m layers. The maize no-tillage in succession with different cover plants did not present mechanical resistance to penetration restrictive to root development, providing the same grain yield in relation to chiseling treatments. The succession maize/oat and maize/radish promoted the permanence of the chiseling soil effect for 24 months, therefore there is no need to carry out the scarification annually

Keywords: Chiseling; Oats; Radish; Vetch; compactation
Financial support: UTFPR, CNPQ, Fundação Araucária, CAPES

(9179 - 1726) Soil organic matter and macronutrients dynamics of a long-term conservation tillage experiment in a brazilian Ultisol

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Low natural fertility and sandy texture in the shallow depth of Ultisols, and climatic conditions of Northeast Brazil stimulate soil degradation in case of inappropriate agricultural management adoption. Conservation tillage (CT) usually has positive impact in soil chemical attributes (SCA), however there is a lack of dataset to support CT establishment in Northeast Brazil. Thus, the overarching goal of this work is to evaluate the dynamics of soil organic matter (SOM) and macronutrients in a long-term maize experiment. The experiment was established in 2001 at UFS Campus Rural (10°55'24"S; 37°11'57"W) and repeated annually throughout 16 yr. Soil is classified as Ultisols and the climate described as tropical with dry summer. Treatments consisted of three tillage operations (conventional, minimum and no-tillage) and four cover crops (sunn hemp, Pigeous bean, millet, cowpea). Tillage operations were laid out as whole plot (830 m²), and the cover crops randomly distributed through three plots (60 cm² each). Soil sampling (0-10 cm) occurred after maize harvesting at 5, 9, 11, and 14 yr of the experiment beginning. A principal component analysis (PCA) was performed to investigate the soil chemical attributes dynamics throughout agricultural management. The first two principal components (PC) accounted for 74.9 % of the dataset variation. The PCA shows that SCA were first separated by the duration of the management adoption: the SCA at 5 and 9 yr were more similar than at 11 and 14 yr. Phosphorus (P) and potassium contents increased with time of management adoption, conversely to Ca and Mg content. SOM content tend to stabilize after 9 yr and presented lower values in conventional tillage. P and SOM contents separated minimum tillage and no-tillage from conventional tillage. There was no clear pattern of cover crops effects on SCA. Our results indicate that either minimum or no-tillage have great potential of increasing natural fertility of maize cultivated Ultisols in Northeast Brazil.

Keywords: no-tillage, minimum-tillage, cover crops, soil nutrients
Financial support: FAPITEC, CAPES

(1411 - 2300) Soil physical attributes under integrated agricultural production systems at Agreste mesoregion of Paraiba State, Brazil

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The objective of this study was to evaluate the soil quality by means of physical attributes under a crop-livestock-forest integration system with two years of implantation. The experiment was conducted at the experimental station of the EMEPA, in Alagoinha City (PB) in a Eutric Planosol. A randomized complete block design (DBC) was used, with five treatments and three repetitions, as: 1) *Brachiaria decumbens* + *Gliricidia sepium* (ILFG); 2) *Brachiaria decumbens* + *Mimosa caesalpiniifolia* (ILFS); 3) *Brachiaria decumbens* + *Tabebuia alba* (ILFI); 4) *Brachiaria decumbens* + *Zea mays* (ILCm); 5) *Brachiaria decumbens* (P), in plots with dimensions of 38 x 20 m. Forest species were planted in triple rows, at spacing 3 x 2 m, with 20 m between triple row and another. Undisturbed samples were collected at depths of 0.0 - 0.10 m and 0.10 - 0.20 m, totalizing 120 samples. Granulometry, flocculation degree (GF), soil density (Ds), total porosity (Pt), macroporosity (Ma), microporosity (Mi), saturated hydraulic conductivity (Kθ), resistance to penetration (Rp), aggregate stability index (IEA), total organic carbon (TOC), field capacity (θCC), permanent wilting point (θPMP) and available water (θAD) had the variances evaluated. The analyzes were carried out at the Soil Physics Laboratory of the Agricultural Sciences Center of the Federal University of Paraíba. The analysis of variance and its medias were compared by the Tukey test at the 5% probability level. The soil was classified as sandy-loam and the sand contents ranged from 650 to 703 g kg^{-1}. At depth of 0 - 0.10 m the soil Ds was lower in T3 - 1.24 kg dm^{-3} and higher in T5 - 1.27 kg dm^{-3}. There was an increase of Ds in depth and the soil Pt ranged from 0.45 to 0.49 m^3 m^{-3}. The Kθ was larger on the surface, with 13.37 cm h^{-1} at T2 and 4.32 cm h^{-1} at the control treatment. The Rp was below the critical limit in all evaluated treatments, and the highest average was 0.30 MPa in T1 in the 0.10 - 0.20 m layer. The COT content decreased in depth, as did the IEA values. The content of θAD did not differ between treatments and depths evaluated. The highest volume of θAD (0.463 m^3 m^{-3}) was verified in T4 at a depth of 0.10 - 0.20 m. Soil density was the attribute that presented the greatest variation between the collection distances and the evaluated treatments. The adoption of ICLF contributed to the improvement of the physical attributes of the soil in comparison to the areas occupied with isolated cultivation.

Keywords: soil management; agricultural practices; semiarid.
Financial support:

(7979 - 1577) soil physical quality of an ultisol under crop-livestock-forest integration system in Amazonia, Brazil

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The Crop-Livestock-Forest Integration System (ILPF) is considered one of the most suitable conservationist systems for the recovery of degraded pastures, because it increases the efficiency of the area utilization. In Brazil, this system have a wide use, mostly because of governamental incentive. In this context, the present work was elaborated with the objective of comparing the management systems with a natural forest with the physical and chemical characteristics of Ultisol in the state of Roraima. The study was carried out in a private property with ILPF experiment installed in partnership with Embrapa-RR. There were 4 main treatments (Areas): T1 = Rotated Pasture; T2 = Natural Forest (NF); T3 = Crop-Livestock Integration (CLI); T4 = Livestock-Forest Integration (LFI); The secondary treatments were 6 depths: P1 = 0 to 10 cm; P2 = 10 to 20 cm; P3 = 20 to 40 cm; P4 = 40 to 60 cm; P5 = 60 to 80 cm; P6 = 80 to 100 cm in a completely randomized design in the spli-plot scheme. The evaluated properties were: Soil Penetration Resistance (PR), Texture, Soil Density (SD) and Soil Particle Density (PD), Total Porosity (TOP), Dispersed Clay in Water (DCW), Clay Flocculation Degree (CFD) , Soil Organic Matter (SOM), Soil Carbon Stock (SCS) and Soil Physic Quality Index (SPQI). Analyzing the set of all the properties and comparing the managed environments with the natural forest, considered as a parameter of physical soil quality, it was verified that there is no physical degradation of the soil in the management systems studied, being able to be indicated to be used as a recovery system for degraded areas. Some properties showed values that indicate soil low quality (SD, TOP and PR), but the natural áreas had the same characteristics.

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