

Sesame Grower Guide

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Quick Grower Facts

Time of Sowing - Sow when soil temperatures at the depth of sowing are 20°C or greater, air temperatures are unlikely to fall below 15°C during the growing season, and harvest is unlikely to coincide with rain.

Sowing Rate - 2.5 to 3.0 kg/ha for standard planters or 300K - 600K seeds/ha for precision planters.

Sowing Depth - 10 - 25 mm.

Row width - 25 to 100 cm, to adapt with existing farming system. Where a 100 cm row spacing is used weed control is more challenging.

Soil Types - Can grow in a wide variety of soils, however, prefers medium textured well drained soils. Attention needs to be paid to crusting soils as these can affect emergence.

Crop Nutritional Requirements for N, P & K

- Pre-plant or at planting apply 40 kg/ha of Nitrogen, 20 kg/ha of Phosphorus, 60 kg/ha of Potassium. This can be applied in the lead up to sowing.
- Approximately 4 to 6 weeks after crop emergence top up with an additional 40 kg/ha of Nitrogen.

Water Management & Irrigation - Sesame requires good soil moisture around the seed for 3 to 5 days after sowing for good crop establishment. Can be grown as a rainfed crop where there is 500 - 650 mm of rain distributed across the growing season; otherwise, supplementary irrigation is required, particularly at establishment and grain fill. After crop establishment, apply quick light irrigations or if limited water available apply a heavy irrigation prior to sowing and again 6 to 7 weeks after crop emergence.

Weed Management - There is a limited range of chemicals for weed control in sesame. Ensure that a field with low weed pressure is chosen. Ideally, prepare the field in advance and allow weeds to germinate and control these with a knockdown herbicide prior to sowing.

Diseases - Major diseases are charcoal rot and pythium. Conduct a Predicta Sesame prior to sowing to identify disease risks.

Insect Management- Sesame Leaf Roller is a major pest. Monitor the crop regularly and act when required.

Harvest Management - If there is residual soil moisture at physiological maturity, apply a desiccant to dry the crop down in preparation for harvesting.

Harvest Timing - Harvest when seed moisture is at or below 6%, as sesame is difficult to dry post-harvest.

Harvesting equipment - Use a standard grain header with a draper style or platform front. The ideal gap between the drum and the concave is approximately 25 to 30 mm.

Introduction

Sesame (Sesamum indicum L.) is an ancient oilseed and one of 36 species within the Sesamum genus, a member of the Pedaliaceae family. Among these species, sesame is the most widely cultivated (Seid & Mehari 2022). Sesame is currently cultivated between the latitudes of 40°N and 40°S (Lakhanpaul et al. 2012) in Africa, Asia, South America and the southern parts of the United States of America across tropical and temperate zones (Islam et al. 2016). Recognized as a promising crop with significant production potential, sesame is also particularly valuable for growers in northern Australia (Rahman et al. 2020), as a break crop in existing farming systems.

Production Potential and Markets

Sesame demand in Australia is forecasted to reach 9,800 t by 2025, with Australia importing about 6,500 t of sesame, valued at A$15 M in 2022 (Trotter & McDonald 2024). Globally sesame production is expected to increase to 12.28 mt/year by 2040, however this is expected to leave a shortfall of 3.02 mt/year (Rahman et al. 2020), providing an opportunity for Australia to export sesame in the future.

Australia currently imports sesame seeds and oil to produce a wide range of products for domestic and international markets. Products made by Australian manufacturers using sesame seed includes tahini, hommus, sesame oil, roasted sesame seeds, flour, halva, chilled falafels, ice-cream, cereals, snacks, crackers, biscuits and bakery goods such as bread, bread rolls and pies.

Seed Quality, Nutritional Value and Market Opportunities

Sesame is a high-value oilseed crop with strong and expanding demand across food, health, and specialty oil markets, typically containing 45–55% oil rich in unsaturated fatty acids such as oleic and linoleic acids, and notable levels of lignans, mainly sesamin and sesamolin, which enhance oxidative stability, antioxidant activity, and overall nutritional quality (Thani et al., 2026).

Recent evaluations of Australian sesame genotypes have shown considerable variation in oil content, antioxidant activity, phenolic compounds, lignan concentration, fatty acid profiles, seed viability, and germination performance (Thani et al. 2026, to be published). This variation highlights the importance of selecting suitable varieties not only for yield but also for seed quality traits that directly influence market value and end-use applications.

Value Addition Through Oil Processing

The value of sesame can be further enhanced through appropriate processing. Research has shown that oil extraction conditions influence both oil recovery and the retention of bioactive compounds. Optimising extraction parameters can improve oil yield while preserving quality attributes that contribute to nutritional value, shelf life, and consumer appeal (Thani et al., 2026). Consequently, the integration of superior genotypes with suitable processing technologies provides opportunities for Australian growers and processors to target premium edible oil, functional food, and nutraceutical markets.

As the Australian sesame industry expands, consideration of seed quality traits alongside agronomic performance will be essential for developing high-value supply chains and strengthening Australia's

competitiveness in domestic and export markets.

Crop Establishment

Sesame prefers medium textured, well drained fertile soils, however can be grown in a wide range of soil types (Lakhanpaul et al. 2012). Sesame has been grown successfully in a range of soil types in Australia, including the Cununurra clay (vertosol) and sandy loam levee soils (kandosol) in the Ord region,Tipera soils (kandosol) in the Katherine region, Coom (hydrosol), Thorpe and Hillview (kandosols) soils in the North Queensland Wet Tropics, Annandale (kandosol) and Rolleston and Rockhampton (vertosols) soil in Central Queensland. The texture of these soils varies from heavy cracking clays to light loams, all of which are well drained.

Good crop establishment and accurate sowing depth requires careful field preparation. Sesame is a small seed preferring a fine soil tilth, as cloddy soils make it difficult to achieve a consistent sowing depth and good soil to seed contact which is required for uniform germination. Sesame can also be direct drilled into stubble in a no-till farming system (Case Study 1 & Case Study 2) provided that the stubble is not so tall as to cause shading (Langham et al. 2008).

Case Study 1: Direct drilling of sesame seeds into Sabi grass stubble in Katherine Summer 2022-23.

In the 2022/23 wet season, a crop of sesame was successfully established in Katherine when direct drilled into a sprayed out Sabi grass fallow (Figure 1).



Figure 1 - Direct drilling of sesame into Sabi grass stubble using a cone seeder in summer 2022-23 in Katherine, NT

Case Study 2: Direct drilling of sesame seeds into wheat stubble in Emerald Summer 2025-26.

In the summer of 2025/26, sesame was successfully direct drilled into wheat stubble at the Central Queensland Smart Farms Cropping Centre using the Monosem precision planter and the RDO Airseeder.



Figure 2 - Monosem precision seeder sowing into wheat stubble at Emerald (Top Left); RDO air seeder direct drilling into wheat stubble at Emerald (Top Right); Emergence in the stubble 7 DAS (Bottom Left); Sesame at 4 leaf stage 12 DAS (Bottom Right)

A wide range of planters can be used to sow sesame, including a Connor Shea disc seeder, cone seeders with tynes and discs, Monosem precision planter with 120 or 60 hole plate with 0.8 or 1.0 mm holes (Figure 3) and entry level air seeders with discs or tynes. When using precision planters, sesame seeds can become statically charged when using plastic seed plates, causing the seed to remain attached to the plate which will affect seed placement. To prevent this from happening, it is

recommended that stainless steel seed plates, such as those in the Monosem planter are used. Any planter that can meter out the small seed at the correct sowing rate with accurate depth control is suitable.

A wide range of row configurations are possible for sesame production, with row spacing selected to complement the cropping system where sesame is being integrated. In Central Queensland, sesame has been grown in a single row on 1 m beds to fit the existing cotton production system, however making two beds into a single bed and planting 4 rows 30 cm apart on top has seen yield improvements, as a crop grown on a single row on 1 m row spacing may not achieve full canopy coverage between rows making weed management difficult. Row spacings between 25 and 50 cm works well, allowing the crop to branch and fill in between rows.



Figure 3 - Planters used for sesame. Cone seeder sowing four rows in Kununurra, WA (Top Left); Connor Shea disc seeder sowing four rows in Tully, OLD (Top Right); Monosem precision planter sowing four rows in Emerald, QLD (Bottom).

The target seeding rate is 2.5 - 3.0 kg of seed per hectare for traditional planters, or 400,000 to 900,000 seeds per hectare for precision planters. Elite Australian lines available for commercial production typically have greater than 85% germination viability. There are natural losses in the soil due to predation, seed size and sensitivity to residual herbicides in the soil. Seeding rate is important, however, populations between 100,000 and 260,000 plants per hectare achieved similar yields, as sesame will branch when there is a low population (Langham et al. 2008). Plant populations at harvest in the CRCNA trials ranged from 11,000 to 711,000 plants per hectare, with plant populations not being the major influence on crop yields. Also, international research has shown that the number of seeds that germinate and emerge is generally a third to a half of the seeds that are sown (Langham et al. 2008).

Sowing depths range from 2.5 cm on very light soils to broadcasting on the surface and tickled in with tynes on heavy clays. Sesame should be sown into moist soil, and a sowing depth of 1 cm is most common.

Time of sowing

The ideal time of sowing will vary across regions and seasons. Understanding varietal traits, season length varietal attributes, heat and cold tolerance in sesame and water management practices, will enable informed decision for individual situations.

Variety Selection

In a mechanised broadacre farming system, non-shattering varieties are key to maximizing crop yields by minimising seed losses. Black and white sesame is grown in Australia, with successful production above the Tropic of Capricorn at multiple trial sites across multiple years. The genetics for the elite, non-shattering black and white varieties are being sourced from Sesaco in the USA.

S3301

S3301 is a non-shattering white variety of sesame that was developed by Sesaco in the USA. Days to 50% flowering ranged from 25 to 56 days and days to harvest ranged from 88 to 126 days, making S3301 a medium season variety (Figure 4). Height to first pod and overall plant height ranged from 23.6 to 56.0 and 65.0 – 126 cm respectively. This variety has enough ground clearance to the lowest pod and the overall plant height is not excessively tall, this, along with the non-shattering trait makes S3301 suitable for machine harvest. The yield potential of S3301 ranged from 683 to 1549 kg/ha (Figure 6).

