

Pinot leaf curl: a nitrogen disorder

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Pinot leaf curl is a disorder that affects several Pinot varieties grown in areas with cool spring temperatures in coastal valleys. Symptomatic leaves on elongating shoots curl downward across the middle of the leaf blade, perpendicular to the mid-vein. The angle of the downward bend is acute; the marginal tip of the center lobe may come into contact with the petiole. Mild symptoms involve only the blades; continued expansion of which results in a misshaped and reduced leaf size. A necrotic region is present on the mid-vein preventing further elongation. If the necrosis expands to include the petiole, the leaf will abscise from the shoot. Severe symptoms occur when necrosis involves the node at which a leaf abscised, killing the shoot distal to that point. Crop load is reduced in severely symptomatic vines.

In 14 vineyard blocks in Sonoma County, symptomatic and non-symptomatic leaves were sampled in May and June 2012 and concentrations determined in blades for putrescine (1,4-diaminobutane) and amino acids. The level of putrescine was found to be elevated in symptomatic versus asymptomatic samples in 12 of the 14 pairs ranging from 0.6 to 10 µmoles per gram fresh wt in symptomatic tissue as compared to 0.2 to 6 µmoles per gram fresh wt in non-symptomatic tissue. Relative amino acid levels were less clearly aligned with symptoms; however in 6 pairs, symptomatic blades had elevated glutamine levels in addition to elevated putrescine. Glutamine is the predominate amino acid in vine sap and the predominate amino transport form of reduced nitrogen in the vine. Thus, pinot leaf curl is probably associated with elevated nitrogen levels in blades.

Elevated putrescine levels are toxic to plant tissue and are thought to be involved in symptom development in false potassium deficiency (“spring fever”) and early bunch stem necrosis. Pinot leaf curl may be an additional disorder associated with putrescine.

Take home messages and *observations*

- Putrescine is associated with pinot leaf curl
- There is no “normal level of putrescine” in blade tissue
- Avoiding N applications in early spring is probably wise if pinot leaf curl symptoms are common
- *The differences in putrescine levels were relative to the site and do not appear to be rootstock or clone dependent*
- *Site (minimum daily spring temperatures) may be the largest contributing factor to severity of pinot leaf curl*
- Pathology results are incomplete; although *Botrytis* has not been found to cause pinot leaf curl symptoms