

Maize seed update

2020 season review



PIONEER

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As we plan for this year's maize crop it is an appropriate time to reflect on what lessons we can take from the 2020 season. A glance at the rainfall record in Chart 1 reminds us of the weather pattern through the year. The soils were water-logged during the winter months and only started to dry out during April when we had sunny days and frosty nights. Growers were understandably impatient to start drilling in mid April as soil conditions were ideal and the temperatures were just climbing above 10°C (Chart 2).

Rainfall (mm)

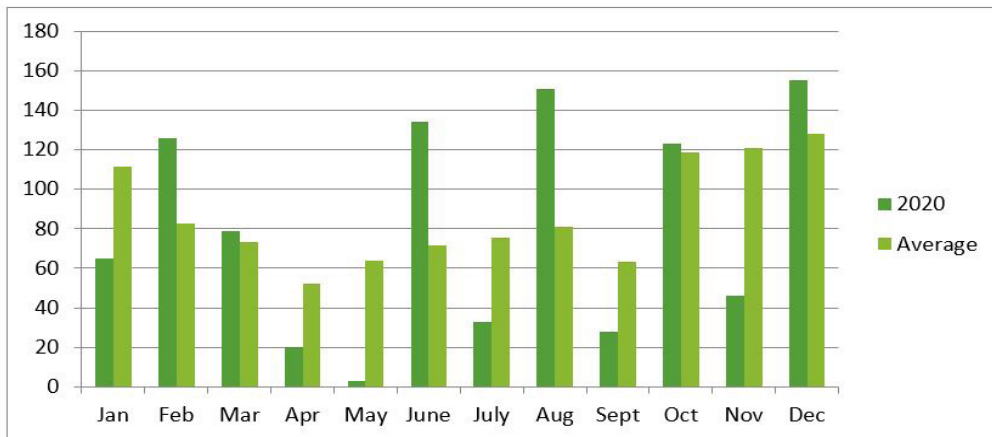


Chart 1: Monthly rainfall (mm) for 2020 compared with 18 year average.

Source: S. Preece. Mid Devon

Temp (°C)

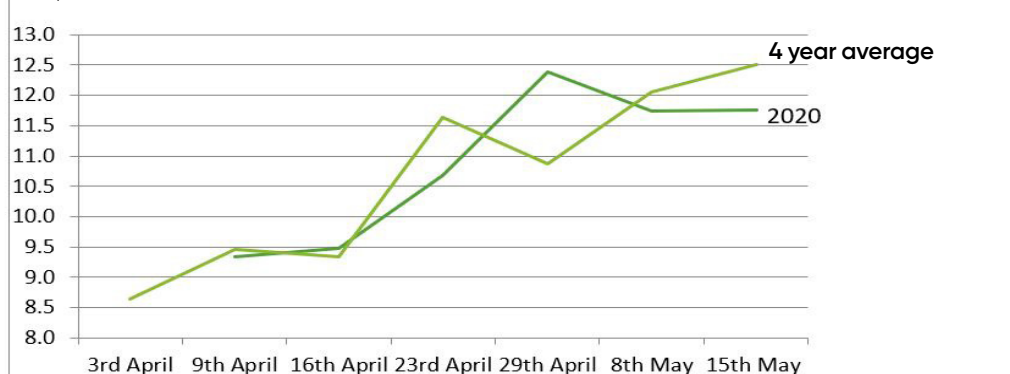


Chart 2: Soil temperatures from across the south west for 2020 compared with the 4 year average.

Source: Pioneer studies conducted between 2017 and 2020.

Maize Update

On favourable sites the early drilled maize emerged quite rapidly only to be exposed to some late frosts which damaged the leaves but fortunately did not reach the growing point and maize crops did recover. The month of May proved to be exceptionally hot with high levels of light intensity as shown in red in Chart 3.

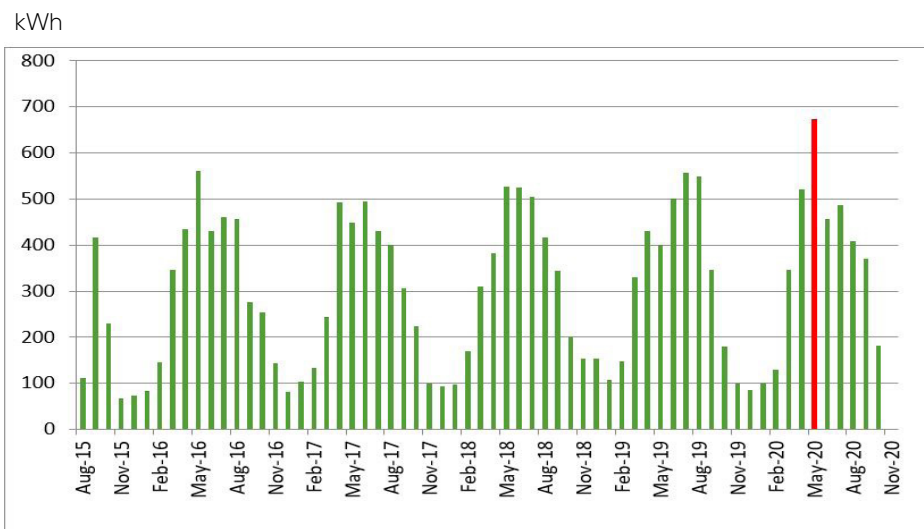


Chart 3: Monthly solar intensity measured by photovoltaic production.

