



GROWING SUNFLOWER MANAGEMENT PACKAGE FOR DRYLAND WA

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Sunflower is a summer growing plant native to North America, and is produced in large quantities throughout the USA, Eastern Europe, China and South America. It has also been grown for a number of years under irrigation, and in the summer rainfall areas of Australia (QLD & NSW) where it is marketed either as an oilseed, or for birdseed.

Sunflower can also be grown in areas with little or no rainfall over summer, as long as the golden rules of management are followed. It has a wider planting window than crops like Grain Sorghum, and reasonable cold tolerance as a seedling, along with reasonable heat and moisture stress tolerance as a mature plant.

Rotation

Sunflower can be grown in rotation with cereals, legumes, pastures, fallows, oilseeds and cover crops. Check the herbicide history of the paddock and the plant back periods for residual herbicides used over past 2 seasons, eg: Glean, Atrazine (18 months), Logran (24 months).

At present, it is difficult to get two crops out of any one year (summer crop cannot normally follow winter crop because winter crop harvest is later than summer crop sowing window). Therefore, a rotation containing summer and winter crops still averages out to 1 crop per year, however it may be possible to increase intensity by growing a summer crop straight after a winter crop if the winter crop is swathed / cut and harvested early, eg: Unicorn Barley, Canola, Hay.

Paddock Selection

Choose a paddock with a **high level of stubble residue** (>80% ground cover) to prevent soil moisture loss over summer. **Well drained soils** with a near neutral **pH (4.8 - 7.5 in CaCl₂)** and **good water holding capacity** are best eg: sand over clay, sand over gravel. Soils with a pH of <4.5 should be avoided. Sunflower tap roots can exploit moisture down to 1.5m, therefore good yields will be most likely when the soil moisture profile is full at seeding. The site should have a low broadleaf weed burden, because in crop broadleaf herbicide options are limited.

Types and Varieties

Hybrids have replaced the older open pollinated varieties. **The slow and medium maturing polyunsaturated oilseed hybrids** such as **Advantage** (Pioneer) and **Hysun 36** (Pacific Seeds) seem to perform best in dryland conditions. They are higher yielding and have better drought and stress tolerance than the monounsaturated and birdseed varieties. Advantage currently supplies 80% of the market.

Two of the more suitable monounsaturated varieties are Sunoleic 04 (Pioneer) and Hyleic 31 (Pacific). Birdseed varieties include Sunbird 7 (Pacific) and Galah (Pioneer).

Disclaimer: The information contained herein is based on trials and paddock observations that are believed to be reliable. The information is for your guidance. We are dealing with biological and environmental variations which are beyond our control, hence we cannot accept responsibility for the results based on this information.

Sowing Time

Seeding can begin **once the soil temperature reaches 10°C at a depth of 10cm at 9.00am** (although emergence will be quicker if the soil is at 12 °C). This normally occurs **between mid and late August**. Soil temperature can be tested using a standard thermometer, which can be purchased at any chemist or white goods outlet. Sunflower is **susceptible to frost from the 6 leaf stage through to the end of flowering**, so crops should be sown no more than 5 - 6 weeks before the last frost normally occurs.

Sowing Depth

Sow into moisture at approximately **3 - 5cm**. Sow deeper if top 5cm is dry, but remember, the deeper you go, the colder the soil and the longer it will take for the plants to emerge. Establishment levels will vary depending on the type of seeding system you use. Press wheels set at 2 - 4kg/cm width of press wheel will ensure good seed/soil contact without compacting the soil.

Implement	Expected Establishment (%)
Disc openers with press wheels	70-80
Tynes with press wheels	50-70
Tynes without press wheels	40-60

Row Spacing

Row spacings of **1m** have been used with some success in low rainfall areas.

1m row spacings

1m	1m	1m	1m	1m	1m	1m
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In very low rainfall areas and on sandy soil types, it may be better to plant on **1m skip rows**.

1m skip rows

1m	2m	1m	2m	1m
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Plant Density

Optimum plant density is **20 000 - 30 000 plants/ha (2 - 3p/m² or 2 - 3p/m row on 1m row spacings)**. Low plant populations can be targeted when sowing with precision seeders, or in marginal dryland areas. Higher populations should be targeted if sowing with less accurate equipment (combines, airseeders), or in areas with more stored soil moisture and/or in crop rainfall. The **seeding rate** required to achieve this can be calculated using the following formula. (Seeds/kg and germination % are usually branded on the side of the bag).

$$\text{Seeding Rate} = \frac{\text{Target Plant Density per ha}}{\text{Seeds/kg} \times \text{Germination \%} \times \text{Establishment Rate}}$$

Example:

Target Plant Density	25 000
Seeds/kg	19 000
Germination %	90%
Establishment Rate (Tynes with Press Wheels)	85%

$$\text{Seeding Rate} = \frac{25\,000}{19\,000 \times 0.90 \times 0.85} = 1.7\text{kg/ha}$$

Plant density, row spacing and even distance between each plant in the row are vital to the success of a Sunflower crop. Sunflower does not tiller, so will not compensate for low plant density or uneven plant distribution, although head size will increase to some extent with lower plant populations. **High plant densities can lead to moisture stress** during flowering and grain fill, so **a precision seeder should be used** to achieve correct plant density and even spacing of plants along the row.

