viti-notes
[understanding grapevine growth]

Research to Practice

Restricted Spring Growth syndrome

Viti-note Summary:

- Symptoms
- Causes
- Environmental
- Pathological
- Management
- Impacts

Figure 1. Vine showing delayed budburst on the left cordon and poor shoot growth on the right. (Photo courtesy of Shayne Hackett, Charles Sturt University)

Restricted Spring Growth (RSG) is a set of symptoms seen in some vines in spring. It is caused by a range of factors and is not a disease in itself. Symptoms can vary between vines, from site to site and between years depending on the factors impacting on the specific vines. Generally vines affected by the condition exhibit poor growth early in the season. Occurrence can be random.

Restricted growth may persist beyond spring and affect yield and overall vine health, or 'catch up' growth may occur resulting in minimal impact by the end of the season. It is common for the 'fitness' of vines in following seasons to be affected.

Environmental conditions experienced during winter and spring can account for RSG symptoms, so it is important to recognise that vines are perennial plants which interact with their environment during dormancy and when actively growing.

Symptoms

Vines affected by RSG generally exhibit one or more of a range of symptoms which give an overall appearance of 'restricted growth'. These can include:

- failed budburst;
- poor shoot growth;
- delayed or retarded leaf and/or bunch growth.

Although RSG can be mistaken for the restricted shoots often associated with spring mite damage, the symptoms differ. The poor growth may appear uniformly along cordons or canes, or be concentrated away from the trunk. Other growth responses associated with RSG may include failure of buds to burst on a cordon or the whole vine, delayed budburst on some vines by up to four weeks, or the sudden collapse of vines.

Other topics in this Viti-Notes series include:

- Bud dormancy and budburst
- Spring shoot growth
- Flowering and pollination
- Berry development - up to veraison
- Berry development - Ripening
- Defining berry ripeness
- Site factors influencing berry ripening processes and rates of ripening
- *Restricted Spring Growth syndrome*

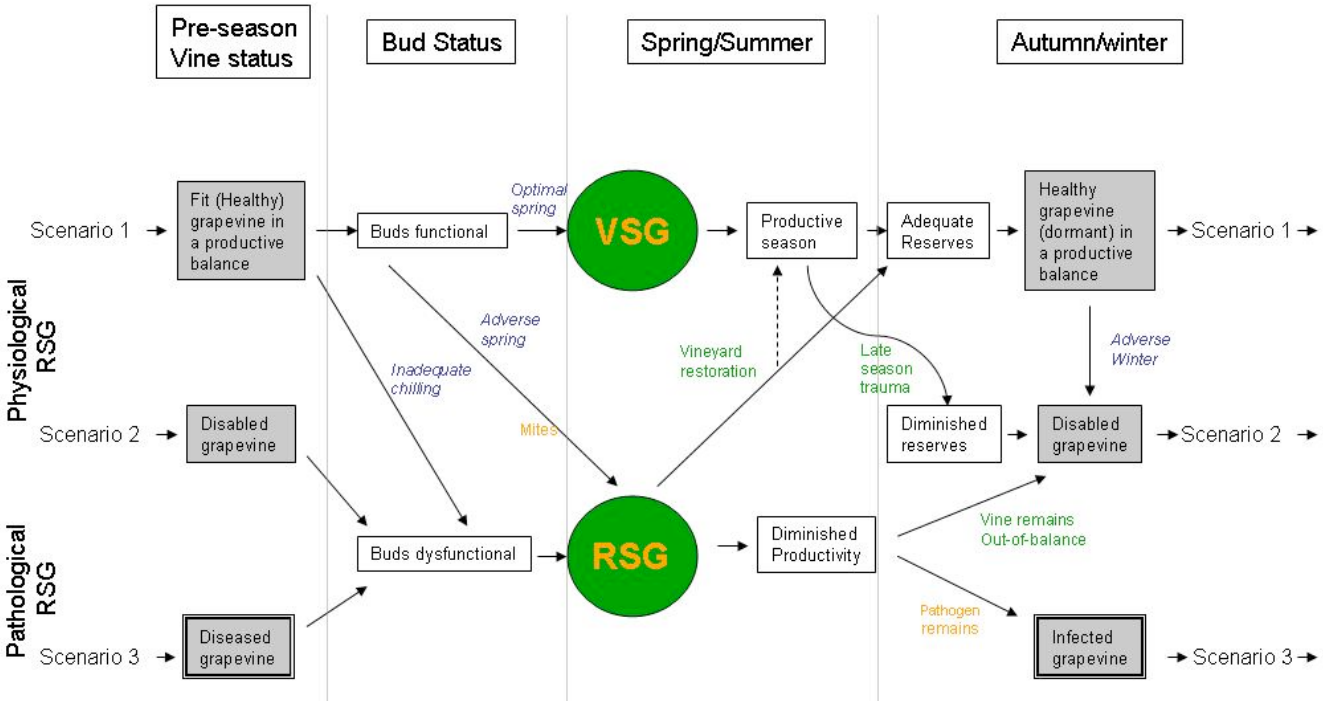

Figure 2. A notional summary of interactive factors that either sustain Vigorous Spring Growth (VSG) or lead to Restricted Spring Growth (RSG). Hackett, S. Holzapfel, B. Factors underlying restricted spring growth in vineyards. Australian Viticulture: practical vineyard management. 6 (5): 76-81; 2002.

Causes

One or more factors attributable to RSG may cause poor vine growth in spring. Some vines may also be more regularly or predictably affected by RSG because of their situation in the vineyard. Some of the causes of RSG are identifiable as conditions or diseases by themselves, but it is when they interact with other factors to cause a more general 'unhealthiness' in vines that defines RSG.

Environmental:

- Micro-level variation in soil resulting in restricted root growth or function, e.g. pH, penetrability, salinity, toxic nutrient levels etc.;
- Micro-scale environmental conditions, e.g. 'frost hollow' effect;
- Winter temperature affects or unseasonal or highly variable spring weather impacting on budburst, e.g. inadequate chilling of buds, chill injury or loss of cold hardiness;
- Lack of soil moisture at budburst and early season, which affects rates of photosynthesis and a range of metabolic functions related to growth of shoots.

Pathological:

- Phytoplasmas or viruses;
- Bud or rust mite activity;
- Vascular fungi, e.g. Eutypa.

Management:

- High cropping levels or over cropping (especially on young vines);
- Late harvest in previous season;
- Inadequate post harvest irrigation;
- Insufficient nutrients made available especially between harvest and leaf fall.

Impacts

Regardless of the cause of RSG in a particular season, the impacts and include:

- Poor development of primordia;
- Low carbohydrate or nutrient storage;
- Poor mobilisation of reserves;
- Restricted sap flow;
- Poor root growth;
- Inhibited root activity.

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Further information

Useful references:

Hackett, S. Holzapfel, B. Factors underlying restricted spring growth in vineyards. Australian Viticulture: practical vineyard management. 6 (5): 76-81; 2002.

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