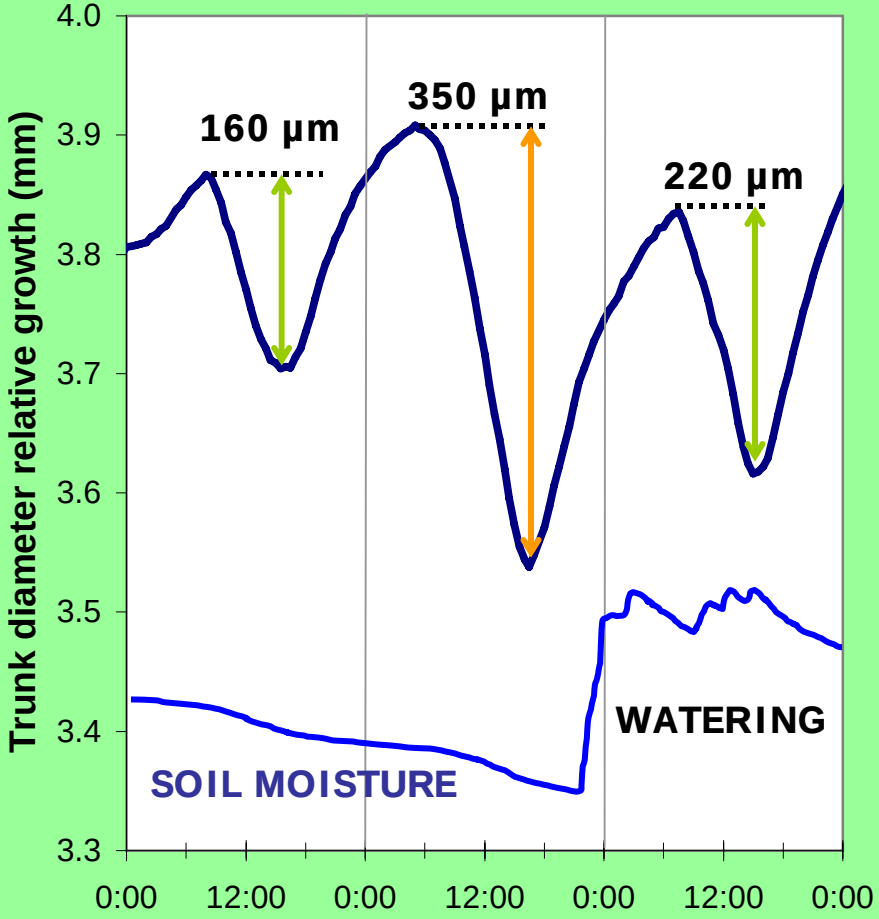

Daily trunk contraction in relation
to a base line reference
as an improved criteria for irrigation in avocado
Leo Winer & Igor Zachs
10 4 2003

Irrigation scheduling

based on the trunk daily contraction (*by Adato*)

