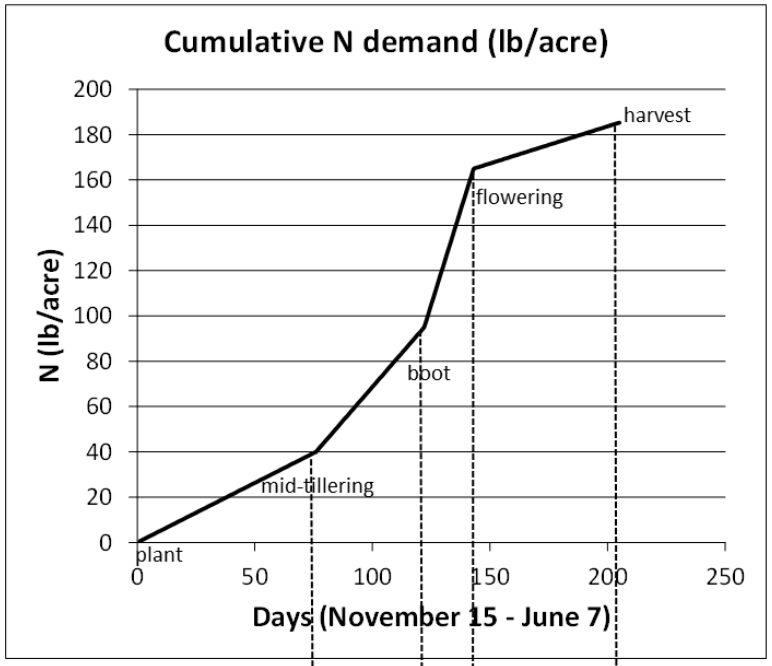
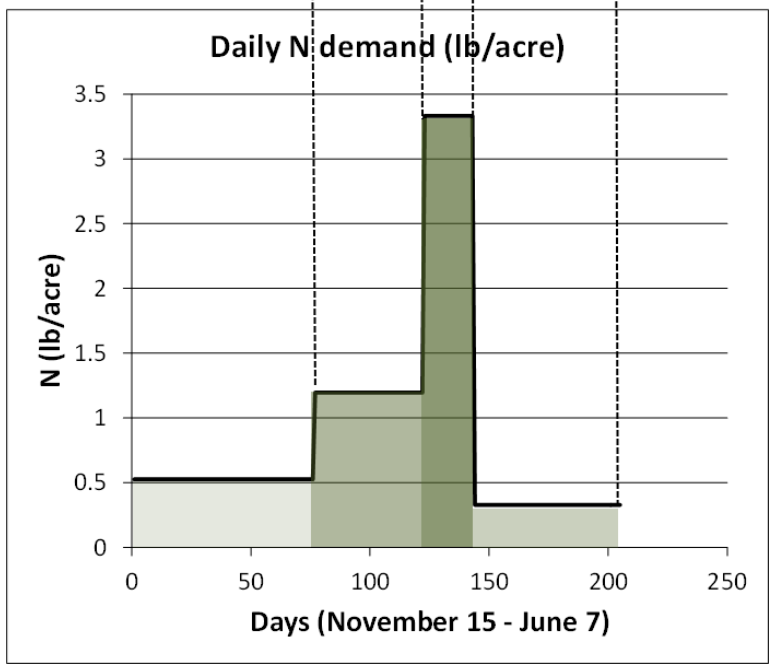
TIMING NITROGEN SUPPLY TO MATCH CROP DEMAND WILL RESULT IN EFFICIENT N USE

