

EFFECT OF SOIL WORKS ON CORN PRODUCTION IN SOUTH EAST BARAGAN

Claudiu CHIȚOI¹, Costică CIONTU²

¹School of Technology no.1 Borcea, Calarasi County

²University of Agronomic Sciences and Veterinary Medicine of Bucharest, 59 Marasti Blvd,
District 1, Bucharest, Romania

Corresponding author email: claudiu.chitoi@yahoo.com

Abstract

Gălățui town, is located in the center of Calarasi County on DJ 307, between the towns Balcescu and Independence. Soil tillage systems both conventional and especially unconventional designed to ensure optimal growth conditions development and plant, soil and water conservation as well as obtaining higher quality productions with high economic efficiency.

The research was conducted on a sample belonging to TC Gălățui demonstration, County Calarasi, on a typical chernozem. The paper presents the production results obtained in the area shown above, the maize grain under the influence of soil works basic, conventional and unconventional.

It was tested a maize hybrid with good productivity and resistance to water stress, a phenomenon commonly found in Southeast Baragan.

Key words: soil tillage, suitability, potential, crop production.

INTRODUCTION

Tillage systems both conventional and especially unconventional designed to ensure optimal growth conditions development and plant, soil and water conservation as well as obtaining higher quality productions with high economic efficiency (Gus et al., 2001; Marin, 2004; Rusu et al., 2009).

The research was conducted on a sample belonging to TC Gălățui demonstration County Calarasi, a typical mold. The paper presents the production results obtained in the area shown above, the maize grain under the influence of soil works basic, conventional and unconventional.

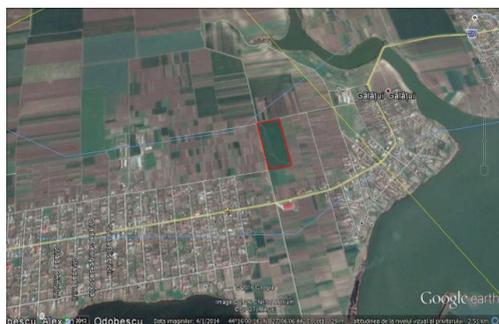


Figure 1. Location territory studied

It was tested a hybrid of maize had Monsanto with good productivity and resistance to water stress, a phenomenon commonly found in Southeast Bărăgan.

MATERIALS AND METHODS

Scientific research topics fall into doctoral internship period 2015-2017. Point research, Gălățui territory belongs District Calarasi area of 10 ha.

The experience was organized in a three-year rotation (1. sunflower, 2. wheat, 3. maize) and comprises six graduations factor "tillage systems", as follows:

a₁ – plowing 20 cm; a₂ – plowing 30 cm; a₃ – scarified 30 cm; a₄ – scarified 40 cm; a₅ – tiger 20 cm; a₆ – tiger 30 cm.

Basic works were executed in the autumn, with CASE 280 CP tractor in the period September 15 to 25, and the maintenance culture tractor with CASE 140 CP, the same day all variants. (Figure 2).

The biological material used: corn variety DKC 4590 with a density of 60 000 plants/ha. Were sown on 20 April 2015 and sprung full 05/01/2016.

On April 25, was executed Adengo first herbicide and the second herbicide on 21/05/2015 using RECORD package consisting of: Kelvin Top, Cambio and DAS (adjuvant). (Figure 3).

During the growing season, had three rain culture as follows: 3.8 l / sqm (05/06/2015) 15 l / m (06.21.2015) and 10 l / m (07.03.2015). They were executed mechanical and manual hoeing as follows: 20/06/2015 06/04/2015.

The climatic conditions during the research were forecasted by the weather station Calarasi, where the average annual rainfall is 504 mm and the average annual temperature of 11.60 C. Biometric measurements were made between 05/22/05 and 11/07/05 on all variants, the evolution of plant growth is nearly uniform, with small differences in the first phenological phases of growth.

It was calculated leaf area index (LAI), the results are conclusive yields.

RESULTS AND DISCUSSIONS

The research results are based on biometric measurements and production all of which are fully compliant, according tillage variants.

