

# **HARVEST MANIPULATION AND HARVESTING OPERATION**

**Robert Beede**

**University of California Cooperative Ext. Farm Advisor**

**Emeritus**

## **QUALITY DOES NOT BEGIN AT HARVEST! HERE'S WHY:**

- 1. WALNUT TIP SHRIVEL AFFECTED BY LIGHT AND IRRIGATION.**
- 2. N.O.W (NAVEL ORANGEWORM) AFFECTED BY DAMAGE TO THE HULLS, SUCH AS BLIGHT, SUNBURN, HAIL, CODLING MOTH INFESTATION.**
- 3. WALNUT SIZE A FUNCTION OF ABSOLUTE NUMBER OF NUTS PER TREE, INSUFFICIENT CHILLING AND ITS EFFECT ON STRUNG OUT (PROTRACTED) BLOOM. LATE SET FLOWERS ON WEAK SPURS ARE LIKELY TO BE PEE WEES.**
- 4. CANOPY MANAGEMENT (PRUNING) AFFECTS NUT ORIENTATION AND SUBSEQUENT SUNBURN, LOW INTERIOR LIGHT AND DEAD SPRURS.**
- 5. SCALE POPULATIONS AFFECT TREE VIGOR, BOTRYOSPHERIA, LOSS OF VIGOR AND FRUIT QUALITY.**
- 6. NUTRITION: ZINC DEFICIENCY AFFECTS GROWTH AND SET.**

# **Refining Ethephon Use**

## **As a**

# **Walnut Preharvest Aid**

# **Past Ethephon Research 1968 – 1977 By:**

**Hendricks, L. C., Martin G. C.,  
Olsen, W. H. and G. S. Sibbett**

**Focus: Rate, Timing, Concentration**

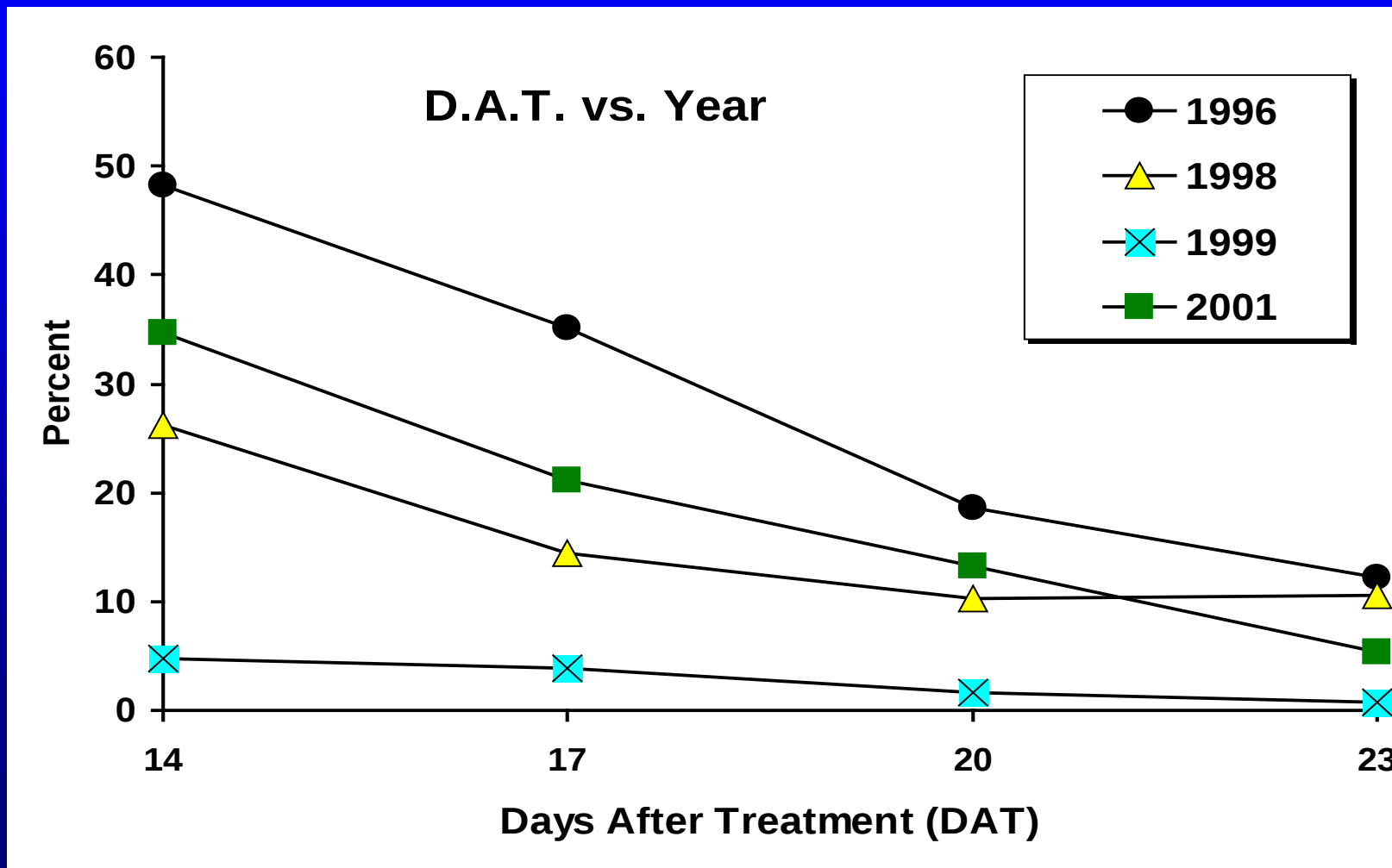
**Cultivars: Ashley, Payne, Chico,  
Hartley, Franquette**

**Method: Handgun (limited speed spray)**

# Past Ethephon Research Results 1968 - 1977

1. Rate: 3 - 5 pts / ac.
2. Drying rate not affected
3. Quality loss with delayed harvest less than untreated
4. Severe leaf drop on stressed trees
5. Greater Value / earlier harvest

