

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



Mark Lundy, UCCE Agronomy Advisor, Colusa-Sutter-Yuba

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&ca=Open&t=IPM.Note&id=RgAAAAAqxQOPS2VoRaQuADNVpTdzBwCXJown04DURK9HVSkLHFAAAAmw9%2bAACUJown04DURK9HVSkLHFAAAYXG>

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Tule Weekly ET Report

Tule [support@tuletechnologies.com]

Tule [support@tuletechnologies.com]

Tue, July 9, 2014 12:18 PM

Plant Response Index (Actual ET / Reference ET)

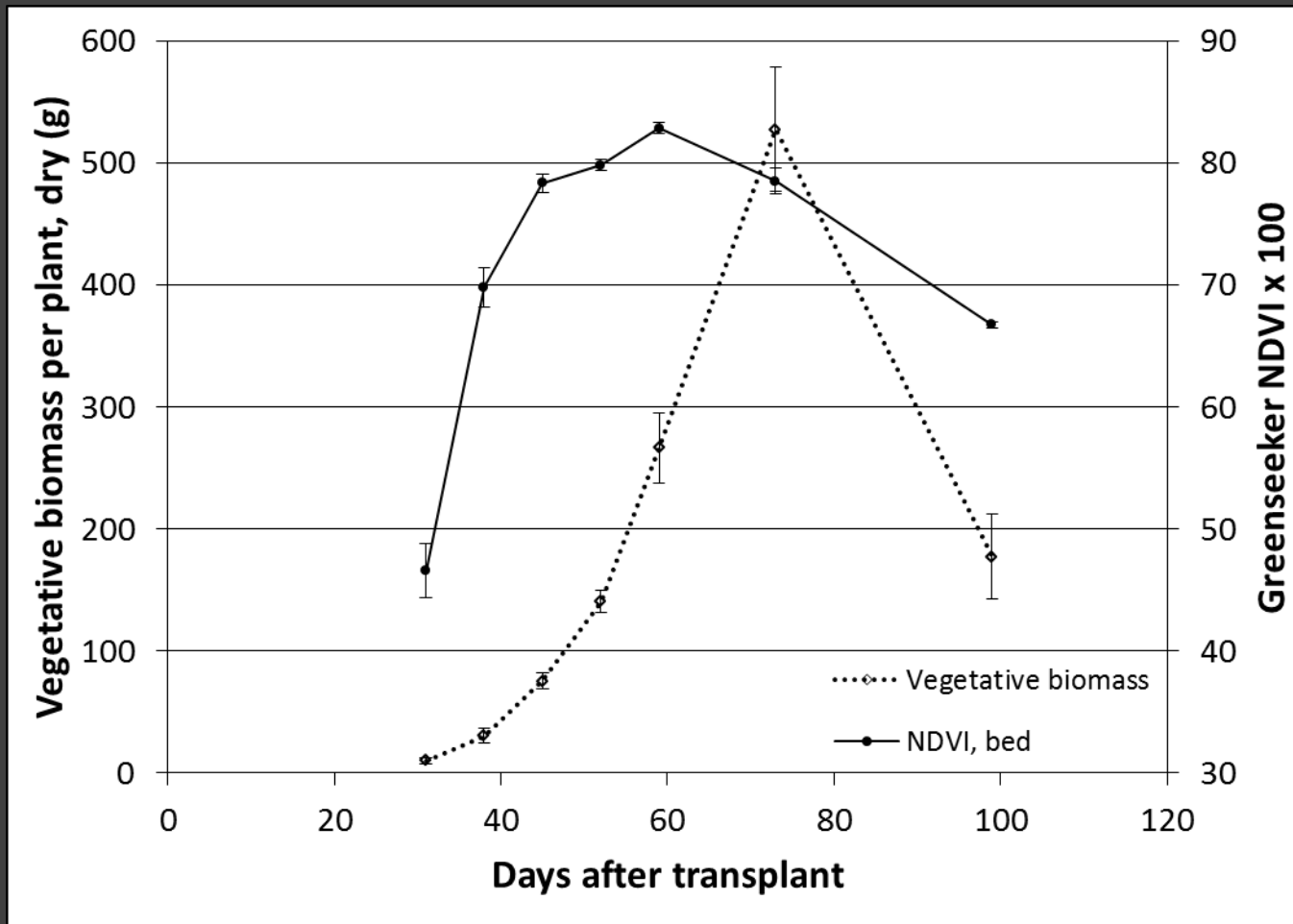
Date	Plant Response Index (%)
May 11	50
May 12	75
May 13	60
May 14	80
May 15	70
May 16	80
May 17	75
May 18	80
May 19	70
May 20	95
May 21	85
May 22	100
May 23	90
May 24	100
May 25	95
May 26	100
May 27	90
May 28	75
May 29	80
May 30	90
May 31	100
Jun 1	90
Jun 2	80
Jun 3	90
Jun 4	75
Jun 5	80
Jun 6	90
Jun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