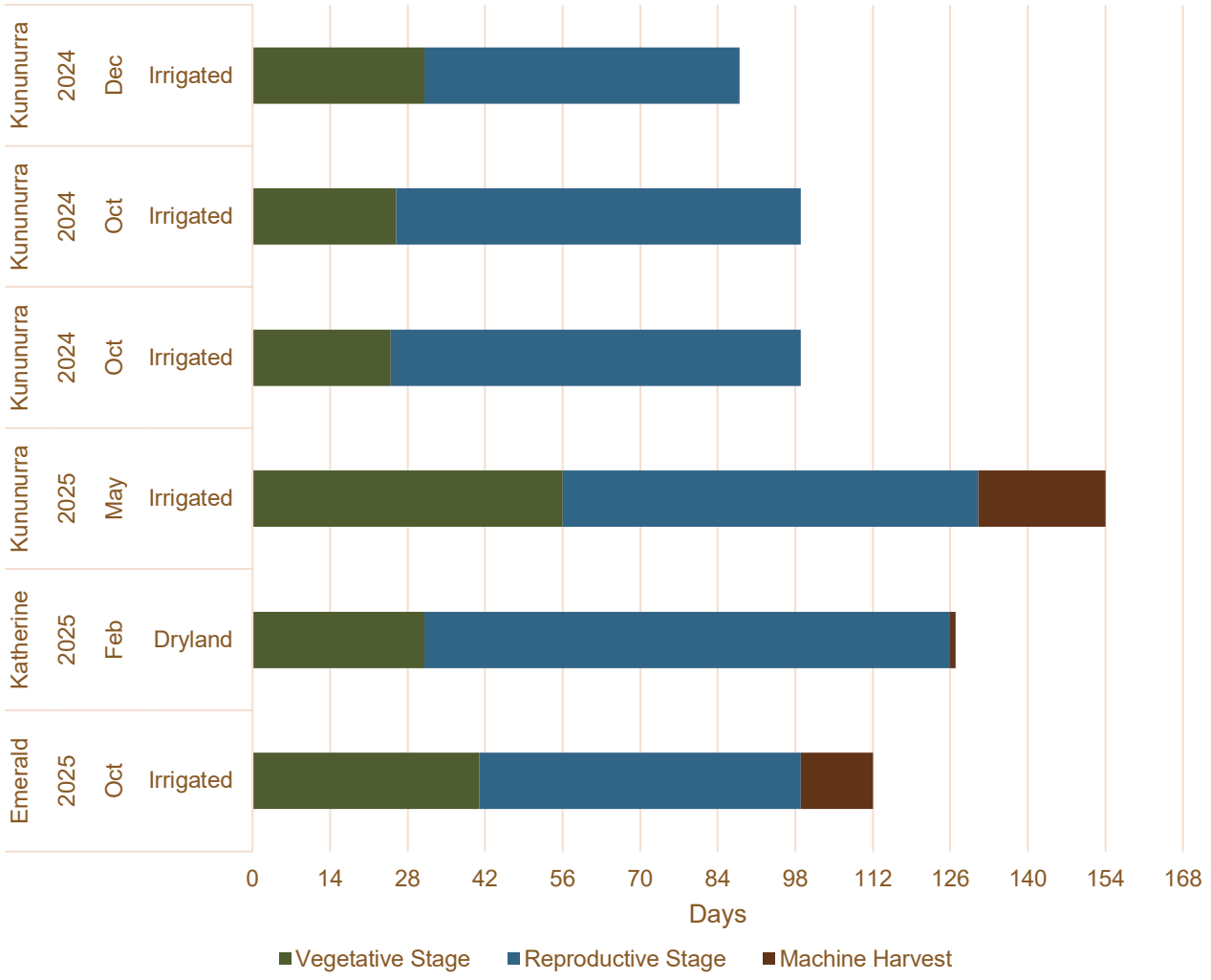


Figure 4 - Days from sowing to 50% flowering (vegetative stage), from 50% flowering to hand harvest (reproductive stage) and from hand harvest to machine harvest (machine harvest) for S3301 across multiple sites, sowing dates and years.

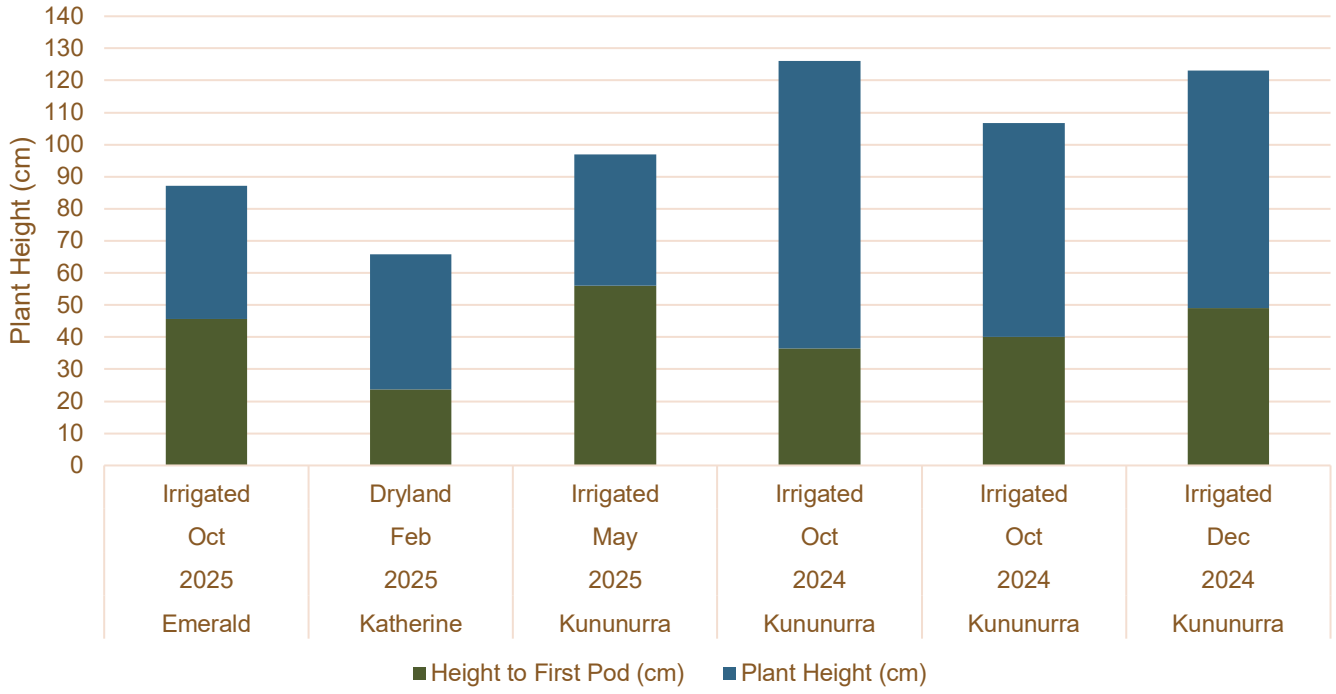


Figure 5 - Height to first pod and total plant height for S57B across multiples sites, sowing dates and years.

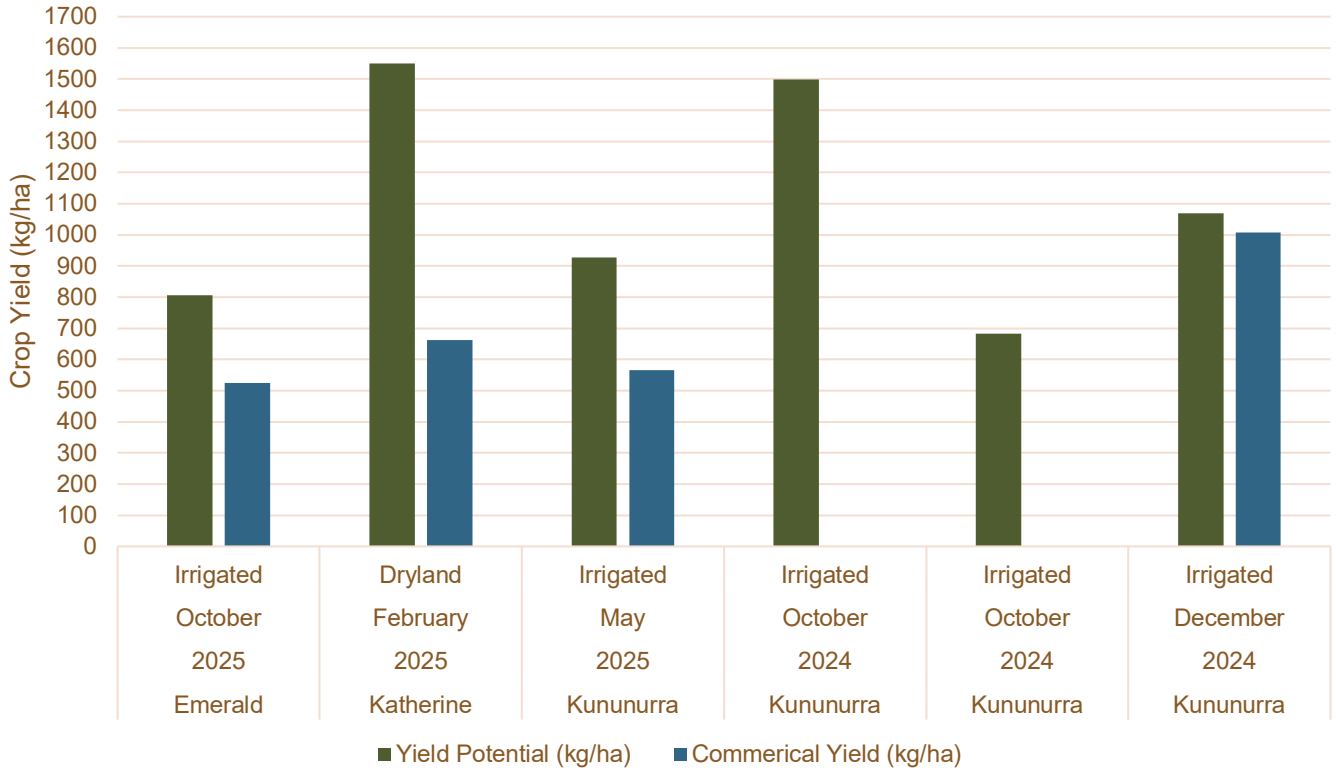


Figure 6 - Yield potential as determined by hand harvest and commercial yield determined by machine harvest for S3301 across multiple sites, years and sowing dates.

S57B

S57B is a non-shattering black variety (Figure 7) that was developed by Sesaco in the USA. Time to achieve 50% flowering ranges from 33 - 103 days and time to harvest is 100 to 203 days (Figure 8) making it a medium to long season variety. Height to first pod varies from 24.6 to 45.7 cm and the overall plant height ranges from 54.0 to 121.6 cm (Figure 9). The height to first pod and overall plant height along with the non-shattering trait makes S57B suitable for machine harvesting. S57B is best grown during the summer season, where a dry finish in addition to a chemical desiccant is used to prepare for harvest. Where soil moisture is available at time of desiccation, this variety has proven to be difficult to dry-down, so aligning maturity with the onset of the dry season or withholding irrigation is essential to achieve the moisture levels required in the grain to harvest the crop. The yield potential for S57B ranged from 79 – 1038 kg/ha (Figure 10), with the low yielding crops sown in February 2023 in Emerald and Tully experiencing poor crop establishment and high weed pressure, which reduced the yield potential of the crop and are not true representation of what is achievable.



Figure 7 - 5578, black sesame at late maturity growing in Katherine NT.