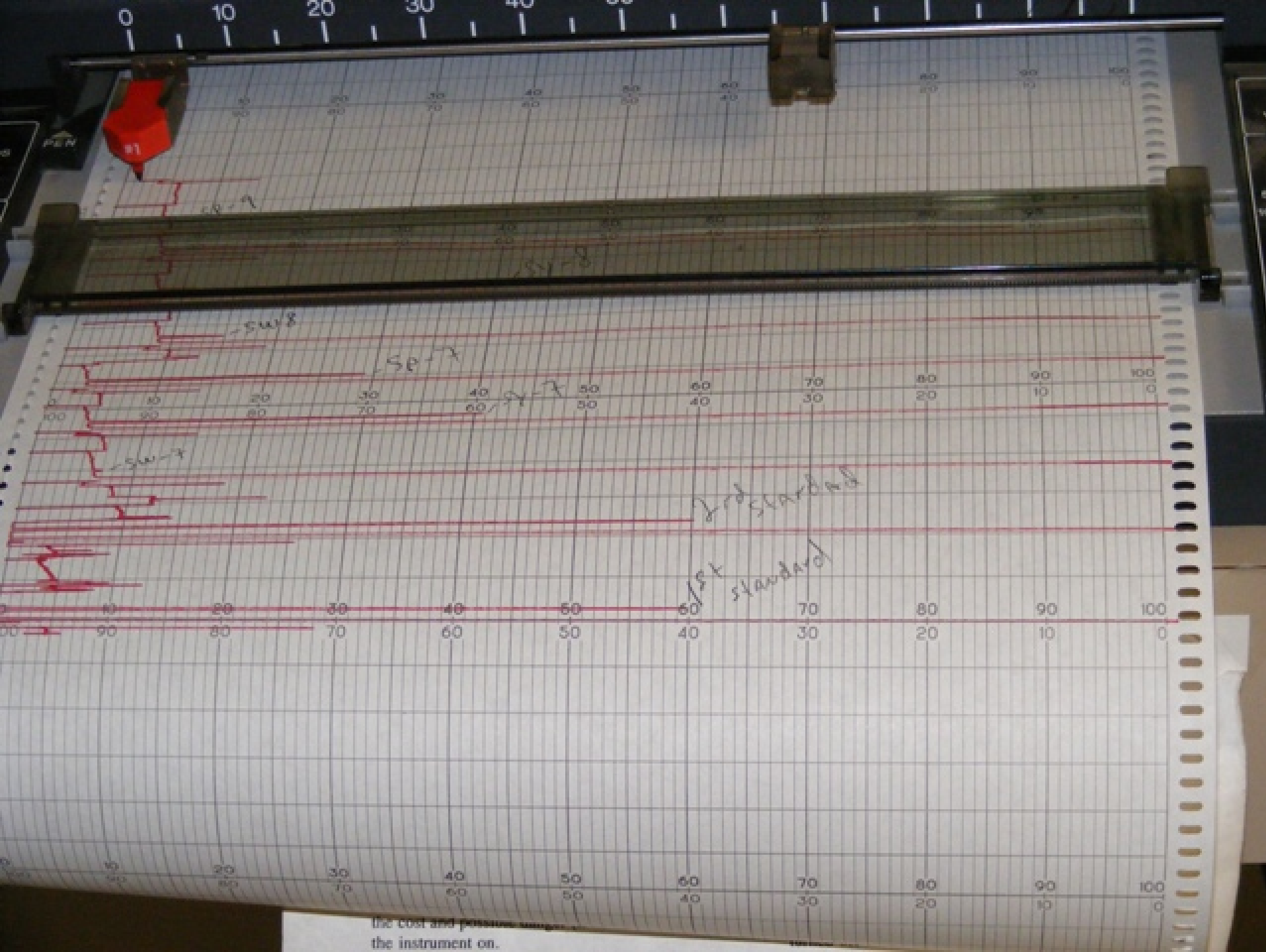
**Figure 5. Effect of ethephon application at packing tissue brown and harvest timings at 14, 17, 20, and 23 days after treatment (D.A.T) on adhering hull between years. SERR WALNUT**