Tule

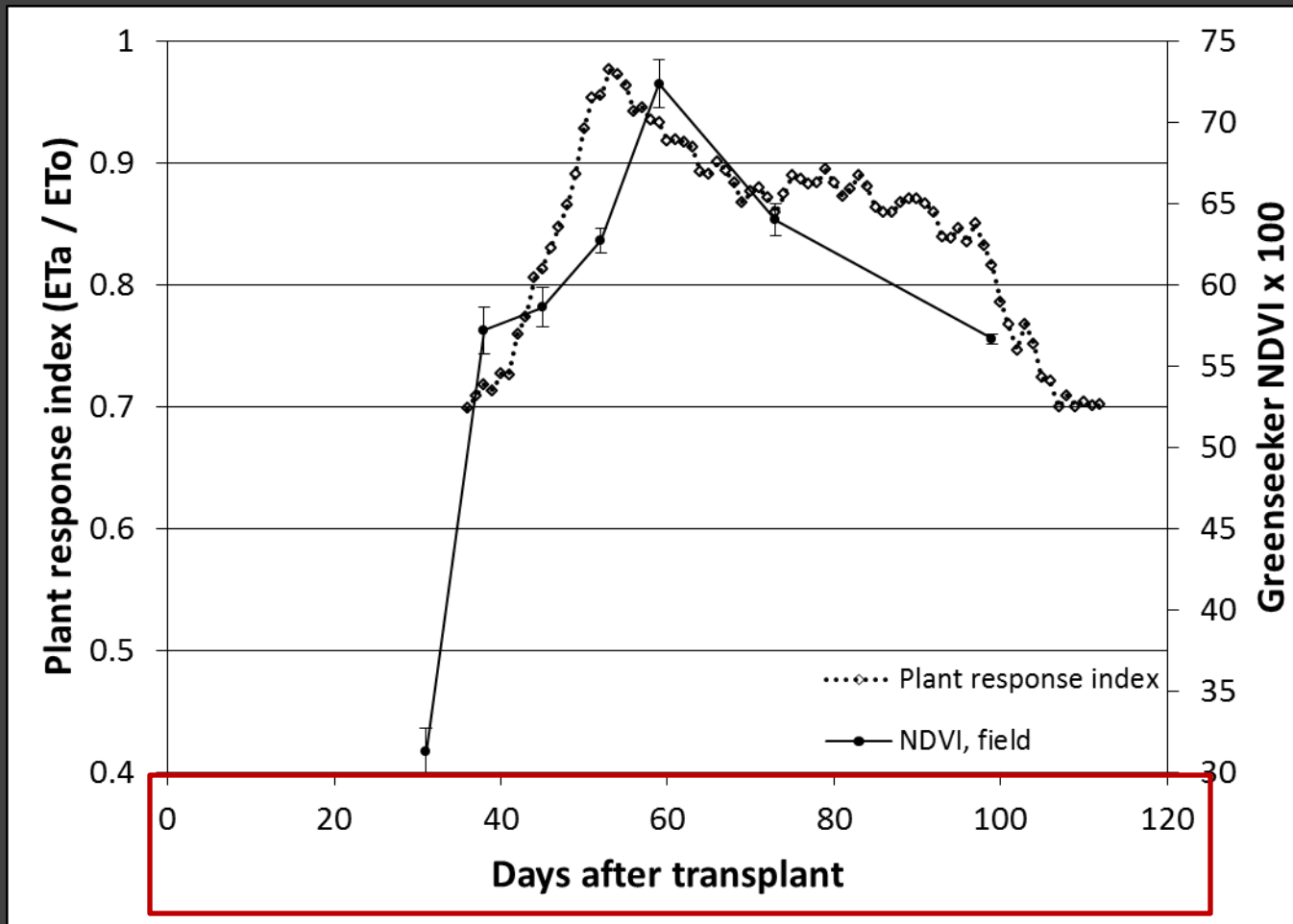
Field 1: Southern Sacramento Valley

- 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

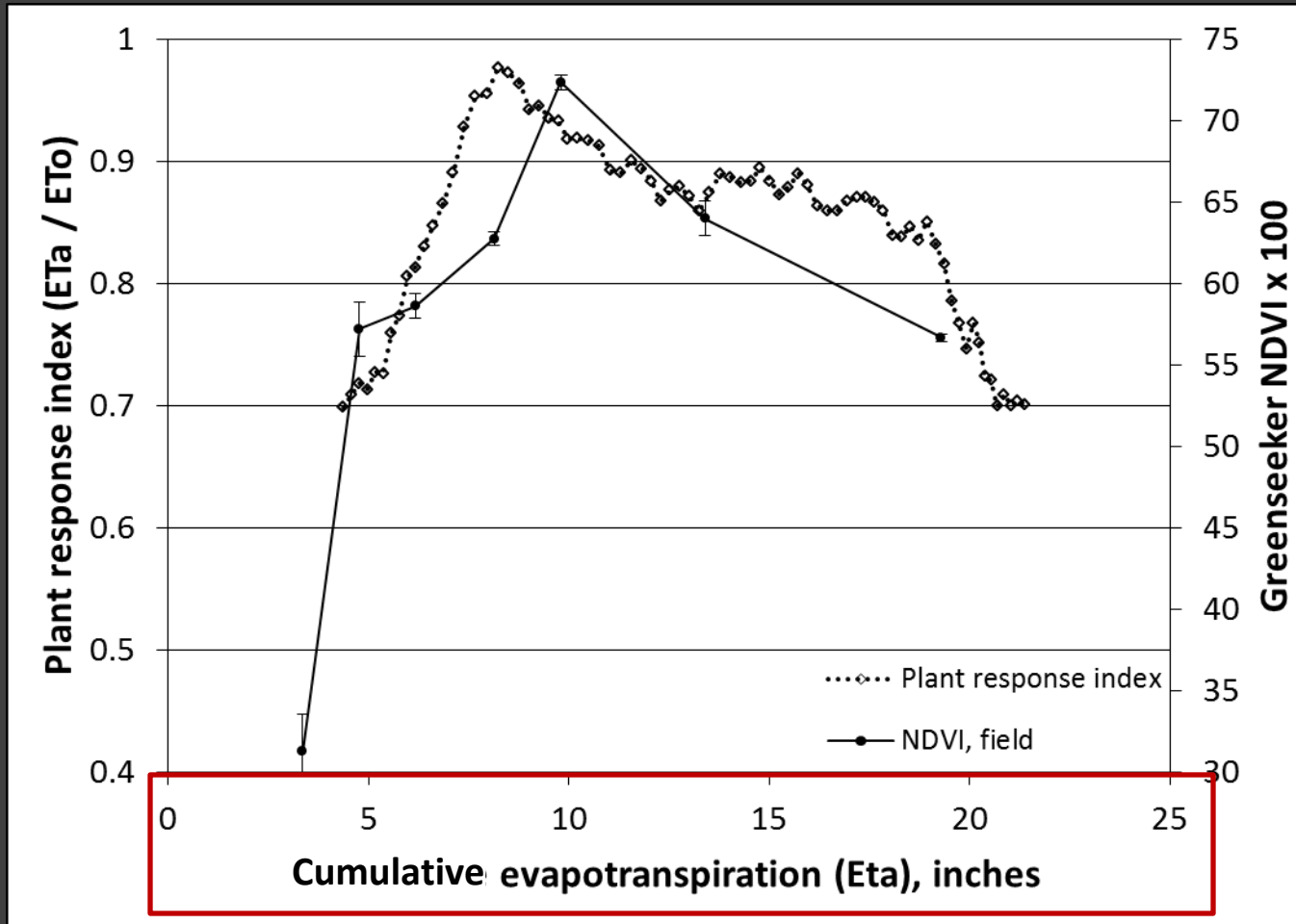
Timing of biomass accumulation and nutrient uptake



