Journal of Agrometeorology 5 (1) : 141-143 (June 2003)

Short Communication

Profiles of temperature and humidity within wheat (*Triticum aestivum L.*) canopy

ABDUS SATTAR*, R.P. TRIPATHI and H.S. KUSHWAHA

Department of Soil Science and Agrometeorology, G.B.P.U.A. T., Pantnagar - 263 145

Information on temperature and humidity within crop canopy can be helpful in effective disease and pest management. Keeping in view of potential significance of these meteorological parameters in wheat growth, the present study was undertaken to characterize the variability of temperature and humidity within wheat crop canopy.

A field experiment with wheat (*Triticum aestivum L.*) crop variety UP-2338, was conducted at Pantnagar (29°N, 79°30'E, elevation 243.8m). The crop was sown on 18th November 1998 in an east-west direction, well fertilized and irrigated. Dry and wet bulb temperatures were measured with the help of a set of thermocouple psychrometers installed at 0.15, 0.60 and 1.25 m heights above the soil surface on a wooden stand of 1.5 m height. One thermocouple junction was maintained wet through a wick which was dipped in a water reservoir containing distilled water 12 mm below the junction and the other was suspended vertically in the open to serve as wet and dry bulb respectively. A flask containing ice served as reference temperature. The emf produced was observed with the help of a DC micro-voltmeter which was then converted to temperature from calibration curve of emf with temperature.

Actual vapour pressure and relative humidity were calculated. Information on crop height and growth stages were recorded.

On February 25 when the crop was at milking stage, temperature profiles (Fig.1) showed an inversion up to 0.60 m height by 0930 hrs which continued till the afternoon (1530 hrs). Above this height normal lapse conditions prevailed. The shape of temperature curve became convex at 1530 hrs from an almost vertical (isothermal condition throughout the crop height) at 0730 hrs.

On April 1, the crop was at maturity stage. Fig. 1 shows that the day started with inversion upto 1.25 m height till 0930 hrs. A strong inversion could be seen prevailing upto 0.60 m height with lapse conditions above this, which continued till the afternoon hours. This may partly be atributed to transpirational cooling in the canopy.

In contrast to these, near isothermal profile was noticed throughout the crop height on a cloudy day when the crop was at flag leaf stage.

The humidity profiles for January 30, February 25 and April 1 reveal a sharp

*Present Address : Agromet Services, Dept. of Agronomy, R.A.U., Pusa - 848125 (Bihar)

