



Paul Petrie, viticulture scientist with The Australian Wine Research Institute (AWRI) and The South Australian Research & Development Institute (SARDI), demonstrates how a 'selfie stick' made from a water pipe can be used to take photos for the VitiCanopy App.

Measuring canopy size

Canopy size and density are important viticultural measures that relate to fruit quality. Traditionally, however, they have been difficult to measure. The University of Adelaide has recently released an app that allows growers to assess grapevine canopies using an iPhone or iPad.

Some common questions about using the app are addressed in this article.

WHY DO I NEED TO MEASURE CANOPY SIZE?

CANOPY SIZE AND DENSITY are key drivers of fruit quality, both in terms of having sufficient leaves to ripen the crop and due to their impact on fruit exposure.

In the past, the methods for assessing canopy size and structure have been onerous and relied on the manual measurement of leaf area or poking a rod through the canopy and counting the number of times that it contacts a leaf or bunch. This has effectively restricted them to research applications.

HOW TO MEASURE CANOPY WITH A SMART PHONE?

The front camera on the phone or tablet is used to take an image of the canopy from below the cordon (almost at ground level). You use the front camera as you are able to see the photo

on the screen and ensure that it is correctly positioned (and doesn't include any obstructions).

The app completes the analysis by separating the photo into leaves and background (sky or clouds) and then dividing the photo into 25 squares and calculating the proportion of each square that is occupied by the canopy.

In order to get accurate results the phone needs to be held at 90° to the direction of the row. Ideally this will ensure that the whole canopy is in the image (i.e. you can see sky at the top and bottom of the photo) with the cordon located in the centre.

If the canopy extends beyond the edge of the photo then you may underestimate the canopy size.

It is recommended that the phone is positioned between 70 and 80 cm below the cordon; if the phone is positioned closer to the cordon then the canopy will take up a higher

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proportion of the photo and the vine size will be overestimated.

It is good to keep the phone as level as possible, but if you can ensure the cordon is in the middle of the photo then the results should be accurate.

ARE THERE ANY TIPS AND TRICKS TO MAKE THE PROCESS EASIER?

Building a ‘selfie stick’ out of 25 mm water pipe or similar (see photo) can make the positioning of the phone a lot easier.

It can also be used to push the dripper pipe out of the way which speeds up the process and makes it more manageable for one person.

The volume buttons on the phone’s headphones can be used as a remote shutter release.

Another option is to use a brick as a permanent positioning point for the phone. This is very useful for benchmarking projects, as you are confident that you are taking the photo from the same position and height each time.

Even if you are taking the photos from a different place every time it can also be useful to locate the phone a standard distance from the vine when taking the image.

This ensures the phone isn’t so close that the trunk obscures the canopy and that you don’t end up monitoring poor cordon fill as opposed to canopy development.

When taking the photos you need to be careful that the view of the vine canopy and the sky isn’t obstructed.

Things to watch out for include weeds growing in the undervine area, the trunk, and the hat or forehead of the person taking the image.

If light shines directly into the camera lens it can also obscure a portion of the canopy, this means the early in the morning or the evening (or cloudy days) are best to take the photos.

Sometimes solar noon will also work as the canopy obscures

the sun. You can normally see if the sun is obscuring the image as the canopy isn’t clearly defined in the photo.

WHAT DO THE RESULTS MEAN AND HOW CAN THEY BE USED?

There are two main outputs: the Leaf Area Index (LAI) and canopy porosity. The LAI is an estimate of the area of all of the leaves on the vine i.e. the size of the canopy. The porosity is an estimate of gaps in the canopy that would allow light to penetrate through to the vineyard floor, this may relate to fruit exposure, but it isn’t an estimate of the amount of light that reaches the bunches.

This app has the potential to help benchmark canopy growth and development from season to season. Measurement taken early in the season could indicate that the canopy is denser than expected and shoot thinning would be useful or that shoot growth is not as vigorous as needed and additional irrigation or fertigation would be beneficial. The impact of management practices such as trimming or leaf removal could also be monitored with before and after photos.

For the app to be used effectively good benchmarks or targets are needed for the size and shape of the canopy. This may be harder than it sounds as the measurements will need to focus on the early part of the season, as this is when management (e.g. shoot thinning or irrigation) is the most effective. Canopy development is also very rapid during this period so any benchmarks will need to be closely related to vine phenology. Any canopy manipulation, such as the positioning of foliage wires is also likely to change the results.

The University of Adelaide’s app, known as VitiCanopy, can be downloaded for free from the App store. For more information about measuring canopy size, please contact the AWRI helpdesk on 8313 6600 or helpdesk@awri.com.au.

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