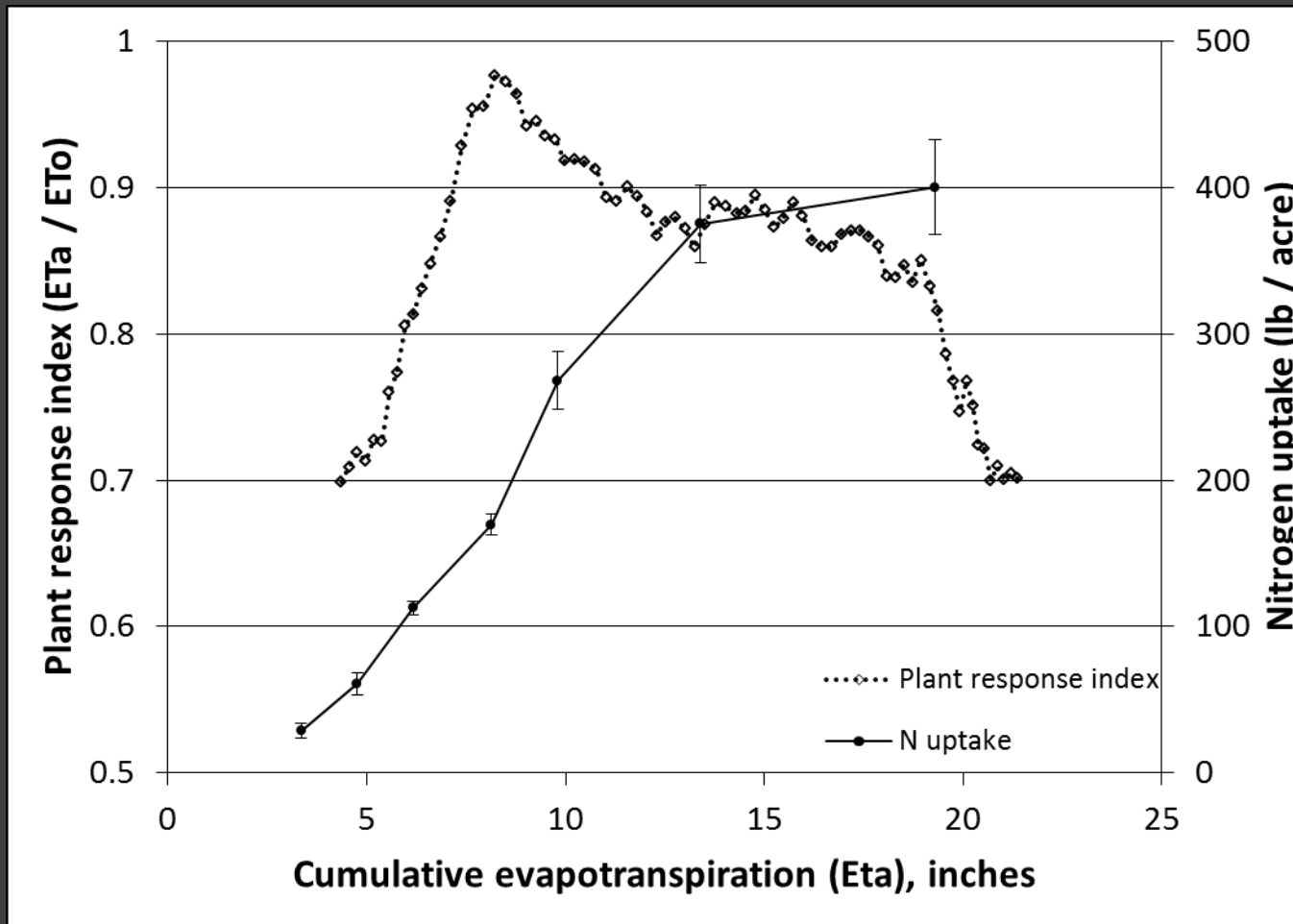
Relationship between biomass accumulation and ET_a / ET_o



