

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

Specific Biophysical Crop Information – Fig

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Activity 1 — Project Team

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FIG

Based on the biophysical requirements and limiting factors, edible fig (*Ficus carica*) is **a potential crop for the Balonne-Border Rivers Region** of the QMDB.

The edible fig (*Ficus carica*) is a member of the genus *Ficus*. The edible fig is considered to be a subtropical plant, but can be grown successfully in cooler areas where winters are relatively moderate. It is believed that figs are native to western Asia (Kamas J. et al). Dried fig production was an important horticultural enterprise in the Murrumbidgee irrigation area during the 1920s. This industry declined in the 1950s, when cheaper imported figs entered the domestic market. Commercial fig production today caters mostly for the fresh fruit market. Figs will tolerate a wide range of climates but yield best in areas with a relatively dry summer. In coastal areas summer rain can cause figs to split. Young trees are susceptible to frost and should be protected during their first and second winters.

Crop Matrix:-

	Perennial Crop	Fig (<i>Ficus carica</i>)
Currently Grown (Y/N)	Qld	Y
	QMDB	Y
	NSW	Y
	Vic	Y
Frost Sensitivity (Y/N or Deg C)	Seedling	Y
	Growth	N
	Reproductive	Y
Low Temp Sensitivity (Y/N or Deg C)	Seedling	Y
	Growth	N
	Reproductive	Y
High Temp Sensitivity	Seedling	N
	Growth	N
	Reproductive	Y
Rainfall Sensitivity	Y/N	Y
	Growth Phase	Maturation & Harvest
Special Soil Requirements	Y/N	N
	Requirement	
Chilling Req.	Y/N	N
	(Hours)	
Water Quality	Sensitivity (dS/m)	2.7
Harvest Months	(Months)	Nov-Dec & Feb-June
Length of harvest	(Weeks)	Variable
First Harvest	(Years)	
Full Production	(Years)	4
QMDB	Y/N	Y

Biophysical Requirements and Limiting Factors (climate)

The edible fig is considered to be a sub-tropical plant, but can be grown successfully in cooler areas where winters are relatively moderate. Fig trees thrive in the inland areas of NSW, and can be grown in the cooler tableland areas. Young trees are very susceptible to frost damage, especially if spring frosts are severe. Figs do not require winter chilling to break dormancy. Figs are in fact a sub-tropical crop, but can withstand varying degrees of sub-freezing temperatures. The degree to which they can avoid cold injury is dependent on variety, soil moisture status, site aspect and climatic pre-conditioning. Mature trees can withstand quite severe frosts. The semi-arid tropical and subtropical regions of the world are ideal for fig-growing if irrigation is available. But very hot, dry spells will cause fruit-drop even if the trees are irrigated.

Temperature

The edible fig is considered to be a sub-tropical plant, but can be grown successfully in cooler areas where winters are relatively moderate. Young trees are very susceptible to frost damage, especially if spring frosts are severe. Figs do not require winter chilling to break dormancy.

Rainfall

An even moisture supply is critical during the fruit development stage. Too little water may result in less meaty or even hollow figs. Any sudden increase in water supply during the ripening period will cause fruit to split.

Soils

Figs are tolerant of most types of soil, but perform best on well-drained, reasonably fertile soils. The perfect pH for growing fig trees is a soil pH of 6.0 to 6.5. The Fig tree is fairly tolerant of moderate salinity. Figs should be planted in well drained soils but can successfully grow in either coarse sandy soils or relatively heavy clay soils. It should be noted that in sandy soils, fig trees can suffer extensive damage from root knot nematodes. Root-knot nematodes, *Meloidogyne sp*, are microscopic, soil inhabiting worms which attack the plant's root system. Root-knot nematodes attack and feed on roots, causing them to swell or gall; thus, interfering with normal uptake of water and nutrients. Fig tree root systems are fairly shallow, but extensive. Because they are shallow rooted, figs will benefit from organic mulch to conserve soil moisture and improved soil structure. Care must be taken when cultivating near the trees not to disturb the roots, as suckers can develop.