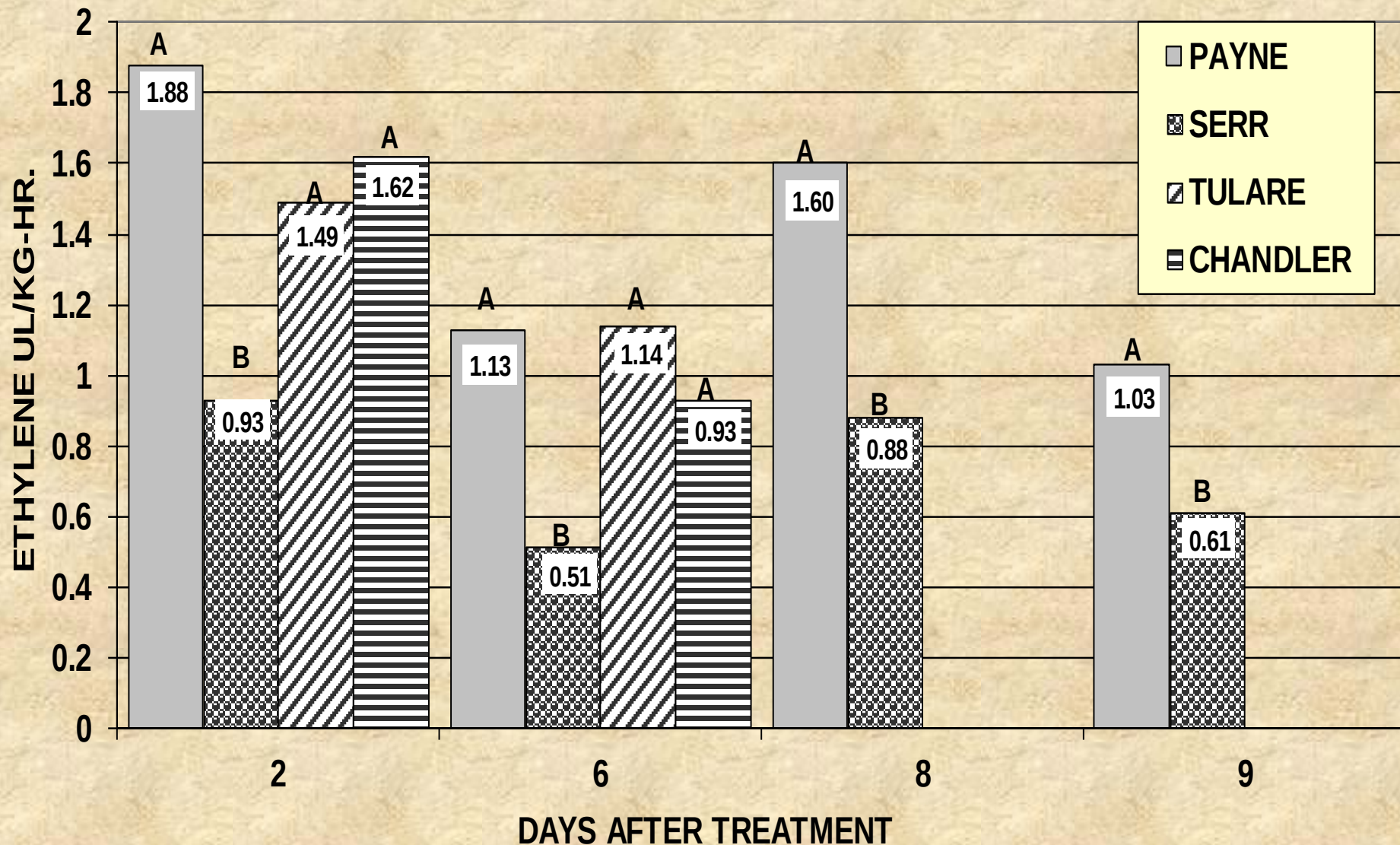
# PROBLEMS WITH ETHEPHON USE

1. CONSIDERABLE EFFORT REQUIRED TO PROPERLY EVALUATE WHEN PACKING TISSUE BROWN (PTB) IS COMPLETE
2. TIMING IRRIGATION TO AVOID “STRESSED TREES” CAN RESULT IN GROUND TOO WET FOR TREATMENT WHEN PTB OCCURS.
3. NOT AS EFFECTIVE ON SERR, AN EARLY MATURING VARIETY. WORKS VERY WELL ON LATER VARIETIES SUCH AS TULARE, HOWARD AND CHANDLER. WHY?





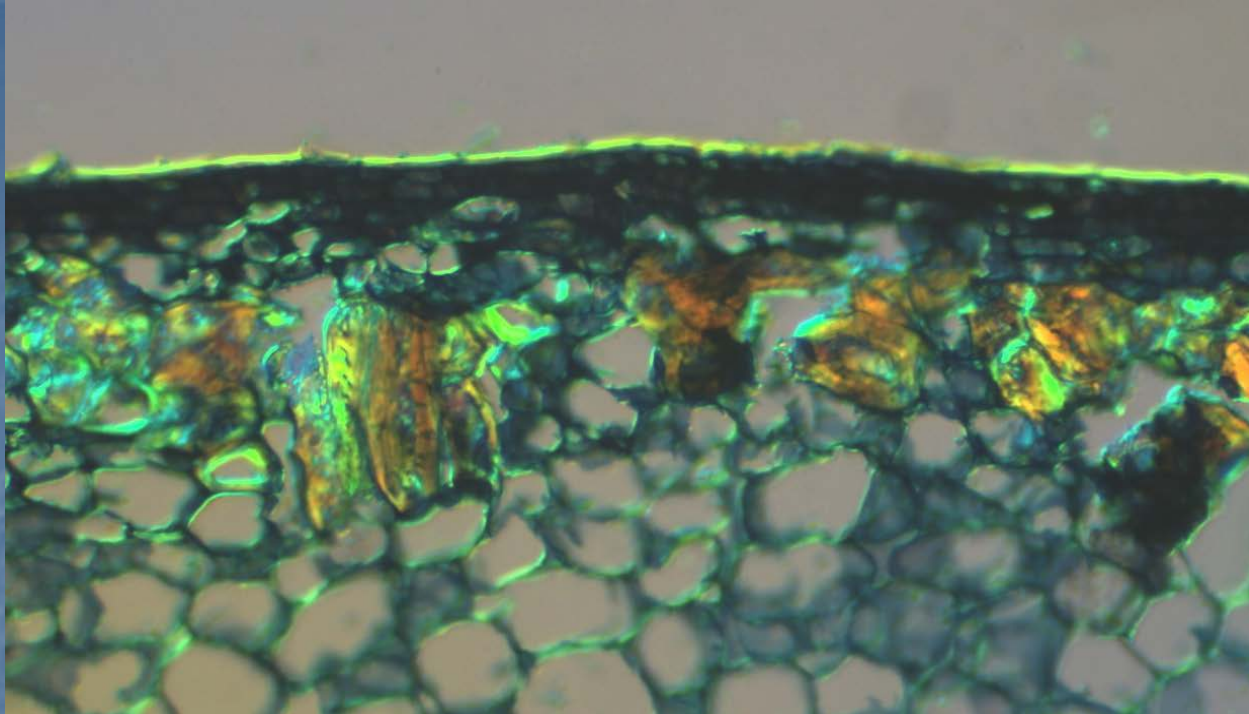
# WALNUT ETHEPHON EXPERIMENT: 1200 PPM (3 YEAR AVERAGE)



