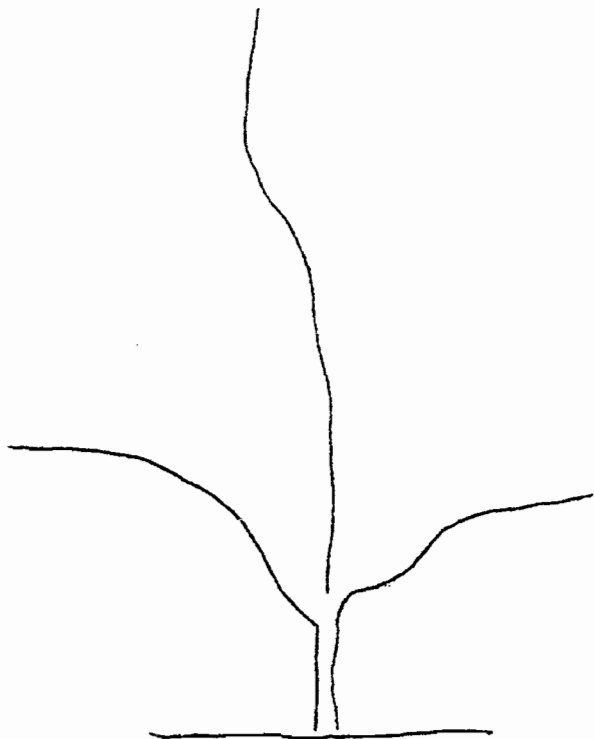


# WALNUTS IN TEHAMA COUNTY



UNIVERSITY OF CALIFORNIA  
AGRICULTURAL EXTENSION SERVICE  
TEHAMA COUNTY

## WALNUTS IN TEHAMA COUNTY

by Wally Schreader, Farm Advisor

The first commercial planting to English walnuts was started in California as early as 1843. In slightly over a century, California's total walnut acreage has mushroomed to nearly 165,000 acres producing about 95 percent of the total United States walnut supply.

Tehama County is the eighth largest walnut growing county in the state with a total of 6,175 acres consisting of 3,977 bearing and 2,198 nonbearing.\*

### CLIMATE

The chief climatic limitations of walnut production in Tehama County are spring frost, fall frost, extreme summer heat and late spring rain.

Spring Frost: Historically cold locations should be avoided. A temperature of 29° - 30° F. for a period of one hour is enough to cause the death of flowers or young fruits. For this reason some of the most popular walnut varieties grown in the county are those which blossom late when frost danger is past.

Fall Frost: Fall frost may cause dieback, especially on young trees. Growers can sometimes avoid fall frost damage on young trees by not irrigating during the period August 15 to November 15. If enough rain has fallen before November 15 to sufficiently wet the soil to a depth of four feet no fall irrigation is necessary. (See pruning frost damaged trees.)

Heat: Temperatures of 100° F. and above accompanied by low humidity will usually cause exposed nuts to burn. Most severe burning occurs on the south and west sides

or tops of trees. Those trees growing on very sandy soil, near a roadway or some object which reflects the sun's rays are most subject to burning. Early hot spells (June) usually cause burned nuts to become blanks. Heat damage occurring in July and August will cause a high percent of the kernels to be shriveled. Heat damage near harvest time will cause kernels of affected nuts to be dark brown or black. The use of a "whitewash" treatment applied to the southwest side of the trees and nuts may be of some benefit to reduce heat damage.

Late Spring Rains: Tehama County frequently has several late spring showers. While this is usually a blessing for range grasses and covercrops it is detrimental to walnuts. Rains aid the spread of bacterial blight, an organism which attacks and may kill developing nuts. Walnut blight is controlled by the application of bactericides at a cost of \$25 to \$40 per acre per year.

### SOIL

Walnuts are most productive when grown on deep, well-drained silt loam. Very sandy soils produce slow growing trees which are moderately productive. Nutritional deficiencies are often magnified in trees grown in sandy soil. Trees grown on heavy clay soils grow slowly and produce small crops, and are more difficult to irrigate. Soils of Tehama County capable of producing good trees lie along either side of the Sacramento River and its tributaries. Of the soil series found in Tehama County, Columbia, Los Robles, Vina and Yolo are examples of common soil types which are the best for walnuts.

