Journal of Agricultural Sciences
Vol. 50, No 2, 2005
Pages 139-152

UDC: 631.423.2
Original scientific paper

CONSERVATION OF SOIL MOISTURE IN DEEP TILLAGE RIGOSOL UNDER WHEAT AND MAIZE

Angelina Tapanarova[1]

Abstract: At the experimental field "Radmilovac" of the Faculty of Agriculture of the University of Belgrade the study of the conservation of soil moisture in deep tillage Rigosol was carried out. The so called type of soil Rigosol was covered by wheat and maize. The Rigosol was formed by special treatment of the parent soil the Eutric Cambisol.

The researches have been conducted during the most important phenophases of the crop growth, including formation of kernels, flowering, fertilization, grain filling and maturity. Special attention was paid to the measurements of soil moisture in the period when crop water requirements are the greatest.

The conservation of the soil moisture was observed along the vertical profiles of soil. The following parameters were monitored: time intervals without rainfall, precipitation rate and the rate of crop phenophase development.

Very favourable soil moisture conservation was observed, both for wheat and maize covered soil. The greatest content of soil moisture was measured at the depths from 10 to 30 cm, in the zone of crop roots. As the consequence, the favourable conditions for crop growth and yields were observed.

Deep tillage of soil had positive effects on homogeneous distribution of soil moisture along the vertical profile, independently of the crop type. It was shown that the Rigosol ensures better conservation of the soil moisture than the parent soil (Eutric Cambisol), if all agriculture measures are applied in the proper time.

Key words: conservation, soil moisture, wheat, maize, deep tillage, precipitation, infiltration, phenophases of growth.

---

[1] Angelina Tapanarova, M.Sc., Faculty of Agriculture, Nemanjina 6, 11081 Belgrade-Zemun, Serbia and Montenegro

This paper is a summarized version of the master' s thesis defended on Mart 31, 2005 at the Faculty of Agriculture in Belgrade.

Introducti on

In agriculture soil represents the basis of plant production. Apart from water and mineral matter, it is an essential resource that human existence depends on. Therefore, studying soil production capacity and finding the way how to increase it are the most important tasks of contemporary science and practice. The highest increase in soil production capacity i.e. its fertility can be mainly achieved by regulating its water regime, which is done by means of various cultural practices and ameliorative measures.

The aim of the study was to find out the level of Rigosol soil moisture conservation after rainfall, in deep tillage, when diverse arable crops are grown.

Kovačević (2003), Jevtić (1992) and Konstantinović (1992) reported that best accumulation and conservation of soil moisture is achieved by deep tillage at the depths from 25 to 35 cm.

According to Konstantinović (1992) and Spalević (1994), the outcomes of soil erosion process are largely dependent of moisture conservation at the moment of precipitation i.e. rainfall occurrence. Moisture conservation is determined to a large extent by some soil physical properties (Spalević, 1995).

Molnar et al. (1981) point out that it is necessary to provide maintenance of soil fertility by selecting appropriate tillage, so as to ensure high and steady yields of grown crops.

In studying the effects of tillage depth and fertilization on maize yield, Drezgić et al. (1972) pointed out the superiority of deep tillage over disking, especially in dry years.

Todorović and Božić (1995) as well as Adam (1981) stress that in heavier soil types deep tillage has ameliorative function and contributes to forming new anthropogenic soils.

Material and Methods

The study was conducted on the “Radmilovac” Experimental Field of the Faculty of Agriculture – Zemun, in deep tillage conditions of Rigosol formed by special treatment of the parent soil the Eutric Cambisol.

To determine soil moisture level after rainfall, two experimental plots 17 m x 70 m in size (approx. 12 ares) were used, located on the northeastern slope of the Experimental Field. Wheat variety “Kraljevica” was grown on one plot, where sowing density was 600 – 650 plants per m2, while maize hybrid ZP SC 539 was grown on another plot with approx. 57,142 plants/ha (70 cm x 25 cm).

Prior to wheat and maize sowing, deep tillage was done at the depth of 25 cm.

Sunflower was a preceding crop in wheat, while red clover was in maize.

On each experimental plot one soil profile was opened. In doing this, care was taken that profiles were in almost identical conditions of soil forming process i.e. that they had similar relief elements.

From opened, previously morphologically studied profiles in detail, soil was continually sampled for analysis in disturbed condition from 0-10, 10-20, 20-30, 30-40 and 40-50cm depth. Also, from identical depth zones soil was sampled for analysis in undisturbed condition in three replications each with Kopecki cylinders of 100 m3 vol.

