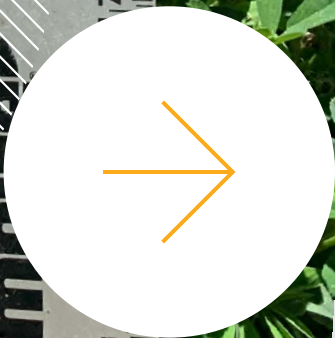




# Lucerne variety trial: Evaluation of plant growth regulator and pod sealant on seed yield



by Amanda Kroehn

October 2025



**AgriFutures<sup>®</sup>**  
Pasture Seeds

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# Foreword

**As a high-quality forage legume, lucerne (and lucerne seed) represents a key pillar of high-performing animal production systems. It is keenly valued (as hay, silage or pasture) as an excellent source of protein, energy, minerals and vitamins. The Australian lucerne seed industry contributes about \$95 million annually to the national economy, supporting domestic and export markets. Over 200 seed production farms operate, with more than 80% of production concentrated in South East South Australia (notably Keith, Tintinara, Bordertown, Frances, and Naracoorte), and smaller contributions from northern Victoria and southern New South Wales.**

Lucerne seed production in Australia is a long commitment (5 to 7 years), with Australian-bred and imported varieties. When growers have reliable, local variety trial data before adopting new cultivars, they are best placed to produce a productive and profitable crop.

The previous iteration of the Variety Trial (PRJ-010959) produced valued industry knowledge about the performance of an entire catalogue of lucerne varieties in Australian conditions and under different management practices. This project builds upon the priority to uplift the entire industry by investigating management practices of applying plant growth regulators (PGRs) and pod sealants.

The industry faces challenges, such as uneven plant growth, poor flower retention, and pod shattering at harvest, all of which can limit yield. While PGRs and pod sealants are available, their combined effect on lucerne seed yield in Australia is not well understood. This project aimed to fill that knowledge gap and provide evidence-based recommendations for growers. Conducting the trial work with the industry association Lucerne Australia means that all lucerne seed growers benefit from the investments of their levy funds.

This project has identified that, compared to standard farmer practice, the application of PGRs and pod sealants generally increased seed yields. The gross margin analysis showed that PGR treatments provided the highest returns, especially in less favourable seasons. Growers are encouraged to trial PGRs and pod sealants, monitor their own results, and contribute to industry knowledge sharing, but note that some products are not yet registered for lucerne seed production.

This project was completed as part of the AgriFutures Pasture Seeds Program, which invests in research, development and extension initiatives to maximise opportunities and minimise risks for a profitable and sustainable pasture seeds industry. For more information, visit [agrifutures.com.au/pasture-seeds](http://agrifutures.com.au/pasture-seeds).

**Peter Vaughn**  
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AgriFutures Australia

# Acknowledgements

AgriFutures Australia acknowledges the First Nations people of Australia as the traditional custodians of the lands and waters on which we live, learn and work. We pay our respects to past, present and future Elders of these nations. In particular, we acknowledge the Wiradjuri people of Australia, the traditional custodians of the lands and waters where AgriFutures' head office is located.

This project would not have been possible without the financial support of AgriFutures Australia through its Pasture Seeds Program, which is funded by a \$15 per tonne levy on the sale of certified lucerne seed from Australian growers and matching Australian Government funding.

Special thanks are due to Simon Allen and his family, with the two-year trial by AgXtra on their Warrawee Park property, south of Keith in South Australia.

Lucerne Australia gratefully acknowledges Alforex Seeds, Barenbrug, Naracoorte Seeds, DLF Seeds, RAGT, AlfaGen Seeds and Upper Murray Seeds for providing seed varieties for the project.

Lastly, sincere thanks are due to those who generously provided time and expertise over the two-year trial period, particularly Scott Hutchings of Delta Agribusiness's Keith branch. This report was written by Amanda Kroehn at Lucerne Australia, with contributions from Sam Sanders at AgXtra, working on behalf of their organisations and Australian pasture seed growers.

## Author disclaimer

While all due care has been taken in compiling the information within this summary report, Lucerne Australia Inc. and the researchers involved take no responsibility for any persons relying on the information, and disclaim all liability for any errors or omission in the publication.

## Abbreviations

PGR	plant growth regulator
CI	confidence interval
CV	coefficient of variation
d.f.	degrees of freedom
LSD	least significant difference
S.E.	standard error

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# Executive summary

**Lucerne (*Medicago sativa*) is a widely adapted, perennial pasture species that plays a vital role in Australian agriculture, providing high-quality forage for grazing and fodder conservation. The Australian lucerne seed industry contributes about \$95 million annually to the national economy and supports domestic and export markets through irrigated and dryland production systems.**

The industry consists of over 200 seed production farms. More than 80% of Australia's lucerne seed is produced in the South East region of South Australia, particularly around Keith, Tintinara, Bordertown, Frances, and Naracoorte. Smaller contributions also come from the Mid North of South Australia, northern Victoria, and southern New South Wales.

Lucerne seed is produced under multiplication contracts involving Australian-bred and imported varieties. However, growers need reliable variety trial data under local conditions before adopting new cultivars because of the long-term commitment and profitability tied to lucerne's five- to seven-year production lifespan. Despite this need, the industry has historically been protective of yield data, which limits broader analysis and benchmarking of seed performance. Preliminary findings and anecdotal evidence suggest that imported genetics may underperform in Australian conditions, reinforcing the importance of local trial data to guide variety selection and industry development.

Following the success of the five-year lucerne variety trial, and to extend our knowledge to manage and maximise lucerne seed yields, a short-term two-year project was undertaken to evaluate the effect of two potential seed yield enhancers on lucerne seed yields, seed quality and gross margins. In 2023, two trials were established at Keith, SA, to measure the seed yield of 31 current and pre-commercial lucerne varieties. The trial was replicated over three flood irrigation bays, with standard farmer practice, plant growth regulator application and a pre-harvest pod sealant application.

Seed yield from the seed trial was measured at commercial harvest each autumn. The data on seed yield differences across the two years provided evidence that seed yield can be increased with the application of PGR or pod sealant, but environmental conditions will have an impact on which product is most suitable in the leadup to harvest.

Under the PGR application, the seed yield response in both years was consistent for the 31 varieties evaluated. However, when compared to the standard farmer practice, seed yield response to the pod sealant application was not consistent over the two years. Responses to the PGR and pod sealant application were varied because of the difference in environmental conditions from lock up of lucerne for seed production to harvest. Further, there were consistent differences in seed yield between varieties evaluated. The fact that the trial was short term (two years), and under extreme environmental conditions, highlights that while the data indicates the application of PGR or pod sealant can increase seed yield through losing less seed at harvest, more data is required to support this finding.

Findings from this project will benefit all stakeholders across the lucerne seed production chain. The data has enabled the understanding of yield response to the application of plant growth regulators and pod sealants and encourage us to pursue more testing of these products over a longer period of time. Future research should continue to provide adequate data to pursue the registration of these products in lucerne seed production. It is recommended that trials run across multiple growing seasons and in diverse environments.

# Introduction

**Lucerne seed production is a key component of Australia’s agricultural landscape, contributing an estimated \$95 million annually and supporting more than 250 seed growers nationwide (Carter and Heywood 2008; Hudson 2017). As a critical input to pasture-based livestock systems domestically and abroad, lucerne seed (*Medicago sativa*) is predominantly produced under irrigated and dryland systems across SA, northern Victoria and southern NSW (Hudson 2017; Humphries et al. 2018). While lucerne seed production offers strong returns under favourable conditions, it remains a high-risk enterprise because of a range of agronomic, climatic and market challenges.**

Maximising seed yield over the productive life of a lucerne stand (typically 5–7 years) is essential for grower profitability. However, factors such as uneven plant growth, poor flower retention, premature pod shattering, and pod shattering at harvest can significantly limit yield potential. In recent years, interest has grown in the use of plant growth regulators (PGRs) and pod sealants as potential tools to manipulate plant growth dynamics and to reduce yield losses due to pod shattering or environmental stress at maturity. While anecdotal evidence and overseas research suggest that PGRs might enhance seed set by improving flowering synchrony and reducing lodging, and that pod sealants may mitigate seed losses by limiting pod dehiscence, their combined impact on lucerne seed yield under Australian conditions remains poorly understood.