\*1966 California Crop and Livestock Reporting Service

## IRRIGATION

Walnuts will grow and produce crops when dry farmed where annual average rainfall is 20 inches or more. Irrigation however is profitable under today's competition for quality and production. Mature walnuts may be expected to use 3-1/2 to 4 acre-feet of water per acre per year. In most years winter rains might be expected to supply one-third of this amount. The remaining requirement must be satisfied by adequate irrigation through the summer. Walnut sizes are frequently decreased if an adequate supply of water is not maintained between the period of bloom and shell hardening. English walnut shells harden from the tip or blossom end to the stem end. This process takes place from May through June, depending on the variety.

See Fall Frost on page 1 for methods of avoiding or reducing damage by fall and winter freezing weather.

## ROOTSTOCKS

Northern California black walnut, Southern California black walnut, Paradox hybrid, Royal and Persian have all been used as rootstocks through California walnut growing history. The most popular stocks now used are Northern California black and Paradox hybrid. The Northern California black root has considerable resistance to oak root fungus but is susceptible to root lesion nematode, crown rot and crown gall.

Paradox hybrid root has special use in wet spots and slow growing areas due to its resistance to crown rot and its vigor. It grows more normally under attack by lesion nematode than black walnut. It is highly susceptible to crown gall.

## VARIETIES AND THEIR SELECTION

An ideal walnut for Tehama County would have the following characteristics.

1. Heavy annual production.
2. Late blooming to avoid damp spring weather and blight or spring frost damage.
3. A well-sealed strong shell capable of withstanding mechanical harvesting methods.
4. Early maturity to avoid wet weather during harvest.
5. Tolerance of high summer temperatures without severe sunburn.
6. A large nut free of defects.
7. Early heavy bearing.
8. A high percentage of kernel.
9. Enough tree vigor to provide tree growth and shade on the nuts with a minimum of pruning.
10. The ability to produce pollen in the amounts and at the time needed throughout the tree's life.

This ideal walnut does not exist yet. Breeding and selection programs conducted by the University of California, private nurseries, and individuals during the last 20 years have produced a vast array of new varieties each possessing some of these ideal characteristics. Selections of the most promising varieties are growing under test in local orchards. Results of these tests in detail are available for your inspection at the Farm Advisors Office.

It is impossible to say that any one or two varieties are better than any other at this time. To overcome this lack of knowledge the common practice is to plant trees 25 or 30 feet apart on the square in such a way that 3 or 4 varieties can be planted and ultimately thinned to the most profitable one 50 to 60 feet apart on the square.

WALNUT VARIETY CHARACTERISTICS

(1965 University of California Table - Hand cracked samples. Mostly 5 year averages)

Variety	Parentage	Leafing Date (1)	Harvest Date(2)	% Lateral Pistillate Flowers	Shell Seal(3)	Tree Vigor(4)	% Kernel (5)	General Remarks
Adams	P.I. 18256 x ?	12	M-L	20	G-E	H	M	
Ashley	Payne Group	3	E	90	F-G	L-M?	H	
Blackmer	Eureka Group	1	E	5	G-E	H	M	
Conway Mayette	Mayette Group	31	M-L	0	P	H	L	Slow coming into bearing
Drummond	Eureka x ?	23	M	5	F	M-H	M	
Ehrhorn	Unknown	7	M	90	F-G	M	L	
Eureka	Seedling of Kaghazi	9	M	0	E	H	M	Tends to alternate bear
Franquette	French Import	33	L	0	G	H	L	Slow and low bearing
Hartley	Mayette Seedling	17	M	8	F	H	M-L	Very susceptible to deep bark canker
Howe	Unknown	15	M-L	0	P	M	H	
Jensen	Payne Seedling	11	E-M	85	F	L-M	H	Blights badly
Marchetti	Eureka Group	7	E-M	90	G	M	M	Blights badly
Mayette	French Import	24?	M-L	0	P	H	L	
Nugget	Payne Seedling	3	M	30	F	M-H	M	
Payne	Unknown Seedling	-	E	80	G	M	M	Blights and sunburns badly
Scharsch - Franquette	Presumed Sport of Franquette	32	L	15	G	H	M	Apparently a little more fruitful than Franquette
Sharkey	Unknown Seedling	1	E	35	F-G	H	H	
S-S Franquette	Franquette Selection	33	L	1	G	H	L	Same as Franquette
Trinta	Sport of Waterloo	7	E-M	80	G-E	H	M	Information supplied by Sierra Gold
Waterloo	Eureka Seedling	17	M-L	0	M-L	H	M	
49 - 35	Payne x Payne	10	E-M	80	G	L	H	
49 - 46	Payne x Hartley	9	E	90	F-G	M	L	
49 - 47	Payne x Franquette	12	M-L	45	G	M	M	
49 - 49	Payne x Franquette	9	M	70	F-G	L	M	
50 - 55	Payne x Conway Mayette	19	M	70	P	M	M	
51 - 170	Payne x Franquette	16	M	35	G	M	M	
51 - 186	Conway Mayette x Payne	18	E-M	70	F-G	M	M	
52 - 48	Waterloo x Payne	6	M-L	50	G	M	H	Blights and sunburns badly
52 - 61	Waterloo x Payne	7	M	80	G-E	L	H	
53 - 113	Conway Mayette x Payne	20	M	80	F	M?	M	Large nut
53 - 179	Waterloo x Payne	14	M	80	G	H	M	

