



Maize (Zea mays) Technical Note F13

Management level	★★★★★
Yield	★★★★★
Quality	★★★
Water use efficiency	★★★★★
Reliability	★★★
Versatility	★★★

Where ★★★★★ is the highest rating.

Varieties

Select on grain (starch) to forage ratio and length of growing season which ranges from 90 - 150 days. High yield is essential to achieve a profit.

Establishment

When irrigated 60 000 - 75 000 plants/ha, when grown without irrigation in 600 - 800 mm/annum rainfall aim for 25 000 - 45 000 plants/ha. Precision plant into 65 - 100 cm row spacing. Confirm row spacing with harvest contractor. Plant into seedbed with full soil profile moisture. Minimum tillage or full seed bed preparation can be successful when soil conditions are agreeable to planting. Minimum soil temperature of 12 - 14oC at 9 am for 3 consecutive days at 10 cm. Pre and post-emergent herbicide is critical for weed control.



Minimum tillage to plant maize.



Irrigation

Ranges from 5 to 8 ML/ha per crop. Up to 70% of water is used in 3 weeks before and after tasselling.

Nutrient requirements and herbicide recommendations

Potassium requirements are often underestimated for a maize crop (see Table below). Soil test for level of Zn, often applied at planting as cautionary measure to minimise a reduction in rate of germination and seedling establishment. N and K split applications at 130 kg N before canopy closure or later in the growing season as fertigation. The Figure on the next page depicts level of water, N, P and K use in relations to crop growth. Pre-emergent herbicide is highly recommended to minimise weeds and competition for radiation, water and nutrients.

Nutrient requirement	N	P	K
Nutrient (% DM)	3.4	0.4	3.2
kg applied (/ha)	340	41	320

Typical mineral content of a maize silage crop and requirements to produce 25 t DM/ha (~75 t wet/ha).

Silage

Expected yields of 15 - 25 t DM/ha (45 - 75 t wet/ha). Yields less than 20 t DM/ha are likely to incur an economic loss. Harvest when milk line halfway down kernel and crop 30 to 35% DM (Kaiser et al. 2003).

Chop length 10 - 15 mm and processed to aid absorption of starch in the rumen.

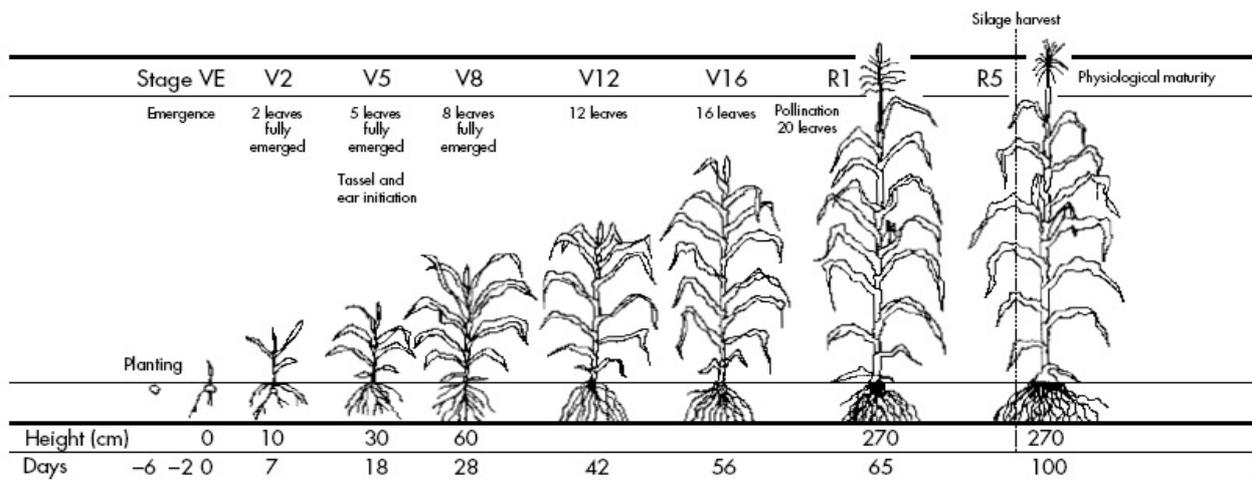
<30% DM higher effluent loss

>35% DM difficult to compact

Nutrient quality

Quality (% DM)	Average	Min	Max
Crude protein	9	7	11
Starch	30	2.4	39
Sugar	4	1.2	8.9
NDF	46	37	55
Fat	3	1.8	3.8
ME (MJ/kg DM)	10.4	9.2	11.3
DM (%)	33	21	53