M. Lundy, S. Orloff, S. Wright, R. Hutmacher; UCCE

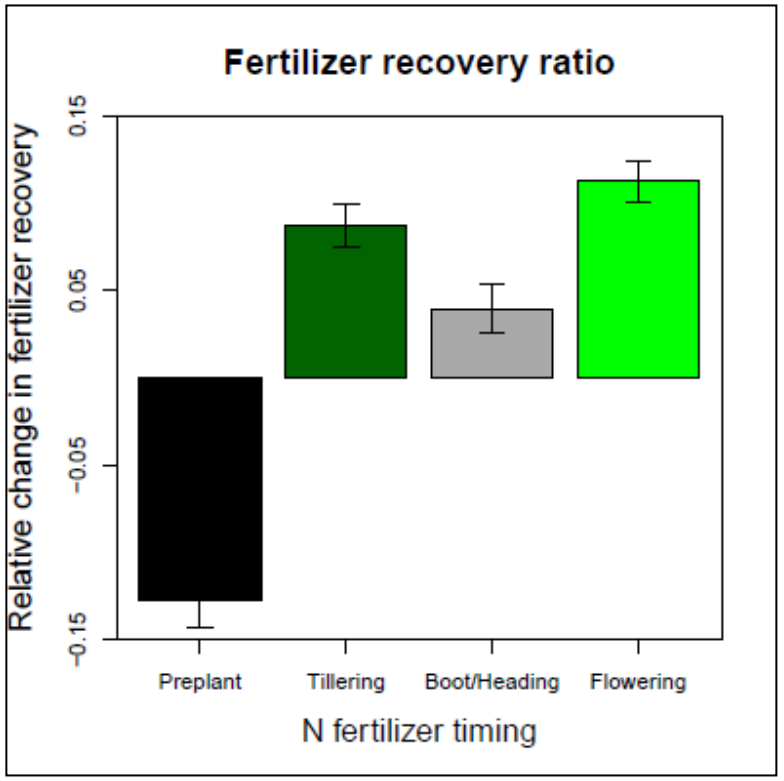




Changes in N demand across the season for irrigated wheat in the Sacramento Valley grown on soil with low residual nitrate-N (<10 ppm) and yielding 7500 lb acre^{-1} with 11.5% protein.

KEY POINTS [TIMING MATTERS!]:

- The rate of fertilizer N demand varies across the growing season.
- Timing of N application affects fertilizer use efficiency
- Applications of N at tillering and flowering boost fertilizer use efficiency relative to other application timings
  - *assuming sufficient water follows N application*



Relative change in apparent fertilizer recovery for N applied preplant, at tillering, at late boot/early heading or at flowering. Change is relative to the overall mean recovery ratio.

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IN-SEASON MEASUREMENTS CAN HELP TO DETERMINE CROP N DEMAND

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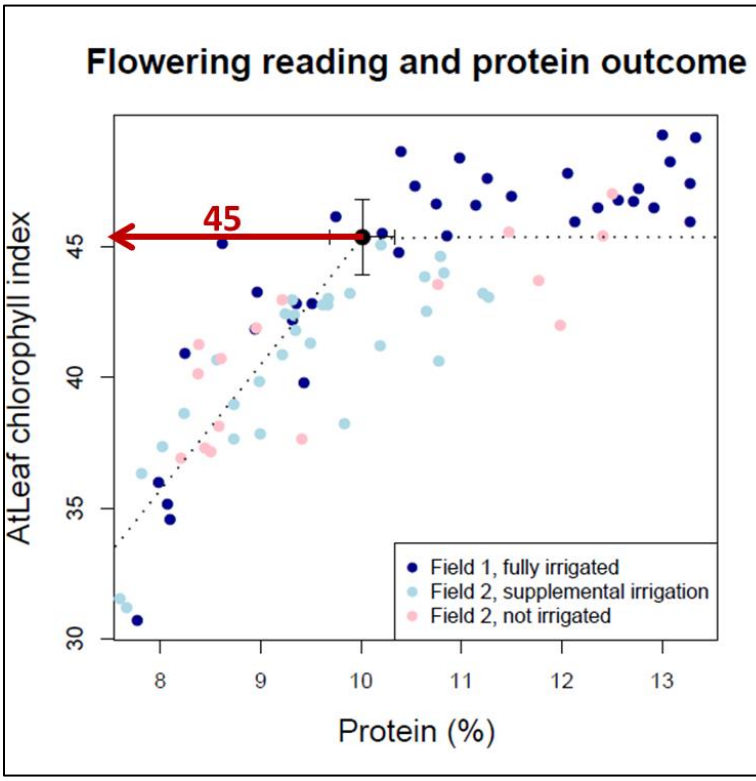
atLEAF chlorophyll meter