WALNUT VARIETY CHARACTERISTICS (continued)

Variety	Parentage	Leafing Date(1)	Harvest Date(2)	% Lateral Pistillate Flowers	Shell Seal(3)	Tree Vigor(4)	% Kernel (5)	General Remarks
56 - 157	Sharkey x Marchetti	12	E	70	G-F	M	H	Upright growth, irregular shaped nuts
56 - 166	Sharkey x Marchetti	13	E	80	F	M	H	
56 - 176	Sharkey x Marchetti	8	E	70	G-F	M	H	
56 - 177	Sharkey x Marchetti	8	E	80	F-P	M	H	
56 - 184	Sharkey x Marchetti	10	E	80	F-P	M	H	Poor shell
56 - 201	Sharkey x Marchetti	15	E	60	G-F	M	M	Very upright growth
56 - 206	Sharkey x Marchetti	9	M	80	G-F	M	M	
56 - 224	Sharkey x Marchetti	10	M	75	F-P	M	H	Poor shell
56 - 226	Sharkey x Marchetti	16	E	70	F-P	M	H	
58 - 11	Waterloo x Payne	20	M	80	G	M	M	
59 - 129	Payne x P.I. 159568	6	M	70	F-G	H	H	May be resistant to blight

(1) Blooming date is expressed as days after Payne at Davis

(2) Harvest date is expressed as: E = early, M = midseason, L = late

(3) Shell seal is expressed as: E = excellent, G = good, F = fair, P = poor

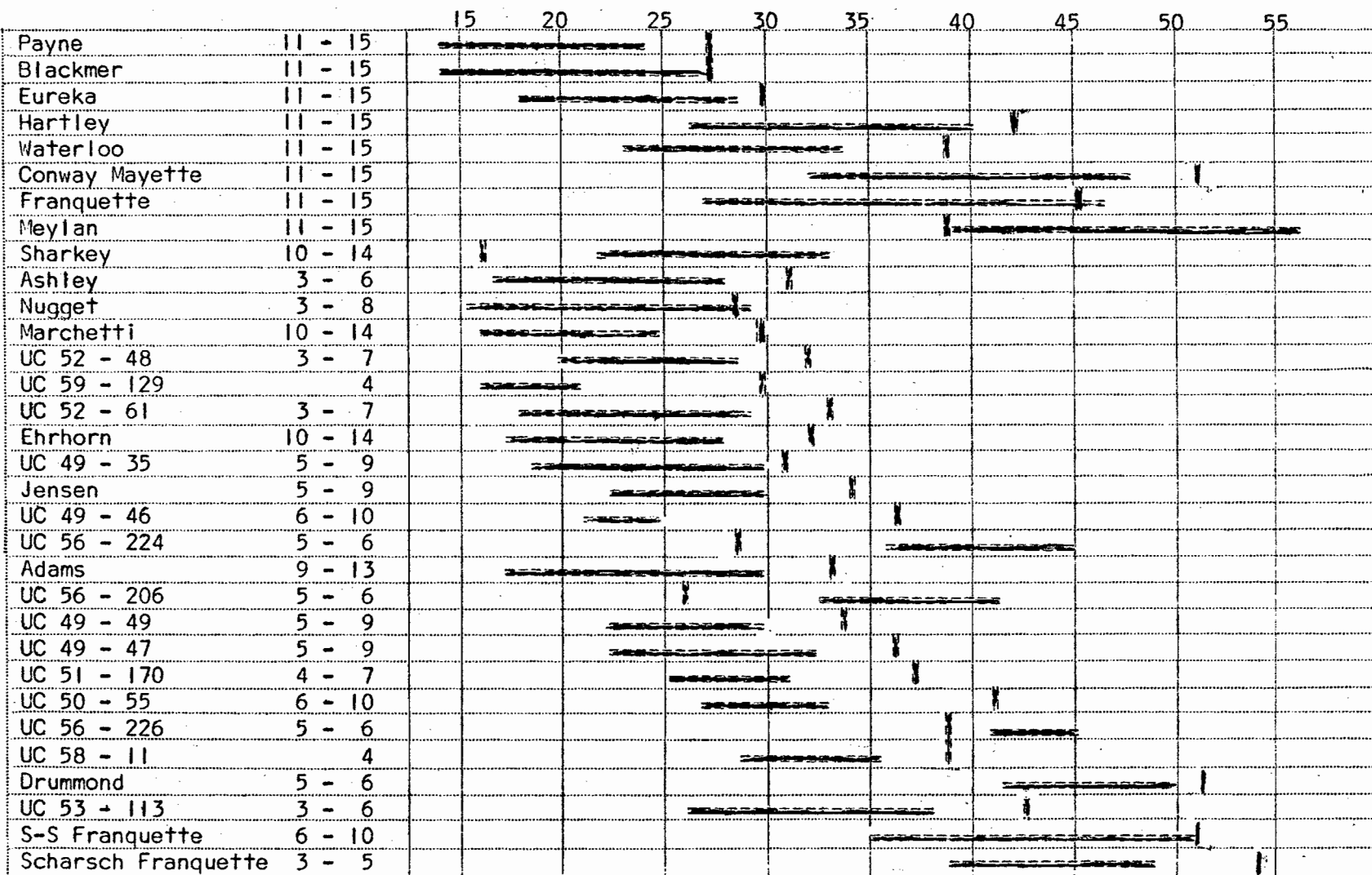
(4) Tree vigor is expressed as: L = low, M = moderate, H = high

(5) % kernel is expressed as: L = low, less than 48%; M = moderate, 48-52% H = high, 53% or over

WALNUT BLOOMING DATES AT UNIVERSITY OF CALIFORNIA CAMPUS AT DAVIS

Walnut Pollen Shedding Periods (—) and Peaks of Pistillate Bloom (|)  
Days After Payne Leafing Date

Ages Averaged  
Years



## INTERCROPS

Intercrops which have proven most successful in Tehama County are beans and milo. Crowding the trees by row cropping close to them is not recommended. Six feet should be left between the tree and cropped area to lessen competition and allow the operator room to manage irrigation, fertilization and cultivation of the orchard. The advisability of an intercrop would depend on available equipment, yield and price date, tree spacing and grower ability. Also consider residue on intercrops from walnut sprays and vice versa if trees are producing.

## COVERCROPS AND MODIFIED SOD CULTURE

Covercrops can consist primarily of native weed growth. Since little or no increase in nitrogen or organic matter can be maintained under normal California orchard conditions, the principal function of a cover crop is to loosen the soil by root penetration. This reduces compaction and increases rate of water infiltration.

It is becoming a common practice to allow native weeds to grow all spring and summer. The weeds are chopped or mowed periodically to reduce competition and avoid accumulating excess litter. This modified sod further reduces compaction, improves water penetration, and provides a better traction surface following rains. It must be remembered that weeds use nitrogen and water as do the trees so that increased supplies of these must be added to offset this competition.

