

TRANSGENIC COTTON LINES OVER-EXPRESSING DELTA-12 FATTY ACID DESATURASE (FAD2-4) EXHIBIT IMPROVED SEEDLING VIGOR UNDER COOL TEMPERATURES**John L Snider****University of Georgia****Tifton, GA****Kent Chapman****University of North Texas****Denton, TX****Viktor Tishchenko****University of Georgia****Griffin, GA****Shanmukh Salimath****University of North Texas****Denton, TX****Abstract**

Chilling sensitive species, like cotton, tend to have poor membrane fluidity at low temperatures, resulting in a number of negative physiological consequences. Membrane fluidity and tolerance to cool, early season temperatures could potentially be improved in cotton if fatty acids were less saturated during the seedling stage. Consequently, the objective of the current study was to assess the response of seedling vigor three weeks after planting under cool (20/15C) and optimal (30/20C) day/night temperature conditions and in the field for one parental line (Coker 312) and 6 different transgenic cotton lines overexpressing a cotton isoform of the delta-12 fatty acid desaturase. Our findings indicate that multiple FAD2-4 overexpressing lines demonstrated promise for improving seedling vigor under cool conditions, relative to Coker 312. Specifically, L4 demonstrated greater seedling vigor than the parental line for most parameters measured under 20/15C growth chamber conditions and field conditions. L2, L3, L4 and L7 had significantly higher % emergence in the field compared with Coker 312. Importantly, several transgenic lines performed comparable to Coker 312 under optimal temperature conditions, indicating no negative impacts of fatty acid desaturase over expression under optimal conditions. Thus, fatty acid desaturation appears to be a promising approach for improving seedling vigor under cool temperature conditions while not necessarily limiting performance under optimal growth temperatures.