

Productivity and morphological characteristics of corn as a function of maturity stage and cutting height for silage production

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Introduction

Corn is acclaimed as one of the best and most recommended crop for silage production, a result of its qualitative and quantitative characteristics, acceptability by various animal species, and satisfactory animal performance in the production of meat or milk (Deminiçis et. Al., 2009). According to Valente (1991), the quality of corn silage is related to the share of grain production in mass to be ensiled.

Objective

The aim of this study was to evaluate the agronomic characteristics of the corn hybrid DOW 587, at different maturity stages ($\frac{1}{2}$ milk line, $\frac{3}{4}$ milk line and physiological maturity), subjected to two cutting heights (0.20m and 0.40m) as a function of yield and morphological characteristics for silage production.

Materials and methods

The experimental design was completely randomized, in a factorial arrangement 3x2 (three maturity stages and two cut heights). Harvest occurred on 36, 48 and 55 days, in four lines per treatment after flowering (replications). One sample was used for the whole plant, and the remaining samples for stem+sheath, leaf blade and grains. For each maturity stage, the green mass weight was obtained for each individual plant harvested and subsequently separated into stem+sheath, leaf blade, grain, cob and straw. Sample was then dried in forced ventilation oven at 65° C until constant weight was obtained.

Results and discussion

There was a decrease in productivity with increasing cutting height, and the difference was decreased with advancing stage of maturity of the plant. In cutting height of 0.20 m, the productivity of dry mass was 1.04; 0.87 and 0.55 t ha⁻¹ respectively, more than the average yield obtained in cutting height of 0.40 m, which represented a reduction of 6.4; 5.2 to 3.9% productivity when the DM raises the cutting height of 0.20 m to 0.40 m, respectively.

Significant differences in the characteristics of participation of all components were found for all maturity stages and significant effect of cutting height on the participation of stem and grain in three stages evaluated (Figure 1) .

The stage of physiological maturity showed values of 42% and 45.1% for participation in green mass of grain when harvested 0.20 and 0.40 m above the ground respectively. Assessing the participation of the grain, which is the most important component to the energy concentration, it appears that only the $\frac{1}{2}$ milk line stadium was below the 40% considered ideal for the production of high quality silage. The productivity of dry corrected to 13% grain moisture was 3.8; 5.7 and 5.6 t ha⁻¹ in the stadiums $\frac{1}{2}$ milk line, $\frac{3}{4}$ milk line and physiological maturity respectively.

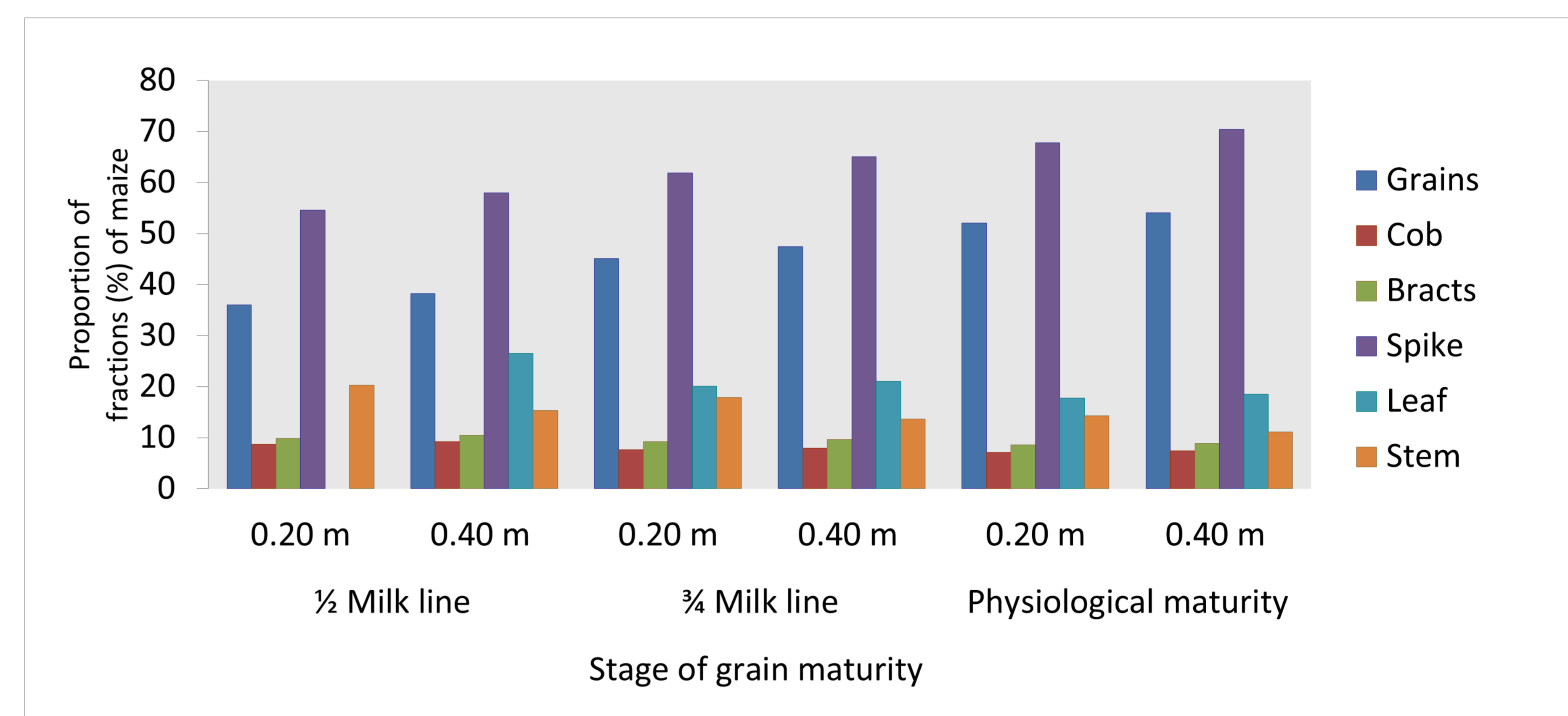


Figure 1. Proportion of fractions (%) of maize in dry matter (DM) with three times of harvest for silage at two cutting heights (0.20 and 0.40m) from the ground.

Significant effect was observed in the relationship between productivity of dry grain and green mass, decreased in the late stages of cut due to the increase in dry matter content with increasing maturity stage (Table1).



Table 1: Relationship between green matter (GM) and dry matter (DM), with three maturity stage of harvest for silage and two cutting heights, per ton of dry grain in the corn plant.

	Maturity Stage		
	$\frac{1}{2}$ Milk line	$\frac{3}{4}$ Milk line	Physiological maturity
	----- 0.20 m -----		
GM	12.9 a	7.4 b	4.7 c
DM	4.4 a	3.2 a	2.5 a
	----- 0.40 m -----		
GM	11.9 a	6.8 b	4.3 c
DM	4.1a	3.1 a	2.4 a

Grains mass adjusted to 13% moisture. Average followed by capital letters in the same line differ (between stages and at the same time) by the Tukey test (P < 0.05).

Conclusion

Raising the cutting height to 0.40m for silage production is recommended when feeding animals of higher productivity potential. This is due to increased nutritional value of corn harvested during the $\frac{3}{4}$ milk line and physiological maturity.

References

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