Nut Maturation and Harvest Determination

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Composition of walnut

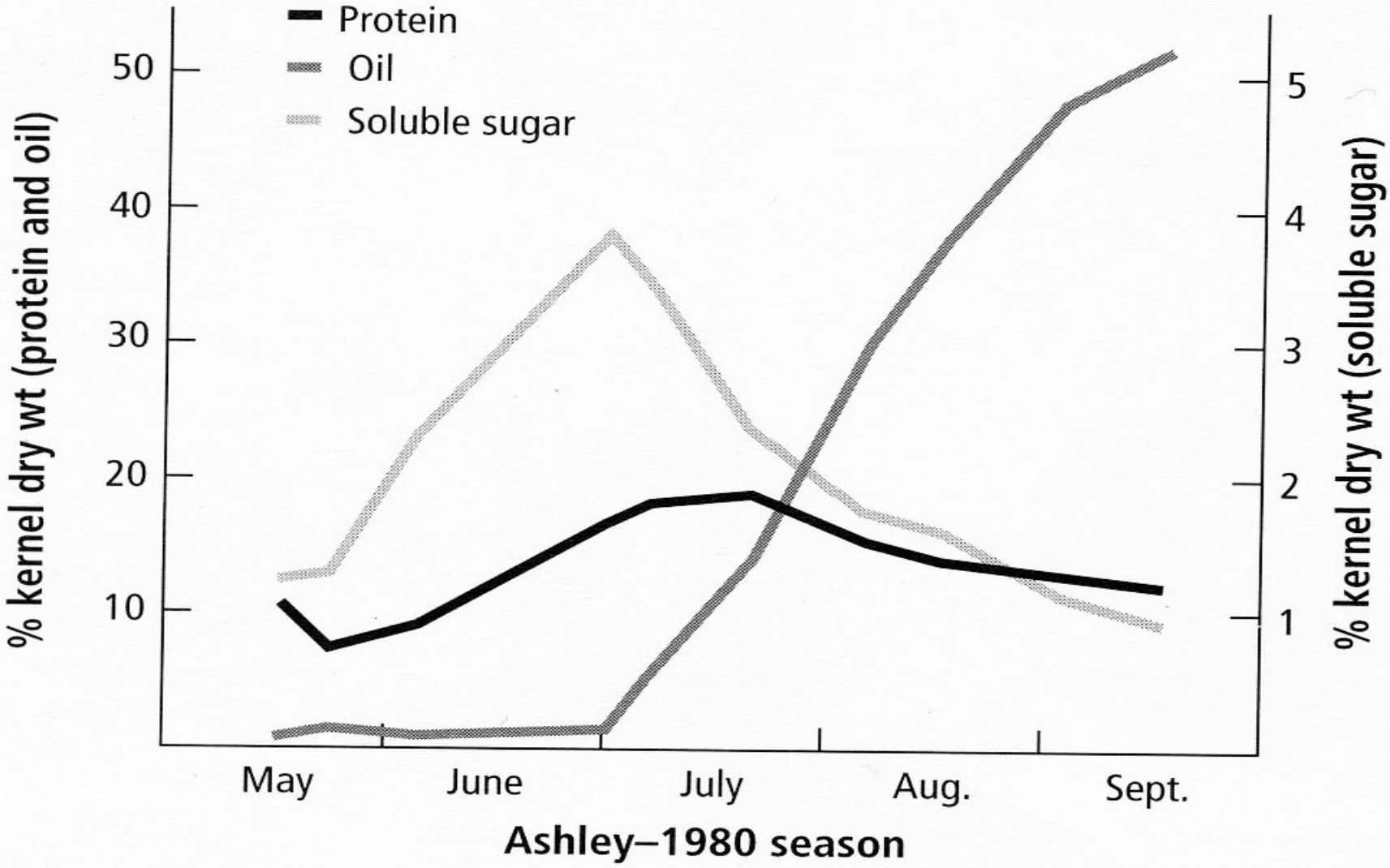


Figure 18.5 This graph shows development-related changes in the proportions of fats (oils), proteins, and alcohol-soluble sugars in the walnut kernel.

