Abstract No: A-222

EXACT MEASUREMENT OF PHOTOSYNTHETIC CARBON ACCUMULATION RATE IN SPHAGNUM COMMUNITY

Akira Haraguchi

Faculty of Environmental Engineering, The University of Kitakyushu, Japan

*Corresponding author: sphagnummire@hotmail.com

Sphagnum plants are major peat forming plants in circumpolar mires and they fix and store atmospheric carbon in peat. Due to water saturation of peat as well as hardly biodegradable substance in Sphagnum plants, Sphagnum peat can be an effective persistent carbon pool. Despite the importance of Sphagnum plants in global carbon dynamics, the carbon fixation rate of the Sphagnum community or photosynthetic activity of Sphagnum plants has not yet been accurately determined. Sphagnum leaves have a layered distribution, not only in a population but also within one individual plant. Thus the photosynthetic response to light shows a community type curve, i.e. the response curve did not saturate within the usual light condition of the actual Sphagnum community. Consequently, the response curve for individual leaves of vascular plants could not be applied to the photosynthetic response of Sphagnum plants. Live shoots of Sphagnum plants continue to senesced litter and form further peat, and so CO2 release by biodegradation of litter and peat should also be included when evaluating the carbon exchange rate between the Sphagnum community and the atmosphere. I attempted to measure exact photosynthetic rates of Sphagnum plants by considering the layered structure of the photosynthetic parts of the shoot as well as respiration of litter and peat, by separating shoot, litter and peat. CO2 release rates from litter and peat were much lower than the respiration rate of live shoots, and the carbon exchange rate between a live shoot and the atmosphere can be a good approximation. However the CO2 release from litter fluctuated largely and sometimes the rate was extremely high depending on the condition, and then the rate was not negligible. I tested the effect of water table and temperature on CO2 release rate from litter. Further exact measurements of photosynthetic rate of Sphagnum plants will improve the advanced model for estimating atmospheric carbon fixation rate and peat accumulation rates in circumpolar peat mires.

Keywords:-