



The cold and wet weather during the spring and summer has put many maize crops under pressure with concerns now being raised as to the yield and quality of the forage that will be harvested. With options of home grown or even purchased wholecrop still available now is the time to work out where you stand.

How much maize will I get?

This year's maize yields are under threat due to the cold and wet conditions. Early drilled maize, where it got away before the rain, has to a large extent stalled. That drilled early into soils that have subsequently capped has struggled to breakthrough with plant populations severely hit in some cases. Later drilled maize has avoided the early pitfalls but it is also struggling to grow in far from ideal conditions. All the above will at best delay maize harvest but in many cases will also impact on crop yield.

To what extent maize yields dip will be the result of a combination of circumstances, not least of which will be the weather from now on. As Simon Draper says in his technical

note, July and August make or break a maize crop and who knows how they will turn out. Unfortunately we cannot wait until the end of August as the key alternative forage (wholecrop cereal silage) which matches and complements maize so well will need to be harvested long before then.

Additional factors affecting yield will also include plant populations and nutrient supply, with the one positive factor in the equation being the potential for compensatory growth of the remaining plants.

Plant populations

Actual plant population is best calculated by counting the average number of viable plants per 10 metres of one row and multiplying this number up to a field scale. This calculation has been tabulated in table 1 below. E.g. if there are on average 40.66 plants per 10m row length, the plant population per acre and per ha would be 22000 and 54362 respectively.

Table 1 Link between plants per 10 row length and plant population per hectare and per acre

Plant populations		
Plants/acre	Plants/hectare	Plants/10m
50000	123550	92.66
48000	118608	88.96
46000	113666	85.25
44000	108724	81.55
42000	103782	77.84
40000	98840	74.13
38000	93898	70.43
36000	88956	66.72
34000	84014	63.01
32000	79072	59.31
30000	74130	55.60
28000	69188	51.89
26000	64246	48.19
24000	59304	44.48
22000	54362	40.77
20000	49420	37.07
18000	44478	33.36
16000	39536	29.65
14000	34594	25.95
12000	29652	22.24

Compensatory Growth

Little data is available as to the potential for compensatory crop growth to make up the difference in yield of crops of target plant populations and those with fewer plants; however it is generally accepted that some form of compensatory growth does take place. Table 2 below, based on a target yield of 18 tonnes per acre (44.5 tonnes/ha) shows how yield losses can be mitigated by compensatory growth. Please note that the rates of compensatory growth are our guestimates and are not based on published data. They should be used as a guide only.

Weather related yield penalties

In addition to any compensatory growth adjustments, the likely impact of past and present weather also needs to be taken into account when forecasting final crop yields. Table 2 shows the potential impact of a 15% and 30% weather related yield reduction. The figures can be used as a guide as to the impact of the poor weather on yield potential. Using table 2 it is possible to forecast a yield for field with different plant populations. E.g. a 40000 plant per acre crop will yield in the region of 11088 kg per acre, assuming a 30% weather related yield adjustment.

Table 2 Plant population and weather factors combined to show potential overall impact on maize yield using two 15% and 30% weather related yield reductions.

Overall Crop Yield		Yield based on compensatory growth at lower plant populations (kg/acre)	Plant populations	
15% yield reduction	30% Yield reduction		Plants/acre	Plants/hectare
Kg/acre	Kg/acre			
15300	12600	18000	50000	123550
14982	12338	17626	48000	118608
14639	12056	17222	46000	113666
14272	11753	16790	44000	108724
13880	11431	16330	42000	103782
13464	11088	15840	40000	98840
13023	10725	15322	38000	93898
12558	10342	14774	36000	88956
12069	9939	14198	34000	84014
11555	9516	13594	32000	79072
11016	9072	12960	30000	74130
10453	8608	12298	28000	69188
9865	8124	11606	26000	64246
9253	7620	10886	24000	59304
8617	7096	10138	22000	54362
7956	6552	9360	20000	49420
7271	5988	8554	18000	44478
6561	5403	7718	16000	39536
5826	4798	6854	14000	34594
5067	4173	5962	12000	29652

*1% compensatory growth increase assumed as plant populations drop by 1000 plants per acre.

Impact on maize quality

As well as the yield implications of reduced plant populations and the weather, both factors will also have an impact on maize silage quality. Lower plant populations tend to allow more light into a crop, with the result that cobs tend to be larger and more mature at harvest. Larger, mature cobs tend to increase the starch levels of crops. In contrast, crops affected by adverse weather tend to be slow to mature and while cobs may be present, grain maturity may be delayed or not happen at all, with the result that starch percentages in the silage are low.

Wholecrop to fill any shortfall in yield and quality?

Members will be aware of the excellent feed characteristics of wholecrop cereal silage. Cattle find the silage very palatable and its similar starch, energy and protein balance to maize silage, make it an ideal addition, or in this case substitute. With wholecrop harvests typically happening during mid and late July,

now is the time to work out how much wholecrop is needed to fill any gap in anticipated maize yields.

Table 3 shows the typical yield of wholecrop silage. The numbers contained in the table can be used to calculate how much cereal land needs to be wholecropped to fill an individual farms silage shortfall. The yield estimates are based on average crops of cereals. With cereal crops looking particularly well at the time of writing, these averages should be on the safe side.

To work out how much, if any wholecrop you may need, first workout using table 1 and 2 above how much different your estimated maize yield is from your original yield target. Next step, use table 3 to work out how much wholecrop wheat or barley you need to cut to make up the difference. Remember that due to maize and wholecrop being relatively similar forages, you can usually clamp them together. That said, urea treated crops should be kept separate from fermented silages.

Table 3 Wholecrop Cereal Silage yield data on a Dry and Fresh Weight Basis

Crop	DM yield (t/ac)	DM yield (t/ha)	Fresh Wt yield (t/ac)	Fresh Wt yield (t/ha)
Wheat	4.9	12	12-14	30-35
Barley	4	10	10-12	25-30

Harvesting wholecrop

When harvesting wholecrop, the Dry Matter (DM) of the cut crop is important. Use the guide below to improve your chances of getting the DM right. While much wholecrop is made without an additive or preservative, the MGA Additive Data sheets should provide you with an up to date list of what is currently available.

Table 4 Wholecrop Cereal DM in field crop assessment guide

DM%	Crop colour	Grain texture
32 – 35	Green	Soft Brie; some grains milky
36 - 38	Green	Soft Brie
39 - 42	Green, ears turning yellow	Soft Cheddar
43 - 46	Green going yellow	Soft Cheddar
47 - 54	Yellow, hint of green	Hard Cheddar, with some harder grains
55 - 65	Yellow, hint of green on stem	Hard Cheddar, with some grains impossible to penetrate with thumbnail
66 - 70	Yellow/brown, traces of green at nodes	Very hard, with grains impossible to penetrate with thumbnail
71 - 80	Yellow/brown	Too hard to penetrate with thumbnail; loosening in daytime

Conclusions – Many maize crops are struggling this year and now is the time to quantify the likely effect of this set back on forage stocks for the coming winter. Plant establishment and as a result plant population and weather will both impact on maize yield and quality. The estimates contained within this technical note provide a method and some assumed numbers to help in this exercise. We would urge members to measure plant populations and estimate yields now.