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**Biomass yield and GHG emissions from fen peatland  
under one and two-cut harvest systems of Reed Canary Grass**

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Reed canary grass (RCG) is a cold season perennial grass which can be a promising crop to use as an energy crop to cultivate at peatland. The main objectives of this paper are to compare the biomass yield and greenhouse gas balance from peatland used for growing RCG in one-cut and two-cut system. RCG was grown in fen peat soil with three management: One cut, two-cut (fertilization after first cut), and two-cut (unfertilized after first cut). All the plots were fertilized with 60–13–77 kg N–P–K ha<sup>-1</sup> at April. In two-cut system grass was harvested at middle of June and half of the plots were fertilized with additional amount of 60–13–77 kg N–P–K ha<sup>-1</sup> fertilizer. Measurements include GHG (CO<sub>2</sub>, CH<sub>4</sub>, and N<sub>2</sub>O) emissions, biomass development with ratio vegetation index (RVI) and biomass yield. Total biomass yield in two-cut (fertilized), two-cut (unfertilized), and one-cut, system were 16, 11, and 12 tons dry biomass ha<sup>-1</sup> making two-cut system better than one-cut only if additional amount of fertilizer was supplied after first cut. Total CO<sub>2</sub> uptake was 68% and 22% higher in two-cut (fertilized) system compared to two-cut (unfertilized) and one-cut. But total CO<sub>2</sub> emissions from two-cut (fertilized) plot were 75% higher than two-cut (unfertilized) and 37% higher than one-cut. Although biomass yield was higher in two-cut (fertilized) system, it did not help in better carbon balance suggesting higher emissions as an effect of enhanced microbial respiration with fertilization at summer.