Irrigation

Fig trees tolerate drier conditions than most fruit trees, but irrigation is still needed. The frequency depends on tree size, vigour, soil type and rainfall. It is better to avoid major fluctuations in moisture, as most fig species do not cope well under these conditions. Fig trees are easily stressed in dry periods because of their shallow root systems. Some varieties may shed early fruits in a dry spring if irrigation is inadequate. An even moisture supply is important during fruit development. Too little water may result in less meaty or even hollow figs. Any sudden increase in water supply during the ripening period will cause fruit to split. Too much water in midsummer will cause excessive vegetative growth at the expense of fruit quality, and will place the tree at risk of damage if growth is too soft going into winter.

Planting

Fig trees are traditionally planted as dormant rooted cuttings in late winter or early spring and perform well if planted two to three inches deeper than grown in the nursery. Figs are one of the easiest fruit crops to propagate. Hardwood cuttings taken when the plants are fully dormant readily root and are most commonly used for propagation. Cuttings should be 12 to 15 cm in length and approximately 2 to 2.5 cm in diameter. Young trees are susceptible to sunburn until the canopy fills. Figs are large trees when left to grow naturally. In older orchards, trees were planted 9 to 12 m apart (67 to 119 trees per hectare), depending on the variety. Trees are now planted closer together in the row (4 to 5 m), with 6 to 7 m spacing between rows.

Hedgerow plantings 5 to 10 m apart have not been successful in the USA. Care must be taken to ensure that the roots do not dry out in the establishment phase.

Nutrition

Control of vegetative growth is critical for good fruit quality. Sufficient nutrients must be supplied to ensure that the foliage is healthy, as it shelters the fruit from sunburn during summer. Small fortnightly applications of water-soluble fertilisers can be applied in the irrigation system throughout the growing season. Complete fertilisers with an NPK ratio of approximately 20:5:20 are commonly used. Leaf analysis and soil tests can be used to monitor nutrition and tailor fertiliser needs to plant requirements.

Pruning

A newly planted tree, if a single stem, should be headed at about 60cm from the ground, and then three developing branches selected to form the initial framework. These are later shortened back to allow for further branches to develop thus allowing a strong framework to be built. Commercial varieties crop in two stages. The first (or breba) crop is formed on the previous season's wood and is usually of lesser quality than the main crop. The main crop is produced later, when the new wood grows its leaves and sets fruit buds. The main crop fruits are usually formed in the leaf axils on this new wood. A light winter prune may help to stimulate new wood growth and increase the main crop. Any branches that are diseased, broken or overlapping need to be removed.

Pruning, when combined with good tree management, should result in four to six figs per shoot, with new growth between 15 and 20 cm long. Excessive vegetative growth will lessen fruit quality. Some older wood should be left on the tree for the breba crop, and can be pruned the year after.

Pollination

"Fruit" of common figs are parthenocarpic (formed without fertilization) and are actually fleshy stem tissue with no seeds. The structure is known as a synconium and the resinous interior contents are actually unfertilized flower structures.

Crop Lifecycle

Figs must be ripened on the tree, once removed from the tree figs stop ripening. Figs are quite perishable and well planned marketing is needed. When harvesting use gloves and long sleeves to prevent skin irritation from the fig latex. A tree usually begins to bear from 2 to 3 years after planting

Varieties

Edible fig varieties fall under the following categories:

- Persistent - (common) figs (used for fresh fig production)
- Caducous - (Smyrna) figs (used for dried fig production)
- Intermediate - (San Pedro) figs (non-commercial fresh fig production)
- Caprifigs - pollinisers of Smyrna and San Pedro figs (not edible).

