



# Improving efficiencies, soil and biodiversity

## Understanding the best options when sowing cover crops

There are many reasons to plant cover crops and if they are to be part of vineyard management, then the first task will be determining which sowing method is best suited to the site in question. Informed decision making in the early stages of implementation will ensure the potential benefits of having a cover crop are realised, thereby justifying the allocation of financial and labour resources to this strategy, writes **Simone Madden-Grey**.

If the motivation for planting cover crops is soil amelioration and/or carbon and nitrogen sequestration, minimising soil movement is key. Speaking at a Jackson Family Wines Rooted for Good webinar, Christina Lazcano, PhD, Assistant Professor of Soil Ecology, UC Davis California, refined the definition of carbon sequestration to make the distinction between atmospheric carbon and liquid carbon, or carbon that is contained within root exudates and consumed by microorganisms. She noted that advances in technology and science have improved data capture and assessment of the impact soil disturbance has on soil structure and the microorganisms within it. Advances in technology have also brought methods from the agricultural sector into the vineyard and this is providing options to reduce the amount soil is worked prior to sowing a cover crop.

### Direct drilling

A direct drilling system uses discs that cut through the soil or a sward in order to deposit the seed directly in the ground. Sowing seed this way significantly reduces the number of tractor passes undertaken and the amount the soil needs to be moved when preparing to sow a cover crop. At Felton Road, Bannockburn Central Otago, Gareth King tells me the Duncan driller they use was constructed from an agricultural drill at the request of Felton Road in 2003, because at the time there was nothing available in the market. Today, Duncan produces drills specifically for vineyards but, King points out, they have yet to build one that sits inside 2m rows.

### Preparation

A number of site specific considerations must be made when using direct drilling. Bart Arnst, a viticultural consultant based in Marlborough says, “you need to know

what you’re drilling into. It’s also important to know how competitive and fast growing the pre-existing species will be”. Essentially, Arnst says, an understanding of how the cover crop will compete with existing cover is critical, as is the sowing season, soil moisture levels and soil temperature at the time of drilling, as well as potential

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rainfall events after drilling. If needed, he advises running a mulching mower over rows prior to drilling in order to reduce competition and give the seeds the best chance at germination.

In Felton Road, King agrees, saying resources need to be considered such as machinery size in relation to row width, aspect and height, the capability of the drill to cut through a heavy or a light thatch and so on. The ability to think ahead is critical says King, and understanding how the cover crop develops, including the potential water competition, moisture retention and disease pressure as well as the impact thatch thickness will have on the viability of future seed drilling are all decisions to be made before starting.

### Soil type

Soil type will have a role in determining sowing method and for fragile soils where erosion can be an issue, Arnst sees direct drilling as the best option. This is also the experience at Greystone Wines in North Canterbury, where Mike Saunders says the

minimal soil disturbance from depositing the seed directly into the soil helps reduce soil erosion, which is particularly good if there are slopes in the vineyard. Speaking at the OWINZ Marlborough Symposium 2021, Saunders had many tips for sowing cover crops. He recommended investing sufficient time in adequate preparation, ensuring the seed is easily available, that sufficient labour for the chosen sowing method is available and that ideal weather conditions in terms of warmth and moisture for the seed being sown are understood. He also highlighted the importance of being flexible with regard to working around the climate and to the sowing method selected. Jono Frew of Natural Performance agreed, saying that when working with a range of clients in New Zealand, he encourages them not to overthink things, not to be limited by access to kit but to be innovative. He says there are a number of different ways to get seed into the soil.

### Sowing rates

At the OWINZ Marlborough Symposium 2021, Arnst stressed the importance of knowing correct sowing rates as well as understanding the iceberg effect of cover crops for undervine impacts. Both Arnst and King note the requirement for a higher sowing rate when using a driller. In his experience, Arnst says, “with direct drilling I would up the rates by at least another 30 per cent over what you would normally drill after mid row cultivation,” and at Felton Road, the seeding rates are also increased to attain the required germination rates.

Talking to me from his tractor cab, King is sowing a mixture of legumes and cereal as well as flowering species to encourage beneficial insect populations, with a plan to crimp those crops in autumn or next

spring. Ideally he says, “we would have perennial species that provide a thatch that can be drilled through when next sowing a cover crop.” The nuances of managing each particular site come into play when selecting and sowing cover crop species, and at Felton Road decisions are guided by goals such as soil quality improvement, increased biodiversity and minimal row passes. With that in mind, simply leaving natural grasses and herbs to come away in the vineyard is not enough. King says it is a conscious decision whether or not to disturb the soil and if so, how much is necessary in order to plant species that realise those goals.

### Kit

In addition to the Duncan seed drillers, other brands are being used across New Zealand such as the Taeye vineyard seed drill, which is used at Te Whare Ra in Marlborough. Arnst tells me that some of the newest drillers being used are from French company Novag, which offers direct drill air assisted seed delivery. The driller can do most things in one pass, says Arnst, such as differing seed depths and various seed mixes.

In terms of virtual kit, Organic Winegrowers New Zealand (OWNZ) has



published a manual for planting cover crops and this is available to all members of the New Zealand wine industry. King describes it as an outstanding resource for the industry, crediting Bart Arnst and Nick Paulin, of Aotearoa New Zealand Fine Wine Estates, as major contributors to the guide. If growers outside New Zealand wish to obtain a copy, it can be downloaded free of charge from the OWINZ website.

### Broadcast

In contrast to direct drilling, a broadcast system deposits the seed directly on the ground and might be suitable for sites where rows are too narrow for seed drillers, which are limited to row widths of 2m or wider. In Hawke’s Bay, Amy Farnsworth and Nick Paulin use drop seeding because drillers will not fit down the narrow rows of Smith & Sheth’s Omahu vineyard. A seed dropper is mounted onto a rotadairon to broadcast a metered amount of seed onto the soil surface. If compost is to be included, this is when it will be added and incorporated into the soil using the rotadairon which is set at a shallow depth so as not to bury the seed too deep.

The manner in which cover crops are established will ultimately be guided by site specifications, resource allocation and viticultural goals whether holistic or commercial. As vineyard practices evolve, reframing learnings from other industries and finessing them for viticultural conditions will continue to help refine the task of sowing cover crops.

### References

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