COOPERATIVE EXTENSION ... UNIVERSITY OF CALIFORNIA

FRUIT AND NUT NOTES

TEHAMA COUNTY **APRIL 2012** Volume 6

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Sacramento Valley Regional
PRUNE NEWSLETTER

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Crop Load Assessment and Adjustment

Bill Krueger, UC Farm Advisor, Glenn County
Richard P. Buchner, UCCE Farm Advisor Tehama County

Matching the crop load with the tree's ability to size the fruit and achieve the desired fruit size is the goal. Fruit size at reference date, when the endosperm is visible in 80 to 90% of the fruit (Figure 1), can be used to estimate fruit dry fruit size at harvest (Table 1.). Reference date in the Sacramento Valley typically occurs in early May about one week after the pit tip begins to harden but may be later if cool temperatures persist. At reference date, a random sample of sound (non-yellow) fruit should be collected and the number of fruit per pound determined. Sample 20 fruit from 20 trees. Use orchard history to determine the sizing potential of the block being considered. Unfortunately, with large crops this procedure may over estimate fruit size. Having a good estimate of the number of fruit per tree will help avoid this. Estimate the number of fruit per tree by removing as much of the fruit as possible with a shaker (prune or walnut) from a few representative trees. Multiple trees will improve accuracy. Three may be a good compromise. Place a tarp under the entire tree before shaking. The remaining fruit should be removed by hand or estimated. Weigh all the fallen fruit after removing twigs and leaves. Take a one pound subsample of fallen fruit. Count the sound fruit in that sample, ignoring any leaves and yellow or shriveled fruit. Multiply the weight of the total fruit removed from the tree by the sound fruit subsample count per pound to determine the number of sound fruit per tree. Adjust this number to allow for fruit drop from reference date until harvest to estimate the fruit per tree at harvest. Work done in the Sutter-Yuba area in the 1970's suggested that approximately 40% of the fruit would drop between reference date and harvest. More recent work in Glenn and Tehama Counties has suggested that fruit drop may be closer to 20%.

Figure 1. Extracting endosperm at reference date.

Prune Reference Size Table

Reference Size Green (count/lb)	Harvest Size (dry) (count/lb) Orchard Sizing Potential	
	Average	Good	Excellent
50	32	31	30
55	36	34	32
60	39	37	35
65	42	40	38
70	46	43	41
75	49	45	43
80	53	48	46
85	56	51	48
90	60	54	51
95	63	57	54
100	67	60	56
105	70	63	59
110	74	66	61
115	77	68	63
120	81	71	66
125	84	74	68
130	88	77	70
135	92	79	73
140	95	82	75

Table 1. Prune reference date and average harvest dry size table. Use the reference size fresh count per pound and read across for orchards with average, good or excellent sizing potential.

For orchards with an excessive drop history, 40% may be a good estimate but for most orchards 10 to 20 % is more realistic. For example if the above procedure results in an estimate of 6000 fruit per tree a drop of 20% would result in 4800 at harvest (6000 X .2

By dividing the estimated fruit number at harvest by the estimated or desired dry count per pound and then multiplying by the number of trees per acre, you can estimate the dry pounds per acre (from the example above, 4800/60 count per lb.= 80 lbs./tree X 150 trees/ac. = 12,000 lbs. or 6 tons/ac.) This number will allow you to judge if the estimated fruit size at harvest (from Table 1) is realistic. You can then determine how many fruit of the desired dry size are necessary to give the expected dry yield based on your experience and adjust the number upward by your estimated drop (ie. 3 dry tons of 60 count fruit = 6000 lbs/150 trees/ac. = 40 lbs./tree X 60 fruit/lb. = 2400 fruit/tree + 20 % = 2880 fruit desired after thinning). Now compare the two sets of numbers. If the number of fruit per tree measured in your orchard with the estimated drop included matches the number of fruit per tree at harvest needed to produce a certain size and tonnage of fruit with the estimated drop subtracted, then you don't need to thin. If the number of fruit measured in your orchard far exceeds the needed number of fruit at harvest then you should thin. For example, if your orchard trees should carry 2880 fruit to produce a solid crop of 3 dry tons of 60 count fruit and your trees have 6,000 fruit/tree at reference date – regardless of what Table 1 predicts -- you should thin.

