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

Specific Biophysical Crop Information – Sweet Corn

(1 August 2014 to 30 June 2016)

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Citation: Carey, D., Deuter, P., Zull, A., Taylor, H., White, N (2017) High Value Horticulture Value Chains for the Queensland Murray-Darling Basin Project: Activity 1 – Assessing Horticulture Crop Suitability for the Queensland Murray Darling Basin Study Area report. Queensland Government Department of Agriculture and Fisheries.

This publication has been compiled by David Carey of Agri-Science, Department of Agriculture and Fisheries.

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Sweet Corn

Based on the biophysical requirements and limiting factors, **Sweet Corn is a potential crop** for the Balonne-Border Rivers Region of the QMDB, although a 'split' summer season will be most appropriate if sweet corn is to be planted in this region.

Crop Matrix :-

	Annual Crop	Sweet Corn
Currently Grown (Y/N)	Qld	Y
	QMDB	Y
	NSW	Y
	Vic	Y
Frost Sensitivity (N or Deg C)	Seedling	Y
	Growth	Y
	Reproductive	Y
Low Temp Sensitivity (Y/N or Deg C)	Seedling	Y
	Growth	Y
	Reproductive	Y
High Temp Sensitivity	Seedling	N
	Growth	N
	Reproductive	Y
Rainfall Sensitivity	Y/N	Y
	Growth Phase	Flowering & Harvest
Special Soil Requirements	Y/N	N
	Requirement	
Chilling Req.	Y/N	N
	Amount (hrs)	
Water Quality	Sensitivity (dS/m)	1.0 (1.7)
First Planting Date	(Month)	++Aug - Sept
Last Planting Date	(Month)	++Jan - April
Consecutive Plantings	(Y/N)	Weekly
First Harvest	(Month)	++Oct - Nov
Last Harvest	Month)	++April - June
Length of harvest	(weeks)	Once over
QMDB	Y/N	Y

++ Sweet Corn - Split Season - PLANTING - Mid Aug to late Sept; and Mid Jan to Mid-April; HARVEST - Mid Oct to end Nov ; and End April to June, due to high temperatures in spring and early summer adversely affecting pollination and cob quality.

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Biophysical Requirements and Limiting Factors (climate)

Temperature

Sweet corn is sensitive to frost and prefers warm weather. Optimum temperature for growth is 24° to 30°C; no growth occurs below 10°C.

Soil temperatures above 18°C are necessary for good germination of supersweet varieties. Normal sweet corn will germinate at soil temperatures above 12°C. Cool or wet conditions will slow germination and increase the chances of seed rots, poor emergence and uneven plant stands (Sweet Corn Agrilink).

Growth ceases below 10°C while temperatures above 35°C are usually above the optimum for photosynthesis and can be detrimental to development of reproductive parts and reduce ear quality. For optimum growth and quality, the temperature range is from 24°C to 30°C.

Pollination will be poor if hot (35°C and above for several consecutive days), dry and windy conditions occur at silking. Poor pollination causes missing kernels or blanks, which often result in poor tip fill.

Frosts can limit the start of the season, as they damage young seedlings—particularly the growing tip which is most susceptible. The crop must be harvested before the first frost.

Rainfall - see Pollination

Soils

Sweet corn grows best in deep, fertile, loam soils, preferably a minimum of 50 cm deep as sweet corn roots can grow to 1.2 m**.** The well-drained, alluvial soils usually found along rivers and creeks are ideal for sweet corn.

Irrigation

Critical times for irrigation are tasselling, silking and cob fill. Moisture stress can lead to poor pollination resulting in blanking.

The most critical development period in terms of determining seed numbers on the ear starts after about the fifteenth to seventeenth leaf stage, around 10 to 12 days from the silking stage.

Water stress during the two weeks before and two weeks after silking will have a greater effect on seed yield than similar stress at any other growth stage. This four week period around silking is the most important time for irrigation

Pollination

Poor cob fill can occur if rain coincides with pollination. A combination of heavy rain and wind causes lodging, making spraying and harvesting difficult.

