ISSN: 0975-8585

Research Journal of Pharmaceutical, Biological and Chemical Sciences

Changing In Ammonifiers of Virgin Land and Black-Earth Ploughland to Central Ciscaucasia.

Valery Sergeevich Tskhovrebov*, Vera Ivanovna Faizova, Alexander Nikolaevich Mar'in, Andrey Anatolievich Novikov, and Anastasia Mikhailovna Nikiforova

Stavropol State Agrarian University, Zootekhnicheskiy lane 12, Stavropol 355017, Russia.

ABSTRACT

The article presents results of year's research, associated with the study of seasonal dynamics one of main physiological groups of microorganism's ammonifiers, in different subtypes black-earth soils of Central Ciscaucasia.

Keywords: Central Ciscaucasia, ammonifiers, black-earth soils, virgin land, wheat.

Corresponding author

ISSN: 0975-8585

INTRODUCTION

Ammonifiers are saprophytic soil microflora, which supports their livelihoods by mineralization of proteins [3, 4]. Agricultural use of soils leads to change the number of ammonifiers. It is accumulation ammonium and sulphate, and ensuring the whole cycle of nitrogen into soil through relationship with nitrifying microflora [2]. Their activity is possible in wide range conditions of temperature, humidity, acidity and aeration to soil, so the process is had evaluated as a universal [1].

MATERIALS AND METHODS

The object our research are main subtypes black-earth soils of Central Ciscaucasia: southern, ordinary, leached (formed on loess loam), alkaline and alkaline-fused (aluvia formed in the Maikop clays of marine Genesis) paired sections of virgin land and arable land.

The selection soil samples and laboratory studies were conducting in the seasonal dynamics by main vegetation phases of winter wheat: autumn, spring tillering, booting, flowering, milk ripeness, after the harvest of crops. In the virgin land of research were carrying out at the same time as plowing. Virgin vegetation is had represented by forb-grass associations in the arable land was sown winter wheat.

Samples were collecting from rhizosphere zone of plants on virgin soil layer 0-8 cm, in crops of winter wheat from the layer 0-20 cm according to the standard technique. The number of ammonifiers were determining by selective nutrient medium MPA, followed by direct counting of colonies [5].

RESULTS AND DISCUSSION

Analyze data of seasonal dynamics number of ammonifiers revealed that on the southern black soil in the virgin lands, this value varies only slightly during the season (Figure 1).

There has been an increase in the number of studied groups of microorganisms in the late spring, summer, warm and humid periods. The minimum values correspond to early-spring and post-harvest periods. In the spring phase of tillering is due to low temperatures, and in the post-harvest period of recurrent drought. On arable land observed changes in the number of microorganisms in the seasonal dynamics. The minimum values below, and the maximum is significantly superior to virgin's land. A similar pattern is had observed on black-earth soils ordinary and leached.

On the solonetzic black-earth soils on virgin soil, in contrast to other subtypes of black-earth soils, there is an increase in the number of microorganisms from the beginning to the end of the growing season. The difference in extreme values is less significant and is 3.1 times. On arable, the highest number of organisms observed in the flowering stage, as in other subtypes of black-earth soils.

In saline-drained black soil is no significant difference between virgin and arable land are not hadobserved. This may be due to a depression of the soil microflora due to unfavorable physical properties of the black-earth soils, formed on alluvia marine sediments.

When comparing average values number of ammonifiers, during the growing season according to years of research under winter wheat (Figure 2) revealed that on southern black soil, their contents in arable land are higher than on virginland of soil. The greatest difference was observing in years that are more favorable. Therefore, on 2006 and 2010 this increase amounted, respectively, to 46.2 and 23.7 million CFU/1G. In 2012, on the contrary, the number of ammonifiers on arable land is significantly lower than in the virgin lands and the difference was 2.4 times. This year was marking by unfavorable moisture conditions, which was the reason for the decline of this group of microorganisms on arable land compared with the virgin land.

On the ordinary black soil carbonate in all years of studies, the number ammonifiers on arable land were higher than similar values for the snow in average 1.2 times, also due to the weather features of the year.

A similar trend was observing in the usual and ordinary leachedblack soil.

