

Exploring the potential for sensor-based fertigation scheduling in SDI tomatoes



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Normalized difference vegetative index (NDVI)



Trimble Greenseeker handheld NDVI



Field-specific evapotranspiration (ET), irrigation measurements

Tule Weekly ET Report - Google Chrome

<https://owa.ucdavis.edu/owa/?ae=Item&a=Open&t=IPM.Note&id=RgAAAAAqxQOPS2VoRaQuADNVpTdzBwCXJown04DURKI9hVSkLHFAAAAmw9%2bAACXJown04DURKI9hVSkLHFAAAYXG>

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Tule Weekly ET Report

Tule [support@tuletechnologies.com]

To: Mark Lundy

Monday, July 07, 2014 12:38 PM

Plant Response Index (Actual ET / Reference ET)

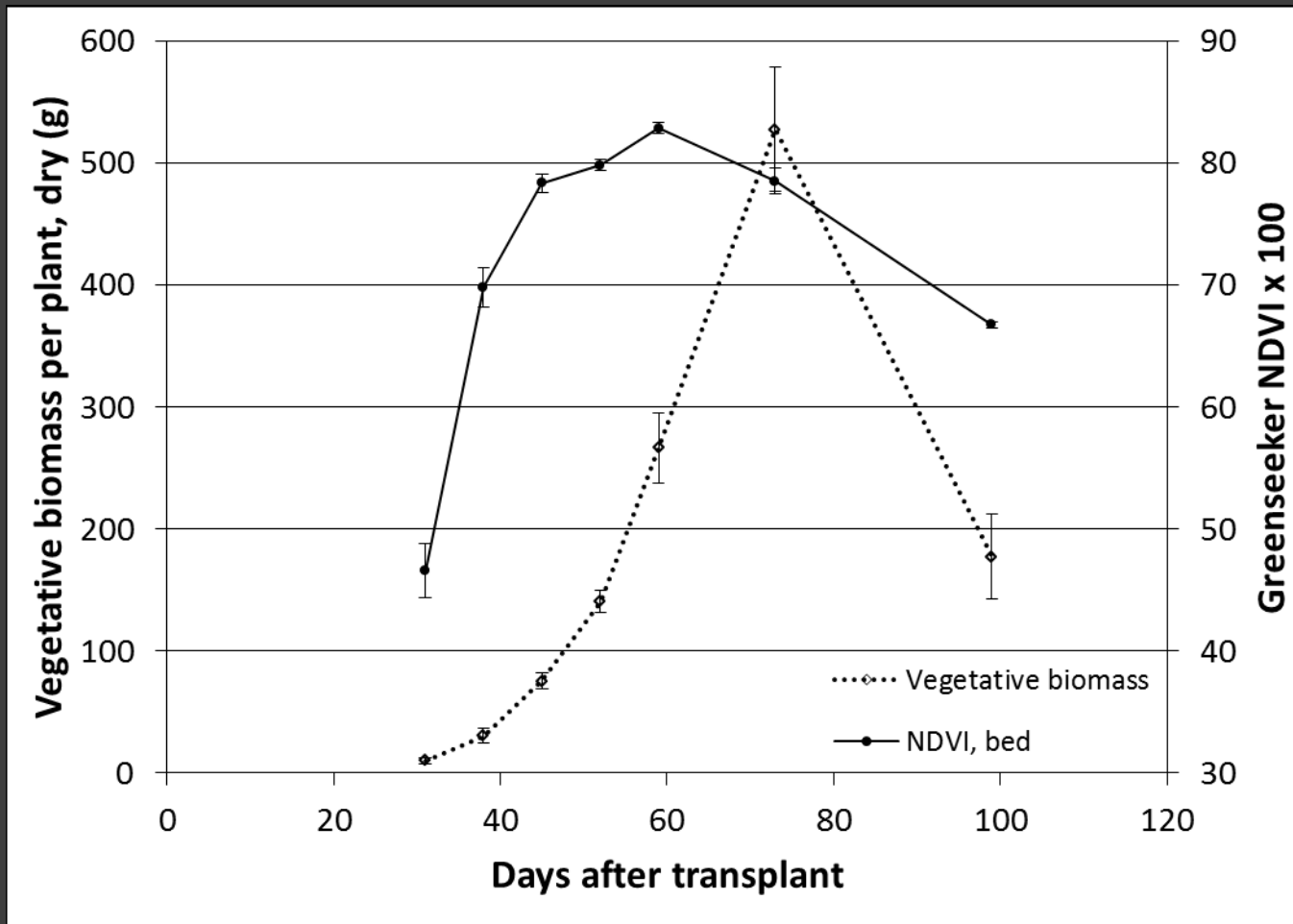
Date	Plant Response Index (%)
May 11	50
May 12	75
May 13	60
May 14	70
May 15	80
May 16	75
May 17	80
May 18	75
May 19	70
May 20	75
May 21	95
May 22	85
May 23	90
May 24	100
May 25	95
May 26	90
May 27	95
May 28	100
May 29	95
May 30	90
May 31	75
Jun 1	80
Jun 2	95
Jun 3	100
Jun 4	75
Jun 5	80
Jun 6	90
Jun 7	75
Jun 8	85
Jun 9	90
Jun 10	90
Jun 11	85
Jun 12	80
Jun 13	85
Jun 14	90
Jun 15	75
Jun 16	90
Jun 17	100
Jun 18	85
Jun 19	90
Jun 20	90
Jun 21	85
Jun 22	80
Jun 23	85
Jun 24	80
Jun 25	85
Jun 26	90
Jun 27	90
Jun 28	95
Jun 29	80
Jun 30	90
Jul 1	95
Jul 2	80
Jul 3	85
Jul 4	85
Jul 5	85
Jul 6	85

