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Influence of the kind of peat and the depth of sampling on the biochemical properties of Tagan peatland

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The upper layer of a peat bog in which organic matter decomposes aerobically much more rapidly than in the underlying, anaerobic catotelm. As litter accumulates at the surface the size of the catotelm increases, because the thickness of the acrotelm is limited to depth at which aerobic respiration can occur. Although the rate of decomposition per unit volume of material is much greater in the acrotelm than in the catotelm, a point is reached at which the difference in volume between the two layers is such that the total rate of decomposition in the catotelm is equal to that in the acrotelm. This limits the thickness to which the bog can grow. Should there be a climate change (e.g. an increase in precipitation) growth can resume. Bogs therefore preserve a record of climatic conditions.

Soils samples were taken from four places marked as No 1, 2, 3 and 4 each from two depth 0-25 and 50-75 cm of the peatland Tagan. Peatlands Tagan is located near Tomsk, West Siberia, Russia. Place No 1 in both layers represents grasses peat with the degree of the decomposition ranged from 25 to 35% (pH 6.31-7.95). Point 2 is characterized by wooden and wooden grasses peat with 35% degree of the decomposition (pH 5.16-9.31. There is buckbean peat in the points 3 and 4 (pH 6.4-6.49). However, 1.5 m depth of sapropel is located in point 4.

The activity of the following enzymes: xanthine oxidase, phenolic oxidase, peroxidase, urease, nitrate reductase were measured and two forms of organic carbon (total organic carbon and dissolved organic carbon) and two form of iron Fe(II) and Fe(III) were determined in these samples. These enzymes participate in several biochemical pathways in soil connected with redox potential. The concentrations of indole-3-acetic acid, very famous fitohormone were also measured.

It was observed in all places of sampling significant increase of the total organic carbon with an increase of the depth. However, the quantity of dissolved organic carbon closely decreased with an increase of the depth, suggesting lower microbiological activity of this level. The increase of the ratios Fe(II)/Fe(III) for place 1 and 2 and 4 and both depth 0-25 were similar (0.56; 0.59 and 0.65) indicating similar redox properties of these levels. Higher contents of F(III) were determined in upper layer than in lower layer of all samples. It indicate higher oxidizing properties upper layer than lower one

The activity of nitrate reductase, peroxidase, phenolic axidase and xanthine oxidase agree with the content of two forms of iron in samples from all depth. In all samples was observed the decrease of the activity of urease with an increase of the depth. It suggest higher rate of the degradation process of urea created from the decomposition of peptides in peat.

In sample No 1 the concentrations of indole-3-acetic acid very famous phytohormone were similar in both determined levels. However for sample No 2, 3 and 4 the significant decrease of the concentrations of indole-3-acetic acid with and increase of the depth of sampling was observed.

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