ECO VINEYARDS
GROWING RESILIENCE NATURALLY

FACT SHEET

UTILISING NATIVE GRASSLAND SPECIES IN AUSTRALIAN VITICULTURE

A 'HOW TO' GUIDE AND MANAGING EXPECTATIONS

By Andrew Randell Fairney, Seeding Natives Incorporated

Wine Australia
retallack viticulture
Seeding Natives Incorporated

PLANNING YOUR PROJECT

The beginning of your successful and exciting journey with native grasses and forbs starts with being aware of native-specific characteristics so that you can set your objectives and manage your expectations. One of the most important things to remember is that each project plan must be tailored to the site and there is not one recipe for success.

Native grasses and forbs are a great option for mid-row, under-vine, headlands, and adjacent land. But you must know what to do, how to do it and what to expect.

Key factors

- Native grasses are slow to establish and the time taken will vary from site to site.
- Appropriate site preparation (weed management) is the key to success.
- While establishing, natives can be outcompeted by the presence of exotic species.
- The time required for adequate site preparation is determined by the weed species and density on the site, the site preparation techniques chosen, the species to be sown and your objectives for the end result.
- Not all seed will germinate at the same time, in the same season or even in the same year.
- Native species require a different management regime, and it may be site specific.
- Guidance from a native species professional is essential.

NATIVES HAVE EVOLVED TO COPE WITH OUR VARIABLE CLIMATE

Native grassland species are adapted to the ancient soils and often dry conditions in Australia. They have evolved with these conditions for thousands of years and have developed a range of unique strategies for germination, growth and survival.

The good news is once established, native grasses are very robust, long-lived perennials that have evolved to cope with drought and can respond quickly to rainfall.

One of the significant features of native grasses that allow them to persist in our Australian climate is varying seed dormancy. Many native seeds have hard coats and/or chemical inhibitors to prevent them from all germinating at the same time.

It can take months to years of weathering and rainfall to wash those inhibitors off before the seeds of some species will germinate. This is one reason why you cannot put a calendar date on when native seedlings will emerge out of the ground like you can with other agricultural crop varieties.

Other variables to consider include, different species prefer different soils, different positions in the landscape, different aspect, different nutrient levels, different climatic conditions, and even different levels of direct sun exposure.

It is nearly impossible to calculate all of these factors, but you can increase your success rate and biodiversity by adding seed from a variety of different species.

With a wide variety of species included in the mix, not only are you increasing biodiversity, they will also have different landscape preferences, different germination cues, different seed dormancy and different growth rates. Whatever the season looks like, there will be seeds that will be ready to germinate and grow across your site.