Fertiliser / Nutrition

Sunflowers have similar nutrient requirements to Wheat, but may be more sensitive to Potassium deficiency. **A 1t/ha Sunflower crop will need approximately 40kg/ha N, 6kg/ha P and 30kg/ha K.** Trace elements should be applied 3 - 5 weeks after emergence as a foliar treatment, based on plant tissue test results, to prevent micronutrient deficiencies. Sunflower is **sensitive to Zinc and Boron deficiency**, and can also suffer from Aluminium toxicity at very low pH (<4.3). Sunflower is not as responsive to N as Wheat, and can access it from depth, so an application of N at seeding is all that is normally required. **Do not place more than 5kg/ha N with the seed.** Ideally, the remainder should be banded 5cm below or to the side of the seed, into moisture.

Herbicide / Weed Control

Good weed control is essential, because the crop will not compete well with weeds in the early stages of growth (less than 8 - 10L). There are a **number of grass herbicides** which can be used post emergent, however there are only **few options for broadleaf control**, and all are pre sowing or pre emergent. Suitable herbicides are as follows. **Note that not all are registered for use in WA. Unregistered chemicals are marked with an asterisk from here on.**

Knockdown / Dessicant	Glyphosate, Sprayseed®, *Reglone®
Pre Sowing / Incorporated By Sowing	Trifluralin
Post Plant Pre Emergent	Dual Gold®
Post Emergent	Verdict®, Correct®, Propon®, Fusilade®, Sertin, Sertin Plus®, Targa®

Insect Pest Control

Problem pests include **soil insects, Heliothis (Budworm), Rutherglen Bug and birds.**

Soil insects such as false wireworm, wingless cockroaches, earwigs, armyworm and cutworm need to be prevented from destroying seeds and seedlings, because plant number and establishment are critical to the success of a sunflower crop. Seed should be treated with ***Fipronil** (Cosmos® etc). Alternatively, ***Chlorpyrifos** (Lorsban 500EC®, Chlorpyrifos® etc) can be sprayed into the furrows at planting, or spread on the soil surface immediately after planting in the form of baits.

Heliothis and Rutherglen Bug are most damaging between budding and grain fill. Spray with a ***Synthetic Pyrethroid** (Fastac Duo®, Dominex 100® etc) if 1 - 2 Heliothis grubs per bud, or 25 Rutherglen bugs per bud are found during budding, flowering or grain fill.

Birds can also be a problem because they sit on the heads and pick the seeds out. Try to choose a variety which has an overhanging head at maturity (more difficult for the birds to hang onto) and avoid planting around clumps of trees and bush. Alternatively, sow a buffer area around the edge of the crop, or sow north to south (heads will face

east and the birds will not be able to stand on the back of the heads to chew on the head behind).

Disease Control

Current hybrid varieties generally have good resistance to the major diseases which affect sunflower. **Red Rust, Alternaria Blight and Sclerotinia Head / Stem Rot** are the main diseases of concern in sunflower growing areas. Long periods of warm, wet weather are required for these diseases to take hold, and so far, they have not been a significant problem in WA. All three diseases can be **effectively controlled by using resistant hybrids and a sensible rotation** (avoid successive plantings of susceptible species and varieties).

Harvesting

Sunflower is an annual plant which will ripen and dry off without the need for chemical desiccation. A sunflower crop is physiologically mature when the majority of the heads have turned yellow, and are facing down (at this stage, harvest will still be some weeks away). It can be harvested at a moisture content of 15%, but it is better to wait and **harvest at 9% moisture**, unless you have the capacity to dry grain on farm. **Receival standards are 9% moisture, 40% oil and 4% admixture.**

Harvest can be done with a conventional header and front, but **sunflower trays** (1 - 2m trays or pans) must be fitted to the front (bolted to the header cutter bar) to avoid shattering losses. **Sunflower reels** and **headsnatchers** reduce the amount of plant material entering the header. Wind speed should be high, and drum speed slow (don't worry about losing small seed out the back - collecting it means collecting admixture, and it is of little value anyway). Heads should be largely intact when they come out the back of the machine, with any small centre seeds still present.

Marketing

A market should be secured before growing Sunflower, as this will determine the type and variety you grow. Specific markets are available with oilseed crushers, and there is also a well established export market. Prices are usually linked to export parity. **Sunflower normally fetches \$450 - \$500/t.**

For more information on growing Sunflowers, contact The Australian Sunflower Association (part of Pacific Seeds) on (07) 4 690 2666, Pioneer on (07) 4 637 2966, or consult Crop Management Notes - Western Downs, Maranoa & Balonne 1999 - 2001, available through DPI QLD. For marketing information contact AgraCorp or Ingham's.