



A clear solution for farmers

CATCHMENT SENSITIVE FARMING



Catchment Sensitive Farming (CSF) in partnership with the Maize Growers Association (MGA)

Case Study 3: Growing Maize under degradable film

The MGA with the support of Catchment Sensitive Farming (CSF) established a demonstration site in Tregony, Cornwall. Alongside cultivation, maize establishment, variety choice, herbicide and organic manure application plots, maize was established under degradable film with the aim being to demonstrate the potential of degradable film to enable earlier drilling and increased rates of crop development with the end result that harvest date is earlier than conventionally sown maize.



Fig 1 Maize drilling using degradable

Why? Drilling Date - Maize requires soil temperatures of 8-10°C to germinate and grow away. Degradable plastic film will raise soil temperatures below it, in a similar way to a garden cloche, and as a consequence drilling can commence when soil temperatures are 6°C. Maize can be drilled, using film typically 2 weeks earlier than would otherwise be the case.

Why? Heat Unit requirement - A specific maize hybrid requires a fixed number of heat units (Ontario Heat Units) to develop from seed to suitably mature maize silage. Because of the warmer soil under film maize will start accumulating heat units earlier in the season compared to

uncovered crops. In addition the rate of heat unit accumulation will be faster than uncovered maize. Early onset of heat unit accumulation combined with rapid accumulation rates will ensure earlier maturity of maize in the autumn.

Dry Matter (t/ha) yields for maize grown under film are typically higher, particularly in more marginal areas (areas of the country that are wetter and colder than the average) compared to crops grown without cover as the varieties are able to reach their full potential due to the increased number of heat units accumulated over the season.

The use of degradable film comes at a cost (in the region of £300/ha). This cost needs to be set against the benefits which, in addition to the earlier harvest and higher yields also include the widening of the work window for both labour and machinery in the spring and autumn.

What was done? – Demonstration sites were set up near Tregony, in central south Cornwall during the 2010 and 2011 growing seasons. Maize was established using the SAMCO system (the only commercial system available to sow maize under film) with the same variety grown with and without film in adjacent plots. The plots were for demonstration only and as a consequence were not randomly replicated. Significant replicated trial work has been undertaken in Northern Ireland (NI) (with similar marginal

maize growing conditions to Cornwall) the results from which prove the benefits in terms of speed of maturity and yield benefits of using film.

The maize grown in NI, with and without film, was harvested on the same day when the covered maize had reached suitable maturity.

The uncovered maize had a 5% lower DM% at harvest. Assuming a typical dry down rate of 2% per week, the uncovered maize would have taken 2.5 more weeks to reach a similar maturity with the associated increased risk of soils being wetter weaker and more vulnerable to structural damage. When harvested on the same day the covered maize yielded more Dry Matter, starch and energy.

Table 1 Crop Performance “With” and “Without” degradable film - Northern Ireland Recommended Variety List 2015

	Silking (flowering) Date	Total Yield (t/ha)	DM Content (%)	Starch yield (t/ha)	Starch Content (%)	ME yield (GJ/ha)	ME Content (MJ/kg)
With film	30 Jun	15.6	35	5.8	37	172	11.1
Without-film	15 Aug	12.8	30	3.6	28	135	10.6
Film gain	16 days	2.8	5	2.2	9	37	0.5

Data from the demonstration site set up at Tregony in west Cornwall during 2010 where crops both uncovered and covered crops were harvested on the same day, indicated an increase in crop yield, DM% and starch yield resulting from the use of degradable film. The higher crop DM% and starch levels of the maize grown under film compared to that grown without film indicates that to achieve target maturity and starch % targets harvest would be earlier for the maize grown under film compared to uncovered crops.

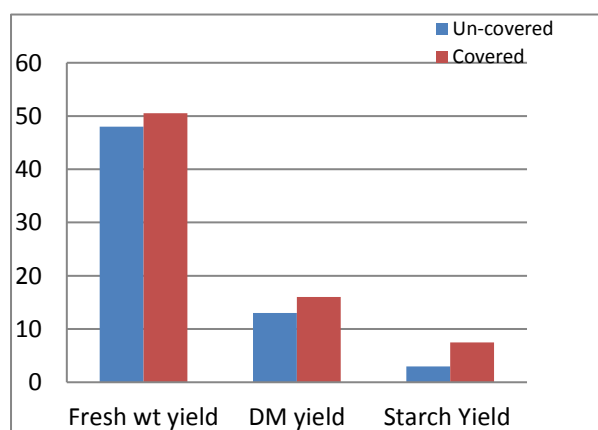


Fig 2 Yield of fresh maize (t/ha), Dry Maize t/ha) and starch (t/ha) of maize grown with and without degradable film during 2010 at the CSF Tregony demo site.

Reduced risk – The warming of the soil and protection of the young maize seedlings below the film combined with the rapid rate of maturity and consequential earlier harvest reduce the risk of crop failure in the more challenging maize season. Earlier harvest reduces the risk of compaction of wet, weaker soils, and subsequent flooding or soil erosion in the autumn.

Farmer response – The benefits associated with use of film appeal to farmers with the uptake of film expanding across the world. The cost of film remains the largest barrier to uptake with weed control challenges and lack of local contractors also having a negative impact.

What's next? - Compensation payments from environmental schemes or utility companies, in return for maize being harvested by a set date may go some way to cover the cost of using degradable film.