The Effect of Crop Rotation On Soil Essentials Elements

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Abstract- Usually short turnover of our country's soil and climatic conditions and crop rotations, type of crop, there are few deficiencies. Therefore, soil and climate conditions change and warming to ongoing the dispensation extend substitutions, diversification of crop.

Evaluating crop rotation in the environmental and climate change have intensified agroecologically sensitive conditions central agricultural area production of grain, studied the major nutrient elements based on a long-term resident survey in the brown soil.

The correlation between soil total carbon and total nitrogen r = 0.92 deep plow soil (0-20 cm), r = 0.63 subsoil deep (20-40 cm) or is strong and moderately dependence. Accordingly, crop rotation it looks evaluating to be possibly the major elements of the soil.

Index Terms- carbon, nitrogen, crop, fallow, wheat

I. INTRODUCTION

Farming has drawn special attention in the cropped framing scientific study of crop rotation. Crop rotation is many fields growing fallow and crop space and time. Crop rotation in the additionally incurring of soil physical, chemical, and biological properties, special effects to crops that became definite. Usually a short turnover of our country's soil and climatic conditions and crop rotations, type of crop, there are few deficiencies. Therefore, soil and climate conditions change and warming to ongoing the dispensation extend substitutions, diversification of crop.

The aim of the study will be evaluating crop rotation in the environmental and climate change have intensified agroecologically sensitive conditions central agricultural area production of grain, studied the major nutrient elements based on a long-term resident survey in the brown soil.

Purposes

- The influence of crop rotation into soil nutrient contents of the resident research field
- Comparison between crop rotation versions

II. MATERIALS AND METHODS

Location: “NART” Research, Training and Production Center, MULS, Bornuur Sum, Tov Aimag (N48°41′ E 106°15′). The annual mean precipitation at Nart is 160-235 mm with a mean annual maximum temperature of 18°C. The experimental plots at Nart were located on Mollisol and Kastanozem soil. These soil series consist of dark-brown colored, low deep soils with a slope of <2%, developed in loess 1.5 to 2 m thick over till under prairie vegetation. Soil pH(H_2O) 7.0～7.6, soil electrical conductivity 0.06～0.14 dS m^{-1}, Max. Water Holding Capacity 44～55%(W/W), Bulk density (0-20cm) 1.14～1.35 g cm^{-3}, Total corban (Plow layer) 15～20 g kg^{-1}, total nitrogen (Plow layer) 1.6～2.0 g kg^{-1}, Available Nitrogen (Plow layer) 60～80 mg kg^{-1} (Toriyama, K. Davaa, L. Solongo, G. Yamasaki, S.). Soils were sampled in May and September 2016 at the Nart site, this followed at least six full cycles of the 3-yr rotation at both sites. At the Nart site, three soil cores with 3.1 cm diam. were taken with a hand-held split-core sampler in each subplot. Samples were cut in the field at depths of 0 to 20 cm, 20 to 40 cm, and stored in plastic bags in a refrigerator.

Field experiment variants were:

- Wheat with fallow- (fallow-wheat-wheat)
- Wheat cont.14 yrs- Wheat cropped for 14 years
- Rotation A -potato-oat/barley-fallow-wheat
- Rotation B - corn- barley/oat- potato-wheat

- Rotation C -millet- green manure-potato-wheat
- Rotation D- oat-mustard-potato- wheat

Soil total carbon (TC), total nitrogen (TN) and available nitrogen (Av.N) were analyzed for top soil (0-20cm) and sub soil (20-40cm).

Laboratory research methods:

- Total carbon and nitrogen of combustion method by Sumigraph NC-830 ^{0}C
- Available nitrogen of incubation with upland moisture (ca. 20% W/W) after 10 weeks at 30 ℃ inorganic N was determined

III. STUDY RESULTS

Crop rotation is to keep the quality of the soil organic matter. Effect rotations, crop rotation, and planted farming system, depending on the type of soil organic matter content are kept stable.