ISSN: 0975-8585

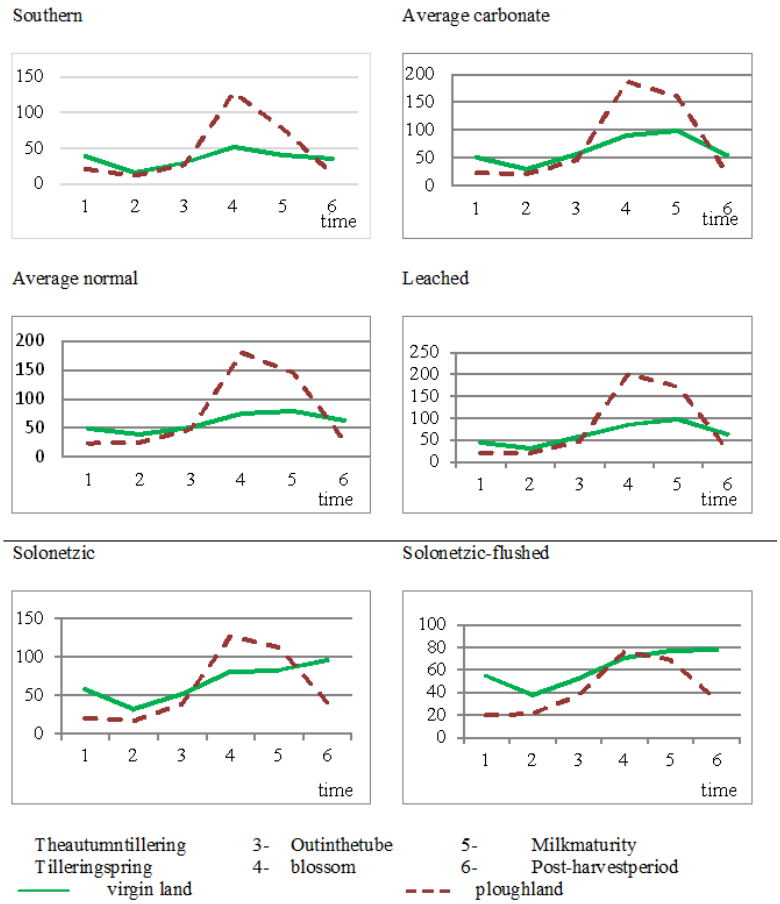

Figure 1: Seasonal dynamics number of ammonifiers to different subtypes black-earth by average over phases of growing season in years of research, million CFU/1G

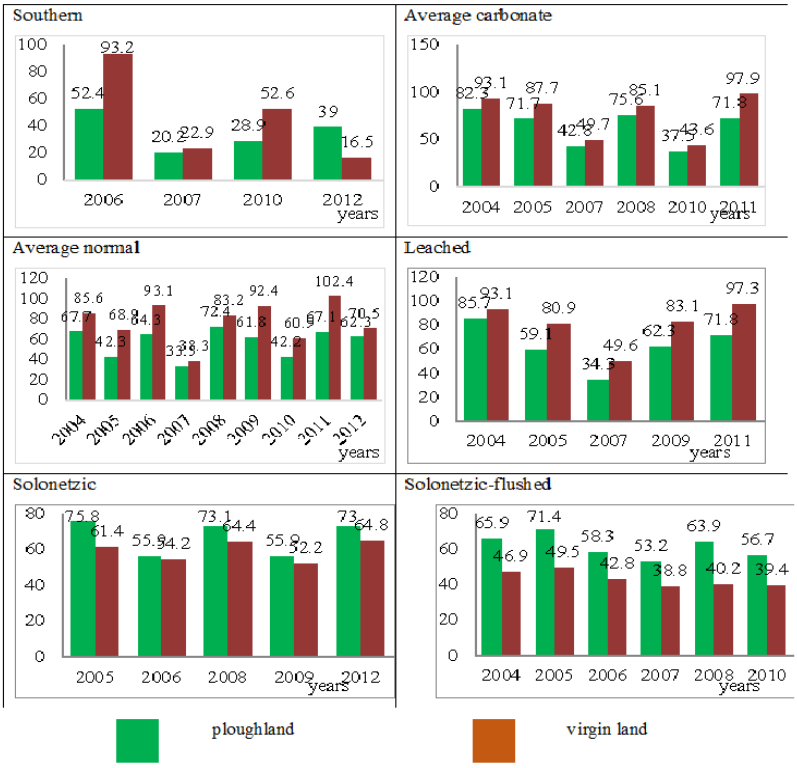

Figure 2: Average during the growing season, the number of ammonifiers in different subtypes of black soil, million CFU/1G

On black soil and solonetzic the merged picture changes dramatically. The number of ammonifiers on virgin land soil in all years exceeds the value of plowing.

In our opinion, this is due to two reasons: first, with the negative physical properties of these soils; second, a lower biomass of cultivated plants on them compared with other subtypes of black soil. Reductions in the biomass of plants ensures a reduction in the secretory activity of the root system, which has an impact on the number of this group of microorganisms.

CONCLUSION

Thus, the number of ammonifiers has seasonal dynamics in different subtypes black soil of Central Ciscaucasia – value is relatively stable. Plowing revealed significant seasonal changes in the studied indicator, timed to the phase of development for winter wheat. The greatest numbers ammonitella microflora had black soil, formed on loess-like loam and the lowest values – soils formed in the Maikop clays alluvia marine Genesis.

REFERENCES

[1] Pospelova O.A., Mandra Y.A., Stepanenko E.E., Okrut S.V., Zelenskaya T.G. Identification of technogenic disturbances of urban ecosystems using the methods of bioindication and biotesting // Biosciences Biotechnology Research Asia. Volume 12, Issue 3, December 2015, Pages 2241–2251.

[2] Agrochemical Principles of Targetting Winter Wheat Yield on Leached Chernozem of the Stavropol Elevation / A.N. Esaulko, M.S. Sigida, E.A. Salenko, S.A. Korostylev, E.V. Golosnoy // Biosciences Biotechnology Researhc Asia, April, 2015, Vol.12(1), P. 301-309.

[3] Effect of Increasing Doses of Mineral Fertilizers on Development of Root Rot Pathogen Fusarium in Crops Winter Wheat / A.N. Esaulko, E.A. Salenko, M.S. Sigida, E.V. Golosnoy, A.Yu. Gurueva // Research Journal of Pharmaceutical, Biological and Chemical Sciences May – June 2016, № 7(3). – P. 2574-2577.

[4] Dokuchaev, V.V. Selected works:. V 3 t / VV. Dokuchaev // M .: Publisher agricultural. Literature 1949.

[5] Methods of Soil Microbiology and Biochemistry / Ed. D.G. Zvyagintsev. M .: Univ. University Press, 1991.- 304 p.