In order to reduce the need for hoeing around trees and chopping weeds in both directions, use of herbicides are recommended to provide a weed free strip down each tree row.

## PESTS AND DISEASES

Insect Pests: Insect and related pests most commonly causing problems in orchards here are walnut aphid, frosted scale, red spider mites, red-humped caterpillars, lesion nematodes, and Navel orange worms.

Walnut Aphid: This pest is usually attracted or made worse by copper blight sprays. Hot weather (110° F) and predators frequently keep populations from building up and making chemical control necessary.

It is believed that aphid should be controlled whenever the population reach 15 - 20 per sub-terminal leaflet. This is particularly true on early blooming varieties and early in the season.

It is desirable to alternate aphicide types between sprays so that a phosphate and a hydrocarbon or some other insecticide is used alternately to delay resistance buildup.

Frosted Scale: Usually controlled by native parasites and predators. On rare occasions nature has failed to provide control and fruit wood up to the size of your finger has been killed. Use of DDT within an orchard can cause severe outbreaks of the scale due to the killing of parasites and predators.

Timing chemical control measures for the summer hatching period allows you a chance of seeing whether or not nature is going to provide adequate control. Sprays at this time also help suppress or control aphid and red spider mites.

Red Spider Mites: This group of pests including European red spider mite, Pacific spider mite, and 2-spotted spider mite are the principle mites attacking walnuts and probably the worst local pests.

## PESTS AND DISEASES (continued)

The first line of defense is that of integrated control. This means taking advantage of those natural factors found to be beneficial. Vigorous dust free trees are less susceptible to infestation than trees poorly irrigated, fertilized, pruned, diseased and insect pest-ridden, dust-laden trees.

In addition mites tend to build up in orchards where parasite and predator killing insecticides have been used indiscriminately.

In addition to causing yield and quality reduction, mites can also cause severe defoliation which results in leaves interfering with harvest and allows sunburn damage to occur to the tree resulting in branch wilt disease.

**Red-Humped Caterpillars:** On occasion this pest can be very severe, causing almost total defoliation in mid-summer. Because of this, careful watch for this pest must be maintained from June through September. Indiscriminate use of insecticides to control the pest is also to be avoided because it can induce severe red-spider and frosted scale problems.

Caterpillars more than about half-grown (about 3/4 of an inch long or more) are seldom worthwhile attempting to control chemically. Usually they will live long enough to produce the greatest amount of damage before they die from insecticidal poisoning.

Parasites of this pest often result in adequate control and should be checked before chemicals are applied. This is done by grasping the fore and rear ends of the worms and stretching them out until they rupture. Parasites will often show as small white worms within the abdominal mass of the larger ruptured red-humped caterpillar. In addition, parasitized worms are listless and slow moving on warm days with a marked darkening or discoloration of the skin.

**Lesion Nematodes:** Microscopic roundworms attacking the roots can cause severe decline of tree vigor. Soil fumigation and rootstock selections can help avoid serious problems.

In addition to low tree vigor and dead or dying tree tops, the nematodes leave characteristic lesions on the larger roots. When carefully scraped with a knife nematode infested roots will have dark spots just under the outer skin of finger-sized roots or smaller. These spots may be very small or coalesced into larger spots.

**Navel Orange Worm:** Primarily a pest in mature nuts both in the field and in and around the dehydrator. No chemical control is available.

The first line of defense is sanitation. Dispose of debris frequently. Disc under or burn all hull and cull piles frequently. Control blight as well as possible to prevent worm buildup in blighted nuts prior to harvest.

Worms cannot enter normal nuts until after the hulls split so harvest, dry, and ship all nuts as early and as quickly as possible. If nuts are to be held in storage a methyl bromide fumigation is recommended.

**Diseases:** Diseases which commonly cause trouble here are walnut blight, crown rot, crown gall, bark canker, branch wilt, and the new deep seated bark canker.

**Blight:** Walnut blight causes heavy crop losses in years when there are frequent late spring rains. Copper sprays properly timed and applied will reduce blight losses but not eliminate them.

Remember, copper sprays tend to worsen aphid conditions so don't spray unless previous history justifies control of blight economically.



