

Potential Evapotranspiration: A Practical Approach to Irrigating Cotton

Bob Glodt

Agri-Search, Inc.

Plainview, Texas

Will PET Irrigation Management Be Beneficial If...

1. I have unlimited irrigation resources?

YES!

2. I do not or cannot irrigate and rely solely on rainfall to meet crop demand?

YES!

3. I have only limited ability to apply supplemental irrigation?

YES!

Undeniable Truth

*There Is No Good
Reason Not to Manage
Irrigation Resources and/ or
Track Water Demand*

Question # 1

How much water does it take to make one bale per acre?

A. Planting date?

B. Rainfall and irrigation data in relationship to the crop developmental stage?

C. Weather data?

D. Soil water holding capacity?

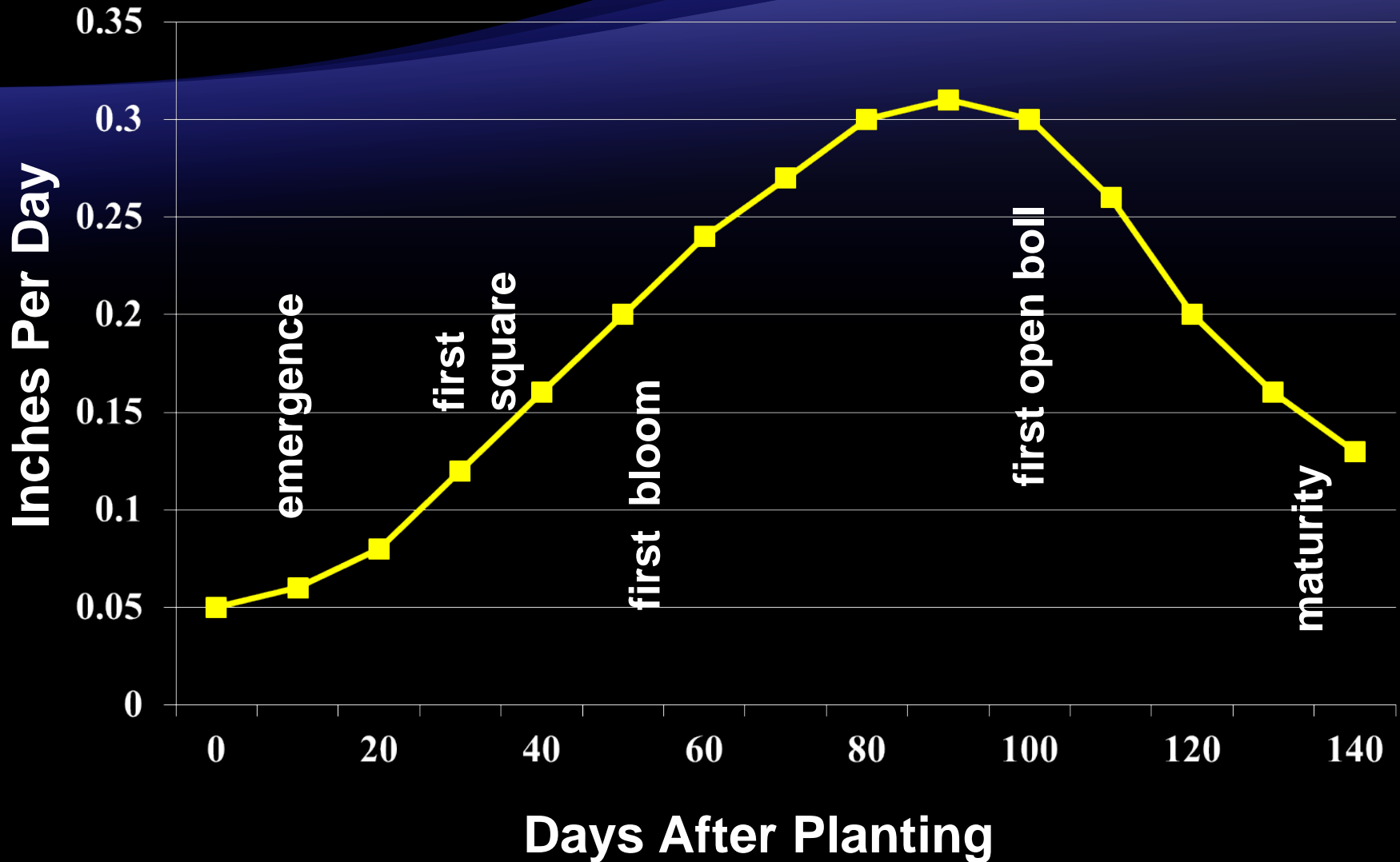
Question # 2

Does it take twice as much water to make two bales per acre as it does to make one bale per acre?

