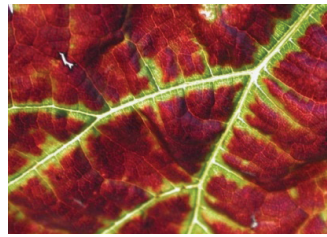




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LEAFROLL CONTROL STRATEGY

3. DISORDERS THAT CAN BE CONFUSED WITH LEAFROLL:

3.1 Nutritional disorders (Potassium [K] deficiency)

Early season symptoms of K deficiency manifests as rolled leaves, accompanied by yellowing of leaf edges (Fig. 1).



Figure 1: Early season symptoms of K deficiency, rolled leaves, accompanied by yellowing of leaf edges. (Image: P. Raath, Bemlab)

Generally the older, mature leaves at mid-cane length show up the deficiency symptoms first.

Symptoms vary with leaf age, in young leaves a lightened color appears in areas and a few necrotic spots can occur along the leaf margin.

On older leaves a reddish-purple interveinal discoloration starts at the leaf margin but, unlike leafroll, does not have the green area bordering the main veins (Fig. 2). Sharp boundaries caused by veins also exist between discolored and normal area, unlike the diffuse edges of leafroll symptoms.

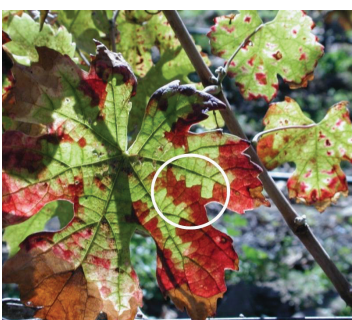


Figure 2: Red to purple interveinal discoloration at the leaf margin typical of K deficiency. Note that unlike leafroll, it does not have the green area bordering the main veins. Also observe the sharp boundaries between discolored and normal area caused by veins (circled in white). (Image: G. Pietersen, ARC-PPRI)

During dry weather necrotic areas develop between the interveinal tissue, leaf margins can dry and roll (Fig. 3).

Leaves can also become distorted and ruffled.

Older leaves can become violet brown to dark brown.



Figure 3: Necrotic lesions on the edges of the leaves. (Image: G. Pietersen, ARC-PPRI)

3.2 Nutritional disorders (Phosphate [P] deficiency)

The leaf symptoms of P deficiency are not common. Where severe deficiencies occur, the symptoms in red varieties are similar, yet distinct, from leafroll symptoms. Firstly red dots appear on the basal leaves, especially on the mid or terminal lobes and at first distant from secondary veins (Fig. 4).

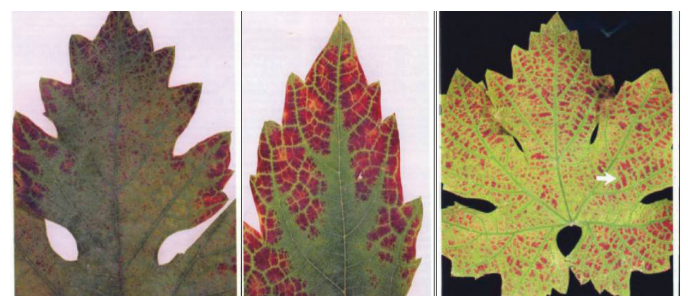


Figure 4: P deficiency: red dots appear on the basal leaves, especially on the mid or terminal lobes and at first distant from secondary veins.

The red dots, at first randomly distributed, later line up at right angles to the secondary veins and form dark red bars, which coalesce into islands between green veins. Even the smallest veins remain green. The red islands are very clearly vein delimited (Figs 4&5).



Figure 5: P deficiency: Observe the net veins that remain green within the red discolored areas. (Image: G. Pietersen, ARC-PPRI)

On white cultivars rather than red dots and islands, yellow ones are formed.

Confirm diagnosis by sending samples to a laboratory for leaf nutrition tests.

3.3 Nutritional disorders (Magnesium [Mg] deficiency)

With Mg deficiency, leaves of red cultivars, show red wedge-shaped areas, extending inwards from the leaf margin between the main veins (Fig.6).

The color change/chlorosis begins at the edge of older leaves and extends between main and secondary veins, and is not parallel with the veins. This helps to differentiate it from leafroll symptoms.

Broad areas of pale green remain around the main veins.

The leaf margins may turn brown and dead patches may develop there and in the red areas when Mg deficiency is severe.

Symptoms are best observed mid-season onwards.

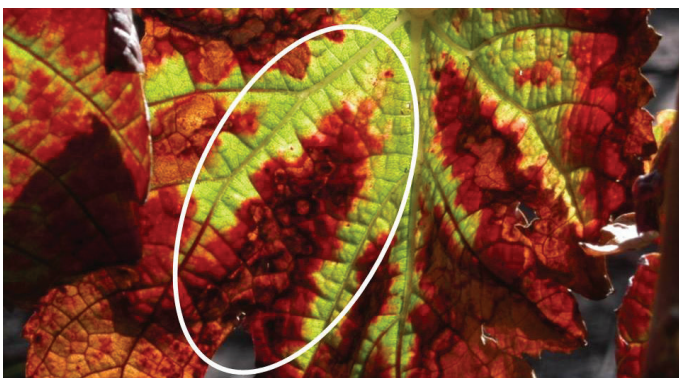


Figure 6: Mg Deficiency: Red discolored wedge shown in circled area, unlike leafroll which tends to leave a green area parallel with the main veins. (Image: G. Pietersen, ARC-PPRI)

3.4 Nutritional disorders (Manganese [Mn] deficiency)

Mn deficiencies appear first on older leaves. In white varieties it can be confused with leafroll due to chlorosis between the veins. The yellowing can become intense between primary and secondary veins, while areas around the fine veins remain green. The discoloration is always yellow, even in red varieties. So it might only be confused with leafroll in white varieties.

3.5 Mechanical damage

Very often mechanical damage to the trunk or a shoot of the grapevine results in all the leaves above that damage turning an even red color (in red-berried cultivars) (Fig. 7).



Figure 7: Typical reddening of leaves on a cane following mechanical damage of the cane. (Image: R. Stolk, IGWS)

Strong winds causing young grapevines to swirl in their planting holes can girdle young grapevine stems resulting in even red symptoms of leaves (in red-berried cultivars) (Fig.8).



Figure 8: General red discoloration of leaves due to mechanical damage of the stem (sometimes caused by wind causing a girdling of the stem at ground level). (Image G. Pietersen, ARC-PPRI)

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