Rs. 191.71, Rs. 88.97 and 571.36 per hectare for the first, second and fifth experiments respectively, while the maximum net profits of Rs. 363.06 and Rs. 682.42 per hectare are obtained in the case of Imidan and Parathion for the third and fourth experiments respectively. Parathion 0.05% and Endrin 0.04% as brood emergence sprays have not only reduced the stem borer incidence considerably but also recorded more grain yields resulting in increased net profits per hectare. Israel (1966) and Pathak (1966) have advocated brood emergence sprays for better stem borer control. The present investigations also indicate that effective control of the rice stem borer is possible by the correct time of application of Parathion 0.05% or Endrin 0.04% coinciding with the brood emergence, at two rounds of spray for each brood, limiting the application to two efiective broods per season rather than giving three rounds of prophylactic treatment, first round in the nursery followed by two rounds in the main field. However, it is felt that a few more trials are necessary to confirm the results.

**Acknowledgement:** The authors are thankful to Thiru. A. Subramaniam, Crop Specialist, Regional Research Station, Aduthurai, for the facilities and encouragement given in the conduct of the experiments.

## REFERENCES

Israel, P. 1966. The present state of rice research in India - Pests. *Indian Fmg.*, **16**: 26.

Pathak, M. D. 1966. New methods of pest control. *Indian Fmg.*, **16**: 37.

Sengupta, G. C. and G. A. Roup. 1957. Control of rice stem borer with Endrin. *J. Econ-Entomol.*, **50**: 221.

---

https://doi.org/10.29321/MAJ.10.A03592

# Weather and the Incidence of Stem-borer (*Chilo zonellus*, S) in Co. 12 Irrigated Summer *Cholam* at Coimbatore

*by*

M. V. JAYARAMAN[1] and R. JANAKIRAMAN[2]

**Introduction:** The incidence of pests and diseases is closely knit with the prevailing weather conditions. With a view to understand the nature of such influence, experiments were started in 1954, in the four irrigated crops of *cholam*, *ragi*, cotton and groundnut raised at the Central Farm, Coimbatore. From the date of sowing to the date of harvest, micro-climatic observations were recorded amidst the crops both morning and evening at stipulated hours and also weekly observations on pests in collaboration with the Entomologist, Coimbatore. The data so collected for fourteen years from 1954 to 1967 in CO.12 irrigated *cholam* raised as a summer crop at Coimbatore were examined with particular reference to stem borer, *Chilo zonellus*, *S.*, which is a major pest of *jowar*, maize and sugarcane and also at

1. Agricultural Meteorologist, 2. Assistant in Meteorology, Agricultural College and Research Institute, Coimbatore-3.

times *bajra* and rice (Trehan and Butani, 1949), together with the macro-climatic observations recorded at Agricultural Meteorological Observatory, Agricultural College and Research Institute, Coimbatore.

**Materials and Methods**: i) The weekly population counts of the pest on *cholam* CO.12 were recorded for the years from 1954 to 1967.

ii) The weekly means of the following macro-climatic weather elements recorded at the observatory were computed for the week ending the incidence and also for one week and two weeks respectively previous to this week.

a. Maximum temperature

b. Minimum temperature

c. Relative humidity (both morning and evening)

d. Wind velocity at the heights of 2′, 4′, 8′ and 10′ from the ground.

e. Duration of bright sun-shine (in hours)

f. Weekly total rainfall

iii) Weekly means of the following micro-climatic factors recorded amidst the crop were also computed for the actual week of incidence ending the observations as well as one week and two weeks before the actual week of incidence.

a) Dry-bulb temperature at the heights of 1′, 2′, 4′ and 8′ from the soil (both morning and evening at 08-02 hours and 15-02 hours).

b) Relative humidity at the heights noted in para (a) above.

iv) Correlations were worked out between the borer population and the weather elements mentioned in para (ii) and (iii) above. The data are presented in the Table.