To address this knowledge gap, a two-year field trial in Keith, SA, evaluated the effects of a PGR and a pod sealant, applied individually and in comparison, to standard farmer practice on lucerne seed yield. The trial aimed to generate local data to support evidence-based decisions on the potential role of these inputs in lucerne seed production systems.

The objectives of the study were to:

- quantify the individual effects of a selected PGR and pod sealant on lucerne seed yield
- assess potential interactions with agronomic and environmental conditions, and
- provide preliminary recommendations for growers on the utility of these products as part of an integrated yield management strategy to maximise seed yield.

# Objectives

This project aimed to generate and communicate seed yield data of newer proprietary lucerne varieties after the application of a PGR and pod sealant, compared to standard farmer practice, and to determine whether their application contributed to higher seed yield than standard farmer practice. Both products are available in Australia but have not been evaluated and registered for lucerne seed production.

The two products selected for evaluation were:

1. Paclobutrazol (Payback), a plant growth regulator that has been shown to increase seed yield by 37% to 153% when applied to lucerne during active vegetative growth in late spring in New Zealand (Askarian 1993).
2. Pod sealant (Mesh), a harvest management tool suggested to improve yield capture and crop quality. The product is a polymer that reduces the intrusion of moisture into the pod as the crop matures. This reduction in moisture intrusion is suggested to benefit the crop when it is exposed to rains or heavy dews during the final stages of development and dry down.

This is not registered use of Payback, and it cannot be used in a manner that is not on the label. It is understood that pod sealants are not registered chemicals and can be used as their label states.

The specific objectives of the research were to:

1. Evaluate the effect of Paclobutrazol (Payback) on the seed yield and quality of 31 lucerne varieties managed under standard farmer practice.
2. Evaluate the effect of a pod sealant, such as Mesh, on the seed yield and quality of 31 lucerne varieties managed under standard farmer practice.

# Methodology

Lucerne Australia engaged AgXtra to manage the project. The trial, conducted at Warrawee Park, near Keith, SA, on a sandy loam soil, evaluated and compared the seed yield of 31 current and pre-commercial lucerne varieties under different agronomic treatments to maximise seed yield.

This trial was the sixth and seventh years of evaluation at the Lucerne Australia Variety Trial site, following a five-year project evaluating seed yield under modified management systems (Copping and Close 2024), which was established in 2018.

Seed varieties were supplied by Alforex Seeds, Barenbrug, Naracoorte Seeds, DLF Seeds, RAGT, AlfaGen Seeds, and Upper Murray Seeds.

The varieties evaluated were SFR27-032, SFR27-033, SF 914QL, SFR27-030 (now released as SF 730QL), L71, L92, GTL60, Magna 901, Magna 868, Silverland (D5), Silverosa GT (D7), Silverado (D9), Silversky (D11), Siriver MK II, Titan 9, AR245, AR323, SW18NPK90, SW18NPK91, SW18NPK92, SARDI 10 Series II, Heritage 10 (now PX1), Heritage ST (now BAR ST), SARDI 7 Series II, SC01, SC02, SC03, SC04 and SC05. The public varieties Siriver and Aurora were included as benchmarks.

From 2023 to 2025, trial site rainfall (mm), air temperature (°C) and daily evapotranspiration (mm) were monitored using an onsite weather station. Data for each irrigation season is reported in the Appendix. Commercial soil probes were also installed at the trial site.

Through the use of commercial soil probes and visual crop assessments, the crop condition and soil moisture were monitored during the trial to help and guide irrigation management regimes.

## Seed trial

The seed trial was replicated over three flood irrigation bays to simulate standard (farmer practice), PGR and pod sealant strategies. Within each bay, there were four replicates of the 31 varieties in a randomised complete block design.

Block 1 was managed under the standard farmer practice with PGR treatment.

Block 2 was managed under the standard farmer practice with pod sealant treatment.

Block 3 was managed under the standard farmer practice only.

The agronomic and irrigation management for all three blocks for both years is listed in the Appendix, and was the same for all blocks. Soil-available water for both years is also in the Appendix.

The timing of the application of the two treatments was very different. They were subjectively managed on crop growth stages.

- PGR was applied at a rate of 4 L/ha (1 kg/ha active ingredient Paclobutrazol) when the crop was about 20 cm high (Image 1). A high water rate of 250 L/ha was used.
- Pod sealant (Mesh) was applied to the crop when pods were 10-15% ripe (Image 2 & 3) at a rate of 1 L/ha, with a 150 L/ha high water rate.
- Dates for application for both seasons are listed in Table 1.

**Table 1. PGR and pod sealant application timings for each season.**

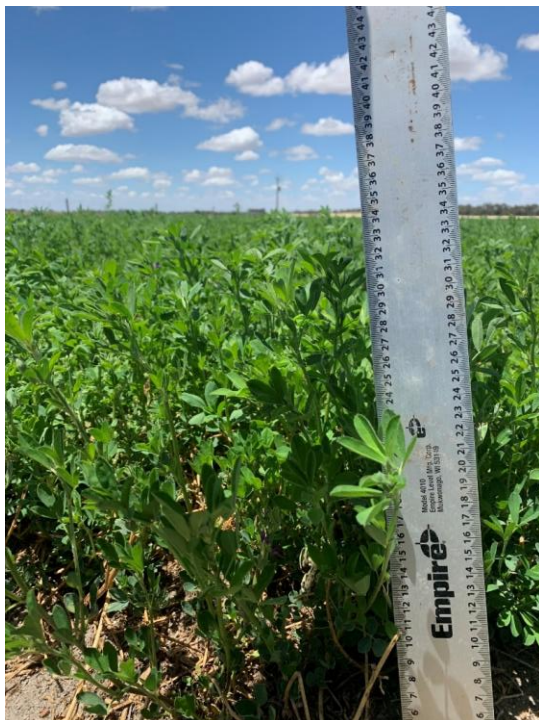
	2023-24	2024-25
<b>PGR</b>	30/11/2023	29/11/2024
<b>Pod sealant</b>	31/01/2024	24/01/2025

**Table 2. Irrigation timing of all bays for both production years.**

All bays	Lock up / 1st irrigation	2nd irrigation	3rd irrigation
<b>2023-24</b>	17/11/2023	23/12/2023	21/01/2024
<b>2024-25</b>	9/11/2024	20/12/2024	14/01/2025

**Table 3. Harvest date for both production years.**

Harvest date	
<b>2023-24</b>	12/03/2024
<b>2024-25</b>	04/03/2025



**Image 1. Height and stage of lucerne for application of PGR (about 20 cm growth).**



**Images 2 & 3. Timing for pod sealant application – pods 10% ripe.**



**Image 4. Trial site post-desiccation and ready for harvest.**



**Image 5. Lucerne harvest with a commercial plot harvester.**

# Results and Discussion

## Year 1

The sixth year lucerne stand produced clean seed yields averaging 0.19 to 0.7 t/ha (Table 4). Under the conditions of the 2023-24 growing season, the PGR and pod sealant treatments both recorded significantly higher yields than the standard treatment strategies (Figure 1 and Figure 2).

### Plant growth regulator

Under the PGR treatment, clean seed yield ranged between 0.43 and 0.70 t/ha (Table 4) with a mean yield of 0.537 t/ha. The highest yielding varieties with this treatment were SW18NPK91; Heritage 10 (PX1), and SC01. These varieties all recorded significantly similar yields, ranging from 0.63 t/ha to 0.70 t/ha.

SW18NPK91 and Heritage 10 (PX1) provided up to 22.85% higher yield than the benchmark varieties Aurora and Siriver (0.54 t/ha).

### Pod sealant

Clean seed yield with the pod sealant treatment ranged from 0.47 to 0.63 t/ha (Table 4) with a mean yield of 0.537 t/ha. The highest yielding varieties under the pod sealant strategy were SW18NPK90, Siriver MK11 and SC01.

SW18NPK90, Siriver MK11 and SC01 provided up to 15% higher yields than the benchmark variety Aurora at 0.62 t/ha. All other varieties recorded similar yields to Aurora.

SW18NPK90, Siriver MK11 and SC01 all produced similar yields to Siriver (0.62 t/ha).

