

WALNUT VARIETY QUALITY EVALUATIONS IN SAN BENITO COUNTY – 2005

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ABSTRACT

Walnut varieties sometimes have different tree and nut characteristics in the cool Central Coast climate of San Benito County when compared to the same varieties in the warmer Central Valley climate. In 2005, 32 samples were collected from 13 commercial orchards and cracked out by Diamond Foods, Inc. The heaviest nuts (mean nut weight) were '64-57'. The largest nuts were '64-57' and 'Howard'. Shrivels were highest for 'Vina' and '92-016-1'. The varieties '64-57', 'Serr' and 'Tulare' had the highest percent edible yield while the lowest were 'Hartley' and 'Vina'. 'Hartley' and '64-57' had the highest percent extra-light and light colored kernels while 'Payne' had the lowest. The highest relative light index (RLI) readings were recorded for '64-57' and 'Chandler'. The highest relative value (RV) figures were for '64-57' and 'Serr' while the lowest were 'Vina' and 'Hartley'. The CLRV-hypersensitive variety '92-016-1' was similar in RV to 'Payne' but with better color and smaller nuts and more shrivel.

OBJECTIVES

The objective of this project was to evaluate established standard as well as some newer varieties from several locations in San Benito County with different management practices and microclimates. The performance of some varieties may differ when grown in a cooler climate than found in the Central Valley where most of the evaluation of new varieties is conducted. A new addition to this project is evaluation of CLRV-hypersensitive varieties.

PROCEDURES

Samples of walnuts were collected at random during the normal harvest timing from thirteen commercial orchards including variety trials. Samples were dried in mesh bags in a laboratory drying oven with a maximum temperature of 110°F. These were then transported to Diamond Foods, Inc., Stockton, CA who provided the crackout information listed in Table One.

RESULTS AND DISCUSSION

The 2005 growing season was one dominated by mild weather throughout the season except for one heat wave in July in which the temperature reached 101° F in Hollister. Samples 902, 903, 907, 912, 913, 914, 919, 920, 925, 926 and 932 were from organic orchards. External nut characteristics are shown in table 1, internal characteristics in table 2 and an overall summary is in table 3. Missing numbers (908, 921 and 927) were severely damaged by walnut husk fly and are not included in this report. The results were derived from 1000 g samples of in-shell dried walnuts. The heaviest nuts based on mean nut weight were '64-57'. The numbered selection '64-57' and one 'Howard' sample had the largest nuts overall as determined by percent large sound nuts. Most of the stained shells and adhering hulls were due to walnut husk fly damage. Sample

924 had 1.2% broken shells – no other variety had any so it is not included in the chart. In nearly half of the samples there was no internal insect damage which refers mostly to codling moth and navel orangeworm damage. Mold was mostly low except for one ‘Payne’ sample. Shrivels were highest for ‘Vina’ and ‘92-016-1’. Percent edible yield was highest for one individual sample of ‘Tulare’ but overall was highest for ‘64-57’ and ‘Serr’. Overall, the samples with the lowest percent edible yield were ‘Hartley’ and ‘Vina’. Color was generally better this year due to the lack of hot weather. ‘Hartley’ had the highest percent light and extra light kernels at 96.7 percent followed by ‘64-57’. ‘Payne’ had the fewest light and extra-light kernels averaging 79.5 percent (versus only 5 percent last year). One sample of ‘Chandler’ had the lowest RLI of all samples. RLI is an objective color rating derived from bouncing light off of a given sample – a higher rating is desirable. The average RLI for each variety is shown in table 3. The highest overall RLI was for ‘64-57’ followed by ‘Chandler’.

Relative value (RV) values also varied from previous years in the summary table (table 3). RV is now determined by the formula $Edible\ Yield \times RLI \times .0364$ which sets the value of a sample with a 50% yield and a RLI of 55 equal to an RV of 1.00. An overall relative value rating of 1.00 or higher generally indicates very high quality nuts. This is different than years previous to 2004 so the data is not comparable. The highest RV was ‘64-57’ followed by ‘Serr’. As with RLI, this is the only the second year in local testing that ‘Chandler’ did not have the highest RV. ‘Vina’ had the lowest RV for cracking purposes followed by ‘Hartley’, as expected. Two ‘Serr’, one ‘Howard’, two ‘Tulare’, one ‘64-57’ and three ‘Chandler’ samples exceeded a RV of 1.00. The three lowest RV ratings were one sample of ‘Vina’ and two samples of ‘Hartley’. The CLRV-hypersensitive variety 92-016-1 was competitive in RV with the old local industry standard ‘Payne’ except with better color and smaller nuts with some shrivel.

CONCLUSIONS

‘Payne’: This variety was more competitive with other varieties this year than in 2004 but still suffered from inferior kernel color. When combined with its high susceptibility to blackline, codling moth, walnut husk fly, walnut blight, and sunburn, it would be difficult to recommend for further planting.