**Results and Discussion**: i) An examination of the correlations presented in the table reveals that of the macro-climatic factors, minimum temperature, after-noon relative humidity, wind velocity at heights of 2′ and 4′ above the ground and rainfall exert a significantly positive influence on the stem-borer population.

ii) A high minimum temperature and rainfall appear to give an impetus to the virulence, though not sustaining as seen from the non-significant nature of the correlations in the previous week and two weeks previous to the week ending the week of incidence. But a rise in the afternoon relative humidity, as well as wind velocity at 2′ and 4′ height appear to account for the increased activity of the pest not only in the week of actual incidence, but also in the week and two weeks respectively following such increase in these elements.

TABLE. *Relationship between weather factors and stem-borer population on Co. 12 irrigated summer cholam*

| Weather element | Week of incidence | | | One week prior to incidence | | | Two weeks prior to incidence | | |
|---|---|---|---|---|---|---|---|---|---|
| | r | Mean | CI | r | Mean | CI | r | Mean | CI |
| *Macro-climatic factors.* | | | | | | | | | |
| Maximum temperature °C | —0.068 | 93.50 | — | —0.121 | — | — | —0 229 | — | — |
| Minimum temperature °C | 0 232* | 21.30 | ±1.28 | —0.117 | — | — | ±0.208 | — | — |
| Forenoon relative humidity | 0.069 | — | — | 0.022 | — | — | —0.0003 | — | — |
| Afternoon relative humidity | 0.288* | 47.50 | ±3.00 | 0.375** | 45.90 | ±2.20 | 0 398** | 43.20 | ±2.00 |
| Wind velocity at 2′ above ground in mls/hr | 0.474** | 2.08 | ±0.22 | 0.289** | 1.97 | ±0.20 | 0 322** | 1.87 | ±0.14 |
| ,, 4′ ,, | 0.237* | 2.40 | ±0.26 | 0.258 | 2.23 | ±0.24 | 0.346** | 2 13 | ±0.18 |
| ,, 8′ ,, | 0.141 | — | — | 0.127 | — | — | 0.197 | — | — |
| ,, 10′ ,, | 0 042 | — | — | 0.232 | — | — | 0.228 | — | — |
| Duration of hours of bright sunshine | —0.185 | — | — | —0 027 | — | — | —0 054 | — | — |
| Total rainfall in mm | 0.238* | 11 70 | ±4.00 | —0.139 | — | — | 0 001 | — | — |
| *Micro-climatic factors* | | | | | | | | | |
| Morning dry bulb temperature within the crop at 1′ above ground | 0.042 | — | — | 0.207 | — | — | 0.238* | 27.1 | ±0.16 |
| ,, 2′ ,, | 0.123 | — | — | 0.184 | — | — | 0.203 | — | — |
| ,, 4′ ,, | 0.414** | 27.2 | ±0.26 | 0.208 | — | — | 0.222 | — | — |
| ,, 8′ ,, | 0.564** | 27.1 | ±0.24 | 0.255* | 26.9 | ±0.24 | 0.261* | 26.8 | ±0.26 |
| Evening dry bulb temperature within the crop | Not significant | | | | | | | | |
| Morning relative humidity within the crop | Not significant | | | | | | | | |
| Evening relative humidity within the crop at ,, 1′ above ground | 0.053 | — | — | 0.210 | — | — | 0.303** | 51.2 | ±2.40 |
| ,, 2′ ,, | 0.071 | — | — | 0.210 | — | — | 0.241* | 49.8 | ±2.60 |
| ,, 4′ ,, | 0.083 | — | — | 0.105 | — | — | 0.335** | 47.7 | ±2.60 |
| ,, 8′ ,, | 0.054 | — | — | 0.189 | — | — | 0.238* | 46.7 | ±2.40 |

*N. B.* Means and confidence interval given only for significant relationships

r = Correlation co-efficient  * Significant at 5% level  ** Significant at 1% level

iii) With regard to the micro-climatic factors both evening dry bulb temperature and morning relative humidity appear not to influence the incidence. But an increase in the morning dry-bulb temperature at 1′ height above soil was associated with the incidence of the pest three weeks hence.