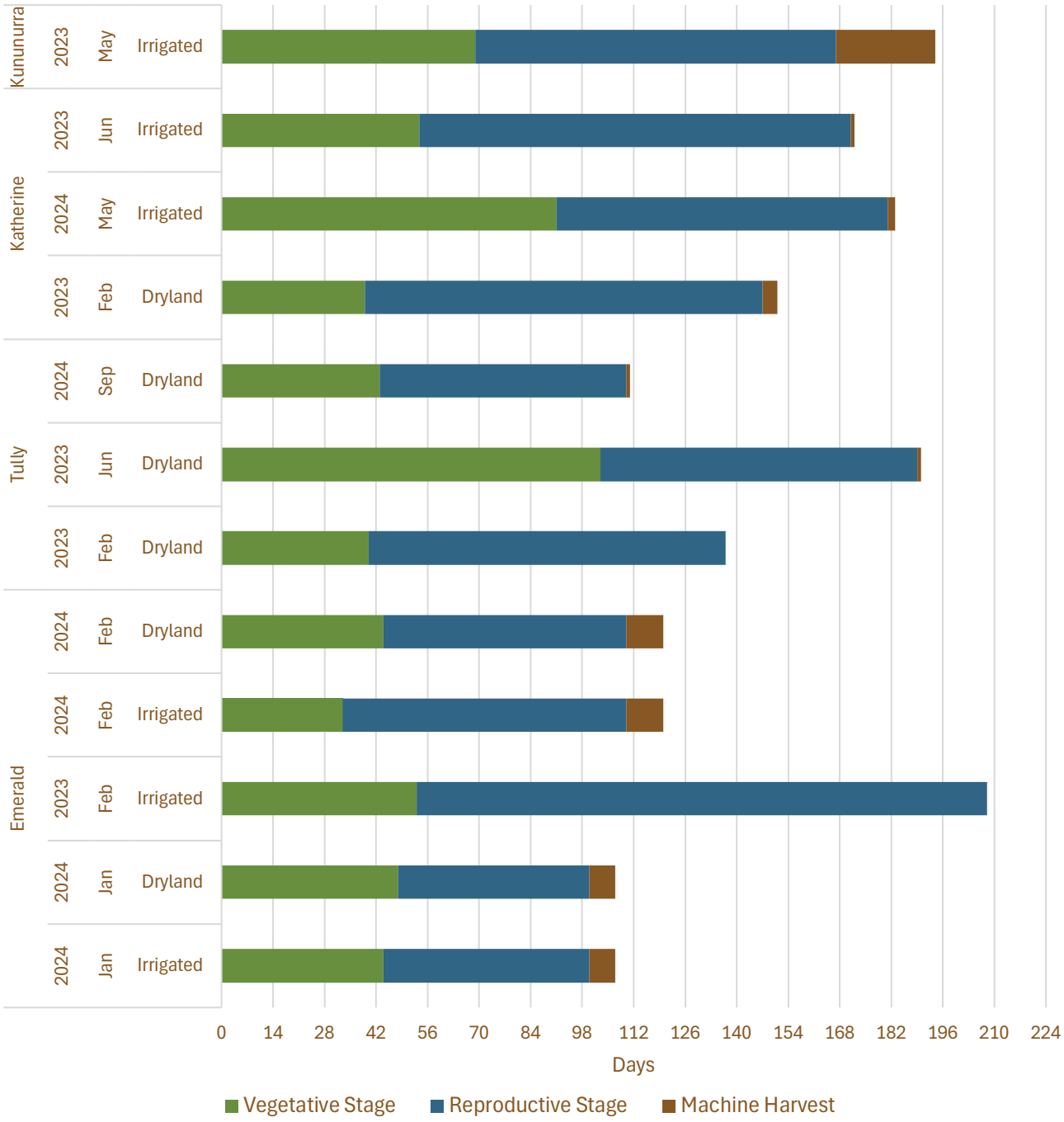


Figure 8 - Days from sowing to 50% flowering (vegetative stage), from 50% flowering to hand harvest (reproductive stage) and from hand harvest to machine harvest (machine harvest) for S57B across multiple sites, sowing dates and years.

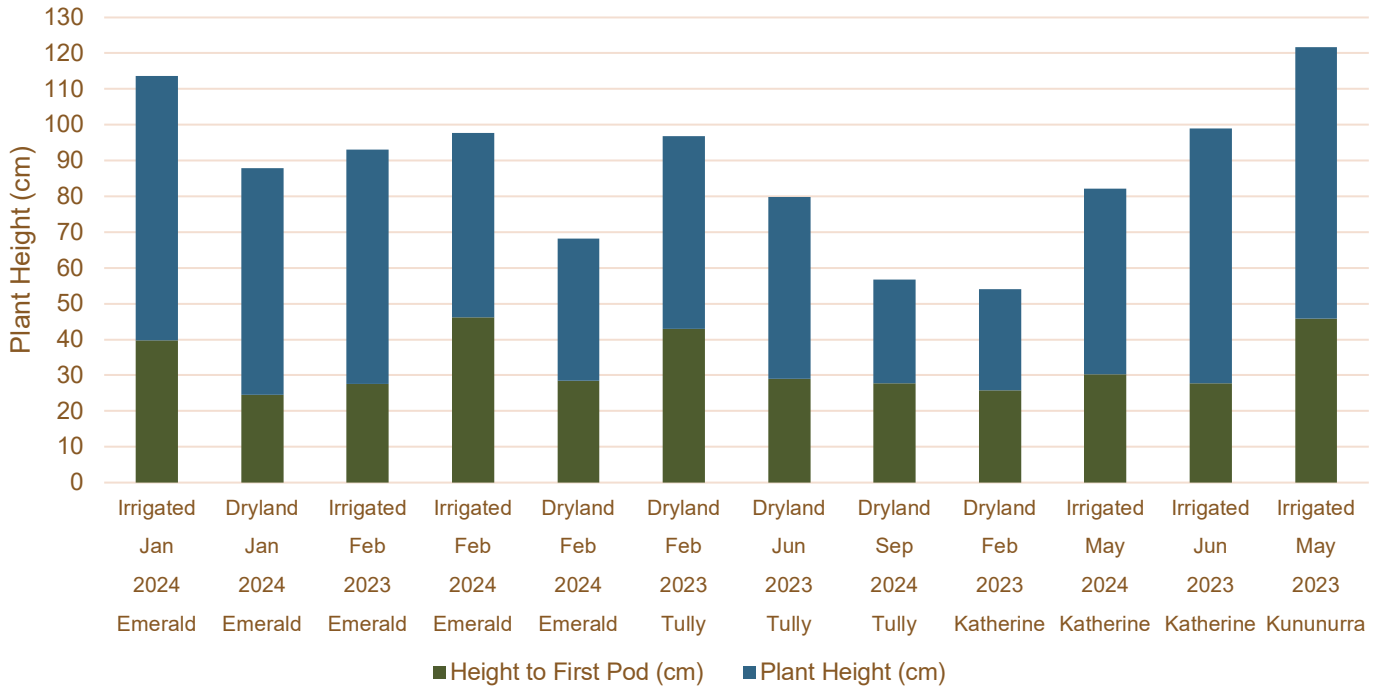


Figure 9 - Height to first pod and total plant height for S57B across multiples sites, sowing dates and years.

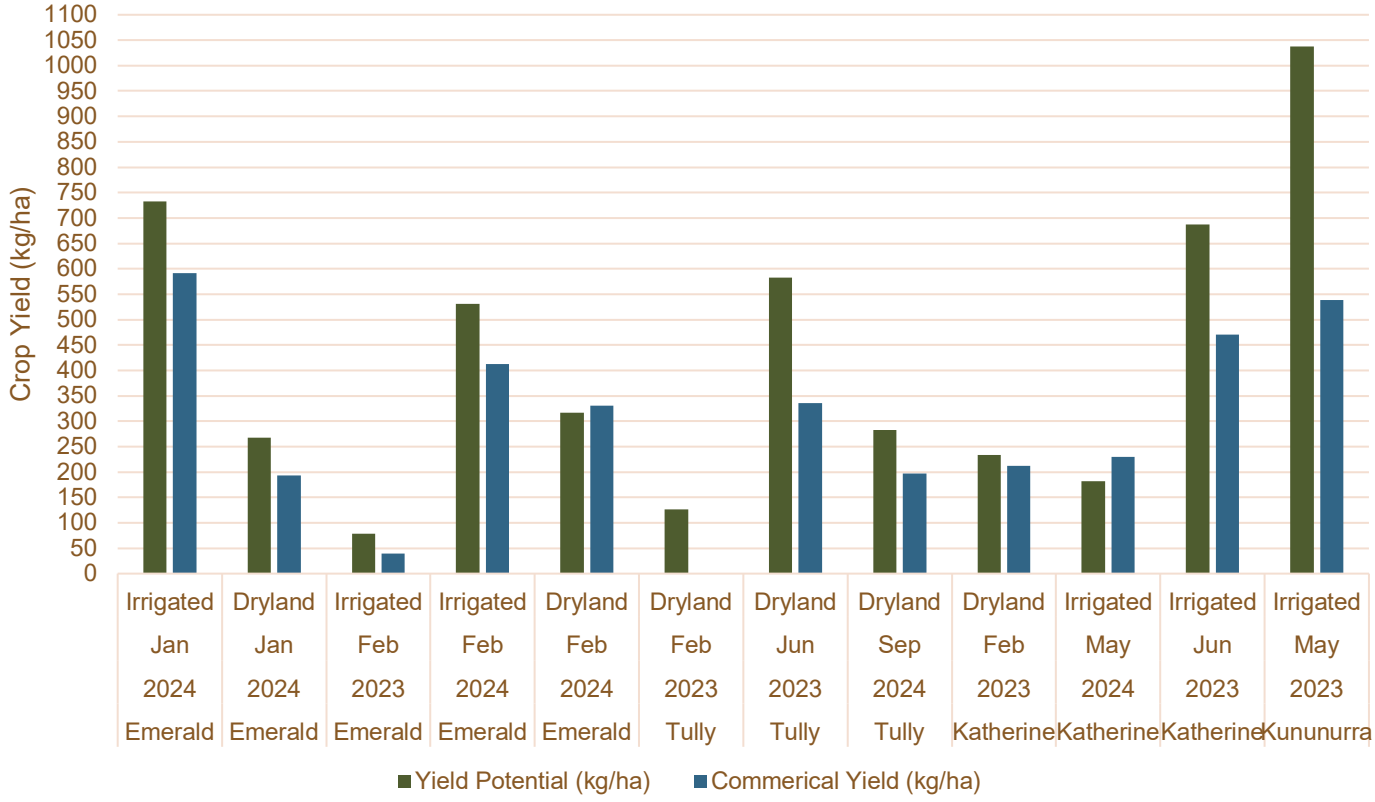


Figure 10 - Yield potential as determined by hand harvest and commercial yield determined by machine harvest for S57B across multiple sites, years and sowing dates.

Heat and Cold Tolerance

The optimum air temperature for sesame development and yield is 25°C to 37°C during the growing season (Terefe et al. 2012). Sesame is sensitive to chilling stress (Case Study 3) resulting in growth suppression when air temperatures drop below 20°C, and inhibiting growth and germination when air temperatures drop below 10°C (Lakhanpaul et al. 2012). Sesame sowing should occur only when the soil temperature at sowing depth is at or above 20°C at 7 am in the morning (Langham et al. 2008).

The northern part of Australia from Mackay north on the east will generally support the sowing of both a summer and a winter or early spring crop as the soil temperature during the winter months may be too cold for germination in some areas. The regions where the average monthly minimum air temperature for the 20th percentile is above 15°C, sesame should be able to be sown every year with minimal risk (Figure 12). However, if the average monthly minimum air temperature for the 20th percentile is below 15°C there may be some years where sesame crops in these months may be at risk from chilling stress affecting both germination and crop growth (Figure 12).

The minimum temperatures in Central Queensland are too low for a successful establishment or growth of a winter crop. Frosts will terminate a crop (Langham et al. 2008), which in areas such as Central Queensland could be beneficial for dry down and harvest of late sown summer crops.

Case Study 3: Soil and air temperatures during germination in Tully Winter 2024.

In 2024, the Tully winter crop sown on 3rd July emerged but due to the minimum air temperature being below 10°C from the 18th to 22nd July inclusive this planting failed to progress past the cotyledon stage. The crop sown 24th July failed to emerge as the soil temperature in the top 10 cm was generally below 20°C at 7 am during the germination period and 7 days after sowing both air and soil temperature reached a minimum of 15°C (Figure 5).