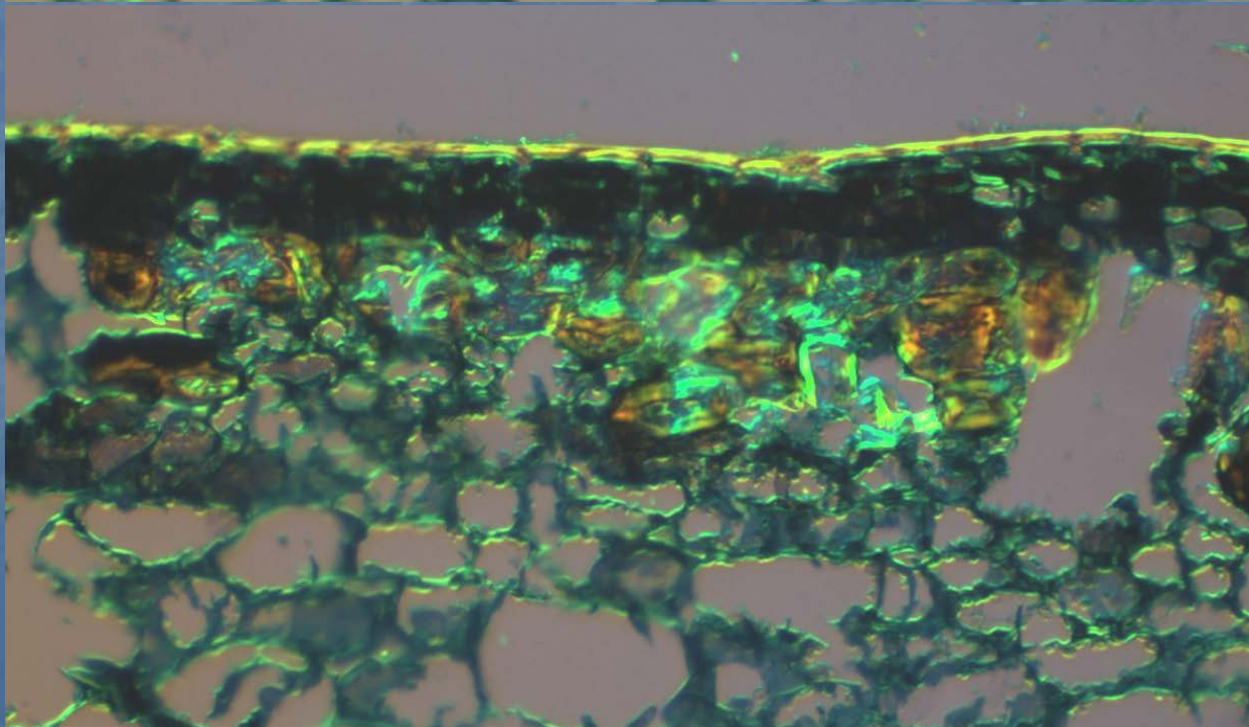
8 AND 9 DAT ARE FROM 2ND HARVEST



Serr



Payne



# Ethrel Adjuvant Trial 2011

at the Kearney Ag Center

Seven  
Treatments  
applied by 9 AM  
on August 31,  
2011.

