Department of Horticulture
Washington State University

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Presented at the following WSU campuses and Research and Extension Centers: Pullman, Tri-Cities, Mount. Vernon, Prosser, Puyallup, Wenatchee

"A multifaceted approach to characterizing and addressing tuber field greening in Washington State"

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Abstract

Tuber field greening, the physiological result of tuber exposure to sunlight, is estimated to cause 14 to 17 percent losses to the US potato industry annually. The associated synthesis of glycoalkaloids taint tubers with a bitter taste and can be toxic to mammals. Tuber field greening can be attributed to an array of factors including environmental conditions, genetics, and cultural practices. A multifaceted study was conducted near Othello, Washington, composed of commercial field observations, hill manipulation (drag-off) trials, canopy shading simulation trials, and tuber underground arrangement digs. Field trials were conducted in 2019 and 2020 consisting of four varieties and four or six replications arranged in a randomized complete block design. In-season data collection included stand, stem, and exposed tuber counts. Post-harvest evaluations included tuber yields, grades, sizes, and culls captured with an automated sizing machine; economic valuations were determined utilizing mock processor contracts. Observations of Columbia Basin potato fields found hill drag-off is universally practiced, planting depth varied drastically, and the number of observed green tubers was cultivar-dependent. In 2019, hill manipulations significantly reduced the yield and percentage of green tubers for Umatilla Russet when the final seed piece depth was at least 20 cm when compared to 15 cm planting depth treatments. In 2020, simulated canopy shading significantly reduced tuber greening. Late-season field excavations revealed that tuber proximity to the soil surface and in-field greening incidence is cultivar dependent, explaining why greening and the associated financial losses are more prevalent with some cultivars. The best defense to prevent tuber greening is planting seed pieces a final depth of 20 cm, maintaining a season long healthy canopy, and avoiding production of varieties genetically predisposed to greening.