Case Study June 2024

Recycled green waste under vines

On-Farm trials to enhance the uptake of composted recycled green waste in vineyards of the Macedon Ranges.

A case study highlighting cost/benefits.

Aim

Investigate the benefit of recycled green waste mulch and compost applied as a band undervine. Measure the effect on soil, weeds, vine health, grape yield and quality in comparison to a weedy control for two seasons with affordable tools and estimate the cost/benefit. Treatments started at bud burst (Fig. 1) with hand applied products undervine.

Application rates

Mulch- 90cmw x 5.0cmH

Compost- 45cmW x 2.5cmH

Laboratory analysis:

SESL, EAL and Winechek

Figure 1 mulch and compost under vine

Figure 2: weed suppresion by mulch at verasion

Trial results

RESULTS

Weed suppression:

Mulch blocked out weeds efficiently (Fig.2), compost did not.

Soil moisture:

Was higher under mulch than under compost or control.

Soil temperature:

Under mulch and compost the soil at 15 cm depth was warmer in spring and cooler in summer compared to control soil.

Petiole analysis:

Mulch undervine improved petiole N and P more than compost.

Vine vigour:

Active leaf area was higher over mulch than over compost or control.

Yield:

Higher over mulch than over compost or control but not every year, as N content of mulch and compost were not consistent between seasons.

Grape quality:

Brix was slightly enhanced by mulch and compost. TA, colour and phenolics were higher over mulch than over compost or control. Tannins were lower over the moist mulched soil compared to grapes from the dryer compost or control soils. Mulch and compost improved YAN.

Soil analysis:

Mulch and compost enhanced soil C and N in year 1 but less so in year 2, but not enough to sufficiently enrich the soil. Mulch and compost led to high NaCl and K levels in the topsoil and did not sufficiently improve the low calcium content.

Mulch and compost analysis:

The batches of year 1 and year 2 were not consistent in their particle size, maturity, N and P content and salt concentrations. This had a distinct effect on soil, plants and yield. AS4454 analysis showed red flags in several test categories in each year, which are being addressed by the recycling industry.

Mulch and compost quantity and cost/benefit calculator

A **mulch/compost cost** calculator has been created according to:

- intended height and width of mulch undervine,
- vineyard's row width,
- cost of mulch/m^3, and
- block size to be mulched.

For a row width of 2.7 m and an intended mulch band of 75 mm high and 1 m wide, as recommended in the literature, 277.8 m^3 mulch is required/ha. At \$ 25/m^3 = \$ 6,944/ha.

For a row width of 2.7 m and an intended mulch band of 50 mm high and 90 cm wide as used in this trial, 166.7 m^3 mulch/ha is required. At a cost of \$ 25/m^3 = \$ 4,167/ha.

A mulching resourcing calculator was elaborated considering:

- row width,
- loading and turning time, tractor speed, and
- spreader capacity.

For a row spacing and band as used in this trial and a side spreader taking 4 m^3 mulch, assuming one person spreads and one person loads (42 times), one ha of vineyard can be spread with mulch undervine in 6.8 h. At a row width of 2.2 m this can amount to 8.4h/ha.

A **cost/benefit analysis** has been undertaken using the cost of:

- mulch/compost/ha calculated with the calculator,
- spreader and front end loader hire (assuming own tractor pulls the spreader), and
- labour calculated with the time requirement calculator.

For the On-Farm trial conditions, mulch application undervine would be about \$6,000/ha.

The mulch expense would be 64%, equipment hire 17% and labour 19%.

The benefit of mulch was assumed to be

- saved summer herbicide spray,
- saved emergency irrigation,
- saved fertiliser (provided mulch is high in N,P), and
- increased income from increased yield.

At a premium grape price, a yield increase of at least 10% is required to break even.

For compost there was no weed suppression and water saving. However this trial used only 42 m^3/ha, which can be spread faster. At \$35/m^3, the cost would be about \$2,500/ha.

The benefit would be the saving of fertiliser if composts were high enough in N and P.

A yield increase of at least 5% is required to break even. This was not reliably obtained, however, there is a pathway to achieve this in the future.

IMPROVEMENTS

Mulch and compost from recycled organic green waste should be batch to batch consistent and delivered with an NPK and biosecurity certificate.

Taylor made mulches or composts for viticulture can be achieved in collaboration between grapegrowers and the recycling industry.

Keep up to date with what's happening

For more information about this project or our other activities please contact Karen Thomas on karen.thomas@melbournewater.com.au or visit https://www.melbournewater.com.au/services/projects/compost-under-vines-macedon-ranges

For an interpreter, please call the Translating and Interpreting Service (TIS National) on 13 14 50

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