



Restricted spring growth



What is restricted spring growth?

When grapevines display symptoms of poor shoot growth and poor yield development during the spring period, they can be described as being affected by restricted spring growth (RSG).

RSG may be caused by a range of factors and is not necessarily due to any pathological cause. Symptoms can vary between grapevines, from site to site and between years depending on the specific factors impacting on those vines. Generally, affected vines exhibit poor shoot growth early in the season. The occurrence can be random throughout the vineyard. Restricted growth may persist beyond spring and affect yield and overall vine health. Vines may recover and in some instances 'catch-up' growth may occur resulting in minimal impact by the end of the season. It is common that the health of grapevines may be affected in the following season. Common RSG symptoms include:

- Failed and patchy budburst

- Poor shoot growth
- Delayed or retarded leaf and/or bunch growth.

What are the causes of RSG?

One or more factors may be responsible for the RSG symptoms observed in spring. In some cases, the same vines may be perennially affected by RSG because of specific genetic, site and management issues. There may be a number of specific causes, and often these interact to impact on the general health, performance and subsequent expression of RSG symptoms in the vineyard. These include:

- Variations in soil across the vineyard which can result in restricted root growth or function, e.g. soil pH, root penetrability, soil salinity or other toxic nutrient levels
- Micro-climatic conditions in the vineyard, e.g. 'frost hollows'
- Weather conditions that may impact on



budburst, e.g. inadequate chilling of buds, chill injury or loss of cold hardiness

- Lack of soil moisture at budburst and early in the growing season, which affects rates of photosynthesis and a range of metabolic functions related to growth of shoots
- Pathological causes, which may include phytoplasmas, viruses, bud mite, rust mite activity and fungi responsible for trunk diseases e.g. *Eutypa*
- Management-induced causes, which may include high cropping levels or over-cropping of vines (especially young vines), late harvest in the previous season, inadequate post-harvest irrigation and insufficient nutrients made available especially between harvest and leaf fall.

Management

It is important to understand the specific causes of the observed RSG symptoms. It is particularly important to ensure that vines are well managed during the post harvest phase of their development. Where possible, ensure vines are managed well from a water and nutrition perspective. This ensures vines are able to store adequate carbohydrates and nutrients which are essential for early season growth in the following season.

It is also important to keep monitoring vines and environmental conditions over the winter dormancy period. Low rainfall and drier than normal weather conditions during this period and in the early phases of bud burst and shoot growth can have a significant influence on the expression and severity of RSG symptoms.

In vineyards which may be perennially or commonly affected by RSG symptoms, it is

important to understand the specific site factors which are responsible for the expression of these symptoms. Soils which have fundamental physical, chemical or biological problems need to be addressed and managed, as poor root growth may limit a grapevine's access to soil water and nutrients essential for growth.

How can I tell RSG apart from bud mite damage?

RSG can sometimes be mistaken for the restricted shoots often associated with bud mite damage; however the symptoms differ. Bud mites live, breed and feed within buds for the vast majority of their life. They burrow deep into developing buds, damaging those cells which will develop in the following season into leaves and flower clusters and the cells which form the primary growing tip of the shoot. The typical early season symptoms of bud mite damage can include:

- dead buds and shoot tips
- cut leaf margins
- 'zig-zag' veins on basal leaves
- shortened internodes
- crooked shoot growth or flattened lower portions of shoots
- increased development of lateral shoots ('witches broom').

In RSG symptoms, 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 and delayed budburst on some vines by up to four weeks.



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Further reading

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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