Tule

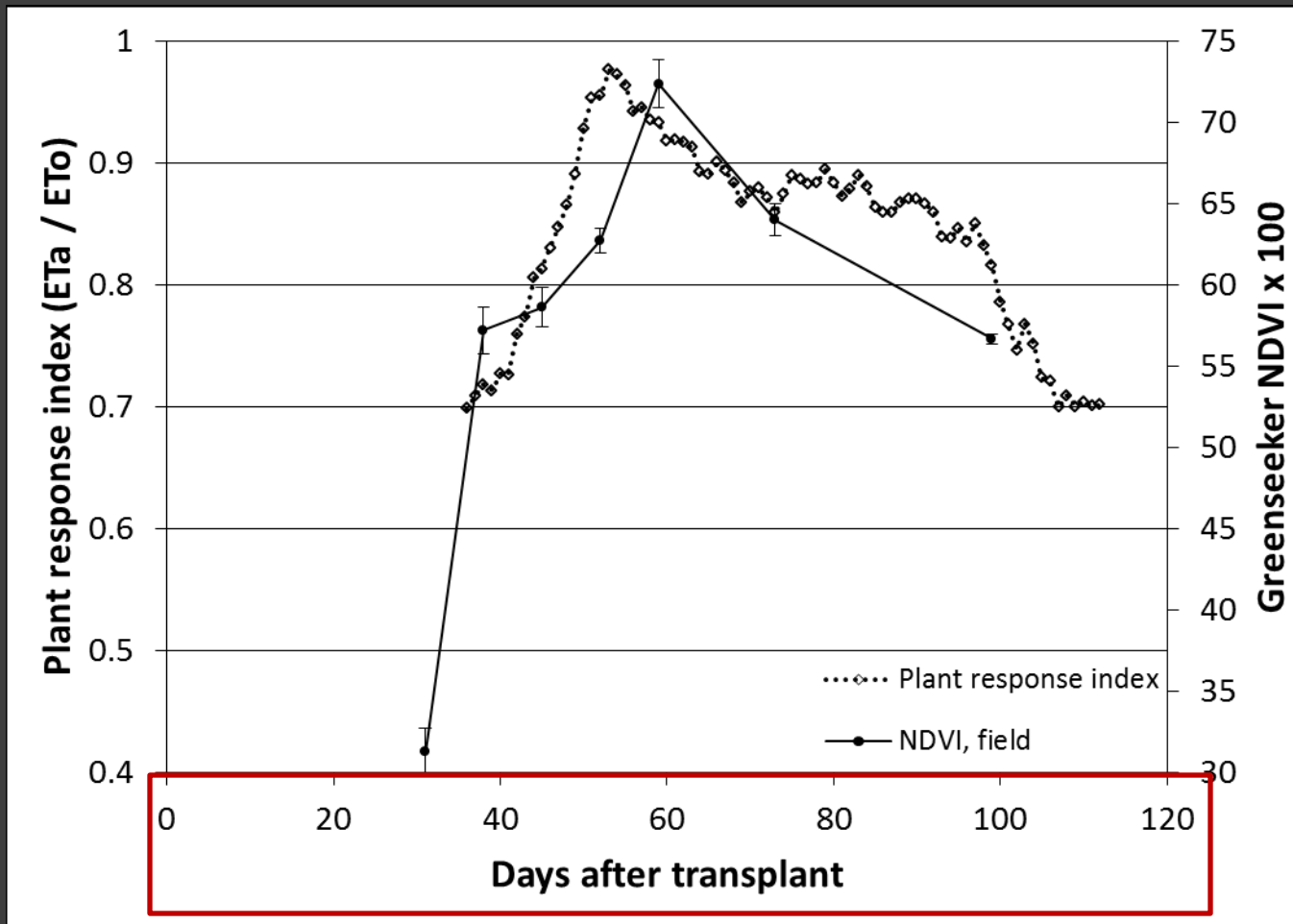
Field 1: Southern Sacramento Valley

- Plant Date: 3/28/2014
- Harvest Date: 7/29/2014
- Yield: 56.04 tons/acre
- Solids: 4.77
- Variety: AB 311
- Total Nitrogen: 190 Units, delivered between 3/25/2014 and 5/8/2014