Biometric measurements, referring to the phenophases plant height and number of leaves per plant are shown in Table 1.

It is noted that corn plant height ranged between 160 -180 cm higher values were registered variant - plowing 30 cm followed by variant - plowing 20 cm.

Table 1. Biometric measurements on corn crop in april - september 2015 (Galatui, Calarasi)

| <i>Date</i> | <i>Variant</i> | <i>Plant height (cm)</i> | <i>No. leaf</i> |
|-------------|------------------|--------------------------|-----------------|
| 22.05.05 | Plowing 20 cm | 23-24 | 5-6 |
| | Plowing 30 cm | 23-24 | 5-6 |
| | Scarified 30 cm | 19-20 | 4-5 |
| | Scarified 40 cm | 19-20 | 4-5 |
| | Tiger 3 MT 20 cm | 17-18 | 4-5 |
| 30.05.05 | Tiger 3 MT 30 cm | 17-18 | 4-5 |
| | Plowing 20 cm | 36-37 | 7-8 |
| | Plowing 30 cm | 36-37 | 7-8 |
| | Scarified 30 cm | 29-30 | 6-7 |
| | Scarified 40 cm | 29-30 | 6-7 |
| 06.06.05 | Tiger 3 MT 20 cm | 27-28 | 5-6 |
| | Tiger 3 MT 30 cm | 27-28 | 5-6 |
| | Plowing 20 cm | 56-58 | 8-9 |
| | Plowing 30 cm | 56-58 | 8-9 |
| | Scarified 30 cm | 40-42 | 7-8 |
| 13.06.05 | Scarified 40 cm | 40-42 | 7-8 |
| | Tiger 3 MT 20 cm | 37-40 | 6-7 |
| | Tiger 3 MT 30 cm | 37-40 | 6-7 |
| | Plowing 20 cm | 80-85 | 9-10 |
| | Plowing 30 cm | 80-85 | 9-10 |
| 20.06.05 | Scarified 30 cm | 68-72 | 8-9 |
| | Scarified 40 cm | 68-72 | 8-9 |
| | Tiger 3 MT 20 cm | 66-68 | 7-8 |
| | Tiger 3 MT 30 cm | 66-68 | 7-8 |
| | Plowing 20 cm | 123-126 | 11-12 |
| 27.06.05 | Plowing 30 cm | 123-126 | 11-12 |
| | Scarified 30 cm | 95-100 | 10-11 |
| | Scarified 40 cm | 95-100 | 10-11 |
| | Tiger 3 MT 20 cm | 85-90 | 9-10 |
| | Tiger 3 MT 30 cm | 85-90 | 9-10 |
| 04.07.05 | Plowing 20 cm | 160-170 | 13-14 |
| | Plowing 30 cm | 160-170 | 13-14 |
| | Scarified 30 cm | 150-160 | 12-13 |
| | Scarified 40 cm | 150-160 | 12-13 |
| | Tiger 3 MT 20 cm | 150-160 | 11-12 |
| | Tiger 3 MT 30 cm | 150-160 | 11-12 |
| | Plowing 20 cm | 170-180 | 14-15 |
| | Plowing 30 cm | 175-180 | 14-15 |
| | Scarified 30 cm | 160-175 | 13-14 |
| | Scarified 40 cm | 165-175 | 13-14 |
| | Tiger 3 MT 20 cm | 165-170 | 13-14 |
| | Tiger 3 MT 30 cm | 165-175 | 13-14 |



Figure 2. Preparing the ground for seeding

The number of leaves per plant was between 13 and 15 leaf the highest values were recorded all the basic variants that work was plowing.

At the end phenophase intensive growth of plants was calculated and leaf area index. (LAI), Table 2.



Figure 3. Aspects of maize, in the early stages of vegetation

The analysis of the data it can be seen that the leaf area index recorded the highest values at work plowing - 30 cm of 3.5, followed by plowing - 20 cm of 2.95 and the smallest variants scarified 30 cm and Ag. C. - Tiger 3MT 20 cm 2.43.

Leaf area index (LAI) representative graphic is shown in Figure 4.