iv) The dry bulb morning temperature at 4′ height appeared to have only a temporary effect on the pest population as seen from the significant correlation of the pest population with the temperature recorded in the week ending the incidence.

v) The dry bulb morning temperature at 8′ height seemed to have a sustained effect, as could be inferred from the significant nature of the pest population with each of the three weeks' dry-bulb temperature *i. e.*, the week ending the pest observation, the week previous and two weeks previous respectively to the ending the pest observation.

vi) The afternoon relative humidity within the crop at all heights appeared to exert a slow but sure positive influence on the incidence, as could be judged from the significant correlation existing between this element and the pest population recorded three weeks later. This led to the inference that a certain minimum dampness in the atmosphere in the hot summer afternoons was indispensible for successful incubation and development of the pest in the various stages of development. This is supported by the experiments of Trehan and Butani (1940) under laboratory conditions where water had to be kept under the insect cage to keep them alive.

**Summary**: i) Both macro and micro-climatic factors appear to have their share in the incidence and development of the *cholam* stem-borer in Co. 12 summer *cholam*.

ii) A rise in the minimum temperature (usually the night temperature) coupled with rainfall appear to give an immediate but short-lived aggravation to the incidence.

iii) In the initial stages of crop growth an increase in dry-bulb temperature within the crop at about 1 foot height appears to be associated with the appearance of the pest within about 2 weeks. In the later stages an increase of the crop temperature at about 4′ height is correlated with an immediate spurt in the population count while the increase of the temperature near about 8′ height where the final leaves and tender nodes will be available had a longer effect of about two weeks increasing the virulence.

iv) Increase in the dampness of air within the crop in the evenings for about a week was closely associated with the increased virulence of the pest, noticable after about three weeks.

v) Cloudiness at nights and afternoons presisting for two or three days, indirectly influences the minimum temperature and the relative humidity status of the atmosphere and thereby the activity of the stem-borer.

vi) Advancing the sowing time of the crop from March end to January end or February beginning, might help the crop to escape the weather conditions favourable for the incidence and development of the pest and thereby help better crop returns.

**Acknowledgement**: The authors are thankful to the Government Entomologist, Coimbatore and his staff and those connected with the collection of the data made use of in the study.

**REFERENCES**

Anon. 1940. *Hand book of Economics Entomology for South India.* (pp. 508) Govt. Press Madras.

Trehan, K. N. and Dhamo T. Butani. 1949. Notes on the Life history, binomics and control of *Chilo zonellus* Swin-hoe, in Bombay province. *Indian J. Ent. 9.*, 47—59.

# The Incidence of Jassids on Cotton in Relation to Micro and Macro-climatic factors

*by*

M. V. JAYARAMAN[1] and R. JANAKIRAMAN[2]

**Introduction**: The jassid, *Empoasca devastans* Dist., came into prominence during the beginnig of this century, along with the introduction of American varieties of cotton in this country. The failure of 3F cotton in the Punjab in 1913 - 14 was attributed mainly to the attack of this species of jassids (Husain 1940). In addition to cotton, this pest survives on a variety of host plants. However, the incidence and intensity of attack of this pest on cotton is found to vary from year to year and this is attributed to seasonal conditions. The influence of weather factors on the incidence of pests on cotton was studied by the Agricultural Meteorology wing of the Agricultural College and Research Institute, Coimbatore from 1954 in collaboration with the Entomologist. The results of the analysis of the incidence of jassids on cotton in relation to rainfall, temperature and other environmental factors are presented in this paper.

**Materials and Methods**: Cotton MCU 1. was raised in Central Farm, Coimbatore in an area of 25 cents under irrigated conditions from September to March every year from 1954 onwards. Micro-climatic observations were

1. Agricultural Meteorologist and 2. Assistant in Meteorology, Agricultural College and Research Institute, Coimbatore-3,