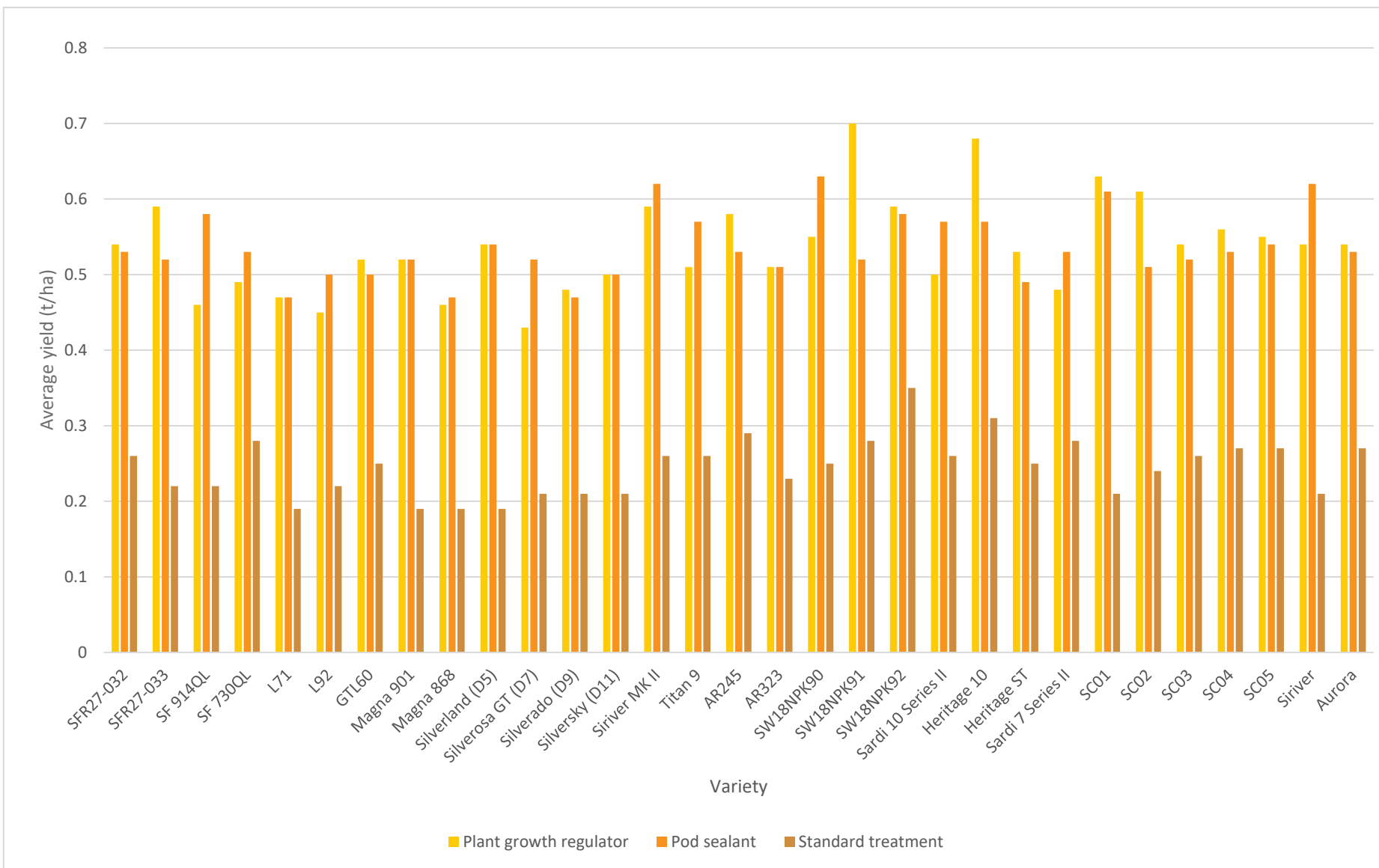
### Standard treatment

Seed yields under the standard treatment were significantly lower, ranging from 0.19 to 0.35 t/ha (Table 4) with a mean yield of 0.244 t/ha. The highest yielding varieties under the standard treatment were SW18NPK92 and Heritage 10.

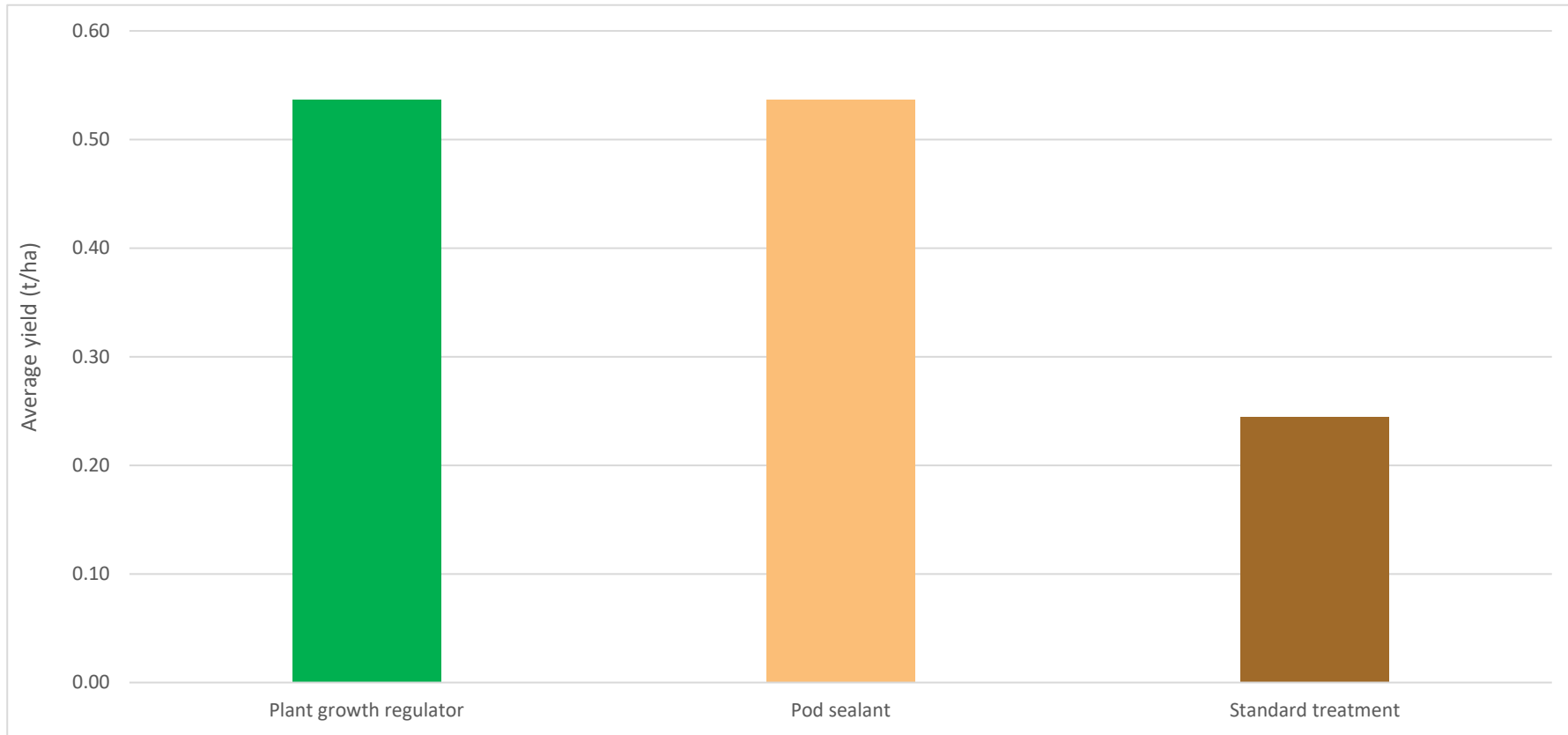
SW18NPK92 and Heritage 10 provided 29% higher yields than the benchmark variety Aurora at 0.31 t/ha and 66% higher yield than Siriver (0.21 t/ha).

The 2024 seed yield data show that the growing conditions favoured the treated blocks rather than the standard treatment. The PGR and pod sealant treatments yielded almost double that of the untreated farmer standard block. Seed yield from the standard treatment was 0.2-0.3 t/ha compared to 0.5-0.6 t/ha in the PGR- and pod sealant-treated blocks.

