Nutrient management in California rice systems

Bruce Linquist January 26 and 27, 2017



Outline

- 2016 Rice Yield Contest
- Variety usage survey
- Boosting yields and maintaining efficiency
 - Assessing need for top-dress N applications
 - K fertility
 - Do temperatures affect yields? If so, what can we do about it?
 - Time of planting

Yield Contest



- 2015 Pilot study Butte County
- 2016 Sacramento Valley
- Minimum of 3 ac from a 10 ac plot
- Yield: 14% moisture minus dockage







Joe Richter 115.0 cwt/ac M-205

Yield Contest Winners 2016





Josh Sheppard 122.5 cwt/ac M-105



Steve Willey 119.4 cwt/ac M-206

Rice Yield Contest: what have we learned?



- Yields have ranged from 108.4 to 126.9 cwt/ac
- Commercial varieties have good yield potential
- High yields does not reduce quality
 - Head:63-68
 - Total 69-72
- High yields were achieved with solid management practices
 - Total N applied across fields ranged from 162-180



California variety usage

- Questions are for growers or PCAs
- Grower
 - Base questions on primary region and practice (conventional vs organic)
- PCA
 - Base questions on one grower you work with
 - Use growers primary region and practice
 - Preferably not a grower in the room

Top-dress N applications: Is it necessary?

- Leaf-color chart
- SPAD meter
- Evaluating the potential for using NDVI (Normalized Difference Vegetation Index)







N uptake at PI vs yield

 Requires 125 lb N in crop at PI to achieve maximum yield



NDVI vs N uptake at PI

 NDVI of 0.76 is a good indication of 125 lb N/ac N uptake



When do top-dress N applications increase yields?

- 2016 research
- 5 preplant N rates
 0 to 200 lb/ac
- 3 top-dress N rates
 0, 22 and 44 lb N/ac

Yield response to top-dress N applications

- Confirms that 125 lb N/ac at PI is adequate
- Adding N when N uptake is below 125 lb/ac increases yields
- Adding N when N uptake is above 125 lb/ac decreases yield



Top-dress N applications: Field trials

- Research will be continued
- Look at accessing N deficiencies with drone



Potassium



Flag leaf K vs. soil K



K fixation

- Some soils low in extractable K also fix K
- Soils tend to be on eastern and southern Sacramento Valley



Cold stress during booting had greatest effect on yields

What does this mean for management?

- Cold stress during booting results in blanking
- Cold stress starts when night time temperatures drop below 56 degrees.
- Low temperatures occur in all regions of the valley but more in south
- Use suitable varieties for the region
 - M-206 is a good variety for cold areas
- Raise water in field to cover emerging panicle.

Optimal planting times

- Planting time determined
 - Temperature
 - Time to work the seedbed
- From May to mid June planting dates the <u>earlier</u> the better.
- Effect is significant but not large
 - May 1 vs May 30 about 6 sacks (20 lb/ac/day reduction)

http://rice.ucanr.edu/

- Website overview
 - Meetings, news, newsletters, blogs, presentations, reports, contacts, yield contest, guidelines

CIMIS Station map

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