‘Serr’: This variety has always excelled in % edible yield. The RV of ‘Serr’ was also high this year as it was last year. It is susceptible to many of the same problems as ‘Payne’. This variety is noted for low and variable yield and is not recommended unless this problem can be solved.

‘Howard’: ‘Howard’ had a high % large, sound nuts and RLI and a good RV. This was a better year for ‘Howard’ than 2004. This variety has had some grower concerns involving weak tree growth, limb breakage and kernel spotting. This variety is recommended with reservations.

‘Tulare’: Nut weight, % edible yield, RLI and RV were all good this year. Tree vigor is better than ‘Howard’ and harvest date is earlier than ‘Chandler’ which are pluses when considering a replacement variety. The nuts are susceptible to walnut husk fly.

‘Hartley’: For cracking purposes, ‘Hartley’ had a very low RV based mainly upon low % edible yield. Most other parameters were good or excellent. Most ‘Hartley’ nuts in the Central Coast are

cracked so this variety is not usually recommended. The tree is relatively vigorous but has low early yields. Mature tree yields are good. The nuts are fairly resistant to walnut blight and codling moth.

‘Vina’: This variety had small, light-weight nuts with a low % edible yield, below average color, and some shrivel. Overall RV was the lowest of all varieties. Walnut blight and walnut husk fly were common this year. This is not a recommended variety.

’64-57’: This is a local variety that was never released by the University of California. It has very distinctive, large nuts that are pointed at both ends (dirigible-shaped). In 2005, it had the largest nuts of all varieties tested with a high % edible yield, excellent color and the among the highest RV figures. It can have a lot of blanks some years and is sensitive to adverse climatic or cultural conditions. It is worthy of continued trial.

92-016-1: This is the first CLRV-hypersensitive (i.e.: blackline-resistant) selection that has come into production in local test plots. It is located in an orchard with blackline-infected ‘Payne’ trees. It had small nuts with a relatively low % edible yield and significant shrivel. Kernel color was okay as measured by both light and extra-light kernels and RLI. The RV was better than the local walnut variety standard ‘Payne’. There will be increasing interest locally in any CLRV-hypersensitive variety with decent quality and yield.

‘Chandler’: This variety is the recognized standard for kernel quality based upon color but mean nut weight, % large sound nuts and % edible yield were no more than average this year. Color as measured by RLI was excellent although one sample had poor color. Its greatest fault is late harvest although in 2005 it was harvestable by mid-October. This is a recommended variety for organic production due to the low incidence of codling moth, walnut husk fly and walnut blight.

TABLE 1: WALNUT VARIETY EVALUATION, SAN BENITO CO. 2005- NUT SIZE, EXTERNAL DEFECTS

Sample #	Variety	Location	Mean Nut Wt (g)	Large %	Large Sound%	Stained Shell %	Adhering Hull%	External Damage %
901	Payne	1	11.81	92	88.8	1.2	1.2	2.4
902	Payne	2	13.04	100	90.5	5.2	0.0	5.2
903	Payne	3	12.06	93	89.6	4.8	0.0	4.8
904	Payne	4	11.64	94	89.1	2.3	1.2	3.5
905	Serr	1	11.90	94	91.7	1.2	0.0	1.2
906	Serr	5	10.91	96	91.0	3.3	2.2	5.4
907	Serr	6	12.05	95	87.2	6.0	0.0	6.0
909	Serr	7	10.99	76	79.5	0.0	0.0	0.0
910	Howard	1	9.74	86	87.2	1.9	0.0	1.9
911	Howard	4	11.51	93	94.8	0.0	0.0	0.0
912	Howard	8	11.63	99	98.3	1.2	0.0	1.2
913	Howard	9	10.00	86	80.7	4.0	3.0	7.0
914	Howard	6	11.78	93	89.0	2.4	0.0	2.4
915	Howard	7	11.52	98	98.4	0.0	0.0	0.0
916	Howard	10	11.52	100	99.2	1.1	0.0	1.1
917	Tulare	1	9.80	99	88.0	8.8	0.0	8.8
918	Tulare	5	12.83	100	85.7	5.1	0.0	5.1
919	Tulare	8	12.68	100	91.5	3.8	0.0	3.8
920	Tulare	8	13.03	100	98.7	0.0	0.0	0.0
922	Hartley	5	11.26	91	90.1	1.1	0.0	1.1
923	Hartley	4	11.64	94	94.0	1.2	0.0	1.2
924	Hartley	11	11.76	96	90.0	3.5	0.0	4.7
925	Vina	8	10.12	70	73.3	0.0	0.0	0.0
926	Vina	8	11.01	85	84.2	0.0	0.0	0.0
928	64-57	1	14.31	100	99.2	0.0	0.0	0.0
929	92-016-1	1	10.01	66	59.0	6.0	3.0	9.0
930	Chandler	1	9.28	75	74.4	5.6	0.0	5.6
931	Chandler	4	10.80	88	77.0	10.8	2.2	12.9
932	Chandler	8	11.14	90	86.0	1.1	0.0	1.1
933	Chandler	11	10.20	98	80.8	2.0	1.0	3.1
934	Chandler	12	10.43	96	89.2	2.1	0.0	2.1
935	Chandler	13	10.55	95	87.7	0.0	1.1	1.1