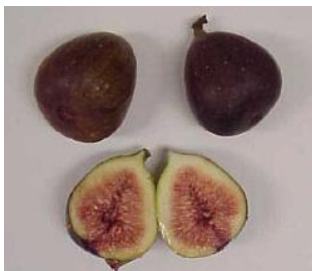
Most information on varieties has been based on trials conducted overseas, mainly in California. The performance of varieties may differ slightly according to location and other environmental factors such as soil, rainfall, temperature and humidity.

Persistent (common) figs

Fresh fig production is based on persistent fig varieties. The synconia contain only female flowers. The fruit form without being pollinated, the seeds being empty. Figs with small eyes are preferred, as pollination may lead to the introduction of spoilage organisms in the fruit. Two crops are usually produced each year. The first (breba) crop forms in spring on wood from the previous year and matures in December to January. The second crop (main crop) sets on new season wood in November to December. This crop usually matures between February and June.

Dark skinned

- **Black Genoa** is a large sized fig with purple skin and dark red flesh. This is the leading commercial variety for fresh fruit production. Fruit flavour is very rich and sweet. Black Genoa is a vigorous and productive variety that is grown commercially due to its high yields combined with an open and spreading tree habit. The fruit is dark purple at maturity, with a red centre and white flesh. It is a squat, pear-shaped fruit, has a distinctive flavour and good storage qualities. The Black Genoa matures slightly earlier than Brown Turkey.



(Image S Hardy)

- **Brown Turkey** is a small tree with sparse foliage. It crops well in most situations, but does not usually produce a breba crop. It is susceptible to souring during wet weather in coastal areas, but the fruit is reasonably resistant to splitting. Fruit is medium to large and pear shaped, with prominent deeply coloured ribs and a large, open eye. The skin is purplish brown and lighter at the stem end. The flesh is pinkish brown with an excellent flavour. Harvested January to March



(Image S Hardy)

- **Preston Prolific** is thought to be a seedling of Black Genoa and originated in Victoria. The tree is vigorous with large leaves. The fruits are oblate, borne on a short stalk and green when immature, changing from straw to purplish brown when fully ripe. The flesh is very thick, creamy white and juicy with a distinctive sweet flavour. The pulp is amber coloured, sometimes tinted red. Fruit splitting is not a problem. The fruit matures in December to late April.

Light-skinned

- **White Adriatic** (Verdone, Adriatic) forms into a large tree. The fruit is a light greenish-yellow with an attractive deep-pink flesh. The flavour is excellent, the pulp being a light strawberry red. The tree is of medium vigour with a low, spreading habit. White Adriatic usually produces no breba crop or only a small number of breba fruit. The main crop fruit is medium to large, spherical and usually greenish, tinged with amber when ripe. The pulp is a light strawberry colour to deep red, with an excellent flavour. White Adriatic has been grown in the Murrumbidgee Irrigation Area (MIA) for canning, jam and drying. Performs well in warmer areas and is well suited to drying. The fruit matures in February and March.
- **Cape White** is a vigorous tree with a low, spreading habit. It was introduced from South Australia and is mainly **grown for jam**. It produces a golden-coloured jam that is more attractive than that of White Adriatic. It grows best in warmer areas. Trees are compact and vigorous. The fruit is small, squat and pear shaped, with almost no neck. The fruit is slightly ribbed, with a small, open eye. The flesh is cream to white, with a solid centre. The fruit matures in January or February, **but is prone to splitting**.

Other common fig varieties available in Australia include Blue Province, Conandria, Excel, Green Ischia, White Ischia, Tena and Flanders

Pests and Diseases

Root knot nematode (*Meloidogyne spp.*)

Nematodes attack a wide range of plants and will carry over from an infected crop.

Dried fruit beetle (*Carpophilus spp.*)

Dried fruit beetle attacks a wide range of fruits.

Queensland fruit fly (*Bactrocera tryoni*)

Queensland fruit fly (QFF) is a major pest of where the climate favours infestation

Fig blister mite (*Aceria ficus*)

These mites are colourless to white.