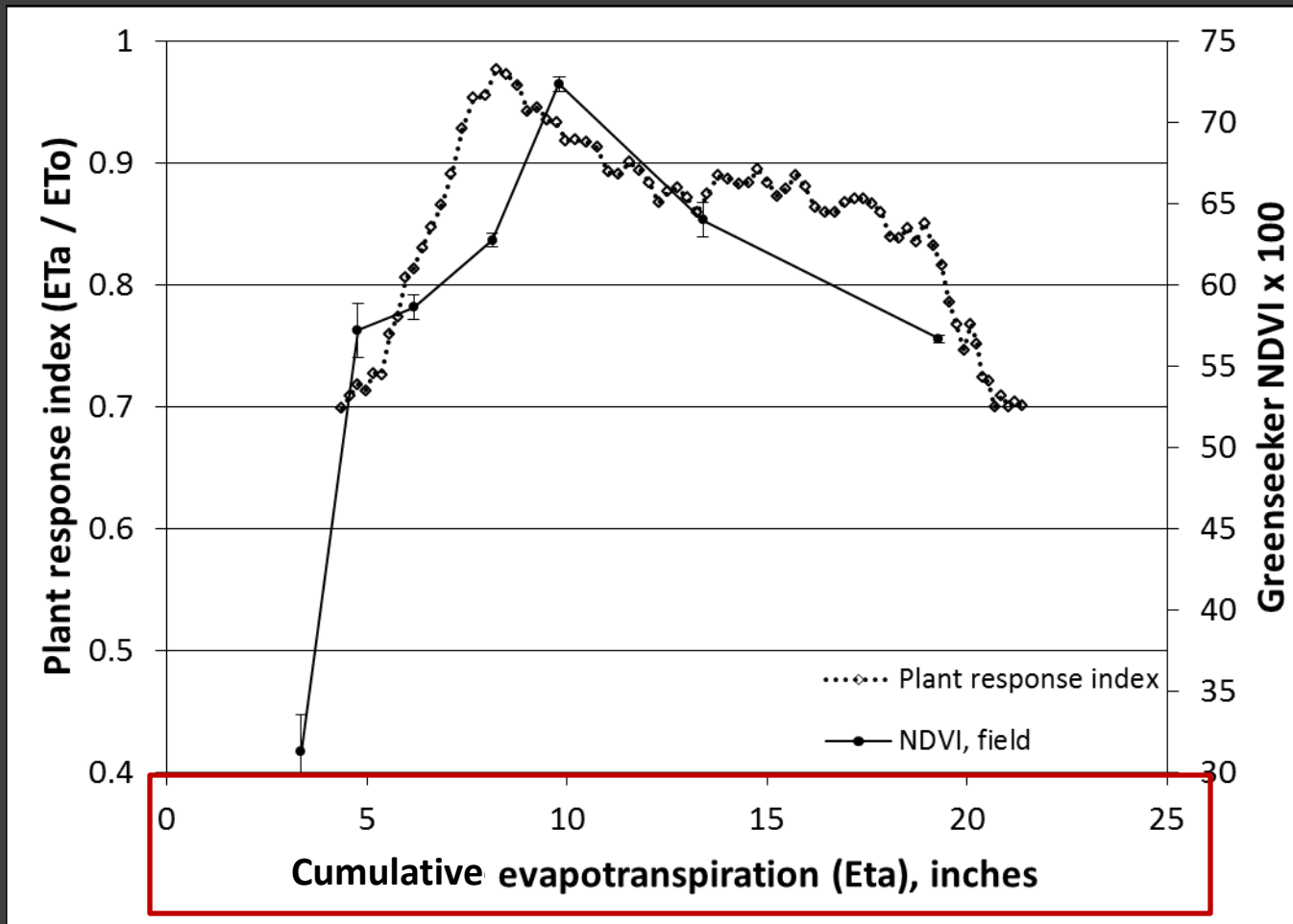
Timing of biomass accumulation and nutrient uptake



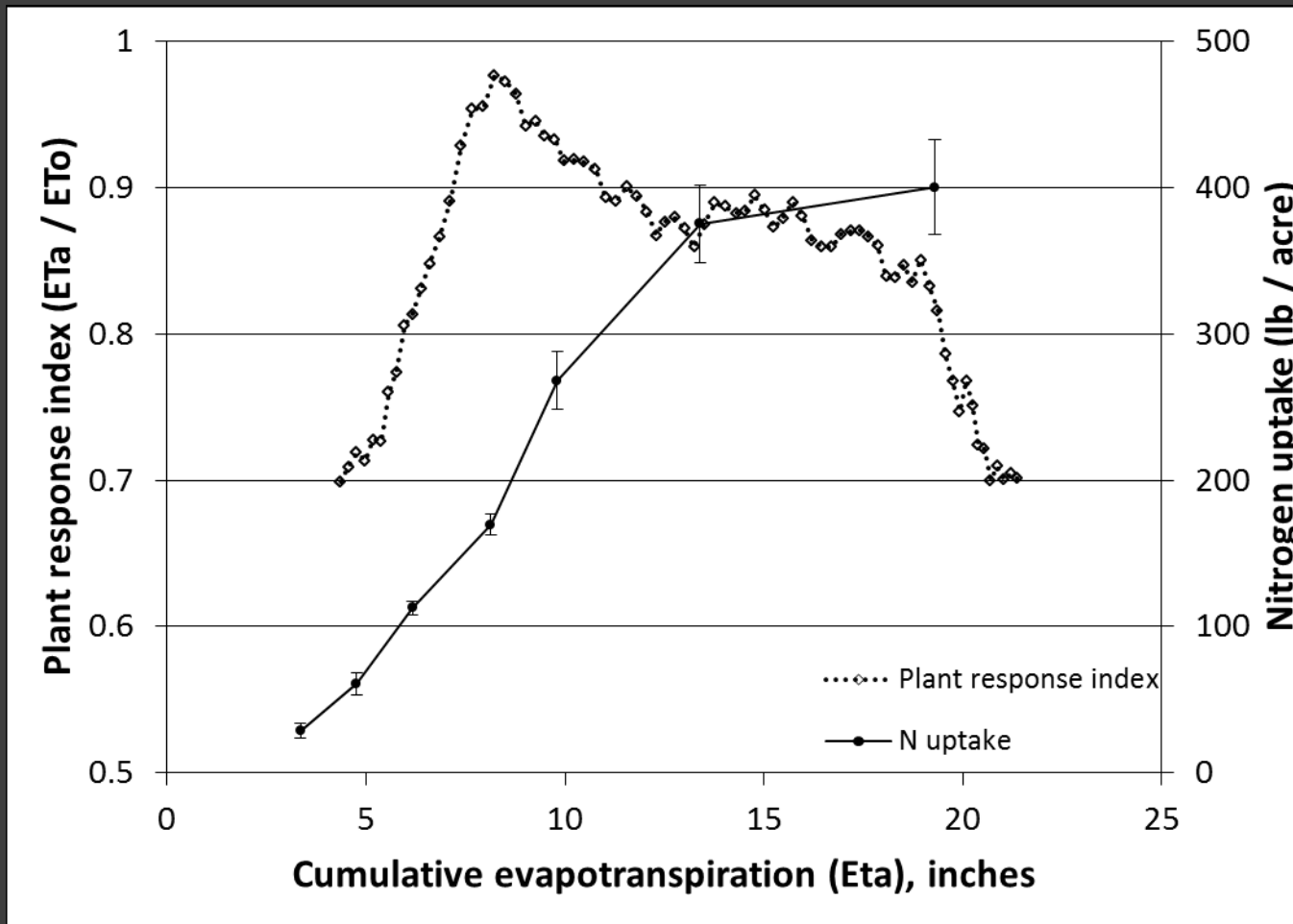
Relationship between biomass accumulation and ET_a / ET_o