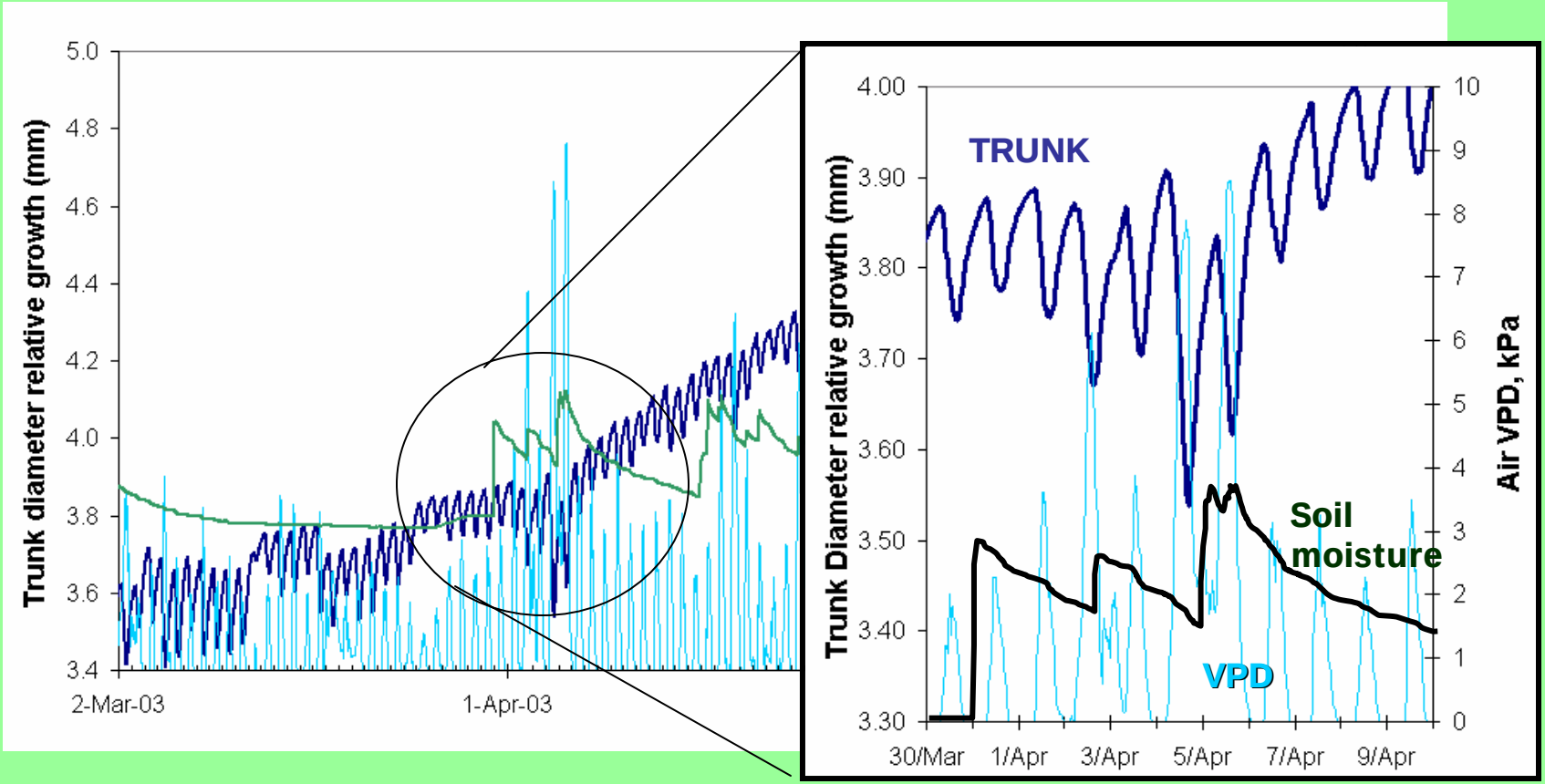


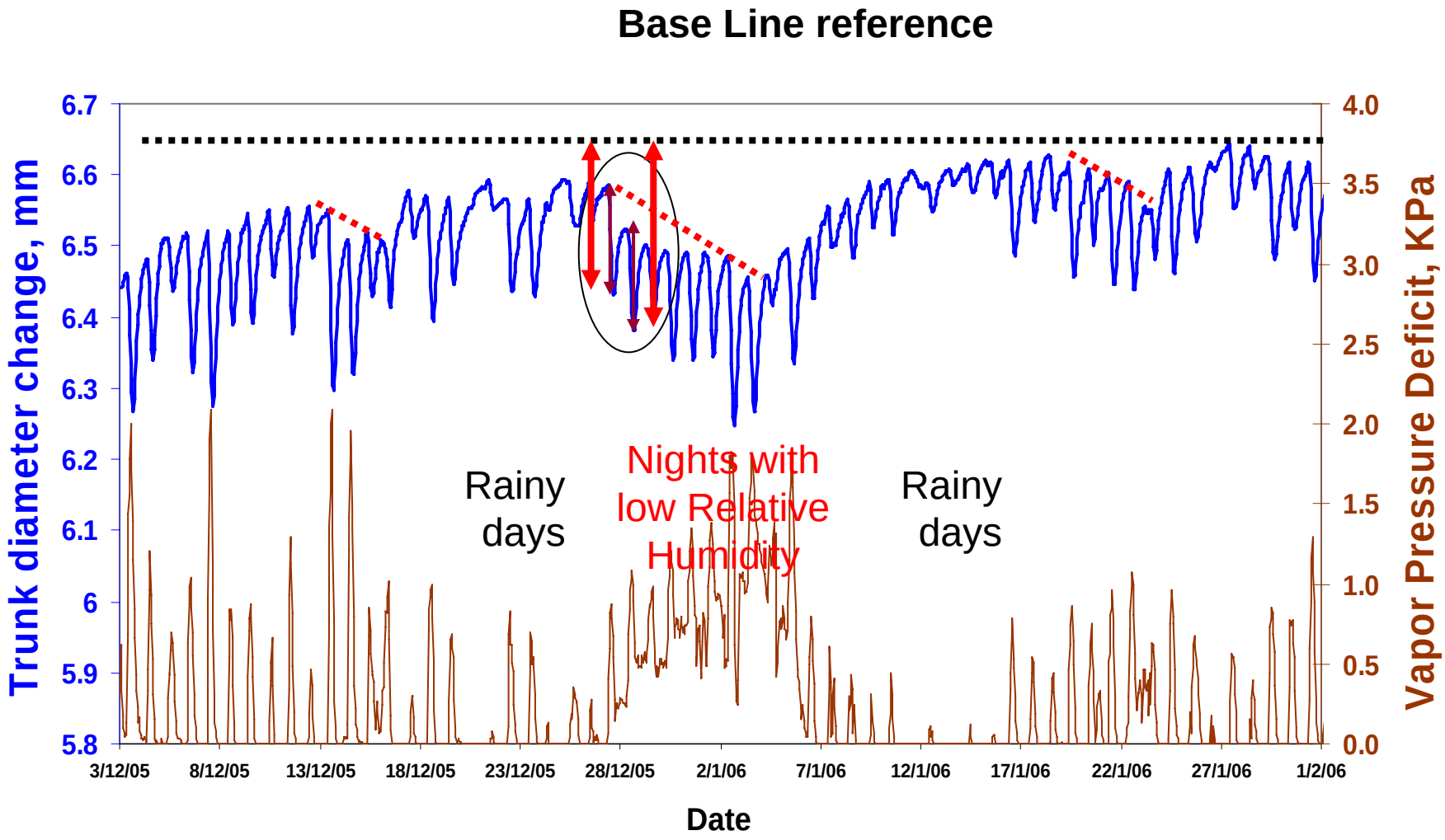
Trunk diameter diurnal curve reflects the appropriate variations of plant water content. Normally, trunk contracts at daytime due to water loss by transpiration and swells at night while replenishing water reserves.