Yield Versus Water Irrigating At A Given % of PET

% PET	Inches Total Water	Expected Yield	Pounds of Lint/Inch
Rainfed	Unknown	Unknown	Extremely variable
30%	9 -12	700 - 900	60 - 90
60%	12-18	1200 - 1500	90 - 120
90%	22-28	1200 - 2000	60 - 90

HYPOTHETICAL WATER USE CURVE FOR COTTON (INCHES PER DAY)



Question # 3

Will yields increase if you supply water above 100% of potential evapotranspiration?

Irrigation Management Aids

CAPACITANCE PROBES



IRT TECHNOLOGY

Undeniable Truth

There is nothing that comes in a cardboard box that will help you understand cotton irrigation better than learning to track daily potential evapotranspiration!

How Do You Get Started?

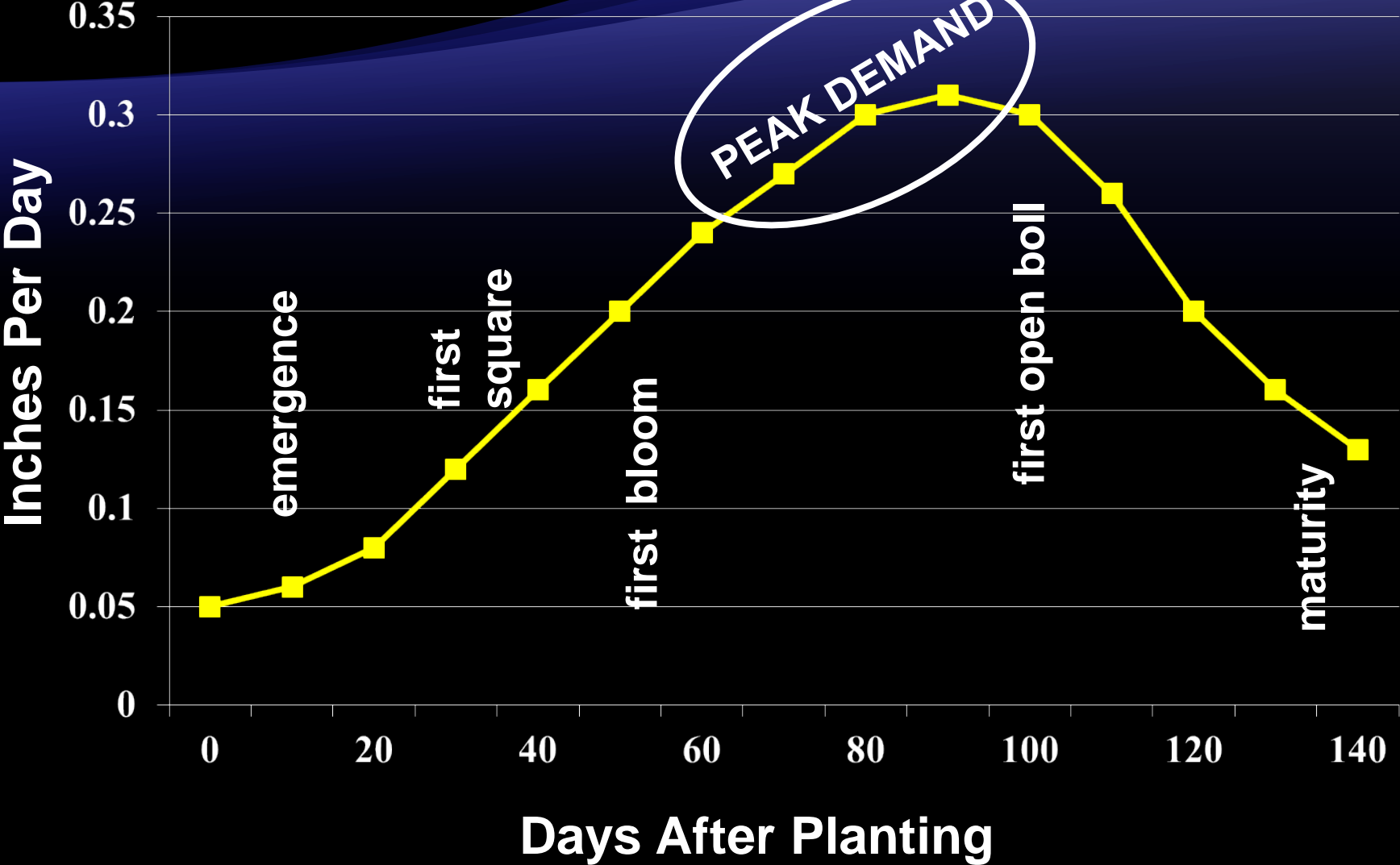
Criteria For Irrigating Based on Potential Evapotranspiration