## PESTS AND DISEASES (continued)

**Crown Rot:** Crown rot is a fungus disease which kills the bark around the tree trunk. It usually starts 4 to 8 inches below the ground level and may extend for several feet in the main roots of the tree. It can be avoided to a degree by maintaining a relatively dry soil around the crown. Where the disease has already begun, growers can usually save the tree by permanently removing the soil in a circle around the trunk to a depth sufficient to expose all of the infected area. Inarching may be employed and works well on small trees.

**Crown Gall:** Works slowly and can usually be controlled by surgery and an elgetol - alcohol treatment. Young trees should be examined carefully to a depth of 18 inches when they are about three years old and galls removed. In some lots of Paradox seedlings this is especially important.

**Bark Canker:** Occurs in some orchards, particularly Hartley. The young cankers will dry up if the diseased bark is shaved off to clean tissue with a carpenter's draw knife.

**Deep Seated Bark Canker:** This disease has many of the outward symptoms of bark canker above. It differs in that it penetrates all the way to the hardwood and shaving the surface does not stop it.

The cause of this condition is believed to be a bacteria. It can kill trees very quickly. The Hartley variety is particularly susceptible and no longer recommended for planting because of this disease.

**Branch Wilt:** Causes extensive losses of limbs when left untreated. This fungus disease enters a wound area usually caused by sunburn. After entrance, the disease moves down the limb toward large scaffolds. After the disease is present, cutting out is the only

treatment. Trees which are well fertilized, have adequate water, with control of red spider and red-humped caterpillar seldom contract branch wilt.

## FERTILIZATION

Nitrogen is the nutrient most commonly deficient. Annual applications of 100 to 150 pounds of nitrogen per acre are frequently advisable for maintenance in mature orchards.

Zinc deficiency may occur at old corral sites, Indian mounds and in some naturally zinc deficient soils such as Columbia fine sandy loam or other sandy soils and soils of volcanic origin. At present the corrective treatment is to drive zinc coated strips or nails into limbs ten inches in diameter or smaller.

Other deficiencies which reduce vigor or yield may occur under certain conditions and growers should watch for them.

## CULTIVATION

Cultivation is done for four reasons. (1) To eliminate weed competition for water and nutrients. (2) To eliminate noxious weeds. (3) To obtain loose soil for irrigation operations (farrowing or checking). (4) To prepare the ground surface for harvest. Excessive cultivation or cultivation when the soil is too wet can create severe compaction. Water and roots penetrate compacted soil slowly if at all. This condition can severely affect tree productivity.

## PRUNING AND TRAINING

Many of the newer varieties come into bearing very early. Some are also low in vigor. These two conditions can cause limbs to bend over and be allowed to sunburn. In addition, loss of vigor does not provide the growth required for proper shaping of the tree.

In order to insure continued vigorous growth the first 8 to 10 years, some varieties require heading back the current year's growth each dormant season. The amount to be removed depends on the variety. The following table is a guide to the amount to cut back.

No heading of previous year's growth is suggested for the following varieties:

Blackmer  
Conway - Mayette  
Drummond  
Eureka  
Franquette  
Scharsch Franquette  
S - S Franquette  
Waterloo

In varieties where trees have already lost their vigor due to insufficient cutting or heading back during the previous dormant season the following steps are necessary to stimulate tree growth. (1) Cut back all of the previous year's growth to 3 - 4 buds. (2) If growth was very weak remove all spurs from the terminal 18 - 24 inches of those limbs where you want major limbs to continue growth.

One-fourth (1/4) of previous season's growth should be headed back on those shoots you want to continue to grow into major limbs on the following varieties.

59 - 129 Adams 51 - 170

One-third (1/3) of the previous season's growth should be headed back on those shoots you want to continue to grow into major limbs on the following varieties.

Nugget  
Payne  
Sharkey  
49 - 35  
49 - 46  
49 - 47  
49 - 49  
52 - 48  
53 - 113  
56 - 224  
56 - 226  
58 - 11

One-half (1/2) of the previous season's growth should be headed back on those shoots you want to continue to grow into major limbs on the following varieties.