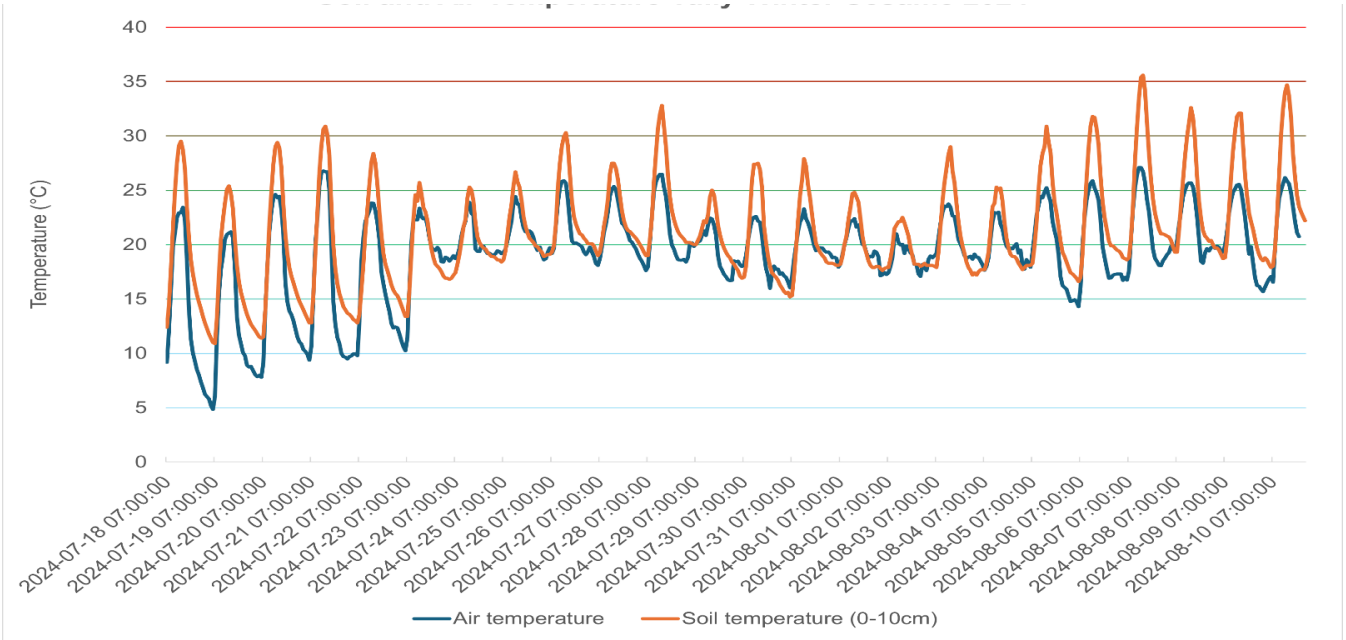


Figure 11 - Daily soil and air temperature at 7am experienced at the Tully winter sesame trial site between 19 July 2024 and 10 August 2024.

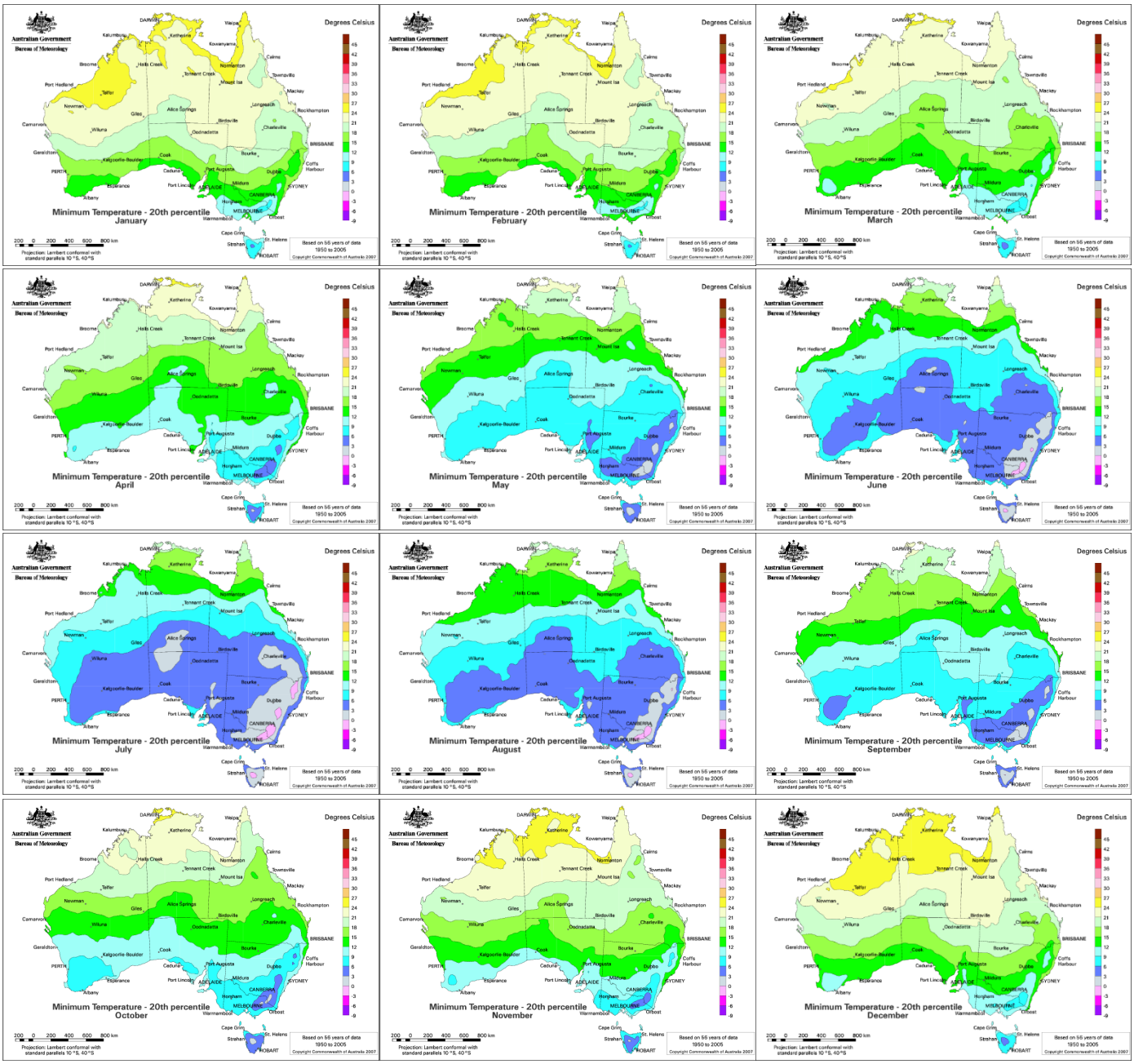


Figure 12 - Average monthly minimum temperatures across Australia from 1950 - 2005 for the 20th percentile. Source BoM (2024)

Water Management

Sesame, although a drought resilient crop, performs better with good water management. Successful sesame production depends heavily on achieving a uniform initial plant stand. Sesame should be sown into a well-prepared seedbed with good soil profile moisture to ensure moisture is maintained around the seed for 3 to 5 days to facilitate even crop establishment (Langham et al. 2008). Sesame develops an extensive root system that can access moisture from deeper soil layers; however, it is highly sensitive to waterlogging particularly during early crop growth stages. Well-drained paddocks and regulated water management are essential to avoid root-zone saturation.

Rainfed (Dryland) Systems

Sesame can be grown as a dryland crop in areas receiving 500 - 650 mm of evenly distributed rainfall across the growing period (FAO 2023). However, yield potential is strongly influenced by rainfall timing, soil water-holding capacity, and in-season moisture availability.

Research indicates that:

- seasonal rainfall below 300 mm may limit crop growth and yield,
- excessive rainfall (> 1100 mm) can reduce yield due to waterlogging risks (Terefe et al. 2012).

Katherine in the NT, has grown rainfed summer crops, and Tully has grown rainfed summer and winter crops, achieving yield potentials above 1 t/ha. However, the major risk of growing a rainfed crop in high-rainfall environments is not drought stress but the potential for waterlogging (Case Study 4).When sesame experiences 2 to 3 days of waterlogging, crop growth and crop yields can decrease (Myint et al. 2020), this is particularly evident in young crops, with more mature crops able to withstand longer periods of waterlogging.

Fully Irrigated Systems

Where rainfall is not reliable or yield targets are high, sesame can be grown using full irrigation. Apply a heavy irrigation prior to sowing to ensure the soil profile is full, and once the crop emerges apply fast, light irrigations as required. Avoid excessive irrigation that may cause waterlogging. It is better to monitor soil moisture and crop demand rather than irrigate on a fixed schedule.

Critical water-demand periods include:

- early vegetative growth,
- flowering,
- capsule development and seed filling.

The amount of soil moisture stored at planting provides the foundation for in-crop irrigation decisions. Crops established with limited soil water reserves will require additional irrigation during the growing season to maintain adequate moisture for growth and yield.

The frequency and timing of irrigation are governed by soil type, water-holding capacity, and irrigation system used:

- Lighter-textured soils (Sandy/Loamy): Require earlier initial post-plant irrigations and shorter intervals (more frequent applications) due to lower water-holding capacity.
- Heavier Soils (Clay): Allow for delayed initial irrigation and extended intervals between passes.

Stop irrigating when the crop reaches late bloom, determined when 90% of the plants do not have an open flower (Langham et al. 2008). Late irrigation can delay maturity and increase the risk of uneven ripening and harvest difficulties.

Partially (Supplementary) Irrigated Systems

When irrigation water allocation is limited, priority should be given to strategic irrigation rather than trying to fully irrigate the crop. Execute a heavy pre-sowing irrigation and then apply a second irrigation 6 to 7 weeks after crop emergence to support the crop as it transitions into its peak flowering and capsule-formation stages (Langham et al. 2008).

Case Study 4: Effects of a monsoon trough on a rainfed crop in Tully, Summer 2023-24.

In January 2024, the summer sesame trial in Tully received 800mm of rainfall (Figure 14) in the 7 days after sowing, causing waterlogging and the crop failed to germinate due to the waterlogging (Figure 15).

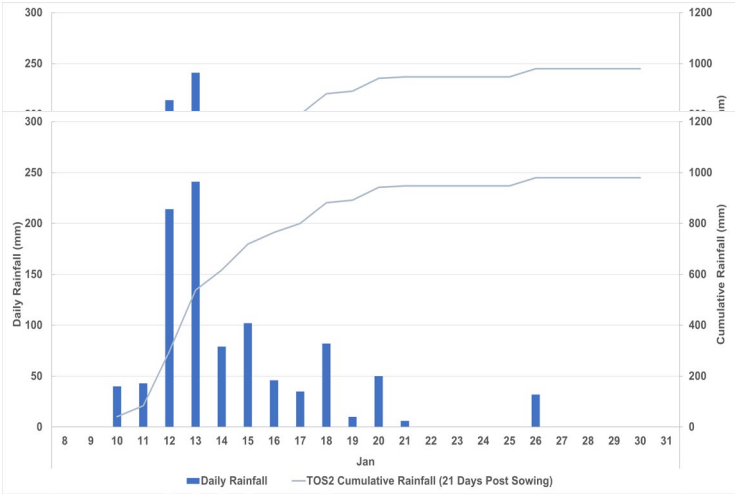


Figure 14 - Daily and cumulative rainfall for 21 days post sowing of Tully 2023-24 summer season trial.



Figure 15 - Waterlogging in the field in Tully 2023-24 summer season trial

Crop Rotation

Sesame can integrate into existing crop rotations in a variety of regions across Northern Australia. Examples are given for Central Queensland, Katherine/Douglas Daly region in NT, North Queensland and the Ord Region in WA.