Apart from opening the profiles, field studies comprised measurements of water infiltration rate and Rigosol infiltration capacity by using metal cylindrical infiltrometers.

Moisture distribution after rainfalls was monitored per phenophase or plant growth stage by collecting soil samples with a sampling rod from the said depths. Phenophases monitored in wheat were: heading, flowering, kernel formation, grain filling, milk stage, maturity, waxy ripeness, and in maize: tasseling, flowering, kernel formation, grain filling, milk stage, maturity, waxy ripeness.

Samples in disturbed and undisturbed state were subjected to laboratory analyses in order to determine soil physical properties (mechanical and aggregate structure, textural classes, specific mass and bulk density, total porosity, maximum water holding capacity, moisture retention under various pressures, air capacity, hygroscopic moisture, current moisture content and filtration coefficient, using the device with steady pressure), agrochemical properties ($CaCO_3$ content, pH value in H_2O and 1N KCl, humus and total N content, organic C content, available P and K content, total Al and Fe content), and Rigosol mineralogical structure by x-ray diffraction analysis. Soil physical and chemical properties were analyzed according to internationally recognized methods as well as those determined by Yugoslav Soil Science Society (Handbook for Soil Testing, Book 1: - Chemical Methods of Soil Testing, 1966; Book 5: - Methods of Soil Physical Properties Testing, 1971 and Methods of Investigating and Determining Soil Physical Properties, 1997).

Results and Discussion

Rigosol mineral structure

Mineralogical analysis evidenced similar mineral structure of Rigosol along vertical profiles on experimental plots under wheat and maize. Clay minerals are in highest proportion. The analysis of clay fraction showed that it is made up of illite, smectite, kaolinite, chlorite, mixed-layer clay minerals and traces of quartz.

Rigosol mechanical and aggregate structure

According to American classification of soil textural classes, the studied Rigosol under wheat and maize belongs to loams containing fractions of clay (particles smaller than 0.002 mm) from 21.7 – 26.8%. The proportion of silt fraction (particles from 0.02 – 0.002 in diameter) is from 31.5 – 35.9%, whereas total sand particles (particles from 2 – 0.02 mm in diameter) are within the 37.0 – 44.2% range.

Rigosol aggregate structure and stability

The results of comparative studies did not indicate any significant differences in the structure of Rigosol under wheat and maize. The proportion of the most favorable structural aggregates in terms of agronomy (0.25 – 10 mm), in a half-meter layer (0 – 50 cm) varies from approx. 65 – 74%.

Also, data on waterproof of structural aggregates indicate no significant differences between the studied Rigosol under wheat and that under maize. The content of waterproof aggregates larger than 0.25 mm varies from 41.3 – 57.2%.

Basic physical and air properties of Rigosol

The results observed for basic Rigosol physical (bulk density and specific mass) and air properties (total porosity and air capacity) do not demonstrate any significant differences between plot under wheat and that under maize. Values for bulk density vary from 1.30 – 1.46 g/cm3 and for specific mass from 2.70 – 2.75 g/cm3. Total porosity ranged from 46.9 – 51.9%. On both plots air capacity was low, based on Pelišek (Živković, 1991) classification, varying from 5.43 – 9.40%.

Rigosol water-physical properties

Soil water properties were characterized by data on maximum water holding capacity (MWHC) and moisture retention capacity (MRC), lento capillary moisture (LCM), plant permanent wilting moisture (PWM), available water capacity for plants (AWC), and filtration coefficient.

Values of MWHC for Rigosol under wheat, along vertical profiles, ranged from 53.65 – 49.16%; MRC – 42.45–41.28%; LCM – 27.97–25.17%; PWM – 20.84-24.42% and AWC – 21.61-16.86%.

The observed values for Rigosol water capacities under maize are similar to those under wheat i.e. for MWHC they ranged from 53.33-48.03%; MRC – 43.00-41.47%; LCM – 28.41-26.13%; PWM – 20.22-24.87%; AWC – 22.78-16.60%.

According to moisture retention capacity level, the studied Rigosol belongs to a soil class of medium-retention capacity, as classified by Astapova (1958).

Pejković (1972) reported similar results for the levels of mentioned water capacities.

In the studied Rigosol, values of filtration coefficient along vertical profiles vary from 7.3 x 10^{-4} to 1.8 x 10^{-4} cm/s. According to the Benedixen classification (Rudić, 1983), those values are characteristic of medium poorly permeable soils.

Rigosol agrochemical properties

Additional studies were conducted to better and more easily explain and comment moisture conservation in Rigosol. Therefore, the most significant chemical properties of Rigosol were analyzed, attention being focused on the pH-value, content of humus, $CaCO_3$, N, P_2O_5, K_2O, Fe and Al.