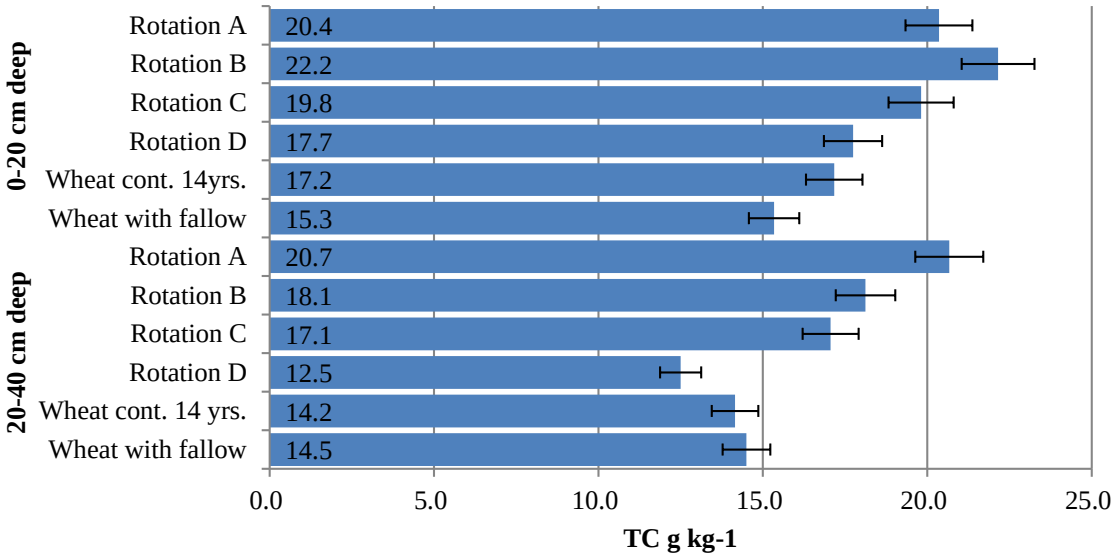

Figure 1. Effect of crop rotation on soil total carbon

Soil carbon in the 0-20 cm depth experience in rotation B version most more or other versions was more 1.8-6.9 g kg-1, wheat with fallow version minimum or other versions of 1.9-6.9 g kg-1 lower. Conspicuously to the total carbon in the 0-20 cm depth of soil concentrations rotations in planted types has shown that while many more.

However, amount of the total carbon to a depth of 20-40 cm in rotation A most more or other versions were more 2.6- 8.2 g kg-1, rotation D version minimum or other versions of 1.7-8.2 g kg-1 lower. Crop rotations in the mustard version of the low accumulation of organic carbon content are related to lower leaves.

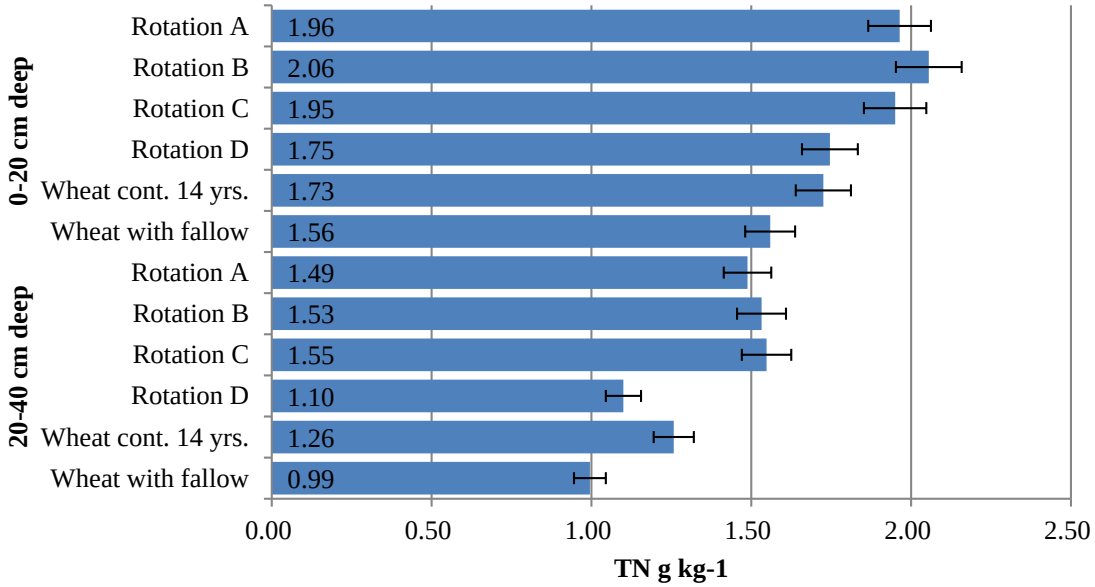

Figure 2. Effect of crop rotation on soil total nitrogen

This table has been showing that soil total nitrogen was more 0.1-1.07 g kg^{-1} rotation B (corn- barley/oat-potato-wheat) version than other versions. It is a crop rotation version leave the green mass and cultivation is related to specifics the soil.

