

Noppadon Prayunsuk 2008: A Comparison on Potential of Forage Crops Growing Soils in Khorat Basin. Master of Science (Soil Science), Major Field: Soil Science, Department of Soil Science. Thesis Advisor: Professor Irb Kheoruenromne, Ph.D. 163 pages.

A study to compare potential of forage crops growing soils in Khorat Basin was carried out on representative soils in 6 areas. Method of study included pedon analyses of soils in the selected areas, laboratory analyses of soil samples on their physical, chemical and mineralogy properties, micromorphological characteristics, fertility assessment, fertility capability and suitability assessment of forage crops growing soils.

Soils in the study area include Kandistult, Endoaqualf, Paleustalf and Paleudult. They are moderately deep to very deep soils. The soils have developed on alluvium and wash over residuum derived from clastic sedimentary rocks, and residuum derived from weathered clastic sedimentary rocks. Their land surfaces are undulating. All soils have clay coatings on pore walls and clay accumulation in subsoils. They are moderately to well developed. These soils generally have clayey to sandy textures and their bulk density ranges from moderately to very high ($1.41-2.15 \text{ Mg m}^{-3}$). Their saturated hydraulic conductivity ranges from slow to rapid ($0.30-16.19 \text{ cm hr}^{-1}$). Chemical analyses of soils indicate their extremely acid to strongly alkaline conditions (pH 4.0-8.8). They have very low to medium organic matter content ($0.29-23.60 \text{ g kg}^{-1}$), very low to low total nitrogen ($0.03-1.67 \text{ g kg}^{-1}$), very low to high available phosphorus ($0.3-24.6 \text{ mg kg}^{-1}$) and very low to very high available potassium ($3.5-148.0 \text{ mg kg}^{-1}$). The soils have very low to very high cations exchange capacity ($0.50-35.06 \text{ cmol kg}^{-1}$). Their total extractable bases are low to medium ($0.33-38.81 \text{ cmol kg}^{-1}$), and their extractable acidity varies from low to very high ($1.00-22.54 \text{ cmol kg}^{-1}$). Their base saturation percentage ranges from low to high (3.44-88.81 %) and electrical conductivity values are generally low ($0.01-1.99 \text{ dS m}^{-1}$). The major mineral in clay fraction of most soils is kaolinite and vermiculite and their silt fraction is clearly dominated by quartz.

Fertility assessment results indicate that most of these forage crops growing soils have low fertility except for one area that the soil has medium fertility status. Their potential based on fertility capability indicates fertility capacity that include Ldeak, Chk, Ldekb, Leak, SLeak, and Sehk units. Their potential based on suitability rating indicates well that three of them are moderately suited and other three of them are marginally suited for forage crop growing. Their moisture availability, oxygen availability, nutrient retention capacity and nutrient availability are the major limitations for forage crop growing. The suitable soil management for these soils needs to emphasize soil moisture and organic matter conservation management, the selection of forage crop type and the use of mixed legume-grass pasture system.

Student's signature

Thesis Advisor's signature