

Scientific group of CPSBB and MVCRI utilized semi-automatic high-throughput tool of Tomato Analyzer (TA) to speed up fruit phenotyping of Balkan pepper and tomato collection

Fruit phenotyping is critical step in breeding fruits with desirable fruit size, shape and color for targeted local niche market. Conventionally, fruits morphology has been phenotyped manually and evidently it limits the breeder's ability to speed up the breeding process and hinders the genetic gain.

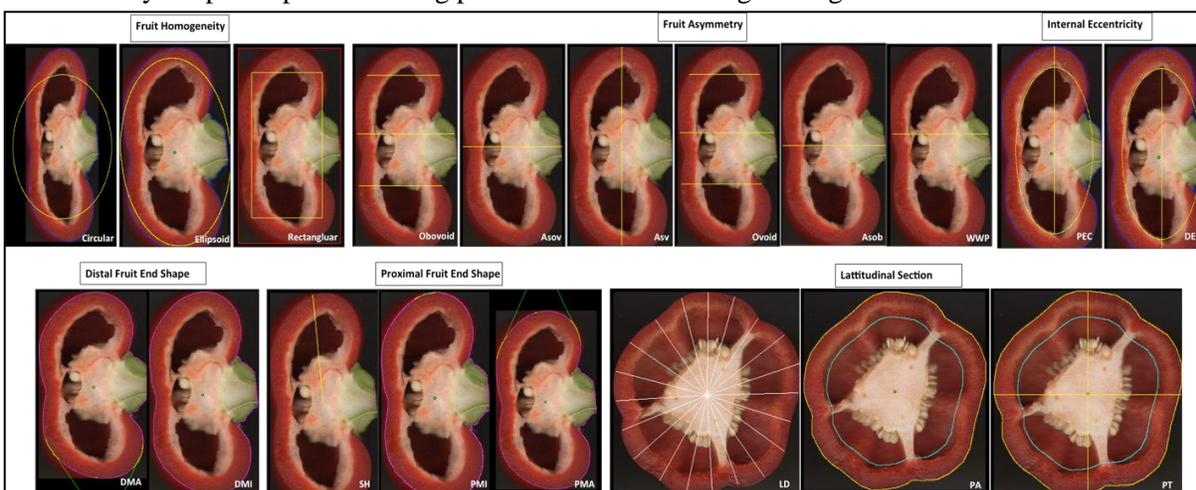


Figure 1. Fruit scanned image of pepper fruit explaining representative descriptor categories of fruit shape, size and color from latitudinal and longitudinal fruit sections.

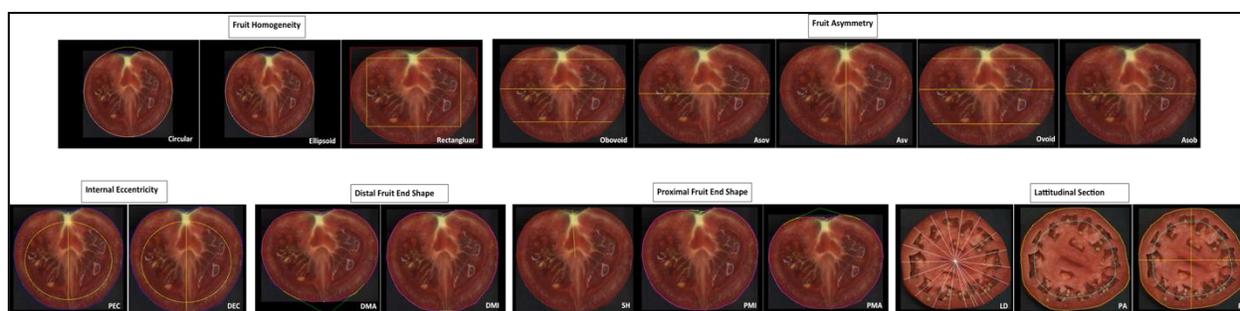


Figure 2. Fruit scanned image of tomato fruit to explaining representative descriptor categories of fruit shape, size and color from latitudinal and longitudinal fruit sections.

A scientific cohort of CPSBB (Dr. Amol Nankar) and MVCRI (Dr. I. Tringovska, Dr. S. Grozeva, Dr. V. Todorova, and Dr. D. Kostova) performed a deep phenotyping on large collections of Balkan pepper (Figure 1) and tomato (Figure 2) fruits using high throughput Tomato Analyzer. Both research findings have been published in leading horticultural sciences journals of *Scientia Horticulturae* (Nankar et al. 2019) and *Plants* (Nankar et al. 2020).

Joint work between CPSBB, MVCRI and UP anticipate identifying further valuable genes or Quantitative Trait Loci (QTLs) for better fruit shape/size based on recently sequenced pepper and tomato collection and application of Genome Wide Association Study (GWAS). Identified (QTLs) or genes can be introgress into elite breeding material so that pepper's and tomato's desirable shape, size, color and enhanced fruit quality will answer the needs of targeted market segment.

References:

Nankar A., Tringovska I., Grozeva S., Todorova V., Kostova D. (2019). Application of high-throughput phenotyping tool Tomato Analyzer to characterize *Balkan Capsicum* fruit diversity. *Scientia Horticulturae*. 260. <https://doi.org/10.1016/j.scienta.2019.108862>.

Nankar, A.N.; Tringovska, I.; Grozeva, S.; Ganeva, D.; Kostova, D. (2020) Tomato phenotypic diversity determined by combined approaches of conventional and high-throughput Tomato Analyzer phenotyping. *Plants*. 9(2): 197. <https://doi.org/10.3390/plants9020197>.