

1931 Alternative Respiration during Cotton Growth & Development

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The inability of varieties to reach their genetic potential is largely due to late season cool weather. Cool temperature during boll and fiber maturation greatly slows the deposition of cellulose in the secondary cell wall. The ultimate result can be immature fibers and lower yield. In "voodoo lily" (*Sauromatum guttatum*) an increase in temperature of the floral tissue serves to volatilize aromatic compounds that attract pollinators. This stress response is regulated by the alternative oxidase enzyme (AOX). Unlike the lily, cotton does not need to attract pollinators, but an increase in temperature in the boll during exposure to low temperature would serve to provide a more optimum and stable environment for fiber development. Agrobacterium mediated transformation was used to create 31 independent transgenic lines that express the tobacco *Aox1* gene. Molecular analysis of several sequential generations putatively identified 13 single copy lines. The spatial and temporal expression of two lines verified as single copy homozygotes was increased by 100 fold in stem, root and bolls (8-10 and 20-25 DPA) when compared to the null line.