Tracking growth as a function of ETa vs days

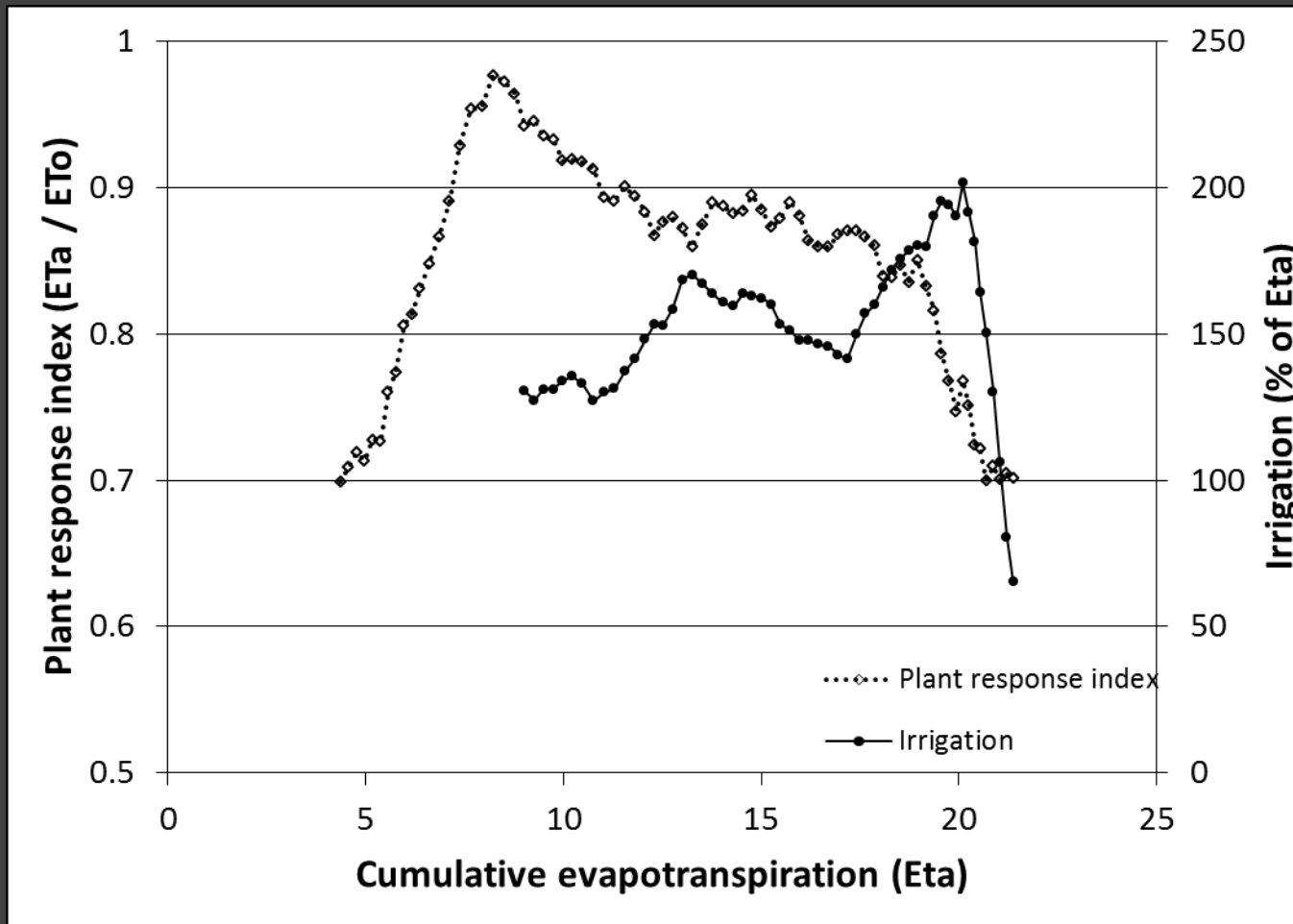


Can we develop robust fertigation recommendations as a function of ETa?

