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Preharvest and postharvest effects on incidence and severity of internal necrosis in "Covington"

Internal Necrosis is characterized by necrotic areas in the sweetpotato flesh appearing at the proximal end of the root. Severity can go from 1 (No IN) to 5 (Unmarketable), even when severity is the highest, IN will disappear about 1/3 to 1/2 of the length of the root. Regrettably IN cannot be identified unless the root is cut making this problem even harder to be investigated.

The appearance of IN in sweetpotatoes might be related to a stress respond of a gene. This stress could be caused by preharvest and postharvest treatments. To determine if there is a preharvest effect, two different fertilizers were used, one with high chlorine and one with low chlorine. The second preharvest treatment tested was mowing vs not mowing the vines previous harvest. To determine if postharvest temperatures influence on incidence and severity of Internal Necrosis, three different temperature treatments (78ºF, 85ºF & 59ºF) with five different curing duration (1/2, 1, 2, 3 & 5 weeks) were tested.

A total of 4 treatments x 4 replications per treatment resulting 16 plots per farm with a total of three farms participating in the test. The fertilizers were applied up front and up front + layby. High Chlorine Fertilizer: Muriate Potash (0-0-60) Vs No Chlorine: Potassium Sulfate (0-0-50) and mowing (10-14 days before harvest) Vs not mowing with a mower.

The roots will be harvested and placed in onion bags with at least 30 roots, then in lugs. Five curing durations will be tested (1/2, 1, 2, 3 and 5 weeks) at two different temperatures (75ºF and 85º F).

Previous research has been conducted over the past eight years, identifying some things that might induce the occurrence of IN such as clone bounded to cultivars "Covington" and "Hatteras", Ethephon have increased significantly the incidence and some other things that do not cause IN like disease nor a virus, herbicides and insecticides, application of Ethylene when curing.

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Elucidating the Molecular Mechanism of POPEYE Movement Involved in Iron Homeostasos, in Arabidopsis Thaliana

Iron (Fe) is an essential plant micronutrient required for proper growth and development. However one-third of the Earth's soil is calcareous, having a pH higher than 7, which prevents Fe(III) from reducing into usable Fe(II). As such, plants must tightly regulate iron sensing, acquisition, transport, and storage to ensure sufficient iron for growth. Transcription factors (TFs) regulate genes involved in responding to these processes. Characterizing and understanding the dynamics of POPEYE, an iron responsive TF that directly and indirectly negatively regulates iron homeostasis genes, will allow us to elucidate the mechanism by which it functions in iron homeostasis. This knowledge has the potential to be used for downstream applications, such as engineering agricultural crops, ornamental plants, and trees that are able to thrive in iron stressed environments. POPEYE mRNA and protein accumulate under iron deficient conditions. However, mRNA expression is localized to the root pericycle, while protein expression is localized to the nucleus in all root cell types. Little is known about the discrepancy between POPEYE mRNA and protein expression patterns in specific root cells. We used two approaches to address this concern; (1) scanning fluorescence correlation spectroscopy microscopy with a transgenic line expressing GFP-POPEYE to examine inter-cellular protein movement in response to iron deprivation, and (2) created and analyzed GFP-POPEYE-pye lines driven by cell specific promoters to mis-express POPEYE protein. Using these approaches we have shown that POPEYE transcript is induced in the pericycle under iron deficiency and its protein moves symplastically to outer root cell types. These new discoveries explain why we see differences between mRNA and protein expression. Additionally, performing iron specific assays on POPEYE mis-expressed transgenic lines suggests that this iron deficiency induced movement is critical for POPEYE function.