According to pH-values, the studied Rigosol belongs to the class of poorly alkaline soils (pH in H_2O varies from 7.7 – 8.2 and in nKCl from 7.2 – 7.5), whereas according to $CaCO_3$ content (2.18 – 8.37%), it falls into the group of moderate to medium calcareous soils. Humus content varies from 1.18 to 1.36%, which is characteristic of poor humose soils. As for total N content (0.074 – 0.088%), Rigosol belongs to medium supplied soils. It is well supplied with available phosphorus (P_2O_5 ranges from 45 – 85 mg/100 g soil) and available potassium (K_2O ranges from 20.1 – 34.2 mg/100 g soil). Total Fe content varies from 3.00 – 3.83%, while total Al content from 6.15 – 8.80%.

Values of the said agrochemical parameters fall within the range expected for this soil type, considering that the studied Rigosol was formed from eroded Eutric Cambisol.

Moisture content in soil under wheat

The results of monitoring current moisture content in soil under wheat along vertical profiles from 0-50 cm are shown in Tab. 1 and Graph 3. Moisture depended of time interval between precipitation occurrence and time of sampling. It was found that in all cases there exists identical regularity: amount of precipitation – vertical profile – time of sampling.

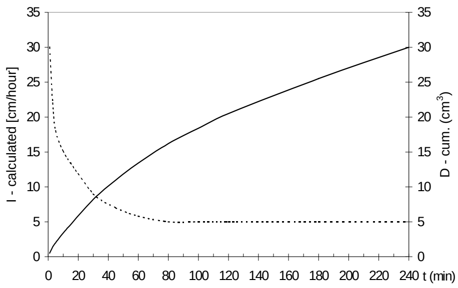
Graph 1 shows data on infiltration properties of Rigosol under wheat according to its most important stages of growth. Values for infiltration rate in wheat are highest in the first hour, declining abruptly throughout the rest of time taken for measurements.

T a b. 1. - Current soil moisture during 1995/96. in the wheat growth period per phenophase and between phenophases

Date of sampling	Soil moisture content in % in layers from 0-50 cm					Average
	0-10 cm	10-20 cm	20-30 cm	30-40 cm	40-50 cm	
25 Apr.	5.27	12.48	16.88	17.26	17.56	13,89
14 May	19.93	16.50	16.05	15.75	15.17	16,68
24 May	13.89	18.25	17.69	17.19	17.01	16,81
07 June	7.94	15.61	15.07	14.06	13.87	13,31
15 June	18.88	11.87	11.73	11.51	12.65	13,33
21 June	7.44	13.28	13.91	14.15	13.24	12,40
28 June	13.35	18.05	20.19	19.93	19.56	18,21

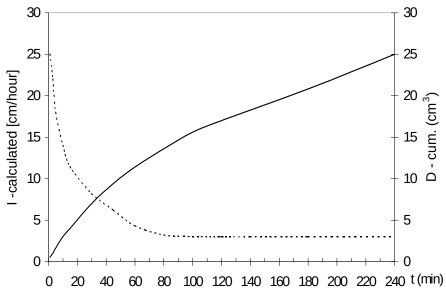
According to classification cited by Kovda (JPDZ 1997), infiltration rate in Rigosol under wheat is satisfactory, however, there is danger of weak erosion.

When in the heading- flovering phenophase



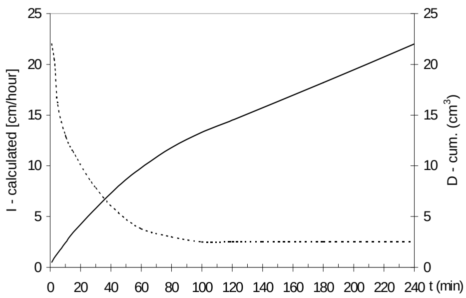
Unit infiltration curve (- - - - - -)
Cumulative infiltration curve (----------)

Wheat in the kernel formation phenophase



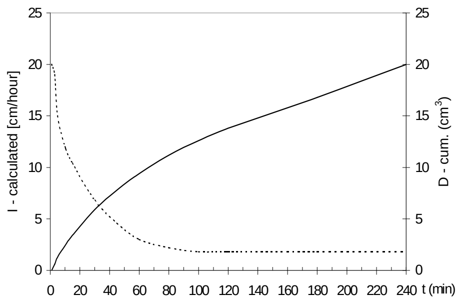
Unit infiltration curve (- - - - - -)
Cumulative infiltration curve (----------)

