Monosem Single-Row Planter Unit for Sesame Planting in Australia

The Monosem single-row planter is a precision planting unit suited for various small-seeded crops, including sesame. Recent research by CQUniversity, funded by AgriFutures Australia, has evaluated the performance of the Monosem unit under controlled conditions to optimise sesame seed placement and reduce common planting issues such as seed damage and poor singulation.

This provides valuable insights into enhancing overall efficiency, contributing to the development of more reliable and effective planting technologies for sesame production in Australia.

Features of the monosem planter for sesame

- **Precision metering system:** Uses vacuum-based seed metering with adjustable singulators for high accuracy in seed delivery.
- **Seed plates:** Compatible with a range of seed plates that vary in hole diameter and number to match different seed types and desired populations.
- **Adjustable vacuum pressure:** Fine-tuning vacuum pressure allows for optimal seed pickup without damage or multiple seed releases.
- **Customisable planting speed and population:** Variable ground speed and seeding rates to align with agronomic requirements and soil conditions.

Experimental Insights

A controlled laboratory study assessed the performance of the Monosem planter using sesame seed across various settings. A total of 24 different treatment combinations were tested, with each treatment replicated three times. Prior to each trial, basic calibrations were performed, including seed metering unit cleaning and seed plate blockage monitoring. Each trial was allowed to run continuously for 20 minutes to simulate extended operation and ensure consistent seed-plate interaction.

Key take-outs

- The planter features a vacuum-based metering system, adjustable singulators and customisable seed plates.
- The 120/08 seed plate delivered the best performance.
- Field trials are needed to validate laboratory optimisations under commercial farming conditions.

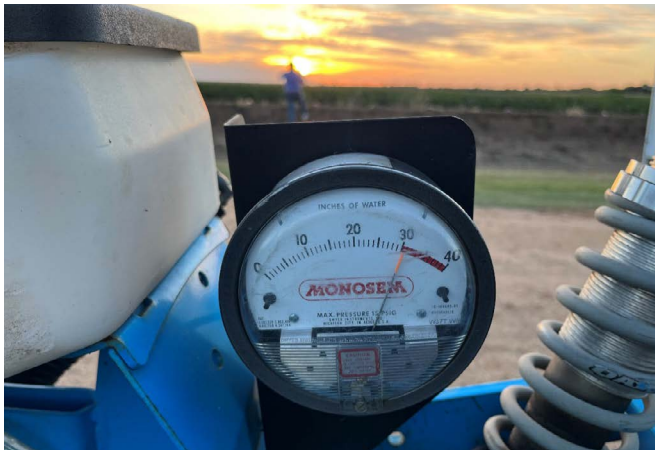


RDO Equipment planter specialist Stephen Frahm demonstrates the Monosem Single-Row Planter Unit.

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Table 1: Sesame variety phenology of a spring plant, summer grown crop and late summer plant, autumn to winter grown crop in Tully, QLD.

Variables	Values		
Planter speed (km/h)	5		8
Population (kS/ha)	200		400
Singulator/scraper angle	Engaged (0)		Disengaged (+5)
Seed plate (no. of holes/diameter of hole (tenths of a mm))	60/10	120/10	120/0.8
Vacuum pressure (inches of water)	15	17.5	20



The vacuum gauge on the Monosem planter shows the pressure (inches of water)



The above image shows the seeds on the plate on the Monosem planter.

Seed singulation

Singulation refers to the process of separating and delivering individual seeds within the planting row. It's crucial for ensuring consistent seed spacing and preventing clumping, which can hinder germination and plant growth.

The highest singulation rate (86.8%) was achieved using the 120/08 seed plate (120 holes, 0.8 mm diameter). Lower singulation rates were recorded with the 60/10 (64.6%) and 120/10 (74.4%) plates. Minimising doubles and multiples is critical for uniform crop establishment. The 120/08 plate had the lowest doubles (6.4%) and multiples (1.8%).

Seed blockage

Blockage was lowest with the 120/0.8 plate (two blockages on average) and highest with the 60/10 plate (six blockages on average). Blockages were caused by damaged seed fragments and foreign materials, indicating the importance of both maintaining the right planter settings and ensuring best quality clean seed for planting use.

Table 2: Best Practice Recommendations for Sesame Planting

Parameter	Recommended Setting
Seed Plate	120 holes / 0.8 mm diameter (120/08)
Vaccuum Pressure	Between 17.5–20 inches of water
Singulator Angle	Disengaged (+5)
Seeding Population	400 kS/ha
Planter Speed	5km/h
Seed Preparation	Ensure clean, undamaged seed lot

Considerations for field use

While stationary tests provide valuable insight into metering efficiency and singulation, field conditions introduce additional challenges:

- **Soil texture and moisture:** variability can affect seed depth and spacing.
- **Residue management:** trash and clods can disrupt seed flow and placement.
- **Planter movement:** bounce and ground contact inconsistencies impact performance.

Further field trials are recommended to validate laboratory optimisations under commercial farming conditions.

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The information in this factsheet is general in nature and needs to be adapted to individual situations. Although the information is believed to be accurate, no liability (whether as a result of negligence or otherwise) is accepted for any loss of any kind that may arise from actions based on the contents of this publication.

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