Table 2. Maize leaf area index in april - september 2015 (Galatui, Calarasi)

| <i>Variant</i> | <i>Work</i> | <i>LAI</i> |
|----------------|------------------------|------------|
| V1 | Plowing 20 cm | 2,93 |
| V2 | Plowing 30 cm | 3,5 |
| V3 | Scarified 30 cm | 2,43 |
| V4 | Scarified 40 cm | 2,62 |
| V5 | Ag. C Tiger 3 MT 20 cm | 2,43 |
| V6 | Ag. C Tiger 3 MT 30 cm | 2,75 |

*LAI – leaf area index

After analyzing the data in the table, one can see that the leaf area index (LAI) presented the highest value variant V2 (plowing to 30 cm) and the lowest values were found in variants V3 (scarified 30 cm) and V5 (tiger 3 MT 20 cm), plotted in figure 4.

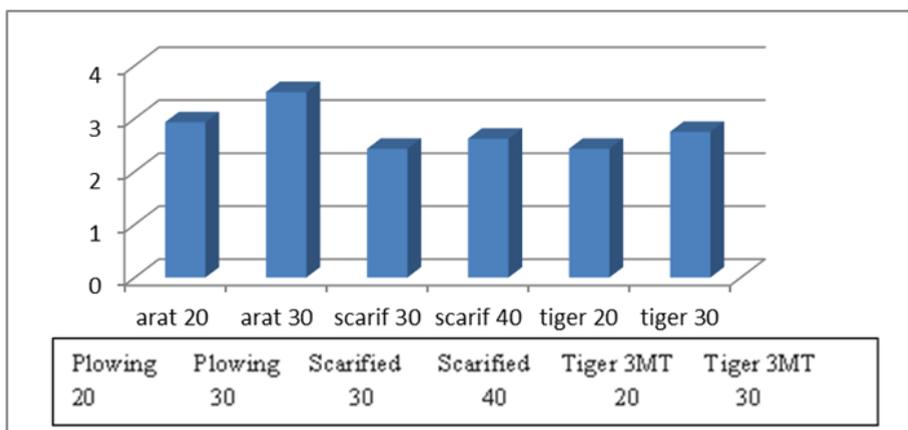


Figure 4. The influence of soil tillage on leaf area index (LAI)

Results of production and thousand seed weight (TSW) obtained from maize are shown in Table 3.

It is found that the largest grain production was obtained from the classic V2 (plowing to 30 cm) of 10,030 kg / ha which were recorded and

the high average length of 18.0 cm and ears of most valuable thousand seed weight (TSW) of 252G.

Option 1 shows at 20 cm, which was statistically considered for calculating the control, with 9100 kg / ha, with the same values

of thousand seed weight (TSW) of 252G but with an average length of 17.33 cm smaller cobs are ranked situated II in the production of grain.

The production of grains less than 7000 kg/ha was obtained in which variation of the ground-based work was performed with the combined

aggregate - Tiger 3MT to a depth of 20 cm, which is very significant negative.

Similar results very significantly negative, were recorded and variants: 3. V V 6. scarified 30 cm and aggregate combined - Tiger 3mt 30 cm. The graphical representation of production of maize is shown in figure 5.

Table 3. Results of production obtained obținute on production zea mays, 2015 (Gălățui, Călărași)

| The basic ground work | Elements of production | | | | | TSW (g) |
|---------------------------|------------------------|----------------------|-----------------|--------|--------|---------|
| | length of the cob | Prod of cobs (kg/ha) | Production crop | | | |
| | | | (kg/ha) | Dif. | Semif. | |
| V 1. Plowing 20 cm | 17.33 | 10.050 | 9.100 | Mt. | - | 252 |
| V 2. Plowing 30 cm | 18.00 | 11.400 | 10.030 | 930 | ** | 252 |
| V 3. Scarified 30 cm | 16.75 | 8.500 | 7.200 | - 1900 | ooo | 240 |
| V 4. Scarified 40 cm | 16.66 | 9.500 | 8.200 | - 900 | oo | 245 |
| V 5. Ag.C.-Tiger 3MT 20cm | 16.83 | 8.200 | 7.000 | - 2100 | ooo | 230 |
| V 6. Ag.C.-Tiger 3MT 30cm | 16.00 | 8.600 | 7.400 | - 1700 | ooo | 234 |

