NEED TO KNOW

GLOBAL EXTENSION TEAM

Using the HazelTrex test

NK39

Updated 3/8/2020

AT A GLANCE

The Hazel™Trex test was developed to give growers an indication of the physiological state of their vines in order to refine application timing of budbreak enhancing sprays. It gives an index based on the relative levels of several marker genes to indicate whether the timing is optimal, too early or too late for budbreaker application, and is specific to each cultivar and budbreak product.

Using the test follows five key steps.

1. Purchase the test kit
2. Make a plan
3. Collect and prepare your sample
4. Sample Analysis & results
5. Results - Decide what it means

1: PURCHASE THE TEST KIT

Kits are available as either 2- or 3-test kits, from most of the main horticultural retailers. Once purchased, there is no additional cost. Kits can't be carried over from one season to the next, so use all of what you've purchased each season.

Each maturity area should be tested separately unless they are very similar, so keep this in mind when purchasing. Two to three tests per area will give the best indication of timing.

2: MAKE A PLAN

Once you have the tests, the next step is to work out when you might expect to be the optimal window for your budbreak applicator, because this will influence when you take your first test.

The recommended timing for most budbreak enhancers is expressed as "days before natural budbreak" (DBNBB). You'll first need to work out when natural budbreak is based on winter chill accumulation, then work back to find the approximate application window.

Step 1) Calculate winter chill

- The best data is from a weather station on your own orchard. If you don't have one, use one of the stations on the KVH website (you'll need a login for this).

Step 2) Use a model to estimate the natural budbreak date on your orchard.

- Natural budbreak date will depend on what variety you are growing. The natural budbreak date models take into account winter chilling on the orchard.
- Compare to historic natural budbreak dates on your orchard to check that you're in the ballpark.

Step 3) Estimate your spray window

- The ideal timing for application of budbreak enhancers (HC or an alternative) will depend on the budbreak enhancer you are using and the cultivar you're applying it to.
- Work back from your estimated natural budbreak date to get an estimated spray window.

How does this compare to application dates in previous seasons? Natural budbreak dates and previous spray dates (and results) are useful piece of information to feed into your estimation too.

So now you should have an estimated spray window – in the example here for Gold 3 it was a window from 19 July – 3 August.

Step 4) Decide when to test

Once you have your estimated window, a HazelTrex test could help you narrow this window down.

When you should take your first test really depends on how many tests you are planning on taking and what you want out of the test.

a) A test relatively early in the season (about 2 weeks before your expected spray date) could indicate what 'type' of season can be expected. This is useful when comparing

season to season – are my vines ahead or behind compared to the same date last year?

b) A test shortly before the anticipated spraying date can be used to confirm other data (or reconsider them!) (within a week to ensure results is back before you want to spray).

c) A test on the day of spraying can help determine what to expect from the actual application and can be useful when comparing results from season to season, or from different budbreak products.

3. COLLECT & PREPARE THE SAMPLE

Tip: Visit the "Enhancing budbreak" page on the Canopy website for a video on how to collect a sample.

Select your sample vines

The first step to taking your sample is to choose the vines to sample from. In order to get results that are meaningful, you need to collect a sample that is representative of the area you'll be spraying. You should collect five buds from each of five female vines, for a total of 25 buds from the maturity area.

You are trying to get a representative sample so the key here to make sure that the buds you use for your Hazel™Trex test truly represent your orchard (bud quality, wood type, vine health)

A few tips:

- Choose healthy, representative vines that are all on the same rootstock. It's a good idea to mark these vines with flagging tape so you can use them again for further tests (and ideally again the next season).
- Take vines spread across the area, not all from one spot or all on the edges of the block.
- Select wood types and canes which are typical of the block:
    - Don't select buds from different wood types
    - Collect upward facing buds which have had good sun exposure from wood which carried fruit last year (Figure 1).
    - Don't take the apical (end) bud from a cane. This might be tempting because it's easy to chop off the end of the cane – but remember that these end buds usually behave differently to the rest, so they're not going to give you a useful result.
- Remove the entire bud (Figure 2). You might need to do a few practice ones first to get the hang of it.
- Take the same care as you would with any plant or soil samples for analysis. Be consistent with your sampling methodology from one test to the next.

Once you've collected all 25 buds, it's important that you process them immediately.

Figure 2. Collect buds from representative vines and wood types across the sample area.

Figure 1. Ensure you take the whole bud, but minimise the woody tissue.

