

Update

August 2020

National Hay Agronomy – supported by AgriFutures Australia

2020 Research in Progress

The National Hay Agronomy research project has trials, demonstrations and paddock surveys currently underway across southern Australia working with SARDI, AgVic, NSW DPI and the Birchip Cropping Group.



Oaten hay disease survey

Agriculture Victoria and DPIRD are currently surveying ~30 oat crops in 2020 to determine foliar disease incidence and severity. Samples displaying symptoms suspected of being Red Leather Leaf, that are collected in WA will be submitted to diagnostic laboratories for confirmation, as this disease has not been confirmed previously in Western Australia. Isolates of pathogens detected will be collected for future virulence testing (if suitable).

Necrotrophic pathogens

Agriculture Victoria is conducting research investigating red leather leaf, while DPIRD is conducting research investigating Septoria blotch, representing the locations where the diseases are most prevalent.

DPIRD and Agriculture Victoria have two research trials at two locations, with six-seven varieties, two treatments (+/- disease), a minimum of four replicates, in randomised complete block design. Visual disease severity is being assessed, and hay cuts will determine yield and quality loss. DPIRD will also take grain yield assessments.

In Victoria, the varieties evaluated include; MSS – Brusher, Yallara, Mulgara, Wintaroo; MS – Williams; MRMS – Forester. Disease pressure; Maximum disease - (Untreated control), and no Disease - (Systiva, propiconazole at Z25, Z31 and Opera at Z39-55).

In Western Australia, the varieties evaluated include; SVS – Brusher, Carrolup; S – Yallara; MSS- Wintaroo; MRS – Mulgara; MRMS – Williams, Koorabup. Disease pressure; Maximum disease - (Untreated control), and no Disease - (propiconazole at Z25, Z31 and Opera at Z39-55).



Trials are located at Dale and Muresk WA, and Horsham and Inverleigh VIC.

Rust diseases

DPIRD is conducting research which assesses the impact of leaf rust on hay quality. Three management strategies (no spray, one spray, two sprays) are currently being assessed, when applied to three varieties with varying resistance rankings (SVS - Carrolup; MR - Mulgara; RMR - Williams).

The trial is located at Manjimup WA, at a specialised pathology facility.

Saprophytic fungal staining / weathering

Agriculture Victoria and DPIRD are currently undertaking a hay staining, fungicide experiment to determine the impact of strobilurin chemistry, compared to other registered chemistry, on the weather damage caused by adverse weather events occurring in the post-cut pre-bale period.

Trials will be cut, creating windrows which will remain in the field exposed to the weather. If rainfall events do not occur within 7 days of cutting, the windrows will be irrigated to simulate adverse weather conditions which may cause staining.

Trials located at Muresk WA, and Horsham VIC.

Core agronomy series

The agronomy trial series which evaluates variety selection, nutrition rate and determines the optimal sowing window for export fodder – early May or early June - is underway in WA, SA, VIC and southern NSW, building on the trials conducted in 2019. This trial series aims to investigate variety sensitivities to agronomy, to develop agronomy packages which supports growers' adoption of new varieties in the diverse growing environments across southern Australia.



Trials are irrigated if required to germinate at the target sowing dates of early May and early June.

Trial sites are located near Muresk WA, Hart SA, Birchip VIC, and Yanco NSW.

The role of plant growth regulators in export fodder

This research is currently evaluating **Moddus**®. In high rainfall environments, high nutrition scenarios or when adverse weather occurs lodging can become a major issue for export fodder producers. Lodging can result in significant downgrades, and difficulty in cutting and baling fodder. The National Hay Agronomy project is evaluating the effect of Moddus on hay yield and quality in this trial to assist the export fodder industry in determining the role of PGRs.

These trials are located near Birchip in VIC, and Tarlee, SA.

This research is currently evaluating **gibberellic acid**. In lower rainfall areas or late sown oat crops particularly in seasons that experience a dry spring, it can be difficult for the panicle to emerge fully from the boot. This is important as curing time of crops increases when the panicle does not fully emerge. As a potential tool to combat this issue, these trials will use an application of gibberellic acid at either stem elongation, flag leaf emergence or both to promote panicle emergence from the boot.

Trials located at Merredin and Wongan Hills in WA, and Lameroo, Tarlee and Booleroo in SA.

Evaluation of new imi-tolerant variety Kingbaleß, and its nitrogen response in comparison to its parent – Wintaroo.

This trial will aid us in understanding if the newly released variety Kingbale (not yet available commercially) responds similarly to its parent - Wintaroo. The hypothesis is that it will respond similarly, and that agronomy for growing Wintaroo is directly transposable to growing Kingbale.

Trials located at Wongan Hills and Muresk in WA, and at Tarlee and Lameroo in SA.

Demonstration of plant density and nitrogen timing requirements in export oaten hay crops in Southern NSW.

This trial aims to provide information to support grower's achieving higher plant densities and nitrogen strategies to produce export oaten hay in Southern NSW, where previously there was a domestic fodder focus.

Trials are located at Marrar and Gerogery NSW.

Understanding the impact that growth stage has on hay yield and quality, with cuts taken at three growth stages.

This trial aims to provide data that identifies trends in hay quality as the plant progresses through the growth stages from head emergence to milk development. This trial will build on previous research conducted by DPIRD in 2006-07.