Central Queensland

Sesame has proven to be a viable summer crop for Central Queensland, used in rotation with cotton. Sesame would be a suitable alternative summer crop when water allocations are limited, due to its drought resilience and ability to be grown with reduced water inputs, would be a viable crop when water allocations are limited. Sesame can be sown from early October to mid-February, with harvest from mid-February to end of June depending on variety sown and time of sowing (Figure 16).

Katherine/ Douglas Daly Region, NT.

Sesame is successfully grown in Katherine as an irrigated winter (dry season crop), and as a rainfed or supplementary irrigated summer (wet season) crop. A short season variety of sesame could be grown after cotton and then followed by a mungbean or soybean crop. In a forage-based system, where

irrigation is available (full or supplementary), sesame could be grown as a winter crop in rotation with Sorghum or hay (Figure 16).

Kununurra and Ord Region, WA

Sesame is a viable irrigated winter crop (dry season) and rainfed or supplementary irrigated summer crop (wet season), that can follow cotton or planted prior to chickpeas. It can also be grown as a maize alternative, or if there has been a failed cotton crop (Figure 16).

North Queensland

Sesame has shown to be viable as a rainfed summer and winter crop in the coastal wet tropic regions of North Queensland, and an irrigated summer crop on the Atherton Tablelands, and an irrigated or supplementary irrigated summer and winter crop in the Burdekin and Mackay.

Sesame can be integrated into an existing sugarcane cropping system and grown as a winter crop where there is an early fallow block in the summer in the traditional fallow (Figure 16). The introduction of sesame into the sugarcane farming system also enhances the viability of long fallows.

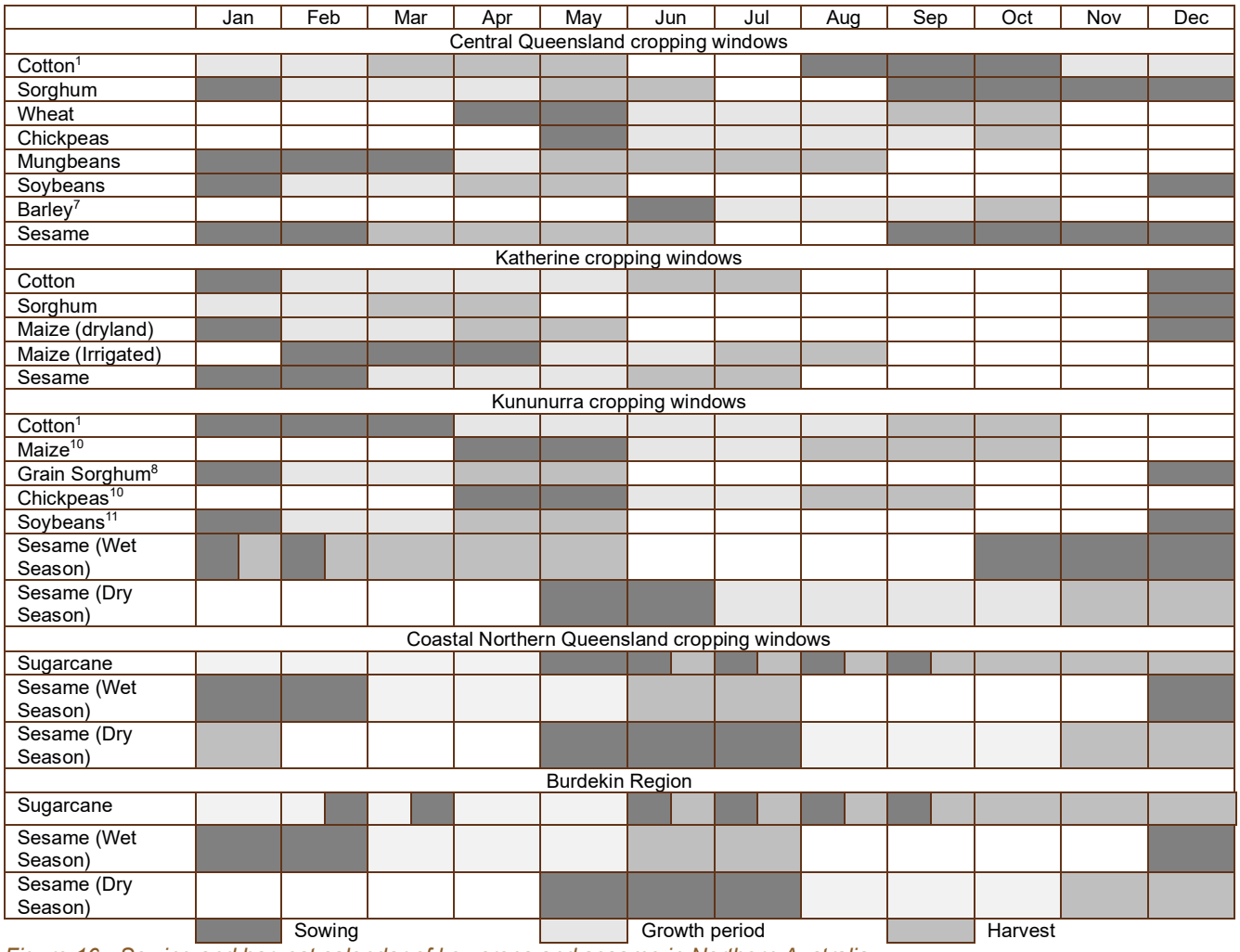


Figure 16 - Sowing and harvest calendar of key crops and sesame in Northern Australia

Crop Nutrition

Sesame requires minimal nutrients during early establishment, but its nutrient demands surge rapidly as the crop develops canopy, branches, and reproductive structures. Nitrogen demand peaks at 74 days after emergence during rapid biomass accumulation, phosphorus uptake is greatest between 60 to 90 days to support active root development and reproductive growth and potassium demand continues from 35 days until the end of the crop to assist with water regulation, photosynthesis and seed filling (Ribeiro et al. 2019).

Based on nutrient accumulation studies, Ribeiro et al. (2019) reported that sesame requires approximately 50 kg/ha of nitrogen, 14 kg/ha of phosphorus and 60 kg/ha of potassium to produce 1 t/ha of seed. However, fertiliser requirements vary with soil fertility, yield potential, water availability and nutrient-use efficiency. Fertiliser programs should therefore be based on soil testing and realistic yield targets rather than applying fixed rates. Currently, Australian recommendations are that between 60 and 120 kg/ha of nitrogen, up to 40 kg/ha of phosphorus and 80 kg/ha of potassium is applied to the sesame crop to maximise yields. This is typically applied at time of sowing. When placing fertilizer at time of sowing, ensure the seed is not in direct contact with Urea and Muriate of Potash forms of fertilizer, as this can damage the seed.

Nitrogen is typically the nutrient most responsive to management, particularly in high-yielding irrigated systems where crop growth is not limited by water availability. In northern Australian trials, early research indicates limited yield response to nitrogen applications above 80 kg/ha (Pers. Comm Bhattarai 2024).

In dryland production systems, nitrogen should be applied according to stored soil moisture at sowing and the expected seasonal rainfall. Higher nitrogen rates are unlikely to increase crop yield unless adequate moisture is available throughout the growing season. Research has shown that nitrogen rates around 64 kg N/ha are generally adequate for rainfed sesame, with little additional yield benefit from higher rates (Gebregergis et al., 2023).

Under irrigated or high-yielding systems, sesame may respond to higher N inputs, with studies indicating useful rates around 64-75 kg N/ha and, in some high-yielding situations, up to about 80-120 kg N/ha (Golan et al., 2022; Gebregergis et al., 2023). A split application of nitrogen, half at sowing and half 30 days after emergence may further improve nitrogen use efficiency compared with applying all nitrogen upfront.

Increasing nitrogen supply may increase seed protein concentration and oleic acid content but can reduce total oil concentration and linoleic acid proportion. Therefore, excessive nitrogen application should be avoided where maintaining high oil content is a priority (Bellaloui et al., 2018).

Harvest Management

Sesame can dry down for harvest on its own, however, the preference is to use a desiccant to speed up the rate of desiccation in preparation for harvest. In rainfed systems where soil moisture is not able to be depleted by the crop once it is mature, the use of desiccants is essential. A rainfall event during maturation can slow down desiccation of the crop, and if there is persistent heavy rain that delays harvest, seed quality may decline. Where there has been available soil moisture at the crop dry down stage, S57B has side shot and proceeded to grow on, even after the application of a desiccant. Several

desiccants are under permit or registered for use in sesame (Appendix 1).



Figure 17 - Heading a mature dry sesame crop with a plot header with a platform front.

Direct harvesting with a conventional grain header with a draper style or platform front or similar, maximises commercial grain yields when using mechanical harvesting (Figure 17). The key to ensuring a good clean harvest sample is to maintain a weed free crop, with seed moisture at or below 6% at harvest.

The ideal gap between the drum and the concave is approximately 25 to 30 mm. If the seed sample in the bin has a large quantity of smashed pods, the drum is too closed, if there are seeds still within the pods when they come out the back of the machine, the drum is too open. Sesame is more difficult to clean in a header compared to maize and sorghum. To maximise yields, trash levels are usually between 6 and 12%. The use of catch trays is critical to monitor effectiveness of harvester adjustments and to minimise seed harvest losses.

Sesame is hygroscopic and will absorb ambient moisture from the air once harvested. If the seed moisture levels are too high at harvest, the humidity is high, or there is green weed plant material present in the grain, it may be necessary to put the sesame on air to prevent heat buildup in the sample, which can cause the sample to spoil. Drying is complete when the seed moisture reaches 6%. Drying sesame after harvest is difficult and not economical.

Diseases and their Management

There are a range of soilborne and foliar diseases identified that could affect sesame production in Northern Australia (Figure 14).





(a)





(b)





(c)




(d)




(e)





(f)



(g)



(h)



(i)


(j)

Figure 18 - Sesame diseases identified at various locations across Northern Australia (a) Alternaria leaf blight/spot, (b) Corynespora target spot and stem rot (c) Phytoplasma phyllody , (d) Powdery mildew, (e) Cercospora leaf spot, (f) Damping off/seedling rot, (g) Charcoal/dry rot, (h) Fusarium wilt (i) Phytophthora rot and blight, (j) Sclerotinia rot

The level of inoculum for a number of these diseases can be determined by taking a soil sample and conducting a Predicta Sesame Test, which serves as a grower's disease risk management decision tool. Predicta Sesame test results can tell a grower which diseases are of great concern, allowing a suitable management plan to be implemented which considers variety choice, rotations, chemical management or whether or not to even plant a sesame crop.

Pythium seedling rot also known as damping off or seedling rot (Figure 18f), Fusarium wilt (Figure 18h) and Macrophomina charcoal/stem rot (Figure 18g) are all diseases that can affect crop establishment, and detectable through a Predicta Sesame test. If high levels of Pythium sp. or Fusarium oxysporum are present, it is important not to overwater the crop during establishment. If high levels of Macrophomina sp. are present, avoiding a dry spell causing moisture stress to the plant could minimise the disease, since charcoal/stem rot is a drought-induced disease. The use of fungicide and/or biological seed treatment may help in reducing the effect of these diseases on the crop, alternatively another site may be more suitable.

An established sesame crop can become infected with leaf spot (Figure 18a), sclerotinia, powdery mildew (Figure 18d) or phytoplasma phyllody (Figure 18c and Figure 19). Of these diseases, only powdery mildew has required the application of fungicides.



a) Phyllody symptoms on flowers *b) Phyllody symptoms on pods* *c) Phyllody symptoms on leaves*

Figure 19 - Phyllody symptoms on (a) flowers, (b) pods and (c) leaves on the sesame plant.