Tracking growth as a function of ETa vs days

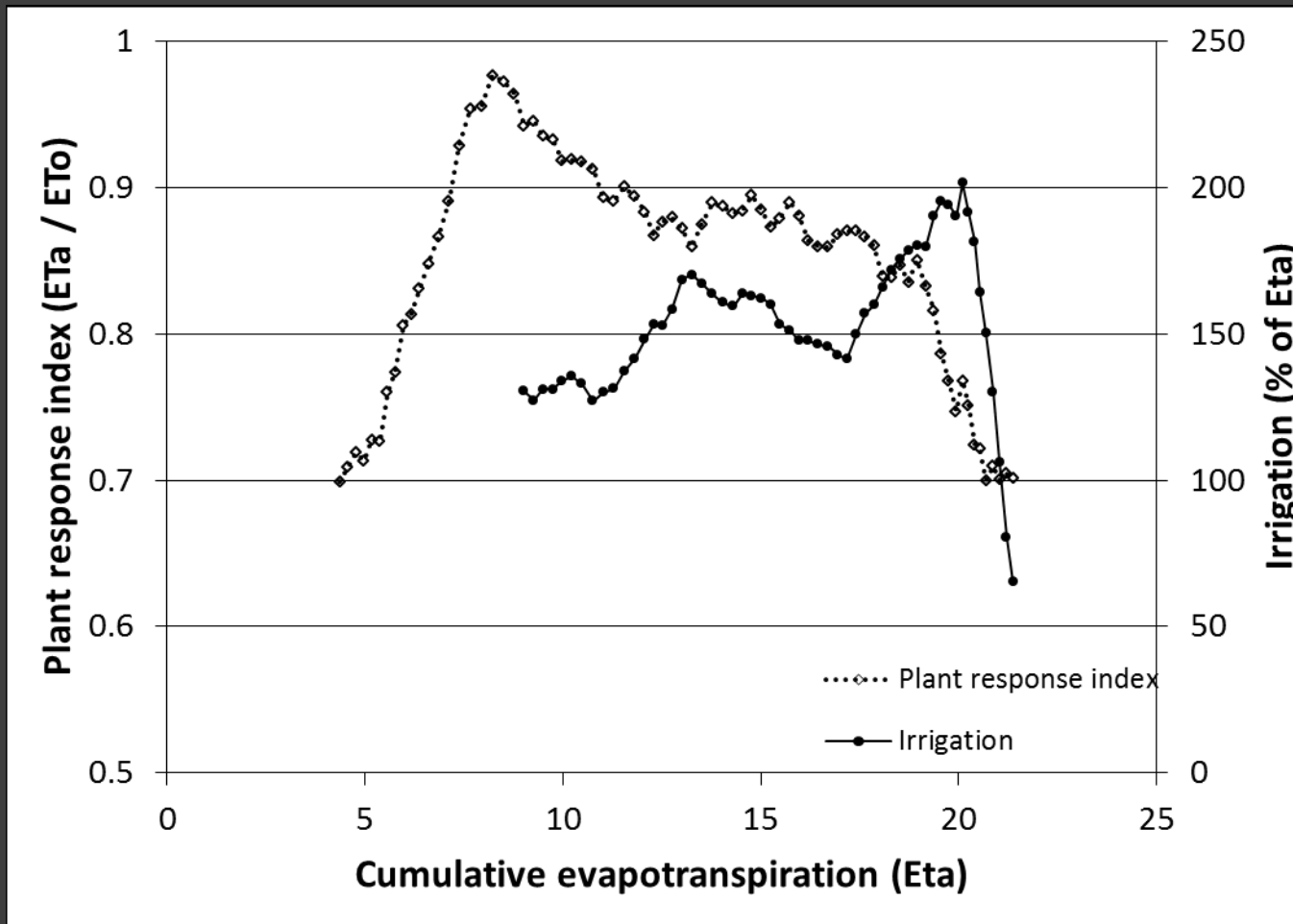


Can we develop robust fertigation recommendations as a function of ETa?

