NUMERICAL DATA

Methane Emissions among Hybrid Rice Cultivars in the Mid- Southern United States (2018)

Summary of methane (CH_4) emissions as affected by cultivar expressed on season-long, area- and yield- scaled bases, post-flood release area-scaled basis, and post-flood release percentage of total seasonal emissions from a silt-loam soil during the 2014 growing season at the Rice Research and Extension Center near Stuttgart, AR..

Cultivar

	CLXL 729	CLXL745	XL753	Roy J	*P*
Area-scaled emissions (kg CH_4-C ha^{-1} $season^{-1}$)	55.3b*	48.9b	53.0b	74.8a	**0.001**
Yield-scaled emissions [kg CH_4-C (Mg grain)$^{-1}$]	5.85b	5.08bc	4.31c	7.85a	**< 0.001**
Post-flood emissions (kg CH_4-C ha^{-1})	6.21b	5.30b	5.18b	8.26a	**0.010**
Post-flood emissions (% total emissions)	**11.2**	**10.8**	**9.8**	**11.1**	**0.612**

*Values in the same row followed by different letters are significantly different ($P < 0.05$).

Based on recent research indicating the potential for hybrid cultivars to mitigate CH_4 emissions from rice, the objective was to determine the influence of several commonly grown hybrid rice cultivars on CH_4 fluxes and emissions from a silt-loam soil. Four cultivars were evaluated: the three hybrids CLXL729, CLXL745, and XL753 and the pure-line cultivar Roy J.

Source: https://www.tandfonline.com/doi/full/10.1080/00103624.2018.1547388.

As expected, based on CH_4 flux measurements throughout the growing season, season-long, area-scaled CH_4 emissions differed among cultivars ($P = 0.001$), where emissions were greater from Roy J (74.8 kg CH_4-C ha^{-1} $season^{-1}$) than from the three hybrid cultivars, which did not differ and averaged 52.4 kg CH_4-C ha^{-1} $season^{-1}$. Seasonal CH_4 emissions were greater ($P < 0.05$) from Roy J (74.8 kg CH_4-C ha^{-1} $season^{-1}$) than from CLXL729, XL753, and CLXL745, which did not differ, and averaged 55.3, 53.0, and 48.9 kg CH_4-C ha^{-1} $season^{-1}$, respectively.

Source: http://www.isaac-scientific.org/images/PaperPDF/AS_100008_20180201114055702 69.pdf

Azolla planting reduces methane emission and nitrogen fertilizer application in double rice cropping system in southern China (2017)

The 3-year (from 2012 to 2014) average grain yields, CH4 emissions, and yield-scaled CH4 emissions influenced by Azolla as a dual crop combination with urea N.

Treatment	Early rice		Late rice		Annual rice cycle[a]		
	Grain yield (Mg ha^{-1})	CH_4 emission (kg ha^{-1})	Grain yield (Mg ha^{-1})	CH_4 emission (kg ha^{-1})	Grain yield (Mg ha^{-1})	CH_4 emission (kg ha^{-1})	**Yield-scaled CH_4 (kg Mg^{-1} grain yield)**
RAN0	4.1 ± 0.5 b	143.1 ± 17.2 c	6.0 ± 0.5 c	233.1 ± 44.3 bc	10.2 ± 0.5 c	376.2 ± 40.1 c	**37.2 ± 2.7 b**
RAN1	5.3 ± 0.2 a	123.0 ± 11.1 d	7.5 ± 0.7 b	196.7 ± 47.5 c	12.7 ± 0.9 b	319.7 ± 42.0 d	**25.2 ± 2.9 d**
RMN0	3.8 ± 0.4 b	202.5 ± 26.4 a	5.9 ± 0.5 c	295.3 ± 54.0 a	9.7 ± 0.7 d	497.9 ± 44.2 a	**51.3 ± 3.6 a**
RMN2	5.7 ± 0.3 a	171.1 ± 19.7 b	8.2 ± 0.4 a	257.2 ± 45.8 ab	13.9 ± 0.4 a	428.3 ± 37.2 b	**30.8 ± 3.4 c**
$LSD_{0.05}$	**0.381**	**18.622**	**0.508**	**46.137**	**0.628**	**39.324**	**3.065**

Mean ± SD; different lowercase letters indicate the significant differences ($P < 0.05$) based on (least significant difference) LSD multiple range tests.

*RAN0 represents the rice + Azolla without N fertilizer

*RMN0 represents the conventional rice without N fertilizer

*RAN1 represents the rice + Azolla with moderate N fertilizer

*RMN2 represents the conventional rice with common N fertilizer

[a] The CH_4 emissions during the winter fallow were near zero. Therefore, the annual emission is equivalent to the sum of the CH_4 emission from the early and late rice paddies. The present experiment indicated that dual cropping of Azolla drastically decreases CH_4 emissions from double rice cropping paddies relative to the conventional rice cultivation system. Compared with the conventional rice with common N fertilizer, the rice + Azolla without N fertilizer and with moderate N fertilizer decreased CH_4 emissions by 11.5–24.5 and 25.2–30.2% during the early rice season and by 6.2-12.7 and 14.8-29.5% during the late rice season, respectively. + Azolla with moderate N fertilizer decreased CH_4 emission per unit of grain yield. The interaction between the dual cropping of Azolla and N fertilizer application significantly influenced the maintenance of rice production while mitigating CH_4 emissions.

Source: https://link.springer.com/content/pdf/10.1007%2Fs13593-017-0440-z.pdf