

People in the wine industry know that bunch stem necrosis (BSN), or shanking, can be a serious problem for some vineyards and during some seasons. This physiological disorder causes berries to shrivel and the ripening process ceases, producing berries of low sugar and high acid levels. Excessive amounts of these grapes in the wine making process can cause difficulties for wine makers and in bad years on susceptible vineyards workers may be used to remove the affected grapes. Even so wine quality may still be compromised.

I began my PhD in 2002 at Massey University. Due to financial support through an AgMARDT scholarship I have been able to concentrate solely on my research project. I have also been very privileged to gain project funding from Winegrowers, and Montana have helped extensively over the three years with access to vineyards and laboratory facilities.

The season before I started my study (2001/2002) was a very bad one for BSN. Varieties, such as chardonnay, which I had been informed was unlikely to show high incidence of BSN, did exactly that. This significant season set me off to a good start and the topic has been a good one to study for the past 3 years – a topic which I have found is a very interesting and complex one with a lot of twists and turns to comprehend.

As most will know, this disorder is not confined to New Zealand alone. It is a world-wide problem that goes by many names including waterberry, le desschement de rafle, stiellahme and palo negro. A lot of research was carried out in the 1970s and 80s particularly in France and Germany. From this research it was concluded that the disorder was physiological in origin (not pathological) and that environmental conditions could impact on its incidence. Most of this research indicated that the disorder was due to a nutrient imbalance between calcium, magnesium and potassium. Recommendations for controlling BSN were developed which included applying magnesium sprays and using low vigour rootstocks. However, the underlying cause of the disorder was not convincingly proven, and in subsequent years following the recommendations that were made resulted in control of the disorder being less than satisfactory in different vineyards.

My PhD was aimed at identifying the underlying mechanisms behind the cause of BSN. A better understanding of the underlying mechanisms may then lead to an improved understanding as to why the previous recommendations do not work for all situations and how new approaches might be possible. Questions that I have raised: was the imbalance in nutrients the cause, or merely a consequence, of the disorder? If an imbalance was the cause then what caused the nutrient imbalance itself? Finding techniques to prevent the imbalance in the first place would then surely be better than trying to treat it. If it was only a consequence of the disorder then in some situations it may not manifest itself and therefore applying nutrient sprays may not work. If it is a vigour problem, why do low vigour vines still demonstrate BSN? And so on.

It would have been naïve of me to think I could solve the problem in the three years I had to study this disorder. Mechanisms within plants are so complex and influenced by so many factors that trying to look at all the possibilities in the three years was an impossibility. But if my work could shed some new light on the underlying cause of

BSN, then future work carried out on this disorder would hopefully be more successful.

After three seasons of field and laboratory work some trends are emerging from all of the information that I have collected. Overall, there appears to be a very strong positive correlation between vine vigour and the incidence of BSN. Hence treatments such as root pruning which suppress the growth of the vine also suppress the incidence of BSN. Equally treatments which enhance vegetative growth, such as heading back of canes and trimming, lead to a higher incidence of BSN. Intriguingly the results indicate that there may be a critical period during the season when the vines are most susceptible with regard to the bunches becoming pre-disposed to the disorder.

A full summary of these findings will be presented at the 2006 Brigato conference. I acknowledge the extensive industry support that I have had for this research and the input of my supervisors Drs Ian Warrington and David Woolley.