Anthracnose

Anthracnose is a fungal disease that affects leaves and fruit, mainly in coastal areas.

Fig rust

Fig rust is a serious fungal disease of figs grown in coastal areas.

Fig mosaic

Fig mosaic is caused by a virus that affects leaf pigment and causes a mottled pattern on the leaf. It is spread mechanically by grafting and taking cuttings from infected trees.

Birds

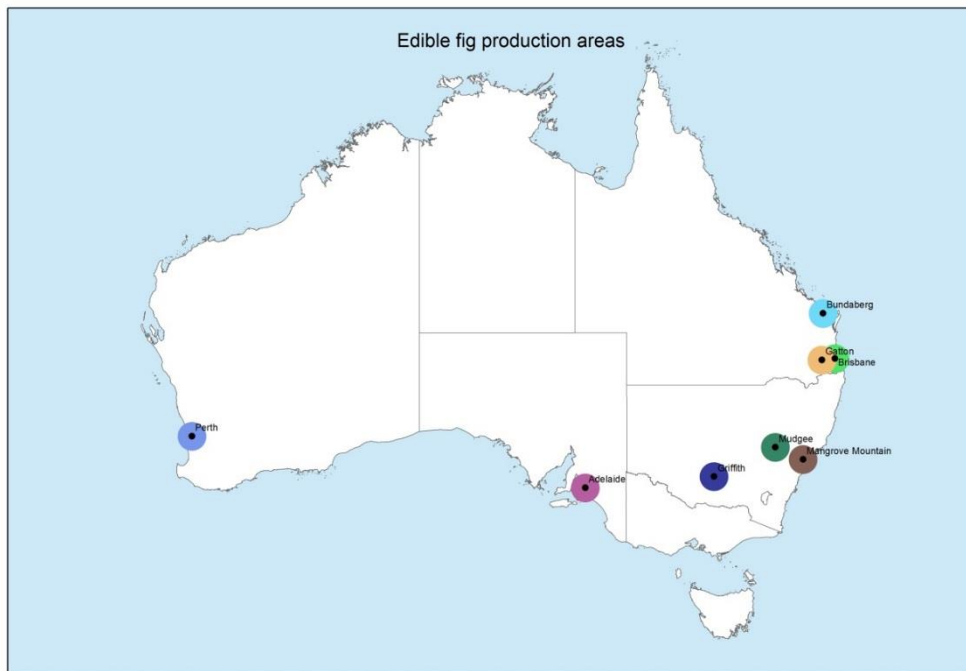
Birds attack and eat developing figs, especially as they start to ripen. Fruit damage ranges from small claw marks and pecks to the whole fruit being eaten. Birds can be a serious pest in most areas, and permanent bird netting is necessary.

Harvesting and Marketing

Figs destined for the fresh fruit market or canning should be picked when they become fully coloured and still firm. The fruit should be cooled to 0°C as soon as possible. Optimum cool room temperature is between -1°C and 0°C, with 90 to 95 per cent relative humidity. At 4.4°C to 6.1°C and 75 per cent relative humidity, figs will keep for eight days. **The shelf life** out of the cool store is **only 1 or 2 days**.

Comparison Region(s)

Edible fig production in Australia is a small industry



Source: J Bishop (pers comm)

Adelaide is reportedly home to Australia's biggest fig orchard which has established markets in Asia for value added fruit (chocolate dipped), as well as local sales of fresh fig, preserves, and a pick your own fig market. A Bundaberg grower produces figs under protective cropping (winter fruit) as well as outdoor production (summer). In other parts of Queensland edible figs are grown around Gatton, Brisbane, and Emerald.

Crop in the QMDB Region

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

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- Brien, J & Hardy, S (2002) “*Fig growing in NSW*”, Agfact H3.1.19, NSW Agriculture.
- Kamas, J, Nesbitt, M & Stein, L, *Figs*, Texas AgriLife Extension (EHT-019, 11-13), accessed April 2016.
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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.