1. Must have access to a PET network that uses local weather data.
2. www.tawcsolutions.org
3. You must understand your capacity to irrigate based on peak crop demand.
4. You must know the soil water holding capacity for your soil type.
5. The irrigation system must be efficient.

Determining Your Capacity to Irrigate at any given % of PET

1. Assume you can apply 1.25" of irrigation per week.
2. Assume peak demand for one week is 0.3" per day or 2.1" per week.
3. $1.25" \text{ divided by } 2.1" = 0.59\%$

HYPOTHETICAL WATER USE CURVE FOR COTTON (INCHES PER DAY)



Undeniable Truth

*To manage irrigation effectively,
you must understand the soil
water holding capacity of the soil
type in which the crop is being
grown.*

SOIL MOISTURE HOLDING CAPACITY (INCHES/FOOT)

Texture	Field Capacity	Permanent Wilting Point	Plant Available Water	Initiation of Stress
Clay Loam	4.8	2.4	2.4	1.3
Loam	4.2	2.1	2.1	1.1
Sandy Loam	3.6	1.8	1.8	0.9
Loamy Sand	2.4	1.2	1.2	0.8

Determining Moisture by Feel



Undeniable Truth

Most growers do not have enough water to compensate for an inefficient irrigation system.

Maximizing the Water You Have

1" @ 50% = 0.5"

1" @ 80% = 0.8"

12" @ 50% = 6"