Wheat in the milk stage



Unit infiltration curve (- - - - - -)
Cumulative infiltration curve (----------)

Wheat in the waxy ripeness phenophase



Unit infiltration curve (- - - - - -)
Cumulative infiltration curve (----------)

Graph. 1. - Current and cumulative infiltration curve of Rigosol under wheat

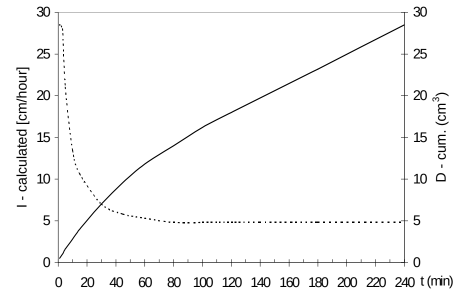
Moisture content in soil under maize

Based on data from Tab. 2 and Graph 4, it is evident that there is similar regularity between moisture content in Rigosol under maize and that under wheat as well as between the amount of precipitation – vertical profile – time of sampling.

Tab. 2. - Current soil moisture during 1995/96. in the maize growth period per phenophase and between phenophases

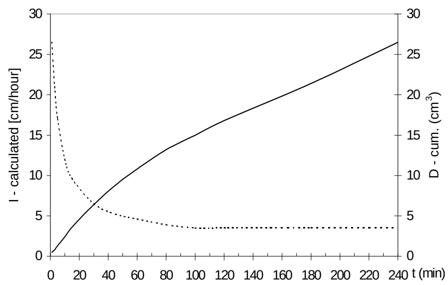
Date of sampling	Soil moisture content in % in layers from 0-50 cm					Average
	0-10 cm	10-20 cm	20-30 cm	30-40 cm	40-50 cm	
09 July	5.31	10.77	12.14	12.04	11.72	10.40
24 July	9.00	12.58	13.48	14.00	13.16	12.45
07 August	10.05	11.93	11.60	11.77	12.18	11.51
19 August	23.18	21.80	16.24	13.40	12.58	17.44
03 Sept.	22.21	22.47	22.12	21.15	19.65	21.52
16 Sept.	23.54	21.52	21.46	21.17	19.80	21,50
25 Sept.	20.77	20.41	20.63	21.26	21.29	20.87

Maize in the tasseling phenophase



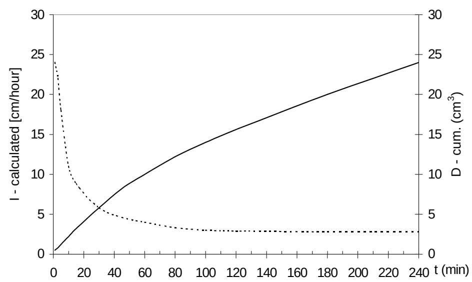
Unit infiltration curve (- - - - - -)
Cumulative infiltration curve (----------)

Maize in the kernel formation phenophase



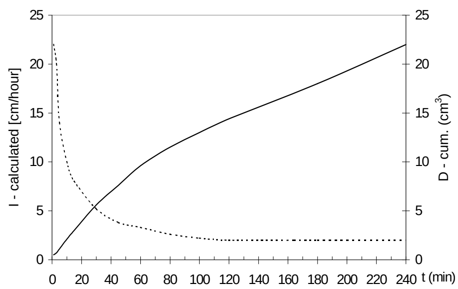
Unit infiltration curve (- - - - - -)
Cumulative infiltration curve (----------)

Maize in the milk stage



Unit infiltration curve (- - - - - -)
Cumulative infiltration curve (----------)

Maize in the waxy ripenes phenophase



Unit infiltration curve (- - - - - -)
Cumulative infiltration curve (----------)

Graph. 2. - Current and cumulative infiltration curve of Rigosol under maize

Graph 2 displays data on water infiltration rate and infiltration capacity of Rigosol under maize. Values for infiltration rate are highest in the first hour, declining abruptly throughout the rest of time taken for measurements.

According to ameliorative assessment of water infiltration into soil, as described by the mentioned classification, infiltration rate in Rigosol under maize in the first hour of measurements is close to satisfactory and good, but there is also danger of weak erosion.

Characteristics of moisture conservation in deep tillage Rigosol under wheat and maize

Characteristics of moisture content in deep tillage Rigosol under wheat and maize were determined only by the amount of precipitation because deep underground water did not produce any effects.

To gain insight into the characteristics of moisture conservation, certain criteria for observing moisture level had to be set.

