

Effects of Partial Rootzone and Controlled Deficit Irrigation on Growth, Yield and Peroxidase Activities of Tomatoes (*Lycopersicon esculentum* Mill.)

ABSTRACT

The aim of the experiment was to examine the application of partial rootzone drying and deficit irrigation on growth and plant development of tomatoes. Potted fresh market tomatoes (*Lycopersicon esculentum* Mill.) in pots were subjected to partial root zone drying (PRD) and controlled deficit irrigation (CDI) under glasshouse conditions. Roots of plants were remained attached to plants and half the volume divided in one plant and the other half planted in the other adjacent pot. The treatments were: well-watered continually maintained close to field capacity in both pots (control), CDI50 (half the amount of water in control divided equally to both pots with each watering), PRD50 (half the amount of water in control applied to one pot while water was withheld from the other pot until soil water declined to 50-70% the field capacity and then water was applied to the other pot), PRD25 (half the amount of water in control was applied to one pot while water was withheld from the other pots until soil moisture declined to 25-50% field capacity and then water was applied to the other pot) and CDI25 (quarter amount of water in control divided equally to both pots with each watering). Imposing water deficit reduced fruit yield up to 18% in PRD50 and 33% in CDI50 which coincided with an impairment of fruit expansion. The percentage of fruit dry matter and osmotic potential increased in both PRD and CDI compared with the control. The incidence of blossom end rot increased in both CDI and PRD25 compared with the control and PRD50 treatments. Cell wall peroxidase in the epidermal layer of fruit may have a role in cessation of fruit expansion towards fruit maturity under reduced water availability.

Keyword: Partial Root drying, Deficit Irrigation, Expansion, Yield, Peroxidase