Mechanical thinning with the same machinery as is used for harvest can be used to remove the desired amount of fruit. Shake a tree and, and using the same methodology described above, calculate how much fruit was removed. Adjust the shaker and repeat the procedure until the desired amount of fruit is removed. Set the shaker and thin the block. The earlier thinning can be done, the greater effect it will have on fruit size at harvest.

When to thin and why

Franz Niederholzer, UC Farm Advisor, Colusa/Sutter/Yuba Counties

Shaker thinning of prune trees – when needed – is an essential part of profitable prune growing. Reducing the number of fruit on a tree (thinning) at the proper timing can increase average fruit size of the remaining crop at harvest and limit limb breakage and risk of potassium deficiency as the season progresses. But when is the "proper timing" for thinning? To best answer this question a quick review of how prune fruit grows is needed.

Prune fruit dry weight increases slowly in the spring and takes off in June and July (see Figure 1 below). However, the biggest, most important changes in fruit growth actually occur in the spring. Fruit growth per unit weight – fruit growth adjusted for total fruit weight – is most rapid right after petal fall (around 3%) and decreases steadily until early to mid-May. After mid-May, fruit growth per unit weight is essentially constant around – 0.2 to 0.3% – until harvest (see Figure 2). [Please note, the fruit growth data in Figures 1 and 2 are from 2004, a very early season.]

Why is early season fruit growth so important to final fruit weight at harvest? Gains in fruit dry weight early in the season are amplified later in the season; much like the end value of a savings account, compounded daily, is influenced by a higher interest rate early in a time interval. An example of this, using a fictitious bank account, is shown in Figure 3. In that example, a higher interest rate in the first 30 days followed by constant interest from 31- 150 days produces a bigger final principal than accounts with lower early timing interest rates, even though all three accounts had the same interest rate for 80% of the time period. This is because early principal growth is faster with the higher early interest rate. That principal difference is amplified over time after the interest rate becomes a constant 1%. So, to take this example back to prune orchards, the earlier the fruit is thinned to allow faster relative growth rates (interest), the sooner the actual fruit weight (the principal) begins to increase faster and the bigger the fruit at harvest. Once the period of equal fruit growth is reached, usually in mid to late May for prunes, the chance to improve fruit size by thinning is gone.

So, when is the best time to thin? Thin at reference date if your goal is to improve fruit size. Why then? Because reference date is the earliest fruit can be removed without excessive shaking and tree damage. Every day after reference date that you wait to thin reduces the potential for improving fruit size. Reference date is late in the period of relatively fast fruit growth shown in Figure 2. Don't delay. Count fruit at or just after pit hardening so you are ready to thin – if needed – at reference date.

Thinning much later than reference date (after late May) is OK if you are only thinning to reduce tree stress (limb breakage, potassium deficiency, etc.) and are not concerned with increasing fruit size at harvest.

For details on how to thin, see the companion article in this newsletter.: "Crop Load Assessment and Adjustment."