Ashley  
Marchetti  
52 - 61  
56 - 206

## HARVESTING AND PROCESSING

Harvest may begin when the nuts are sufficiently mature to be hulled. Kernels are normally mature when the packing tissue (between kernel and shell) has turned brown, but harvest is not usually started until 95 - 98% of the nuts are hullable without special treatment. Before the buyer will take possession, the nuts must be hulled, culled and dried.

If harvest is prompt, many nuts will be shaken from the trees with hulls still attached. The hulling process

## HARVESTING AND PROCESSING (continued)

will remove most hulls but some will stick tight and have to be handled separately. They can be water treated in sacks or bins. Continuous sprinkling with cool water is preferable to maintain good color. Treatment with ethylene gas is another method used in removing tight hulls.

The standards to which a grower's nuts must be culled should be laid out by the buyer. The buyer may be able to cull more cheaply than the grower, reflecting a saving to the grower.

The drying process is important in that it (1) arrests molding and darkening, (2) gives the product a stable weight, (3) permits effective bleaching. Nuts may be considered dry when the septum (the membrane between kernels) snaps when bent. As the kernels become dry they lose their rubbery texture.

## WALNUT LOGS AND BURLS

The value of walnut logs and burls should be taken into consideration when planting a new orchard or removing an old one. These valuable walnut byproducts are used in the manufacture of expensive furniture, gunstocks and paneling. There is no proven method of stimulating the formation of burls. (A burl is an enlarged area around the crown above and below ground having wood with a very curly grain.) One can, however, topwork black walnut rootstocks at least four to six feet above the ground in anticipation of their future log value regardless of whether or not a burl forms.

Growers who sell their walnut trees for logs or burls should contact several buyers and arrive at a price on a competitive bid basis. The disposal of debris, filling of holes, etc., should be agreed on before work starts.

## COST OF WALNUT PRODUCTION

This cost study was designed to give you an idea of the expected per acre costs of producing walnuts under assumed conditions. These conditions are:

1. 80 acres of level land with 17 trees per acre planted 50 feet apart on the square.
2. Sprinkler irrigation with water supplied by one of the local mutual water companies.
3. Modified sod culture without preharvest cultivation.
4. Strip spraying down the tree rows for weed control.
5. All labor is computed at \$1.75 an hour including taxes and insurance.
6. A yield of 2,000 pounds per acre.

A list of equipment on page 11 is based on "new" value and shows the fixed costs of 6% interest and straight line depreciation.

On page 12 is a calendar of operations, man hours per acre, materials and costs. You will note that the right hand column has been left for your use in computing your own budgeted expectations.

CAPITAL INVENTORY AND FIXED COSTS PER ACRE

Inventory	Capital Investment	Investment Per Acre	Expected Life	Annual Fixed Costs Per Acre		
				6% Interest	Depreciation	Total
Land, 80 Acres	\$80,000.00	\$1,000.00	-----	\$60.00	---	\$60.00
Trees	80,000.00	1,000.00	40 years	30.00	\$25.00	55.00
Irrigation System, Sprinkler	10,000.00	125.00	20 years	3.75	6.25	10.00
PTO Sprayer, 400 gal.	2,800.00	35.00	15 years	1.05	2.33	3.38
1-40 hp. diesel wheel tractor	5,400.00	67.50	10 years	2.03	6.75	8.78
Chopper	1,500.00	18.75	10 years	.56	1.87	2.43
Pruning Tower & Tools	2,100.00	26.25	10 years	.79	2.63	3.42
Buckrake	800.00	10.00	10 years	.30	1.00	1.30
Pickup Truck, 1/2 Ton	2,300.00	28.75	10 years	.87	2.87	3.74
Shaker, self-propelled	5,000.00	62.50	10 years	1.87	6.25	8.12
Pickup Machine	5,000.00	62.50	10 years	1.87	6.25	8.12
Carts (3)	1,500.00	18.75	10 years	.56	1.87	2.43
Nut Rake	1,800.00	22.50	5 years	.67	4.50	5.17
Boom Sprayer	1,000.00	12.50	10 years	.37	1.25	1.62
Shed and Shop	<u>10,000.00</u>	<u>125.00</u>	30 years	<u>3.75</u>	<u>4.16</u>	<u>7.91</u>
<b>Total</b>	<b>\$209,200.00</b>	<b>\$2,614.90</b>		<b>\$108.44</b>	<b>\$72.98</b>	<b>\$181.42</b>

