

EFFECT OF WATER DEFICIT STRESS ON SELECTED AGRONOMIC,  
PHYSIOLOGICAL AND BIOCHEMICAL CHARACTERISTICS OF CHILLI  
(*Capsicum annum* L. Var. "Arunalu") WHICH DETERMINE THE YIELD

By

SIVAGURU MAHENDRAN

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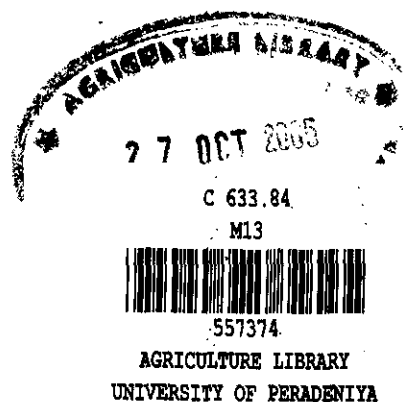
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## ABSTRACT

Studies were conducted in the field and the green house to evaluate the effects of soil moisture stress on the agronomic, physiological and biochemical characteristics of chilli plants var. 'Arunalu'. Two moisture stress cycles, each of 15 days duration were imposed as the treatments at different growth stages. A re-watering every 5<sup>th</sup> day for a period of 15 days in between the stress cycles was practiced. The first stress cycle was imposed during the vegetative, flowering, pod setting, podding and pod maturing stages of the plant.

In the agronomic parameters, moisture stress reduced the leaf area index, root length density and pod dry weights of chilli plants. It increased the stomatal resistance but, reduced the net photosynthetic rate, transpiration rate, leaf water potential and relative water content of chilli plants in the physiological parameters. In the biochemical parameters, moisture stress reduced the leaf and pod chlorophyll contents of chilli plants. There was no significant difference in the  $\beta$ -carotene content of chilli fruits between the stressed and the control chilli plants.

Except the stomatal resistance, leaf and pod chlorophyll contents of chilli plants, the agronomic, physiological and biochemical parameters were partially recovered either on the 5<sup>th</sup> day or on the 10<sup>th</sup> day after withholding the stress. The plants did not manifest the acclimatization effects with respect to agronomic, physiological and biochemical characteristics despite the experience of the first stress cycle. These

effects were simply the outcome of the damages caused to the biological system of these plants during the course of stress.

The relationship between different physiological parameters for the stressed, control and re-watered plants was also assessed on the 10<sup>th</sup> day and 15<sup>th</sup> day from the commencement of the stress during the vegetative and podding stages of the plant. The relationship was found either positive or negative between the characteristics. The chilli plants showed stress avoidance and stress tolerance characteristics under well-watered and water stressed situations respectively.

Moisture stress during the vegetative stage showed the highest yield reduction compared to the other growth stages. This observation suggests that prolonged and gradual stress at the seedling stage suppressed the growth and yield more significantly than brief and rapid stress at the mature stages. After the removal of the stress, the shortage of photosynthetic sources might not have allowed for the rapid recovery of the vegetative parts. The highest correlation was found between the transpiration rate and yield in the field and the green house. This indicates that yield reduction is mostly attributed to reduced transpiration rate.