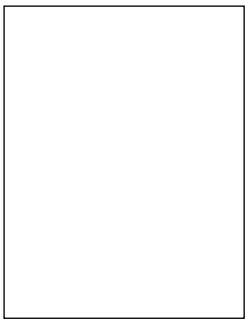

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Influence of organic amendments on soil physical attributes and aggregate associated phosphorus under long-term rice-wheat cropping

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ABSTRACT

We evaluated phosphorus (P) distribution within a water-stable aggregate of soils in a long-term fertility experiment of rice-wheat rotation in the Hot-humid sub-tropics of India. Surface soil samples were collected from seven treated plots having different combination of organic amendments with 50% substitution of nitrogen levels. The soils were separated by wet sieving techniques into >2.0, 2.0-0.25, 0.05-0.25 and <0.05mm aggregate fractions. Structural indices were found to be higher in the soils receiving organic amendments compared to minimally fertilize soils. Organically amended soil showed a higher proportion of water-stable macroaggregates compared to control and fertilized plots which were rich in microaggregates. The concentration of available phosphorus within the water stable aggregate showed an inverse relationship with aggregate size fraction irrespective of the treatments. The total P also followed the same trend. The distribution of available P and total P in aggregated fraction was as follows**:** silt + clay associated P > small macroaggregated P > fine microaggregated P > large macroaggregated P. Within a size class, aggregated available P and total P concentrations of the organically amended treatments were of the order of farm yard manure (FYM) > paddy straw (PS) ≥ green manure (GM). The available P content of microaggregates (<0.25 mm) was 8 to 10 times higher than the macroaggregates (0.25 mm) whereas the total P content in microaggregates was 4 to 5 times higher than water stable macroaggregates. Cultivation without organic amendments leads to microaggregates that could be checked by application of organic amendments like FYM, GM that increased the mass of water stable macroaggregates because of increased consolidation of microaggreates into macro aggregates.

*Key Words***:** Long-term experiment, Organic amendments, Phosphorus, Rice-wheat, Soil aggregate.

ABBREVIATION

AR; Aggregate Ratio, AS; Aggregate Stability, FYM; Farmyard Manure, FMicAP; Fine Microaggregated Phosphorus, GM; Green Manuring, GMD; Geometric Mean Diameter, MWD; Mean weight Diameter, LMacAP; Large Macroaggregated Phosphorus, MacAP; Macroaggregated Phosphorus, MicAP; Microaggregated Phosphorus, P; Phosphorus, PS; Paddy straw, SMacAP; Small Macroaggregated Phosphorus, SCAP; Silt + Clay associated Phosphorus, WSA; Water Stable Aggregates, WSMacA; Water Stable Macroaggregates, WSMicA; Water Stable Microaggregates.