MCC P19. Exploring combined effect of elevated CO_2 and temperature on *Fusarium* wilt development of chickpea

Sudharani Reddy[1,2], Avijit Tarafdar[1], Gangadhara Naik[2]and Mamta Sharma[1]

[1]International Crops Research Institute for the Semi-arid Tropics, Hyderabad, India,
[2]Department of Plant Pathology, UAHS, Shivamogga, India

Email: sudhar2883@gmail.com

Fusarium wilt (FW) caused by *Fusarium oxysporum* f. sp. *ciceris* (Foc) is one of the major diseases in chickpea. Under changing climatic scenario, elevated CO2 (eCO2) (550 and 700 ppm) and temperature (25°C, 30°C and 35°C) have potential impact on plant resistance mechanisms and pathogen virulence. Hence, the present study was aim to assess the impact of eCO2 and temperature on FW incidence and disease progression in two chickpea cultivars, JG 62 (susceptible) and WR 315 (resistant). Irrespective of temperature, the incubation period was delayed in eCO2 when compared to ambient. In case of combined effect, the maximum disease incidence was found in 30°C combined with 700 ppm as well as ambient CO2 conditions. To quantify the pathogen load and expression of several defence responsive genes in chickpea and virulence-related genes in Foc, qPCR study was employed. As compared to the eCO2, the expression of defence and virulence response genes in chickpea inoculated seedlings was highly up-regulated in ambient CO2 conditions irrespective of temperatures. The results suggested that among different defence-related genes studied, peroxidise gene was highly expressed in WR 315 cultivar, there by restricting the Foc colonization, by providing an evidence of efficient defense mechanism in the resistant cultivar. Moreover, in JG 62 the pathogenicity-causing secreted in xylem (SIX 14) gene was highly expressed as it mainly helps in colonization of Foc by defeating its defense in susceptible cultivar, which helps in providing more insights in understanding the compatible and incompatible interactions between chickpea and Foc