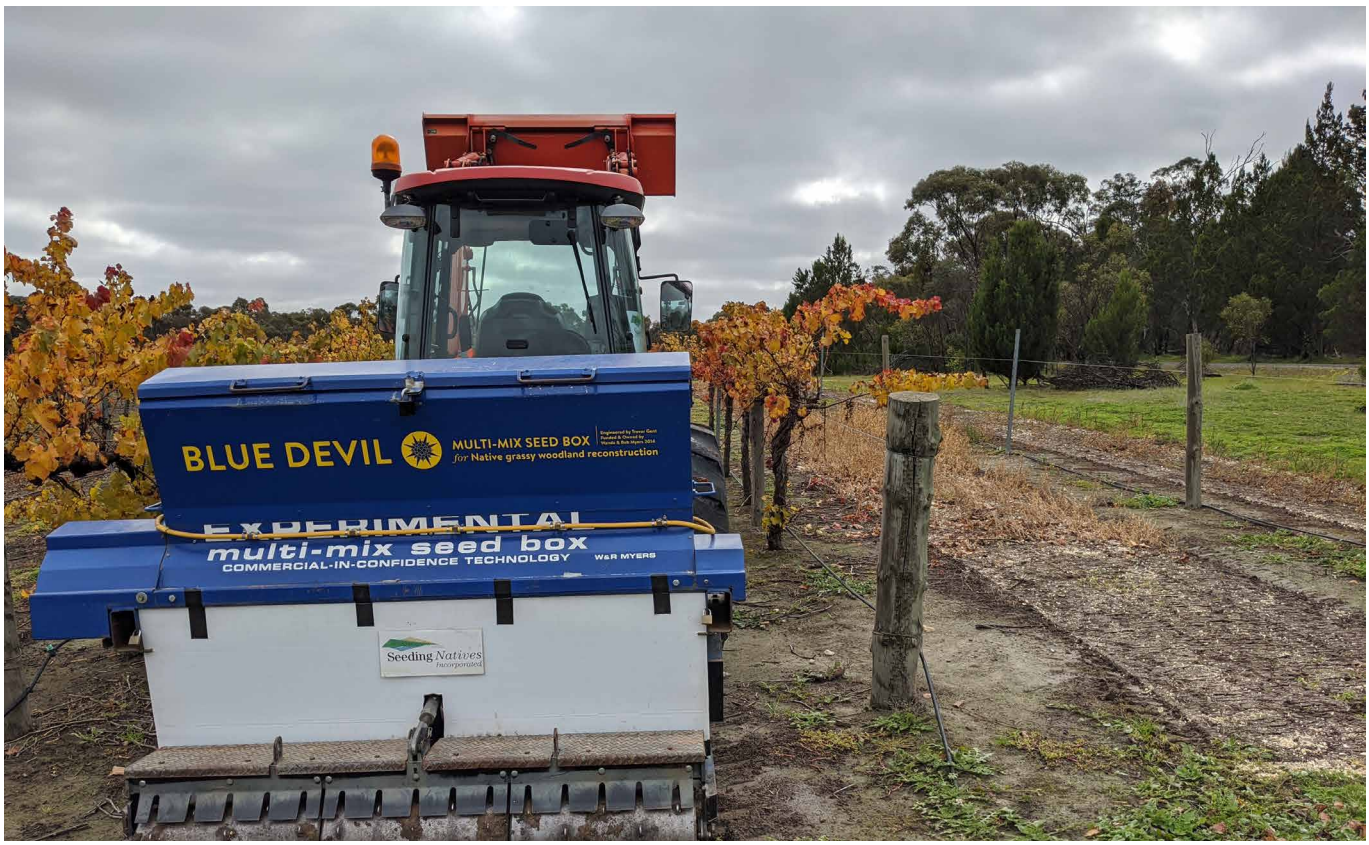

Figure 1. Seeding Natives Inc direct seeding at Dan Falkenberg's property in the Barossa wine region, South Australia [Photo: Andrew Randell Fairney].

Native versus introduced grasses

Most native grasses are long-lived perennial plants. Initially, they can be very slow growing but once established they are tough, adaptive, and resilient.

Introduced grasses can be annual or perennial. Most, but not all, are better adapted to higher rainfall and soils with a higher moisture content. They will germinate and grow more quickly than our native species and also may have an ability to give themselves a competitive advantage by altering the soil (allelopathy) to the detriment of native species.

Introduced annuals are widespread; however, in South Australia only a few species, including wild oats and annual rye are a serious threat to native grasses.

Introduced perennials are also widespread and in South Australia many of them pose a serious threat to the persistence of native grass ecosystems, whether in the mid-row or in a paddock. Some of the common introduced perennials in South Australia include

- *Dactylis glomerata*, cocksfoot
- *Ehrharta calycina*, perennial veldt grass
- *Holcus lanatus*, Yorkshire fog
- *Lolium perenne*, perennial rye
- *Pentameris pallida*, pussy-tail grass
- *Pipatherum miliaceum*, rice millett
- *Phalaris aquatica*, canary grass.

Site preparation

Living weeds are not the only factor to be considered in site preparation. More importantly, it is the significant weed seed bank in the soil.

There can be anywhere from 20,000 to 200,000 weed seeds in one square metre of soil. Native grasses will not compete with introduced grasses in their establishment phase. It is important when establishing native grasses and forbs, that you manage the weeds that will be there, because the vulnerable part of this process is getting the natives established.