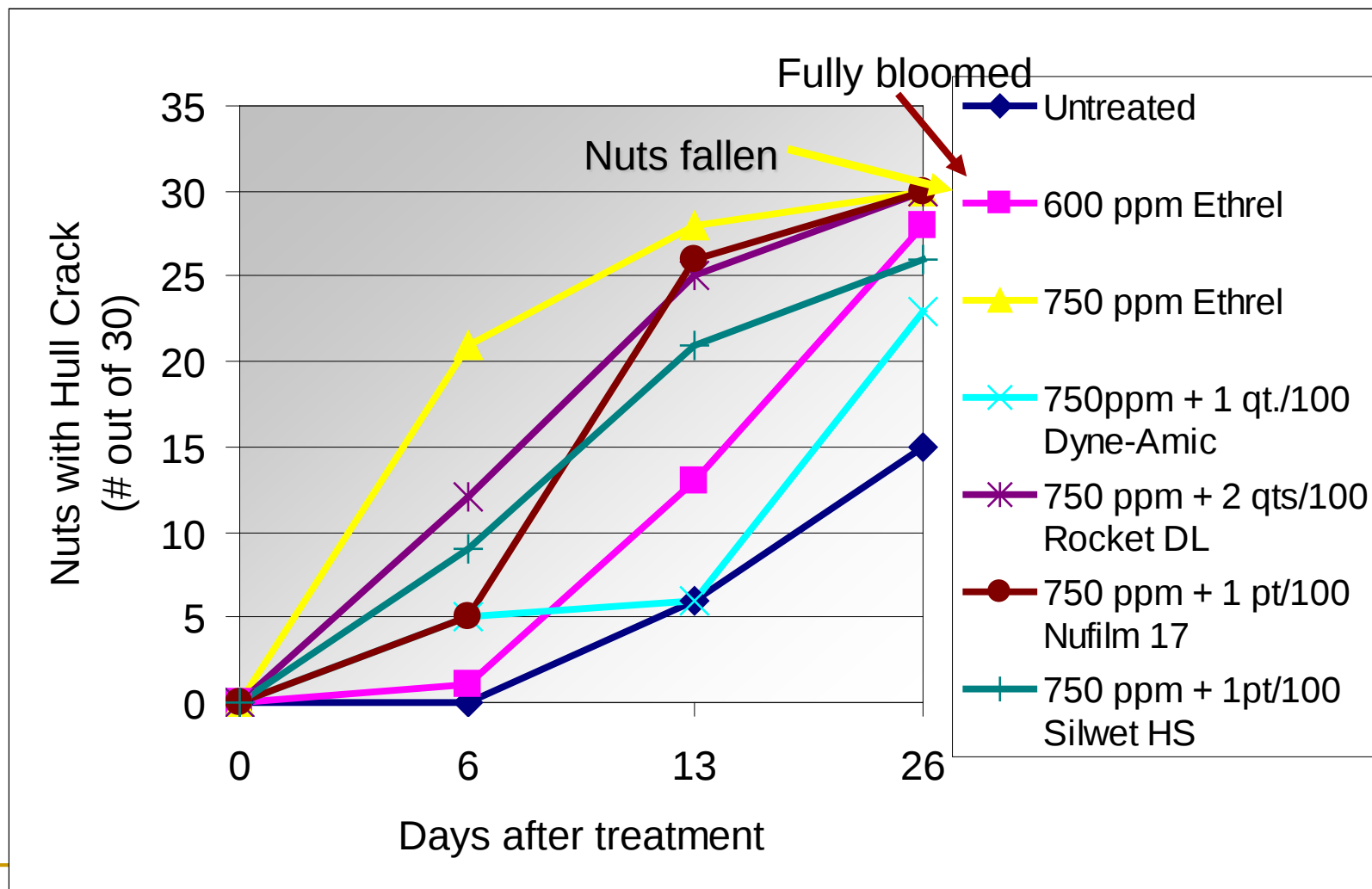
Variety: Serr

Temperature: 62°  
F

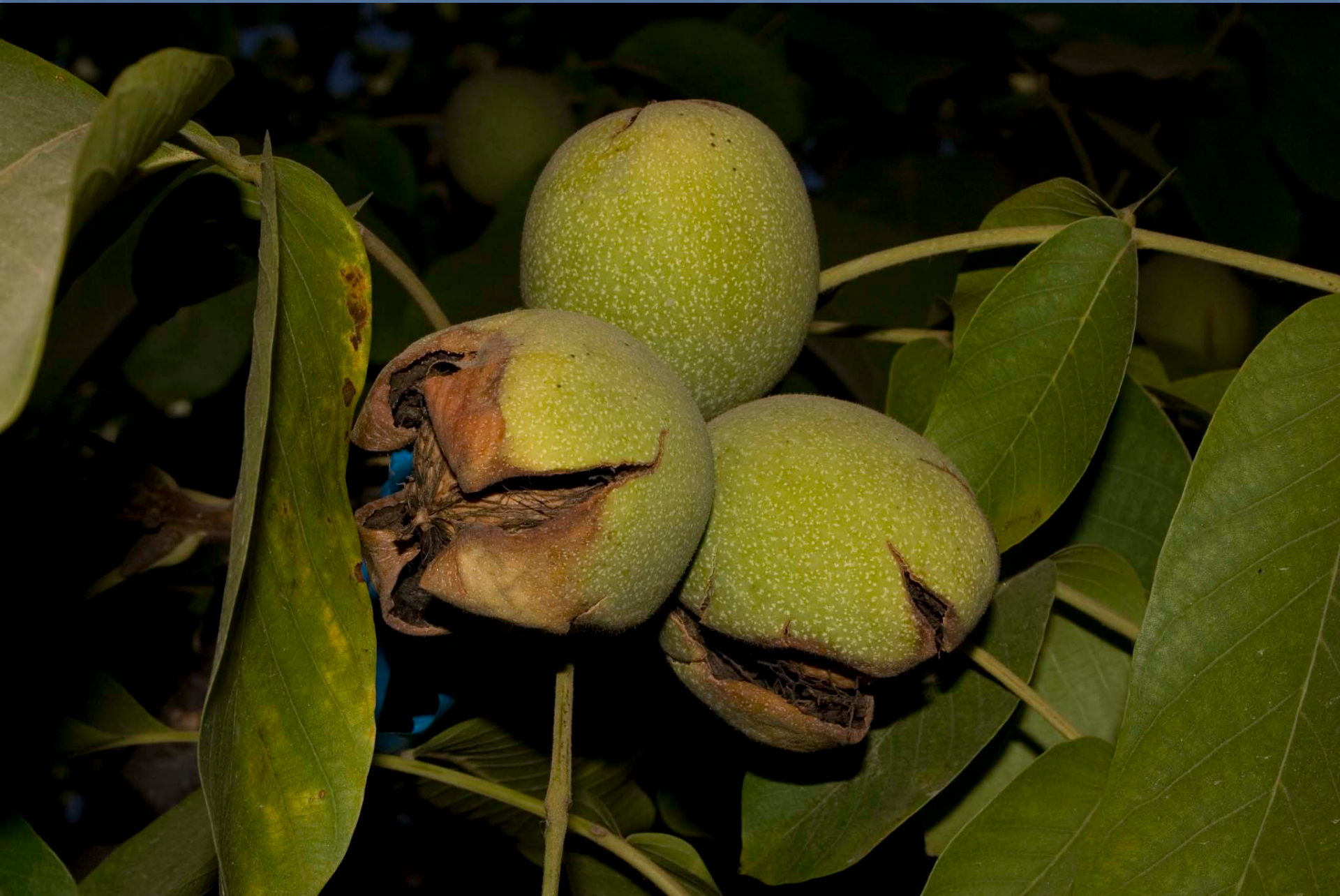
- ◆ Untreated
- 600 ppm Ethrel
- ▲ 750 ppm Ethrel
- ✕ 750ppm + 1 qt./100 Dyne-Amic
- ✱ 750 ppm + 2 qts/100 Rocket DL
- 750 ppm + 1 pt/100 Nufilm 17
- + 750 ppm + 1pt/100 Silwet HS