Walnuts are Physiologically Mature when they have reached Packing Tissue Brown

This occurs well ahead of hull cracking and “blooming”

Blooming Walnuts are Aging Walnuts Susceptible to Quality Loss

1. What is Packing Tissue Brown?
2. Why is it important?

3. How do I determine it?

4. When do I begin sampling?

PACKING TISSUE BROWN (PTB) IS A VERY IMPORTANT STAGE OF WALNUT MATURATION THAT SHOULD BE MONITORED ANNUALLY. ITS COMPLETION REPRESENTS THE STAGE AT WHICH THE WALNUT HAS REACHED MAXIMUM OIL CONTENT, LIGHTNESS OF THE PELLICLE (KERNEL SKIN), AND QUALITY. THE NUT AGES SLOWLY FROM THIS POINT UNTIL HULL MATURITY ALLOWS COMMERCIAL HARVEST.

LIMITED RESEARCH DATA SUGGESTS THAT 80% NUT REMOVAL CAN BE ACHIEVED ABOUT 21 DAYS AFTER THE COMPLETION OF PTB.

HARVEST CAN BE ADVANCED 4-7 DAYS WITH IMPROVED HULL REMOVAL WITH THE USE OF ETHEPHON, A PLANT GROWTH REGULATOR PRE-HARVEST AID. ITS TIME OF APPLICATION IS DEPENDENT ON COMPELETION OF PTB.

PTB IS DETERMINED BY WALKING A DIAGONAL OR ZIG-ZAG PATTERN THROUGH THE ORCHARD ABOUT 35 DAYS PRIOR TO THE TYPICAL HARVEST DATE FOR YOUR WALNUT VARIETY IN YOUR REGION.

SAMPLE A MINIMUM OF 100 NUTS FROM THE BOTTOM OF THE TREE. ONE SAMPLING TRIAL IN TWO ORCHARDS SUGGESTS THAT PTB IS COMPLETED LAST IN THE BOTTOM OF THE CANOPY.

CAREFULLY CUT THE NUTS IN HALF FROM THE STEM END. CHOKE UP ON THE KNIFE BLADE TO PREVENT IT FROM SUDDENLY PENETRATING INTO THE PALM OF YOUR HAND HOLDING THE NUT. BE READY FOR WEAK SHELLS!

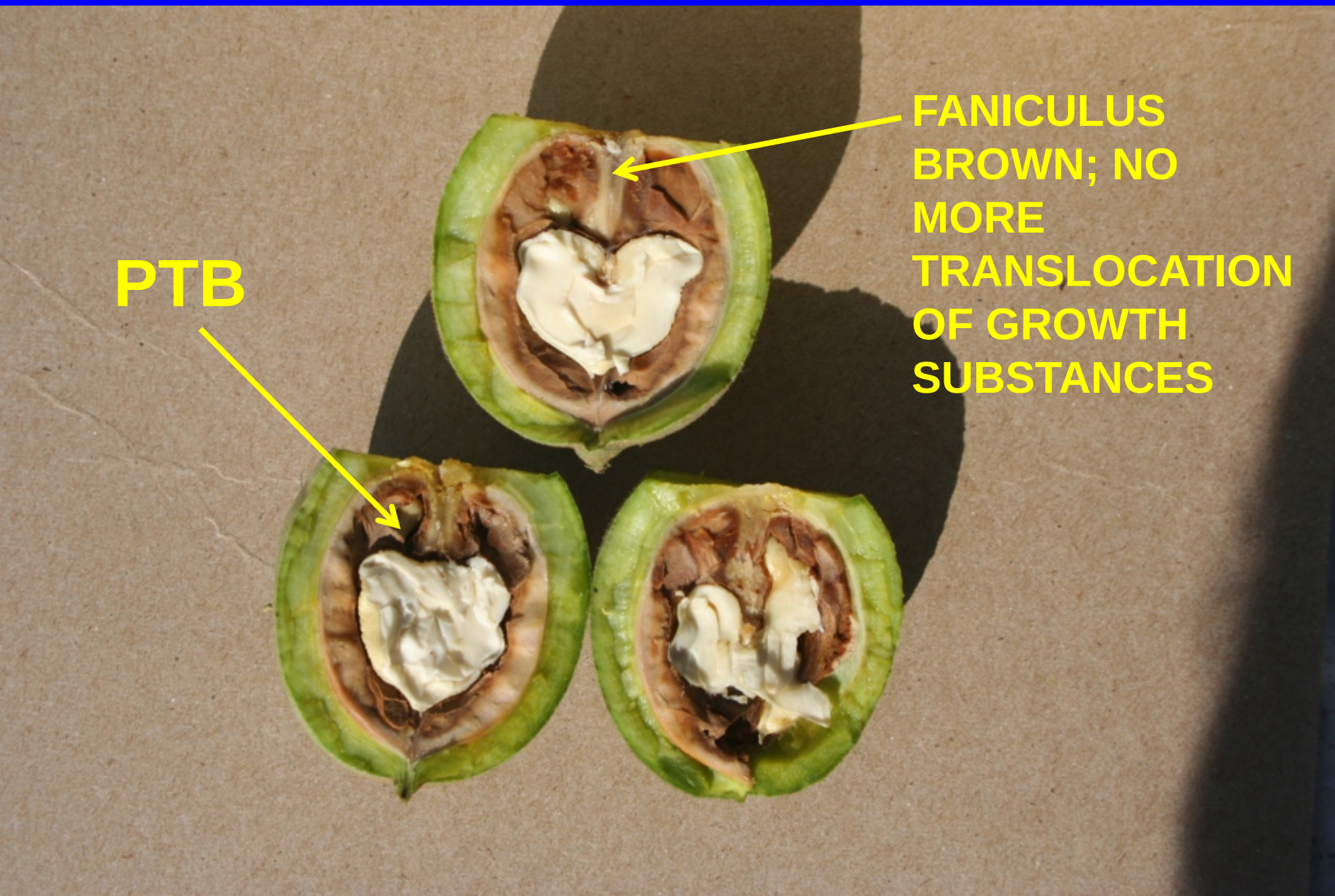
GROUP THE NUTS INTO “YES” OR “NO” PTB. DETERMINE THE PERCENT COMPLETED USING THE CRITERIA SHOWN IN THE FOLLOWIING SLIDES.

