



***Developing a Crop Coefficient (K_c) for
Efficient Irrigation of Table Grapes in a Semi-Arid
area.***

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Vitis vinifera c.v. Superior Seedless (Sugraone).
Semi arid conditions.







The objectives of this research :

- (1) To determine seasonal crop evapotranspiration (ET_c) and the crop coefficient (κ_c) of Superior Seedless table grapevines grown in a semi-arid region.**
- (2) To establish the relationship between seasonal change in Leaf Area Index and that of ET_c and K_c .**
- (3) To test the effect of irrigation at three different ET_c levels on yield.**

Drainage Lysimeters :

Diameter : 1.05 m

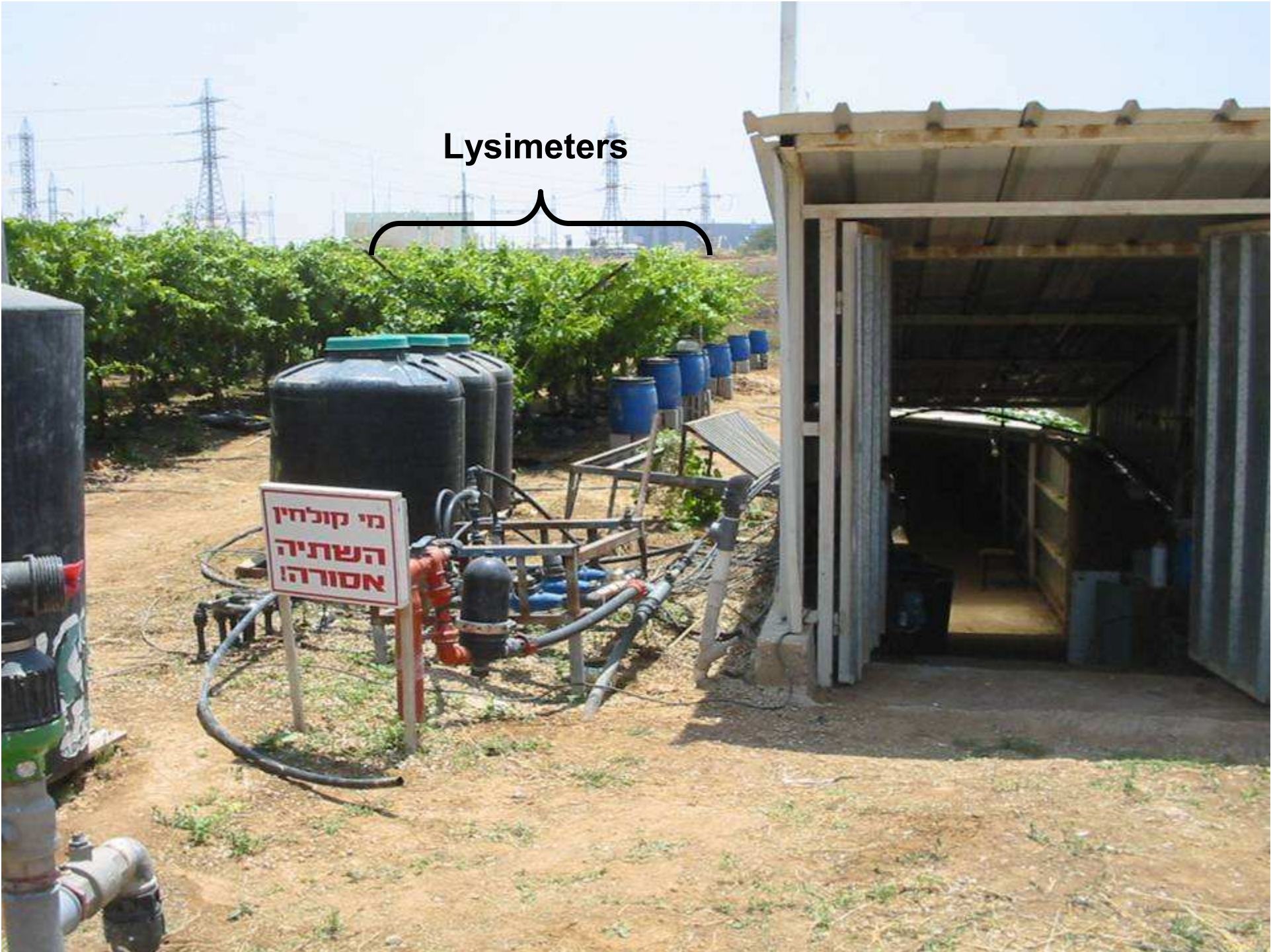
Height : 1.5 m

Volume : 1.3 m²



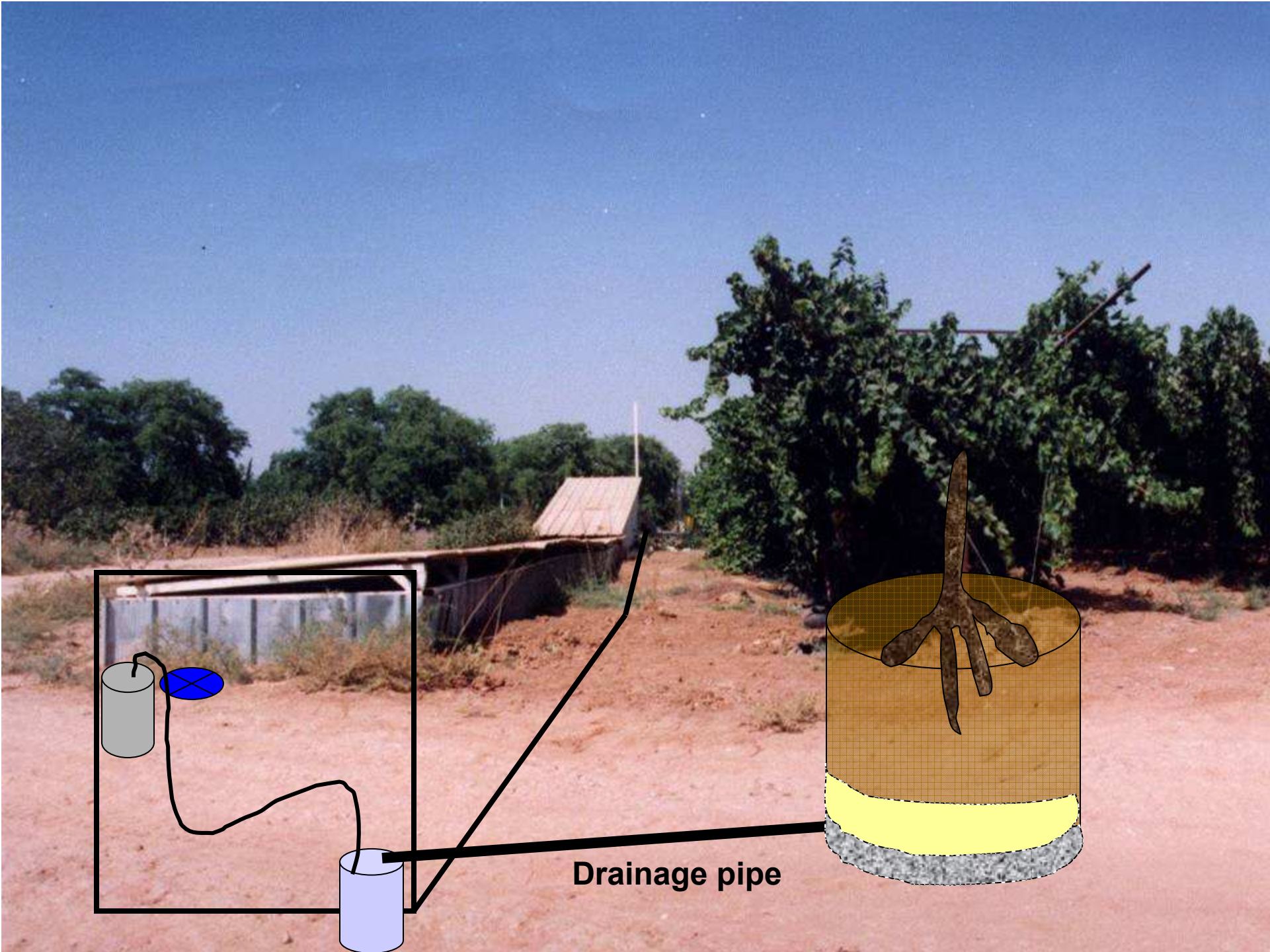


Lysimeters



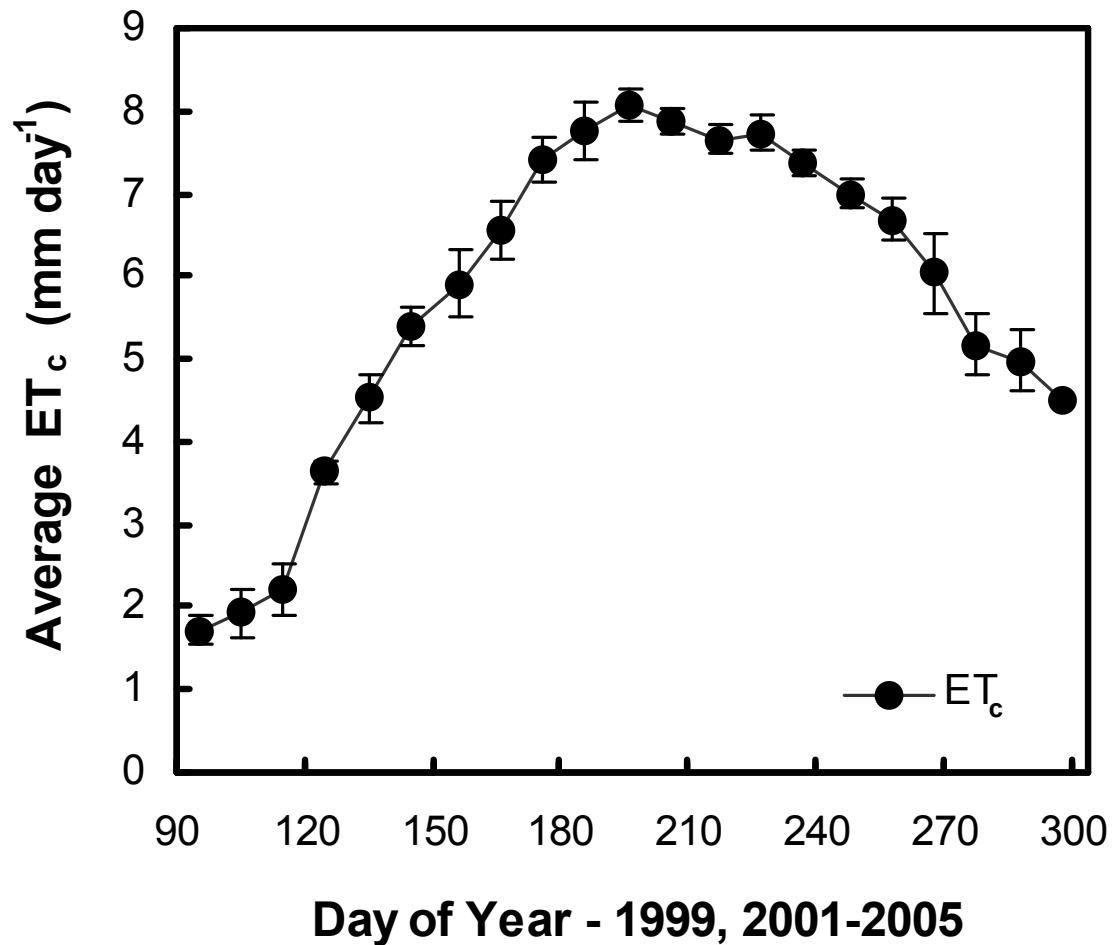


סכנת איסוף הנקז



Drainage pipe

Seasonal curve of water use (ET_c)

