

Dry matter accumulation trend on corn (TWC 647) as affected by plant density and planting pattern

ABSTRACT

To examine the effect of plant density and sowing pattern on some characteristics of corn (hybrid T. W. C. 647), a field experiment was conducted at Agricultural Research Station of Iranshahr. This experiment was laid out in a randomized complete block design arranged in a factorial with four replications. This experiment had four levels of plant densities (D1 = 70,000, D2 = 80,000, D3 = 90,000 and D4 = 100,000) with three levels of planting arrangements (p1 = single row, p2 = double row 15 cm space apart and p3 = double row 20 cm space apart). The results showed increasing accumulation trend of leaf dry matter on different levels of planting arrangement till receiving 1560 degree day and fixation and after that decreasing. With increasing density and using double row planting arrangement till before grain milking stage, the most leaf dry weight produced and after that decreased. With increasing plant density amount of leaf dry matter will increase, as high plant density (100,000 plant ha⁻¹) has the highest leaf dry matter. The results showed till douching stage (1658 degree day) logarithmical increasing of assimilate accumulation reach to its highest amount and after a time fixes and later that because of the leaves become old and transferring assimilates from source to sink, amount of leaf dry matter decrease. Stem dry weight changes started from 607 growth degree day and continued till milking-doughty stage (1357 ó 1560 GDD), and decreased later because of assimilate repeated transferring during seed becoming old. Trend of changes in stem dry weight such as leaf is sigmoid. It means with passing time stem dry weight have increased and decreased safter reaching to maximum weight. With plant entering to reproductive stage and after getting 1123 GDD emergence of flowering started which ended to ear production. Study of ear dry matter accumulation trend at different levels of planting arrangement showed there was significant difference between double row planting pattern and single row, but there is no significant difference on two levels of planting arrangement. It means at minimum and medium plant density, especially on one double-row pattern, the plants can grow better and produce a good ear. The changes on husk dry weight from 1123 GDD started and after getting 1357 GDD reached to its maximum very fast and later there was gradually reduction at the growth season because of grain formation and filling. With increasing plant density amount of husk in the unit area increased. Husk has chlorophyll and due to closing to grain plays effective role to filling, at single row planting pattern it is able to transfer its assimilates to ear store sinks more than in other planting patterns. During growth season after pollination and grain formation grain dry weight increased. Its trends at initial stage after getting 1123 ó 1357 GDD is very fast and at the end because of losing assimilate and filling sinks and loading becomes slow. The highest grain yield (1400 g m⁻²) was got from 90,000 plants h⁻¹ density and double row with 15 cm space apart treatment at 1797 GDD.

Keyword: Grain yield; Hybrid T.W.C. 647; Planting arrangement; Sowing density