

Activity # 1- Assessing Horticultural Crop Suitability for the Queensland Murray Darling Basin Study Area

Specific Biophysical Crop Information - Onions

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Activity 1 — Project Team

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Onion

Based on the biophysical requirements and limiting factors, **Onion is a potential crop** for the Balonne-Border Rivers Region of the QMDB.

Crop Matrix:-

	Annual Crop	Onions
Currently Grown (Y/N)	Qld	Y
	QMDB	Y
	NSW	Y
	Vic	Y
Frost Sensitivity (N or Deg C)	Seedling	N
	Growth	N
	Reproductive	N
Low Temp Sensitivity (Y/N or Deg C)	Seedling	N
	Growth	N
	Reproductive	N
High Temp Sensitivity	Seedling	Y
	Growth	N
	Reproductive	N/A
Rainfall Sensitivity	Y/N	Y/N
	Growth Phase	Harvest
Special Soil Requirements	Y/N	N
	Requirement	Prefers light soils
Chilling Req.	Y/N	N
	Amount (hrs)	
Water Quality	Sensitivity (dS/m)	1.2 (1.8)
First Planting Date	(Month)	May
Last Planting Date	(Month)	June
Consecutive Plantings	(Y/N)	More than 1
First Harvest	(Month)	Nov
Last Harvest	Month)	Dec
Length of harvest	(weeks)	8
QMDB	Y/N	Y

Onions require a high level of management to achieve optimum yields. Weed and disease management are crucial to successful production.

Biophysical Requirements and Limiting Factors (climate)

The climate should be cool and dry.

Day length

In the Lockyer Valley, onions can be planted from late February to June, allowing a wide range of varieties to be grown. The other Queensland production areas have a more restricted growing season because of the effect of temperature and day length on the formation of bulbs.

The choice of variety for a particular planting date is critical because of the effect of temperature and day length (photoperiod) on the formation of bulbs.

Queensland onion varieties are derived from short day tropical onions.

The long day temperate onions (such as Cream Gold) grown in southern Australia, will not form bulbs when planted in Queensland.

Bulb size generally declines from early to late sowing.

However, depending on the variety, planting too early can increase the risk of bolting (running to seed).

Optimum yield is likely to result from the earliest planting date that avoids bolting problems.

Queensland produces a short day, salad-type onion which is sweeter and has lower pungency than onions produced in southern Australia.

Unfortunately these differences have not been widely promoted in the market. Queensland onions should complement the southern onions instead of competing against them. Queensland onions can be used fresh in salads or in cooking, particularly barbecuing. Southern onions are used mainly for cooking.

Short day onions have a shorter shelf life. In Queensland this can largely be **overcome by serial planting to allow a continuous supply of fresh onions.** This avoids premature harvest and allows enough time for curing.

Temperature

Temperature also influences bulbing and varieties differ in how strongly they are influenced. High temperatures reduce the minimum day length required for bulbing. If temperatures are too low a variety may not bulb, despite an otherwise suitable day length. With a suitable day length, bulbing will start earlier and plants mature sooner under warmer conditions.

The main stimulus to bolting (flowering) in onions is cold temperatures. Varieties differ in the amount of cold they require for bolting, but **temperatures of 9 to 13°C for a while are cold enough.** There appears to be a minimum plant size for cold to induce a floral bud. Large plant or set size during cold periods favours bolting.

Table 1. Onion varieties grown in the Lockyer Valley

Variety	Seed source	Plant	Harvest	Notes
Early Lockyer White	Local	Late February and March	Early July to late August	Some variation in performance of local selections.
Early Lockyer Brown	Local	Late February and March	Early July to late August	Gatton Research Station selection Barton Brown released in 1994.
Early Lockyer White	Commercial	Mid March to early April	Late July to early September	Out-yields local selections in these later plantings.
Golden Brown	Local and commercial	March to early May	Late August to October	Selection from early Lockyer Brown. Milder flavour than Early Lockyer White. Has been exported.
Lockyer Gold	Commercial	Late March to May	September to October	Golden Brown selection.
Lockrose White	Commercial	Late April to early May	Late September to October.	Good appearance but does not store well
Snowball	Commercial	Late April to late May	Late September to early November	White hybrid. Good appearance but does not store well.
Diamond White	Commercial	Early May to June	Late October to November	White hybrid. Good late season onion, resists greening.
Omega	Commercial	Early May to June	Late October to November	Brown hybrid. Sweet onion with mild flavour, good size and reasonable storage.
Red Rojo	Commercial	Early May to June	November to mid December	Bright red skin, develops internal red rings.
Wallon White	Local and commercial	Late April to late May	Late October to November	Gatton Research Station early selection within Gladalan White.
Wallon Brown	Local and commercial	Late April to late May	Late October to November	Gatton Research Station early selection within Gladalan Brown.
Centurion	Commercial	Late May to June	November to mid December	Brown hybrid. Uniform good quality firm bulbs that retain skins well in storage.
Gladiator	Commercial	Late May to June	November to mid December	Brown hybrid. Similar to Centurion in appearance and storage. Has been exported.
Gladalan Brown	Commercial	Late May to June	November to mid December	Salad-type onion that does not store well but has some tolerance of downy mildew.
Gladalan White	Commercial	Late May to June	November to mid December	Similar qualities to those of Gladalan Brown.