PREDICTA SESAME TESTING AND DISEASE IDENTIFICATION

For more information on where to get a Predicta B test done and how to interpret the results visit:- https://Rir.sa.gov.au/research/services/molecular diagnostics/Rredicta b#toc Pathogens-tested

If disease symptoms are observed within the crop, establish the incidence and severity of the disease, take photos of the disease symptoms and send a sample of the diseased plant along with the photos to a nearby plant pathologist for identification, or to:-

Dr. Dante **L.** Adorada, Centre for Crop Health,

University of Southern Queensland, Toowoomba Old 4350.

T:0477718593

E:dante.adorada@unisq.edu.au.

Pests and their Management

A number of insect pests have been observed in the sesame in Northern Australia (Table 1), with Sesame Leaf Roller posing the greatest threat and causing the greatest damage. For effective control, and for resistance management and IPM strategy needs to be used for insect control, and where possible select insecticides that are soft on beneficial insects and encourage beneficial insects to be present in the crop. The currently registered insecticides are shown in Appendix 1.

Table 1 - Insect pests observed in sesame in Northern Australia with the corresponding beneficial insects that can control them.

Common Name	Scientific Name	Beneficials
Sesame Leaf Roller (SLR) or Sesame Leaf Webber	*Antigastra catalaunalis*	Pollinators: Bees, eg. European honeybee (Apis mellifera), native sugarbag bees, eg. *Tetragonula spp*., hoverflies, eg. wasps.
Green Vegetable Bug	*Nezara viridula*	Ladybird beetles, Family Coccinellidae eg. *Coleophora inaequalis*
Native budworm and Helicoverpa spp., Cotton bollworm or corn earworm	*Helicoverpa punctigera* *Helicoverpa armigera*	Spiders, Araneae.
Green peach aphid	*Myzus persicae*	Lacewings, *Mallada sp.*, *Micromus sp*.
Broken-backed bug	*Taylorilygus apicalis*	Parasitic flies and wasps.
Mealybugs	*Phenacoccus spp*,	
Eysarcoris sp.	*Eysarcoris sp*.	
Rutherglen bug,	*Nysius vinitor*	
Brown leafhopper,	*Orosius sp*.	



Figure 20 - Sesame leaf roller caterpillar (left) and adult moth (right).

Sesame leaf roller (SLR), *Antigastra catalaunis* (Figure 20 is a lepidopteran pest which rolls up young leaves, and sticks them together with silk, then feeds from the inside where it is protected from most chemicals (Figure 21). SLR can cause severe defoliation which can delay crop development if it occurs during the vegetative growth stage. From the vegetative stage onwards, SLR caterpillars can also feed on flowers and bore into pods causing a yield reduction.

An IPM strategy for the

management of SLR in sesame is critical, as chemical control measures alone will not be sufficient moving forward. To ensure effective management of

SLR, regular crop inspections are critical to ensure SLR is identified early while populations are low and caterpillars are small and more susceptible to insecticides, as SLR populations can explode in a very short time frame. In sesame in northern Australia, SLR has been identified during the germination phase, and been detrimental for crop establishment. Economic pest thresholds have been developed for Australian sesame by Geoff Gurr et al (2025) and are shown in Table 2.



Figure 21 - Sesame leaf roller, the typical webbing and damage observed on sesame in Summer 2023-24 in Emerald, CQ.

Table 2 – Economic pest thresholds for Sesame Leaf Roller in Sesame in Australia

Sesame growth stage	Spray if at least one damaged plant per:
Seedling (6 true leaves)	100 plants inspected
Advanced vegetative pre-bloom	13 plants inspected
Early bloom	8 plants inspected

Green Vegetable Bug (Figure 22) is a polyphagous insect species with a piercing–sucking feeding habit. It can be present at various stages of crop development, although population densities typically increase during the reproductive stages of the crop. Green vegetable bugs preferentially feed on soft plant tissues and developing grains. Damage occurs when insects extract plant sap and inject phytotoxic saliva, leading to tissue necrosis. Feeding injury may cause abortion of floral buds, flowers and early-stage pods early in the crop, and empty grains and reduced grain weight during advanced crop stages. They can also function as vectors of plant pathogens, as their piercing–sucking feeding activity creates wounds that serve as entry sites for bacterial and viral infections.



Figure 22 - Green Vegetable Bugs at various stages. Top is early instar nymphs, bottom left is later instar nymphs, and bottom right is an adult beetle. Summer 2023-24 Emerald, CQ.



Figure 23 – Leaves of a young sesame plant damaged by Helicoverpa sp. Inset is a photo of a Helicoverpa sp. larvae.

Cotton Bollworm and Native Bollworm have both been found in sesame crops, especially the native bollworm. During the vegetative stage, larvae feed primarily on young leaves (Figure 23). They may also attack the apical meristem and other active growth points, disrupting apical dominance and consequently affecting plant development and branching. Larvae exhibit a preference for tissues with high nitrogen content. Additionally, they may bore galleries into branch stems, thereby compromising plant structural integrity. During the flowering stage, larvae feed on buds and flowers and finally, during the reproductive or pod-filling stage, larvae attack developing pods, boring into them and feeding on the seeds, which directly reduces crop yields**.**

The cotton bollworm has the ability to develop resistance to insecticides, and both are widespread in several regions of northern Australia. Soil sampling for pupae is recommended prior to sowing, particularly when the preceding crop has been maize, sorghum, or cotton. Additionally, the use of light or pheromone traps is effective for monitoring adult populations. A range of natural enemies of this pest can be identified, including predators, parasitoids, and pathogens. Among the predators, hemipteran bugs, spiders, lacewings, beetles (Coleoptera), and ants are prominent, all of which contribute significantly to the regulation of larval populations.

Parasitoid wasps such as *Trichogramma* and *Netelia*, as well as dipteran species from the genera *Carcelia* and *Chaetophthalmus*, which parasitize different developmental stages of the host insect are also key for controlling both the cotton and native bollworm to reduce the use of insecticdes and insecticide resistance.

Green Peach Aphid are sap feeding insects which favour warm cloudy and relatively humid days. They compete with the growth of young leaves and the development of reproductive structure and can cause growth reduction when the plant is unable to compensate. Aphid infestations can also cause a reduction in photosynthesis due to damage to the leaves from stylet insertion or from the growth of sooty mould which is encouraged by the saliva secretion. Aphids can also transmit a wide array of viruses

Aphids generally prefer to feed on sites with a high supply of assimilates such as terminal buds, young leaves, and reproductive structures. Despite the damage they may cause in high numbers, it is very important not to completely eliminate aphid populations, as they serve as food and support the multiplication of predators like ladybugs, lacewings, flower bugs, and some flies.



Figure 24 - Nymphs and adults of genus *Eysarcoris* on sesame.

Eysarcoris sp. is commonly associated with rice crops and is widely distributed across eastern Australia as well as western Australia (Figure 24). It has been recorded in sesame crops at Katherine research station. It is similar to the green vegetable bug and will cause similar damage.

Weeds and their Management

Sesame is highly susceptible to yield losses through poor weed management. Currently there are two grass selective herbicide actives and one pre-emergent herbicide active under permit for use in sesame in Australia (Appendix 1). To ensure good weed control, select a paddock that has low weed pressure, and very few broadleaf weeds and no vines. Prepare ground in advance and allow a germination of weeds prior to sowing. This germination can then be controlled with herbicide prior to sowing. Sesame fits well in a GM cotton rotation where the use of glyphosate in season during cotton production creates ideal field preparation through the depletion of broadleaf weeds during the cotton growing season.

Where there is an expectation of high weed pressure, a pre-emergent herbicide can be applied just prior or soon after sowing. Sesame however is very sensitive to pre-emergent herbicides, and their use can further slow emergence and affect germination if the crop is exposed to temperature stress, nutrient stress or moisture stress. If using a pre-emergent herbicide, it would be advisable to sow at the higher recommended seeding rate to ensure good crop establishment.

In crop, interrow cultivation can be undertaken 3 to 4 weeks after sowing, and soil can be thrown up on the stems without creating disease issues or damaging the plant. Grass weeds can be controlled using a grass selective herbicide (See Appendix 1). Into the future, diuron and pendimethalin have been identified as potential pre-emergents, however, sesame is extremely sensitive to pre-emergents and these products need to be evaluated further. In crop, diuron and Lontrel Advance have been used in trials and internationally and have proven to be safe after the crop reaches the 4-leaf stage.

Whenever any product under permit is used, be advised that often the sensitivity of the crop being treated has not been fully evaluated, and the recommendation is to only treat a small area to ascertain the reaction before treating the whole crop.

Key Weeds

A range of weeds and have been identified in sesame in Northern Australia (Table 3).

Table 3 - Key weeds identified in sesame crops in Northern Australia

Local name	Scientific name
Grasses	
Awnless barnyard grass	*Echinochloa colona* (L.) Link
Feathertop Rhodes grass	*Chloris virgata* Sw.
Purple lovegrass	*Eragrostis cilianensis* (All.) Vignolo ex Janch.
Crowsfoot grass	*Eleusine indica* (L.) Gaertn.
Broadleaf weeds	
Asthma weed	*Euphorbia hirta* L.
Common purslane/Red pigweed	*Portulaca oleracea* L.
Horse purslane/Black pigweed	*Trianthema portulacastrum* L.
Common sowthistle/Milk thistle	*Sonchus oleraceus* L.
Flaxleaf fleabane	*Conyza bonariensis* (L.) Cronquist
Groundcherry/Wild gooseberry	*Physalis angulata* L.
Pigweed	*Amaranthus retroflexus* L.
Slender amaranth	*Amaranthus viridis* L.
Tridax daisy	*Tridax procumbens* L.
Bladder ketmia	*Hibiscus trionum* L.
Wild sunflower/Crownbeard	*Verbesina encelioides* (Cav.) Benth. & Hook.f. ex A.Gray

Vines	
Phasey bean	*Macroptilium atropurpureum* (DC.) Urb.
Calopo	*Calopogonium mucunoides* Desv.
Stinking passionflower	*Passiflora foetida* L.
Three-lobed morning glory	*Ipomoea triloba* L.
Wild melon	*Cucumis melo* L. (wild form)

Grasses are generally easy to control with the use of pre-emergent herbicides and through the use of selective grass herbicides in crop. Selective grass herbicides under permit or registered for use in sesame are listed in Appendix 1. However, care needs to be taken to ensure that good control is achieved to prevent herbicide resistance.

Awnless barnyard grass (*Echinochloa colona*) is a warm-season grass which can cause severe yield losses in summer crops. It has a short lifecycle, capable of producing 5,000–24,000 seeds/plant even under moisture stress / fallow periods. Multiple cohorts each season rapidly rebuild the seed bank. Awnless barnyard grass has developed resistance to Group 5 (atrazine) and Group 9 (glyphosate) herbicides in Australia. Seeds readily move with water flow after heavy rain events following wet summers.

Awnless barnyard grass is a coarse upright annual grass which grows in clumps. Leaves come up from the base of the plant to form tillers. No ligule. The flowers consist of awnless spikelets with 2 membranous glumes enclosing florets. Short spikes of the flower are arranged alternately up the main axis. Seedlings are erect from birth, with lower nodes rooting at early growth stages. The seed head normally arises out of the leaf sheath. Leaf sheaths can develop purple-red stripes or bands when water-stressed.

Awnless barnyard grass can cause major problems during sesame establishment when competing with other crops, decreasing vigour and yield. Plants that escape at the end of the season can produce a large number of seeds and greatly contribute to the seed bank, building pressure in subsequent seasons.

