

## Yield and chemical composition of contrasting maize cultivars at sequential stages of maturity

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**Introduction** Forage maize of high starch content is a high quality feed for ruminants that supports high dry matter intakes and animal performance. However in Ireland, unsuitable climatic conditions can result in poor yields compared to other forages such as grass silage. This study evaluated the effects of maturity at harvest on the yield and composition of the cob and stover components of maize cultivars selected for cold tolerance, high biomass and conventional forage maize silage use.

**Material and methods** Six cultivars of forage maize selected as conventional (Tassilo and Beethoven), cold tolerant (Andante and Nescio) and high biomass (Atletico and KXA 7211) were sown under plastic mulch on 7 May 2008. Plots from the three replicate blocks of a split-plot design were harvested on 16 September, 7 October and 28 October. Samples of whole crop, stover and cob were precision chopped and sampled for chemical analyses. Data were analysed using GLM procedures of SAS software (SAS, 2002).

**Results** Whole-crop yield and the proportion of cob present both increased with later harvest dates (Table 1). Delaying harvest also resulted in higher DM and starch content of cobs. The *in vitro* dry matter digestibility (DMD) of stover decreased with later harvest. High biomass cultivars had a lower cob DM content and cob proportion compared to the other cultivars.

**Table 1** Yield and physical composition of forage maize

<sup>1</sup>= harvest date; <sup>2</sup>=cultivar, <sup>3</sup>= water soluble carbohydrates; <sup>4</sup>=*in vitro* dry matter digestibility.

\*  $P < 0.05$ , \*\*  $P < 0.01$ , \*\*\*  $P < 0.001$ , NS=  $P > 0.05$ .

| H <sup>1</sup> | C <sup>2</sup> | Whole crop      |                           | Cob       |                 |                           | Stover    |                         |              |
|----------------|----------------|-----------------|---------------------------|-----------|-----------------|---------------------------|-----------|-------------------------|--------------|
|                |                | DM yield (t/ha) | Proportion of crop (g/kg) | DM (g/kg) | Starch (g/kgDM) | WSC <sup>3</sup> (g/kgDM) | DM (g/kg) | DMD <sup>4</sup> (g/kg) | NDF (g/kgDM) |
| 16 Sept        | Tassilo        | 9.63            | 612                       | 268       | 227             | 157                       | 175       | 703                     | 575          |
|                | Beethoven      | 13.66           | 651                       | 242       | 276             | 175                       | 179       | 667                     | 605          |
|                | Andante        | 11.56           | 519                       | 281       | 314             | 120                       | 180       | 660                     | 627          |
|                | Nescio         | 9.92            | 623                       | 182       | 175             | 223                       | 189       | 683                     | 583          |
|                | Atletico       | 13.05           | 442                       | 204       | 211             | 188                       | 194       | 682                     | 597          |
|                | KXA 7211       | 12.01           | 376                       | 175       | 103             | 211                       | 199       | 657                     | 601          |
| 7 Oct          | Tassilo        | 14.35           | 700                       | 380       | 481             | 126                       | 160       | 675                     | 623          |
|                | Beethoven      | 15.33           | 678                       | 367       | 545             | 117                       | 172       | 618                     | 684          |
|                | Andante        | 14.75           | 665                       | 364       | 528             | 108                       | 183       | 620                     | 668          |
|                | Nescio         | 12.79           | 763                       | 304       | 405             | 135                       | 171       | 675                     | 597          |
|                | Atletico       | 14.33           | 520                       | 189       | 138             | 247                       | 188       | 677                     | 573          |
|                | KXA 7211       | 14.89           | 567                       | 255       | 308             | 194                       | 192       | 658                     | 598          |
| 28 Oct         | Tassilo        | 15.02           | 767                       | 381       | 537             | 39                        | 218       | 578                     | 719          |
|                | Beethoven      | 15.52           | 738                       | 446       | 612             | 31                        | 244       | 545                     | 755          |
|                | Andante        | 14.74           | 765                       | 479       | 606             | 24                        | 259       | 551                     | 736          |
|                | Nescio         | 12.29           | 762                       | 304       | 585             | 54                        | 197       | 576                     | 717          |
|                | Atletico       | 16.47           | 597                       | 261       | 317             | 147                       | 193       | 632                     | 617          |
|                | KXA 7211       | 16.41           | 697                       | 255       | 525             | 86                        | 216       | 592                     | 706          |
| Sig            | H              | **              | **                        | ***       | **              | ***                       | ***       | ***                     | ***          |
|                | C              | ***             | ***                       | ***       | ***             | ***                       | **        | **                      | ***          |
|                | HxC            | NS              | NS                        | **        | ***             | ***                       | ***       | NS                      | *            |
| SEM            | HxC            | 0.829           | 51.5                      | 17.0      | 36.6            | 12.6                      | 7.9       | 16.8                    | 17.6         |

**Conclusion** Later maturity at harvest increased whole-crop DM yield due to an increase in the yield of cob. This paralleled a rise in the starch content of the cob with later maturity. Cobs from high biomass crops had a lower DM and starch content than cold tolerant and conventional cultivars.

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### References

SAS (2002-2003) Statistical Analysis Institute (version 9.1). SAS Institute inc., Cary, N. Carolina, USA