Early to mid-season (February to March plantings) – harvest July to August

Plantings from mid-February to early April are considered commercially viable in the Lockyer Valley. Mid-February is the earliest that Early Lockyer White strains can be planted to be commercially successful. Plantings earlier than this do not produce enough leaves to develop bulbs to commercial size.

Mid-season (April to mid-May plantings) – harvest September to October

White and brown selections

Late season (late May to mid-June plantings) – harvest November to mid-Dec

Red Rojo is more suited to late rather than early and mid-season plantings. Centurion and Gladiator have potential for storage. Gladalan (white and brown) – are not suited to storage.

Planting Time

Bulb size generally declines from early to late sowing. However, depending on the variety, planting too early can increase the risk of bolting.

Optimum yield is likely to result from the earliest planting date that avoids bolting problems.

Later planting may reduce the time the crop is in the ground and assist weed control and overall management.

If the crop is planted very late it may mature successfully, but produce only small bulbs because they form and mature too quickly. Late varieties planted too late could fail to mature properly because the days shorten below the critical day length needed to induce bulb formation. Similarly, a variety may bulb very rapidly because day length requirements are met too soon. This can lead to problems in getting adequate bulb size. An example is the performance of Early Lockyer varieties in southern Australia.

Soils

Well drained clay loams are preferred but onions are tolerant of a wide range of soils, from sandy loams to heavy clays.

Rainfall

Excessive rainfall at crop maturity may delay harvest in heavier soil types resulting in bulb rots, skin damage and reduced yield.

Irrigation

Onions are a member of the *Allium* family which all have a shallow sparse root system which means that the plant is able to access only a small proportion of available soil moisture. The quantity of water required to produce an onion crop will vary from three to **four mega litres (ML) per hectare**, depending on time of planting and soil type. Good quality water is essential at the seedling stage, so conductivity (salt content) should be less than **1200 microsiemens per centimetre (mS/cm)**.

Onions are more tolerant of salinity during the remaining stages of growth and can tolerate conductivities up to 1800 mS/cm. Yield will be reduced by around 16% for every 1000 mS/cm increase above this threshold (1000 mS/cm is equal to 1 deciSiemen/metre)

Crop Lifecycle

In the Lockyer Valley, seed can be planted from late February to June, allowing a wide range of varieties to be grown. The other Queensland production areas have a more restricted growing season. The choice of variety for a particular planting date is critical because of the effect of temperature and day length on the formation of bulbs. Queensland onion varieties are derived from short day tropical onions. The long day temperate onions grown in southern Australia (such as Cream Gold) will not form bulbs when planted in Queensland.

The industry is concentrated in the Lockyer Valley where 80% of the crop is grown. Onions are also grown commercially on the Eastern Darling Downs, and in small quantities in the Callide Valley and on the Atherton Tableland.

The growth cycle

The onion plant forms a bulb so that it can survive very cold or dry periods. In its usual growth cycle, the plant forms a bulb in the first year of growth, becomes dormant for a period, and then goes on to bolt and produce seed in the second year.

Bulb size generally declines from early to late sowing. However, depending on the variety, planting too early can increase the risk of bolting. Optimum yield is likely to result from the earliest planting date that avoids bolting problems.

Comparison Region(s)

Australian Onion Industry

Just over 6,700 ha of onions were sown in Australia during the 2012–13 season with almost 350,000 tonnes harvested. About 85 per cent of onions harvested are brown varieties, with red varieties accounting for 10 per cent and white accounting for 5 per cent.