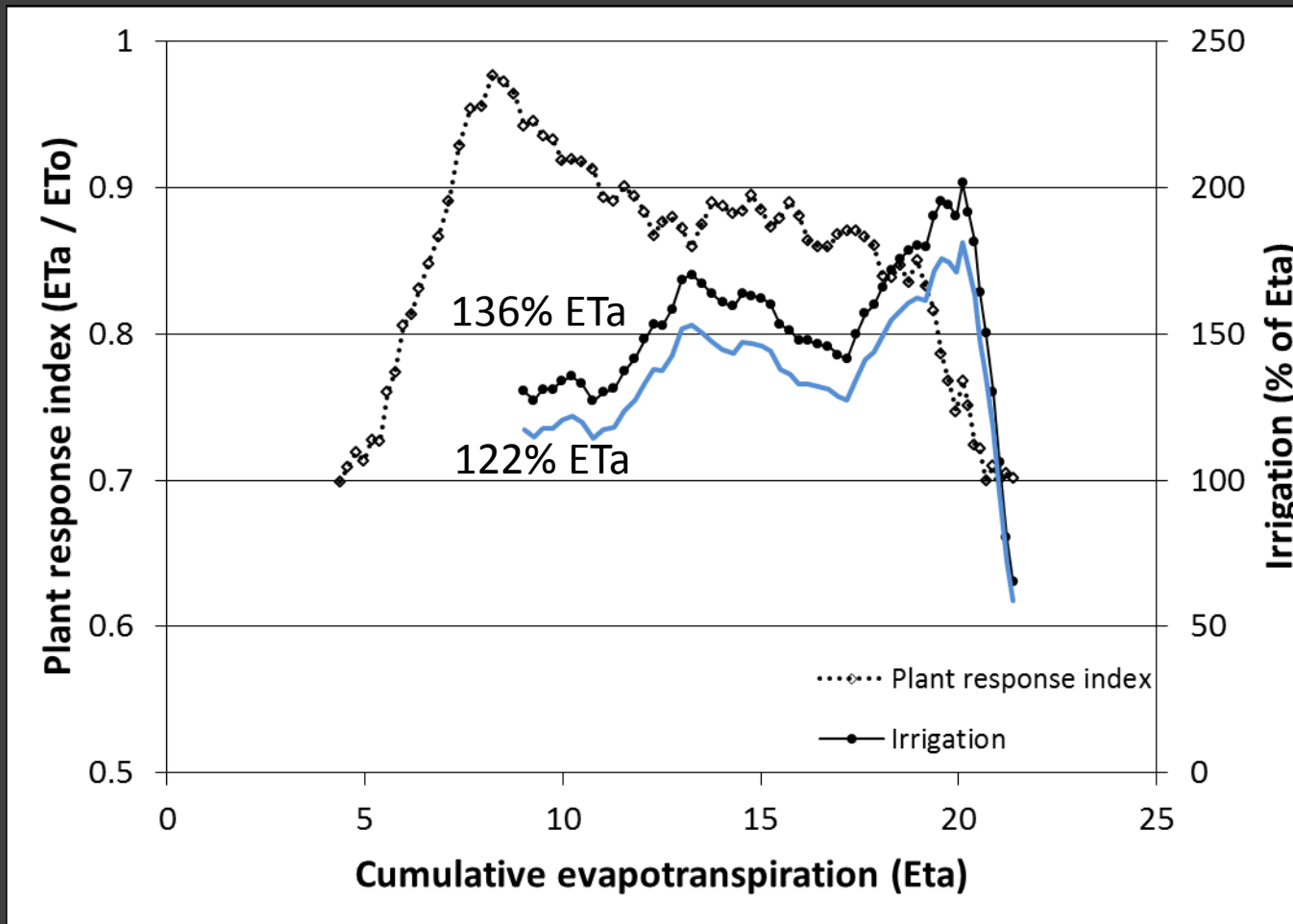


Between 4 – 14 inches of ETa, apply 15 lb N per inch of water?

Water use reduction without productivity reduction by irrigating according to ET_a ?

