SARDI

SOUTH AUSTRALIAN RESEARCH AND DEVELOPMENT INSTITUTE

Australian Government

Grape and Wine Research and Development Corporation

Phomopsis Control in the Limestone Coast



FINAL REPORT to
GRAPE AND WINE RESEARCH & DEVELOPMENT

Project Number: **RT-08/01-3**

Principal Investigators: **Trevor Wicks (SARDI)**
Kerry DeGaris (LCWIA)

Organisation: **Limestone Coast Wine Industry Association (LCWIA)**
Sub-contracting agency: **South Australian Research and Development Institute (SARDI)**

TABLE OF CONTENTS

1. EXECUTIVE SUMMARY 2

2. BACKGROUND 2

3. OBJECTIVES 4

4. WORKSHOP 4

5. RESULTS/DISCUSSION 4

6. OUTCOME/CONCLUSION 6

7. ACKNOWLEDGEMENTS 6

8. REFERENCES 7

9. BUDGET RECONCILIATION 8

1. EXECUTIVE SUMMARY

To demonstrate the importance of spray timing and to provide a site suitable for a vineyard walk to demonstrate symptoms, trials were initially set up in 2008 in vineyards known to be infected with *Phomopsis*. After two fungicide applications in spring the trials were abandoned as the weather was dry and unsuitable for the disease development. One trial was repeated in 2009 where different spray timings of the fungicide Polyram were applied either I,2,3 or 4 times at approximately 14 day intervals from green tip bud burst. Assessments in late November showed that the amount of disease was similar in all treatments including the unsprayed. This trial showed that spraying on a calender date of regular intervals is unsuited for the control of *Phomopsis* and suggested that control is likely to be most effective if protectant sprays are applied before and as close as possible to a rain event. The trial also demonstrated how effectively *Phomopsis* carries over for several seasons on infected wood.

The results of this trial and descriptions of the fungus and its biology were presented at a work shop and vineyard walk in December 2009.

2. BACKGROUND

In the past 5 years, cane and leaf blight caused by the fungus *Phomopsis viticola* (type 2) has become wide spread in the Coonawarra vineyards (and to a lesser degree in Padthaway) and is thought to be contributing to reduced yields in the area. The disease has spread to such an extent that in some vineyards 70% of shoots are now infected (Wicks & Horsfield 2008 trial data).

Personal communication with various vineyard managers across the region have indicated a 50% reduction in yield due to type 2 *Phomopsis,* and even more damage on canes required for cane pruning in the proceeding year. This reduction in cane viability due to severe ringbarking at one site resulted in 40% of vines being unproductive in the following year. The cost deductions attributed to this disease include the down grade in fruit quality due to fruit not ripening to its full potential. This quality fruit produced is similar to fruit affected by Bunch Stem Necrosis (BSN), where often the fruit will taste sour (as it has died prior to reaching full maturity) and when harvested with sound fruit can downgrade the quality significantly. This can be the difference between the fruit making a regional Coonawarra product or a generic South Eastern Australia product. In the example of Cabernet Sauvignon, the price difference per tonne could be upwards of $2000.

While the economic impact of *Phomopsis* on vineyard production has not been accurately measured in Coonawarra, in other areas the disease is known to reduce yields by 30% or more. The fungus infects the berry stem and develops into the berry, rotting berries and causing them to shatter before harvest. These symptoms have only recently been observed in the Coonawarra area.

Another common symptom observed in Coonawarra is the loss of shoots as a result of the fungus infecting the base of the shoots. These infections girdle and weaken the shoot which usually breaks off either under heavy crop load or windy conditions in spring or during pruning in winter.

The widespread distribution of this disease and the severity of symptoms observed in vineyards suggests that significant yield losses are occurring in many vineyards in Coonawarra As the causal fungus can persist in vineyards for many seasons and many vineyard managers do not recognise the disease, the disease is likely to increase and continue to cause significant yield losses in the area unless appropriate management strategies are put in place.