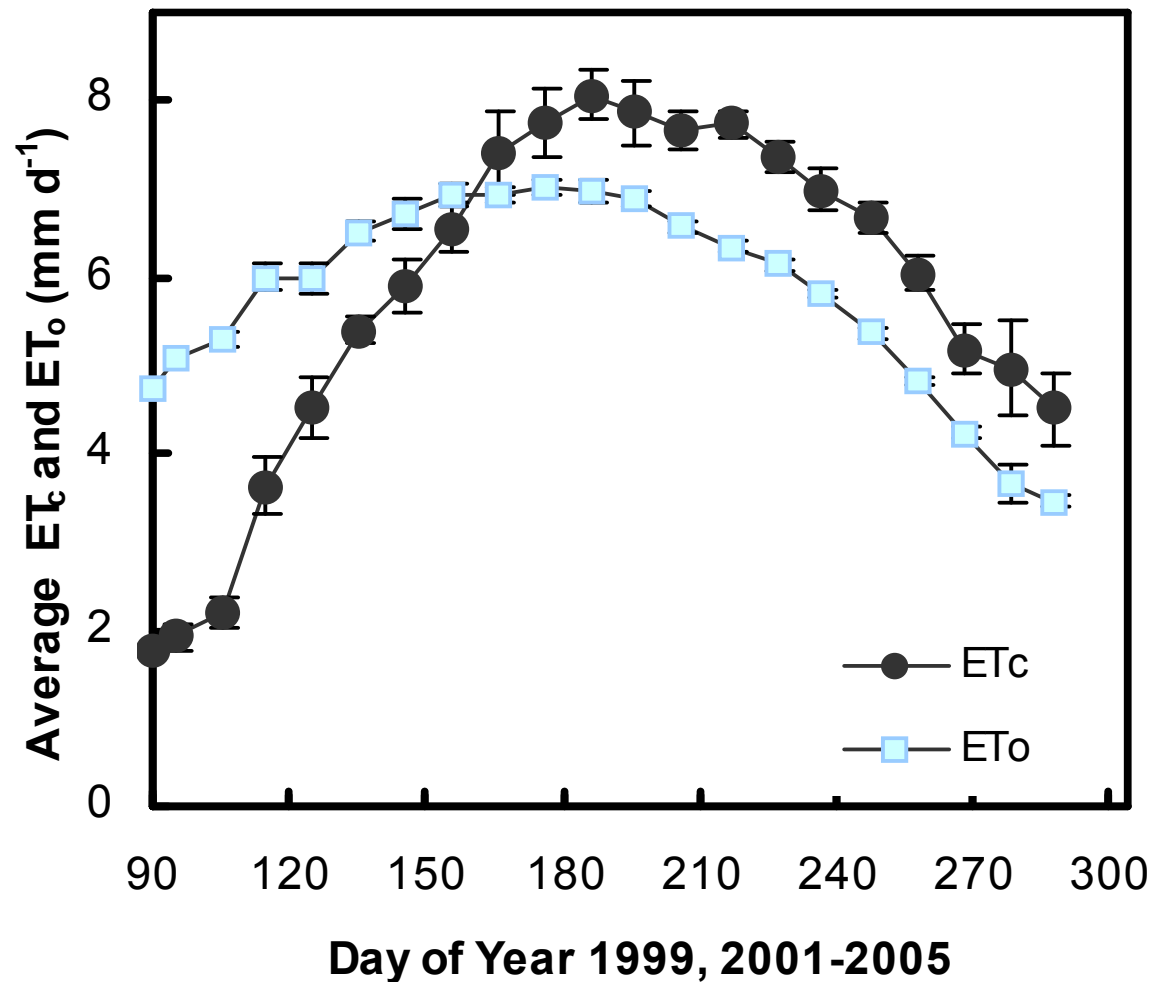


Seasonal curves of water use (ET_c) as measured using 12 drainage lysimeters.

Each data point represents an average of 10-11 days during six seasons, 1999 and 2001 to 2005.

Vertical error bars represent the double S.E. of the mean.

Seasonal curve of water use (ET_c) and ET_o



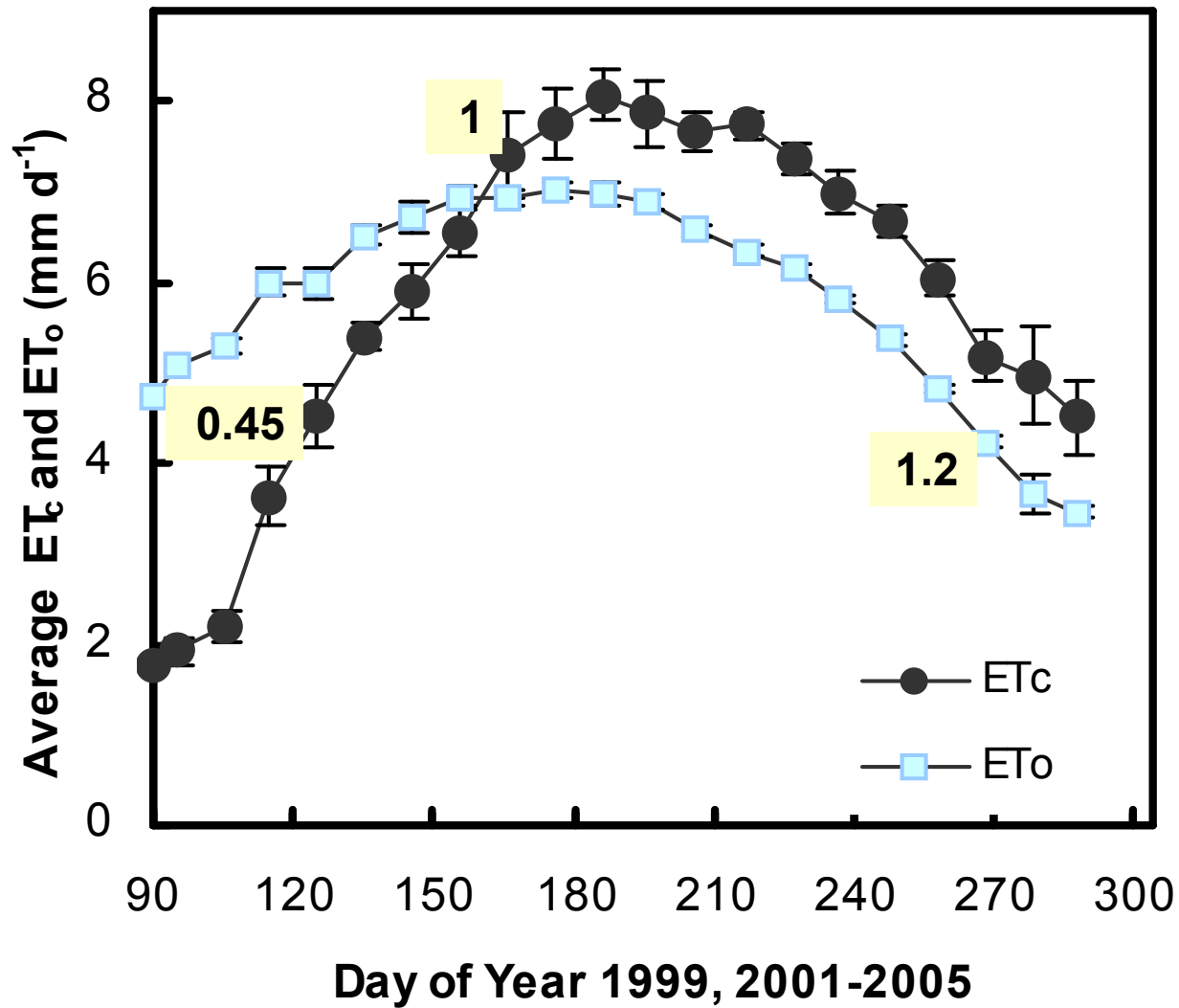
Seasonal curves of water use (ET_c) as measured using drainage lysimeters, and of ET_o calculated from the Penman-Monteith equation as modified for CIMIS.

