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Effects of post-harvest cold storage in bolting and disease susceptibility (*Botrytis cinerea* and *Fusarium gramminearum*) in sugar beet roots.

Two traits that could enhance sugar beet production are bolting tolerance and disease tolerance/resistance to post-harvest storage pathogens. Bolting refers to the elongation of the stem usually followed by flowering; sugar beets are biennial, requiring vernalization (prolonged cold period) to induce bolting. Improving bolting tolerance in sugar beet roots could prolong the growing time of sugar beets, make winter beets a more viable option for the industry and increase sucrose content. Sucrose losses caused by post-harvest storage pathogens can be significant, particularly in areas where storage piles are unable to remain frozen. Developing tolerant/resistant sugar beets to post-harvest storage pathogens could increase sugar recovery during prolonged storage. To understand the effect of cold storage in sugar beet roots, we (1) phenotypically characterized bolting and disease susceptibility for eleven genotypes from the USDA-MSU germplasm across variable durations of cold treatment at 4°C and (2) analyzed the transcriptomic changes for three of those genotypes across cold durations of 0, 4, 8, 13 and 17 weeks. We observed differences in bolting response between genotypes and within plants of each genotype. The number of bolting plants increased as cold storage time increased, and the time between planting and bolting decreased as cold storage period increased. For the disease susceptibility, we observed larger lesions caused by *B. cinerea* compared to *F. gramminearum*. Subtle differences in lesion diameter were noted across genotypes for both pathogens. Larger lesion diameter caused by *B. cinerea* was noted as cold storage period increased across genotypes. Differences in transcriptomic response associated with bolting and disease susceptibility were detected.