

EFFECT OF SOIL TILLAGE AND HERBICIDES ON THE GRAIN MAIZE YIELD UNDER CONDITIONS OF THE FOREST-STEPPE ZONE OF UKRAINE

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Abstract

Introduction

Food production has always been one of the global problems. Recently it has become even more urgent due to development of the programs on the fuel production from crops. Under such conditions domestic commodity producers are interested in intensification of the output of food and fodder grain as a demand for food products, fodders and bio raw materials is growing. Maize is one of the leading crops which grain is used for biofuel (ethanol) production. In recent years areas under this crop in Ukraine have grown up to 3,6 mln ha, and grain production exceeded 18 mln t. The problems of increase of maize productivity and search of the ways of reduction of energy costs for its production, mainly introduction of no-till technology, are still very urgent for the farmers.

Materials and Methods

Field trials were carried out in 2010-2011. The soil of the trial field was grey forest, mid loamy by the mechanical composition with humus content – 2,2 – 2,4 %.

Three methods of soil tillage were researched in the trial:

1. Ploughing at the depth of 20-22 cm; 2. Discking at the depth of 10-12 cm ; 3. No-till.
2. concepts were used for weed control:
 1. Weed control without herbicides
 2. Topramezon 50 a.i. g/L+dicamba 160 a.i. g/L + metolat 1.25 L/ha⁻¹

Results and Discussion

Analysis of research results has shown that the plots had a mixed type of weed infestation before herbicide application (3-4 leaf phase of the crop).

Weed number on untreated plots was 138 per m², among them such weeds as *Setaria glauca* L. – 45-76 per m² and *Echinochloa crus-galli* (L.) Roem. – 26-45 per m² dominated. Dicotyledonous weeds were represented by *Chenopodium album* L. – 4-6 per m², *Amaranthus retroflexus* L. – 3-5 per m². As for perennial species there were *Elytrigia repens* L. – 2-4 per m² and *Convolvulus arvensis* L. – 1-3 per m². Annual weed height was within 1-3 cm, and the height of were *Elytrigia repens* L. was 10-15 cm.

Yield increase 2.49 t ha⁻¹ was obtained against a background of ploughing where herbicide Topramezon 50 a.i. g/L+dicamba 160 a.i. g/L + metolat 1.25 L/ha⁻¹ at 3-leaf phase of maize was applied.

Conclusions

Efficacy of weed control concept has not been sufficiently different against a background of different methods soil tillage.

Grain maize yield in no-till variant was reliably low than in ploughing.

Keywords: maize, bioenergy, no-till, weed control, herbicides