Feather top Rhodes grass (*Chloris virgata)* is another warm-season grass that competes strongly with crops and is hard to control once tillered. Very high seed producer that sets seed quickly, even under stress. Adapted to saline conditions and responds well to high temperatures and moisture stress. Glyphosate resistance is increasingly documented throughout Australia, further reducing options. Common in fallows and unmanaged areas, providing an abundant seed supply to sesame paddocks.

Feather top Rhodes is an annual grass with erect, flattened seedlings. Leaves are flat and drooping with stems that are hollow, hairless and can root at nodes. Develops many tillers with seedheads consisting of upright, fluffy feather-like spikes. Seeds are formed at the top, bundled seed spikes protruding from erect stems (15–100 cm tall).

Feathertop Rhodes grass is becoming increasingly common in sesame production areas, especially in poorly managed fallows, low-residue paddocks, and along fence lines. It can be a huge problem if the emergence synchronises with the sesame crop, as it is able to easily overtop. The main source of introduction into sesame is from summer fallows.

Feather top Rhodes can be extremely damaging early to mid-season when plants quickly overtop sesame seedlings. Plants that emerge later can still produce massive amounts of seeds, which can exacerbate future problems.

Purple lovegrass (Eragrostis cilianensis) is quick to establish each summer, rising early and competing fiercely with crops at establishment before building the soil seed bank if left unchecked. Fine leaf growth can go unnoticed until seed heads emerge, and soil seed bank replenishment is already underway.

Purple lovegrass is a fine-textured tufted grass with narrow leaves. The flower head is an open, airy panicle that often appears purplish when mature. The plant stays small but seeds prolifically.

Purple lovegrass is common in areas of disturbed soils, paddocks with poor residue cover or a history of summer-active grass weeds and can be most problematic at crop establishment, where heavy competition can decrease seedling vigour and open the canopy to further invasion.



Figure 25 - Mature crowsfoot grass plant

Crowfoot grass (*Eleusine indica*) also commonly known as crabgrass is a tough, stress-tolerant summer grass that thrives on compacted and trafficked soils. Highly competitive at establishment and capable of surviving under heat, drought and mechanical pressure. Produces abundant seeds and can rapidly dominate headlands and crop rows, acting as a persistent reinfestation source. Many populations of crowfoot grass are resistant to group 1 (fops and dims) and group 9 (glyphosate).

Crowsfoot grass is a low-growing grass with a flattened rosette base. Leaves are dark green, flat and smooth. Distinctive finger-like seed heads radiate from a single point, resembling a crow's foot (Figure 25). Seed heads typically appear early under favourable conditions.

Commonly found in sesame headlands, wheel tracks and within rows, particularly where soil compaction limits crop competitiveness. Crowsfoot grass is most problematic during early crop establishment, where competition reduces sesame vigour and creates gaps that favour further weed invasion.

Broadleaf weeds are more difficult to control in crop compared to grasses. Pre-emergent herbicides will assist with the control of select broadleaf weeds, however as herbicide options are very limited, an integrated weed management approach is necessary in sesame for broadleaf control, which includes paddock selection, and encouraging weeds to germinate prior to sowing to allow early weeds flushes to be controlled.

Asthma weed (*Euphorbia hirtus*) is an annual broadleaf weed capable of producing multiple flushes during warm summer months. Thrives in bare and disturbed areas, allowing populations to explode following rain events. Populations can build up and resupply the surface seed bank within one season if left untreated. The plant growth habit ranges from prostrate to spreading; typically establishes prior to sesame emergence and competes aggressively with young seedlings (particularly where wide crop row spacing is used).

Identification varies, as this species can grow prostrate on the ground or ascend several inches vertically. Overall appearance of a low-lying ground-cover with opposite, small leaves. Milky white latex will leak from leaves and stems when broken or damaged. Branches develop frequently from the base of the plant, forming dense patches at ground level.

Asthma weed is widespread throughout CQ, commonly found within sesame crops, headlands and

wheel tracks. It is best controlled when young and before plants begin to branch and produce side shoots. As the plant matures, control becomes significantly more difficult. Asthma weed typically establishes itself well before sesame crops start to grow. With a prostrate growth habit and tolerance for low-light conditions, asthma weed quickly smothers sesame seedlings, resulting in patchy crop establishment.

Comon Purslane (*Portulaca oleracea*) also known as red pigweed is a very heat and drought-tolerant summer annual broadleaf weed that forms dense mats, which can suppress crop emergence (Figure 26). Rapidly regrows after cutting and produces very large numbers of black seeds about 1 mm in diameter, which are difficult to separate from the sesame seeds and black sesame should be avoided if this weed is present.



Figure 26 - Common purslane also known as red pigweed.

Common purslane is a very low-growing prostrate plant with reddish succulent stems spreading out from a central taproot. Leaves are thick, fleshy, smooth and oval-shaped. Opens small yellow flowers in bright sunlight. Broken stem fragments readily re-root if moisture is present.

Commonly found throughout sesame areas and summer fallows. Especially common on lighter sandy soils and areas with a history of bare soil or disturbance. It is most problematic early to mid-season, when populations can form dense mats and prevent crop emergence. Late-season populations can disrupt harvest operations and contribute significantly to the seed bank.

Horse purslane (*Trianthema portulacastrum*) also known as black pigweed is a highly competitive summer broadleaf weed that readily colonises bare ground and smothers small crop seedlings. An effective competitor under hot, dry conditions, meaning it can easily move into sesame paddocks and dominate early in the season with rapid post-fire regeneration capabilities.

Plant is prostrate with thick succulent stems spreading radially along the ground. Surface bark may be hairy. Leaves are opposite, fleshy, oval-shaped, and slightly shiny. Flowers are small and white and produced at leaf axils. Plants form mats and cover the ground surface.

Commonly found in sesame paddocks and summer fallows, especially where crops have struggled to establish early or where early-season weed control has been poor. Early to mid-season, weeds can form large mats that completely suppress crop emergence and reduce early vigour, opening the canopy, increasing the risk of further weed invasions.

Common sowthistle (*Sonchus oleraceus*) also known as milk thistle is a fast-growing, highly competitive broadleaf weed that produces very high numbers of seeds that can efficiently disperse on wind currents. Thrives in fallows and low-disturbance systems with leftover moisture and fertility. Reported resistant populations to Group 2 (ALS), Group 4 (synthetic auxins) and Group 9 (glyphosate) in Australia, making chemical control very limited. This weed is problematic across summer, winter, and fallow crops throughout the year in sesame.

Thin, prickly leaves with jagged lobes; when the stem is broken, a milky white latex will leak from inside

the stem. Stems can lie flat and form a rosette or be erect. Leaves and stems are tall and hollow, containing grooves and red colouring. Yellow flower heads similar to dandelions produce seeds with a fine, feathery pappus (hair attached to the seed), which allows them to be dispersed by wind.

Common sowthistle be found in sesame fields and fallows and can blow into crops from roadsides, field margins and neighbouring fields even if in-field control has been successful. It is most problematic during the beginning stages of crop growth, where sowthistle can quickly overtop sesame seedlings. If not controlled during fallow or early crop growth stages, heavy infestations can occur and persist, reinfesting soils.

Flaxleaf fleabane (*Conyza bonariensis*) is extremely problematic due to widespread glyphosate resistance and very efficient wind-borne seed dispersal. Populations build up very quickly in no-till systems when plants escape early control. Control options once plants have bolted are limited and expensive.

It has hairy, narrow-leaved rosette when young, before dying down to an upright, much-branched plant. Leaves are hairy and soft. Many small daisy flower heads are clustered at the top of the plant, creating a fluffy appearance.

Common found in fallows and sesame paddocks, particularly where fallow spray has been delayed or ineffective. Seeds are introduced from roadsides and other fallows. Most damaging after bolting and producing flowers and then it becomes harder to control and it sets large amounts of seeds. Late-season escapes have high potential to rebuild the seed bank.

Ground cherry (*Physalis agnulata*) also known as wild gooseberry is a robust, bulky growing broadleaf weed. Competes well for light and nutrients and causes harvest contamination from its fleshy fruits, which are enclosed in papery husks. Mature plants may interfere with machinery and crop hygiene standards when grown in sesame and other spice crops.

An erect to spreading plant with soft green stems. Produces small yellow flowers with darker markings near the centre. Plant fruits are distinctive and easily identified by their inflated papery husk, which turns straw-coloured when mature.

Occasional to locally common in sesame paddocks and low-intensity mixed farming systems. More frequent following wet summers or where fallow weed control has been poor. Infests low competition areas and field margins more frequently than interiors. It is a mid to late season weed. Large plants compete with crops and contaminate harvested produce with husks and fruits.

Pigweed (*Amaranthus retroflexus*) also referred to as redroot amaranth is an extremely competitive summer broadleaf weed. Rapid growth and very high nutrient and water use allow it to shade out and suppress young crops. Produces prodigious amounts of seed, which rapidly build a persistent seed bank. Found globally with herbicide resistance, so manage effectively and early.

An erect coarse annual plant with rough, hairy stems and leaves. Leaves are ovate to diamond-shaped with very visible veins. Has dense green terminal seed heads with smaller flowers emerging from axillary clusters. Pigweed can have a reddish tinge on stems as it matures.

Found throughout the sesame production areas. Often encountered in paddocks that have a history of summer broadleaf weeds, high fertility or late first-pass weed control. Generally causes problems early to mid-season, competing strongly with sesame during establishment and early canopy growth.

Slender Amaranth (*Amaranthus viridis*) is a fast-growing summer annual broadleaf weed that emerges soon after rain events and can quickly out-compete young crops for light, nutrients and moisture. Produces large quantities of seeds, leading to rapid accumulation of weed seed banks and repeated reinfestation if plants are left to go to seed.

An erect to spreading slender green amaranth with smooth stems and leaves. Leaves are ovate to lance-shaped and soft-textured. Small green flowers and seed clusters are produced at the leaf axils and stem tips. Less dense than pigweed but can produce just as many seeds.

It is seen quite commonly throughout sesame paddocks, where early-season weed control or crop establishment has been lacking or patchy. Generally seen early to mid-season. Vigorous growth can suppress crop seedlings and reduce early-season crop vigour.



Figure 27 - Mature Tridax daisy plant

Tridax Daisy (Tridax procumbens) is a summer annual broadleaf weed that rapidly colonises bare ground through prolific seed production and dispersal by wind. It may even survive longer and behave as a perennial in areas without frost**.** A low-growing, prostrate habit allows tridax daisy to go undetected early, giving it time to establish and compete with crop seedlings when crop emergence is patchy or slow.

Appears as a low-growing, prostrate plant with hairy stems that creep along the ground, rooting at the nodes. Has white to pale yellow daisy-like flowers with opposing yellow centres. Leaves are opposite, with hairy leaves and coarsely toothed edges.

Found in sesame crops and summer fallows, particularly on bare soil or where crop competition is poor. Most commonly found established first in headlands and areas of low crop residue. It is mainly problematic during early crop emergence when it can compete strongly with sesame seedlings. Tridax daisy also contributes large numbers of seeds to the soil seed bank for later flushes.

Bladder ketmia (*Hibiscus trionum*)is a persistent “hard-seeded” weed with low fresh-seed germination but strong carry-over potential, leading to late-season escapes. It emerges in successive flushes after rainfall/irrigation and can set seeds quickly (45–60 days), so small misses can quickly rebuild the seed bank.

It has hibiscus-like pale yellow/cream flower with a dark (purple/red) centre. Leaves are often 3-lobed/segmented and variable. Distinctive, inflated “bladder-like” capsule/pod that dries and splits to release many seeds.