DI 5% = 434 kg/ha; DI 1% = 645 kg/ha; DI 0.1 % = 956 kg/ha

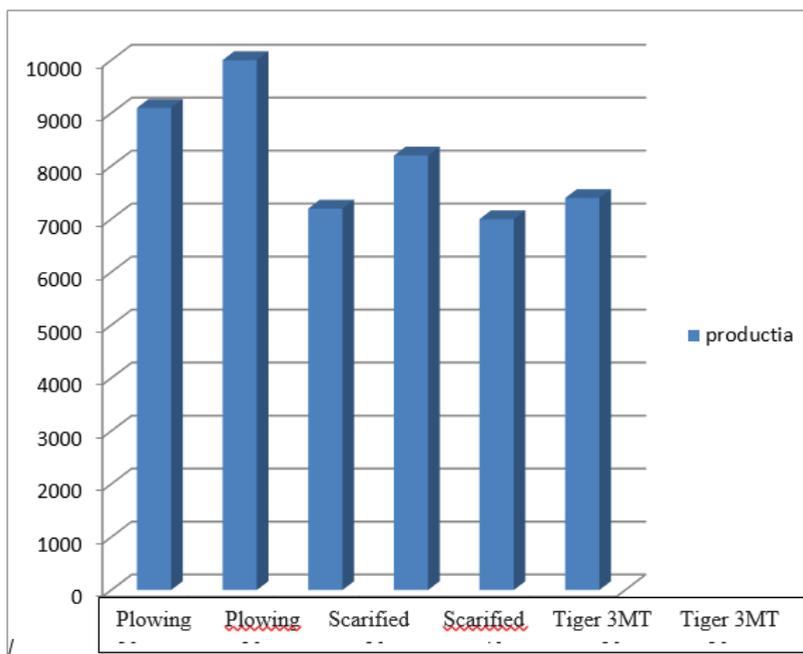


Figure 5. Influence of soil tillage on production of Zea mays

CONCLUSIONS

In terms of the agricultural year in 2015 on the influence of tillage on corn crop in Regina irrigated yields in Southeast Bărăganului are appreciable characteristic hybrid tested.

Corn plant height was between 160 -180 cm higher values were registered variant - plowing 30 cm followed by variant - plowing 20 cm. The number of leaves per plant was between 13 and 15, the highest values were recorded in basic variants that work was plowing.

Leaf area index recorded the highest values at work plowing - 30 cm of 3.5 followed by plowing - 20 cm of 2.95 and the lowest in variants scarified 30 cm and work with combined aggregate - Tiger 20 cm 2.43.

The biggest grain production was obtained from the classic V2 (plowing to 30 cm) of 10,030 kg/ha where they recorded the longest average of 18.0 cm cobs and most valuable TSW of 252G.

Basic work - plowing 20 cm, considered the control, gave a yield of 9100 kg / ha and 930 kg / ha me less than 30 cm plowing. The production of grains less than 7000 kg / ha was obtained in which variation of the ground-based work was performed with the combined aggregate - Tiger at a depth of 20 cm, which is very significant negative. Very significant negative results were recorded in variants: Rippers 30 cm and aggregate combined - Tiger 30 cm.

REFERENCES

- Guş P., Rusu T., Bogdan I., Haţegan M., 2001. Sistemeconvenţionale de lucrarea solului, Ed. Risoprint, Cluj-Napoca.
- Marin D.I., 2004. Sisteme de lucrare a solului, Ed. Elisavaros, Bucureşti;
- Rusu T., Gus P., Bogdan I., Moraru P.I., Pop A.I., Clapa D., Marin D.I., Oroian I., Pop L.I., 2009. Implications of minimum tillage systems on sustainability of agricultural production and soil conservation. Journal of Food, Agriculture & Environment ,vol.7(2), p. 335-338.