CHOKE UP ON THE KNIFE BLADE TO CONTOL ITS DEPTH OF PENETRATION

IMMATURE WALNUTS NOT AT PTB

IMMATURE WALNUTS NOT AT PTB

WALNUTS AT PACKING TISSUE BROWN (PTB)



WALNUTS AT PACKING TISSUE BROWN (PTB)

PTB COMPLETE

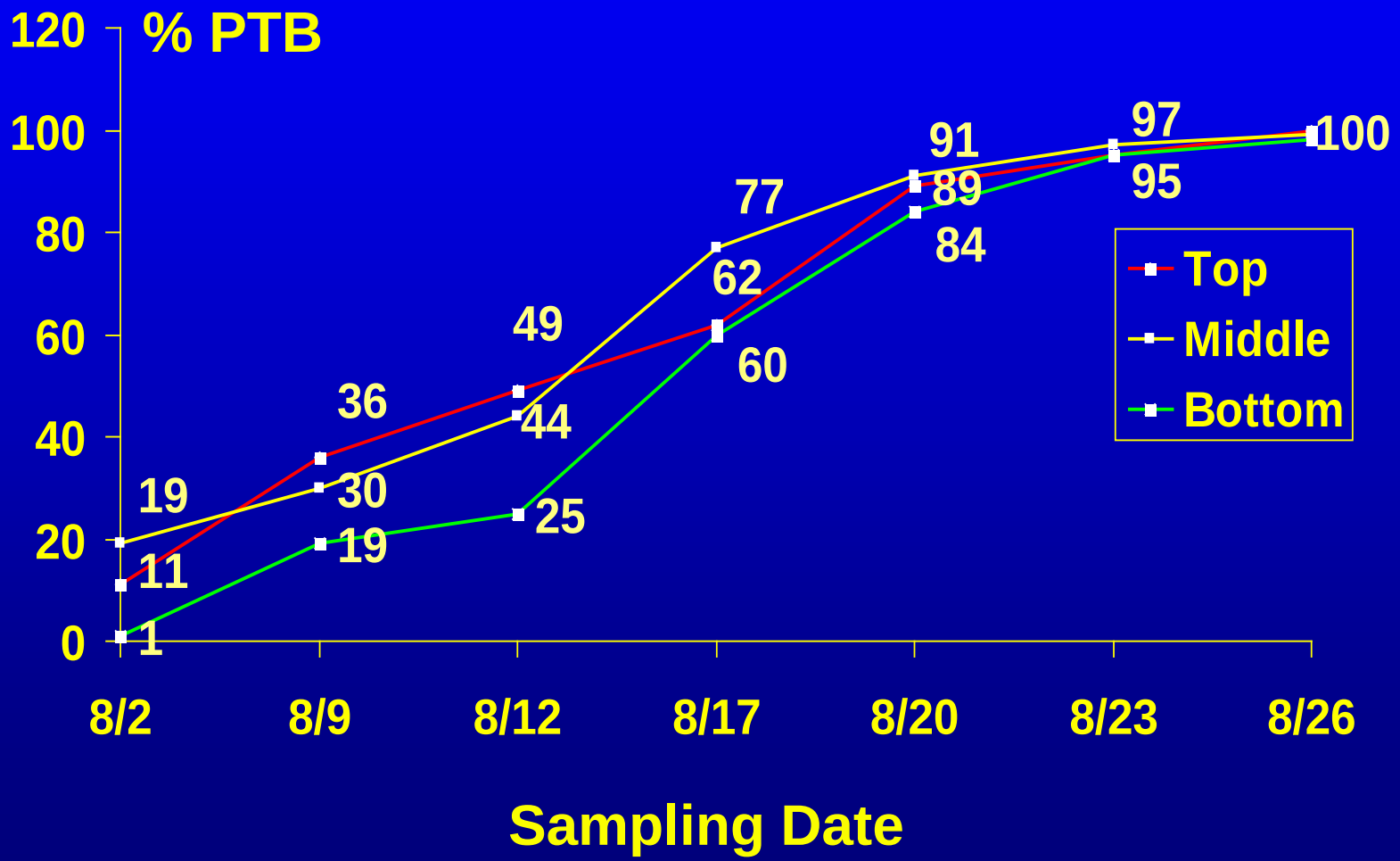
