

Impact of Organic Transition Systems and Texture on Soil Organic Matter Fractions

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Physical fractions of soil organic matter are widely recognized as sensitive indicators of changes in cropping system management. Relatively little is known about how textural variation modifies the impact of cropping systems on soil organic matter. The organic transition experiment described by Creamer et al. includes large variation in soil texture and organic matter inputs, and thus provides a good opportunity for evaluating new physical fractionation methods and interactions between texture and soil organic matter fractions. Soil cores (0-7.5 cm) were collected mid summer in 2004 from the 5 geo-referenced sampling points in all start 2 plots of the organic transition experiment. The transitional systems differed with respect to C input level: systems 2, 3 and 6 = highest input, systems 4 and 5 = intermediate input and system 1 = lowest input. Soil cores from each plot were composited, air dried and passed through a sieve with 2 mm openings. Soils were then physically fractionated using combinations of air elutriation, wet sieving, full dispersion and sedimentation. Soil physical fractions were analyzed for total and permanganate oxidizable C. The C content of most physical fractions was strongly related to fine (< 20 micron) mineral content ($R^2 > 90\%$). Differences in C input level had greater impact on the C content of soils with greater fine mineral content. The C content of stable microaggregates isolated from stable macroaggregates was uniquely insensitive to fine mineral content but sensitive to C input level. A low terminal velocity fraction isolated using air elutriation was highly sensitive to C input level.