NAPPN Annual Conference Abstract:

Title

Use of machine vision to decipher the genetic basis of potato tuber characteristics in a biparental tetraploid linkage mapping population

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Abstract text

Tuber size, tuber shape, colorimetric characteristics of tuber skin and flesh, and defect susceptibility are all factors that influence the adoption of potato cultivars. Despite the importance of these characteristics, our understanding of their inheritance is limited by our inability to precisely measure these features on the scale needed to evaluate breeding populations. To alleviate this bottleneck, we have developed a low-cost, semi-automated workflow to capture data and quantify each of these characteristics using machine vision. This workflow was applied to assess the phenotypic variation present within 189 F1 progeny of the A08241 breeding population and map the genetic basis of tuber characteristics. Several medium-to-large effect, quantitative trait loci (QTL) were found to be associated with different measurements of tuber shape. These results indicate that quantitative measurements acquired using machine vision methods are reliable, heritable, and can be used to map and select upon multiple traits simultaneously in structured potato breeding populations.