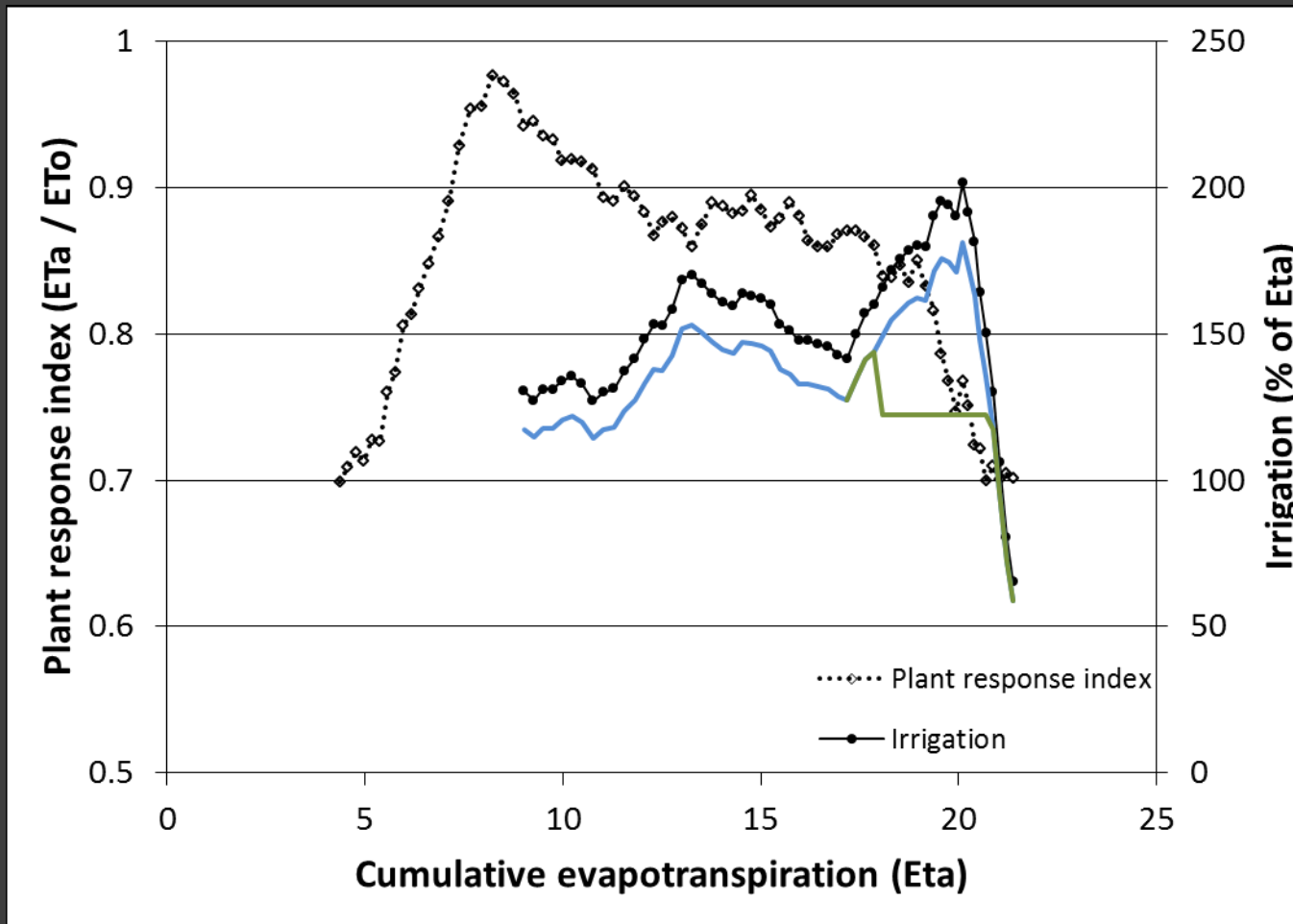


Water use reduction without productivity reduction by irrigating according to ETa?



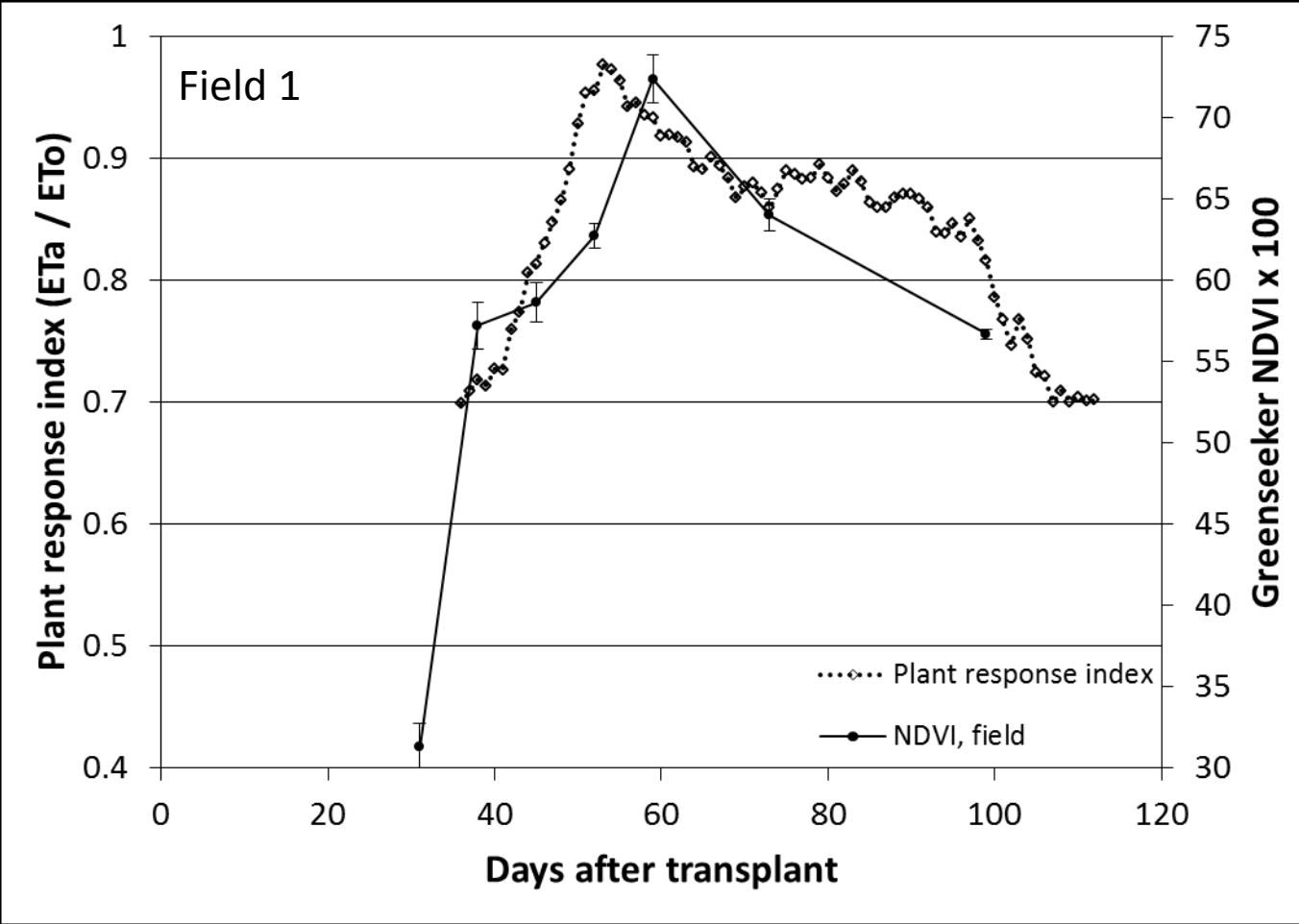
≈ 2 inches of water

Water use reduction without productivity reduction by irrigating according to ET_a ?