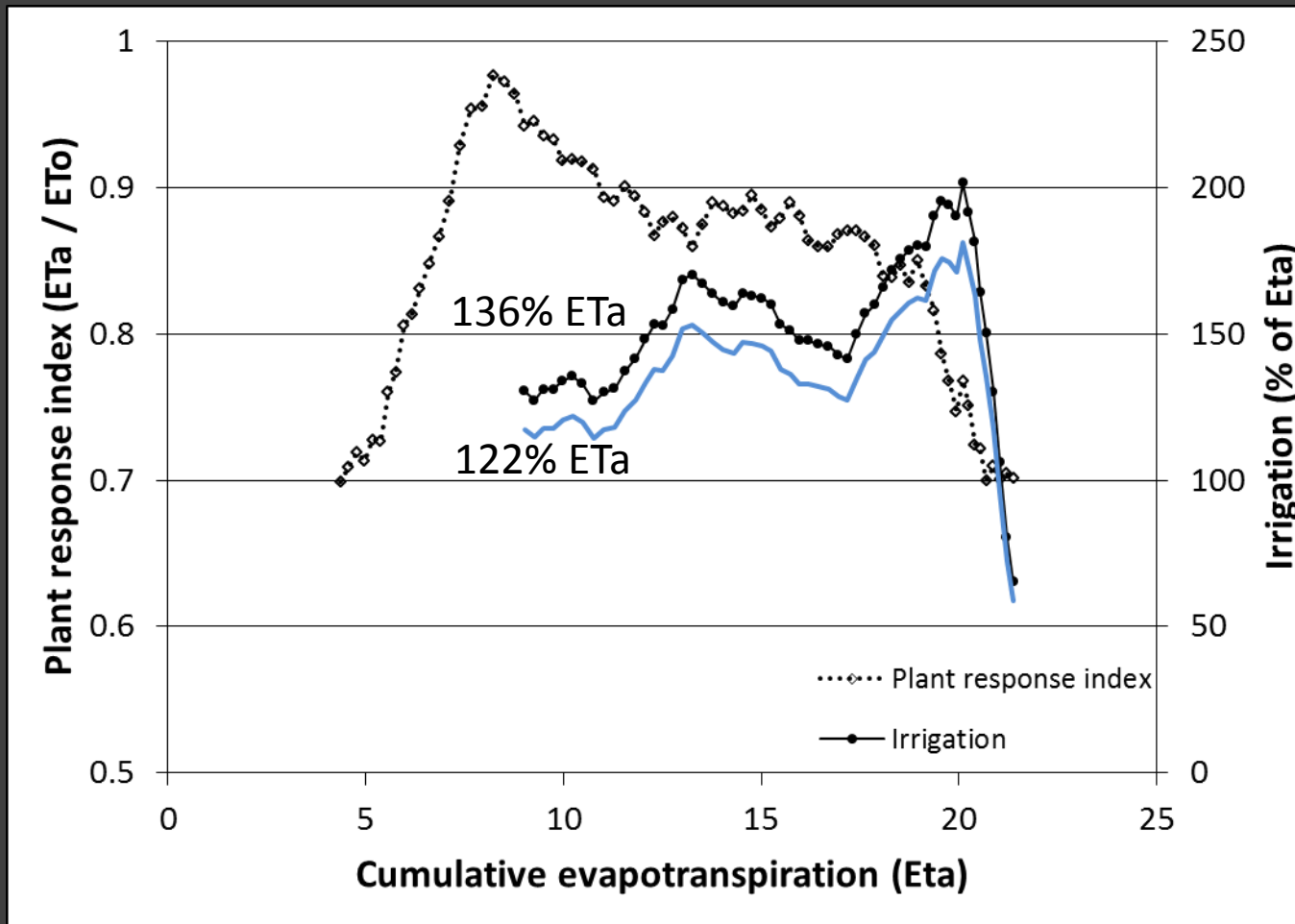


Between 4 – 14 inches of ETa, apply 15 lb N per inch of water?