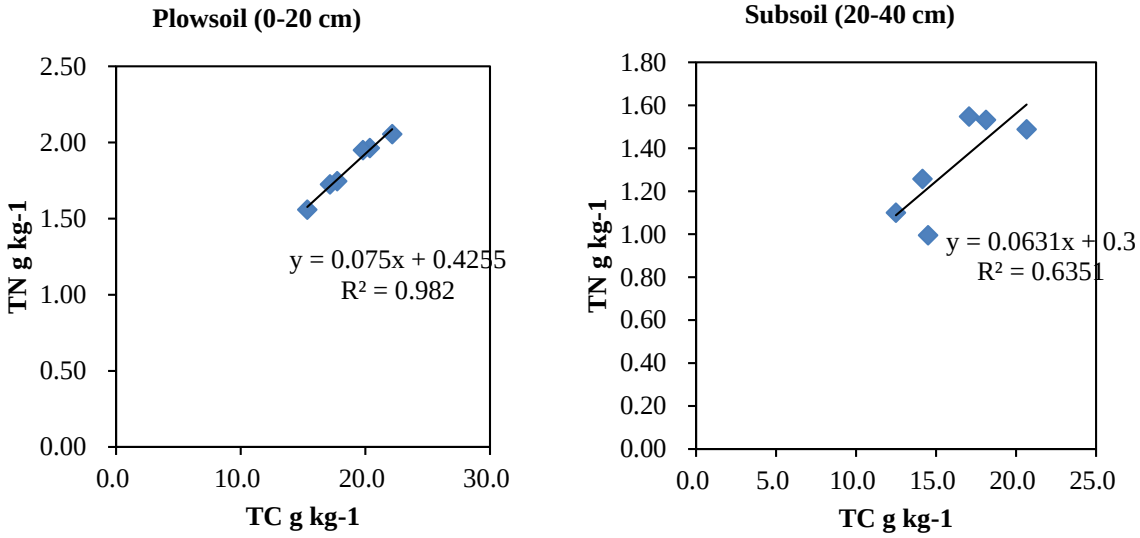

Figure 3. Correlation between soil total carbon and total nitrogen

The correlation between soil total carbon and total nitrogen r = 0.95 deep plow soil (0-20 cm), r = 0.79 subsoil deep (20-40 cm) or is strong and moderately dependence. Accordingly, crop rotation it looks evaluating to be possibly the major elements of the soil.