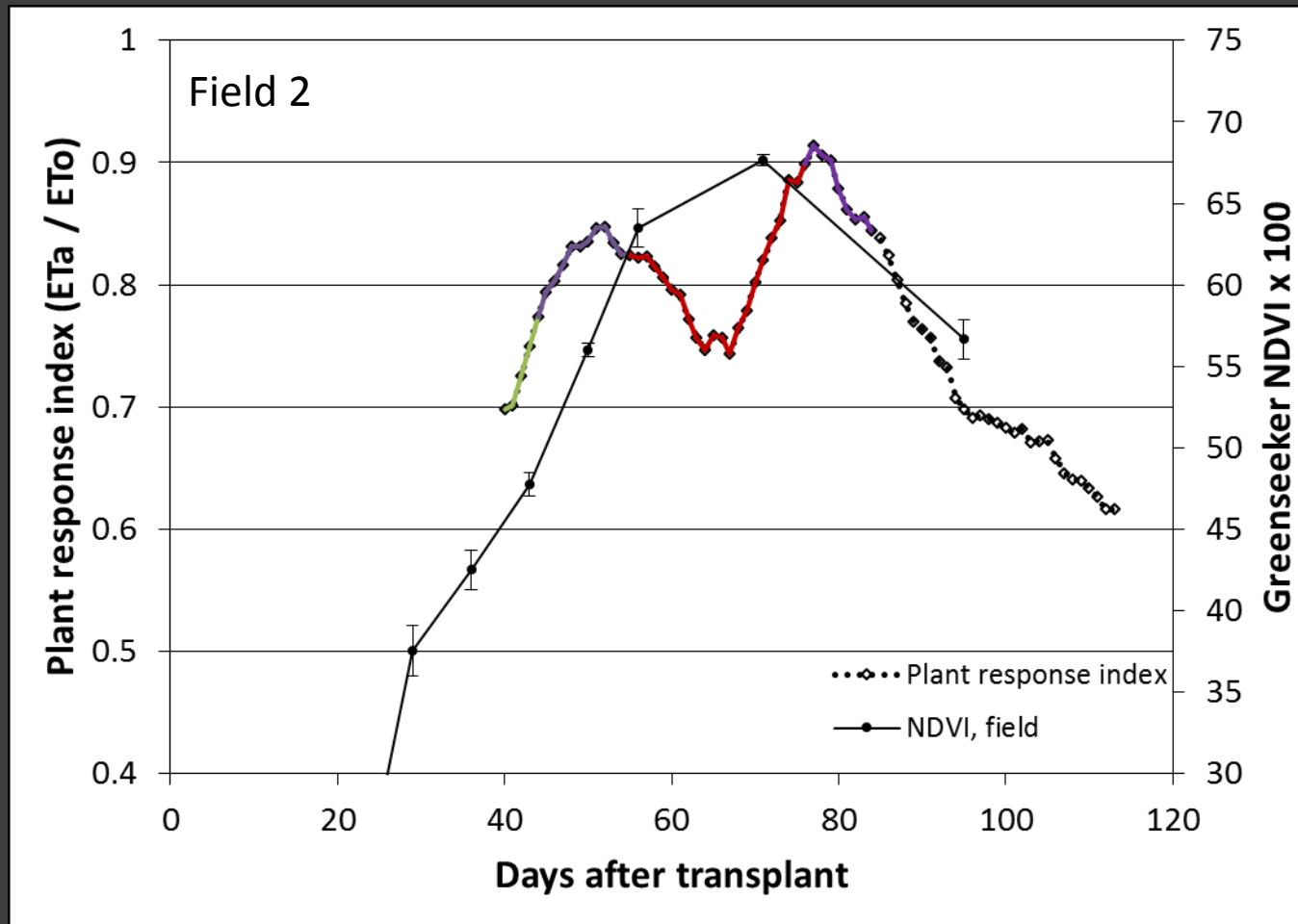


≈ 3 inches of water

Can field-specific Eta act as a diagnostic tool?



Can field-specific Eta/NDVI act as diagnostic tools?