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

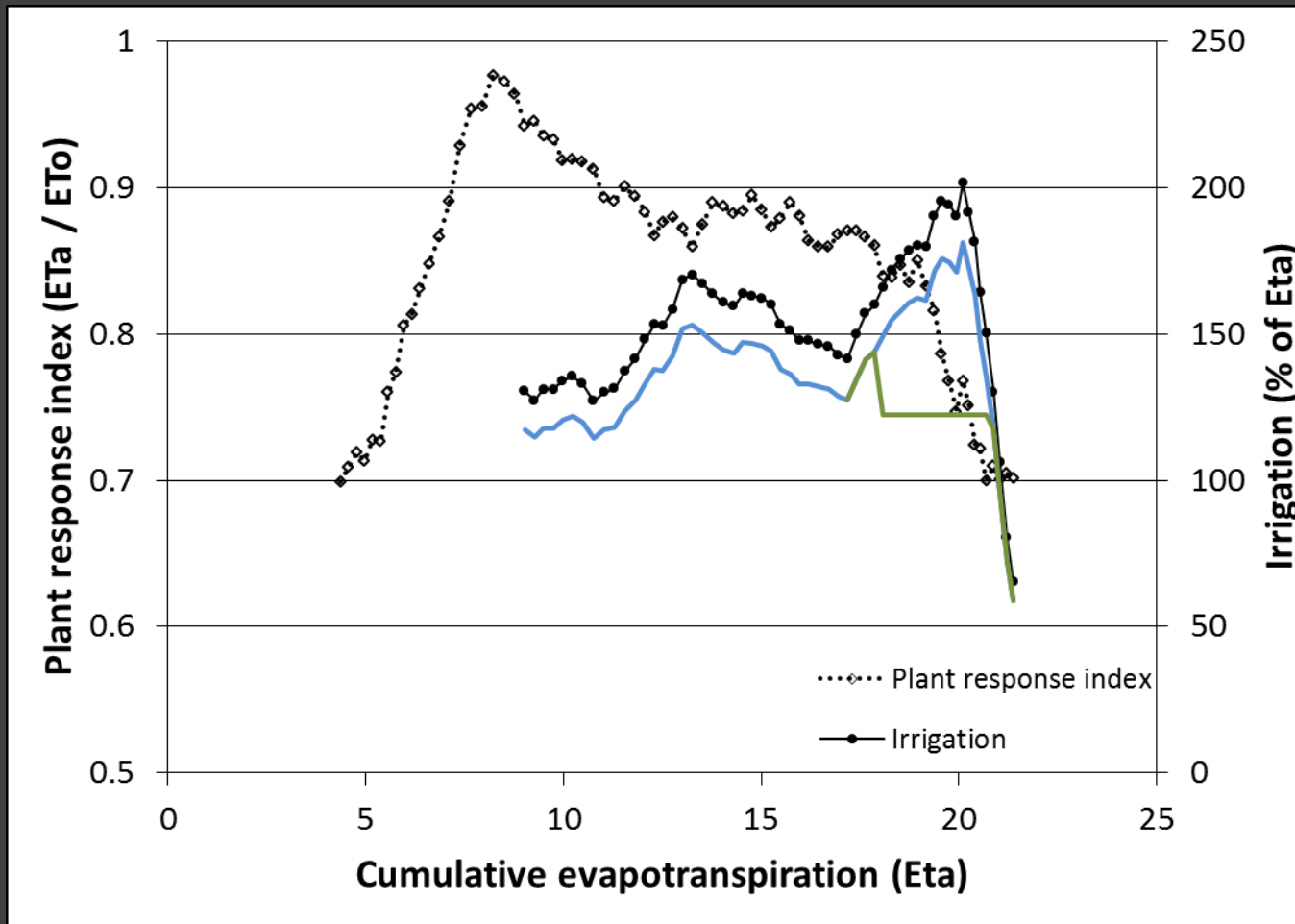


Water use reduction without productivity reduction by irrigating according to ETa?



