

# Recovery response of three contrasting genotypes suggests a “pre-defense” mechanism for highly drought tolerant genotype in *Solanum aethiopicum* Shum group

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## Abstract

Drought stress is known to interrupt plant function but the underlying behavior of contrasting genotypes in *Solanum aethiopicum* Shum group had not been investigated. This study was aimed at determining the relationship among selected leaf traits of *S. aethiopicum* Shum under drought recovery; and comparing the response of contrasting genotypes (G) under watering resumption. Three genotypes (E17GP=susceptible, E14GP=moderately tolerant and E6=highly drought tolerant) were subjected to two watering regimes (WL) over time (DAR); and leaf traits namely leaf wilting score (LWS), leaves per plant (LPP), leaf relative water content (LRWC), gas exchange (STC) and chlorophyll content (CHL) were measured. Strong linear relationships were observed between trait pairs: CHL and LPP ( $R^2=0.75$ ), CHL and STC ( $R^2=0.56$ ), and STC and LPP ( $R^2=0.53$ ); offering an alternative to use of any of the three traits for drought phenotyping. Generally, significant WL, G, DAR, WL x G, G x DAR, WL x DAR and WL x G x DAR responses for all measured traits were obtained at 1% error margin. The susceptible genotype recovered the slowest and maintained STC irrespective of WL which predisposes it to severe drought effects. The moderately tolerant genotype maintained better overall leaf health (high CHL) irrespective of WL than other genotypes. Based on both STC and CHL, the highly drought tolerant genotype is suggested to exhibit a “pre-defense” mechanism by functioning at reduced gas exchange and moderate CHL as a mitigating strategy against drought.

**Keywords:** African indigenous vegetables; differential variety response; drought recovery; gas exchange; leaf functional traits; leafy vegetables