

Response of Peat Soil's Microbes to Drainage and Forest Fire

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Abstract. Peat soil is technically a soil which contains appreciable quantities of organic matter that is considered to dominate the soil properties. It has been estimated that the total area under peat land is around 240 million ha world over, including about 14.9 million ha occurred in Indonesia and 300,000 ha occurred in Japan. Peat soils in Indonesia and Japan have for long time been used for paddy cultivation. Some portions of peat soils in Indonesia are also use for estate crop cultivation like coconut, pine apple, and presently oil palm. The utilization of peat soil for estate crops cultivation is commonly started by constructing drainage ditched to release the excessive water. Over drain, coupled with human carelessness, may lead the peat soil to front of forest fire. Intermittent drainage is practiced in paddy filed to remove hazardous substance from paddy filed. Peat soil has attracted considerable attentions globally due to its potent as source of greenhouse gases (GHGs) and subsequent global warming. This paper is aimed at summarizing the response of microbes to drainage and forest fire of peat soils. The information was mainly gained from the studies carried out by author in Indonesia and Japan, using plate count, adenosine tri phosphate (ATP) measurement, and denaturized gradient gel electrophoresis (DGGE) methods. The results indicate that forest fire and intermittent drainage (draining peat for less than 6 days) did not affect the population and community structure of GHG related-microbes. However, the intermittent drainage and forest fire reduced the activities of methanogens and methanotrophs, respectively. Moreover, long term drainage affects the population of nitrifiers and denitrifiers. Water filled pore space (WFPS) seemed to be the most influential soil properties to GHGs related-microbes in responding drainage and forest fire.

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