Source S Preece Mid Devon

In the UK we are familiar with the purple leaves that occur when the maize plant is under cold stress during May and June. In 2020 we saw maize plants turning purple as a consequence of heat stress which is most unusual. (Photo 1) Some of the maize that was drilled during late May after grass into knobbly seedbed did struggle to germinate and establish.



Photo 1: Heat stressed maize on 4th June 2020 Cornwall.

Source: S Preece

By June we were getting concerned that there would be no second cuts of grass and were pleased when we had some steady rainfall that boosted the stature of maize crops. July was favourable with sufficient heat and moisture to enable the crop to continue to develop, flower and fertilise well. It seems to be developing into a pattern now; once the winter barley has been harvested the August weather breaks providing frustrating

wheat harvesting conditions. Other areas of the country will vary but in Mid Devon we had double the average monthly rain this August. During late July the maize crops had been two weeks ahead of schedule but by the end of August the prospective harvest date was back to normal.

As we erected the electric badger fences around our trials in early September it became apparent that the Favourable sites were developing well but the trials in the Less Favourable sites were late to start depositing starch. This is borne out when we look at Table 1. Yields and maturity on Favourable sites in 2020 were very close to the four year average while on Less Favourable sites the dry matter content was down 5.4% while starch contents were down by 5.6% which is largely as a consequence of the lack of sunshine and heat during the key grain fill period in August.

Type of Sites / Year	Yield / Ha (T DM)	DM (%)	Starch (%)	D Value (%)
Favourable 2020	17.23	38.8	33	67
Favourable 2017-2020	17.6	38.7	33.9	69
Less Favourable 2020	15.98	32.8	27.9	67
Less Favourable 2017-2020	16.23	38.2	33.5	68

Table 1. Average PACTS maize trial results from 2020 compared with the four year average.

Source Pioneer

Maize Update

As breeders increase maize yields the question is posed as to whether the newer hybrids should be planted at different seed rates to accommodate the larger stature plants. Pioneer conducted twelve trials for hybrid P7034 in 2020 to determine the plant density that provides the optimum performance in terms of both yield and forage quality. (Table 2). Changes in plant density had little impact on the forage dry matter content but we did see a slight increase in starch content with increasing plant population which was surprising. It was noticeable that the plants in the plots with higher densities had thinner stems and this may have had an influence on the ear to stem ratio. The energy yield advantage of the highest plant density range was not sufficiently large to offset the additional seed cost. Overall the results confirmed that the optimum plant density was for the plots with 90 – 105,000 plants / ha. Allowing for a 2 – 5% of seeds failing to germinate that equates to a seeding rate of 95 – 105,000 / ha (38 – 42,000 / acre) which reaffirms our current drilling rate recommendations.

Plants / Ha (1000s)	Plants / Acre (1000s)	P7034 Plant Density	Forage DM %	Relative			Forage Quality Relative	
				DM Yield (%)	Starch % %	Sugar % %	(MJ ME / Kg DM)	ME Yield (%)
< 90	< 36	Low	39.7	93.7	31.2	3.8	10.9	92.9
90 - 105	36 - 42.5	Medium	41.4	100	33.1	3.6	11.0	100.0
> 105	> 42.5	High	41.1	97.4	34.7	4.3	11.3	100.2

Table 2. Performance response of P7034 drilled at a range of plant densities.

Source: Average of 12 PACTS sites in 2020.

Summary

Drilling before the third week of April can result in the emergence of maize plants in early May when frosts are still a potential hazard particularly on level ground or valley bottoms where the cold air gathers at night. If soil conditions and temperatures tempt you to drill early then drill a little deeper in order to delay seedling emergence and to protect the growing point from possible frost damage.

Drilling maize in the latter part of May after grass harvest is risky and can result in uneven or delayed germination due to lack of moisture. Late drilled maize crops will be late to harvest thereby increasing the risk of damage to soil structures which can negatively impact subsequent crops. Don't be tempted to delay first cut grass for a little more yield if it means maize drilling is pushed into the second half of May.

Seed density trials with P7034 confirmed that the optimum planting rates are between 95,000 – 105,000 seeds per hectare having consideration of seedbed conditions.

Contact Us

Mark Shaw

Southern UK and South & West
Wales

Mobile: **07880 407839**
Email: mark.shaw@corteva.com



Jonathan Bellamy

Northern Ireland, Central UK

Office: **01270 619825**
Mobile: **07801 183233**
Email: jonathan.bellamy@corteva.com



Andy Stainthorpe

UK & Ireland

Office: **01823 334279**
Mobile: **07801 183234**
Email: andy.stainthorpe@corteva.com



Simon Preece

South West UK

Office: **01884 861 529**
Mobile: **07813 142957**
Email: simonpreece62@gmail.com



Rebecca Cartwright

Northern England & Scotland

Mobile: **07917 520707**
Email: rebecca.cartwright@corteva.com



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Corteva Agriscience Limited,
CPC2 Capital Park, Fulbourn, Cambridge CB21 5XE. Tel: 01462 457272.

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