The required site preparation for your property will depend on three important variables, site-specific characteristics, weeds that need controlling and your objectives. For example, if you're an organic enterprise and your objective is to get some natives onto your property with the other species that already exist, you may get away with cultivating a few times and then seeding the area.

At the other end of the spectrum, if you are not organic and want a sward of native grasses as clean as possible, you may need to undertake weed control activities, potentially including herbicide applications for two or three years to work down the weed seed bank before direct seeding the area.

There are a variety of preparation methods that can be utilisied either on their own or in a combination to get the best results. The methods you include on your property will depend on site characteristics, soil type and profile, as well as site land use. The most common methods include, herbicide application, mechanical soil disturbance, topsoil scraping, mouldboard ploughing, capping with clean soil, and Bioweed Ultra application to desiccate the weed seed.

Direct seeding

Seeding can be undertaken in a variety of ways. One of the most important factors is getting good seed-to-soil contact for germination. Seed depth is also a factor to consider. Predation of the seed can occur if it is left on the surface and buried too deep it may not germinate. Timing of the seeding event will depend on the species you are sowing and where you live.

Generally, cool season (C_3) grasses (and forbs) are sown in cooler temperatures after breaking rains of the season but before the soil loses its warmth.

Warm season (C_4) grasses are sown when the temperature is above 25°C with follow up rainfall to initiate the germination process. All species can be sown at the same time, they will sit in the soil until conditions are right and they will begin to germinate.

Native grasses and forbs are notoriously difficult to sow through agricultural equipment due to their lack of flowability. Pelletising can rectify this issue; however, the expense can be prohibitive. Hand casting of seed or machine distribution of the seed across the surface of the soil is an option. However, a method of topsoil incorporation may be required to prevent predation and loss of the seed to wind. Specialised direct seeding machinery is the best option for reliability, to place the seed at the right spot in the soil and achieve the desired plant density.

Management

As with the other aspects of native grasses, the management will also be site specific and influenced by your objectives. Once established, most native grass swards only need to be cut once a year after mature seed has been produced.

Weed management can take a variety of forms, including selective herbicide, herbicide wiping, timed biomass management, and hand control methods. Due to the site-specific nature of management, please seek the advice of a native grass specialist before undertaking any management.

Some benefits of native ecosystems

Many native grasses are long-lived. Some grasses can live for more than 60 years and the bigger iron-grasses, *Lomandra* spp. (not actually grasses) can be hundreds of years old. Over time, plants are continually growing and dying but there's a perennial structure throughout the landscape that promotes fantastic root depth and the underrated soil biology that drives what we see above ground.

This under ground structure sustains all the other plants through good soil moisture-holding capacity, intact carbon latticework, a good liquid carbon pathway, nitrogen cycling, and phosphorous availability. The benefits to viticulture include, but are not limited to, improved water-holding ability, quality and structure of the soil, enhanced nutrient availability to vines, and superior habitat above ground for beneficial insects that help with integrated pest management.

When undertaking restoration with native grassland plants, there needs to be patience and realistic expectations of what to expect while they are getting established.

They are worth the wait!