Although the disease has been present in the area for many years the reason for the spread of the disease are unclear, although several factors may be involved. Many vineyards have not been treated with fungicides such as mancozeb early in the season, as growers have thought that these sprays may inhibit predatory mite populations. Many growers have also been either unaware of the symptoms of this disease, or mistaken them for some other problem and have not applied appropriate fungicides. Whatever the reason, *Phomopsis* is now well established and widespread in Coonawarra vineyards. In particular it is a serious problem in minimal pruned vineyards where severely infected lignified wood is retained in the canopy and provides high levels of inoculum for 3 or more seasons.

A considerable amount of research has been conducted on *Phomopsis* in Australia (GWRDC projects (DAN8GW and DAN 94/1) and overseas, and a great deal of information about the disease has been discovered. These studies have shown that the disease can be controlled by a number of protectant fungicides, such as Mancozeb, Captan or Chlorothalonil products. However most of these studies were conducted over 10 years ago and since that time a number of fungicides with new and novel modes of action have been registered for use in grapevines. The efficacy of these products on *Phomopsis* needs to be demonstrated, particularly when they are applied around flowering. In the GWRDC project (DAN94/1), dormant applications of Shirlan were shown to inhibit spore production and reduce the level of carry over inoculum. This option has not been widely taken up by the industry, and is worth re evaluating, particularly in vineyards in the Coonawarra area with high levels of infection.

This project originally planned to fine tune recent studies conducted on *Phomopsis* in the Coonawarra area and will address the main objective of making the industry more aware of the disease and to demonstrate the potential impact the disease has on production. The extension component of the project was to demonstrate the best practices (fungicide programs) to control the disease comparing different fungicides and spray timings. The results for this work would also be applicable to other grape areas of Australia particularly those on “cool” growing areas where early spring rain over flowering is likely to provide ideal conditions for *Phomopsis* to develop.

Due to the reduced funds available this project was limited to one trial to increase the awareness on the importance of *Phomopsis* in the Coonawarra area and to demonstrate how the disease can be managed.

3. OBJECTIVES

The objectives of this program were to conduct a workshop and undertake a vineyard walk of trial areas to familiarise growers with field symptoms of *Phomopsis* and to demonstrate the importance of spray timing in the control of this disease.

4. WORKSHOP

A workshop and field walk that combined *Eutypa* and *Phomopsis* was held at Katnook Estate Stables on December 3, 2009. At least 30 growers and industry personel attended the presentation.

5. RESULTS/DISCUSSION

Two trials were established in the spring of 2008 in the Coonawarra district to demonstrate the symptoms of the disease *Phomopsis* as well as how important it is to get the timing right. It was intended to show these results at a field trial in late November with the help of the LSCWIC-TSC in Katnook and Fosters vineyards. The trial at Katnook aimed to demonstrate the effectiveness of Shirlan applied as a dormant spray and its ability to reduce the level of disease carryover from one season to next.

The second trial was set up on a minimum pruned cabernet sauvignon Fosters vineyard known to be heavily infected and therefore useful to demonstate the disease symptoms and to show the importance of spray timing. A previous survey of this vineyard in late winter of 2008 showed that darkened longitudinal splits and cracks typical of *Phomopsis* infection were present on 70% of the shoots. Samples of these shoots incubated in the laboratory at the Plant Research Institute in Adelaide confirmed the presence of *Phomopsis viticola*. A replicated trial with 7 different treatments was set up to demonstrate the importance of spray timing. Assessments of these trials in November 2008 showed that the level of disease was too low to undertake a field walk as only a few leaf spots were detected. The reason for the low infection rate was probably due to the extreme dry spring (34% reduction in rainfall) and warmer than normal conditions in October that were not conducive to the development and spread of *Phomopsis.* As a result these trials were abandoned and the vineyard walk cancelled.