# Ethrel Adjuvant Trial 2011

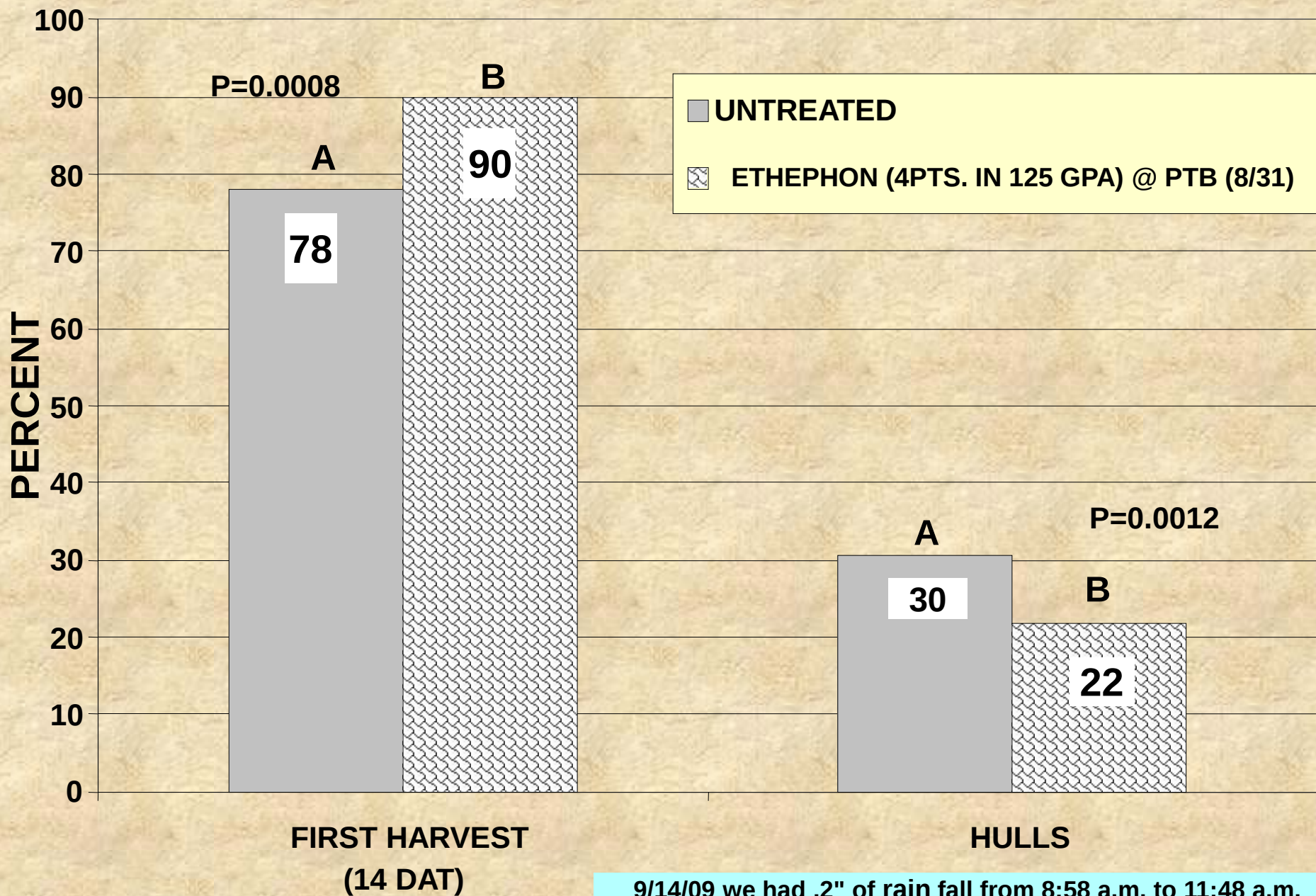
at the Kearney Ag Center



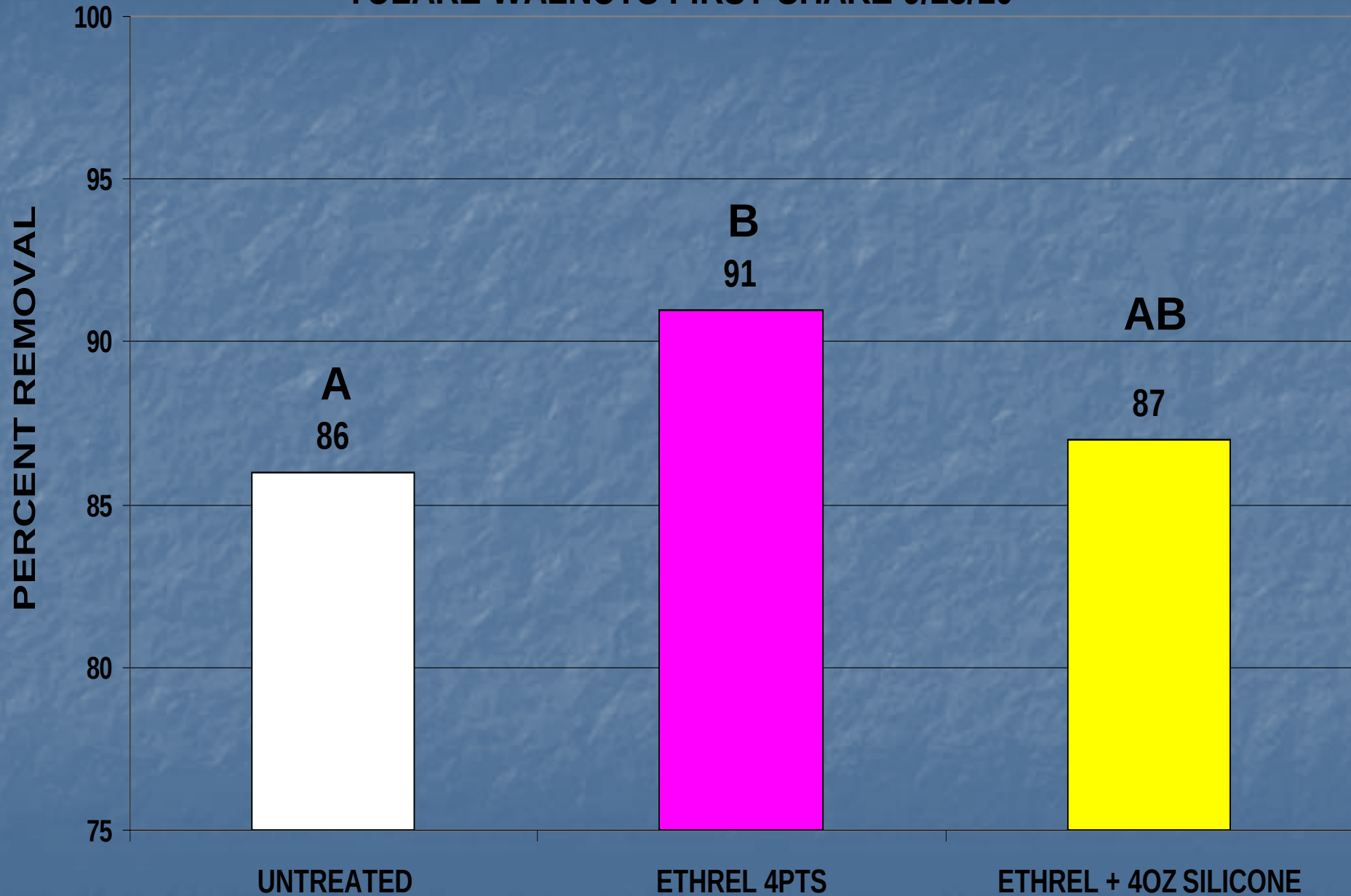
# 750 PPM TREATMENT 13 DAYS AFTER TREATMENT



# 2009 ORCHARD ETHEPHON TRIAL: TULARE cv.



# WARMERDAM FARMS 2010 ETHREL TRIAL PERCENT REMOVAL TULARE WALNUTS FIRST SHAKE 9/23/10





**UNTREATED WINDROW**



**TREATED WINDROW**

# ETHEPHON APPLICATION GUIDELINES:

1. 3-5 PINTS PER ACRE
2. NO LESS THAN 100 GPA BY GROUND (5 PTS IN 200 GALLONS = 750 PPM)
3. NO LESS THAN 40 GPA BY AIR (4 PINTS/AC IN 40 GALLONS = 3000 PPM. AIR TREATMENT MORE COMMON IN NORTHERN CALIFORNIA)
4. GROUND APPLICATION SPEED NO GREATER THAN 2 MPH
5. TREAT IN AS COOL OF TEMPERATURE AS POSSIBLE TO ALLOW ADEQUATE ABSORPTION
6. DO NOT APPLY BEFORE THE COMPLETION OF PTB FOR BEST RESPONSE AND KERNEL YIELD

