Optimising grain yields reduces CH4 emissions from rice paddy fields. (S03-vanbreemen070600-Oral)

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Abstract:

Microbial production in anoxic wetland rice soils is a major anthropogenic source of atmospheric CH4, the most important non-CO2 greenhouse gas. CH4 emissions from well-managed irrigated rice fields were much higher in the wet than in the dry season, with no apparent link between temperature and methane emission. We tested the hypothesis that partial failure of spikelet development reduces the plants' capacity to store photosynthetically fixed C in grains, leading to extra C inputs to the soil and higher CH4 emissions. In a screenhouse experiment, we removed 0, 33, 66 and 100 % of the spikelets immediately after flowering. CH4 emissions indeed increased in proportion to the fraction of spikelets removed. This explains the high CH4 emissions to in the wet season, when conditions for spikelet formation are less favourable than in the dry season. The observed relationship between performance of the rice plant and CH4 emission provides opportunities to mitigate CH4 by optimising rice productivity.

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