

Best Practice Guide for Vineyard Powdery Mildew Assessment

Introduction

This guide provides a summary of information required for the assessment of powdery mildew severity on grapes in patches of vines in vineyards (vineyard patches).

In-field assessments of disease on grapes in vineyard patches are conducted normally in the period from pre-bunch closure to just before harvest. Assessments of powdery mildew severity may be conducted either alone or in combination with assessments of severity of other diseases (e.g. Botrytis bunch rot) or damage affecting the quality of grapes for wine production, depending on wine company protocols. Diagrammatic keys may facilitate assessment of disease severity (Emmett et al., 2015).

Knowledge of powdery mildew history and/or presence and distribution in vineyard patches before field assessments are conducted can be important because it may influence sampling strategies. A review of records of disease severity during crop assessments in previous seasons and/or records of disease appearance and incidence during monitoring (Appendix 1) earlier in the current season may identify parts of patches with disease 'hot spots' that need to be treated differently during field assessment (Allan 2003).

Vineyard assessment flow chart

Key steps for assessors

1. Ability to recognise powdery mildew on grape bunches reliably?
 - (a) No – Go to 2.
 - (b) Yes – Go to 3.
2. Review symptoms of powdery mildew on grape bunches and other symptoms commonly confused with powdery mildew ([powdery mildew recognition tool](#)).
 - (a) Yes – Go to 3.
3. Ability to assess severity of powdery mildew on bunches consistently¹?
 - (a) No – Go to 4.
 - (b) Yes – Go to 5.
4. Undertake bunch powdery mildew [area assessment training](#), evaluation and in-field mentoring to develop ability to assess bunch powdery mildew severity consistently. A [diagrammatic key](#) is available to assist with area assessment.
 - (a) Yes – Go to 5.

¹ Consistently = concordance value ≥ 0.9 in results from area assessment training tool, where concordance value indicates agreement of estimated with actual area of the images assessed.

5. Knowledge of procedures for vineyard patch assessment and calculation of disease incidence and severity scores?

(a) No – Go to 6.

(b) Yes – Go to 7.

6. Review procedures for vineyard patch powdery mildew assessment ([Procedure A](#)) and calculation of crop disease incidence and severity scores ([Procedure B](#)).

(a) Yes – Go to 7.

7. Conduct vineyard patch powdery mildew assessment and calculate crop disease incidence and severity scores. A free app, PMapp, [[Apple products](#), [Android products](#)], has been developed to facilitate recording powdery mildew in the vineyard.

Procedures

A. Vineyard patch powdery mildew assessment

- Select vines and bunches for assessment according to the wine company's protocol, or use the following procedure to make at least 200 observations per patch (Allan 2003):
 - For every 10 ha, select at random at least 200 typical bunches from vines evenly distributed across the patch.
 - Randomly select rows in each patch. For example, if there are 20 rows, select 4 rows (row numbers 2, 7, 12 and 17), 5 rows (row numbers 2, 6, 10, 14 and 18) or 6 rows (row numbers 2, 5, 8, 11, 14 and 17)
 - Walk down each selected row and assess (or collect) a similar number of bunches to give a total of at least 200 bunches from all rows. For example, about 50 bunches from each of 4 rows, or about 33 bunches from each of 6 rows.
 - Bunches to be assessed should be selected relatively evenly but randomly along each row. Where possible, angle each bunch to sunlight so that the fungus can be seen on the berry surface.
 - Rows at the edge of patches, atypical rows and vines in panels at the end of rows should be excluded from sampling and assessments.

B. Calculation of crop disease incidence and severity scores

- Calculation of crop disease incidence (percentage of bunches diseased) and severity (mean percentage of each bunch diseased) should be done using MS Excel spreadsheets or similar software provided by the wine company or vineyard enterprise. PMapp allows the user to view cumulative incidence and severity during the assessment and to email to a nominated email account the assessment data and a summary.

References and further reading (Guide and Appendix)

Allan W. (2003). Winegrape assessment in the vineyard and at the winery. Winetitles, Adelaide SA. pp 7-8.

Emmett R, Scott E, Petrovic T, Zanker T, Evans K, Kravchuk O, Perry W. 2015. A diagrammatic key to assist assessment of powdery mildew severity on grape bunches. Australian and New Zealand Grapegrower and Winemaker, 623, 46-49.

Viti-notes (2010). Monitoring powdery mildew. Australian Wine Research Institute, Adelaide SA. 3 pp.

Appendix 1

Monitoring vineyard patches for powdery mildew appearance and incidence

Early to mid-season (bud burst to just before pre-bunch closure)

Use the wine company's monitoring protocol to select rows and vines for assessment, or use the following procedure (Viti-notes 2010).

- Select vine rows randomly across the patch for inspection.
- Slowly walk along the selected rows and inspect each side of at least 200 vines for disease symptoms, taking up to 30 seconds per vine.
- Record the number of vines inspected.
- If powdery mildew is detected, record the number of vines with symptoms of powdery mildew on any organ(s), i.e. leaves, stems, flowers, berries.
- Determine the proportion of vines with disease, i.e. disease incidence, by dividing the number of vines with disease by the number inspected.
- Inspect vineyards every 2 weeks commencing at E-L Growth Stage 12 (around 2 weeks after bud burst). Combine inspections with other disease monitoring where appropriate.
- Conduct initial inspections in the most disease prone parts of vineyard patches and/or parts with a history of disease, i.e. potential 'hot spots'.
- Early in the season, when vine canopies are open, look for isolated diseased leaves and shoots.
- As the season progresses, focus inspections on dense vine foliage where air movement is poor or where disease occurred last season.

Glossary of Terms

Disease incidence – the percentage of *bunches* affected of the total number of bunches assessed

Disease severity – the percentage of *bunch surface area* affected

Hot spot – a disease-prone area of vines within a patch.

Patch – a defined area of vines within a vineyard.