First, moisture level was observed along vertical profiles from 0-10cm; 10-20cm; 20-30cm; 30-40cm; 40-50cm in both wheat and maize, depending on the length of time interval without rainfall relative to date of sampling and method of soil utilization.

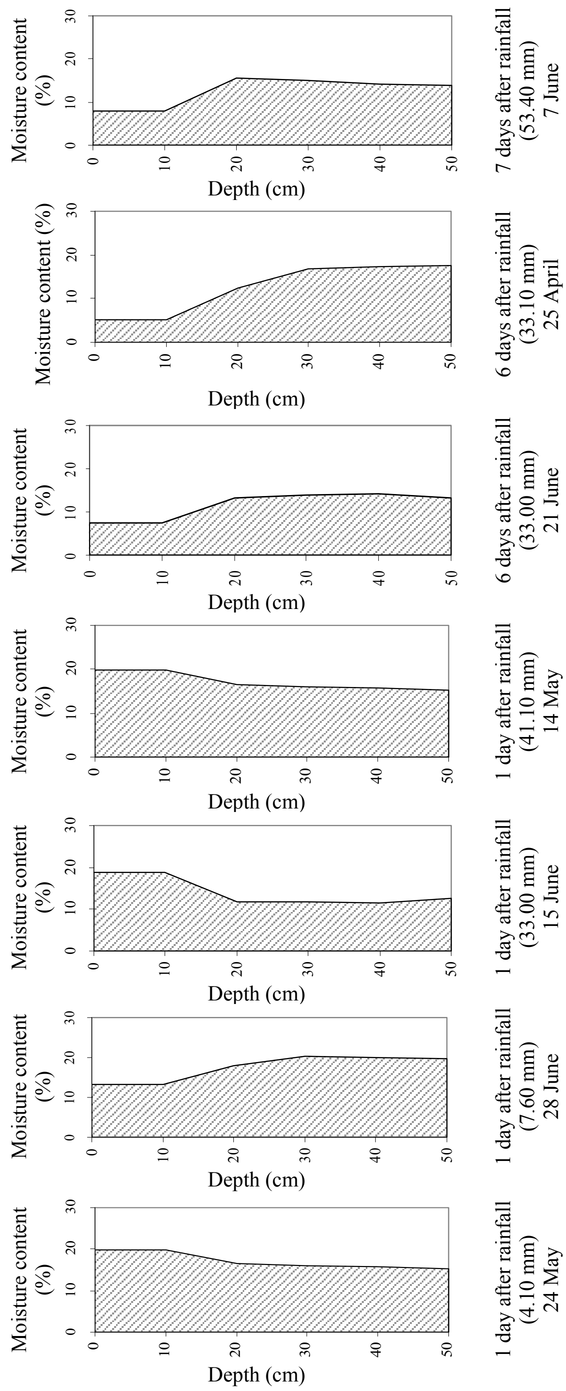
In wheat, time intervals without rainfall were one day, six, and seven days, but in a one-day variant four cases were analyzed, when up to 5 mm, 10 mm, 35 mm and 45 mm of rain fell. In a six-day variant two cases were subjected to analysis: in one case 33 mm of rain fell, while in another 33.10 mm. In a seven-day variant there was only one case with 53.40 mm of rainfall.

In maize, time intervals without rainfall were one day, two, six, and seven days. In a one-day variant four cases were considered, when up to 20 mm, 30 mm, 35 mm and 45 mm of rain fell. In other variants, one case was analyzed each, such as: in a two-day variant when 14.70 mm of rain fell, in a six-day variant when 7.60 mm of rain fell, and in a seven-day variant when 8.40 mm of rain fell.

Values for moisture conservation in wheat, in the first case of the first variant, when samples were collected one day after 4.10 mm rainfall, were as follows: 0-10cm 13.89%; 10-20cm 18.25%; 20-30cm 17.69%; 30-40cm 17.19%; 40-50cm 17.01%, which is explained by a small amount of rainfall the previous day and a large amount of rainfall (61.90mm) four days prior to the last rainfall that remained mainly at approx. 20 cm depth.

However, when 7.60 mm of rain fell, values were as follows: 0-10cm 13.35%; 10-20cm 18.05%; 20-30cm 20.19%; 30-40cm 19.93%; 40-50cm 19.56%, which is explained in the same way as in the previous case, except that water remained at the 20-30cm depth.

When samples were collected one day after a 33.00-mm rainfall, soil moisture had the following values: 0-10cm 18.88%; 10-20cm 11.87%; 20-30cm 11.73%; 30-40cm 11.51%; 40-50cm 12.56%. The data evidence that water remained in a surface soil layer. Also, the deeper the vertical profile, the lower the amount of water.



