
RESEARCH PAPER

Stomatal conductance and stomatal resistance studies in relation to haulm yield in potato

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The experiment was laid out in *Rabi* season(2009-2010 and 2010-2011). IRGA instrument (LI-6400XT) was used for estimation different microclimatic parameters of the crop within the height of 2 mt. In general, during both seasons, there was a rapid increase in mean stomatal conductance from early growth stage to 56 days and thereafter it gradually decreased towards maturity of the crop. Highest mean values of stomatal conductance were recorded at 56 DAP interval as 0.38 and 0.52 mol. m⁻² s⁻¹ in 2009 and 2010, respectively. Further, there was also gradual increase in mean stomatal resistance from early growth stage towards maturity of the crop. Lowest mean values of stomatal resistance were recorded at 28 DAP interval as 4.21 and 3.28 mol. m⁻² s⁻¹ in 2009 and 2010, respectively. Increased stomatal conductance appeared to be the reason for the first peak whereas for the second peak non stomatal characters may be responsible. Stomatal resistance governs photosynthesis and transpiration. Decrease in soil moisture content increased stomatal resistance. High temperature was associated with decreased stomatal resistance. Stomatal resistance is affected by many factors including PAR, leaf age, air temperature and the CO₂ concentration. Analysis of the relationship between PAR, leaf age, air temperature and the CO₂ concentration at the various growth stages for the different treatments showed that 1.2 IW/CPE ratio and planting on 44th MW with mulching treatment proved to be superior to the other treatments. It is observed from the data that during both the years of experimentation, of haulm yield (q ha⁻¹), mulching produced significantly higher mean values of these haulm yield (q ha⁻¹) than without mulching. The haulm production which was reduced by the effect of water stress on stem growth and reduction in number of branches, as well as to a limited extent on the tubers themselves.

Key words : Stomatal conductance, Stomatal resistance, Haulm yield, Potato

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INTRODUCTION

The major potato growing countries in the world are China, Russian Federation, India, USA, Ukraine, Poland, Germany, Belarus, Netherlands, France, UK, Canada, Turkey and Romania. India ranks 4th in area and 3rd in production in the world. The total potato production in India is about 36.57 million tonnes from about 1.83 million ha with productivity of 19.98 t ha⁻¹ during 2009-2010. Potato is grown over the states under very diverse conditions. The plant leaves must remain turgid for leaf expansion, to keep stomata open for higher photosynthetic rate. In plant, leaves functions as an optical organs and spectral radiation properties are attuned to environment in which they live. The efficiency of absorption

of PAR partly determines the efficiency of photosynthesis of plant. The PAR is absorbed more efficiently and centering around 400-700 nm, determines the plant development. Among the main factors which affect the rapid establishment of the crop canopy are genotypes, planting date, planting density, temperature and the availability of water and nutrients in the soil. Potato is a weather sensitive crop influenced by environmental conditions. With this back ground in view, the present investigation was undertaken to know the relationship between stomatal conductance with haulm yield as affected by irrigation levels in potato.

RESEARCH METHODOLOGY

The experiment was laid out in Split Plot Design in *Rabi* season during 2009-2010 and 2010-2011 with recommended