

Title: Utilizing wild *Capsicum annuum* germplasm for breeding *Curtovirus* resistance in cultivated chile pepper

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Abstract:

The US Pepper industry was valued at \$802.6 M grown on 78,700 acres in 2012. Geminiviruses are the largest family of viruses threatening vegetable production, and *Beet curly top virus* (BCTV) is one of the most damaging geminivirus of pepper in the US. Curly top disease, which results from infection by viruses in the genus *Curtovirus* (family *Geminiviridae*), affects >300 plant species from 44 different families and are transmitted by the beet leafhopper (*Circulifer tenellus*). BCTV affects several economically important crops such as pepper, sugar beet, tomato and spinach, and it significantly impacted California vegetable production in 2013 due to unusually large vector populations.

Little is known about resistance to BCTV, and only a few sources of moderate tolerance have been serendipitously identified with the most resistant sources being wild accessions. Twenty-seven pepper lines (nine reportedly tolerant accessions, thirteen wild accessions, and two commercial lines) have been screened for BCTV resistance using an *Agrobacterium*-mediated screen.

Two of the reportedly tolerant lines were shown to be susceptible to BCTV, as well as the commercial lines. Most wild accessions screened show resistance and will be re-screened with leafhoppers to confirm resistance. It is likely that resistance genes to BCTV are present in the wild accessions, and the long-term goal of this project is to introgress resistance to BCTV from wild pepper germplasm into a cultivated background. Integrating BCTV resistance into a cultivated background will be useful for pepper production as well as understanding the genetic mechanism of BCTV resistance.