

National Hay Agronomy - PGR effect on 2019 hay production

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for hay production. A practice that needs field assessment is the use of a plant growth regulator (PGR) to manage hay production. PGR application is intended to reduce the internode length, shortening plant height and increasing straw strength, to reduce the likelihood of lodging which is detrimental to hay making logistics and quality.

The National Hay Agronomy project is a four-year investment by the AgriFutures™ Export Fodder Program, led by Western Australia's Department of Primary Industries and Regional Development working with BCG, Agriculture Victoria, NSW DPI, and SARDI.

The project aims to understand how agronomic practices affect export oaten hay production and quality. This will help growers better manage oaten hay crops to meet export market specifications and develop a competitive advantage in our export fodder markets.

The aim of this research was to evaluate the effect of a plant growth regulator (Moddus® Evo) on hay yield and quality to determine the role of PGRs in the export fodder industry.

How was it done?

Two replicated field trials were sown on 6 June 2019 with oats using a complete randomised block trial design. The treatments are listed in Table 1 and the rates of the plant growth regulator Moddus Evo. The targeted plant density was 320 plants/m² and the trial had three replicates. The trial was sown using small plot equipment with knife points + splitter boot (70 mm split), press wheels and 30 cm row spacing. The fertiliser used was Granulock® Supreme Z + Flutriafol (200 mL/100 kg) @ 60 kg/ha at sowing, and seed treatments of Vibrance® @ 360 mL/100 kg and Gaucho® @ 240 mL/100 kg. The trial was managed as per best practice for herbicides, insecticides and fungicides.

Assessments included establishment counts, NDVI crop biomass, hay biomass at GS71, plant height, lodging, leaf greenness (SPAD chlorophyll measure), stem diameter. NIR (including DairyOne calibration) was being analysed at the time of writing.

What happened?

At Kalkee in 2019, applications of Moddus Evo reduced hay yield and height, but did not increase stem thickness (Table 2).

Key messages

- Hay yield and height was reduced by PGR Moddus® Evo application.
- Stem thickness and lodging was not influenced by PGR application in 2019 due to the dry finish.

Why do the trial?

The National Oat Breeding Program variety trials in Victoria are conducted annually, but there has been little recent evaluation of agronomic practices beneficial

Table 1. Oat variety and plant growth regulator Moddus evo rates at Kalkee North in 2019.

Oat variety	PGR rate (mL/ha)
Brusher	0
Forester	200
Koorabup	400
Mulgara	
Williams	
Yallara	

Table 2. Oaten hay yield, plant height and stem thickness with different PGR rates. Letters indicate significant difference.

Variety	Hay yield (t/ha)			Plant height (cm)			Stem thickness (mm)		
	0	200	400	0	200	400	0	200	400
Koorabup	6.6	6.1	5.1	72.3	63.1	50.8	4.6	4.0	3.7
Brusher	7.4	6.3	6.3	71.4	52.8	52.3	4.0	5.0	4.9
Forester	6.1	5.6	5.0	53.8	47.3	39.4	4.8	5.2	5.3
Mulgara	8.1	6.7	6.3	82.2	61.8	50.7	5.2	5.0	4.8
Williams	6.9	5.6	4.8	62.3	49.2	43.4	4.6	5.0	4.8
Yallara	7.4	6.8	6.2	67.6	57.1	48.0	4.8	4.8	4.8
<i>Sig. diff. Variety</i>	<0.001			<0.001			P=0.046		
<i>Moddus</i>	<0.001			<0.001			ns		
<i>Variety x moddus</i>	ns			P=0.004			ns		
LSD (P=0.05)									
<i>Variety</i>	0.3			4.1			0.6		
<i>Moddus</i>	0.4			2.3			ns		
<i>Variety x moddus</i>	ns			5.8			ns		
CV%	9.2			5.8			16.3		

The trial was June sown, and there were no measured changes to crop maturity. The dry finish to the season restricted overall crop height and lodging did not occur.

In Western Australia, 2019 trials recorded a similar lack of response to Moddus Evo due to the dry conditions. However, previous preliminary trials have measured a stem thickness increase and a subsequent reduction in lodging, indicating the response is seasonally dependent.

It is not beneficial to apply a plant growth regulator to a hay crop in a lower rainfall season when plant height is constrained and lodging will be less of a risk. However, applying a plant growth regulator has shown to be of benefit in more favourable seasons when lodging is more likely, with any compromises to hay yield outweighed by the reduction in lodging.

This trial will be repeated in 2020 to evaluate the agronomic practice under a different set of seasonal conditions.

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