A NOTE ON THE EFFECT OF METEOROLOGICAL FACTORS ON THE INCIDENCE AND DEVELOPMENT OF STEMBORER IN WINTER PADDY CROP AT BHUBANESWAR

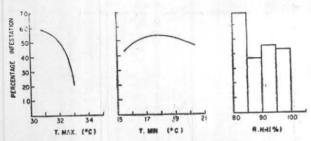
The forewarning of stemborer attack on paddy crop may be possible by the knowledge of correlation existing between the infestation and various meteorological factors. In view of this an attempt has been made to investigate the correlation from the past entomological data collected for winter paddy crop at agricultural station Bhubaneswar (20°15′N, 85°52′E) alongwith meteorological data recorded at that time in the nearby meteorological observatory. The details about the techniques for recording entomological observations are given in Agricultural Meteorology Technical circular Nos. 50 and 51 issued by Director of Agricultural Meteorology, Meteorological Office, Pune. Generally

TABLE 1

Correlation co-efficient of various meteorological parameters

Met. para- meters	standard week No.	correlation coefficient	't' values	level of significance
Tmin	45	-0.60212	2.72	2
Tmax	39	-0.72524	3.18	ĩ
RH-I	47	-0.63471	2.96	1
RH-II	41	0.50679	2.12	5
SSH	52	0.53408	2.28	5
RFL	40	0.55136	2.38	5
EVPN	30	0.68683	2.50	2

the maximum period of the crop is from July to December. So the weekly meteorological data from the std. week Nos. 26 to 52 are collected for 15 years from 1966 to 1980.



Figs. 1 (a-c). Variation of percentage (%) infestation of stem-borer in winter paddy crop with (a) maximum temp (T^{ma_x}) , (b) minimum temprature (T_{min}) & (c) morning relative humidity (RH-I)

- 2. The monthly qualitative pests data in the categories light, moderate and heavy were also collected for the same period. Each category represents the ratio of paddy plants infested with stemborer to the total No. of plants in the sampling unit. The categories light, moderate and heavy indicate infestations of 25, 50 & 75 per cent respectively.
- 3. The average percentage infestation in a particular year was worked out on the basis of monthly infestation data as done by Dubey et al. (1985). The weekly average values of minimum temperature (Tmin), maximum temperature (Tmax), morning relative humidity (RH-I) evening relative humidity (RH-II), bright sunshine hrs (SSH) and evaporation (EVPN) were correlated with the percentage infestation of stemborer on paddy crop of that year using simple linear regression technique. The correlation coefficients (CC) of all meteorological parameters were calculated for every standard week from 26 to 52 falling in full crop life. The students 't' test was applied to find the statistical significance of CC values. The standard weeks having highest CC statistically significant upto 5% level were selected for each parameter and shown in Table 1. Evaporation data were available only for nine years where as other parameter data were available for 15 years. So all the parameters T_{\min} , T_{\max} , RH-I, SSH & RFL except EVPN were combined together to calculate regression equation by using multiple-linear regression technique. The regression equation was obtained as

$$Y = 330.6631 - 4.55 X_1 - 2.9575 X_2 - 25.928 X_3 - 1.066 X_4 + 17.998 X_5 + 0.268 X_6$$

where,

 X_1 = Weekly mean of T_{\min} for 45th std. week X_2 = ,, , T_{\max} ,, 39th ,, ,, X_3 = ,, RH-I ,, 47th ,, ,,

$$X_4 =$$
 ,, ,, RH-II ,, 41st std. week $X_5 =$,, ,, SSH ,, 52nd ,, ,, $X_6 =$,, total RFL ,, 40th ,, ,,

The multiple correlation is 0.917764 which accounts for 84.3 per cent of total variation in percentage incidence.

4. The average percentage infestation for different temperature and relative humidity values were calculated from the data of 1966 to 1980 and depicted in Figs. 1 (a - c) by curves for $T_{\rm max}$ and $T_{\rm min}$ and by histogram for RH-I.

Other parameters could not show clearcut optimum values. The infestation was reduced at T_{max} higher than 33°C in 39th standard week (24-30 Sep) and highest infestation was found for T_{min} of 17-18°C in 45th standard week (5-11 Nov). The favourable morning relative humidity was found to be 80-85% in 47th std. week, i.e., middle of November.

- 5. The temperature <30° C and relative humidity >60% at Aduthurai were also found by earlier workers to be favourable for more infestation (Kazi et al. 1983). It shows that the temperature and relative humidities are not differing much with place of infestation. The only similarity in these two places is that both are near the coast. The similar studies are necessary for some interior places also to confirm the result before using the results for issuing forewarnings.
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