Potassium deficiency

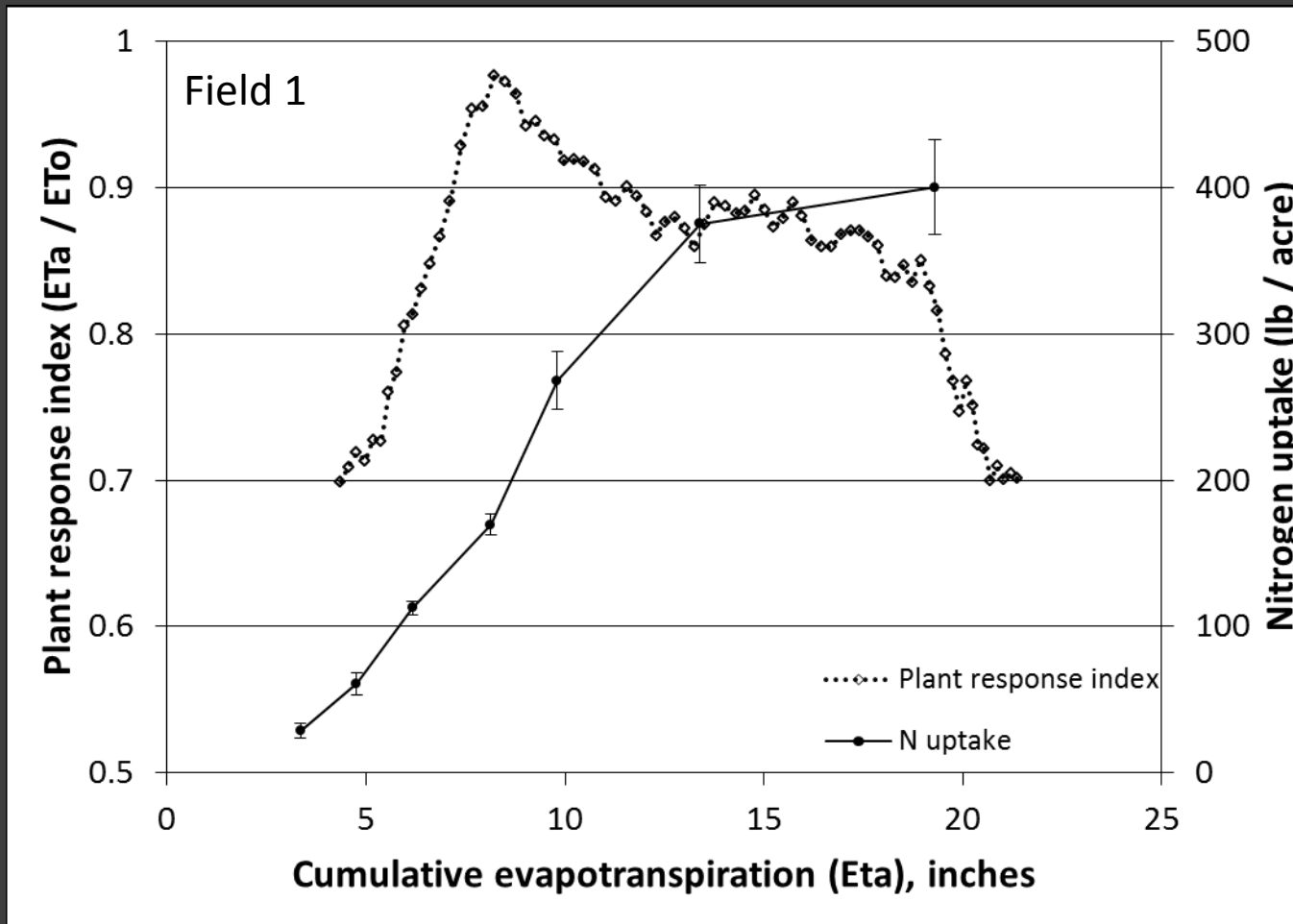
Next steps

- More sites, planting dates
- Detecting variations in N/water management?
- High resolution spectral data?

Acknowledgments

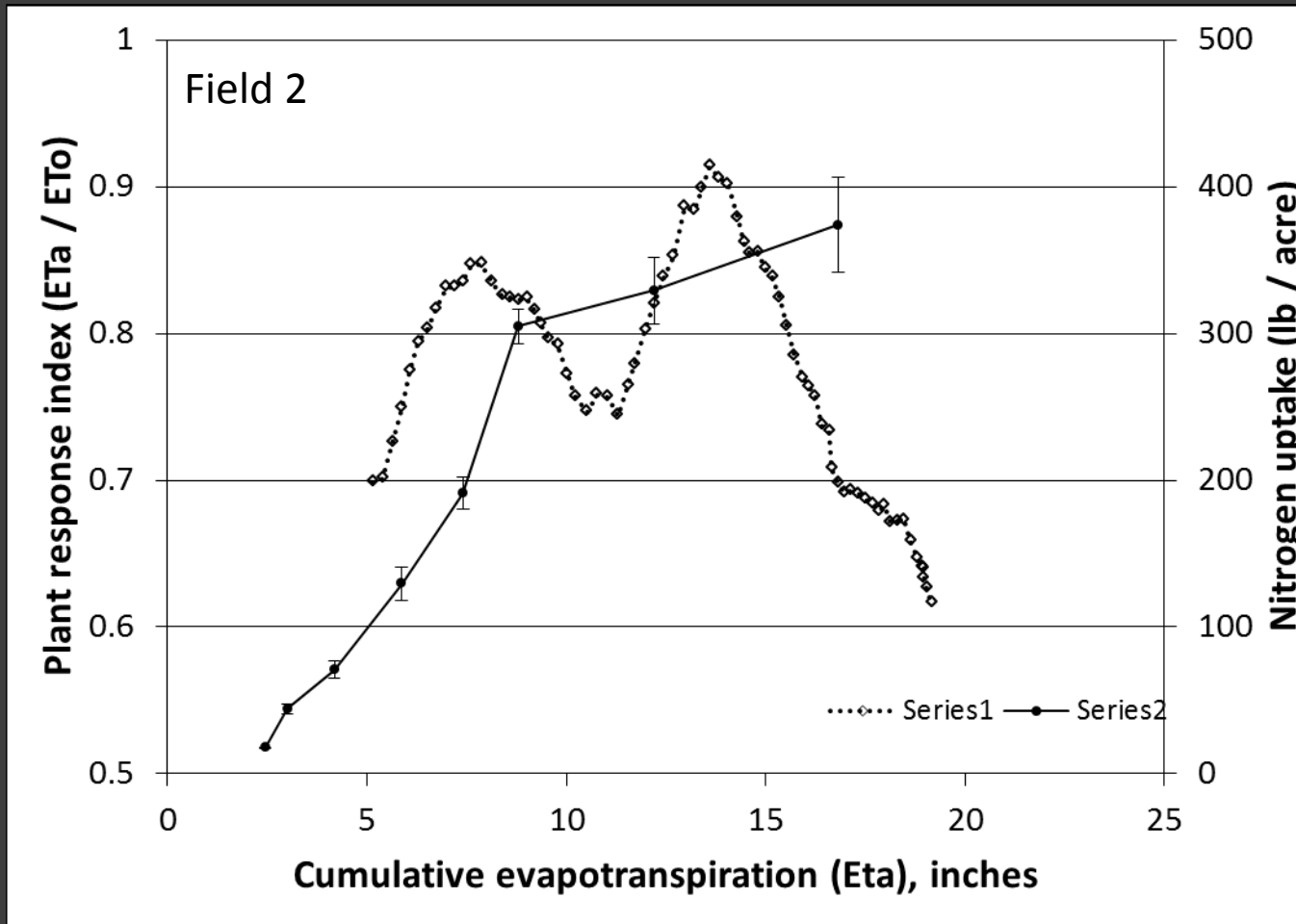
- Participating grower, crop advisor
- California Tomato Research Institute

Can we develop robust fertigation recommendations as a function of ETa?



Between 4 – 14 inches of ETa, apply 15 lb N per inch of water?

Can we develop robust fertigation recommendations as a function of ETa?



Between 4 – 14 inches of ET_a, apply 15 lb N per inch of water?