12" @ 80% =

9.6" applied

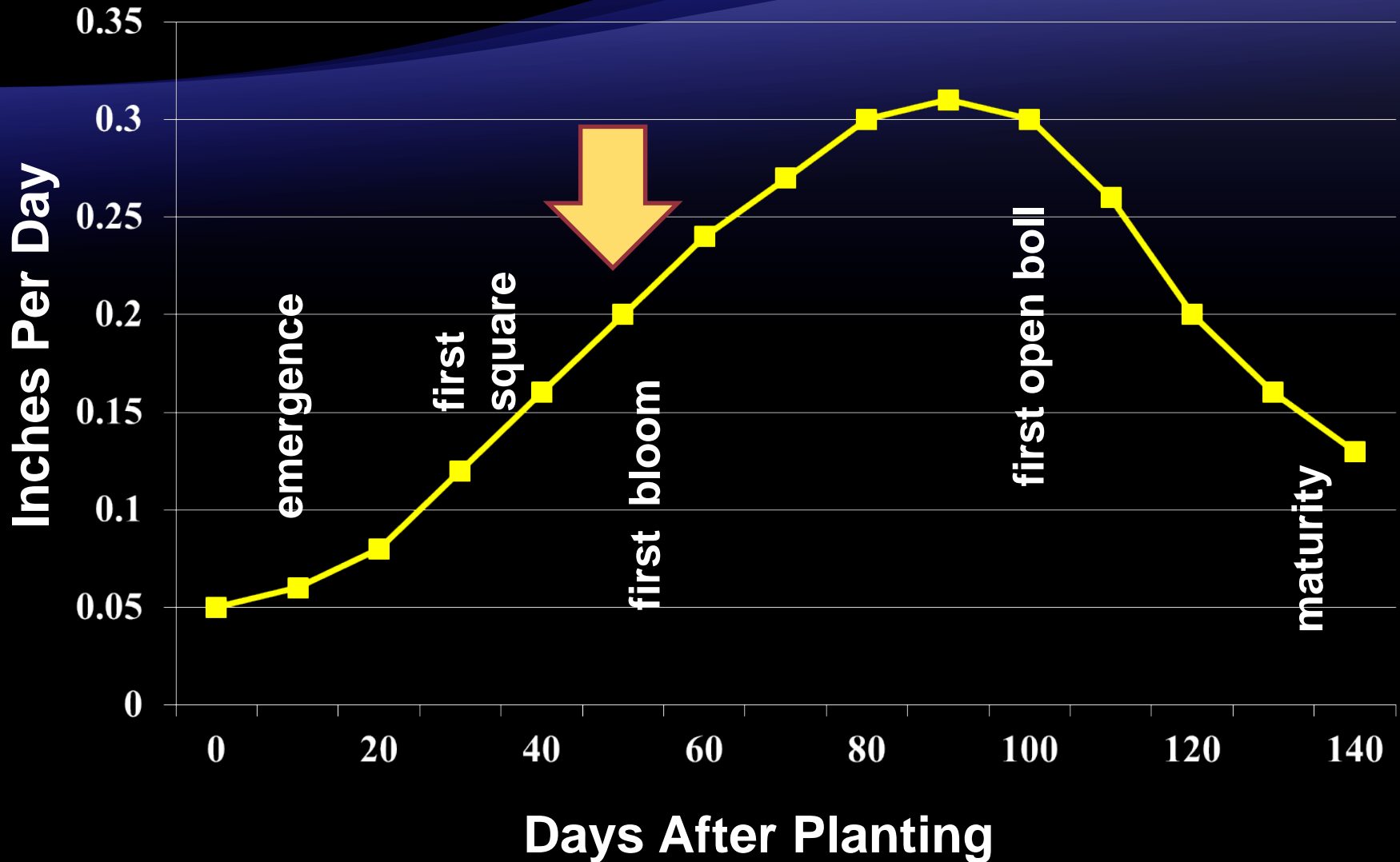
= 3.6" difference

3.6" x 80 pounds = 288
pounds of lint per acre.



Date	Growth Stage	100% Daily PET	Effective Rain	Acc. Irr. Needed
7/20	EB	0.27	0	0.16
7/21	EB	0.26	0	0.32
7/22	EB	0.28	0	0.49
7/23	MB	0.30	0	0.67
7/24	MB	0.31	0	0.86
7/25	MB	0.31	0	1.05
7/26	MB	0.28	0	1.22
7/27	MB	0.29	.75	0.64
7/28	MB	0.30	0	0.82

STRATEGIC IRRIGATION STRATEGY



DP 0924 B2RF - 2009

<i>% ET</i>	RF	30%	60%	90%
<i>Irrigation</i>	0"	4"	8"	12"
Effective	9.4"	13.4"	17.4"	21.4"
Yield/Ac	475	1111	1849	1934
Loan Value/Ac	\$246.25	\$612.80	\$1027.40	\$961.34
Yield Per Inch	50.5	82.9	106.3	90.4

**2010 AGRI-SEARCH FARM
60% PET – 2.8 BALES/AC**



QUESTIONS?