PTB NOT COMPLETE

Packing Tissue Brown (PTB) is completed LAST in the BOTTOM of the Canopy.

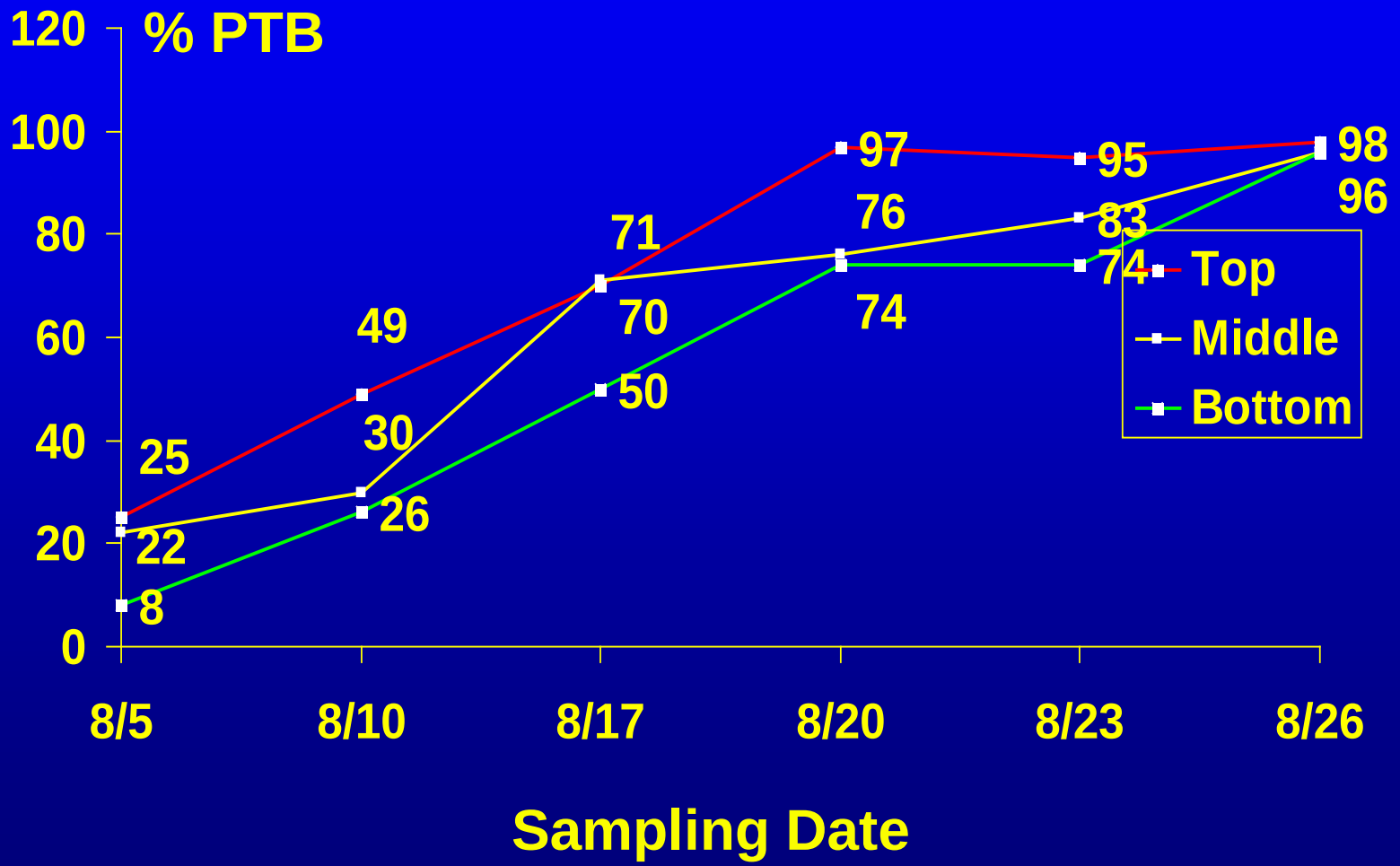
Therefore, when the Bottom nuts are 99% PTB, the rest of the canopy should be 100%.