- SPAD proxy (660 and 940 nm)
- proxy for leaf N concentration
- Retail: ≈ $250

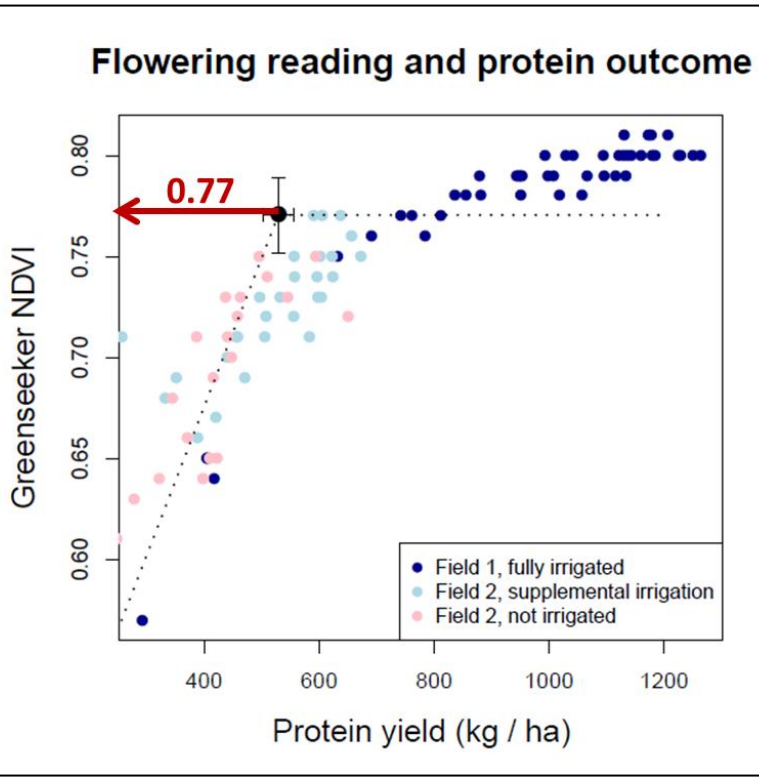
Trimble Greenseeker handheld

- NDVI (660 and 770 nm)
- Suitable proxy for yield potential?
- Retail: ≈ $500

Flowering reading and protein outcome

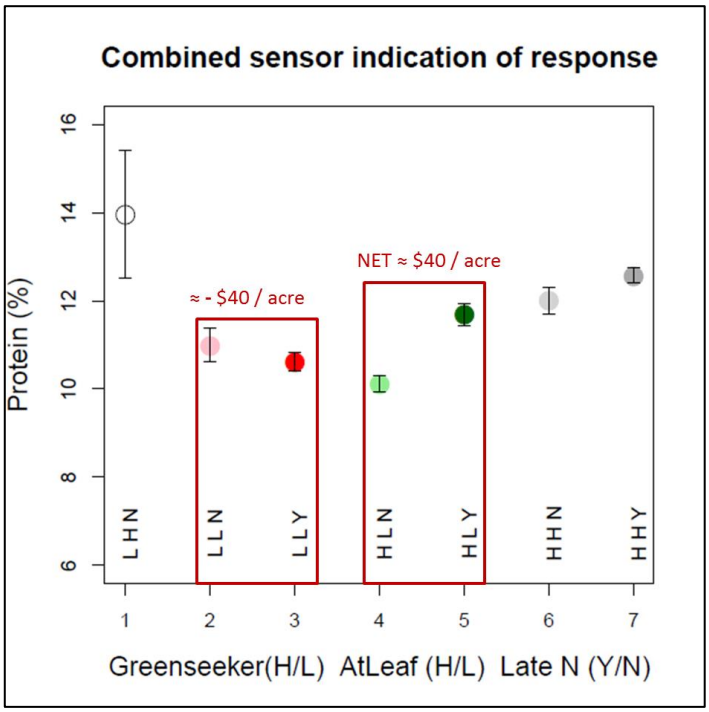


Flowering reading and protein outcome

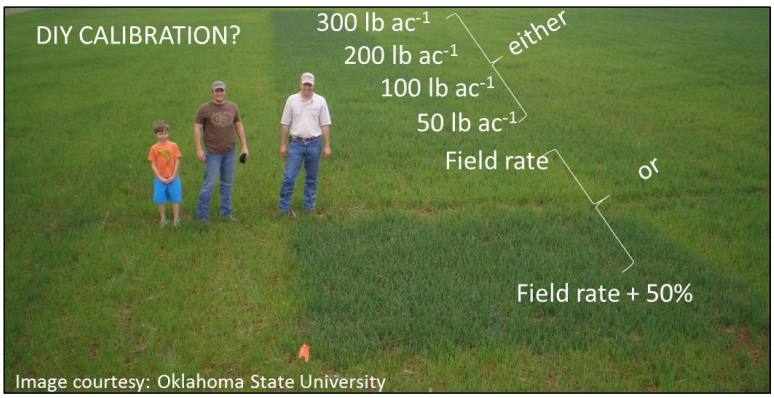


The two sensors provide distinct pieces of information. Both are needed to best determine whether an in-season application of N will add value to the crop. H/L indicate whether the measurements were above (H) or below (L) the sufficiency thresholds we developed in N rate trials. Y/N indicate whether N was added at flowering. If the leaf is "L" and the canopy is "H" you will see the most dramatic response because there is sufficient yield potential, while leaf chlorophyll indicates that the plant may be low in N. Whereas, if the leaf is "L" and the canopy is also "L", there is not sufficient yield potential to make use of the added N. The protein response has been translated to per acre value based on a 4 ton crop with a $0.50 / cwt premium/discount per % above or below target (11%).

Combined sensor indication of response



The best way to determine N sufficiency/deficiency under the conditions at <u>your site</u> is to set up a <u>DIY calibration (see below)</u> and use the combined information from these tools (and perhaps a soil nitrate quick-test?) to figure out whether/how much N to add at any given point in the season.



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