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Effect of Pollination Levels on Yield and Quality of Maize Grown for Silage

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Abstract: Maize (Zea mays L.) hybrids with good yields of grain and whole-plant dry matter are preferred for forage production. The objective of this study was to examine the relationship between kernel development and nutritive value of maize silage, using controlled pollination to alter the extent of ear fill in 4 maize hybrids. Whole-plant acid detergent fiber (ADF), neutral detergent fiber (NDF), and crude protein (CP) were measured. Pollination control affected the ear fill for 0% and 100% pollination levels. Stem diameter and plant height were not affected by pollination treatment; however, they were different for the hybrids. Leaf content and stalk content were negatively correlated (r = -0.68** and -0.87**, respectively) with actual ear fill. Ear content was also positively correlated with dry matter (DM) yield (r = 0.69**) and was negatively correlated with ADF (r = -0.73**) and NDF (r = -0.73**). Harvest index varied among pollination treatments and the hybrids. The greatest DM yield (17.8 Mg ha^{-1}) obtained at 100% pollination level. Whole-plant DM content increased by 19% as pollination level increased from 0% to 100%. DM content was positively correlated with grain yield (r = 0.80**) and ear content (r = 0.81**) and it was negatively correlated with leaf content (r = -0.63**) and stalk content (r = -0.77**). Whole-plant NDF (r = -0.81**) and ADF (r = -0.75**) were negatively correlated with pollination levels or actual ear fill. DM content and DM yield increased with pollination levels as a function of ear fill. The results revealed that ear fill and kernel development are important factors in decreasing whole-plant NDF and ADF values.

Key Words: Silage maize, pollination, agronomic characters, dry matter yield, crude protein, acid detergent fiber, neutral detergent fiber

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