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Long-term soil nitrogen and carbon change in semi steppe rangelands of golestan national park , Iran

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Key words : enclosure ,long term grazing ,Ah horizon ,rooting depth ,soil color .

Introduction Livestock exclusion induced great changes in the modifications in nutrient cycling of rangelands .The purpose of this study was to study effect of long-term enclosure (46 years) on change of soil Carbon ,Nitrogen and color in Ah (= A₁) (Dormar and Willms ,1998) horizon and rooting depth (Frank et al .1995) of rangeland plants .

Materials and methods Study area located in the semi steppe rangeland of Golestan National Park in North Khorasan Province of Iran .We sampled 3 heavily grazed by sheep and goat and 3 adjacent enclosures ungrazed by livestock for 46 years .Soil sampled from Ah (15 .11 cm average thickness in ungrazed and 9 .94 cm average thickness in heavily grazed) and rooting depth (58 .11 cm average depth in ungrazed and 47 .55 cm average depth in heavily grazed) .

Results and discussion Long-term enclosure increased Ah horizon thickness and rooting depth compared to heavy grazing (P< 0 .01) also had a significant effect on the N and C concentrations in the Ah soil horizon (P< 0 .01) .In the rooting depth is not seen difference in C concentration between two areas also N concentration in soils sampled null in two areas .Long-term enclosure influenced changes in soil color of Ah horizon from 10YR^{5/4} (yellowish brown)-10YR^{4/3} (dark yellowish brown) in ungrazed to 10YR^{6/4} (light yellowish brown)-10YR^{5/4} (yellowish brown) in grazed .In the rooting depth is not seen significant difference in soil color between two areas .

Conclusions 46 years of long-term enclosure had measurable effect on N and C concentrations in the Ah horizon as compared with grazed areas .These results is supported by Frank et al .(1995) and Reeder et al .(2004) but differ from Berg et al .(1997) who reported long-term enclosure had no measurable effect on C and N concentration in the surface 5-cm of soil .Changes in soil color of Ah horizon can be attributed to either decreased organic matter input into the Ah horizon or the upper part of the B horizon slowly being incorporated into the Ah horizon due to erosional loss of Ah horizon soil or both (Dormar and Willms , 1998) .The Significant differences occurred in Ah horizon .

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