

Effect of the different soil tillage systems on the productivity and yield structural elements of common winter wheat (*Triticum aestivum* L.) cultivar Pchelina

M. Nankova* & S. Doneva

Agricultural Academy, Dobrudzha Agricultural Institute, 9520 “General Toshevo”,
Bulgaria

* Corresponding author: nankova_margo@abv.bg

Soil tillage is one of the most basic and important components of agricultural production technology. The adopted soil tillage techniques, must ensure the long-term productivity of the land, be environmentally sound and profitable. Under South Dobrudzha climatic conditions (Haplic Chernozems soil) wheat yield (grain, protein and structural components) is strongly influenced by application of different main soil tillage systems (MSTS) in 4-field crop rotation. The objectives of this study were: to investigate the seasonal variability in wheat grain and protein yield and the structural yield components as influenced by the main tillage systems; to investigate the variability in the physical properties of wheat grain and to evaluate the correlations between the grain yield and all other investigated indices. For the period 2018–2021 in Dobrudzha Agricultural Institute – General Toshevo seven MSTS were tested: 1. CP – Conventional plowing (24–26 cm); 2. D – disking (10–12 cm) 3. C – cutting (24–26 cm); 4. NT – NT (direct sowing); 5. CP-NT (CP for spring crops – NT for wheat); 6. CP-D (CP for spring crops-D for wheat) and 7. CP-D (CP for spring crops-D for wheat). The meteorological conditions have a decisive influence on the values of the studied indices. The highest average yield for the 2018-2021 was obtained in the CP-D system (6953.7 kg/ha) and excess over CP-CP by 6.4%. The same is true for crude protein yield, where the increase is with 70.0 kg/ha. Prolonged application of deep irreversible tillage in the crop rotation has a strong negative impact on the amount of the grain and crude protein yield. Significant dynamics has been established in the values of the yield structural elements. The largest grain was obtained in the D-D, and the heaviest – in the CP-CP. Tillage combination systems are characterized by lower values of the physical characteristics of the grain compared to their individual application. Numerous correlations in both directions between yields (grain and crude protein) and its structural elements have been found. The positive reaction of wheat under the conditions of NT and minimal tillage in the crop rotation show that they can definitely replace conventional plowing in the growing climate changes, causing stress in critical phases of wheat development.

Keywords: tillage systems; wheat grain and protein yield; structural elements; physical properties of grain