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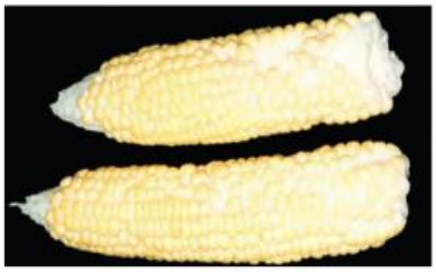
Missing and damaged kernels on cobs



Blank areas or unevenly sized kernels

Cause. Poor pollination due to weather conditions such as rain or temperature extremes at silking or silks damaged by grubs. Blank areas can occur anywhere on the cob.

Management. Do not plant crops to silk during periods when adverse climatic conditions can be expected.

Tip blanking (poor tip fill)

Cause. This is may be a varietal problem, some varieties have kernels covering the tip, others do not. It is also caused by stress at pollination or tip fill due to shortage of nutrients, particularly nitrogen or water stress. Most often it will be due to poor pollination due to adverse conditions at pollination such as hot, dry, windy weather or wet weather which will stop pollination and affect germination of the pollen tube. Tip blanking may not be a problem in processing crops.

Management. Plant varieties with good tip fill. Ensure plants have adequate nutrients and are not water stressed at these critical periods.

Pollination is an extremely critical stage and poor tip fill will result if the plant is water or nutrient stressed or if environmental conditions are not favourable.

Pollination continues over several days but it is not continuous and stops when the tassel is either too wet or too dry. Hot dry conditions are much more likely to interfere with pollination than wet conditions.

A silk elongates from each embryo and eventually extends out of the husk at the tip of the ear. Silk growth continues until fertilisation, basal spikelets develop first and silk emergence proceeds towards the tip.

Although silks from further up the ear start elongating later, they may emerge sooner than basal silks because of the shorter distance travelled. The result is that the first embryos fertilised are often those near the middle of the ear. Silks from nearest the tip of the ear sometimes emerge too late to receive viable pollen, resulting in poor 'tip fill'. However, development of the ear shoot is usually in time with tassel development so that most of the silks emerge during pollen shed.

It takes about 24 hours to reach the ovule, where it ruptures and fertilisation produces a new kernel. If silks are damaged before the pollen tube has fertilised the ovule, for example chewed by grubs, pollination may not occur and 'blanks' appear on the cob from these missing kernels.

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Sweet Corn Lifecycle

Main planting and harvesting times for sweet corn in Australia Sweet Corn Agrilink

State	District	Plant	Harvest
QLD	Dry tropics	early March – late August	mid May – early November
	Bundaberg	January – April mid July – mid September	April – July October – December
	Southern Queensland	early August – late February	early November – mid June
NSW	Sydney Basin	August – late February	November – early June
	Central West: Dubbo – Narromine Cowra Bathurst	 late September – early January late October – early January mid November – late December	 late December – early May late January – early May mid February – late March
	Riverina	mid September – early January	late December– late April
VIC	East Gippsland	late September – late January	late December – May
	Northern Victoria	early September – December	late December – April/May
	Southern Victoria	early October – January	late January – April/May
TAS	Northern Tasmania	late October – November	mid February – April
SA	Riverland	September – February	December – May
WA	Metropolitan	mid August – mid March	December – June
	Harvey , Bunbury, Busselton	mid September – early February	mid December – late May
	Manjimup, Albany	November – January	mid January – mid May
	Carnarvon	February – May August – September	July – October mid November – January
	Kununurra	April – early September	early July – late October

Sweet Corn in the QMDB Region.

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

High temperatures during the summer will limit production (effects on pollination and cob quality), especially in the more western locations (e.g. St George), and cool winters (and frosts) will exclude winter production.

Cold soils in spring will limit early establishment of sweet corn. Supersweet Sweet Corn germination and emergence is more sensitive than maize, so planting in the spring will occur later than maize in the QMDB regions.

Therefore late spring plantings may be possible, as long as silking can be completed before high temperatures of the early summer occur. Late summer plantings are also possible, with harvesting completed before the likelihood of early frosts occurring.

Therefore a 'split' summer season will be necessary if sweet corn is to be planted in the Balonne-Border Rivers region.

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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.

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