The main growing areas include the Lockyer Valley, St George & Darling Downs in Queensland; Murrumbidgee Irrigation Area (NSW); Adelaide Plains, Riverland (SA) Manjimup and Pemberton (WA), Werribee, Cranbourne (Victoria) and north-west to northern midlands of Tasmania.

Sowing of onions starts in Queensland during February (short day types) and finishes in the southern states in August (long day types). **The harvest period starts in Queensland during September** and finishes during April in the southern states.

The Australian onion industry was worth \$212 million in 2011–12 and exported \$26 million of fresh onions.

Domestic consumption of onions is approximately 9 kg per person per annum.

The NSW onion crop is planted in May–June and harvested from early November to the end of December. For marketing purposes, the NSW onion crop slots into a consumer window which comes after the southern Queensland crop in the Lockyer Valley/Darling Downs harvest, which finishes in early November (St George - November to December), and before the South Australian harvest, which starts in early February.

Allium Crop Overview

There are seven classifications of allium crops reported by the Australian Bureau of Statistics (ABS) and major produce markets in Australia. Below is a list and description of the alliums crops reported on by the ABS and major produce markets.

Bulb onions (*Allium cepa*). There are three main types of bulb onions including brown, red and white onions which are grown for their bulbs only.

Garlic (*Allium oleraceum*). These are grown for their bulbs only.

Leeks (*Allium ampeloprasum var. porrum*). These are grown for their leaves and thickened stem.

Spring onions (*Allium fistulosum*). This term means different things to different people. True spring onions are harvested with about 40cm of green leaves and a slightly enlarged bulb. Spring onions marketed in NSW are markedly different as they are generally a white bulbing variety that is harvested when the bulb is immature and the leaves are intact. They are commonly sold in bunches of 4 or 5 plants with about 2 bunches/kg.

Shallots (*Allium cepa, aggregatum*). This term also means different things to different people. True shallots are grown for their bulbs only. Shallots marketed in NSW are similar to true spring onion and are harvested with about 40cm of green leaves and a slightly enlarged bulb. They are marketed in bunches of about 20 plants with 3 bunches/kg. Shallots grown and marketed this way are also known as **Eschallots** (*Allium ascalonicum*).

Chives (*Allium schoenoprasum*). These are the smallest species in the allium family but are not mentioned in either the ABS or Sydney Market reporting service. It is suspected that any production of chives is recorded under spring onions or shallots.

Australian Growing Regions

Accessed at: [Onions Australia - onion information](#)

SA	TAS	QLD	NSW	VIC	WA
Adelaide Plains	Tasmania	Lockyer Valley	Riverina	Western Districts	Perth, Manjimup
Upper South East of South Australia		St George		South Western Victoria	Myalup
Lower South East of South Australia		Darling Downs		Central Victoria South	
River Murray		Fassifern Valley		Gippsland	

Average State Yields (approximately)

South Australia	1076ha	96100 tonnes/year
Tasmania	1591ha	98800 tonnes/year (85% crops exported to Europe, UK and Japan)
Queensland	915ha	28900 tonnes/year
NSW	526ha	19400 tonnes/year
Victoria	362ha	18700 tonnes/year
Western Australia	362ha	21800 tonnes/year

DATA from AUSTRALIAN Bureau Statistics June 2009

Ref 7121.0 - Agricultural Commodities, Australia, 2008-09

Ref 7121.0 - Agricultural Commodities, Australia, 2008-09

Onions Statistics 2008-2009

	2007	2008	2009	NSW	Vic	Qld	SA	WA	TAS
Production(t)	246500	254400	283800	19400	18700	28900	96100	21800	98800
Area(ha)	5413	5013	5463	526	362	915	1708	362	1591
Yield (t/ha)	46	51	52	37	52	32	56	60	62

Australian Onion Production Statistics

Onions		2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13
Number of growers	number	375	350	391	370	356	425	378	342
Area planted	hectares	4537	4662	5013	5463	5329	6139	6708	5506
Production	tonnes	221923	212487	254362	283819	259947	330847	346640	301672
Yield	tonnes/hectare	48.9	45.6	50.7	52	48.8	54	51.7	54.8
Gross value	\$m	145.3	189.9	206.7	224	180	274	212.5	199.6
Farm gate value	\$m	126.6	168	183.9	198.8	156	239.2	182.8	661.6
Gross unit value	\$/tonne	655	770	813	789	692	828	613	172

