HARVEST MANIPULATION AND HARVESTING OPERATION

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QUALITY DOES NOT BEGIN AT HARVEST! HERE’S WHY:

1. WALNUT TIP SHRIVELED 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, BOTRYOSPHAERIA, 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
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
- 750 ppm + 1 qt./100 Dyne-Amic
- 750 ppm + 2 qts/100 Rocket DL
- 750 ppm + 1 pt/100 Nufilm 17
- 750 ppm + 1 pt/100 Silwet HS
Ethrel Adjuvant Trial 2011
at the Kearney Ag Center

Nuts with Hull Crack
(# out of 30)

Nuts fallen

Days after treatment

Fully bloomed

Untreated
600 ppm Ethrel
750 ppm Ethrel
750 ppm + 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
750 PPM TREATMENT 13 DAYS AFTER TREATMENT
9/14/09 we had .2" of rain fall from 8:58 a.m. to 11:48 a.m.
WARMERDAM FARMS 2010 ETHREL TRIAL  PERCENT REMOVAL
TULARE WALNUTS FIRST SHAKE 9/23/10

PERCENT REMOVAL

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<tr>
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<th>PERCENT REMOVAL</th>
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<tbody>
<tr>
<td>UNTREATED</td>
<td>A 86</td>
</tr>
<tr>
<td>ETHREL 4PTS</td>
<td>B 91</td>
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<tr>
<td>ETHREL + 4OZ SILICONE</td>
<td>AB 87</td>
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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
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!
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?

   A. BLOSSOM AND STEM ENDS MOST SUSCEPTIBLE TO INFECTION.
   B. INFECTION INCREASES AT THE ONSET OF HULL SPLIT
   C. TEMPERATURES ≥ 80°F AND RELATIVE HUMIDITY ≥ 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

I HATE STICKS!
STICKS REMOVED BY CONDITIONER
SELF-PROPELLED HARVESTER VERUS PTO: YOUR CHOICE!
IT’S ONLY MONEY!
RECEIVERS WITH AUGERS AND TRANSFER ELEVATOR MOST EFFICIENT
TRANSFERING 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
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!