Figure 1. Average fruit dry wt over time 'French' prune trees. 2004

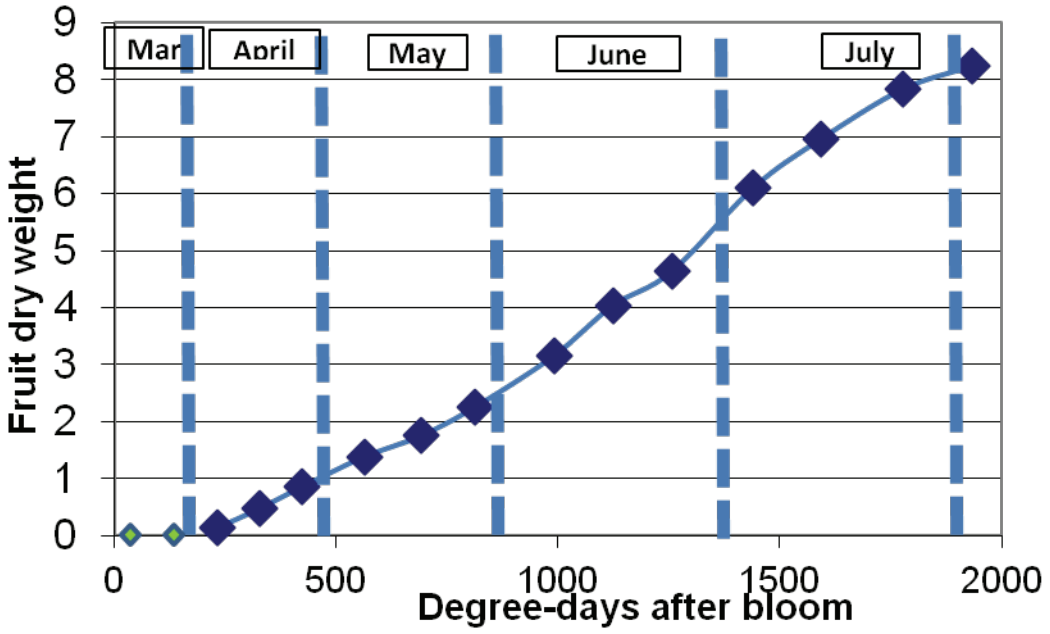


Figure 2. Fruit growth per unti fruit weight (mg/gm) on 'French' prune trees. 2004

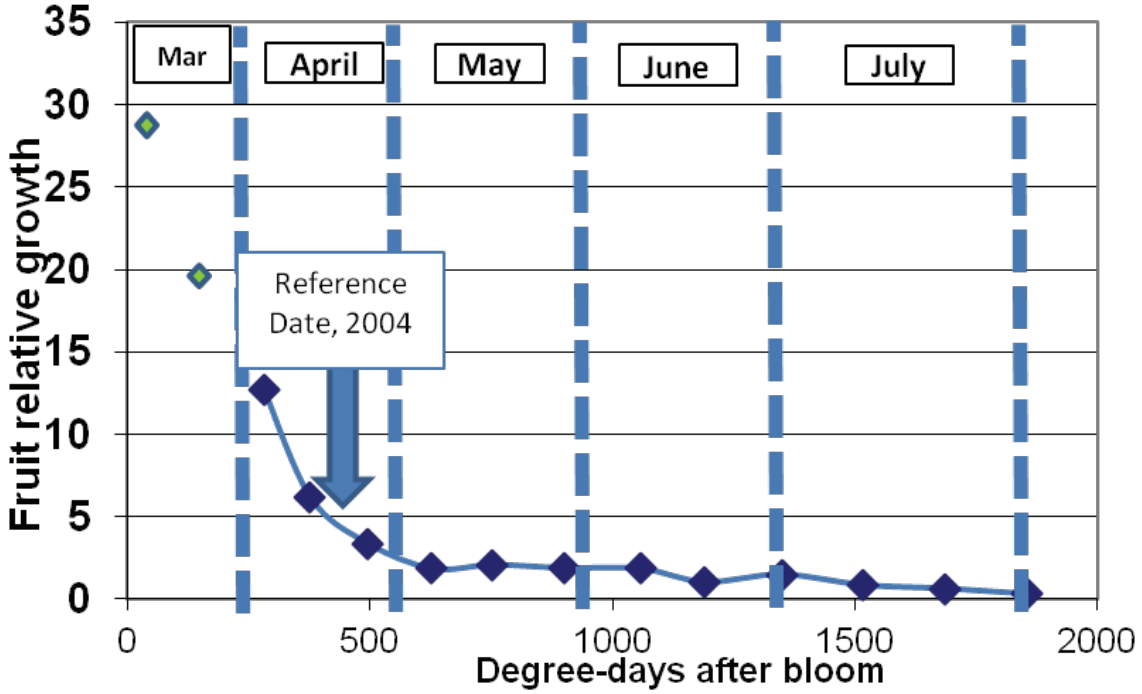
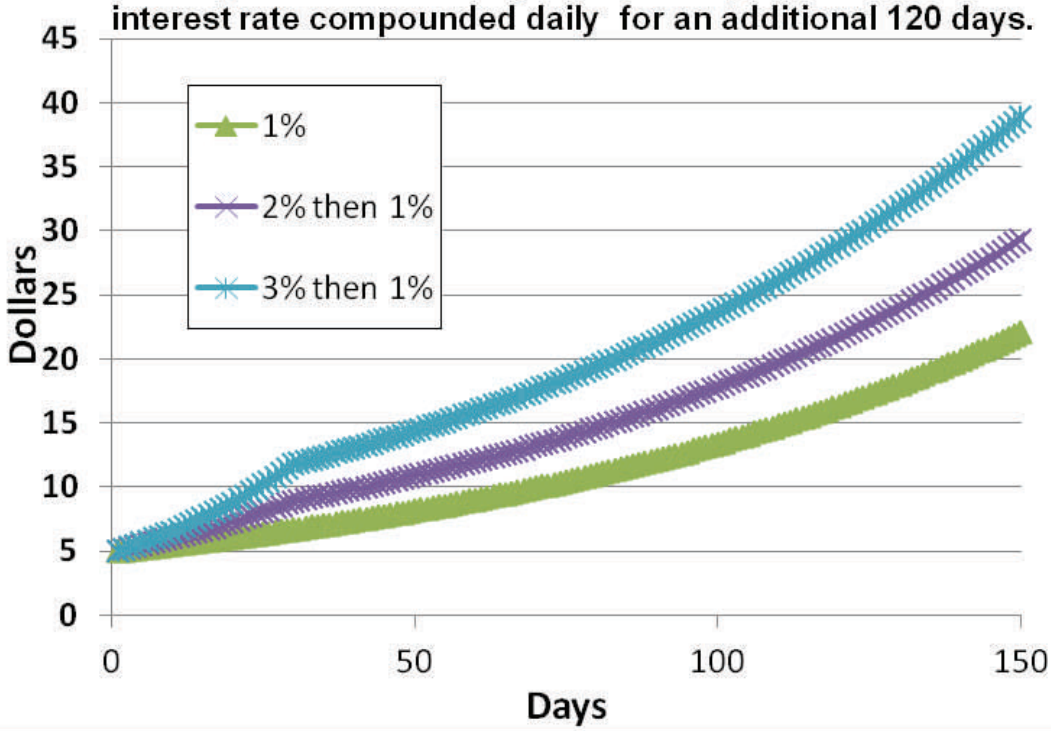