Single nuts appear to mature later than doubles or triples.

Serr Walnuts - 1999
Packing Tissue Brown Study
Full Sun Exposure



Serr Walnuts - 1999
Packing Tissue Brown Study
Heavily Shaded



OTHER METHODS FOR DETERMINING HARVEST TIMING

1. WAIT FOR OTHERS TO BEGIN.
2. THROW RANDOMLY SELECTED NUTS ONTO THE GROUND TO SEE IF THEY “HULL”.
3. IF YOU HAVE A SHAKER, DO A TEST.
4. OBSERVE WHEN AN ESTIMATED 80% OF THE NUTS SHOW CRACKING IN THE HULL TISSUE.

MY PROFESSIONAL RECOMMENDATION IS :

DO THEM ALL!

THE OBJECTIVE IS TO REMOVE 80% OR MORE OF THE NUTS FROM THE TREE ON THE FIRST SHAKE, WITH AN ACCEPTABLE NUMBER OF "STICKTIGHTS" (NUTS WHOSE HULL IS NOT COMPLETELY REMOVED AT THE DEHYDRATOR)

MANY GROWERS ACCEPT 10% STICKTIGHTS FOR BEGINNING HARVEST.

Table 1. Effect of ethephon application at packing tissue brown and harvest timings of 14, 17, 20, and 23 days after treatment on Serr walnut removal, hull retention and sticktights in 1996, 1998, 1999 and 2001

	Harvest Data		
	Removal[2] (%)	Hulls[3] (%)	Sticktights[4] (%)
A. Treatment:[1]			
1. Treated	81.6 a	34.2 b	13.4 b
2. Untreated	79.3 b	38.9 a	19.3 a
LSD	2.3	2.9	5.5
B. Days after treatment: (DAT)			
1. 14	74.5 c	44.1 a	28.5 a
2. 17	79.5 b	39.4 b	18.7 b
3. 20	80.5 b	33.3 c	10.9 c
4. 23	87.2 a	29.4 d	7.2 d
LSD	4.6	2.6	2.6
C. Year:			
1. 1996	79.5 b	36.7 b	28.6 a
2. 1998	72.1 c	37.9 ab	15.4 c
3. 1999	89.4 a	31.8 c	2.7 d
4. 2001	80.6 b	39.8 a	18.6 b
LSD	2.4	2.1	2.6
Interactions:[5]			
Treatment x DAT	N.S.	N.S.	N.S.
Treatment x year	N.S.	N.S.	**
DAT x year	**	**	**

1. Ethephon applied 8/17/96, 8/30/98, 8/28/99 and 8/15/01 using engine-driven FMC 757 speed sprayer at 1.75 mph (0.75 mph in 2001), 200 gpa and 4 pts. Ethrel per acre.

2. Based on two harvests per plot, the second 7-14 days after the 23 DAT harvest.

3. Based on weighing a 10-30 lb.. Sample from each plot before and after commercial hulling.

4. Based on counting all sample nuts with ≥ one-eighth of shell surface with adhering hull.

5. N.S. = not significant at P=0.05. **highly significant at P=0.01.

Degree-day accumulation for walnut development in 1996, 1998, 1999 and 2001. Based on single - sine with horizontal cutoff using a 40 degree F. minimum threshold.

	Degree - Days			
Year	3/15-6/14	6/15 - (PTB)[1]	PTB - 23 DAT)[2]	Ease of Harvest
1996	2486	2584 (8/17)	854 (9/9)	4
1998	1952	3021 (8/30)	835 (9/21)	2
1999	2061	2861 (8/28)	802 (9/20)	1
2001	2639	2564 (8/15)	913 (9/7)	3

Thank you for your Attention!