

1535 Expression of an Arabidopsis vacuolar H⁺-pyrophosphatase gene (*AVP1*) in cotton to increase tolerance to drought and salt stresses

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The Arabidopsis gene *AVP1* encodes a vacuolar pyrophosphatase that functions as a proton pump on vacuolar membrane. Overexpression of *AVP1* could increase proton electrochemical gradient in vacuole, thereby activating vacuolar membrane-antiporters including Na⁺/H⁺ antiporter, which helps in sequestration of Na⁺ into the vacuole. In addition, overexpression of *AVP1* increases auxin transport and enhances auxin mediated root development, consequently achieving higher water absorption and retention capacities. We have generated *AVP1*-expressing cotton plants and tested their performance. Under 200 mM NaCl, *AVP1*-expressing cotton plants performed better than wild type plants and the increased salt tolerance is positively correlated with the *AVP1* transcript. Under periodic drought stress treatment, *AVP1*-expressing plants are significantly more tolerant than wild type plants. Furthermore, our small scale greenhouse experiments showed that *AVP1*-expressing plants produced bigger bolls than wild type cotton under drought conditions, which suggests a great potential of this approach in increasing cotton fiber's yield in the semi-arid land of America's Southwest. Most recent data on the performance of the *AVP1*-expressing cotton plants under stress conditions will be presented at the meeting.