Figure 3. Principal growth of three different initial $5 investments with interest rate of 1, 2, or 3% compounded daily for the first 30 days followed by a constant 1% interest rate compounded daily for an additional 120 days.



Get what you pay for with fertilizers

Franz Niederholzer, UC Farm Advisor, Colusa/Sutter/Yuba Counties

Costs are up, but the need for fertilizer and other inputs to produce a large, high quality crop remain the same. Using more efficient materials and practices can help control costs relative to income. However, be careful not to trim muscle when you are looking to cut out fat. One example of this is in fertilizer materials and rates.

Dried prunes contain roughly 1% potassium (K) and 0.6% nitrogen (N) on a per weight basis. At harvest, a prune crop can contain 70% of all the potassium in a tree and half the nitrogen. That amounts to the equivalent of 3+ tons of potassium sulfate and 4+ tons of ammonium sulfate trucked out of a 50 acre orchard in a three dry ton/acre crop in one year.

To replace this kind of orchard output, substantial amounts of N and K must be available to heavily cropping prune trees. Potassium is particularly important because of the risk of sunburn and scaffold death following defoliation due to potassium deficiency. University of California (UC) recommendations for maintenance rates of K fertilizer include 250-400 lbs of soil applied potassium sulfate/acre/year – depending on irrigation system – or 100 lbs potassium nitrate/acre/year as a foliar fertilizer. The soil provides significant K, but not enough or at fast enough rates at certain times of the year to satisfy the needs of a rapidly growing crop while maintaining leaf health (no deficiency).