This indicates that in a year where environmental conditions are not ideal for lucerne seed set, the use of such products in the decision-making process could prove to be a valuable tool to reduce seed loss and maximise yields.



**Figure 1. Clean yield (t/ha) of each lucerne variety under three treatment options for 2023-24 season.**



**Figure 2. Total average clean seed yield (t/ha) for each treatment for 2023-24 season.**

**Table 4. Lucerne clean seed yield presented as t/ha for 2023-24 season.**

Description		Block 1		Block 2		Block 3	
Rating Type		YIELD		YIELD		YIELD	
Description		CLEAN		CLEAN		CLEAN	
Rating Unit		T-MET		T-MET		T-MET	
Trt	Treatment	PGR		POD SEALANT		STANDARD TREATMENT	
No.	Name						
1	SFR27-032	0.54	d-j	0.53	b-f	0.26	-
2	SFR27-033	0.59	b-e	0.52	def	0.22	-
3	SF 914QL	0.46	jkl	0.58	a-e	0.22	-
4	SF 730QL	0.49	h-l	0.53	b-f	0.28	-
5	L71	0.47	i-l	0.47	f	0.19	-
6	L92	0.45	kl	0.50	ef	0.22	-
7	GTL60	0.52	d-k	0.50	ef	0.25	-
8	Magna 901	0.52	d-k	0.52	c-f	0.19	-
9	Magna 868	0.46	i-l	0.47	f	0.19	-
10	Silverland (D5)	0.54	d-j	0.54	a-f	0.19	-
11	Silverosa GT (D7)	0.43	l	0.52	c-f	0.21	-
12	Silverado (D9)	0.48	h-l	0.47	f	0.21	-
13	Silversky (D11)	0.50	g-l	0.50	ef	0.21	-
14	Siriver MK II	0.59	c-f	0.62	ab	0.26	-
15	Titan 9	0.51	e-l	0.57	a-f	0.26	-
16	AR245	0.58	c-g	0.53	b-f	0.29	-
17	AR323	0.51	e-l	0.51	ef	0.23	-
18	SW18NPK90	0.55	c-j	0.63	a	0.25	-
19	SW18NPK91	0.70	a	0.52	def	0.28	-
20	SW18NPK92	0.59	c-f	0.58	a-e	0.35	-
21	Sardi 10 Series II	0.50	f-l	0.57	a-e	0.26	-
22	Heritage 10	0.68	ab	0.57	a-e	0.31	-
23	Heritage ST	0.53	d-k	0.49	ef	0.25	-
24	Sardi 7 Series II	0.48	h-l	0.53	b-f	0.28	-
25	SC01	0.63	abc	0.61	a-d	0.21	-
26	SC02	0.61	bcd	0.51	ef	0.24	-
27	SC03	0.54	c-j	0.52	def	0.26	-
28	SC04	0.56	c-h	0.53	a-f	0.27	-
29	SC05	0.55	c-i	0.54	a-f	0.27	-
30	Siriver	0.54	d-j	0.62	abc	0.21	-
31	Aurora	0.54	d-j	0.53	b-f	0.27	-
LSD P=.05		0.087		0.098		0.098	
Standard Deviation		0.062		0.07		0.07	
CV		11.57		12.93		28.54	
Grand Mean		0.537		0.537		0.244	
Bartlett's X2^		28.754		43.094		16.93	
Skewness^		0.15		0.3574		0.323	
Kurtosis^		-0.315		0.2558		-0.5748	
Replicate F		1.067		4.253		5.553	
Replicate Prob(F)		0.3671		0.0074		0.0015	
Treatment F		4.082		1.634		1.096	
Treatment Prob(F)		0.0001		0.0398		0.3605	

## **Year 2**

The seventh year lucerne stand produced clean seed yields averaging 0.47 – 1.20 t/ha (Table 5). Under the conditions of the 2024-25 growing season, the PGR strategy recorded significantly higher yields than the standard and pod sealant treatment strategies (Figures 3 and 4).

### **Plant growth regulator**

Under the PGR treatment, clean seed yield ranged between 0.83 and 1.20 t/ha (Table 5) with a mean yield of 0.996 t/ha. The highest yielding varieties under this strategy were Heritage 10, SW18NPK90 and SW18NPK92. These varieties all recorded significantly similar yields, ranging from 1.17 to 1.20 t/ha. There were very significant differences between the varieties.

### **Pod sealant**

Under the pod sealant treatment, clean seed yield ranged from 0.47 to 0.73 t/ha (Table 5) with a mean yield of 0.605 t/ha. The highest yielding varieties under the pod sealant strategy were Magna 868 and Heritage 10, yielding 0.70 to 0.73 t/ha. The 2025 analysis showed no statistically significant differences between the varieties.

### **Standard treatment**

Lucerne seed yields under the standard treatment ranged from 0.52 t/ha to 0.87 t/ha, with a mean yield of 0.669 t/ha (Table 5). The highest yielding varieties under this management were Heritage ST, SC01 and Heritage 10 yielding 0.86 t/ha and 0.87 t/ha.

The standard treatment showed a slightly higher average yield than the pod sealant yields but was not significantly different.

The 2025 harvest provided some clear and valuable insight into the possible benefits of applying a PGR product during active vegetative growth stages of the crop.

PGR-treated varieties showed yield improvements of 0.2 to 0.5 t/ha, while the yields of all 31 increased when treated with the PGR product rather than the pod sealant and standard treated block.

Favourable conditions over the summer meant that the potential benefits of the pod sealant treatment were likely limited compared to the 2023-24 season. The 2024-25 season had no significant rainfall or wind events during the ripening and harvest period, leading to the pod sealant treatment having less impact on seed yield than the standard treatment.