Each data point represents an average of 10-11 days during six seasons, 1999 and 2001 to 2005.

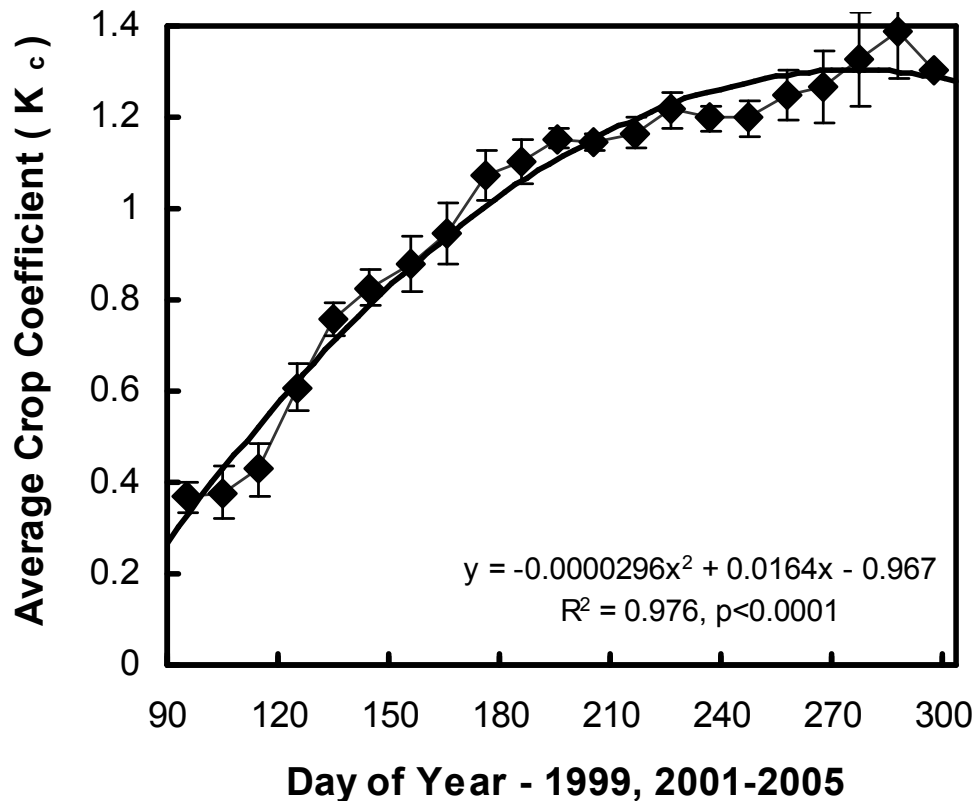
Vertical error bars represent the double S.E. of the mean.

Crop Coefficient calculation

$$K_c = \frac{ET_c}{ET_o}$$



Seasonal curve of Crop Coefficient (K_c)