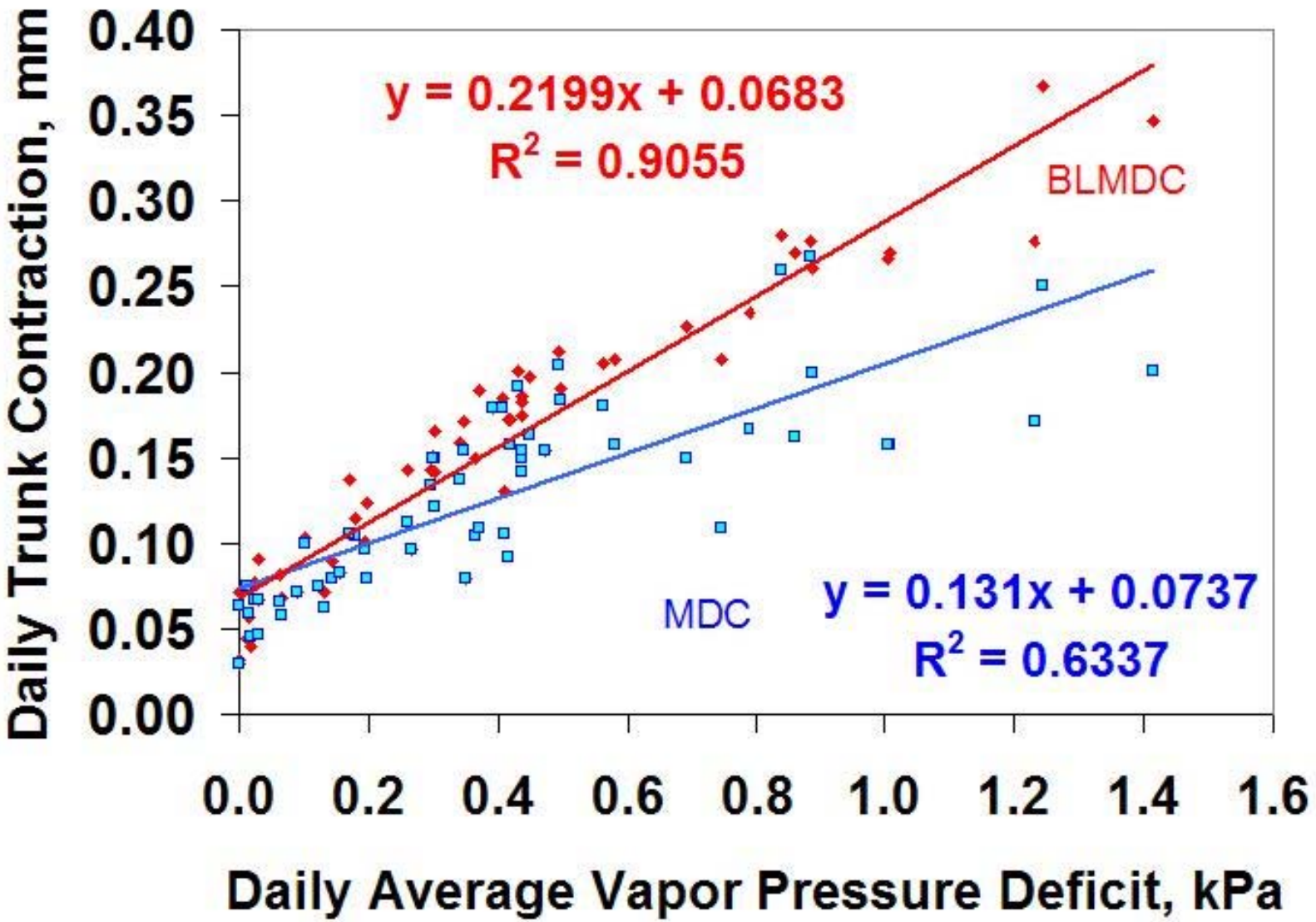
Amplitude of such variations is proportional to water deficit. Thus, the Daily Maximal Contraction (DMC) may be used as a criterion for scheduling irrigation.

In the practical example, shown in the figure, the grower irrigated his plants when DMC exceeds 250 µm.

Decrease in the trunk Maximal Daily Contraction by irrigation




Base Line reference
Trunk diameter change, mm
Vapor Pressure Deficit, KPa
Date
Rainy days
Nights with low Relative Humidity
Rainy days
6.7
6.6
6.5
6.4
6.3
6.2
6.1
6
5.9
5.8
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
3/12/05
8/12/05
13/12/05
18/12/05
23/12/05
28/12/05
2/1/06
7/1/06
12/1/06
17/1/06
22/1/06
27/1/06
1/2/06


Daily Trunk Contraction, mm
0.40
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
y = 0.2199x + 0.0683
R2 = 0.9055
BLMDC
MDC
y = 0.131x + 0.0737
R2 = 0.6337
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4
1.6
Daily Average Vapor Pressure Deficit, kPa

Conclusions:

- Maximum Daily Contraction of the trunk may be used for the evaluation of water balance of the tree.
- Irrigation must be done to have minimal MDC (*by Adato)*
- Poor correlation between MDC and water balance of the tree in conditions of accumulated stress.
- High correlation between MDC and water balance of the tree measuring the MDC in relation to a Base Line Reference (*by Winer*)

Why to Measure MDC in relation to a Base Line Reference (*by Winer*)?

1. Easier Detection of Accumulated Stress Conditions.
2. Better correlation to atmosphere conditions and plant water balance.
3. Improve in the irrigation decisions in avocado orchards.
4. Optimization of Plant and Fruit Growth


Thank you for your attention
Leo Winer & Igor Zachs