Change in Soil NH_4^+-N and NO_3^- under Different Land Use Types in the Longzhong Part of Loess Plateau

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Key words : NH_4^+—N , NO_3^-—N , different land use types , Loess plateau

Introduction Nitrogen is a limiting element for plant growth in many ecosystems . Inorganic N (NH_4^+-N and NO_3^--N) , in soil is the primary N pool available for plants . The availability of these different N forms can change depending on types of land use (Antonio Gallardo et al , 2005) . The purpose of this study was to research the effect of different land use types on soil N .

Materials and methods This study was conducted at the Semi-Arid Climate and Environment Observatory of Lanzhou University (35°57′N , 104°09′E) . Elevation is 1966 m , which means annual air temperature is 6 .7℃ and means annual precipitation is about 382 mm . Soil type is Sierozem , Four sites [fenced grassland (FG) , grazing grasslands (GG) , millet field (MF) and fallow cropland (FC)] , each 1 hm^2 and adjacent to one another , were selected for the study . Three sample plots (50×50 m^2) were randomly located within each site . In May 2007 , ten soil samples at five soil depths (0—60cm) were taken in each plot using soil cores and each five soil samples from same depth were mixed together . The fresh soil sample passed through 2 mm sieve prior to analysis . Data were analyzed using General ANOVA model .

Results Soil NH_4^+-N content at the same soil layer did not differ significantly between different study sites . Soil NH_4^+-N content within a site did not differ significantly between soil layers in May and July(Figure 1) . The content of NH_4^+-N was significantly higher in May compared to that of July ($p<0.05$) (Figure 1) Soil NO_3^--N content was ranked according to MF > FC > GG ≥ FG ($p<0.05$) ,There were some differences between May and July . In May , soil NO_3^--N content of the four study sites were highest in 0-10 cm soil layer and decreased with soil depth . In July , the trend of soil NO_3^--N content of two grassland was same as that of May along the soil profile . While farmland appeared inflexion in the 10-20 cm layer , the trends of them were to reduce then increase . The highest point of MF was in 40-60 cm , and of FC , was in 30-40 cm (Figure 2) .

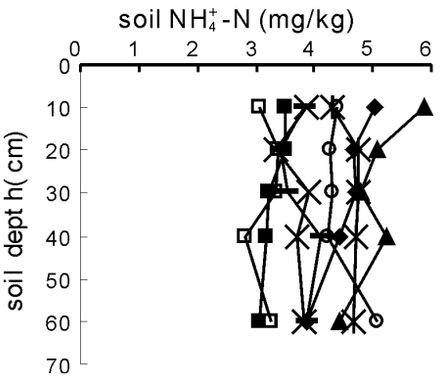

Figure 1 *Soil NH_4^+-N content*

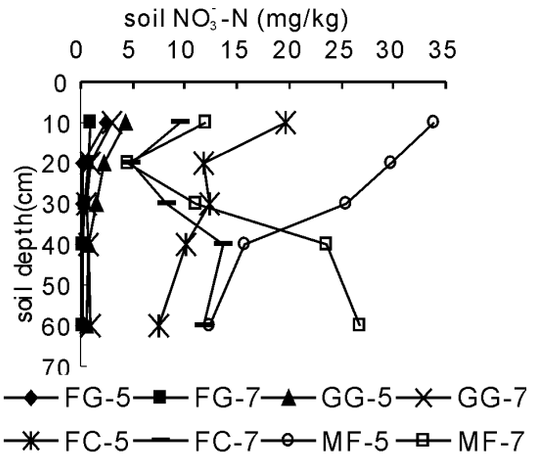

Figure 2 *Soil NO_3^--N content*

Conclusions In the Loess plateau , because of alkaline soil , soil NH_4^+-N content was not significantly differenent . Soil NO_3^--N content was imported for plant growth . Soil NO_3^--N content was different between May and July between farmland plot . Soil NO_3^--N content decreased with soil depth in May , while NO_3^--N content tended to increase in July . Cultivation destroys soil physical structure . In July 2007 , because a great deal of rainfall , soil NO_3^--N content was leached to the deeper soil layers . Compared to farmland , grassland has more cover and root biomass which aides in reducing soil N loss .

References

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