$$K_c = \frac{ET_c}{ET_0}$$

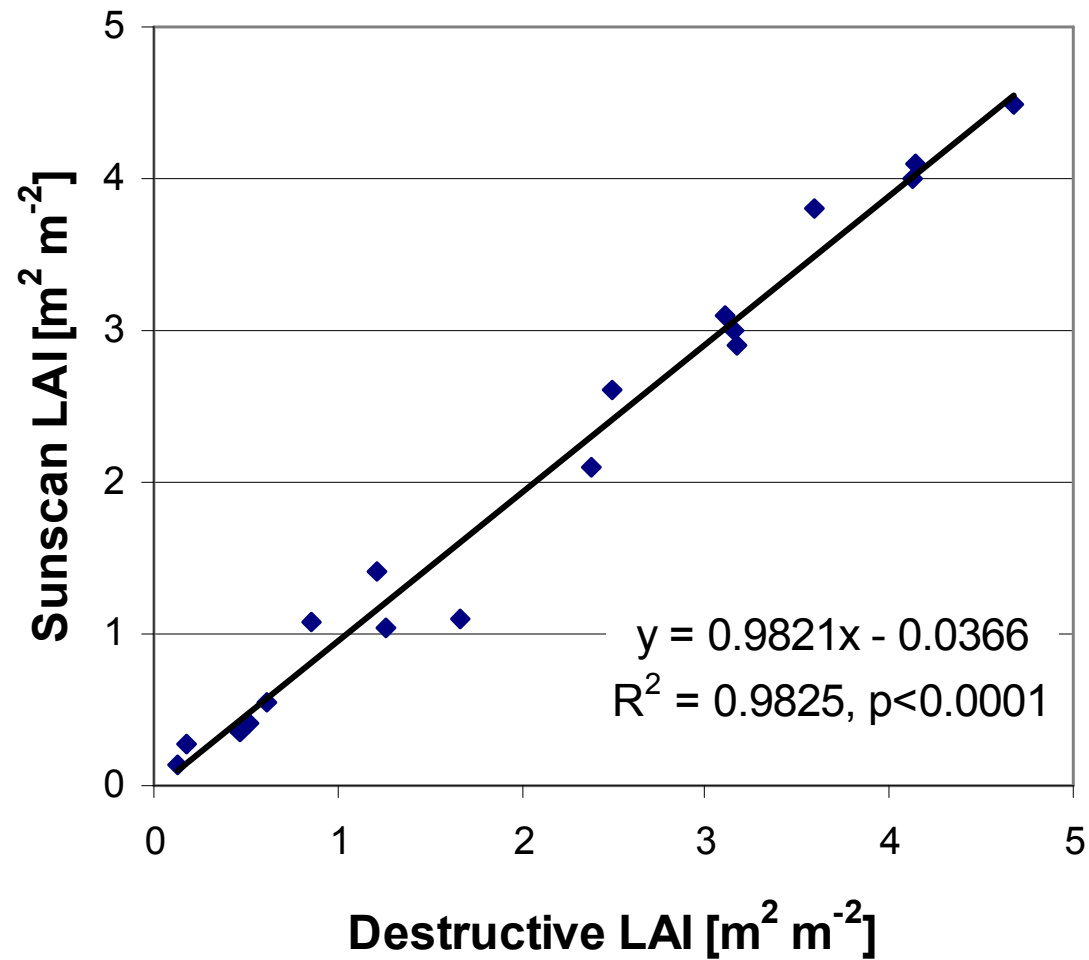
$$ET_c = K_c \times ET_0$$

Seasonal curve of crop coefficient K_c for the 1999 and 2001-2005 growing seasons.
Each data point represents an average of 10-11 days during six seasons, 1999 and 2001 to 2005.
Vertical error bars represent the double S.E. of the mean