A GUIDE TO WALNUT PRODUCTION COSTS IN TEHAMA COUNTY - 1967

Operation	Dates	Man Hours Per Acre	Cash and Labor Costs			Total	Your Cost Per Acre
			Labor	Equipment	Materials		
<b>Cultural</b>							
Prune	Dec.-March	10.0	17.50	3.00		20.50	
Brush Disposal	Dec.-March	2.0	3.50	1.70		5.20	
Fertilize	Dec.-March	0.3	.53	2.85	100# Nitrogen 10.00	13.38	
Chop 6 Times	April-August	1.2	2.10	1.80		3.90	
Spray 2 Times	March-May	1.4	2.45	4.90	Blight & Aphid Spray 20.45	27.80	
Sprinkle 3 Times	May-August	1.8	3.15	1.50	2.5 Acre-Foot Water 12.00	16.65	
Spray	June-Sept.	0.7	1.23	2.45	Mite Spray 7.42	11.10	
Strip Spray	Oct.-Nov.	0.3	.53	.47	Herbicide 3.00	4.00	
Taxes					20.00	20.00	
Miscellaneous			4.01	1.33	6.13	11.47	
<b>Total Cultural Cash and Miscellaneous Costs</b>			<b>35.00</b>	<b>20.00</b>	<b>79.00</b>	<b>134.00</b>	
<b>Harvest</b>							
Chop	Aug.-Sept.	.2	.35	.30		.65	
Shake	Sept.-Nov.	2.0	3.50	2.00		5.50	
Rake	Sept.-Nov.	1.0	1.75	.50		2.25	
Pickup	Sept.-Nov.	1.0	1.75	4.50		6.25	
Haul to Huller	Sept.-Nov.	.3	.53	.50		1.03	
Hull and Dry	Sept.-Nov.				Contract at \$40.00 a ton	40.00	
Haul to Market					Contract at \$5.00 a ton	5.00	
<b>Total Harvest Cash Costs</b>			<b>7.88</b>	<b>7.80</b>	<b>45.00</b>	<b>60.68</b>	
<b>Total Cultural and Harvest Cash Costs</b>			<b>42.88</b>	<b>27.80</b>	<b>124.00</b>	<b>194.68</b>	
<b>ANNUAL FIXED COSTS</b>							
Investment		Per Acre	Interest	Depreciation			
Land		\$1,000.00	\$ 60.00	-			
Trees		1,000.00	30.00	\$ 25.00			
Equipment		365.00	10.94	37.57			
Irrigation System		125.00	3.75	10.00			
Shop and Building		125.00	3.75	4.16			
		<u>\$2,615.00</u>	<u>\$108.44</u>	<u>\$ 76.73</u>			
				Annual Fixed Cost Per Acre		185.17	
				Total Cost Per Acre		<u>\$379.85</u>	
<b>Total Cost Per Pound at 1 Ton Per Acre Yield</b>						<b>\$ .19</b>	

OTHER PUBLICATIONS - - - - -

Pest and Disease Control Program for Walnuts  
Walnut Orchard Development Costs in Tehama County  
Selecting Suitable Walnut Varieties  
Planting the Orchard with Seedling Walnut Trees  
and Topworking  
Walnut Rootstocks  
Chemical Weed Control in Walnuts  
Training Young Walnut Trees  
Care of a Walnut Orchard  
Nutritional Deficiencies in California Walnuts  
Combination Plantings of Old and New Walnut  
Varieties  
A Technical Study of Insects and Related Pests  
Attacking Walnuts  
Branch Wilt Disease of English Walnut Trees  
Bark Canker of Persian (English) Walnut  
Diuron and Simazine For Weed Control In Walnut  
Orchards  
  
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furtherance of the Acts of Congress of May 8 and  
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In order that ---

the information in our publications may be more intelligible it is sometimes necessary to use trade names of products or equipment rather than complicated descriptive or chemical identifications. In so doing it is unavoidable in some cases that similar products which are on the market under other trade names may not be cited. No endorsement of named products is intended nor is criticism implied of similar products which are not mentioned.

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