Data from Australian Bureau of Statistics retrieved from [Ausveg statistics](#)

Types and Varieties of Onions Varieties

Brown Onion



Brown onions which have a brown or almost yellow skin and creamy flesh are usually strongly flavoured and are suitable for cooking. This is the most widely used onion. With its pungent aroma and strong flavour it is a good all-round onion. There are many different varieties grown in Australia. Some examples are below:

- **Creamgold**

Grown in the Riverina New South Wales, South Australia, Victoria, Western Australia and Tasmania. It is an open pollinated, intermediate day variety. It is planted from May through to July and is harvested from early January to early March, depending on location.

- **Murray Brown**

The Murray Brown is grown across South Australia. It is an open pollinated long day variety. The Murray Brown is planted in September and is harvested in February through to March.

Red Onion



Red onions, sometimes called (incorrectly) Spanish Onions have purplish red skin and white flesh tinged with red. These onions tend to be medium to large in size and can have a mild to sweet flavour, but after being stored for short time can become quite pungent. They are often consumed raw, grilled or lightly cooked with other foods, or added as colour to salads. They tend to lose their redness when cooked.

They can be stored 3 to 4 months under ideal conditions. Some examples of different varieties are:

- **Redshine**

Grown in the Riverina New South Wales, South Australia, Victoria, Western Australia and Tasmania. It is an open pollinated intermediate day variety. It is planted from mid-May to late June and is harvested from late December to mid-January.

- **Redwing**

Grown across South Australia, across Victoria and in Western Australia Redwing is an intermediate day hybrid. Mainly planted from August to September and harvested from February through to March.

- **Red Emperor**

Red Emperor is grown in the Riverina in New South Wales and in Tasmania. It is an intermediate day hybrid variety. Crops grown in the Riverina are planted in late May and harvested in early January whilst the crops grown in Tasmania are planted in mid-September and harvested in mid-February.

White Onion



White onions, are considered to be the strongest in flavour after brown onions. On average the Australian consumer buys less white and more brown and red onions. The varieties vary in size, skin characteristics and flavour.

Varieties include:

- **Bianca**

Grown in the Riverina New South Wales, South Australia, Victoria and Western Australia. It is a hybrid intermediate day variety planted from late May to mid-August and harvested from late December to mid-February.

- **Gladalan White**

Gladalan White is grown in Queensland, the Riverina in New South Wales, in South Australia, Western Australia and Northern Victoria. It is an open pollinated short day variety planted from May to July and harvested from November through to January.

- **White Spanish**

White Spanish is grown in South Australia is an open pollinated long day variety. It is planted in July/ August and harvested in February.

- **Mild Onions**

Mild onions have lower pungency levels whilst retaining their taste. Having a lower pungency levels allows it to be eaten raw, in sandwiches or in salad. These onions have a mild and pleasant flavour that leave a lingering impression of sweetness with none of the burning aftertaste or tears associated with the everyday brown onion.

Retrieved from: [Onions Australia - onion types](#)

Types (Physiological classification)

Short Day

These varieties require a short amount of daylight hours (10-12) to bulb and are **generally grown in Queensland and New South Wales** i.e.: north of about 35 degrees latitude. Depending on variety and location, planting starts in February through until May and harvest starts in September.

Early Long Day

Long Day refers to the spring sown onions grown at latitudes of 45+ degrees and is not relevant to Australia. In reality Australian onions are short day or intermediate day varieties. The very late varieties in South Australia such as Patrick Brown could be classified as Early Long Day. These varieties require a longer period (15 hours or more) of daylight to bulb and are generally grown, in South Australia and the planting occurs in June and July for a March to April harvest.

Intermediate

These varieties require more daylight than short day varieties but less daylight than long day varieties (around 13 to 14 hours) per day to bulb and this approximates to regions south of 35 degrees. **These varieties are generally grown in southern states where planting occurs from May to August for a late November to March harvest.**

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- Onions Australia (2015) [Onions Australia - allium crops](#)

Disclaimer: The candidate crop information presented in this QMDB study area report (Activity 1) are based on the analysis of the published biophysical needs of the crops (e.g. temperature, frost sensitivity, chill requirement, water quality, etc.) and current climate records for the QMDB study area. The candidate crops are deemed suited to the study area where the biophysical needs are met either year round or for portion of the year and will allow crop production.