The use of reduced potassium application rates from those listed above should be approached very cautiously. Whether you are considering reducing standard fertilizer rates or using new materials marketed as more efficient than standard products, be careful not to under fertilize your trees.

Don't step over a dollar to pick up a dime. For example, a four year UC research study documented that 100 lbs potassium nitrate/acre/year divided into four to five sprays is as effective in maintaining leaf K levels, fruit size, and total crop yield as a large maintenance rate of soil applied potassium fertilizer (600 lbs/acre/year potassium chloride). Replacing a single spray of 20 lb/acre of potassium nitrate (9 lb K_2O) with one using one gallon/acre of 0-0 -26 potassium fertilizer (2.9 lbs K_2O) reduces the amount of K_2O applied in a single spray by 70%. You would have to repeat the application twice at the same 1 gallon/acre rate -- for a total of 3 applications – to equal the amount of K_2O delivered in a single spray using 20 lb/acre of potassium nitrate. It would take fifteen (15) applications at a rate of one gallon/acre 0-0-26 liquid material to match the K delivered in 100 lbs/acre potassium nitrate. You could do it, but I'll bet it would cost more than the potassium nitrate program. If the 0-0-26 material (or any other product) is reported to be more efficient than potassium nitrate, check it out in a small block. Even if the material is more efficient than potassium nitrate, if insufficient K/acre is applied in a season using the new material, the orchard may become K deficient. You can't build a 2000 square foot house with the materials for a 1000 foot house, no matter how good the quality of those materials.

A prune orchard carrying a good crop has high K demands. If enough K doesn't get into the tree to meet crop K demands, there is a strong chance of potassium deficiency, leaf drop, small fruit, sunburned limbs and loss of fruiting wood. New ideas should be considered, but do the math and/or a small test block before committing to a new nutrient program.

35th Annual Nickels Field Day

Thursday, May 3, 2012
Nickels Soil Lab
Greenbay Avenue, Arbuckle

8:30 a.m. — **Registration**
Coffee and Danish provided by Farm Credit Services of Colusa-Glenn, ACA

9:00 a.m. — **Field Topics:**

Hedgerow Chandler walnut pruning trial.
Carolyn DeBuse, UC Farm Advisor, Solano/Yolo Counties
Janine Hasey, UC Farm Advisor, Sutter/Yuba Counties

Howard walnut hedging trial results.
Bruce Lampinen, Extension Specialist, Plant Sciences Department, UC Davis

Does increasing Nonpareil percentage improve per acre returns?
Joe Connell, UC Farm Advisor and County Director, UCCE Butte Co.

Spraying herbicide in orchard middles.
Brad Hanson, Extension specialist, Plant Sciences Department, UC Davis

Self-fertile almond varieties.
Tom Gradziel, Professor, Plant Sciences Department, UC Davis

New almond leaf sampling practices.
Sebastian Saa, PhD candidate, Plant Sciences Department, UC Davis

Nonpareil on peach and plum rootstocks.
Bill Krueger, UC Farm Advisor, UCCE Glenn Co.

Introduction to foliar nitrogen sprays in almond.
Franz Niederholzer, UC Farm Advisor, Colusa/Sutter/Yuba Counties

12:15 pm — **Lunch** by reservation, proceeds to benefit the Pierce FFA Program
Luncheon Speaker - Jeff Sutton, General Manager, Tehama Colusa Canal Authority.

PCA and CCA credits pending
If directions needed for the Field Day Location, Call: (530) 458-0570 –UCCE Yuba/Sutter ***or*** (530) 527-3101-UCCE TEHAMA

Luncheon Reservation Form

Cost: $12.00/person (Prepaid Reservation)
$15.00/person at the door
Make checks payable to: Pierce High School
Mail to: Cooperative Extension
P.O. Box 180
Colusa, CA 95932

Name:_____
Address:_____ City: _____State: ___ Zip:_____
Email: _____ Phone:_____
Name(s) of Attendees(s):_____ _____ _____ _____
Total Amount Enclosed: $_____

Please return this form & your check
by April 27th to receive the discounted price.

Tehama Fruit & Nut Notes
and
Sacramento Valley Regional

PRUNE NEWSLETTER

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