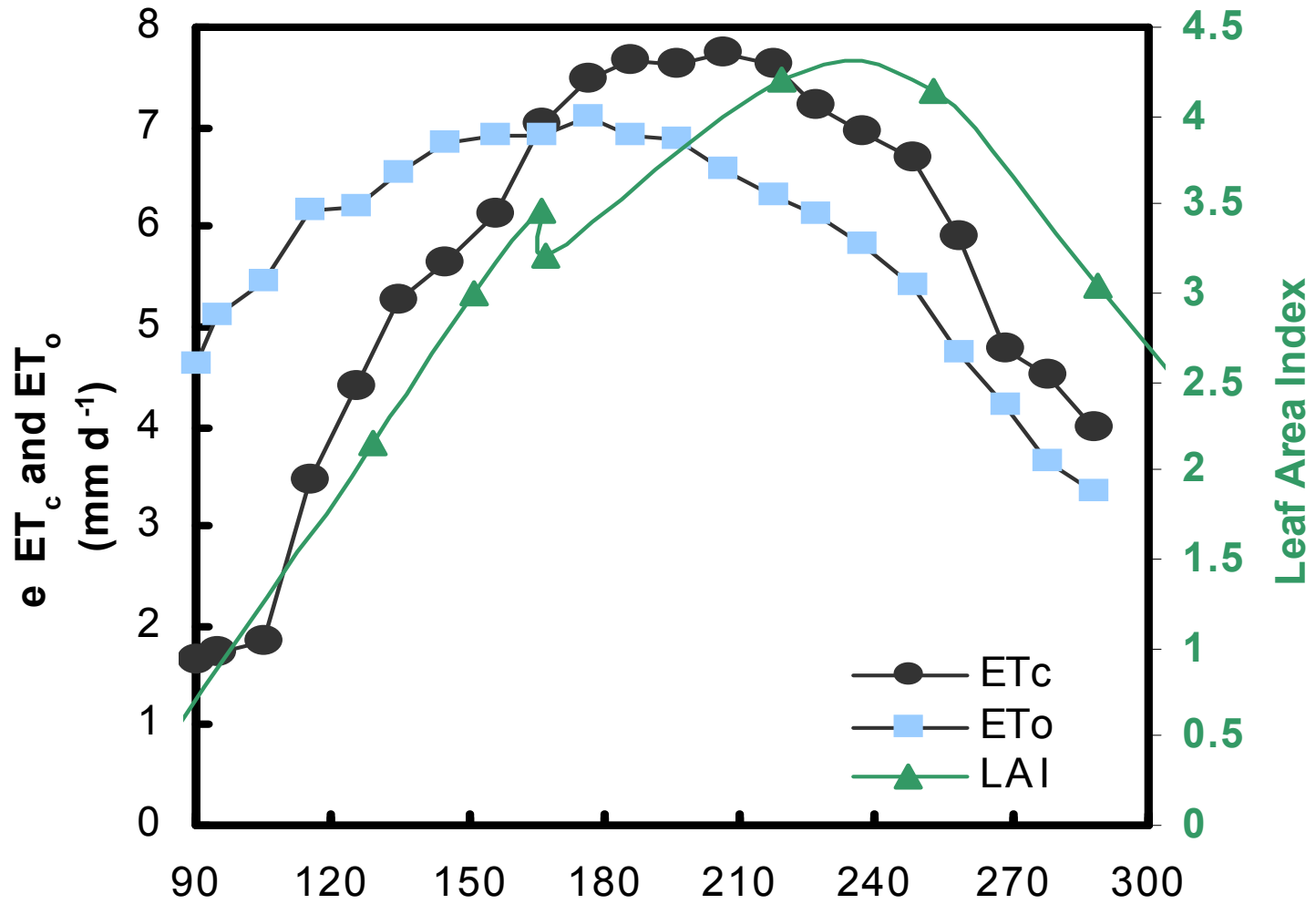




Sunscan's measurement validation

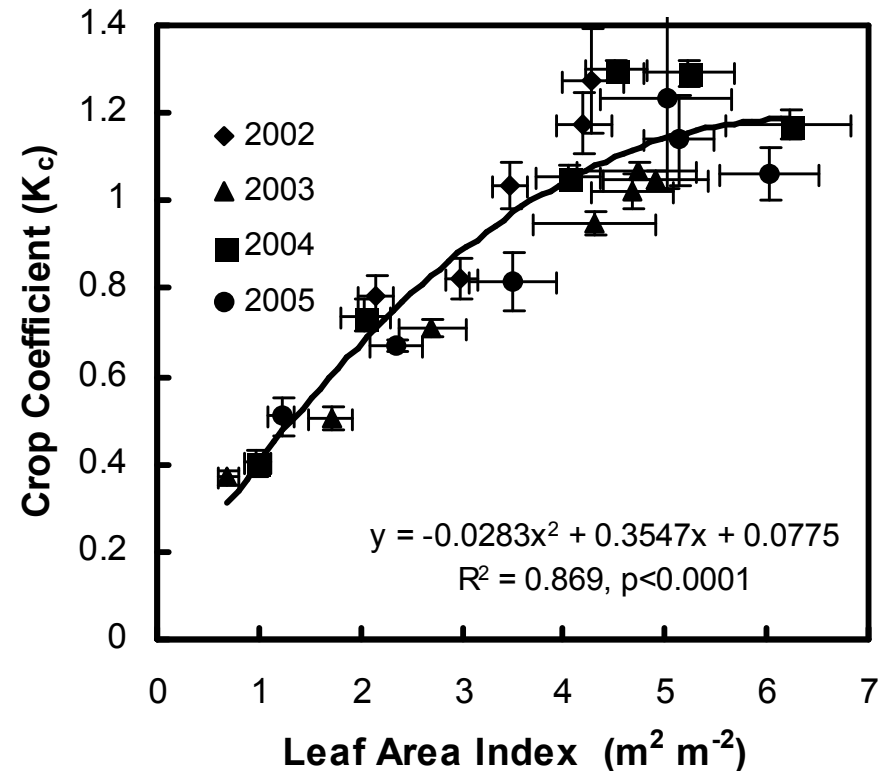
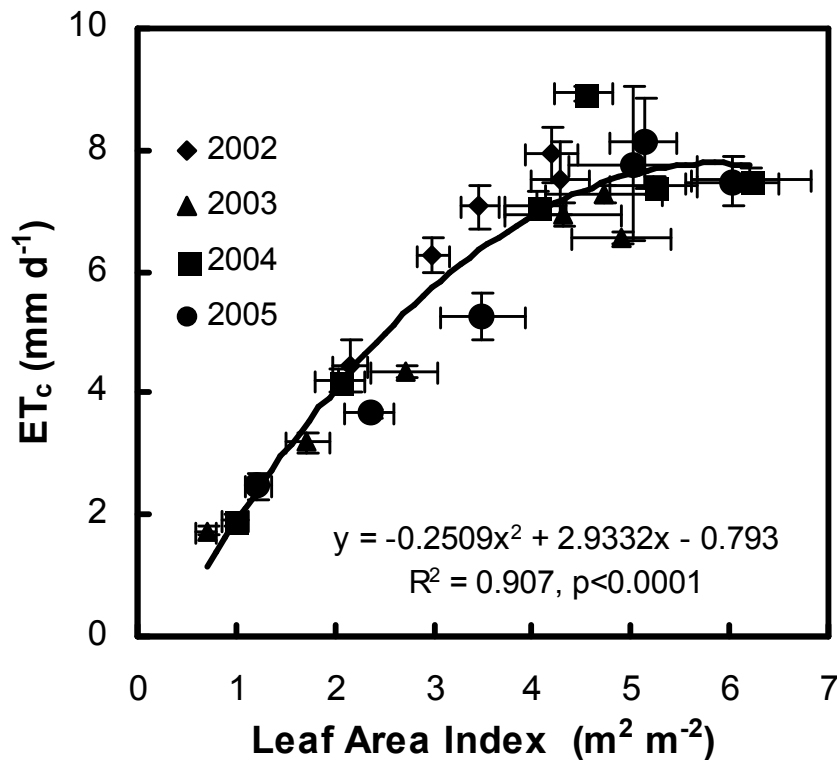


Seasonal curve of water use (ET_c) and ET_o and Leaf Area Index.



Relationship between LAI and ET_c and (a).

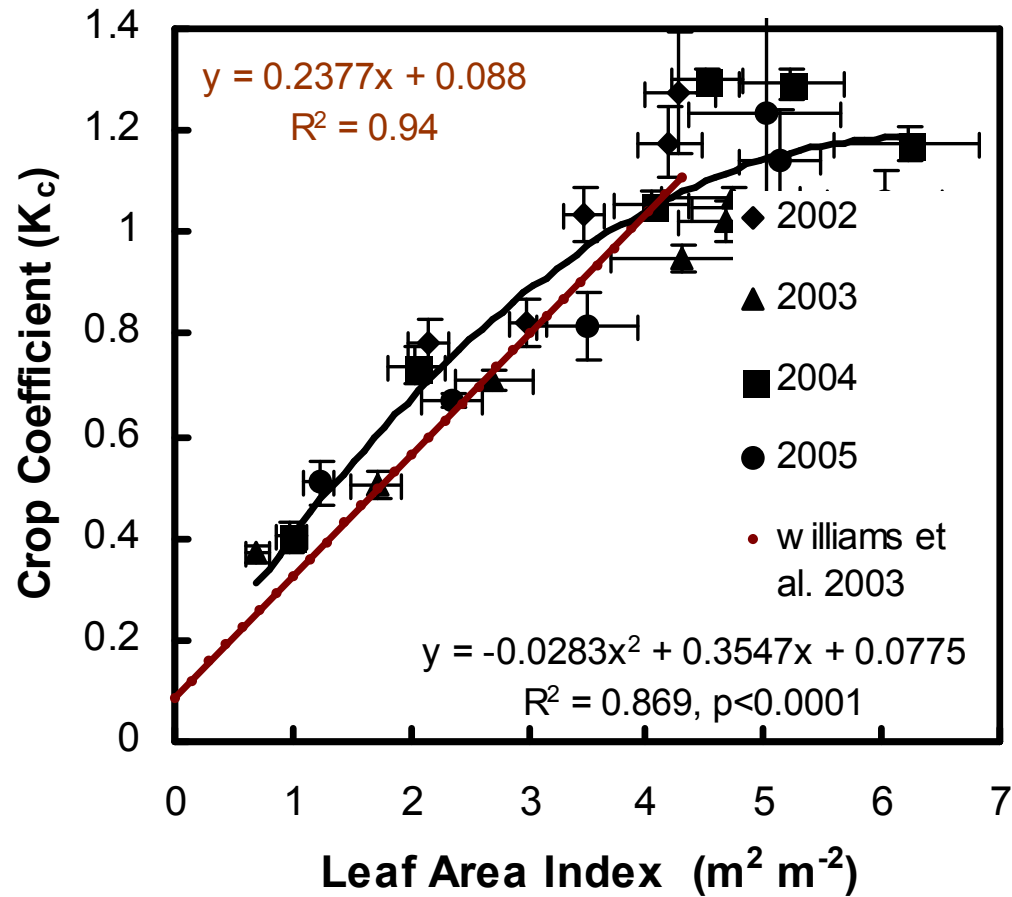
Relationship between LAI and K_c (b).



