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.

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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.

taken amidst the crop daily from surface to 4' height at 08-25 and 15-25 hrs. from sowing to final harvest with Assmann Psychrometer. The crop was precluded from any prophylactic or control measures so that the pests infesting the crops under natural environmental conditions are not hampered. Weekly observations on the population of jassids (adults and nymphs) present on the topmost two fully opened leaves were taken on plants selected at random. The population of jassids recorded for 12 years from 1954-1955 to 1965-1966 were pooled together and correlations with the macro-climatic data collected amidst the crop were worked out. The weather elements considered for the study are (i) maximum and minimum temperature (ii) duration of bright sunshine (iii) wind-velocity at 4' height (iv) relative humidity at 07-22 hrs. and (v) rainfall. The dry-bulb temperature and relative-humidity recorded at 1', 2' and 4' heights at 08-25 hrs. are the micro-climatic factors taken into account. The data thus considered involve 250 weeks observations. As the weather conditions favourable during egg-laying may cause an increase in the nymphs and adults during later weeks, the weather data even upto four weeks prior to the date of pest counts were taken into account for the correlation studies. The correlation co-efficients are presented in the Table.

TABLE. *Correlation coefficients between weather factors and jassid population in MCU 1. irrigated cotton. Weeks before the population counts*

Weather element	IVth Week (22-28 days)	IIIrd Week (15-21 days)	IInd Week (8-14 days	Ist Week (Upto 7 days)
Macro-climatic factors				
Maximum temperature	−0.132	−0.152	−0.201*	−0.353***
Minimum temperature	−0.088	−0.164	−0.062	+0.009
Hours of bright sunshine	−0.094	−0.104	−0.156	−0.402***
Wind velocity at 4' height	−0.089	−0.101	−0.119	−0.124
Relative humidity	+0.114	+0.338***	+0.355***	+0.873***
Rainfall	+0 005	+0 008	+0 014	+0.027
Micro-climatic factors				
Dry bulb temperature	−0.107	−0.176	−0.236*	−0.287**
Relative humidity	+0 132	+0.212*	+0.212*	+0.249*

*Sig. at 5% ;** Sig. at 10% and ***Sig. at 0.1% (n=250)

Results and Discussion : Among the macro-climatic factors, maximum temperature during the week ending the day of observation has a negative significant correlation with the population indicating thereby that higher temperature is detrimental to the activity of jassids. As maximum temperature is generally associated with the duration of bright sunshine in each week, the correlation between sunshine and jassid population was also found to be

significantly negative, thus confirming the previous finding. It can therefore be concluded that clear sky with bright sunshine and maximum temperature are not conducive for the activity of jassids. The maximum temperature during the previous week (8 to 14 days before observation) also shows a significant negative correlation with the jassid population, but to a lesser degree. It gives room to guess that higher maximum temperature may exercise a check over the population of jassids. Minimum temperature, wind velocity and rainfall may also influence the population, but none of the correlations upto four weeks is significant, probably because of combining all the years and weeks to work out a single correlation in this study. Relative humidity, on the other hand, exercises by far the most potent influence on the population, as the correlations even upto third week (15-21 days, prior to the date of observation) has a positive influence on the population of jassids, as may be seen in the table. The coefficient of correlation between relative humidity during the week ending the date of observation and population is very high showing thereby that the activity of the jassids is favoured by this factor. Solan (1938) has observed that excessive rains accompanied by long periods of dull showery weather tend to promote sappy growth in the plants which is attractive to jassids.

Ananthanarayanan and Abraham (1956) also have observed that the cloudy, humid and drizzling weather, usually prevalent in September in Thanjavur district appear to favour the multiplication of paddy jassid *Nephotettix bipunctatus*, while heavy rains and bright sunshine are not congenial to them.

As high humidity is associated with continuous cloudy and drizzling weather, the observations made by the above authors lent support to the finding that high relative humidity is favourable for the incidence of jassids. The results are also in conformity with the findings of Jayaraj (1964) on *Empoasca* flavescens on castor

Among the micro-climatic factors, the dry-bulb temperature recorded near surface at 08-25 hrs. during the two weeks ending the date of observation bears negative significant correlations with the population of jasssids as in the case of maximum temperature. This shows clearly that high temperature is not conducive for the multiplication of this pest. On the other hand the relative humity recorded at surface amidst the crop for three consecutive weeks has significant correlation with the population. These values only confirm the earlier results that higher relative humidity of the atmosphere recorded at 07-22 hrs. are favourable for the multiplication of jassids.