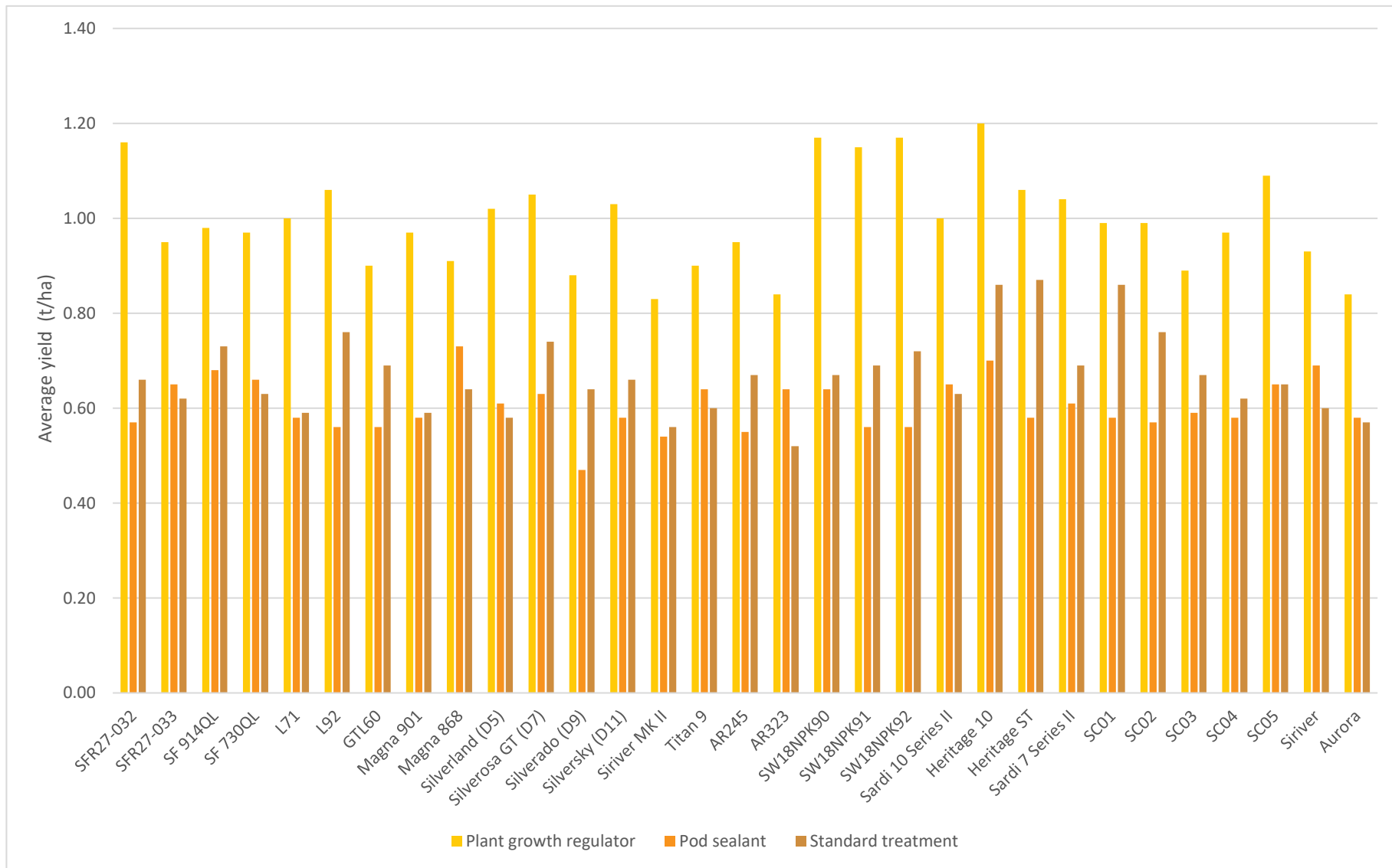
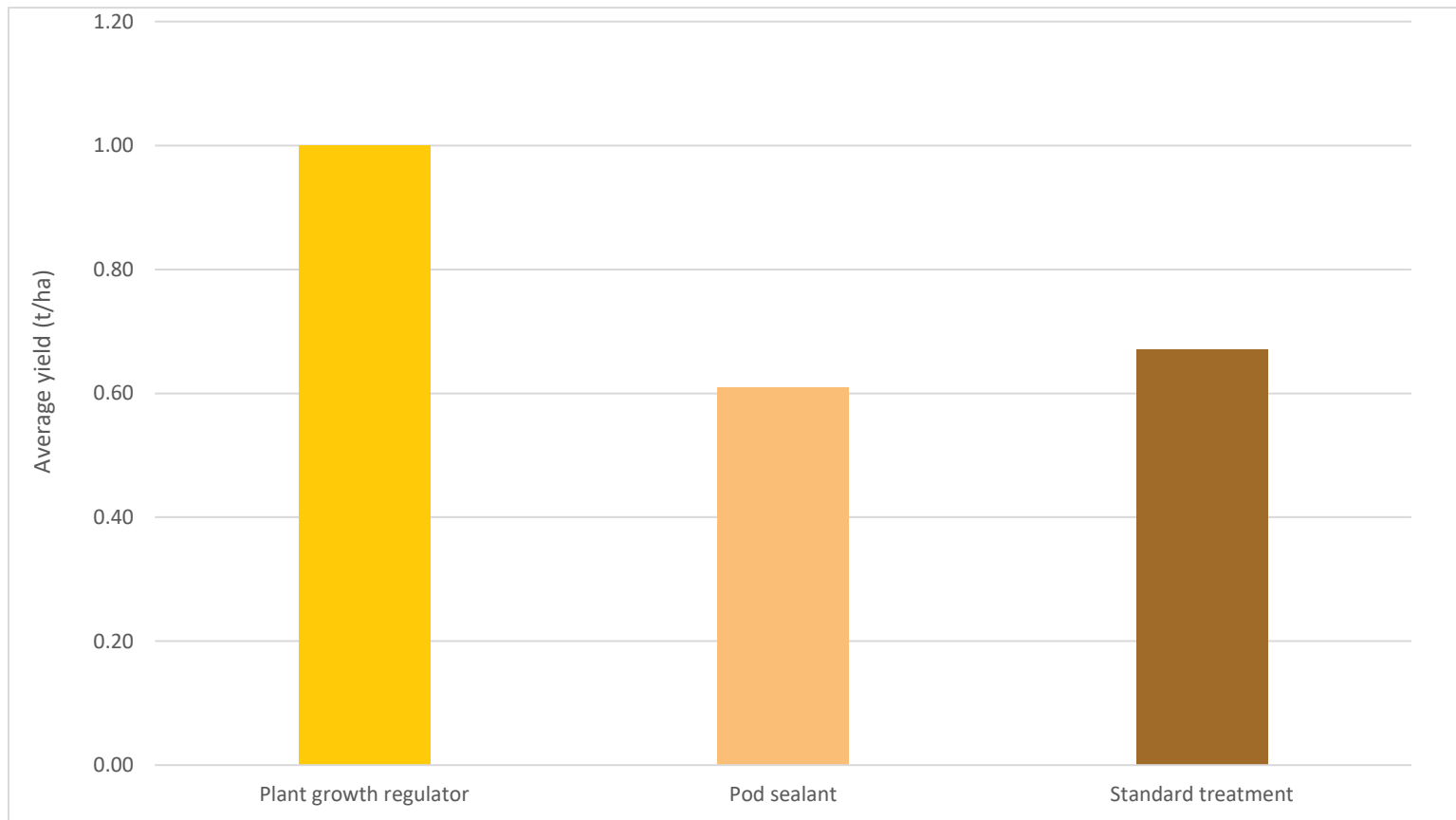


Figure 3. Clean yield (t/ha) of each lucerne variety under three treatment options for 2024-25 season.



**Figure 4. Total average clean seed yield (t/ha) for each treatment for 2024-25 season.**

**Table 5. Lucerne clean seed yield presented as t/ha for 2024-25 season.**

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Rating Type		YIELD		YIELD		YIELD	
Description		CLEAN		CLEAN		CLEAN	
Rating Unit		T-MET		T-MET		T-MET	
Trt	Treatment	PGR		POD SEALANT		STANDARD TREATMENT	
No.	Name						
1	SFR27-032	1.16	-	0.57	-	0.66	-
4	SFR27-033	0.95	-	0.65	-	0.62	-
7	SF 914QL	0.98	-	0.68	-	0.73	-
10	SF 730QL	0.97	-	0.66	-	0.63	-
13	L71	1.00	-	0.58	-	0.59	-
16	L92	1.06	-	0.56	-	0.76	-
19	GTL60	0.90	-	0.56	-	0.69	-
22	Magna 901	0.97	-	0.58	-	0.59	-
25	Magna 868	0.91	-	0.73	-	0.64	-
28	Silverland (D5)	1.02	-	0.61	-	0.58	-
31	Silverosa GT (D7)	1.05	-	0.63	-	0.74	-
34	Silverado (D9)	0.88	-	0.47	-	0.64	-
37	Silversky (D11)	1.03	-	0.58	-	0.66	-
40	Siriver MK II	0.83	-	0.54	-	0.56	-
43	Titan 9	0.90	-	0.64	-	0.60	-
46	AR245	0.95	-	0.55	-	0.67	-
49	AR323	0.84	-	0.64	-	0.52	-
52	SW18NPK90	1.17	-	0.64	-	0.67	-
55	SW18NPK91	1.15	-	0.56	-	0.69	-
58	SW18NPK92	1.17	-	0.56	-	0.72	-
61	Sardi 10 Series II	1.00	-	0.65	-	0.63	-
64	Heritage 10	1.20	-	0.70	-	0.86	-
67	Heritage ST	1.06	-	0.58	-	0.87	-
70	Sardi 7 Series II	1.04	-	0.61	-	0.69	-
73	SC01	0.99	-	0.58	-	0.86	-
76	SC02	0.99	-	0.57	-	0.76	-
79	SC03	0.89	-	0.59	-	0.67	-
82	SC04	0.97	-	0.58	-	0.62	-
85	SC05	1.09	-	0.65	-	0.65	-
88	Siriver	0.93	-	0.69	-	0.60	-
91	Aurora	0.84	-	0.58	-	0.57	-
LSD P=.05		0.245		0.149		0.201	
Standard Deviation		0.174		0.106		0.143	
CV		17.5		17.58		21.39	
Grand Mean		0.996		0.605		0.669	
Bartlett's X2^		38.436		24.544		34.066	
Skewness^		0.3291		0.2538		0.6928*	
Kurtosis^		0.0404		0.4016		0.8541	
Replicate F		1.760		7.467		5.630	
Replicate Prob(F)		0.1605		0.0002		0.0014	
Treatment F		1.397		1.054		1.458	
Treatment Prob(F)		0.1159		0.4102		0.0893	

**Multi-year summary**

Analysis of data over the two-year period shows that the PGR treatment had higher average seed yields than the standard treatment in 2024 and 2025, respectively (Figure 5). Seed yields from all treatments were greater in 2025 than in 2024.

