

## PHYTOCLIMATE OF PADDY

A phytoclimate—the meteorological conditions produced amongst plants (grass stands, treetops etc.) - is a modified microclimate. A phytoclimate is controlled by the structure of the plant cover; that is to say, by plant height, the density of stand (the number of plants in a unit area of a field), the leaf surface area of the plants, the manner in which plants are distributed within a stand (a cluster stand, a row stand etc.), and by the width of the inter-row spaces (Chirkov, 1979). It is known that the weather is influenced by different crops and they establish their own climate at the same place due to the structure and eco-physiological growth characteristics of a plant. Crops like sugarcane, banana and tapioca cover the soil surface during their maximum growth and establish their own phytoclimate which may be different from another crop, like rice. A strong inversion with great stability of the air layers is developed during the day inside the sugarcane field in contrast to the turbulent or unstable conditions in the open (Anon. 1957). Rice unlike other crops is submerged during its growth period and establishes its own phytoclimate due to thermal characteristics of water within the crop. For understanding the phytoclimate of rice, the two different paddy varieties Ptb 4 and CC 1 (Chitteni Cochin 1) were selected and compared with the open climate.

The weekly field weather data of the two paddy varieties as well as the open during the mundakan season were collected from Ollukkara Agro-met Station, Mannuthy (Trichur) for the period 1960-61 to 1973-74. The mean values of air temperature, vapour pressure and relative humidity were computed for individual years during the growth period of paddy (transplantation to harvest) and in the open for comparison. The data are represented graphically in Fig 1.

It can be seen that the air temperature within the field in the two varieties of paddy is comparatively higher than in the open possibly due to thermal capacity of water inside the crop. It is also noted that the air temperature in CC 1 is comparatively more throughout the canopy than Ptb 4. It may be due to the fact that the growth density of CC 1 (number of tillers per plant and height of the plant) is less, so that it allows relatively more direct radiation to the surface levels than Ptb 4. The decrease in vapour pressure throughout the crop period indicates that water vapour flux is consistently upward within the canopy and more stable than in the open. It is concluded from this study that the vertical profile of air temperature, vapour pressure and relative humidity within the paddy also decreases with height as in the open. Moreover, the profile of phytoclimate of paddy differs from other crops especially sugarcane which shows inversion (temperature increase with height) in lower layers of the crop during its maximum growth phase. Hence, this type of study for individual crops may pinpoint a particular phytoclimate of each crop according to its local environment of a region which is responsible for crop growth and its development.

The author is thankful to the Professor of Agronomy, Department of Agro-meteorology, the Associate Dean, College of Horticulture and the Director of Research Kerala Agricultural University for providing facilities. The author is also grateful to Dr. M. Aravindakshan for his suggestions and encouragement. Thanks are also due to Dr. M. Achuthan Nair for writing the Malayalam summary.

സംഗ്രഹം

നെൽചെടികളുടെ ഇടകളിലെ വായുവിന്റെ ചൂടിനെപ്പറ്റി നടത്തിയ പഠനങ്ങളിൽ നിന്നും, സി സി 1 എന്ന ഇനത്തിൽപ്പെട്ട നെല്ലിൽ, പി റാി ബി4 എന്ന ഇനത്തിൽ ഉള്ളതിനെക്കാൾ ചൂട് ഉള്ളതായി കാണപ്പെട്ടു. അതോടൊപ്പം, ഈ രണ്ട് ഇനങ്ങളിലും വായുവിന്റെ ചൂട് പുറമെയുള്ള വായുവിനെക്കാൾ കൂടുതലായി കാണപ്പെട്ടു. CTmgJ^al^s^s^ലെ വായുവിന്റെ ചൂട്, വേപ്പർ പ്രഷർ, ആപേക്ഷിത ഹ്യൂമിഡിറ്റി എന്നിവ നെല്ലിനങ്ങളുടെ പൊക്കമനുസരിച്ച് പുറം വായുവിനെക്കാൾ കൂടുതലായിരുന്നു.

Regional Agricultural Research Station  
Pilicode 670 353, Kerala

G. S. L. H. V Prasada Rao

References

Anonymous, 1957. Agricultural Meteorology in India, *Meteorological Department (1932 - 57) - A review*, 1-32  
Chirkov, Y. [, 1979. Microclimate and phytoclimate. *Agrometeorology*, Springer-Verlag Berlin Heidelberg, New York, 136-141

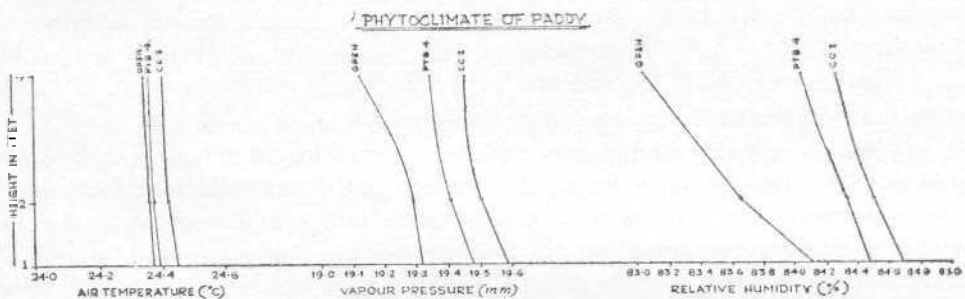


FIG-1. PHYTOCLIMATE OF PADDY PTB 4 & CCI DURING THE PERIOD  
1960-61 TO 1973-74 AT 7:25 AM, OLLUKKARA (TRICHUR)