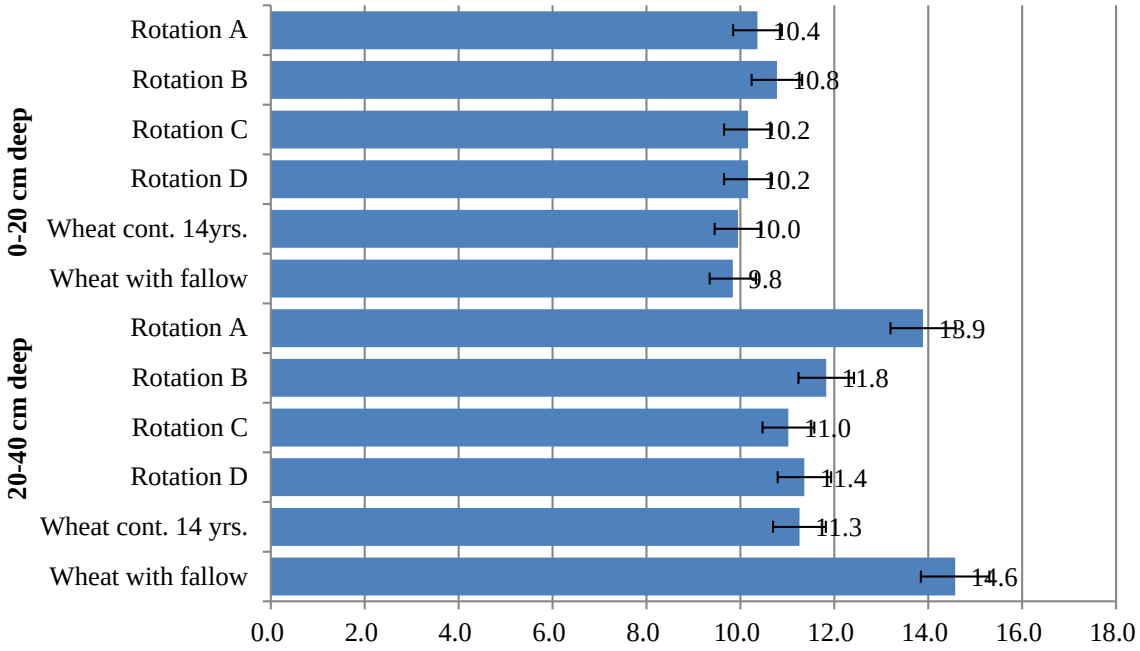

Figure 4. Soil carbon and nitrogen ratio

Total carbon and nitrogen ratio rotation B the highest C: N = 10.8 in the 0-20 cm depth. Experience, which shows that the total area of mineralization appears to have been low. Total carbon and nitrogen ratio wheat with fallow the highest C: N = 14.6 in the 20-40 cm depth. Subsoil at wheat with a fallow version of the C: N ratio is plowed fallow explain the link to the rotation.

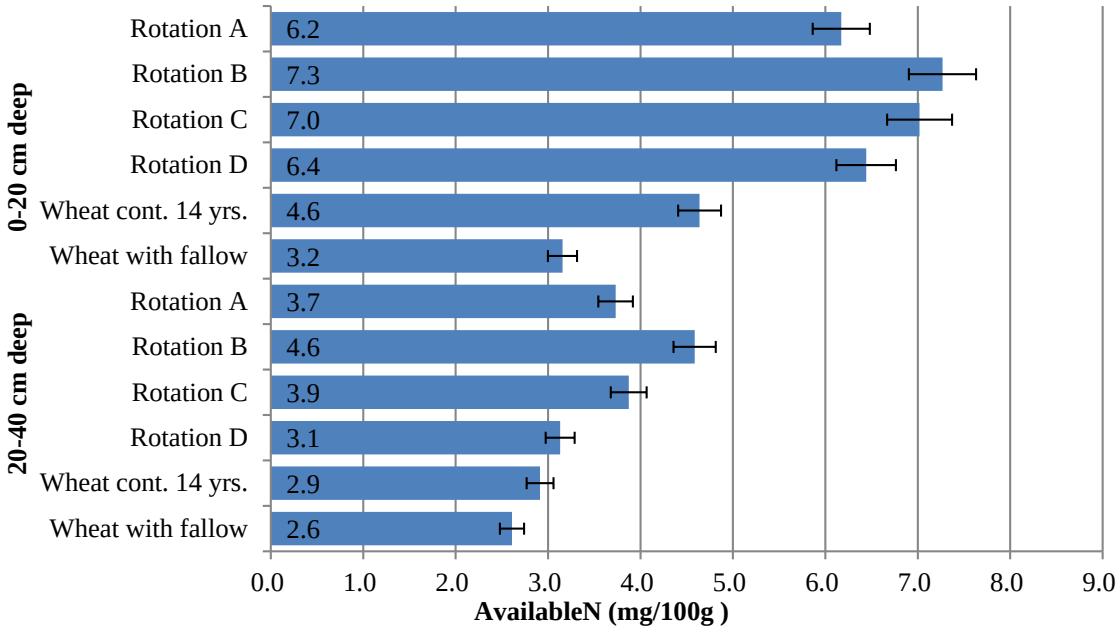

Figure 5. Effect of crop rotation on soil available nitrogen

Soil available nitrogen contents in the plowed soil were 7.3 mg in 100gr dry soil is the maximum of rotation B but was 3.2 mg in 100 gr dry soil is the minimum of wheat with fallow version. Soil available nitrogen contents in the subsoil were 4.6 mg in 100 gr dry

soil is the maximum of rotation B version but was 2.6 mg in 100 gr dry soil is the minimum of wheat with fallow. Accordingly, if the soil is available nitrogen at a plow soil ongoing tends to be subsoil than ever mineralization of the soil (r = 0.73).

IV. CONCLUSION

According to the results of our study

Rotation versions the rotation B (C=22.2 g kg-1, N=2.06 g kg-1, Av.N=7.3 mg 100gr-1) version of the best performance, crop rotational agricultural technology and economically need to add the important sown.

Under wheat production system, fallow system might enhance the decrease trend of soil fertility.

At the end of the evaluation of is showing that there is a need to increase the number of rotations in sown

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