

# Cob development in forage maize: influence of harvest date, cultivar and plastic mulch

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**Introduction** Forage maize grown for silage tends to be a compromise between reproductive and vegetative yield, and the cob component is the main driver of feeding value (Keane *et al.*, 2003). Thus the aim is to produce a well-developed crop of high dry matter (DM) and starch content reflecting large cobs of well-filled grains rather than crops with low DM and starch contents reflecting poorly developed (immature) cob components at harvest. The use of plastic mulch can increase total DM yields with the increase in cob yield accounting for 75% of the total yield increase (Easson & Fearnough, 1997). In this experiment the composition of cob components (i.e. rachis plus kernel) of two cultivars of different maturity under Irish conditions grown with or without plastic mulch were monitored between the harvest dates of 10 September to 9 November.

**Materials and methods** Two forage maize cultivars of different maturity under Irish conditions (Tassilo: FAO 210 (early) and Benicia:FAO 270 (late)) were grown at Oak Park in 2002. Each plot consisted of 4 rows (70 cm spacing) of 5 m length sown in duplicate blocks either uncovered (NP) or under complete-cover clear polythene mulch (P; 6 micron; IP Europe Ltd) on 24 April using a Samco precision seed drill at a seed rate of 100,000 seeds/ha. Standard fertiliser (150 kg N, 50 kg P, 200 kg K/ha) and weed control (4.5 l atrazine/ha) was applied pre-sowing. At 10-d intervals from 10 September to 9 November the cob component was removed from plants from a one m length per plot. *In vitro* DM digestibility (DMD) was measured using the Tilley and Terry (1963) two-step method and acid detergent fibre (ADF) was measured using the Ankom fibre analyser. Data were analysed as a repeated measures analysis of variance using Genstat 7<sup>th</sup> Edition.

**Results** As harvest date was delayed cob starch content increased ( $P<0.001$ ) and cob DMD and ADF generally decreased ( $P<0.001$ ) (Figures 1-3). However cob ADF did increase initially in uncovered plants before decreasing.

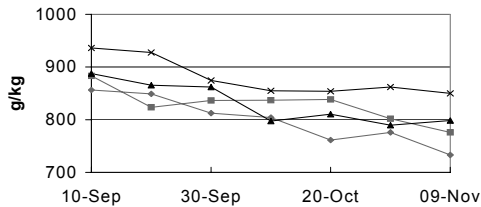


Figure 1 Cob *in vitro* DMD over time

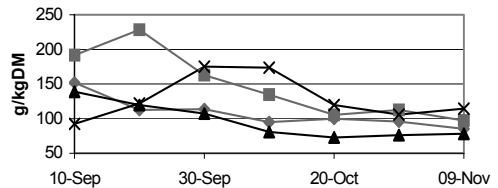


Figure 2 Cob ADF content over time

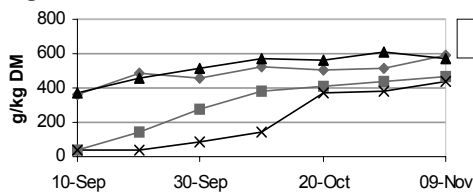


Figure 3 Cob starch content over time

Legend for Figures 1-3:  
● Tassilo P    □ Tassilo NP    ▲ Benicia P    × Benicia NP

Plastic mulch increased ( $P<0.001$ ) cob starch content, this effect being most evident with Benicia ( $P<0.01$ ) particularly in early September. It also reduced ADF ( $P<0.01$ ) and DMD ( $P<0.05$ ). Tassilo generally had a higher starch and lower DMD and a similar ADF to Benicia.

**Conclusions** A progressive rise in starch content was observed over time and was most evident in uncovered plants reflecting the greater maturity of covered plants. A corresponding decrease in ADF was observed as starch rose. The initial rise in cob ADF of uncovered plants could indicate the later, final stages of rachis development when compared to those under plastic cover. The temporal decline in cob *in vitro* DMD was quite large and may reflect decreasing degradability of starch and/or increasing indigestibility of the rachis as the cob matures.

## References

- Easson, D.L. & W. Fearnough (1997). Proceedings of the Agricultural Research Forum, p. 241-242.
- Keane G.P, J. Kelly, S. Lordan & K. Kelly (2003). Agronomy factors affecting the yield and quality of forage maize in Ireland: effect of plastic film system and seeding rate. Grass and Forage Science, 58, 362-371.
- Tilley, J.M.A. & R.A. Terry (1963). Journal of the British Grassland Society, 18, 104-111.