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Elucidation of Physiological Behavior of Stomata under Drought in Cotton Leaves

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ABSTRACT: Stomata are formed by modified leaf epidermal cells called Guard cells, they receive environmental signals and regulate the movement of stomata. Different exogenous environmental factors like carbon dioxide, light, water and endogenous plant hormones also regulate stomatal movement and development. Stomatal regulation and its density play an important role in balancing plant water and carbon dioxide levels. Elevated carbon dioxide, seasonal variations and abiotic stress are very severe factors that affect stomatal behavior. Cotton (*Gossypium hirsutum*) is an oilseed and fiber crop, grown in more than seventy countries worldwide and plays an important role in the global economy. Thus understanding of stomatal response of cotton leaf towards different environmental stimuli and endogenous factor is of critical importance. In an attempt to have a better understanding of difference in stomatal density and its connection with physiological responses of stomata we studied the stomata and the gas- exchange parameters in different seasons and under drought stress in different varieties of cotton. This study shows how stomatal density of different cotton varieties changes in different seasons and water deficient condition and their relationship with leaf gas exchange parameters. Our results revealed that stomatal density of different varieties and between the same varieties varies in response to different seasons. Under drought condition, all varieties also show variation in stomatal density, accompanied by distinctions in rate of stomatal conductance, photosynthesis, transpiration and water use efficiency.

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