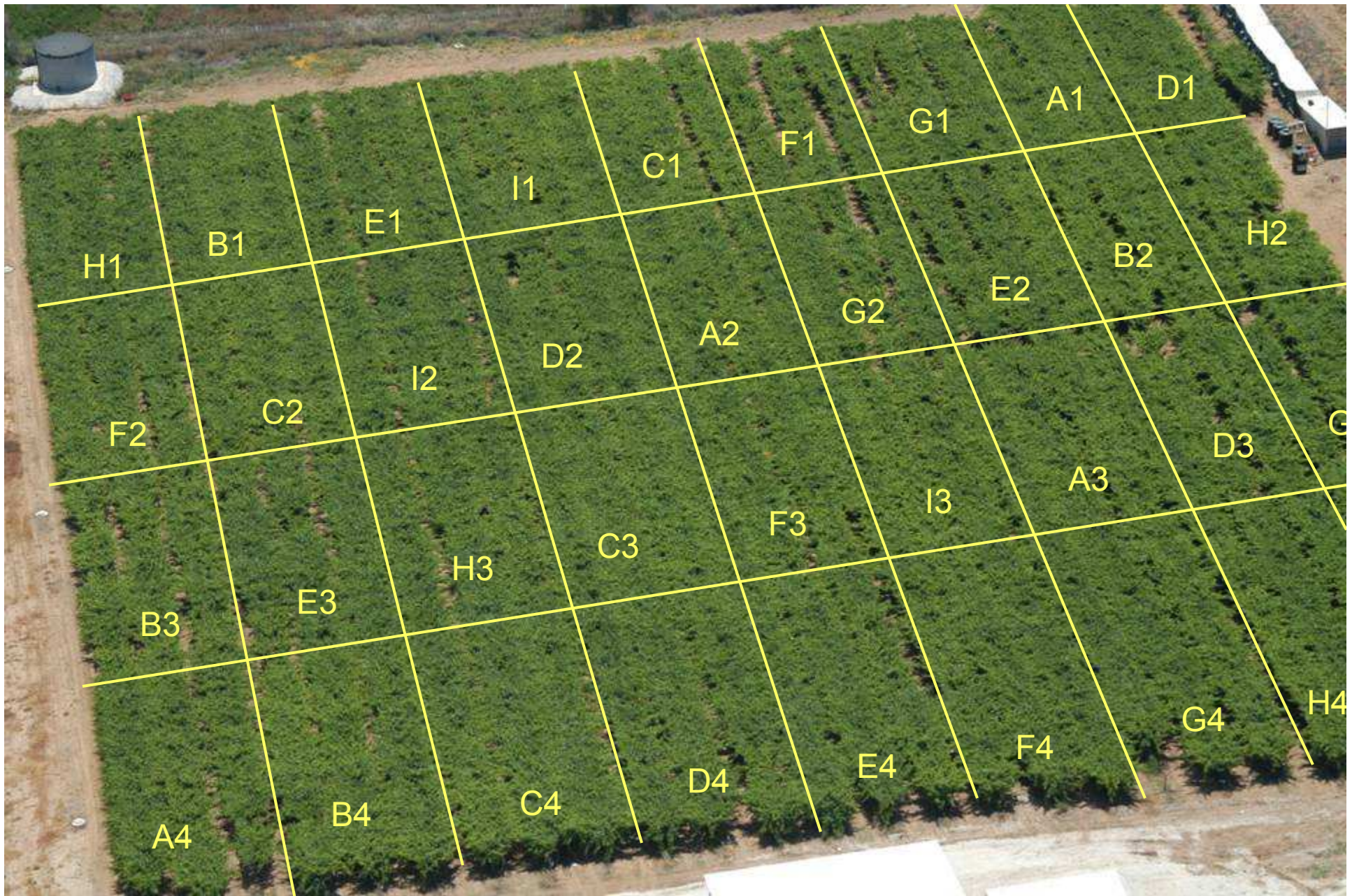
Each ET_c and K_c data point represents an average value of 20 days, 10 days before the LAI measurement and 10 days after the measurement. Each data point represents the average LAI value of 10, 9, 6 and 4 vines in the 2002, 2003, 2004 and 2005 growing seasons, respectively.