**F. YOSHIKAWA, J.H. CONNELL, G.S. SIBBETT, AND G.C. MARTIN  
1977-78**

**WALNUTS HARVESTED BEFORE PACKING TISSUE  
BROWN CAN SUFFER ALMOST 20% LOSS IN KERNEL  
WEIGHT!**

**1. PTB WHITE TO BUFF COLOR: 8.6 % INCREASE IN KERNEL  
WEIGHT**

**2. BUFF COLOR TO BROWN: 9.5% INCREASE IN KERNEL  
WEIGHT**

**TOTAL: 18.1%**

**WALNUTS TREATED BEFORE COMPLETE PTB ALSO SUFFER KERNEL  
SHRIVEL, DARK PELLICLES, AND HULLING DIFFICULTY.**

**THEREFORE, BE SURE YOU DO NOT TREAT TOO EARLY!**

# **A QUICK OVERVIEW OF HARVEST OPERATIONS**

**1. HARVEST EFFICIENCY**

**2. HARVEST EXECUTION**

**3. POSTHARVEST CONSIDERATIONS**

**BERMS EVERY ROW ARE GREAT FOR WATER MANAGEMENT, BUT THEY LIMIT TRAVEL IN THE ORCHARD AND ARE SLIGHTLY SLOWER TO HARVEST.**



**OCCASIONAL BERMS ALLOW EASY HARVEST EQUIPMENT OPERATION , BUT THEY REQUIRE LEVEL LAND AND UNIFORM SOIL TEXTURE FOR IRRIGATION UNIFORMITY**



**DISCING CLOSE TO THE TREE CUTS ROOTS, CREATES CLODS AT HARVEST, AND CUPS THE BERM, MAKING IT HARDER TO SWEEP AND BLOW**



**HIGH, PEAKED BERMS REDUCE RAKING, BUT THEY DISCOURAGE WALKING THE ORCHARD, AGGRAVATE GOPHERS, AND LIMIT CROSS TRAFFIC.**



**TREE GROWTH AND CROWN GALL CREATES CLODS THAT WIND UP IN THE WINDROW. MORE WEAR ON PICKUP MACHINE TINES.**



**BERMS KEEP THE CROWN OF THE TREE OUT OF STANDING WATER, AND THE LOW VOLUME IRRIGATION TUBING AWAY FROM THE SWEEPER PADDLE**



**DON'T LET THE WEEDS GET AWAY FROM YOU IN MID-SUMMER!**

**IT IS DIFFICULT TO DECOMPOSE ALL THE ORGANIC MATTER  
BEFORE HARVEST**



**A CLEAR VIEW OF THE TRUNK IS IMPORTANT TO AVOID INJURY**



**KEEP UP WITH MAINTENANCE DURING HARVEST TO MINIMIZE BROKEN SHELLS**



**WATCH THE SLINGS FOR WEAR AND BROKEN ATTACHMENT CORDS.  
SILICONE THEM AND ROTATE THE PILLOWS AT REGULAR INTERVALS**



## **SUGGESTIONS FOR SHAKING YOUNG TREES:**

- 1. LESS CHANCE FOR BARKING IF THEY ARE SHAKEN ON DRIER SOIL CONDITIONS.**
- 2. WAIT UNTIL THE HULLS ARE BEGINNING TO BLOOM.**
- 3. TREAT WITH ETHEPHON 5-7 DAYS AFTER PTB.**
- 4. AVOID USING PILLOWS THAT ARE DEFORMED.**
- 5. REDUCE YOUR CLAMP PRESSURE. SHORT SHAKE**
- 6. SEEK ADVICE FROM MANUFACTURER**

**A VETERAN SHAKER OPERATOR IS A VERY VALUABLE ASSET!**



# EFFECT OF SUN VERSUS SHADE ON WALNUT QUALITY (PAYNE AND HARTLEY)

G. C. MARTIN, G.S. SIBBETT, AND D.E. RAMOS, 1972

1. THERE WAS A SIGNIFICANT DECREASE IN THE NUMBER OF LIGHT KERNELS AFTER ONLY THREE HOURS WHEN NUT TEMPERATURE WAS  $\geq 90^{\circ}$  F.
2. "SUN NUTS" SWEAT AND MOLD UNDER HIGH TEMPERATURE.
3. NUTS IN THE SHADE SUFFERED NO QUALITY LOSS.
4. KERNEL TEMPERATURE CHANGES QUICKER IN NUTS WITHOUT HULLS.
5. QUALITY LOSS IN WINDROWED WALNUTS WAS NO DIFFERENT THAN THOSE NOT WINDROWED (LONNIE HENDRICKS, 1972, ASHLEY VARIETY)



# WHAT CAUSES MOLD IN WALNUT KERNELS?

1. W.H. OLSEN, 1976. (HARTLEY). WALNUTS ARE MORE PRONE TO DEVELOP MOLD IN THE TREE THAN ON THE GROUND.
2. S. THOMAS, G.C. MARTIN, W. MOLLER. 1977-78 (ASHLEY, SERR, TEHAMA)
  - A. GREATER MOLD WITH DEEP HULL INJURY, SUNBURN, BLIGHT
  - B. ETHEPHON TREATMENT DID NOT REDUCE MOLD
  - C. INFECTION SITES TYPICALLY AT THE STEM AND BLOSSOM END OF THE NUT. FUNGUS MOST LIKELY ENTERS THROUGH SHELL SEAL.
  - D. HULLS AND KERNELS MORE SUSCEPTIBLE TO INFECTION ONCE THE HULLS SPLIT.
  - E. GET WET NUTS PROCESSED PROMPTLY TO PREVENT SHELL STAINING AND MOLD DEVELOPMENT.