Lucerne seed yields under the pod sealant treatment showed no significant difference over the two seasons. Harvest and ripening conditions during the 2024-25 season were favourable, which may have

reduced the impact of pod sealant; however, results suggest that the pod sealant maintained performance even when seed set and harvesting conditions were suboptimal.

Lucerne seed yields under the standard treatment showed significantly higher yields in 2025 than 2024, which is also attributed to the environmental conditions favouring seed set and harvest in 2024-25.

The variety Heritage 10 show consistently high yields across all three treatments, followed by the SW18NPK varieties.

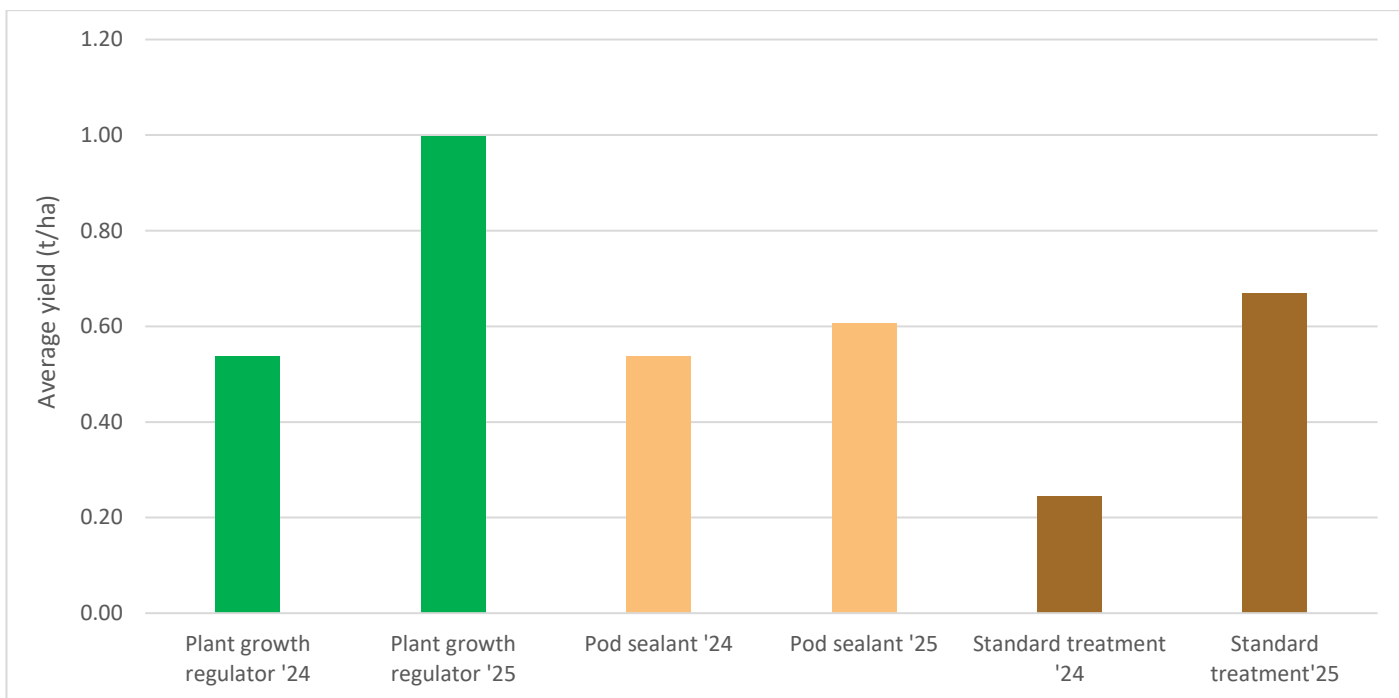
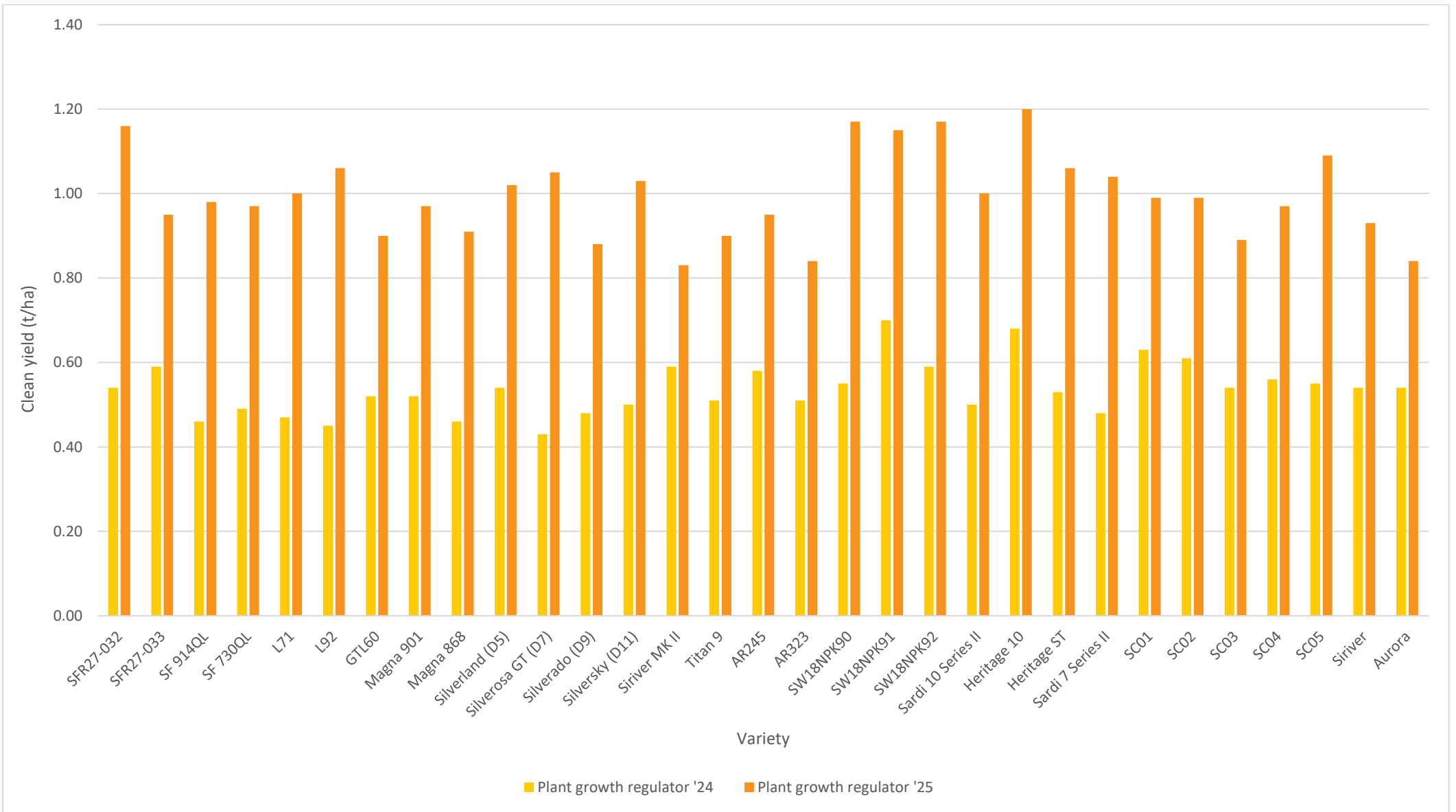


Figure 5. Total average clean seed yield (t/ha) comparison for each treatment for both seasons.