Evaluation of awnless wheat and oaten hay varieties at Merredin WA.

This trial aims to evaluate awnless wheat lines/variety (LPB 19-7946, LPB 18-7982 and Sunlamb) for their suitability as export fodder varieties. The trial will also demonstrate export oaten hay varieties (including Kingbale, Koorabup, Swan, Carrolup, Durack, Mulgara, and Brusher) in this lower rainfall environment, which is capable of producing high quality export fodder.



2019 Research

Pathology key messages

Can weather damage post-cutting, pre-baling be managed?

Fungicides and antimicrobial chemicals applied according to label recommendations reduced saprophytic fungal colonisation of senescent tissue, but did not improve green leaf retention or reduce overall microbial population in oaten hay.

Following label recommendations for rates and withholding periods is vital to avoid chemical residue in hay which could jeopardise export hay markets.

What is the impact of Red leather leaf, and its best control?

Red leather leaf (RLL) was the most common and severe foliar disease of oats in south eastern Australia during 2019.

Red leather leaf infection caused up to 13% (2.1 t/ha) hay yield losses to susceptible rated varieties.

Fungicide application at mid-tillering (Z25) growth stage provided the best suppression of RLL.

Septoria and leaf rust were not an issue in a short, dry season.

Low levels of septoria in 2019, resulted in no definitive key messages. The trials will be repeated in 2020.

Leaf rust trials were opportunistic in 2019 – there was no occurrence.

Agronomy key messages

At all trial sites there was supporting evidence for variety specific agronomy.

In southern NSW, varieties responded differently to the changes in sowing date, and its influence on their hay yield, height, leaf chlorophyll, stem diameter, WSC, NDF, ADF, crude protein, digestibility, and dry matter.

In Victoria, varieties responded differently to the changes in sowing date, and its influence on their hay yield, height, leaf chlorophyll, NDF, and dry matter. Varieties also responded differently to nitrogen, and its influence on their hay yield, height, ADF, NDF and WSC.

In South Australia, varieties responded differently to the changes in sowing date, and its influence on their hay yield, height, leaf chlorophyll, WSC, NDF, ADF, crude protein, digestibility, and dry matter. Varieties also responded differently to nitrogen, and its influence on their WSC, NDF, ADF, ADF and hay yield.

In Western Australia, varieties responded differently to the changes in sowing date, and its influence on their hay yield, height, leaf chlorophyll, NDF, digestibility, and dry matter. For example, unlike the other varieties tested, the hay quality of Yallara was stable in response to increasing applied N to 90 kg N/ha, and was the only variety to consistently meet Grade 1 quality requirements for WSC% and NDF% as applied N increased.

The information generated from the 2019 trials is supporting growers in improved variety selection as the variety needs to match the optimal growing window for export oaten hay production, and the season break, and there is now data to support their decision making.

Forester is too slow in its phenology to be suitable for export oaten hay based on the trials located at Muresk, Northam, Katanning, Hart, Lameroo, Tarlee, and Kalkee. This variety has been swapped for Vasse in the 2020 trial series.

Based on only one season of data, there are no changes to current agronomy practices recommended yet. It is expected that following the repetition of this trial series in 2020, there will be variety specific recommendations published to increase the likelihood of growers improving hay quality, and modifications to the trial design.

What is the role of plant growth regulators in export fodder?

In Victoria, at Kalkee, the application of Moddus® (at either 200 ml/ha or 400 ml/ha) reduced hay yield, plant height, leaf chlorophyll, and NDF %, but did not influence other hay quality traits. Forester showed signs of increased sensitivity to Moddus®, as the only variety whose WSC % was increased (from 32.3% to 39.9% when 400 ml/ha of Moddus® was applied). No lodging occurred at the site in 2020, due to the environmental conditions – lodging was expected as the crop was early sown, with high nitrogen application rates.

In Western Australia, at Highbury, the application of 400ml/ha of Moddus® reduced hay yield, and increased leaf chlorophyll, but did not influence other hay quality traits. At the second trial in Western Australia, at Nunile, the application of Moddus® did not influence hay yield or quality. The trials in Western Australia were sown in early April, and irrigated with 40mm at sowing, to ensure a good germination, early growth, to increase the likelihood of lodging, and the opportunity to lengthen the phenology of the oats with a PGR - to shift their cutting date into a later, lower rainfall risk window. Due to the unusually dry season, and long periods between rainfall events, lodging did not occur. Mean hay yield was ~10 t/ha at both sites.

Do awnless wheats have a fit in the export fodder industry for frost prone areas – Lake Grace, WA?

An awnless wheat breeding line produced strong hay yield, taller height, and similar WSC % and NDF % to the benchmark oaten hay variety Carrolup. Long season variety DS Bennett had good quality, but low yield (4.3 t/ha) compared to Carrolup (6.2 t/ha), Williams (6.7 t/ha), and Koorabup (7.4 t/ha). Feedback on breeding line performance has been provided to the CSIRO and a private breeder who submitted entries for this trial, to assist in variety development.



Acknowledgements

Agronomy – Georgie Troup (DPIRD WA), Courtney Peirce (SARDI), Peter Matthews (NSW DPI), and the Birchip Cropping Group.

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