# WHAT CAUSES MOLD IN WALNUT KERNELS?

3. J. BARTON, E.M. ROBB, R. WEINHOLD, AND M.N. SCHROTH. 1979-1980. (ASHLEY, SERR, TEHAMA, AND HARTLEY)
  - A. BLOSSOM AND STEM ENDS MOST SUSCEPTIBLE TO INFECTION.
  - B. INFECTION INCREASES AT THE ONSET OF HULL SPLIT
  - C. TEMPERATURES  $\geq 80^{\circ}$  F AND RELATIVE HUMIDITY  $\geq 80\%$  FAVOR MOLD
  - D. SUSCEPTIBILITY INCREASED WITH NUT "HANG TIME" IN THE TREE
  - E. VARIETIES EQUALLY SUSCEPTIBLE
  - F. *PENICILLIUM* MOST COMMON MOLD



# STICKS: LABOR INTENSIVE AND A SIGN OF CANOPY PROBLEMS



# WALNUT WINDROW CONDITIONER (DESTICKER)



# STICKS REMOVED BY CONDITIONER



# SELF-PROPELLED HARVESTER VERSUS PTO: YOUR CHOICE! IT'S ONLY MONEY!



## RECEIVERS WITH AUGERS AND TRANSFER ELEVATOR MOST EFFECIENT



## TRANSFERRING NUTS FROM RECEIVER TO BANKOUT WAGON



**SIDE DUMP SYSTEM ALLOWS ONE WORKER TO OPERATE  
ELEVATOR WITHOUT DISMOUNTING FROM THE TRACTOR**



**CUSHION THE  
DROP WITH  
RUBBER SLINGS  
IF POSSIBLE TO  
MINIMIZE  
BREAKAGE.**

**MORE OF A  
PROBLEM LATER  
IN THE SEASON  
WHEN THE NUTS  
LACK THEIR  
HULLS AND ARE  
DRIER.**



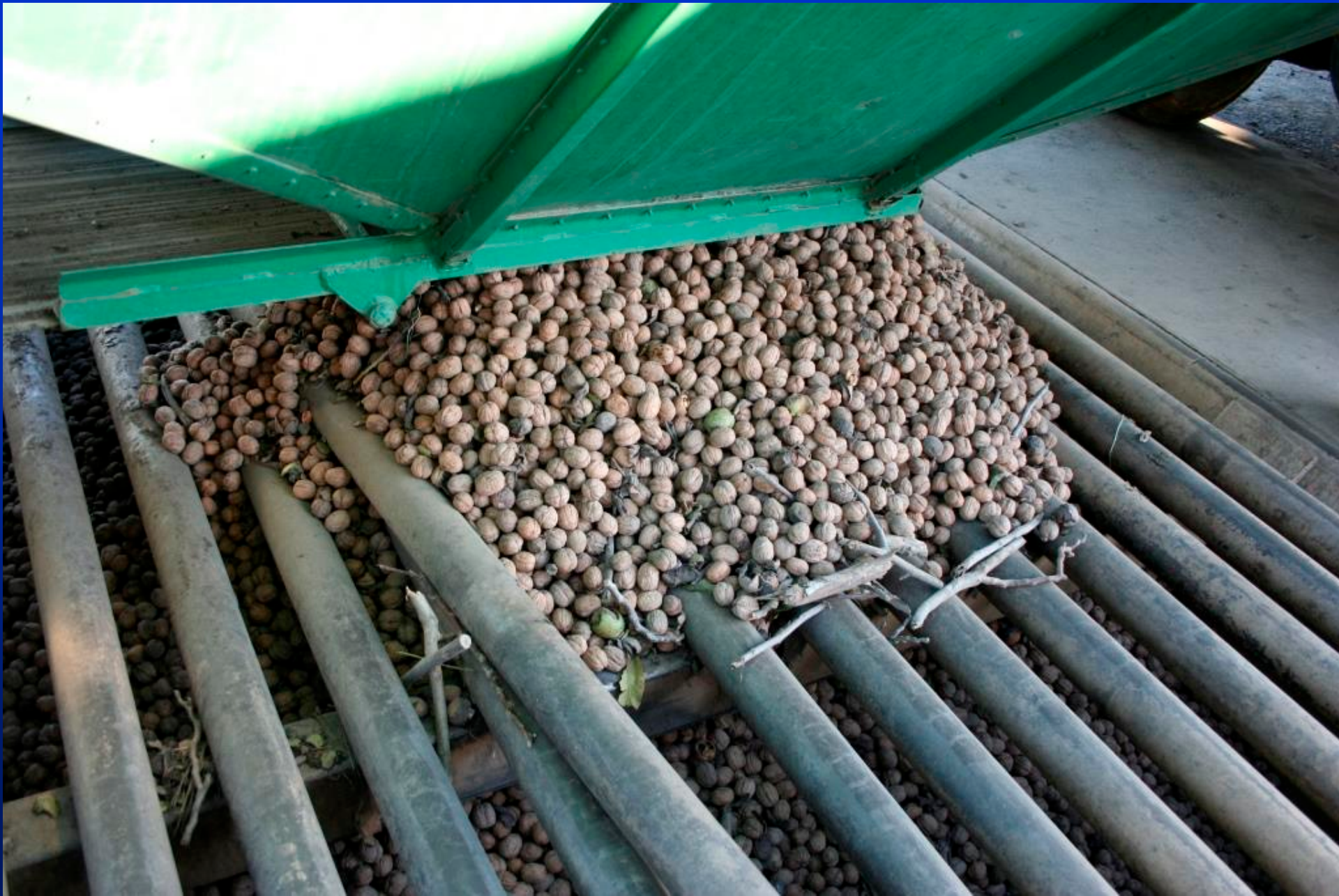
# A 60 FOOT WIDE LOADING AREA GREATLY HELPS IN LOADOUT AND TRANSPORT



# THE DEHYDRATOR VISIT: ASSESS YOUR CROP QUALITY



# THE DELIVERY PIT: CROP AND HARVEST OVERVIEW



# WALNUT CULLS : THE REST OF THE STORY!





**POST HARVEST IRRIGATE PROMPTLY! SEVEN TO NINE INCHES  
OF WATER USED FROM MID-AUGUST TO THE END OF SEPTEMBER!**

# REAL FARMERS:

1. KNOW WHAT TO DO
2. KNOW WHEN TO DO IT
3. KNOW HOW TO DO IT

AND THEN:

**THEY DO IT!**

**THANK YOU AND...**

**HAPPY FARMING!**