**Figure 6. Comparison of clean seed yield (t/ha) for each variety treated with PGR in 2024 and 2025.**

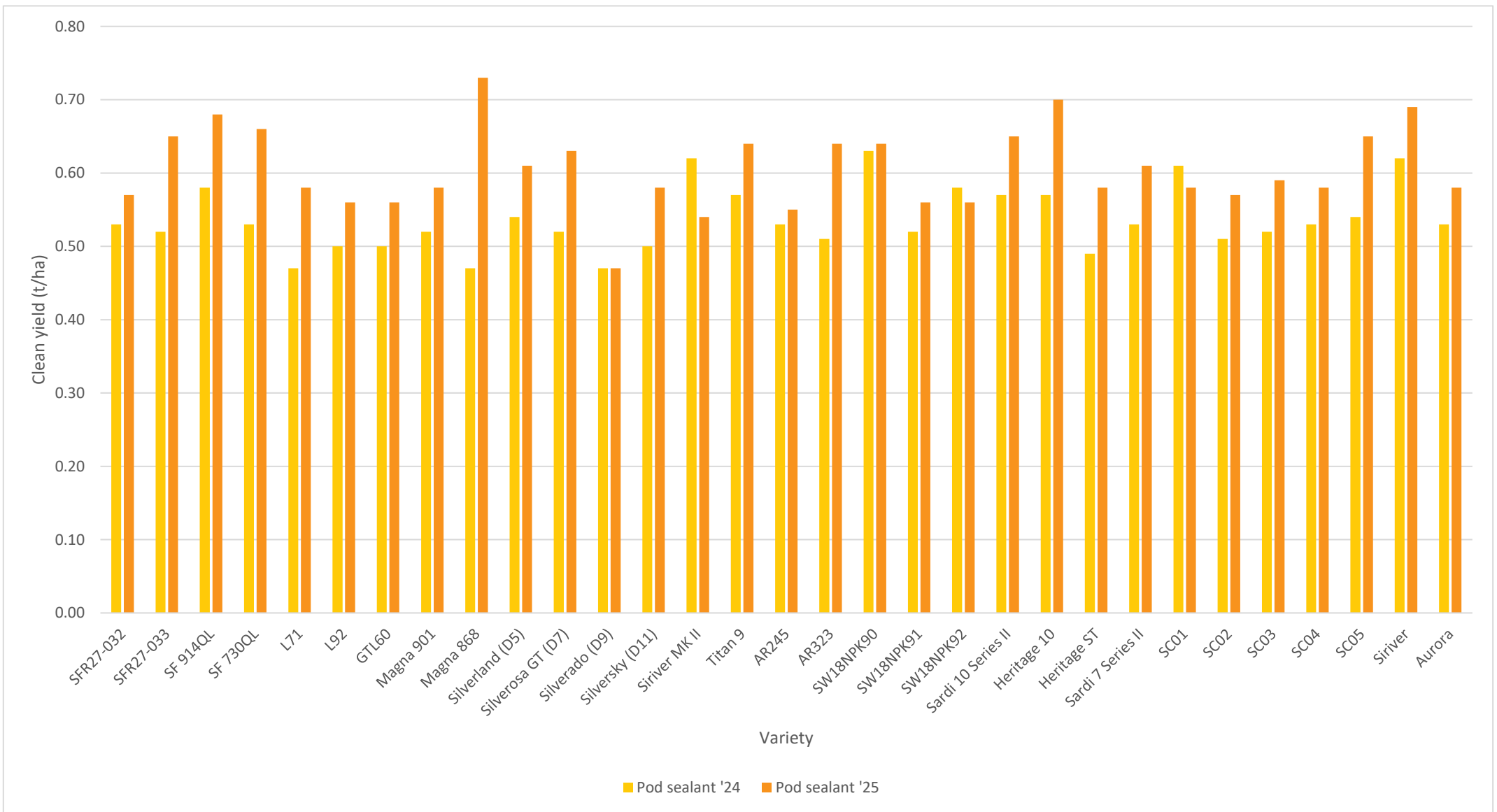


Figure 7. Comparison of clean seed yield (t/ha) for each variety treated with pod sealant in 2024 and 2025.

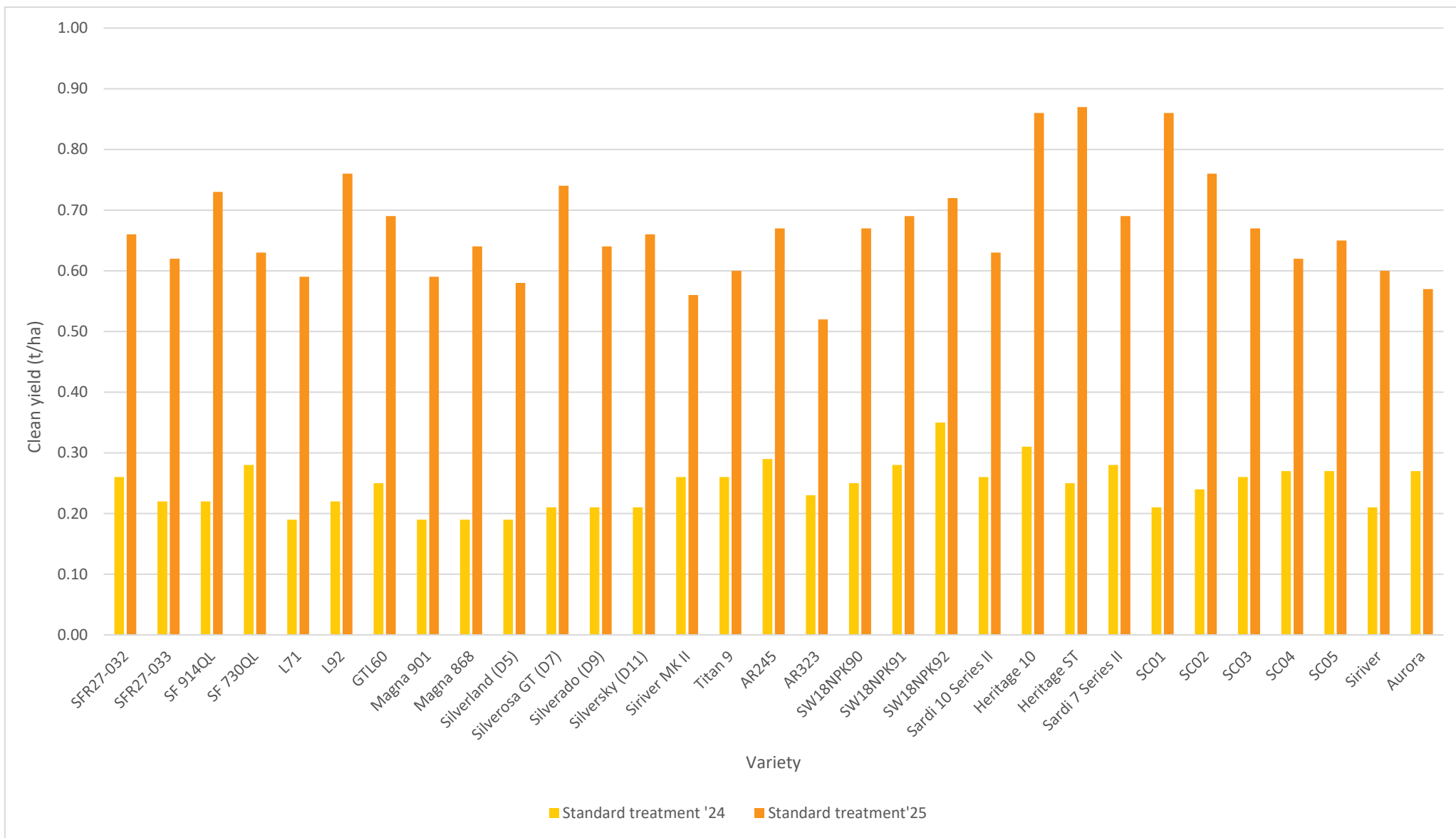


Figure 8. Comparison of clean seed yield (t/ha) for each variety treated with pod sealant in 2024 and 2025.

# Gross margin analysis

Gross margin analysis was conducted on the three treatments evaluated in the seed trial for both years. The calculations considered all variable costs, including irrigation expenses, and accounted solely for seed yield. It should be noted that the gross margin figures presented do not represent the total cost of production; however, individual growers may calculate comprehensive production costs using the Lucerne Australia Cost of Production Template, available on the Lucerne Australia website.

The gross margin analysis indicated some variability among treatments. Notably, PGR had a consistently higher gross margin than the standard treatment each year, and it exceeded the pod sealant in the second year. In the first year of the standard treatment, a considerable loss was due to low seed yields, underscoring the advantages of PGR and pod sealant applications during less favourable seasons.