TABLE 2: WALNUT VARIETY EVALUATION, SAN BENITO CO. 2005 – INTERNAL DEFECTS, QUALITY, VALUE

Sample #	%Insect	%Mold	%Shrivel	Edible Yield%	Extra Lt%	Lt%	Light Amb%	Amb%	RLI	RV
901	1.2	4.7	3.5	49.50	23	69	7	0	50.1	0.9027
902	3.9	0.0	1.3	46.81	0	36	62	2	50.7	0.8639
903	0.0	0.0	0.0	49.75	27	67	6	0	51.4	0.9308
904	1.2	0.0	2.3	48.55	37	59	3	0	51.4	0.9084
905	2.4	1.2	0.0	53.40	0	94	6	0	51.3	0.9971
906	1.1	0.0	0.0	54.48	19	72	8	1	53.5	1.0610
907	2.4	0.0	0.0	51.60	22	69	8	1	51.3	0.9635
909	0.0	0.0	0.0	52.70	44	54	2	0	52.4	1.0052
910	0.0	0.0	0.0	54.84	22	67	11	0	54.1	1.0798
911	0.0	0.0	0.0	48.35	12	80	8	0	55.1	0.9698
912	1.2	0.0	0.0	46.30	19	81	0	0	53.7	0.9050
913	0.0	0.0	2.0	47.00	33	60	7	0	55.9	0.9563
914	3.5	0.0	0.0	45.25	5	83	11	0	51.3	0.8451
915	0.0	0.0	0.0	48.90	67	31	2	0	53.5	0.9523
916	0.0	0.0	0.0	51.50	7	92	1	0	51.5	0.9654
917	0.0	1.0	2.9	55.50	5	83	11	1	52.8	1.0667
918	12.8	0.0	3.8	44.86	0	99	0	1	53.5	0.8735
919	5.1	0.0	0.0	50.20	17	64	17	2	51.4	0.9392
920	1.3	0.0	0.0	52.54	35	59	6	0	53.9	1.0309
922	2.2	1.1	1.1	40.82	18	81	1	5	54.1	0.8038
923	0.0	0.0	0.0	43.76	3	94	3	0	53.3	0.8489
924	2.4	0.0	0.0	42.50	10	84	5	0	51.8	0.8013
925	3.0	0.0	12.1	42.71	0	87	11	2	53.1	0.8256
926	3.3	0.0	1.1	43.61	21	73	6	0	50.4	0.8001
928	0.0	0.0	1.4	54.09	14	82	4	0	54.5	1.0731
929	0.0	0.0	9.0	48.55	0	90	8	2	52.1	0.9207
930	0.0	0.0	0.9	53.89	15	64	19	1	49.5	0.9710
931	0.0	0.0	0.0	51.20	45	54	2	0	56.5	1.0529
932	1.1	0.0	2.2	47.56	38	50	12	0	51.3	0.8198
934	2.1	0.0	3.1	49.95	36	64	0	0	55.4	1.0073
935	1.1	0.0	1.1	49.50	91	9	0	0	56.6	1.0198

TABLE 3: WALNUT VARIETY EVALUATION, SAN BENITO CO. 2005 - SUMMARY TABLE

Variety	No. of Samples	Mean Nut Wt (g)	Large (%)	Large Sound(%)	Edible Yield(%)	Insect (%)	Mold (%)	Shrivel (%)	Light & Ex. Lt. (%)	RLI	RV
Payne	4	12.14	94.75	89.50	48.65	1.6	1.2	1.8	79.5	50.9	0.9015
Serr	4	11.46	90.25	87.35	53.05	1.5	0.3	0.0	93.5	52.1	1.0067
Howard	7	11.10	93.57	92.51	48.88	0.7	0.0	0.3	94.1	53.6	0.9548
Tulare	4	12.09	99.75	90.98	50.78	4.8	0.3	1.7	90.5	52.9	0.9776
Hartley	3	11.55	93.67	91.37	42.36	1.5	0.4	0.4	96.7	53.1	0.8180
Vina	2	10.57	77.50	78.75	43.16	3.2	0.0	6.6	90.5	51.8	0.8129
64-57	1	14.31	100.00	99.20	54.09	0.0	0.0	1.4	96.0	54.5	1.0731
92-016-1	1	10.01	66.00	59.00	48.55	0.0	0.0	9.0	90.0	52.1	0.9207
Chandler	6	10.40	85.00	82.52	49.33	1.9	0.0	2.4	94.3	54.2	0.9737

RLI = Relative Light Index: A measure of overall kernel color (higher is better)

RV= Relative Value: A measure of overall value (higher is better)