Pacific Northwest
Vegetable Extension Group

Identification & Management of Emerging Vegetable Problems in the Pacific Northwest

Pacific Northwest Vegetable Extension Group

November 2012

Toxic Seed Piece Syndrome (TSPS)

Affected plant species: Potato

Common name of the causal organism/agent: TSPS is generally characterized as a physiological disorder as extensive testing for plant pathogenic fungi, bacteria, and viruses, has failed to identify a particular agent responsible for TSPS. TSPS may be due to a complex of pathogens. Due to a failure to find the cause of the problem, TSPS has been called IWW ('I Wonder What').

Symptoms & key characteristics for identification: TSPS is a disorder associated with a seed piece that does not rot in the typical fashion. Initially, the seed piece is firm but may have a watery rot internally. The cut tuber may have a translucent, gelatinous appearance. The seed piece eventually breaks down, but a remnant of the seed piece may still be attached. There is usually no rotten smell associated with the deteriorating seed piece. Above-ground symptoms can be remarkable and easy to distinguish from most other problems. Interveinal chlorosis and bronzing of leaves are early symptoms, followed by wilting of stems. Not all stems may be affected. Wilted stems tend to remain erect rather than falling over when they die. Progression of symptoms is rapid, and the problem can be mistaken for wilt diseases. The vascular tissue is usually discolored brown above the seed piece and the discoloration extends into the above-ground stem. The plants almost always die prematurely. Symptomatic plants often produce harvestable tubers, but tend to be small compared to tubers on healthy plants.

Fig. 1. A typical potato seed piece associated with TSPS. Photo Source: Phil Hamm, OSU.

Fig. 2. Remnant of a potato seed piece still attached to the stem. Photo Source: Carrie Wohleb, WSU.

Fig. 3. Vascular discoloration in the potato stem just above where the seed piece was attached. Photo Source: Phil Hamm, OSU.

Fig. 4A and 4B. Potato leaves showing interveinal chlorosis and bronzing. Photo Source: Carrie Wohleb, WSU.

Biology/epidemiology: TSPS allegedly results when breakdown products from the seed piece are transported up the vascular tissue to the leaves. It has been attributed to conditions that result in sudden and rapid plant growth, often preceding extended periods of slow growth. The problem has been seen sporadically in potato fields in the Columbia Basin over the last 10-15 years. Wilt symptoms are usually noticed in June or July. The percentage of plants affected in a field is usually low (1-5%), but the problem may appear more extensive due to the scattered distribution of symptomatic plants and their striking appearance. Symptomatic plants are often found in stressed areas in a field, but can occur throughout a field, e.g., more symptomatic plants may be seen on ridge tops than lower areas. In fields planted with more than one seed lot, the amount of damage in each lot may vary.

Fig. 5. Symptomatic plant showing wilt symptoms. Photo Source: Phil Hamm, OSU.

Fig. 6. Potato field with several plants showing TSPS symptoms. Photo Source: Carrie Wohleb, WSU.

Management: Seed potatoes should be harvested, stored, transported, cut, and planted under the best possible conditions to ensure optimum seed health. Maintain adequate but not excessive soil moisture and fertility levels during the growing season.

Selected references: Pacific Northwest Vegetable Extension Group: http://mtvernon.wsu.edu/path_team/vegpath_team.htm