



Growers were recently hosted on Quintin and Janelle Havenga's Nanric Orchard in Pukehina, with BerryCo and international berry consultant Stu Doyle leading growers through a visual assessment of spray efficacy. The purpose of the demonstration was to compare existing growers' sprayers with a new machine on the same canopy to critically review the spray deposition. Often growers will 'set and forget' their spray rig potentially compromising diseases and pest control.

At the Pukehina orchard, fluorescent food grade dye was mixed with water and loaded into three types of spray devices, then applied to separate sections of the orchard. Fluorescent dye is invisible in daylight, however viewed after dark with an ultraviolet light the dye highlights spray deposition on the leaves, flowers, fruit and any off-target deposition like tunnels, pots weedmat and trellising. See photos below.

Stu stressed that the aim of pesticide application is to effectively place chemicals and biological products where they will have the most impact in protecting the crop and or eliminating pathogens and pests. If a grower can hit the desired target with an appropriate dose of the required product, they are able to protect the crop / kill the pathogen or pest whilst saving time and potentially reducing input costs and environmental impacts of off target drift.

Matching the appropriate product, water rate spray quality and machine speed and pressure are critical in achieving the desired result. The setup of a spray rig and the fan and tractor speed may be changed many times during the season depending on the size and shape of the canopy (target) and where on the plant the disease or pest is most likely to be found. Growers need to know how to change sprayer set up, based on the task at hand. The use of spray dye and water sensitive paper allow measurement of spray deposition on the target.

Top tips:

- Acquire necessary calibration and testing equipment (dye, water sensitive paper, measuring cylinders etc)
- Assess the canopy (target), weather and pest pressure to ensure set up will be suited to the task at hand.
- Understand the product and adjuvant package – not all wetters/ stickers / humectants are the same.
- Be flexible - your spray equipment may need to change through the season as the plant and target pest changes.
- Spray coverage can be impacted by the effects that wind, air temperature and time of day. Again, your set up may need to be adjusted for the conditions.
- Only have enough fan speed (air assist) to displace the air inside the canopy. Don't be tempted to turn up the fan or hydraulic pressure too high, this can cause droplets to either bounce, shatter or miss the target completely.
- Manage your water quality, Hard water can 'bounce off' seemingly wet leaves due to high mineral content in the water.
- If you are looking at new machinery, work closely with your supplier and allow them to understand in detail your requirements
- Conduct regular testing of spray coverage, and adjust equipment as necessary

Each of the five sprayers used in the demonstration proved to have pros and cons. The largest, newest rig offered air assist, where a fan blew atomized mist into the canopy which improved leaf coverage. Two utilised hydraulic pressure, where water was pushed through a nozzle. All sprayers

achieved a reasonable leaf surface spray quality however deposition on the underside of the leaf and on the flowers / fruit was relatively poor. Post the first trial Duwett was applied and assessed and appeared to improve flower/ fruit deposition – see photo 2 below.

For growers who wish to test their equipment at home using this method, contact your supplier or BerryCo.



1) Air assisted Oktopus spayer

500L linkage, air assisted Sylvan Oktopus sprayer (brand new)

<https://www.silvannz.co.nz/silvan-sprayers/oktopus-500l-450mm-fan-electric-valve-controls/>

This is a brand-new sprayer from Miro Te Teko that was still in the process of being set up having not actually sprayed on the orchard. The dye testing was useful to identify what needed adjusting.

This sprayer gave an excellent, fine coverage that was very homogeneous, extensive, and consistent over the foliage surface. Both the dye distribution and spray papers confirmed this. There were a couple of bands that were receiving only light coverage, but this was due to the initial orientation of the spray arms. Also, some of the underside of the leaf was not getting coverage. This started a process of making the necessary adjustments.

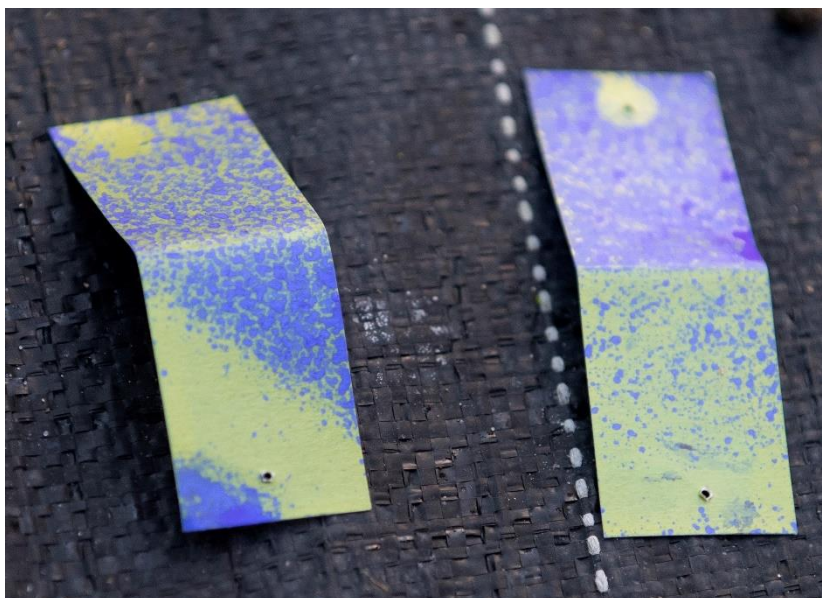
This coverage was able to be achieved at a faster speed than the other sprayers (6km/hr). The tractor is 80HP and has a variable rate controller mounted to optimise the spray delivery.



2) 500L tow behind pressure sprayer driven by sperate motor

This was Nanric's own sprayer. The sprayer, while purchased 2nd hand was modified by Splash Direct, Te Puke. The innovative feature of this sprayer was the addition of a 'swing out' arm which straddled the outside row directing spray to both sides of the plant. The nozzles are pressurised by a petrol driven motor mounted in front of the spray tank with no fan or air assist.

Results were satisfactory but the trial results set off a series of adjustments to nozzle height and direction to improve distribution.



3) 500L tow behind air blast sprayer driven by sperate motor.

The 'Mirtillo' development in Papamoa is also a new sprayer for that development. Similar to #2 as it is pressurised by a petrol motor mounted on the spray tank but different in that it also has a fan so is air assist. This sprayer had not been used on a full canopy yet. Testing reinforced the comment above, that if the fan pressure is too high it is counter productive for good, targeted coverage. The set up for this sprayer will be testing to find the sweet spot between nozzle selection, pressure, fan adjustment and speed down the rows.



4) 200L self-powered Sylvan sprayer towed behind a quad bike

This is the sprayed used to spray Akaroa's 1 Ha at Pongakawa. It is light, manoeuvrable and gives great access to this sloped property. The nozzles were selected to give a fine mist achieving satisfactory results. Like all the sprayers used, coverage under the leaves was less while the top of the leaf was homogeneous. To get adequate coverage a slow speed was required – around 2km/hour.



5) 15L Stihl Crop duster

Included as a comparison this 15L backpack, motor driven sprayer is from BerryCo's Clarke Rd site. It is used there for both nursery plants and fully grown plants. Coverage was extensive but tended to be 'over done' with the residue pooling on the leaves and running off the tips. This was from close range application. It would be better applied walking up the row from both sides with the spray mist penetrating the canopy at a distance where the spray mist is 'swirling' as opposed to close range 'blasting'. It could have an application in a large orchard for supplementing spraying persistent pests/diseases in the leg row if coverage is consistently less. Also, it has an excellent secondary application as a 'blower' to clean up dropped leaves and debris around the base of the plants.