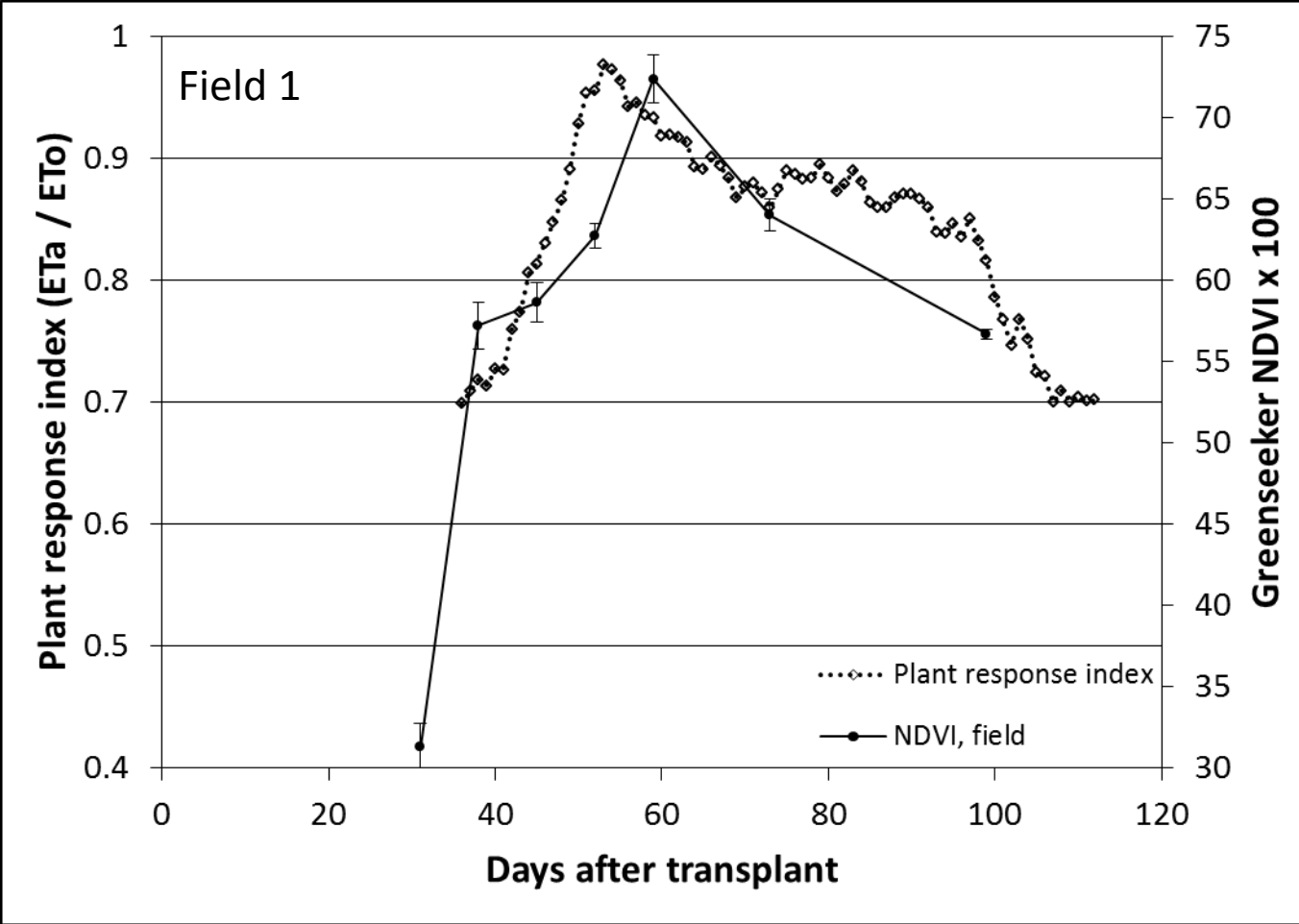
≈ 2 inches of water

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

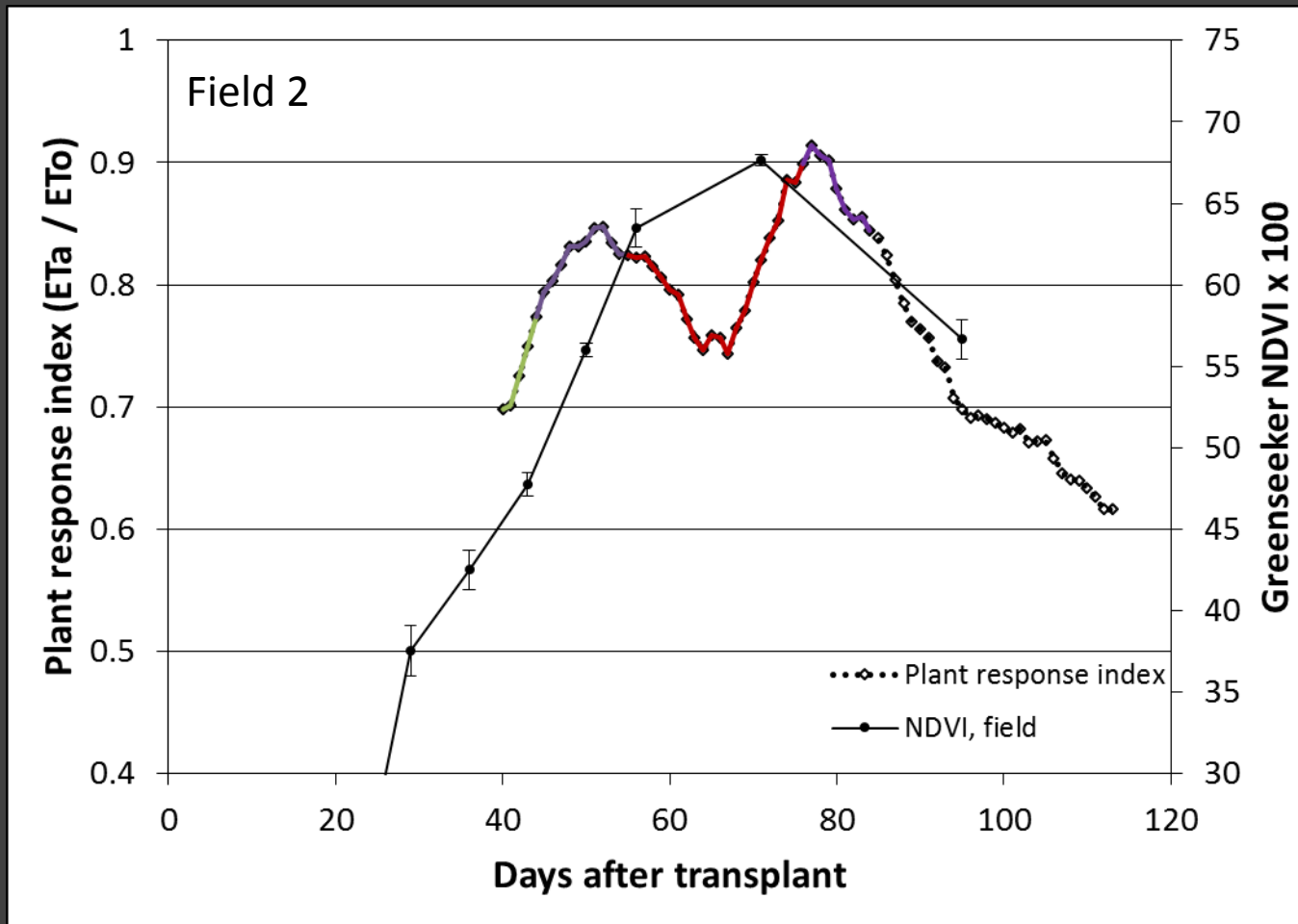


≈ 3 inches of water

Can field-specific Eta act as a diagnostic tool?