Range in quality for maize harvested as silage



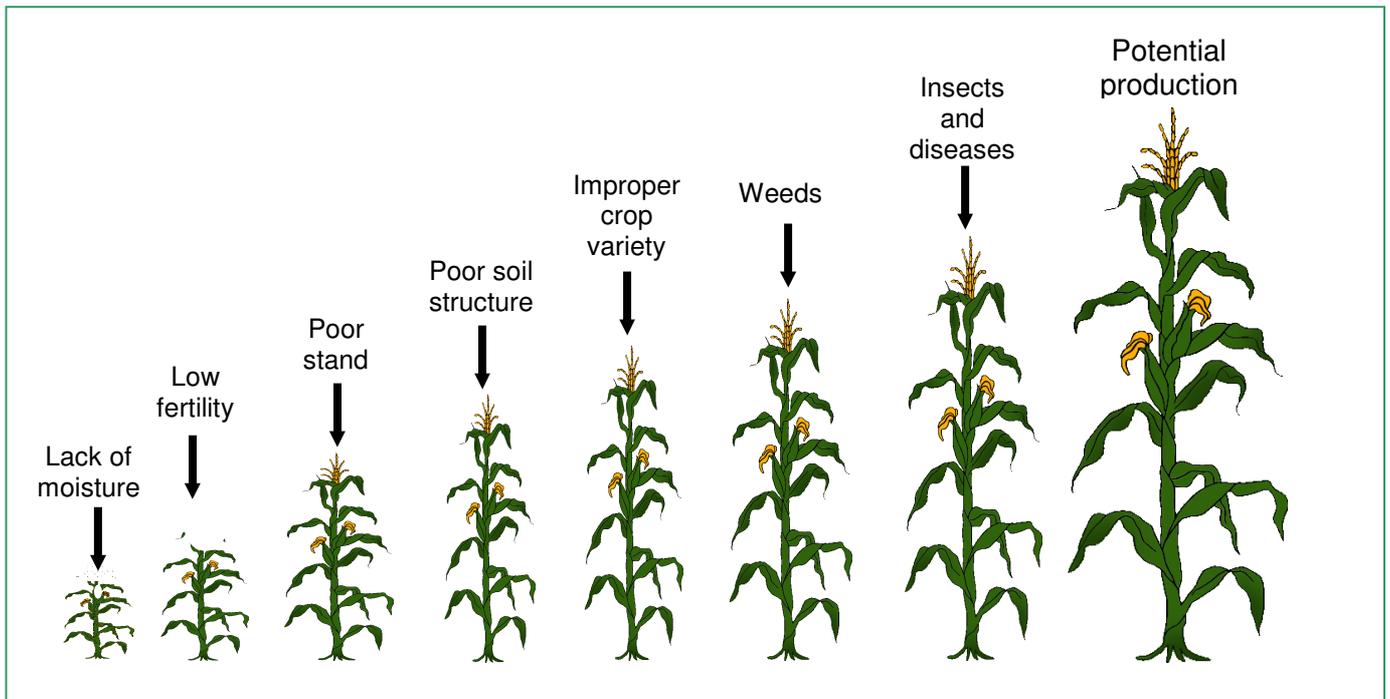
Rate of water, nitrogen, phosphorus and potassium use by maize.

% Water	1	2	4	5	7	19	11	12	12	11	8	6	5	3	2	1	1
% N	1	1	1	2	7	11	14	15	16	12	10	6	4	2	1	1	1
% P	1	1	1	1	2	4	7	10	11	15	13	11	9	8	5	2	1
% K	1	1	1	3	9	16	21	20	16	8	5	1	-	-	-	-	-

Herbicide windows for weed control in maize.

Pre-plant application	Post-sowing pre-emergent application	Post-emergent application	Harvest aid
	Avoid Spraying	<p>Atrazine 2-3 leaves</p> <p>Dicamba 10-90 cm or 15 days prior to tasselling</p> <p>2,4-D amine 10-20 cm 20 cm - before tasselling: drop nozzles only</p> <p>Starane™ Advanced 3-5 leaves 6 leaves to tasselling: use droppers</p> <p>MCPA 250 10-60 cm: drop nozzles only</p>	<p>2,4-D amine from dough stage</p>
		Avoid Spraying	

Rate of water, nitrogen, phosphorus and potassium use and recommended herbicide application for maize (Serafin et al. 2011 - Summer Crop Production Guide 2011).



Potential productivity losses caused by mismanagement

Economics, risks and potential issues

Including establishment, fertiliser and irrigation costs - \$2500 – 3000/ha; plus an additional \$25 t wet for ensiling which includes: chopping; rolling; and covering.

Considered a high risk crop in terms of high level of inputs and high potential for decreased dry matter production (see Figure above), agronomic management needs to be precise. Additional costs associated with feeding out need to be considered.



Further information

Contact the DAFF Customer Service Centre by Phone 13 25 23, or Email callweb@daff.qld.gov.au

More technical notes can be found at: www.dairyinfo.biz

Garcia Y. Growing maize for silage: A guide for dairy farmers. FutureDairy forages.

Kaiser et al. (2003). Successful Silage. TopFodder.

Callow et al. (2013) Successful Dairy Production in the Sub-Tropics

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