Make the juice sample

a) Place all 25 buds in a single compartment of the extraction bag

b) Add the tube of extraction fluid to the bag

c) Close the bag and smash the pieces to a fine consistency using a hammer.
    - Maximum 1 minute
    - Choose a smooth surface to avoid puncturing the bag

d) Collect some juice from the other compartment of the extraction bag using the plastic pipette. You are looking for a nice dark liquid as pale liquid is likely to give an inconclusive result.

e) Apply 2 drops of juice inside the black circle on the sampling card (Figure 3).

f) Air dry the card for at least 2 hours
    - Keep out of direct sunlight and heat
    - The card must be completely dry

g) Insert the dry card into the grip seal bag along with the silica chip to absorb any moisture.

h) Send to Hill Labs in the pre-labelled courier bag.

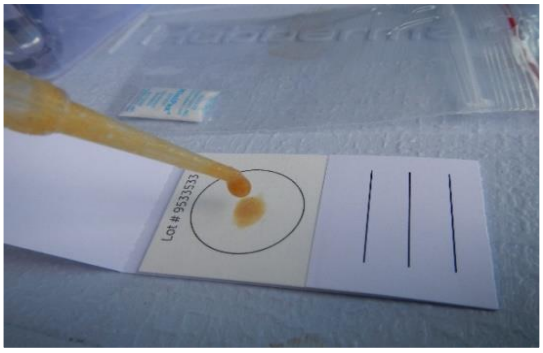

Figure 3. Droplets of juice on the sample card need to be completely dry before you send them off, but keep it out of direct sunlight and heat – these can degrade the sample and affect the result.

Register the sample

The kit has instructions for registering your sample online with Hazel (the test kit providers). You'll need to include which cultivar you've sampled (Hayward or Gold3) and which budbreak enhancer you're using (hydrogen cyanamide or Advance Gold). This is important as the genes they look for differ by cultivar, and the optimal index is different for each budbreak enhancer.

Results will be returned by email within 2 business days. Try to take samples earlier in the week to avoid weekend delays.

4. SAMPLE ANALYSIS AND RESULTS

Samples are processed by Hill Labs in New Zealand, and the sample data is then sent to Hazel Technologies in the USA for analysis and interpretation.

5. RESULTS – DECIDE WHAT IT MEANS

The **index** is a number based on the relative levels of different marker gens in the sample that correlates to how close to the optimal timing for application the vines are.

Results will also give a suggestion of how close to optimal you are:

Too early: it's difficult to draw any conclusions on when the optimal window is - retest in 7-10 days.

Early: you could choose to spray based on the results, or re-test in a few days to a week. Remember that things will have moved since you took the test a couple of days ago.

Optimal: spray on the next good day

Late: the index has passed the optimal window. If your target is a late application to reduce lateral flowers, this may be what you're aiming for.

In the example in Figure 4, the index is 4.5, right at the start of the optimum window. Remember that this is the index that the vines were at **at the time you took the sample**, so by the time you get the result, you should expect the index to be higher. This is why it's useful to take a test on the day of application of your budbreak enhancer, so you know what the index was and can relate it directly to the results you achieve.

What else matters?

Remember that these test results form part of a much bigger decision. You may have to work with a contractor to organise spray applications. Keep in mind that they may have limited capacity to spray on the day that is ideal for you.

Factors other than application timing have an impact on efficacy, including:

- Wood type and quality
- Spraying conditions
- Spray mix – rate, volume, adjuvants etc
- Coverage

Leaving some vines or canes unsprayed and monitoring budbreak can help you to understand how effective your application has been.

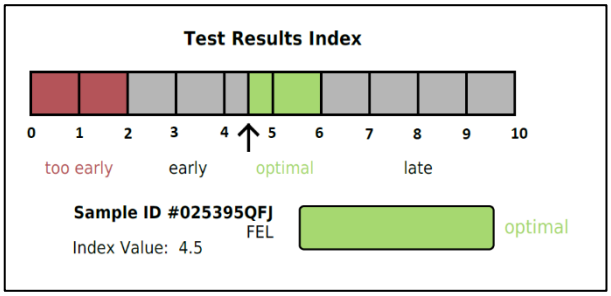

Figure 4. An example of a HazelTrex result. Note that the optimum window may be at different index levels depending on the budbreak enhancer and the cultivar you select.

SHARING DATA WITH ZESPRI

At some point during the process, you'll be asked whether you're happy to share your results with Zespri.

The Global Extension Team is keen to learn more so that we can improve how the test is used.

We want to:

- understand where the test has been used
- follow up with some growers on how they used the test result to inform their budbreaker application dates and what results they had.

We will aggregate data up to industry level or anonymize individual data.

The key to this is understanding how an index on the day of application relates to actual budbreak and flowering data.

For more detail on how the test was developed, see **Need to Know 38 Development of the HazelTrex test**.