Graph. 3. - Profile curves of soil moisture for wheat during growth period per phenophase and between phenophases in 1995 and 1996

In samples taken one day after a 41.10-mm rainfall, soil moisture had values as follows: 0-10cm 19.93%; 10-20cm 16.50%; 20-30cm 16.05%; 30-40cm 15.75%; 40-50cm 15.17%. Percent of moisture declines with vertical profile, like in the third case, however, somewhat slightly because moisture content in deeper layers, influenced by heavy rain, increased to an extent.

Values for moisture conservation in the first case of the second variant, when samples were collected six days after a 33.00-mm rainfall, were as follows: 0-10cm 7.44%; 10-20cm 13.28%; 20-30cm 13.91%; 30-40cm 14.51%; 40-50 13.24%. Moisture content increases with vertical profile, because water has run off from surface into deeper layers.

In the second case, after 33.10 mm rain fell, values were as follows: 0-10cm 5.27%; 10-20cm 12.48%; 20-30cm 16.88%; 30-40cm 17.26%; 40-50cm 17.56%. Moisture content rises with vertical profile, due to water percolation into deeper layers after a large amount of rain has fallen.

In the third variant, when samples were collected seven days after a 53.40-mm, values for moisture content were: 0-10cm 7.94%; 10-20cm 15.61%; 20-30cm 15.07%; 30-40cm 14.06%; 40-50cm 13.87%. In this case too, moisture content rises with vertical profile, starting from 10cm, like in previous cases.

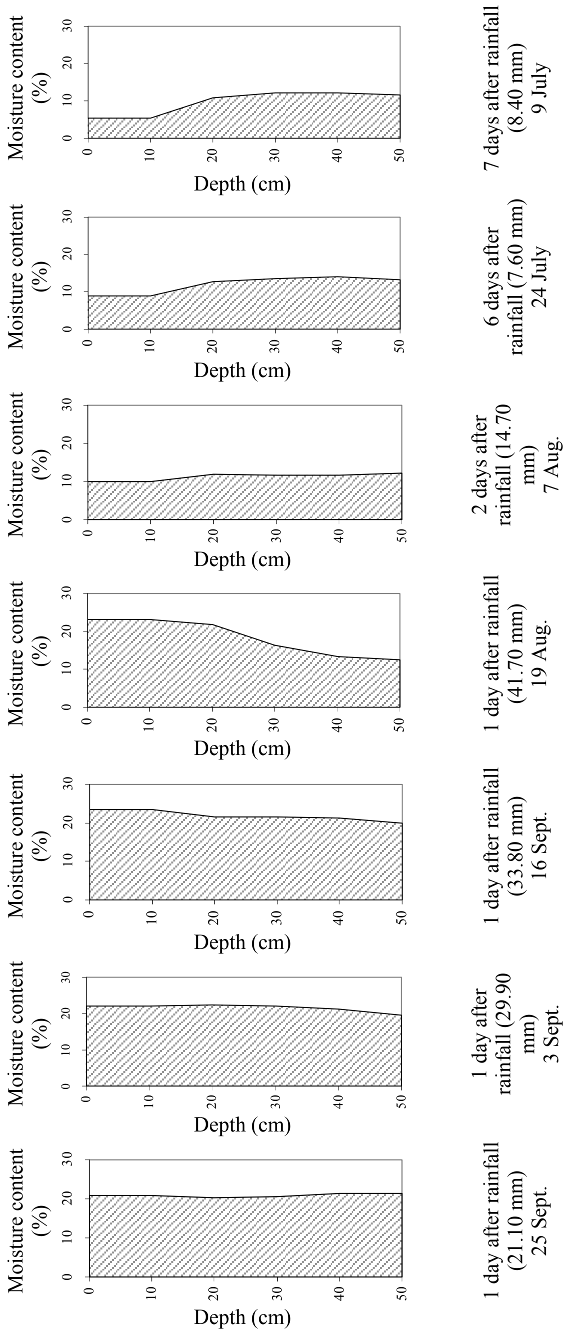
Values for moisture conservation in maize in the first case of the first variant, when samples were taken after a 21.10-mm rainfall, were as follows: 0-10cm 20.77%; 10-20cm 20.41%; 20-30cm 20.63%; 30-40cm 21.26%; 40-50cm 21.29%, which is fairly uniform.

After 29.90 mm of rain fell, values were as follows: 0-10cm 22.21%; 10-20cm 22.47%; 20-30cm 22.12%; 30-40cm 21.15%; 40-50cm 19.65%. Those data indicate a certain decrease in soil moisture content with vertical profile.