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



Potassium deficiency

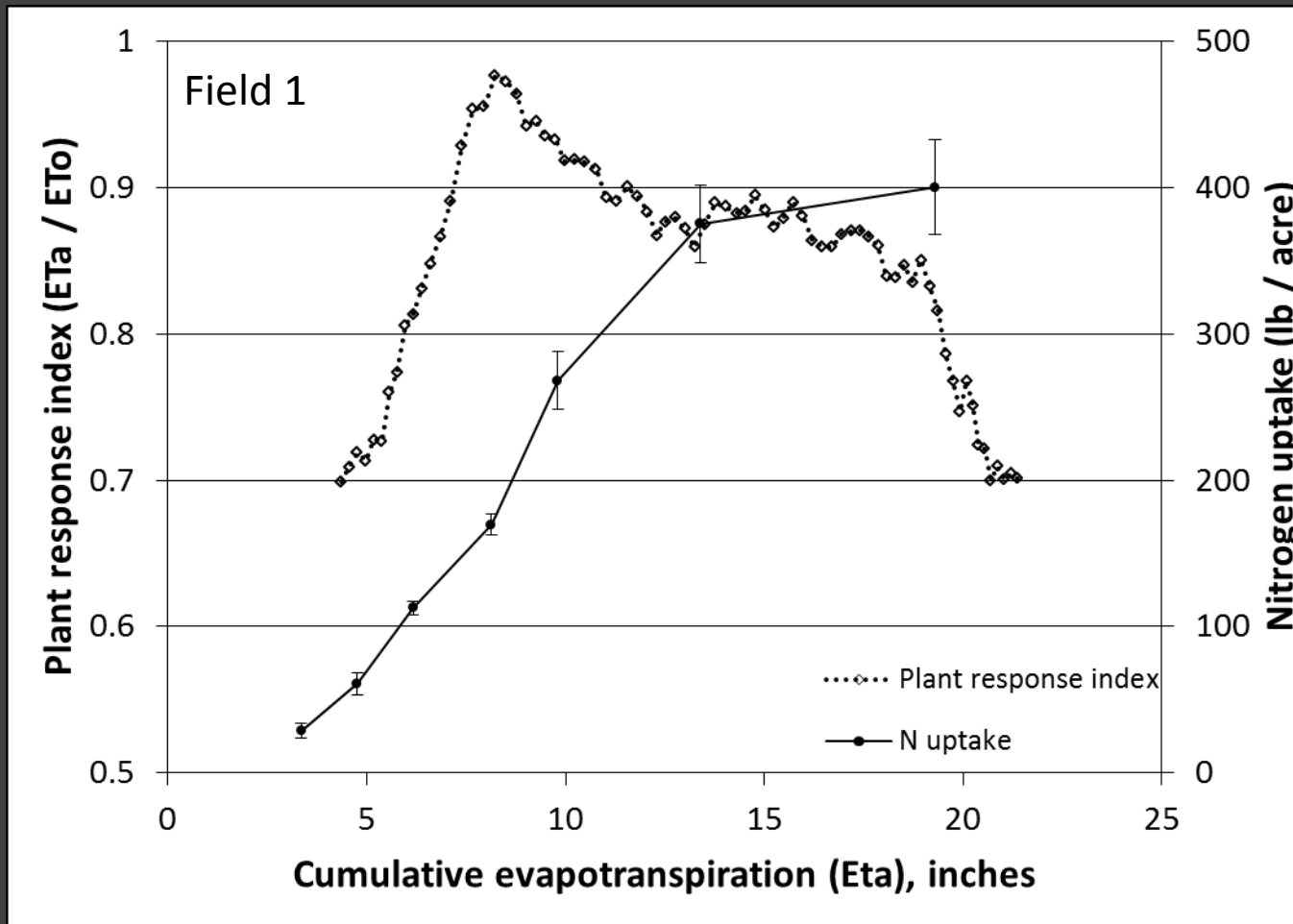
Next steps

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

Acknowledgments

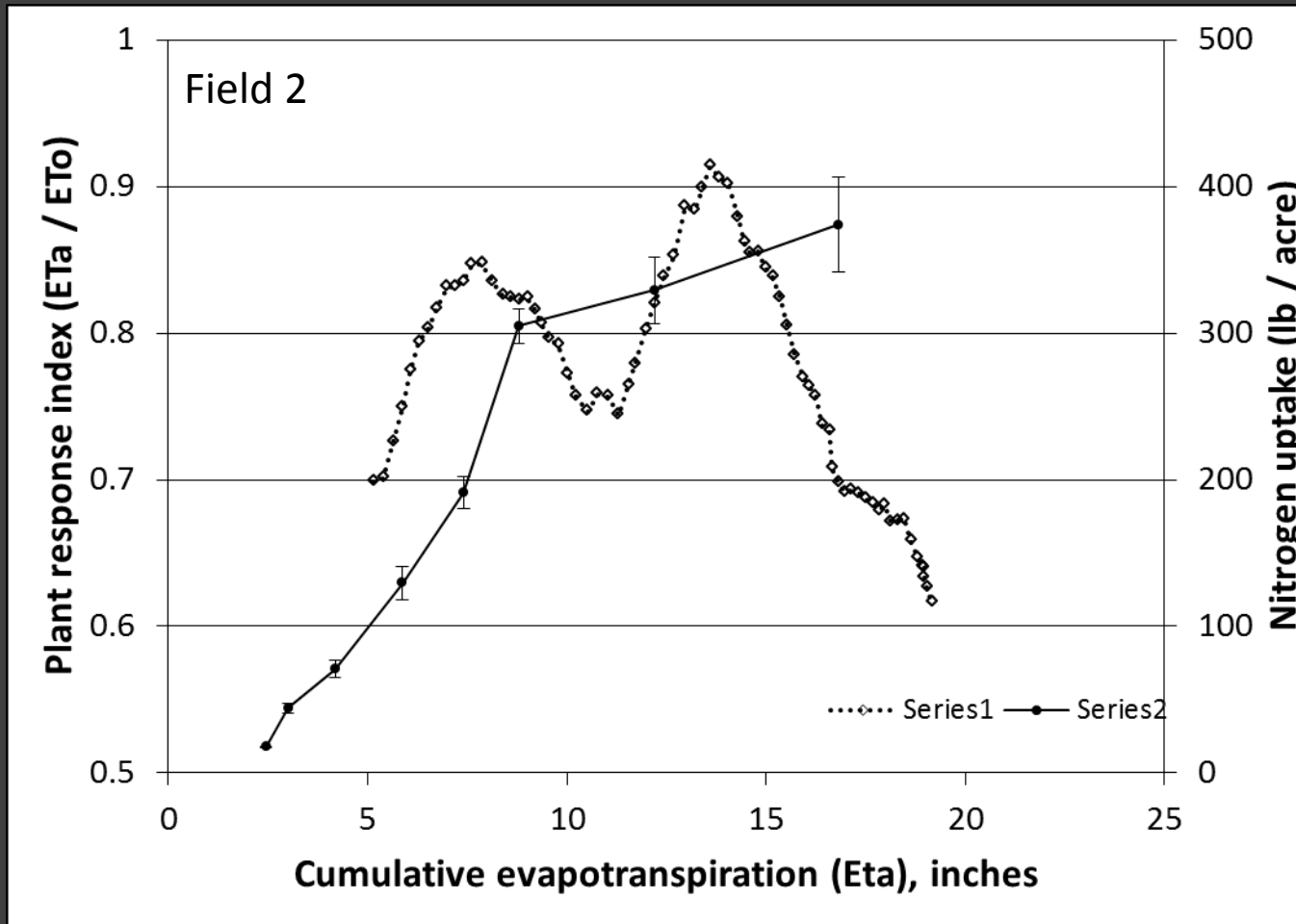
- Participating grower, crop advisor
- California Tomato Research Institute

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?