

1300 Overexpression of ascorbate peroxidase confers drought tolerance in transgenic germplasms of cotton

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Oxidative stress is one of the major factors causing injury to plants exposed to environmental stress. Ascorbate peroxidase (APX, EC 1.11.1.11) is the key enzyme in scavenging H_2O_2 , one of the major reactive oxygen intermediates produced in chloroplasts, mitochondria and peroxisomes. Transgenic cotton plants with an enhanced tolerance to drought stress were developed by overexpressing the gene of APX under the control of CAMV35S promoter. The transgenic plants had higher total APX activity than non-transgenic (NT) plants as analyzed by enzyme kinetics and native polyacrylamide gel electrophoresis. The transgenic plants also exhibit a novel 27.5 kDa polypeptide which is not detected in NT plants. These transgenic plants were evaluated for drought induced oxidative damage in whole plants. The overexpression of APX in transgenic plants led to increased protection under drought stress, without visible symptoms of leaf wilting under pot culture, whereas in NT plants wilting started after 7 d of drought induction and the wilting became more prominent within 14 d of drought. These studies reveal an efficient way to enhance drought tolerance in cotton.