The results also indicate that it is possible to forecast with fair decree of occuracy the incidence of jassids on cotton with the relative humidity

(macro-climate) of the atmosphere even 15 days in advance and confirm the same by taking the maximum temperature also a week hence. Husain and Lal (1940) have observed at Llayalpur eleven generation of *E. devastans* on cotton, the interval between successive generation varying from about 15 days in autumn to 46 days in December–January. They have also noted overlapping of successive generations. The average duration of 21 days for each generation seems to justify the correlation between the pest population and relative humidity prevailing 15-21 days prior to taking counts.

Summary: The data on the incidence of jassids on irrigated cotton MCU 1. collected for 12 years from 1954–1955 to 1965–1966 at Agricultural College and Research Institute, Coimbatore were correlated with the meteorological and micro-climatic factors. Among the meteorological factors studied, maximum temperature prevailing during the week as well as the previous week (8–14 days) ending, the data of pest counts shows significant negative correlation with the population of jassids indicating that higher maximum temperature is not favourable for the multiplication and activity of the jassid. But the correlations with the maximum temperature prevailing during the third and fourth weeks are not significant.

The duration of sunshine during the week ending the pest observation has also a significant negative correlation with the population showing that long hours of bright sunshine also is not favourable for this pest. The correlations for the previous weeks are not significant. Factors like mean minimum temperature, wind velocity and total rainfall do not indicate any significant correlations. An intensive study probably may throw some light on the influence of these factors on the jassid population.

On the other hand, the relative humidity recorded at 07–22 hrs. during the first three weeks ending the date of pest counts, has highly significant positive correlations with the population of jassids. The correlation is particularly very high ($r = + 0.873$) for the first week, indicating that high humidity of the atmosphere is conducive for the activity of the jassids.

Among the micro-climatic factors, the dry bulb temperature recorded at surface at 08–25 hrs. during the first two weeks and relative humidity for the first three weeks have significant correlations with the population confirming the earlier findings.

As high relative humidity is associated with cloudy and drizzling conditions the farmers can be forewarned to take prophylactic measures against the onset and multiplication of jassids on cotton.

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Insecticidal Control Trials Against the Oriental Fruitfly, *Dacus dorsalis* Hendel on Mango in Tamil Nadu

by

P. C. SUNDARA BABU,[1] PL. LAKSHMANAN,[2] S. M. ULAGARAJ,[3] T. SANTHANARAMAN[4]

Introduction : Among the various insects affecting mango, the oriental fruitfly, *Dacus dorsalis* H., is a serious pest. The fly makes a dark puncture during oviposition and the maggots that hatch out from the eggs feed on the pulp of the fruit for a few days and thus cause a brown rotten patch on the fruit surface. The fruits eventually fall and the maggots come out of the fruits to pupate in the soil. Their attack not only reduces the yield but also affects the quality of fruits. Ayyar (1940) recommended plant sanitation in orchards by destruction of fallen and badly infested fruits as the most important measure against the fruitfly. Giang *et al* (1956) reported that DDVP is very effective against the pest in Hawaii and its residues virtually disappear in 72 hours. Narayanan and Batra (1960) advocated spraying of diesel oil emulsion (diesel oil one gallon plus soft soap one pound plus water one gallon, diluted eight times) during the night and cooler hours of the morning when the flies congregate in large numbers.

Field trials were undertaken at the Model Orchard cum Nursery, Thimmapuram and the Fruit Research Station, Kanyakumari on *Neelum* and *Bangalora* varieties during 1964-67 with a view to evaluate the efficacy of

1 & 2 Entomology Assistants, 3. Post Graduate Student, IARI, New Delhi (Formerly Entomology Asst., and 4. Entomologist and Assoc. Prof. of Entomology, Agrl. College and Res. Institute, Coimbatore-3.