Wanrapee Suwanprapa 2014: Relationship between Soil Properties, Organic Carbon and Water-stable Aggregates in Forest Soils of Sakaerat Environmental Research Station. Master of Science (Soil Science), Major Field: Soil Science, Department of Soil Science. Thesis Advisor: Assistant Professor Somchai Anusontpornperm, Ph.D. 137 pages.

A study on properties, organic carbon content and aggregate stability of soils under different types of forest was conducted in eight areas in Sakaerat Environmental Research Station, Wang Nam Kheo district, Nakhon Ratchasima province. They comprised one soil each under secondary mixed deciduous forest and ecotone (transitional zone between dry dipterocarp and dry evergreen forests), two soils under dry dipterocarp forest, and four soils under dry evergreen forest. Water stable aggregate was analyzed and separated into six sizes; 2-8 mm (WSA1), 1-2 mm (WSA2), 0.5-1 mm (WSA3), 0.25-0.5 mm (WSA4), 0.1-0.25 mm (WSA5), and smaller than 0.1 mm (WSA6) in order to investigate the relationships of the impact of soil properties on the formation of soil aggregate at different sizes and their organic carbon content in those aggregates.

Results revealed that WSA1 and WSA5 statistically had, respectively, highly positive and negative correlation with organic carbon (r=0.71** and -0.64**) due to the organic carbon being the important cementing agent that basically forms large aggregate. Iron and manganese in crystalline, amorphous and organo-complex forms were statistically positively correlated with WSA2 and WSA3, and had negative correlation with WSA5. This is because iron and manganese acting as cementing agent binding between organic matter and clay to form aggregates of larger than 0.25 mm. Most plant nutrients in soil had the positive correlation with large aggregate in a similar fashion as that of organic carbon, indicating that the role of organic matter is not only essential for aggregation but also contributing the availability of some plant nutrients in these soils. WSA1 dominated in the top layer of all forest soils studied whereas WSA5 was found dominant in subsoil layers. The highest amount of WSA1 was in the soils of the transitional zone between dry dipterocarp and dry evergreen forests (Skr-4) and undisturbed dry evergreen forest (Skr-8), having the contents of 51.4 and 51.30 g 100 g^{-1} soil, respectively. The soil under secondary mixed deciduous forest (Skr-1) contained the greatest amount of WSA5 with the content of 60.10 g 100 g^{-1} soil. There was no different organic carbon content in various sizes of water stable aggregate in topsoil and subsoil. This indicates that different types of forest had no influence on the amount of organic carbon distribution in different sizes of water stable aggregate.

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