Treatment	Year 1	Year 2
PGR	\$1,598.95	\$4,928.83
Pod sealant	\$1,598.95	\$2,650.83
Standard	-\$964.06	\$3,036.58

## Implications and Recommendations

The data from this two-year lucerne variety trial provides information for growers in Australia's main lucerne seed-production area. Historically, the Australian lucerne seed industry has restricted access to production data, resulting in limited performance analysis, particularly under consistent growing conditions.

This trial identified the varieties that produce higher seed yields and assessed their performance when treated with a plant growth regulator (PGR) or pod sealant, offering guidance on the potential use of these products for seed yield management. Results indicate that PGR or pod sealant application can increase seed yields across various varieties, depending on prevailing environmental conditions during seed set.

Application of PGR produced generally uniform seed yield responses for the 31 varieties assessed over five years. Seed yield responses to pod sealant were variable, compared to standard farmer practice. The trial also found consistent differences in seed yield among evaluated varieties.

It must be noted that bulk germination tests were undertaken for seed harvested in Year 1, but were not done for seed harvested in Year 2 before seed was blended. A bulk germination test was completed on the blended line.

More research is necessary because the current results reflect only two years of data. Evaluating these products across multiple growing seasons and environments is recommended to further inform lucerne seed producers on management strategies for adapting to changing conditions, reducing seed loss, and increasing yields.

Independent lucerne seed growers who have trialled pod sealant products indicated that the crop can be harder to thrash when harvesting. Therefore, harvesters may need setting adjustments to factor this in. Pod sealant products are not registered chemicals and can be used as their label states.

Decisions on management and variety replacement or retention should not be solely based on this data and should include consideration of relative performance across location, long-term yield predictions, risk and local grower and consultant knowledge.

# Implications

## Access to data

The data from this two-year lucerne variety trial provides information for growers in Australia's main lucerne seed-production area. Historically, the Australian lucerne seed industry's restricted access to production data results in limited performance analysis, particularly under consistent growing conditions.

## Yields responses after PGR and pod sealant treatment

This trial identified varieties that produce higher seed yields and assessed their performance when treated with a plant growth regulator (PGR) or pod sealant, offering guidance on potential use of these products for seed yield management. Results indicate that PGR or pod sealant application can increase seed yields for various varieties, depending on prevailing environmental conditions during seed set.

Application of PGR produced generally uniform seed yield responses for the 31 varieties assessed over five years. Seed yield responses to pod sealant were variable, compared to standard farmer practice. There were consistent differences in seed yield in evaluated varieties.

## Germination tests

Note that bulk germination tests were done for seed harvested in Year 1, but not for seed harvested in Year 2 before seed was blended. A bulk germination test was completed on the blended line.

## Pod sealant products and thrashing

Independent lucerne seed growers who have trialled pod sealant products indicated that the crop can be harder to thrash when harvesting. Therefore, harvesters may need setting adjustments to factor this in. Pod sealant products are not registered chemicals and can be used as their label states.

# Recommendations

1. Trials should run across multiple growing seasons and in diverse environments to guide management strategies for adapting to changing conditions, reducing seed loss, and increasing yields.
  - More data that is relevant and adequate to pursue registration of these lucerne seed products is needed.
  - More research is necessary because the current results reflect only two years of data.
2. Decisions on management and variety replacement or retention should not be solely based on this data.
3. These decisions should consider relative performance across location, risk, and long-term yield predictions.
4. These decisions should be made in conjunction with knowledge and experience of local growers and consultants.

# Appendix

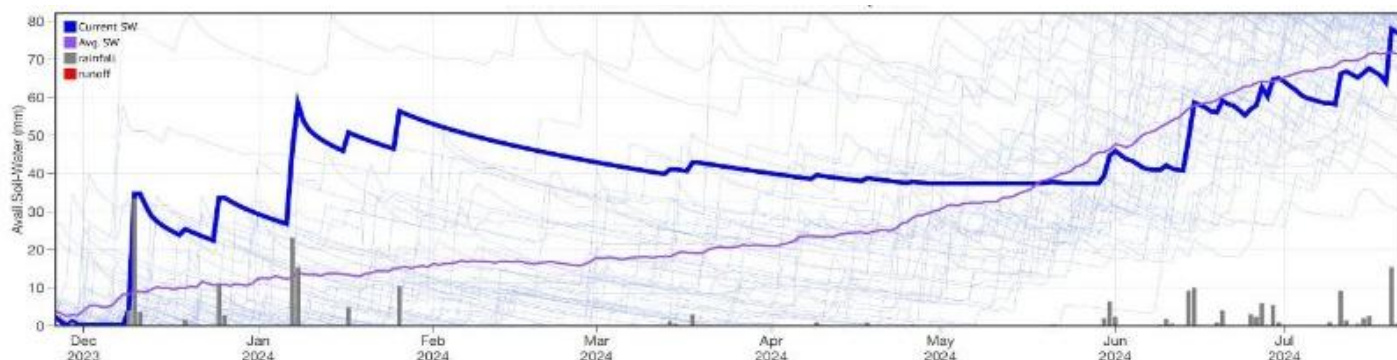


Figure 9. Soil-available water at trial site, December 2023 – July 2024.

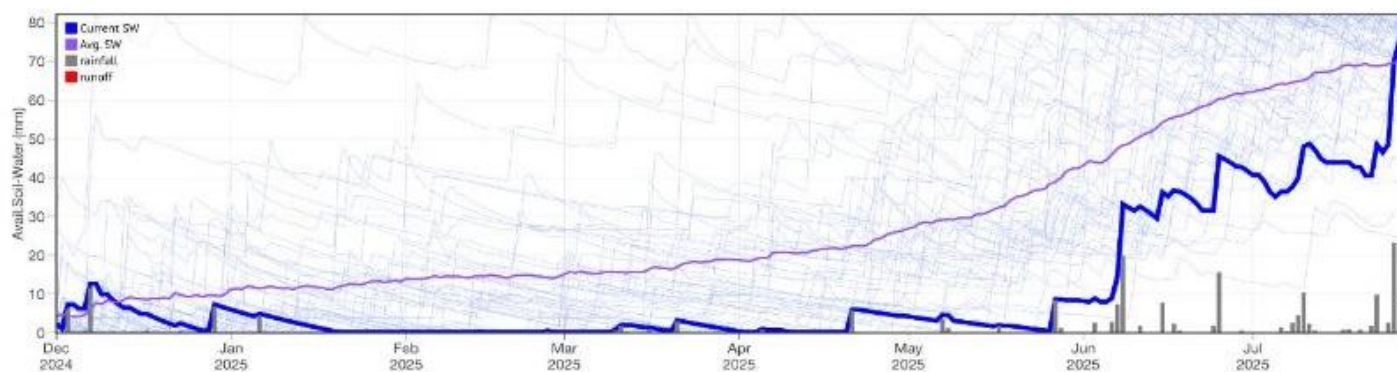


Figure 10. Soil-available water at trial site, December 2024 – July 2025.

Table 6. Management of lucerne for 2023-24 season.

2023-24 Calendar of events	
DATE	ACTIVITY
1/06/2023	Grass spray
1/07/2023	Winter clean
14/07/2023	Fertiliser
21/09/2023	Hay irrigation
12/11/2023	Fertiliser
14/11/2023	Pre-emergent spray
17/11/2023	1st irrigation for seed
30/11/2023	Foliar fertiliser
9/12/2023	Rain – approx. 40 mm
19/12/2023	Insecticide/trace
23/12/2023	2nd Irrigation for seed
5/01/2024	Insecticide/trace element
21/01/2024	3rd irrigation for seed
3/03/2024	Desiccation

**Table 7. Management of lucerne for 2024-25 season.**

<b>2024-25 Calendar of events</b>	
<b>DATE</b>	<b>ACTIVITY</b>
02/08/2024	Grass spray
18/0/2024	Winter clean
01/11/2024	Fertiliser
12/11/2024	Pre-emergent spray
19/11/2024	1st irrigation for seed
2/12/2024	Grass spray
09/12/2024	Insecticide/trace element
20/12/2024	2nd Irrigation for seed
07/01/2025	Insecticide/trace element
14/1/2025	3rd irrigation for seed
25/2/2025	Desiccation

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by Amanda Kroehn

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