



Pacific Northwest
Vegetable Extension Group

Identification & Management of Emerging Vegetable Problems in the Pacific Northwest

Pacific Northwest Vegetable Extension Group
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Physiological Leaf Roll of Tomato/Potato

Affected plant species:

PNW VEG researchers in Idaho, Oregon, and Washington have received many reports of moderate to severe leaf rolling on tomato plants in home gardens and commercial fields. Indoor production (greenhouse or hoophouse) tomatoes can be affected as well. Potatoes also can experience a similar problem.

Common name of the causal agent:

Physiological leaf roll

Symptoms & key characteristics for identification:

Symptoms:

- Upward cupping of the leaf margins followed by an inward leaf roll so that the margins of adjacent leaflets may overlap in a tube-like appearance.
- Lower leaves typically are affected first, and rolling may eventually involve most of the plant.
- Rolled leaves feel rough and leathery to touch but are otherwise normal in size and color.
- Leaf roll symptoms typically persist through the season, particularly if conditions favoring leaf roll are prolonged. Rolled leaves can sometimes recover if environmental conditions and cultural factors are adjusted to reduce plant stress.
- Plant growth, and fruit (or tuber) yield and quality do not appear to be affected.



Pacific Northwest
Vegetable Extension
Group of Washington
State University, Oregon
State University, and
University of Idaho: Photo
Gallery of Vegetable
Problems

[http://mtvernon.wsu.edu/
path_team/diseasegallery.
htm](http://mtvernon.wsu.edu/path_team/diseasegallery.htm)

Physiological leaf roll can be confused with:

- Virus-induced leaf curl. Symptoms expressed following some virus infections, in addition to leaf curl, often include yellow chlorosis, mottling, and stunting of leaves.
- Growth-regulating chemical damage (herbicide application, herbicide-contaminated mulch or manure, or saliva of pests like aphids). Symptoms depend on exposure and age of plant tissue at the time of contact, and may involve pointed, narrow leaves, prominent veins, young leaves that don't expand, as well as fruit deformities.

Biology/epidemiology:

Many university extension publications (listed below) provide information about this physiological condition. Physiological leaf roll is believed to be a plant strategy to conserve moisture. Factors reported to contribute to physiological leaf roll include:

- The severity of leaf roll appears to be cultivar dependent. High-yielding cultivars tend to be most susceptible. Indeterminate-growth ("staking"/"vining") tomato cultivars appear to be more sensitive to this disorder than determinate-growth ("bush") types.
- In some cases, the condition occurs most commonly when plants are staked and pruned under dry soil conditions.
- Nutrient stress, including growing high-producing cultivars under abundant nitrogen fertility programs; or plants experiencing phosphate deficiency.
- Drought or extended dry periods.
- Excessive soil moisture under prolonged high temperatures can induce leaf roll.
- Transplant shock may result in leaf roll symptom development.

Management:

Some management strategies recommended for physiological leaf roll include:

- Careful cultivar selection to avoid susceptible cultivars.
- Plant in well-drained soils and maintain uniform, adequate soil moisture (~1 inch per week during the growing season depending on the area of production).
- Follow fertilizer programs recommended for the specific region of production and tomato cultivar; avoid over-fertilizing with nitrogen or under-fertilizing with phosphate.
- Avoid pruning plants severely, particularly if soil conditions are dry.
- Maintain indoor growth temperatures <95°F via shading or evaporative cooling.

Additional Readings:

http://mtvernon.wsu.edu/path_team/PhysiologicalLeafRollOfTomato-PNW_VEG_FactSheet.pdf

Pacific Northwest Vegetable Extension Group of Washington State University, Oregon State University, and University of Idaho. http://mtvernon.wsu.edu/path_team/vegpath_team.htm

<http://agdev.anr.udel.edu/weeklycropupdate/?p=3288> Physiological Leaf Cupping and Rolling in Vegetables, Gordon Johnson, University of Delaware Extension

http://www.clemson.edu/extension/hgic/hot_topics/2008/05tomato_leaf_roll.html Tomato Leaves Rolling?, Janet McLeod Scott, Clemson University

<http://www.extension.umn.edu/distribution/horticulture/M1274.html> Disorders of Tomato. Michelle Grabowski. University of Minnesota

Verma, Piyush, 2009. Physiological Disorders of Vegetable Crops. , Alfa Beta Technical Solutions: Jaipur.