

STUDIES ON THE SEASONAL AND DIURNAL PERIODICITY OF *PYRICULARIA ORYZAE* Cav. Conidia IN THE AIR OVER RICE CROP*

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In nature different combinations of factors occur and at each combination the organism reacts in a particular manner. Some of these combinations may be favourable to the organism not only for the production of inoculum but also for successful infection and spread. It is increasingly clear that a knowledge of the effective disposal of a pathogen, in addition to information on other aspects of the disease, is essential for predicting the plant disease. Atmospheric spore content, the primary inoculum of the disease has got a direct bearing on the incidence of epidemics. In the present work, an attempt was made to assess quantitatively the load of *Pyricularia oryzae* conidia in the air over rice crop at Vellayani over a period of eight months using Hirst's spore trap (Hirst. 1952).

Materials and Methods

Three rice crops were raised in the garden land of Agricultural College Vellayani during the period of investigation. Four strains of paddy viz. ADT. 27 Taichung Native-1, I. R. 8 and Culture-28 were raised in the plots. The experimental area was divided into 2 blocks, leaving a strip of land two metres wide in between. Each block was subdivided into 4 plots, each plot with a net area of 5×1.5 square metres, to accommodate the 4 varieties. Hirst's spore trap was located in the centre of the blocks.

The spore trap was mounted with its orifice sufficiently above the ground level for assessing periodicity in rice blast conidia. All the plants which obstructed the free movement of the trap were removed. Ordinary microscopic slides of size 75 X 25 mm were used in the trap. They were first cleaned, dried and dipped in alcohol and flamed. A mixture of molten vasline and paraffin wax in the ratio of 9:1 was uniformly spread over 2/3 of the length (55 m.m.) on one side of a previously warmed slide to form a thin coating. The uncoated portion of the slide was used for labelling.

The slides were changed daily at 9 A. M. The slides were scanned at monthly intervals by the short traverse method of Hirst (1953). The spore counts were converted to a number per cubic metre of air. Based on the data available the concentrations of conidia for each month were calculated.