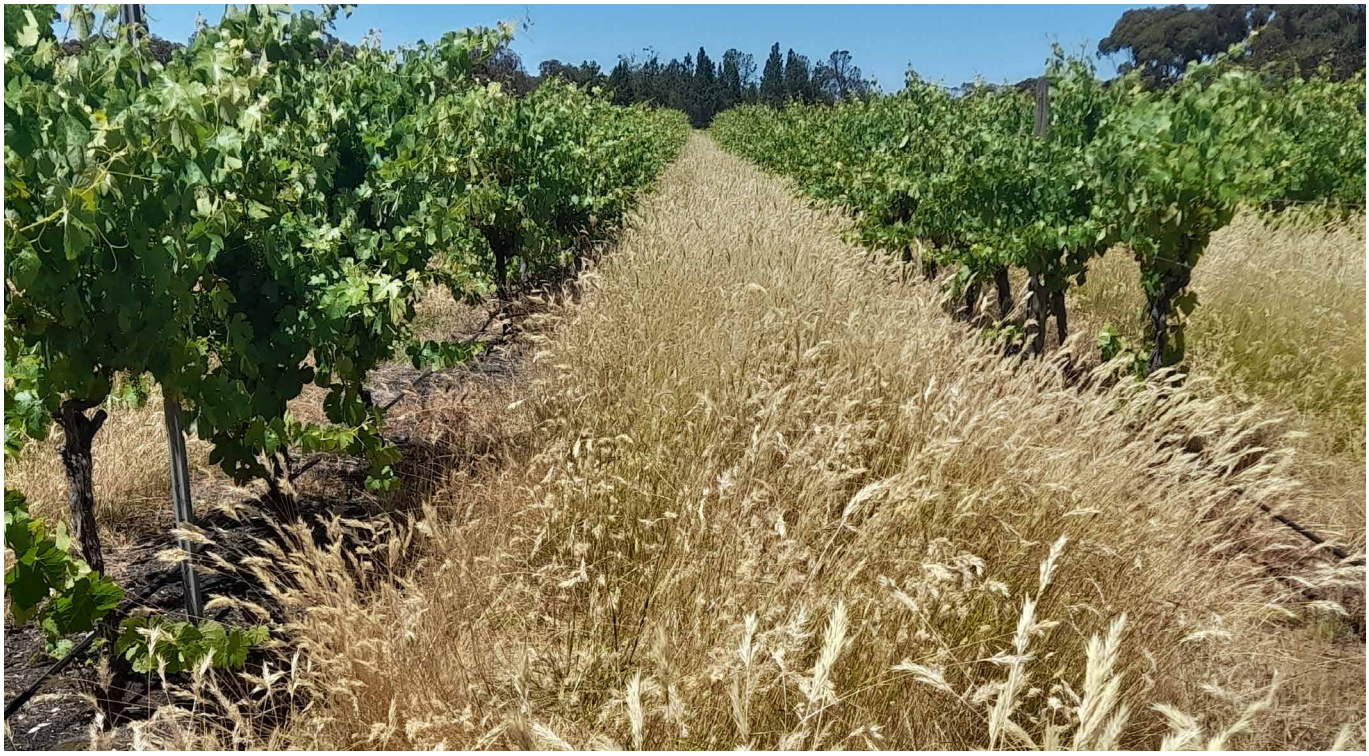

Figure 2. Established native grass in a mid-row at the Falkenberg Vineyard, Barossa, South Australia [Photo: Dan Falkenberg].

Disclaimer

For more information about the National EcoVineyards Program please visit www.ecovineyards.com.au @EcoVineyards

ECO VINEYARDS
GROWING RESILIENCE NATURALLY

PROGRAM PARTNERS

Wine Australia

retallack viticulture
wine growing for the future

REGIONAL PARTNERS

Adelaide Hills Wine Region

WINE GRAPE COUNCIL SA

riverland wine

CLARE VALLEY

A DROP ABOVE Orange Wine Region

LANGHORNE CREEK REGION WINE

wine. Yarra Valley

MPY MORNINGTON PENINSULA WINE

MARGARET RIVER WINE

HUNTER VALLEY WINE AND TOURISM ASSOCIATION

The National EcoVineyards Program is funded by Wine Australia with levies from Australia's grape growers and winemakers and matching funds from the Australian Government.

ACKNOWLEDGEMENT OF COUNTRY

EcoVineyards proudly acknowledges the Aboriginal and Torres Strait Islander Peoples, and their ongoing cultural and spiritual connection to this ancient land on which we work and live.

As the Traditional Custodians of this land, we recognise their wealth of ecological knowledge and the importance of caring for Country.

We pay our respects to elders past and present and extend this respect to all Aboriginal and Torres Strait Islander Peoples.


ECO VINEYARDS
GROWING RESILIENCE NATURALLY