In samples collected one day after a 33.80-mm rainfall, soil moisture had values, such as: 0-10cm 23.54%; 10-20cm 21.52%; 20-30cm 21.46%; 30-40cm 21.17%; 40-50cm 19.80%. Those data evidence that moisture content is uniform in vertical profiles from 10-40cm, but it is lower than in a surface layer from 0-10cm.

After a 41.70-mm rainfall, values for moisture content were: 0-10cm 23.18%; 10-20cm 21.80%; 20-30cm 16.24%; 30-40cm 13.40%; 40-50cm 12.58%. Moisture content in the first two layers is fairly uniform, but declines abruptly in the next three layers, which is explained by the intensity of rainfall and infiltration, primarily a longer period of time without rainfall (10 days0.

Values for moisture conservation in the second variant, when samples were taken two days after a 14.70-mm rainfall, were as follows: 0-10cm 10.05%; 10-20cm 11.93%; 20-30cm 11.60%; 30-40cm 11.77%; 40-50cm 12.18%. Moisture content increases with vertical profile, because it took two days for water to percolate from surface into deeper layers.



Graph. 4. - Profile curves of soil moisture for maize during growth period per phenophase and between phenophases in 1995 and 1996

In the third variant, when samples were taken six days after a 7.70-mm rainfall, values for moisture content were: 0-10cm 9.00%; 10-20cm 12.58%; 20-30cm 13.48%; 30-40cm 14.00%; 40-50cm 13.16%. In this variant too, soil moisture content was lowest in a surface layer, where water percolated from into deeper layers, while a portion of moisture has evaporated.

In the fourth variant, when samples were collected seven days after a 8.40-mm rainfall, values for moisture content were: 0-10cm 5.31%; 10-20cm 10.77%; 20-30cm 12.14%; 30-40cm 12.04%; 40-50cm 11.72%. Moisture content in a surface soil is considerably lower than in deeper layers, by over 50%, which is explained by a small amount of rainfall and relatively long dry period prior to rainfall.

Conclusion

The results indicate that moisture conservation takes place mainly at the depth greater than 10 cm i.e. at the 10-30cm depth. In this zone, the largest part of the grown crops' root system is found.

During time periods without rainfall, not longer than seven days, there is sufficient conserved moisture so that the drought problem is overcome, which makes possible for plants to normally develop the next phenophase.

Soil tillage at the 25cm depth produced favorable effects on the water infiltration process, concerning both intensity of infiltration and infiltration capacity in wheat as well as in maize.

Infiltration rate also depended on the stage of growth of both wheat and maize, so that the highest intensity of infiltration rate under wheat was in the heading-flowering phenophase and that under maize in the kernel formation phenophase.

As for moisture conservation, along the entire vertical profile, Rigosol is more favorable for plant growing than parent soil that Rigosol was formed from, provided timely cultural practices are applied.

REFERENCES

1. Adam, M. (1981): Tla središnjeg dijela sekcije. Poljoprivredni fakultet. Novi grad 4. Osjek.
2. Астапов, С. В. (1958): Мелиоративное почвоведение (практикум). Москва
3. Drezgić, M., Živković, B., Dragović, S., Jocić, S. (1972): Rezultati proučavanja uzajamnog dejstva dubine obrade i đubrenje na prinos kukuruza i fizičke osobine zemljišta u uslovima sa navodnjavanjem i bez navodnjavanja. Zemljište i biljka. Vol. 21. No. 3. Beograd.
4. Grupa autora (1966): Priručnik za ispitivanje zemljišta. Knjiga I: Hemijske metode ispitivanja zemljišta. JDPZ. Beograd.