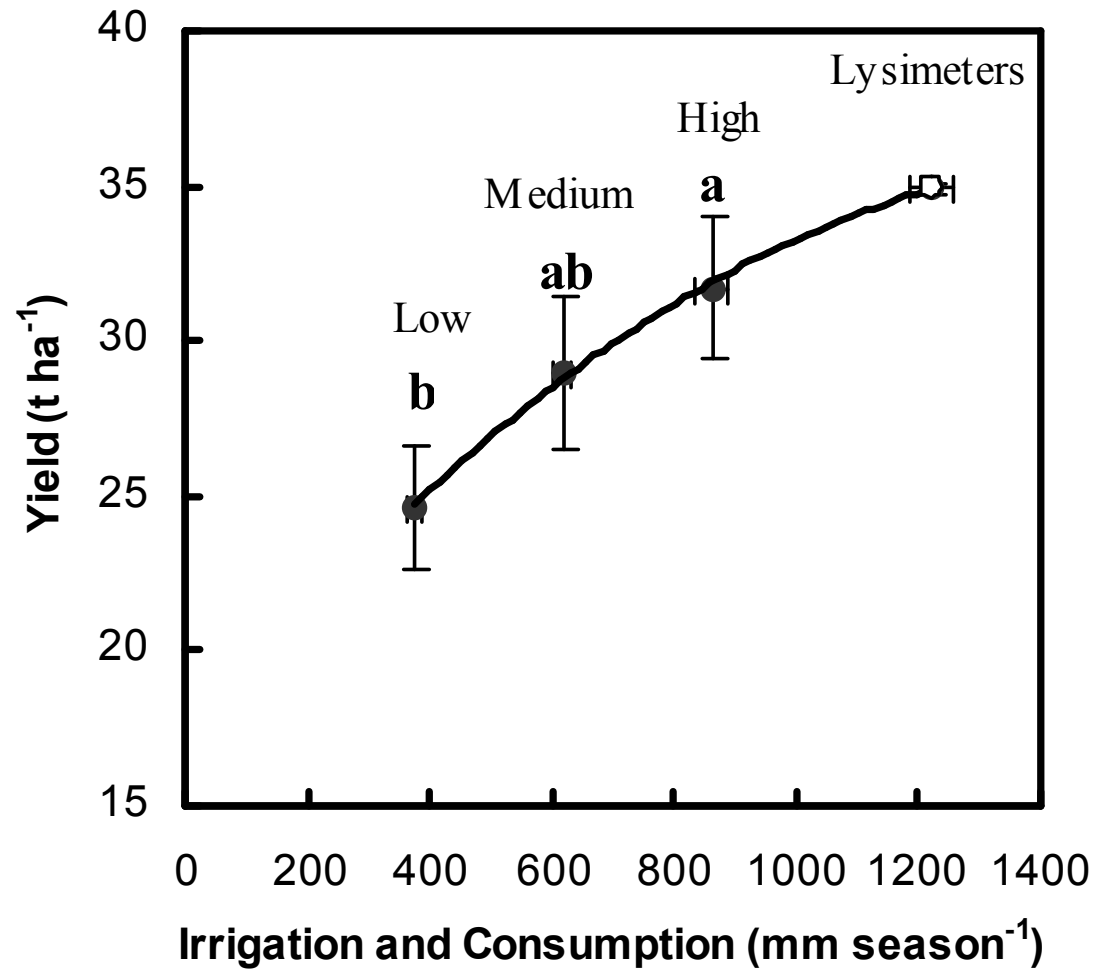
Vertical and horizontal error bars represent the S.E. of the means.

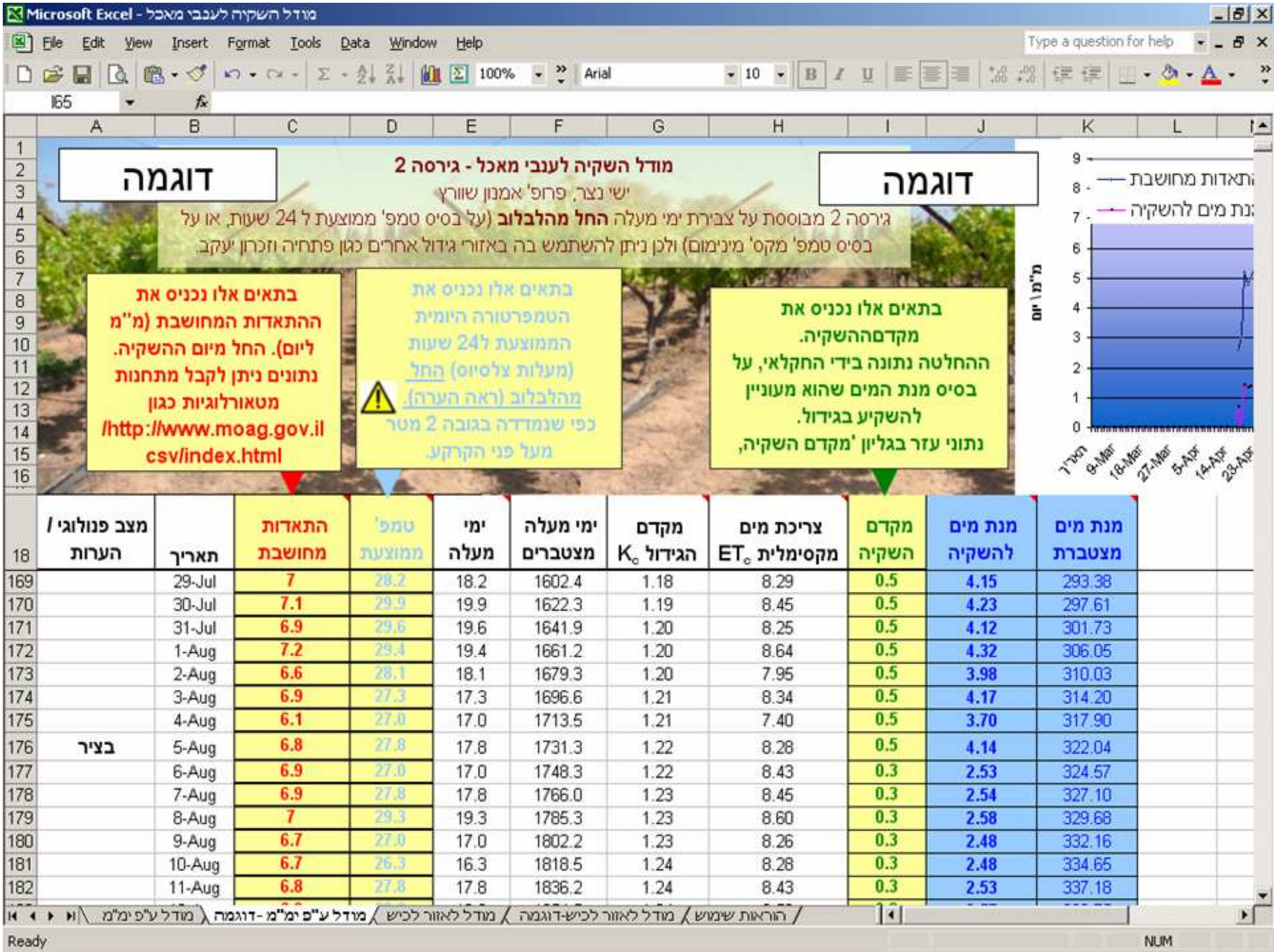
The curves were fitted to quadratic polynomial equations.



Williams LE, Phene CJ, Grimes DW, Trout TJ (2003b) Water use of mature 'Thompson Seedless' grapevines in California. Irrig Sci: DOI 10.1007/s00271-003-0067-5









**Thank you for your
attention.**

