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THE IMPACT OF CROP DENSITY ON GRAIN FILLING AND WATER RETENTION IN MAIZE GRAINS

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Sowing density affects not only crop growth, but also grain filling, including grain dry-down. Maize hybrids with upper-standing leaves allow to be grown in higher densities, what could affect some traits during ripening. An experiment with six maize hybrids (ZP388, ZP5550, ZP5601, ZP6263, ZP6364, ZP707), grown at 59,523 (D1) and 89,286 plants ha^{-1} (D2), during 2019 and 2020 was established. Maize cobs were sampled 15 days after pollination (DAP), according to 10 day time-schedule (five times), up to the harvesting. Fresh weight of grains, water percentage, as well as grain yield and shelling percentage at the end of vegetative cycle were determined.

Gradual and significant increase in grain fresh weight was noticed at D1, while at D2 greater values were obtained between 15^{th} and 25^{th} day, as well as between 45^{th} and 55^{th} DAP. At D1, continual increase in grain weight was observable for all hybrids, except for ZP6364, where drop 45^{th}–55^{th} day was observable. For ZP388, significantly higher values were noticeable at D1, at 55^{th} DAP (31.83 g) and also at D2, 15^{th}–45^{th} DAP (from 24.06 to 32.02 g), including steeper drop to the 55^{th} day (24.39 g), in regard to other hybrids. Significant and continual decrease in water content were noticed in grains of all of examined hybrids at D2, while at D1trend was slowed 45^{th}–55^{th} DAP, having the lowest values for ZP5550, ZP5601, and ZP6263. Significantly higher average grain yield achieved ZP6364 (10.05 and 11.35 t ha^{-1}, at D1 and D2, respectively), and D2, compared to D1 (>830 kg ha^{-1}). Similar trend was observable for shelling percentage with 0.71% greater value obtained at D2. ZP707 had the highest value, 82.80% and 90.11% for D1 and D2, respectively.

It could be concluded that, up to the 55^{th} DAP, maize grain gained greater weight and retained higher water amounts at D1, while grain dry-down started from the 45^{th} day and was greater at D2. This was followed with greater grain yield and shelling percentage. From this standpoint, ZP6263 expressed the best features, according to yield potential and grain dry-down.

Keywords: *grain yield, shelling percentage, grain weight, grain dry-down.*