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**Yield reduction of direct-seeded rice under returned straw can be mitigated by appropriate water management improving soil phosphorus availability**

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**Table S1. Canopy structure of rice plants under different straw return methods and irrigation regimes at heading stage**

Treatments	Leaf biomass (g)	Flag leaf		2 <sup>nd</sup> leaf		3 <sup>rd</sup> leaf	
		Leaf area (cm <sup>2</sup> )	Leaf angle (°)	Leaf area (cm <sup>2</sup> )	Leaf angle (°)	Leaf area (cm <sup>2</sup> )	Leaf angle (°)
CF-CK	14.96b	20.71c	15.22a	20.57c	17.89a	20.08c	20.89a
CF-M	13.20c	20.35c	15.56a	19.28c	17.56a	17.36d	19.22a
CF-I	13.04c	22.49bc	12.89b	20.22c	16.89a	17.13d	21.00a
AWD-CK	17.05a	23.51b	4.56c	28.68a	10.78b	29.09a	13.78b
AWD-M	16.90a	27.77a	5.78c	30.02a	10.67b	27.90a	15.44b
AWD-I	15.39bc	21.84bc	3.89c	26.27b	10.78b	26.76b	12.78b
Straw	F=20.08, P<0.01	F=4.43, P<0.05	F=82.28, P<0.01	F=4.31, P<0.05	F=39.31, P<0.01	F=19.81, P<0.01	F=19.45, P<0.01
Irrigation	F=70.80, P<0.01	F=25.57, P<0.01	F=32.70, P<0.01	F=341.58, P<0.01	F=12.39, P<0.01	F=263.94, P<0.01	F=28.30, P<0.01
Straw*irrigation	F=6.04, P<0.05	F=14.76, P<0.01	F=52.39, P<0.01	F=9.11, P<0.01	F=17.45, P<0.01	F=4.48, P<0.01	F=8.61, P<0.01

Notes:

CF-CK: Control treatment under continuous flooding; CF-M: straw mulching under continuous flooding; CF-I: straw incorporation under continuous flooding; AWD-CK: Control treatment under alternate wetting and drying; AWD-M: Straw mulching under alternate wetting and drying; AWD-I: Straw incorporation under alternate wetting and drying.