5. Grupa autora (1971): Priručnik za ispitivanje zemljišta. Knjiga V: Metode istraživanja fizičkih svojstava zemljišta. JDPZ. Beograd.
6. Grupa autora (1997): Metode istraživanja i određivanja fizičkih svojstava zemljišta. Monografija JDPZ. Novi Sad.
7. Jevtić, S. (1992): Posebno ratarstvo. Nauka. Beograd.
8. Konstantinović, J. (1992): Agrotehnička analiza sistema konzervacione obrade zemljišta za pšenicu. "Savremena poljoprivreda" Zbornik radova XL, br.6. Novi Sad.
9. Kovačević , D. (2003): Opšte ratarstvo. Poljoprivredni fakultet. Beograd.
10. Molnar, I., Stevanović, M., Belić, B., Džilitov, S. (1981): Promene nekih fizičkih osobina černozema u zavisnosti od sistema iskorišćavanje zemljišta. Zemljište i biljka. Vol. 30. No. 2. Beograd.
11. Pejković, M. (1972): Praktikum iz fizike zemljišta (skripta). Poljoprivredni fakultet. Beograd.
12. Rudić, D. et al. (1983): Uticaj rastresanja na neke vodne i fizičke osobine pseudoglejnih zemljišta. Zemljište i biljka, Vol. 32. No. 2. Beograd.
13. Spalević, B. (1994): Konzervacija zemljišta i voda na području Vučja-Igrište. Monografija "Uzroci i posledice erozije zemljišta i mogućnosti kontrole erozionih procesa. Šumarski fakulteta Beograd. Beograd
14. Spalević, B.; Popović, V.; Ivanović, S.; Šekularac, G.; Ivanović Saša (1995): Značaj popravke fizičkih osobina zemljišta sa gledišta njegove konzervacije. Savetovanje o kiselim zemljištima. Recenzirano u štampi. Paraćin.
15. Todorović, J., Božić, D. (1995): Opšte ratarstvo.Poljoprivredni fakultet, Banja Luka. Poljoprivredni fakultet, Beograd. Banja Luka. Beograd.
16. Živković, M. (1991): Pedologija. Prva knjiga. Poljoprivredni fakultet. Beograd.

Received September 20, 2005
Accepted November 15, 2005

KONZERVACIJA VLAGE U ZEMLJIŠTU TIPA RIGOSOL POD PŠENICOM I KUKURUZOM PRI DUBOKOJ OBRADI

Angelina Tapanarova[1]

Rezime

U ovom radu predmet istraživanja bio je proučavanje stepena vlažnosti posle svake kiše i utvrđivanje stepena konzervacije vlage u zemljištu. Stepen konzervacije vlage zavisio je od načina korišćenja zemljišta, pa u ovom radu proučavanja su se odnosila na konzervaciju vlage u zemljištu tipa Rigosol koji se

[1] Mr Angelina Tapanarova, Poljoprivredni fakultet, Nemanjina 6, 11081 Beograd-Zemun, Srbija i Crna Gora

Rad je skraćena verzija magistarske teze odbranjene 31.03.2005. godine na Poljoprivrednom fakultetu u Beogradu-Zemunu, pred komisijom u sastavu: prof. dr Batrić Spalević, prof. dr Dušan Kovačević i dr Gordana Šekularac.

koristio za gajenje ratarskih useva, odnosno za gajenje pšenice i kukuruza u pojedinim fenofazama, a u uslovima duboke obrade. Proučeni Rigosol obrazovan je rigolovanjem erodirane gajnjače.

Istraživanja su obavljena na oglednom dobru “Radmilovac” Poljoprivrednog fakulteta u Beogradu.

Posle svake kiše došlo je do procesa infiltracije, svakako različitim intenzitetom, što je zavisilo od karakteristika zemljišta i od fenofaza porasta biljaka. Jedan deo padavina zadržavao na površinskom (orničnom) delu, a drugi deo padavina, sa površina koje su nagnute, otekao je niz padinu, što je zavisilo od intenziteta padavina i brzine infiltracije.

Istraživanjima su obuhvaćena dva najvažnija parametra konzervacije zemljišta i to: infiltracija i sadržaj vlage u zemljištu.

Istraživanja su vršena u najznačajnijim fenološkim fazama porasta useva kada je gajenim biljkama najpotrebnija vlaga u zemljištu pri formiranju, nalivanju i sazrevanju zrna i to: kod pšenice u fenofazama klasanja–cvetanja, formiranja zrna, mlečne i voštane zrelosti, a kod kukuruza u fenofazama metličenja-cvetanja, formiranja zrna, mlečne i voštane zrelosti.

Kod pšenice, kao i kod kukuruza, vlažnost zemljišta po dubini profila uglavnom je bila zadovoljavajuća za biljke, jer su najveće vrednosti vlage bile u zoni korenovog sistema na dubini od 10 do 30 cm, što je veoma povoljno uticalo na njihovo razviće i prinos zrna.

Rezultati istraživanja su pokazali da je u svim ispitivanim varijantama, u pogledu konzervacije vlage, po celoj dubini profila, Rigosol povoljniji za gajenje biljaka od prethodnog–matičnog tipa zemljišta, od kojeg je Rigosol obrazovan, pod uslovom da se agrotehničke mere pravovremeno primenjuju.

Primljeno 20. septembra 2005.
Odobreno 15. novembra 2005.