection rate of 12.93%.

The positive correlations between RH / rainfall with the rate of fungal infection indicates that fungal survival and spread are assured under higher rainfall and relative humidity conditions, however negative correlations between temperature and *B. bassiana* infection is due to the fact that spores of *B. bassiana* have a lower rate of survival under high temperature regimes, which conforms to the findings of Walstead *et al.* (1970). Dresner (1949) and Muller Kogler and Zimmerman (1980) worked on the effect of RH on spore germination of *B. bassiana* and found that the spore germination increased with an increase in the relative humidity at a constant rate. The above findings lend support to the observations of the present study. The occurrence of *B. bassiana* on *H. armigera* infesting redgram indicates the possibility of utilizing the fungus for the management of this pest.

KEY WORDS : *Heliothis armigera*  
*Beauveria bassiana*, redgram

#### REFERENCES

- ATGER, P. 1970. Note sur les microorganismes entomopathogenes des ravageurs du Cotonnier utilises on par. *Coton et Fibres Tropicales*, 25, 521-524.
- DRESNER, E. 1949. Culture and use of entomopathogenic fungi for control of insect pests. *Contr. Boyce Thompson Institute*, 15, 319-355.
- Mc COY, C.W. 1974. Fungal pathogens and their use in microbial control of insects and mites. In "Proc. Summer Institute on Biological control of plant insects and diseases," Mississippi University, pp. 564-574.
- MULLER-KOGLER, E. and ZIMMERMAN, G. 1980. On the storage of cultures of entomopathogenic fungi. *Entomophaga*, 25, 301.
- WALSTEAD, J.D., ANDERSON, R.F. and STAMBAUGH, W. 1970. Effects of environmental condition on two species of muscardine fungi. *J. Invert. Pathol.*, 16, 221-226.