Most likely in disturbed fallows and lighter-competition blocks (e.g., kalonji/fennel rotations and edges) and can move into sesame where summer rainfall triggers repeated flushes. Early–mid-season competition, plus late escapes that flower/seed close to harvest, increase contamination risk and “resetting” the seed bank for next season.

Wild sunflower (*Verbesina* encelioides) also known as crownbeard , is a tall-growing summer broadleaf weed (~130 cm) capable of establishing dense competitive stands that greatly reduce light availability. Can germinate and grow rapidly during the early part of summer before the crop canopy

closes, resulting in yield loss.

It is an erect coarse plant with rough, hairy, triangular to ovate leaves. Large yellow sunflower-like flowerheads with a dark centre. Plants have stiff, branching stems and are very visible when established.

Found across sesame and winter spice areas of CQ, especially in paddocks bordering roadsides, grazing areas and unmanaged fallows. Early in the season, before crops reach canopy closure, they can rapidly grow past crop seedlings and establish a dense canopy that dominates the paddock.

Vines generally present a problem to the sesame crop later in the season. Vines can climb up the sesame plant and then spread across the top of the canopy. This creates competition for light, but more importantly can inhibit harvesting if it is dense.

Phasey Bean (*Macroptilium atropurpureum*) Phasey bean is a competitive, twining/climbing legume that shades out and tangles within crop canopies. Difficult to control due to its trailing growth habit and tendency to resprout (particularly under warm, moist conditions).

Trailing/climbing plant with trifoliate leaves, leaflets attached to long petioles. Produces large, distinctive purple pea-flowers. Thin stems twine around other plants/trail on the soil surface.

Locally troublesome in sesame crops, especially where crops are grown after phasey bean–based pastures/cover crops or poorly managed fallows. Causes trouble in the crop, mid to late season. Growth overtops and entangles sesame crops, complicating canopy management and harvest.

Calopo (*Calopogonium mucunoides*) is a very vigorous legume that smothers crops via tangling growth throughout the canopy (Figure 28). Competes strongly against low-growing spices if rain and soil fertility are high enough to also support rapid calopo growth. Difficult to control once established due to the vining growth pattern and tendency to resprout from nodes.



Figure 28 - Calopo in a sesame crop in North Queensland.

A trailing/climbing legume with trifoliate leaves (wide, soft leaflets). Leaves are extremely hairy, which prevents spray droplets from penetrating and makes control difficult. Forms purple pea flowers. Creeps along the ground with stems, climbs over other plants. Can form large mats later in the season, which can be an issue for harvesting sesame.

Occurs sporadically but can be an important weed in higher-rainfall regions, particularly when sesame or spices follow pasture, cover crops, or fallows containing calopo. Usually found along field edges, drainage lines and moisture pockets rather than uniformly across paddocks. Causes the greatest issues from mid-season onwards, when vining growth smothers sesame or spice plants, impedes airflow around the crop, and complicates harvesting.

Stinking passionflower (*Passiflora foetida*) is an ggressive smothering vine that scrambles through crops, decreasing light interception and affecting harvest operations. Difficult to manage once established due to fast growth rate and prolific regrowth from nodes.

Trailing to climbing hairy vine with soft stems. Leaves are palmately lobed and hairy. Flowers are characteristic of a passionflower-type, followed by small spherical fruit surrounded by hairy, sticky

bracts. Gives off a strong, unpleasant smell when trodden on or crushed.

Common along sesame field margins, fence lines and fallow areas, from which it spreads into paddocks. Can be problematic during mid to late season due to prolific vine growth that smothers sesame plants and complicates harvest.

Three-lobed morning glory (Ipomea triloba) also known as pink convolvulus is a hard to control climber found in crops, that vigorously vine through the canopy, suppressing crop growth.



Figure 29 - Three-lobed morning glory.

Medium-sized trailing or climbing vine with lobed (ivy-like) leaves. Leaves are unique, having three large lobes. The plant produces attractive, pink-to-purple funnel-shaped flowers. Stems are thin and easily wrapped around other plants and crop stems.

Found in sesame crops within Central and North Queensland, mainly in wide row systems with poor early competition against the crop. Can be an issue when it enters crops from paddock margins and fallows. Mid to late season, when vines grow up through sesame crops, blocking airflow and becoming tangled in harvest machinery.

Wild melon (*Cucumis melo*) is a vigorous, sprawling, and climbing vine that smothers the soil surface and moves quickly through crop canopies. It can severely impact harvest operations and access to crops. Vines left on the ground can suppress crops, result in uneven paddocks, and contribute to harvest contamination.

Wild melon is a prostrate to climbing vine with coiled tendrils and coarse, lobed leaves. It flowers with yellow blossoms, then produces small, round to oval melons that range in colour from green to yellow and often have stripes or mottling. Melons are easily spotted when mature.

Found occurring within sesame crops, mainly within wide-row production and where previous crops had cucurbit weeds or summer fallows were poorly managed. Wild melon is most problematic mid- to late season, as vines tangle through crops, reduce machinery access, and can complicate harvest.

Appendix 1 - Chemicals registered or under permit for use in sesame.

These details are correct at the time of publication. Always refer to the product labels or the relevant permits for full details, prior to recommending or using any products, as this is an excerpt only. For full permit details go to - https://portal.apvma.gov.au/permits.

Pre-emergent Herbicides

PRODUCT	GROUP	RATE	WHP	CRITICAL COMMENTS
Metolachlor and s-metolachlor PER94810 (Valid to 30 Sep 2029)	15	720 g/L metolachlor product 3-4 L/ha OR 960 g/L metolachlor product 2.25-3 L/ha OR 960 g/L s-metolachlor product 1.5-2.0 L/ha		• Apply by calibrated boom spray in a minimum spray volume of 60 L/ha. • Apply to the soil as a pre-emergent spray before, at or immediately after planting and before crops and weeds have germinated. • Apply in sufficient water to ensure complete coverage of the soil surface. Increase the rate of metolachlor as the expected density of the weeds increases. • DO NOT make more than one metolachlor or s-metolachlor application per year. • DO NOT apply by pivot irrigator or other forms of chemigation.

Grass Selective Herbicides

PRODUCT	GROUP	RATE	WHP	CRITICAL COMMENTS
Clethodim (Various) PER86796 (Valid to 31 July 2029)	1	360 g/L Product 100 - 330 mL/ha OR 240 g/L Product 175- 500 ml/ha PLUS 2 L/100L Liase, 1 L/l00L Hasten or 0.5 L/l00L Uptake	Harvest-Nil Grazing-21 Days	• Apply one foliar application only via calibrated ground boomspray or aerial equipment. • DO NOT apply after flower buds become visible.
Haloxyfop (Various) PER92824 (Valid to 04 Oct 2029)	1	520 g/L product 75 - 100 ml/ha OR 900 g/L product 45- 60 ml/ha	Harvest-Nil Grazing-28 Days	• Apply at 2nd leaf to 8 leaf stage of crop. DO NOT apply after 8 leaf stage of the crop. • Target grass weeds at the 2-leaf to early tillered stage that are actively growing and free from temperature or water stress. • Ground application: use a minimum spray volume of 80 L/ha. • Aerial application: use a minimum spray volume of 30 L/ha. • Use the higher spray volume for dense grass populations. Apply in sufficient water to ensure complete and thorough coverage of grass weeds. • Increase the rate of haloxyfop as the size, age and/or density of the weeds increase. • Use with spray oil as per label instructions. • DO NOT apply more than 1 application per crop.

Crop Dessicants

PRODUCT	GROUP	RATE	WHP	CRITICAL COMMENTS
NUFARM WEEDMASTER DST HERBICIDE	9	2.0-3.3 Uha	7 Days	Apply as a foliar spray when at least 70% of the seed capsules have changed colour from dark green to light green or yellow.
NUFARM CRUCIAL Herbicide	9	1.6 - 2.6 L/ha	7 Days	Apply as a foliar spray when at least 70% of the seed capsules have changed colour from dark green to light green or yellow.
NUFARM WEEDMASTER ARGO HERBICIDE	9	1.8-2.9 Uha	7 Days	Apply as a foliar spray when at least 70% of the seed capsules have changed colour from dark green to light green or yellow.
ROUNDUP ULTRAMAX Herbicide with Plantshield	9	1.7 - 2.74 L/ha	7 Days	Apply as a foliar spray when at least 70% of the seed capsules have changed colour from dark green to light green or yellow.
Diquat dibromide monohydrate (Various) PER94919 (Valid to 28-Feb-2026)	22	200 g/l product 2- 3 L/ha	Harvest -4 Days Grazing - **1** Day	• Apply as a foliar spray as soon as the crop has reached full physiological maturity. • Apply one application only per crop, via calibrated boom sprayer or similar equipment, in a minimum water volume of 100 L/ha. • Add Agral Spray adjuvant at the rate of 200 ml/100L or BS1000 Bio-degradable Surfactant at 150 ml/100L.

Insecticides

PRODUCT	GROUP	RATE	WHP	CRITICAL COMMENTS
Methomyl (Various)	1A	225 g/L product Corn Earworm 1.5 - 2.0 L/ha Green Vegetable Bug 1.5 L/ha	14 Days	• Apply when significant populations are noted. • Apply at the recommended rates when the insects first appear and repeat as needed. Apply the lower rates on small caterpillars and light infestations of insects. Use the higher rates on larger caterpillars and heavier infestations. Best control is obtained when spray schedules are initiated on young insects.
Nuclear polyhedrosis virus (Various)		100 ml/ha Helicoverpa sp.		• Thorough coverage of the crop is essential as it needs to be ingested to be effective. • Apply when temperatures are between 25°C and 35°C when larvae are actively feeding. • This product is more effective on smaller larvae. Target application to coincide with neonate larvae emerging from their eggs. This product should not be applied on larvae larger than 13 mm in length. • This product will provide between 60 and 90% control. Under extremely high pest pressure or sub-optimal application conditions, or when protection against damage is vital, additional control options should be considered.
Pirimicarb PER94884 (Valid to 31 October 2026)	1A	500 g/kg product 250 - 300 g/ha 800 g/kg product 160 - 190 g/ha Aphids Including Cowpea aphid and Green peach aphid	21 Days	• Closely monitor for aphids and time the foliar spray application to target adults and nymphs when the first appear. Reapply based on pest monitoring. • Apply via ground boom or equivalent or aerially via fixed-wing, helicopter or drone. • DO **NOT** Apply more than 2 applications per crop. • DO NOT apply less than 14 days after the initial treatment • Add summer spray oil at recommended rates.

PRODUCT	GROUP	RATE	WHP	• CRITICAL COMMENTS
VANTACOR Insecticide PLUS OTHER REGISTERED PRODUCTS containing 600 g/L Chlorantraniliprole PER94865 (Valid to 31 October 2029)	28	40 ml/ha Plus 125 g ai/100L of non-ionic surfactant Heliothis and other lepidopteran larvae	14 Days	• Closely monitor pest populations [check every 3 to 5 days] and time foliar spray application to target mature (brown) eggs and newly hatched larvae and when the crop is highly susceptible to pest damage. • Treat when pests first appear, targeting eggs at hatch or small larvae (prior to the third instar stage) before the pest becomes entrenched. Reapply based on pest monitoring. • Apply by ground based boomspray, or aerially using fixed wing, helicopter, or drones. • Use a spray volume of 100 L/ha for ground application, or 30 L/ha for aerial application. • DO NOT apply if heavy dew is present on crops, or if rainfall is expected within 2 hours of application. • DO NOT make more than 2 applications per season. Applications must be a minimum of 7 days apart.

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