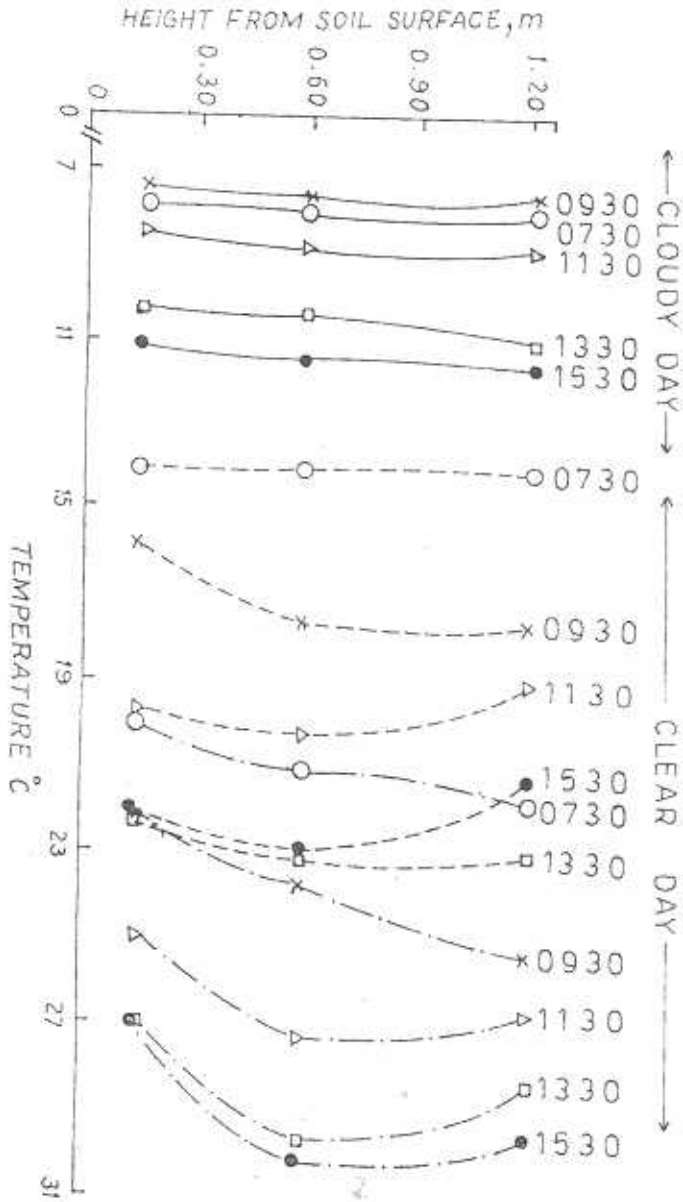

Fig. 1 : Profile of temperature within and over wheat canopy on a cloudy day (-30 Jan.) and on clear days (--- Feb. 25, --- April 1)

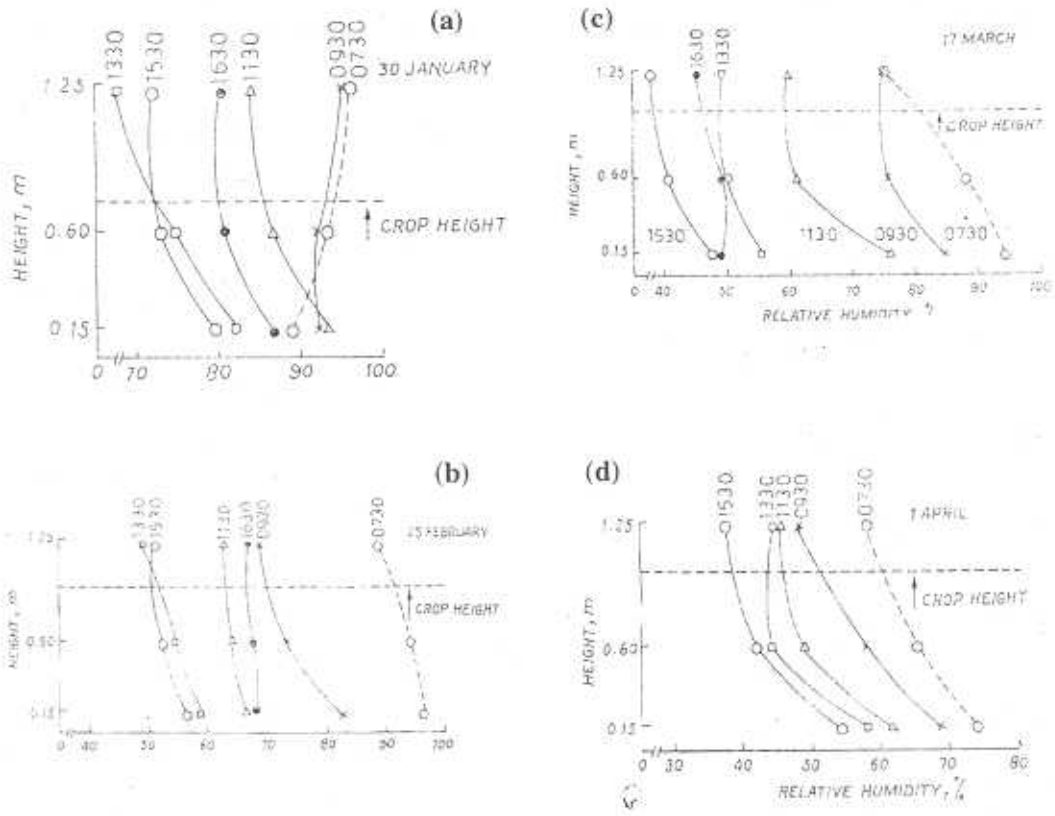

Fig. 2 : Profile of relative humidity on (a) 30 Jan., (b) 25 Feb., (c) 17 March & (d) 1 April within and over wheat canopy

decrease in relative humidity with height from the ground surface (Fig 2). A general decrease in humidity with height and time of the day towards the afternoon was observed.

An exception was observed on January 30 at 0730 and 0930 hrs, when humidity showed an increase with height. Prolonged wetting of the canopy due to fog and dew might have contributed increased humidity in the upper canopy region. Around March 17, when the crop was at dough stage, sharp decrease in humidity up to 0.60 m was observed, which showed more or less uniform humidity conditions above 0.60 m height.

The humidity profiles thus reflect the influence of corresponding temperature inversions on its distribution with height in the wheat crop conopy at different growth stages.

The first author is grateful to ICAR for awarding JRF for successful conduct of the experiment.