The trial at the Fosters vineyard was repeated the following season using the same design and treatments. The fungicide Polyram was applied at 200g/100L using a knapsack motorised misting sprayer. The different spray timings and dates of application are shown in Table 1. Inspection of the vines in late November 2009 showed that conditions had been suitable for infection as numerous small leaf spots and cracks at the base of the stems were present in most vines. At this stage 25 shoots were selected at random from each of the 5 replicate plots of each treatment and rated for the presence of *Phomopsis* symptoms on leaves or stems. The results shown in table 1 indicate that the application of fungicides in several different spray programs did not control *Phomopsis* as the amount of disease was similar in all treatments, including the unsprayed control.

Examination of the rainfall data (Figure 1) from the nearby Coonawarra weather station suggest that rain 2 days after the first application may have diluted the fungicide deposit with further dilution due to shoot growth and allowing some *Phomopsis* infection with the rain in late September. Most infection however likely arose from the rain in mid October and which occurred 12 days after the previous application of fungicide.

These results have demonstrated that spraying on a regular calendar basis of 14 or more days is unsuitable for the control of *Phomopsis.*

While the timing of sprays is often dictated by the local weather conditions the results from this trial suggest that *Phomopsis* sprays are best applied just before and as close as possible to rain events that are likely to give rise to infection.

The high level of disease that developed in this vineyard also demonstrated how readily *Phomopsis* carries over for more than one season in infected canes. These factors were discussed and the symptoms demonstrated with fresh shoot and leaf samples and the vineyard walk in early December 2009.

Table 1 Effect of spray timing on the incidence of *Phomopsis vitivola* - Coonawarra -2009.

No. of	Spray date				% shoots
sprays	Sept 15	Oct 1	Oct 19	Nov 5	infected
0	-	-	-	-	21
1	✓	-	-	-	21.4
2	✓	✓	-	-	22
3	✓	✓	✓	-	20
4	✓	✓	✓	✓	22
2	-	✓	✓	-	21.8
3	-	✓	✓	✓	21.6

