

Title: Relating FBS3 Gene Function to Plant Health and Salt Stress Gene Co-expression utilizing *A. thaliana*

Author: Shamir Chambers

*F-BOX STRESS INDUCED (FBS)* genes are a family of four stress-responsive genes in *Arabidopsis thaliana* encoding components of the ubiquitin 26S proteasome system. FBS proteins act as ubiquitin ligase adaptor proteins targeting proteins for degradation. *FBS3* is the least studied gene in the *FBS* gene family, and it is unknown whether it plays a role in plant stress response. Previous studies on the *FBS* family point to *FBS3* playing a role in regulating salt stress response in *Arabidopsis* and as result promote plant resilience under salt stress conditions. Genetic mutations were introduced in *FBS3* creating two knockout lines *fbs3-1* and *fbs3-4* via T-DNA insertions. *FBS3OX* lines were created via a viral promoter to induce overexpression of *FBS3* in *Arabidopsis*. Following this, *Arabidopsis* was placed in 0 and 100 mM NaCl concentration environments to induce varying levels of stress. qPCR was used to measure *fbs3* versus wild type *FBS3* expression in relation to growth, metabolic, and stress genes using *IPP2* a constitutively expressed gene as the reference gene. Ultimately, results showed that manipulating *fbs3* expression induced changes in expression of plant health and stress response in *Arabidopsis* suggesting that *fbs3* plays an important role in plant health impacting plant resilience under salt stress conditions. Global warming is creating heightened temperature environments that introduces ion toxicity in plants. This can increase incidence of salt stress in plants as a result which highlights the importance of understanding stress response in plants.