

Entry No. IRR-0228

Category	: International Rice Research Conference
Select Theme	: Sustainable and equitable farming systems
Endorsement email	:
Keyword 1	: Nutrient management
Keyword 2	: Precision Agriculture
Keyword 3	: Decision support tools
Title of Entry	: Evaluating the potential of NDVI to guide midseason nitrogen fertilizer applications in California rice systems
Presenting author	: Telha H. Rehman
Presenting author email	: trehman@ucdavis.edu
Co author 1	: Andre Froes de Borja Reis
Co author 2	: Nadeem Akbar
Co author 3	: Bruce A. Linqvist
Co author 4	:
Co author 5	:
Co author 6	:
Co author 7	:
Co author 8	:
Co author 9	:

Co author 10	:	
Co author 11	:	
Co author 12	:	
Co author 13	:	
Co author 14	:	
Affiliation presenting author	:	University of California, Davis
Affiliation 1	:	University of Sao Paulo
Affiliation 2	:	University of Agriculture, Faisalabad
Affiliation 3	:	University of California, Davis
Affiliation 4	:	
Affiliation 5	:	
Affiliation 6	:	
Affiliation 7	:	
Affiliation 8	:	
Affiliation 9	:	
Affiliation 10	:	
Affiliation 11	:	
Affiliation 12	:	
Affiliation 13	:	

Select only one type of presentation

: 15 minute oral presentation

Abstract

: California (CA) rice (*Oryza sativa* L.) growers commonly apply topdress nitrogen (N) fertilizer at panicle initiation (PI) stage. In most cases, these applications take place without consideration of crop N status and result in both environmental and economic losses. Some tools are available to guide in-season N fertilization, such as the leaf color chart and SPAD chlorophyll meter, but these technologies are inefficient, cumbersome, and limited by their small-scale sampling methods. The recent development of sensor-based techniques however, has provided an alternative method to quickly assess N status of large vegetative systems. Canopy reflectance data is measured in the field using a multispectral sensor attached to a drone and interpreted through a vegetative index, among which normalized difference vegetation index (NDVI) is the most popular. Despite growth in this area of research, our understanding of how these sensor-based techniques can guide N fertilizer management is still quite limited. The objective of this research was to evaluate the potential of NDVI to guide midseason N fertilization decisions in CA rice systems. Specifically, this study aimed to (i) determine how well NDVI correlates with PI crop N status and (ii) develop a 'response-index' capable of predicting the grain yield response to adding topdress N across varying NDVI values. Seven N response trials were established over a 3-year period across the Sacramento Valley rice growing region of CA. Experiments were arranged according to a split-plot randomized complete block design with main plot treatments being the varying rates of preplant N fertilizer ranging from 0-275 kg N ha⁻¹ (aqua ammonia injected into the soil), and subplot treatments being the PI topdress N rates of 0, 25, and 50 kg N ha⁻¹ (ammonium sulfate broadcast by hand). Our results indicate that NDVI measurements taken at PI correlate strongly ($r^2 = 0.86$) with total N uptake (g N m⁻²). Furthermore, applying topdress N fertilizer to rice plants with a PI NDVI value of 0.70 or greater generally resulted in a yield loss. These findings indicate that NDVI measurements at PI can provide growers the information needed to guide sustainable N fertilizer management of CA rice systems.

[Read Less»](#)

Uploaded Files »

No files found.