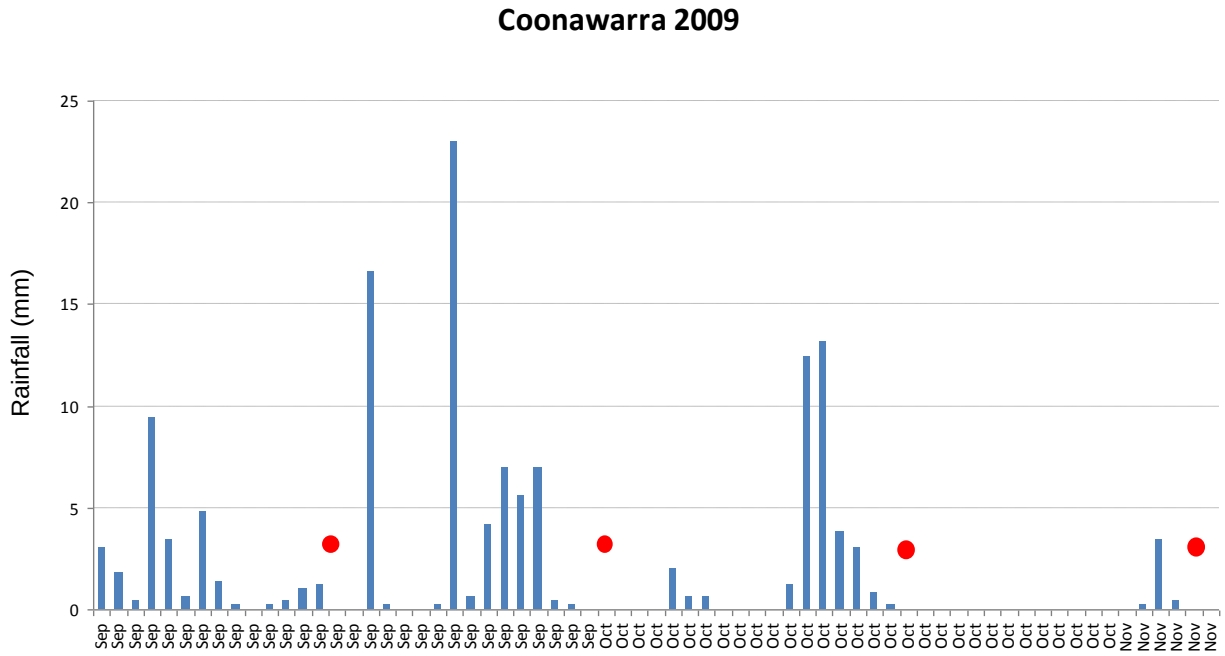


Figure 1 Rainfall Coonawarra 2009 (September – November). Red Dots indicate date of sprays.

6. OUTCOME/CONCLUSION

Workshops and talks on *Phomopsis* have been delivered in Coonawarra on several occasions as well as recent articles published in Australian Viticulture and the Australian and New Zealand Grapegrower and Winemaker. As a result most growers in the area should be confident in recognising the disease.

Further workshops and trials highlighting the importance of *Phomopsis* and spray timing need to be undertaken to ensure that this disease is managed and does not become a widespread problem in Coonawarra and other cool climate areas.

7. ACKNOWLEDGEMENTS

We would like to thank Dan Newson (LCWIA) and Hans Loder, Katnook Estate for organising the workshops and growers and industry representatives for attending the workshops, for their interaction and enthusiasm and the local hospitality that was extended to the visiting presenters. Also thanks to the GWRDC for their investment into this project through the Regional Innovation and Technology Transfer program and to each of the presenters for their time and professional expertise. Also thanks to Dave Sosnowski for applying the fungicides and to the Fosters team at Coonawarra for the use of the vineyard.

8. REFERENCES

Erincik O,Madden L.V., Ferree D.C. and Ellis M.A (2003) Temperature and wetness duration requirements for grape leaf and cane infections by *Phomopsis viticola*. Plant Disease. *87.832-840*.

Erincik,O,. Madden,L.V.,Ferree,D.C., and Ellis,M.A. (2001) Effect of growth stage on susceptibility of grape berry and rachis tissues to infection by *Phomosis viticola* Plant Disease. 85. 517-520`

Erincik. O, Madden L.V Ferree D.C. and Elliss M.A. (2002) Infection of grape berry and rachis tissue by *Phomopsis viticola* Plant Health Progress plant management network.org

Nita M, Ellis M.A. Wilson. L.L. Madden L.V. (2007). Evaluations of new and current management strategies to control *Phomopsis* cane and leaf spot of grape. Plant Health Progress plant management network.org

Nita, M, Ellis M.A. and Madden L.V. (2008) Variation in disease incidence of *Phomopsis* cane and leaf spot of grape in commercial vineyards in Ohio. Plant Disease. 92.1053-1061

Nita, M , Ellis M A . Wilson L.L and Madden LV (2006) Evaluation of the curative and protective activity of fungicides and fungicide –adjuvant mixtures on *Phomopsis* cane and leaf spot of grape : a controlled environment study. Crop Protection 26 ; 1377-1384

Pscheidt J W and Pearson R.C (1989) Time of infection and control of *Phomopsis* fruit rot of grape. Plant Disease. 73. 829 833

Rawnsley B, Wicks T.J. Scott.E. S. and Stummer B.E. (2004) *Diaporthe perjuncta* does not cause Phomopsis cane and leaf spot disease of grapevine in Australia Plant Disease. 88: 1005-1010.

Rawnsley B. and De Garis (2006) *Phomopsis* alert in the Limestone Coast. The Australian & New Zealand Grapegrower &Winemaker 61: 60-61

9. BUDGET RECONCILIATION

Budget	**Funding approved by GWRDC**		**Actual Expenditure**
Prior to 2010 (Inc GST)	4554.00		
Accommodation/meals	SARDI		
Vehicle hire	SARDI		
Field day organisation			From LSCWIC
Total		**Total**	
GST		**GST**	
Total funds requested from GWRDC		**Total funds expended**	