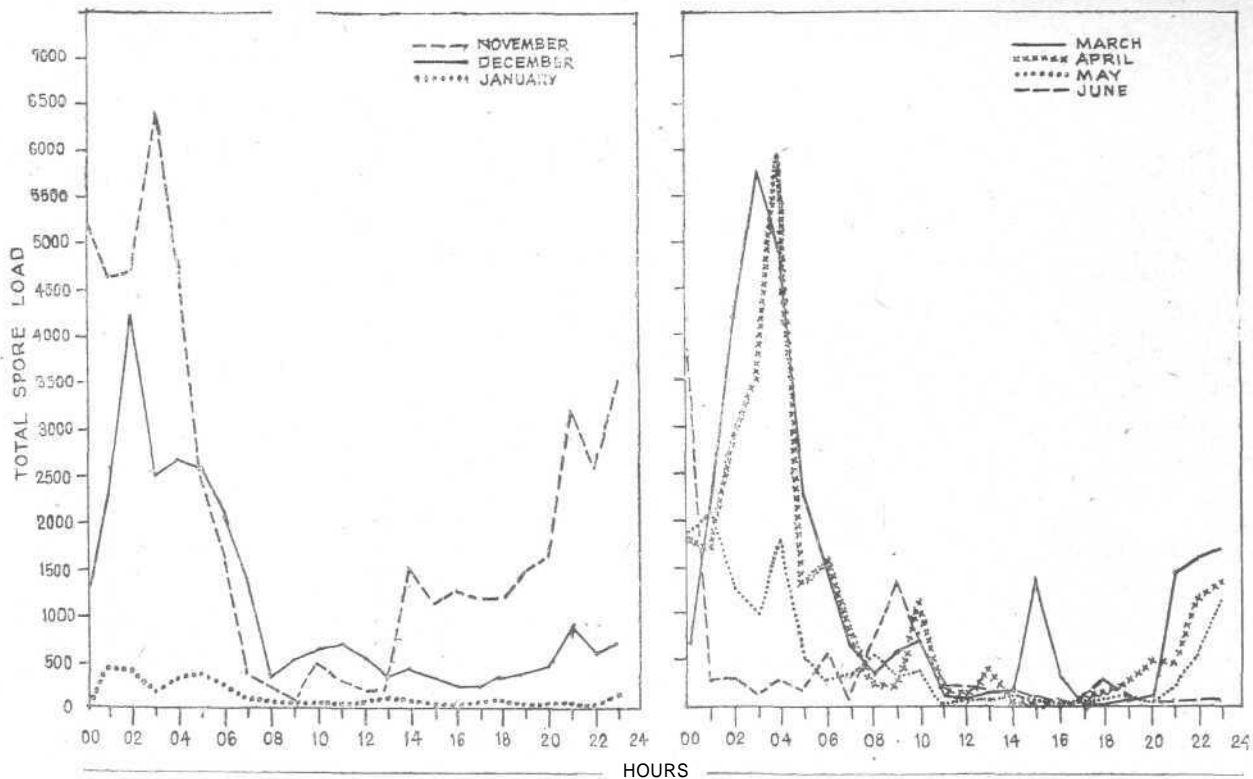
Results and Discussion

The maximum load of *Pyricularia oryzae* occurred during the 1st crop season (November - January) (Table 1). The average conidia load was 75.09 conidia per cubic metre of air. The average conidia concentrations for the succeeding two crops are 60.86 and 34.04 per cubic metre of air. The highest conidia concentration was noticed in November. The conidia trapped during this month works at the rate of 132.14 per cubic metre of air. During the succeeding months a slight decrease in conidia concentration was observed and in February no conidia could be trapped. A sudden increase in the concentration of conidia was noticed in March, the average load being 114.14 conidia per cubic metre of air. A decreasing trend was observed till May and a substantial increase in June,

Table 1

Total monthly conidia concentrations *Pyricularia oryzae* over the rice crop

Months	No. of days with blast conidia catches	Monthly mean concentration No/m ³
<i>I Crop</i>		
November	26	132.1
December	21	85.8
January	25	6.5
Total for the season	—	75.0
<i>II Crop</i>		
February	20	—
March	15	141.1
April	16	87.0
Total for the season	—	60.8
<i>III Crop</i>		
May	24	29.9
June	5	49.6
Total for the season	—	34.0



PYRICULARIA ORYZAE — TOTAL SPORE LOAD CALCULATED ON HOURLY BASIS FOR EACH MONTH
 NOVEMBER 1968 - JUNE 1969

Fig.1

The peak conidia concentration of *Pyricularia* occurred during night hours in all seasons (Fig 1). During day hours the concentration was low. The conidia concentration at night during November between 18.00 hours works out at the rate of 5719.86 conidia per cubic metre of air. The conidia concentration during day time in November between 06.00 and 18.00 hours works out at the rate of 1155.5 conidia per cubic metre of air. A similar trend was noticed in all the subsequent months. Thus a definite periodicity in the liberation of conidia was exhibited by *Pyricularia oryzae*.

Seasonal and diurnal periodicity in conidia liberation was observed in the case of *Pyricularia oryzae*. The conidia load was highest during November and December. High humidity and low temperature prevailed for longer periods during night hours during these months and these might have favourably influenced the production and liberation of the conidia of *Pyricularia*. The seasonal maxima coincided with the maximum vegetative period of the rice plant during which it is most susceptible to blast.

Ramalingam (1966) recorded seasonal periodicity pattern for the air borne conidia of *P. oryzae*. The conidia of *Pyricularia* showed always a night maxima, the peak load usually occurring between 01.00 to 05.00 hours. This position remained unchanged during the entire period of study. A definite nocturnal pattern of conidia liberation was noticed in the case of *Pyricularia* by earlier workers like Panzer *et al* (1957) and Ramalingam (1966). The fall in temperature and the rise in humidity in early forenoon hours have favourably influenced the production and dispersal of conidia of this fungus. It was observed by Ingold (1964) that the spores of *P. oryzae* can be set free easily if air is saturated or nearly so.

Summary

Air spore over rice crop was studied during three seasons using Hirst's spore trap. A definite pattern of seasonal and diurnal periodicity of occurrence was noted in the case of *Pyricularia oryzae*. The conidia load of *Pyricularia oryzae* was highest during November and December while it was comparatively lower during other months. Conidia of *Pyricularia oryzae* showed a night maxima throughout the period of study, the highest load occurring around 01.00 to 05.00 hours.

സംഗ്രഹം

നെൽചെടികളുടെ ഉപരിതലവായുവിൽ കലന്ന കമിരൂ സ്പോറങ്ങുകളെക്കുറിച്ച് സ്പോർട്രാപ്പ് ഉപയോഗിച്ചുകൊണ്ട് വെള്ളയാണിയിൽ പാറങ്ങര നടത്തുകയുണ്ടായി.

പൈറീക്ലോറിഡ് ക്ലോറൈഡ് എന്ന കൃമിം കോണീഡിയകൾ ഏറ്റവും കൂടുതലായി കാണപ്പെട്ടത് നവംബർ - ഡിസംബർ മാസങ്ങളിലായിരുന്നു. മറ്റു മാസങ്ങളിൽ താരതമ്യേന അവയുടെ എണ്ണം കുറവായിരുന്നു. പഠനകാലത്ത് മുഴുവനും കോണീഡിയകൾ കൂടുതലായി കണ്ടത് രാത്രികാലങ്ങളിലായിരുന്നു. കോണീഡിയകൾ രാത്രി ഒരമ്പതിരുകൾ രാവിലെ 5 മണിവരെ കൂടുതലായി കണ്ടു.

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