

EVALUATION OF ALTERNATIVE VARIETIES FOR CALIFORNIA PEAR ORCHARDS

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ABSTRACT

The California pear industry relies mainly on Bartlett and a few other varieties for its commercial fresh market production. Increased consumer interest in diverse produce choices offers new possibilities for acceptance of alternative fresh market varieties. Two pear variety evaluation trials were established in Lake County in 1995 and 1997, respectively. 26 varieties, some bred for fire blight resistance, are being tested for production, post-harvest quality, and sensory traits. Results to date suggest several varieties with excellent potential for consumer acceptance, particularly Blakes Pride (USDA 66131-21), Cinnamon and Sunrise (USDA 66170-47).

INTRODUCTION

The California pear industry relies mainly on the Bartlett variety due to its versatility and longstanding consumer preference. Many Bartlett trees are between 30-60 years or even older. Bosc (mainly the russeted strains) and Red Clapp's Favorite (a.k.a. Starkrimson, Super Red) comprise most of the remaining acreage. This is very different from other types of tree fruit for which numerous varieties are available and grown. California growers have experimented with alternative varieties for the fresh market in previous years, including red-skinned cultivars (e.g. Crimson Gem Comice, Canal Red, Sensation Red Bartlett), Beurre Precoce Morretini, and others. Few attempts have met with permanent success, for reasons such as poor external and/or internal quality in the field or post-harvest, inadequate promotion - and consequently - lack of retailer or consumer familiarity and acceptance, poor propagability, poor production characteristics (yield, fruit size), among others. As a result of past failures, as well as current tenuous pear economics, few growers are considering replanting pear orchards, much less diversifying varieties.

There has been, however, recent interest expressed by some growers in planting new varieties. There is also renewed interest and activity worldwide, with cultivars becoming (or soon to become) available from Australia, Europe, New Zealand, South Africa, and the U.S. Some of the cultivars mentioned in trade literature include Banjo, Blakes Pride, Concorde, Gold Rush, Potomac, and Taylors Gold Comice.

There is a lack of consistent data on most new varieties in California. Growers must depend solely on trade publications, nurseries, and word of mouth. Past and current negative experiences can be avoided if systematic, objective data is obtained. Notable past and present examples are the poor yields and tree vigor of Crimson Gem Comice and the partial russetting of Taylor's Gold in California.

Two pear variety trials were established in Lake County in 1995 and 1997. The former is in Scotts Valley in a conventionally farmed orchard and originally consisted of five products from Dr. Richard Bell's fire blight resistance breeding program at USDA in Kearneysville, WVA. The latter is in Kelseyville in a certified organic orchard and was originally a group of 22 selections chosen in

collaboration with USDA, Oregon State University (OSU), and nursery experts. There are 10-20 trees of each variety in Kelseyville. There are always five each on *P. betulaefolia* (BET) and OHxF97. The Comice types are also on Quince BA29C and some varieties are on Pyrodwarf. Both of these plantings are maintained by cooperating growers. Since being planted, UC European Workgroup funding was obtained for one three year period (2002-2004) to collect basic yield, fruit size, and post-harvest data prior to California Pear Advisory Board funding. From 2004-2006, eight sensory evaluations have been carried out in collaboration with OSU Hood River Experiment Station personnel and the OSU Food Innovation Center Experiment Station in Portland. In addition, the trials have been viewed at field meetings, by individual growers interested in new varieties, and by nursery personnel. Results have been presented at professional society meetings. Nursery personnel have also forwarded customer inquiries on some varieties. Each variety was professionally photographed by (retired) UCANR photographer Jack Kelly Clark.

The trials are currently the only source of local, systematic, objective information on Blakes Pride, Concorde, Cinnamon, Taylor's Gold, and the newly named USDA cultivar Sunrise (66170-47). In 2006, project objectives were to:

- Continue to develop a database on existing varieties;
- Perform post-harvest evaluation on multiple harvest dates for the most promising varieties;
- Remove unsuitable cultivars and replace as appropriate;
- Replace several unsuitable USDA fire blight selections with selections from the Harrow (Ontario, Canada) program (Harrow Sweet, Harrow Gold, Harrow Delight, etc.);
- Research and collect new promising cultivars;
- Carry out several more sensory evaluations (200 consumers each per year).

PROCEDURES

The Scotts Valley trial site originally consisted of five selections bred at Kearneysville, WVA to be fireblight resistant: 76115-10, 66131-21 (now named Blakes Pride), 67218-83, 66170-47 (now named Sunrise), and Potomac. The rootstock was *Pyrus betulaefolia*. In 2005 and 2006, data were taken only on the most promising two varieties, Blakes Pride and Sunrise; the other three were abandoned in spring 2005 and grafted to Bartlett. Plot design is randomized complete block (RCBD) with five single tree replications. The orchard is conventionally farmed, 9' x 15', on Still loam alluvial soil.

The Kelseyville trial site originally consisted of 21 varieties. All except "Comice-types" are planted on two rootstocks, BET and Old Home x Farmingdale 97. Each group of five trees is planted linearly across five rows east to west (row direction is north to south), thus there is no randomized replication of the treatments. Comice and Taylor's Gold Comice are also planted on Quince BA29C and Comice on Pyrodwarf (total of 15 Taylors Gold and 20 Comice trees). The orchard is certified organic, 9' x 14', on Cole clay loam. From 2005 to the present, several unpromising cultivars were removed due to poor production characteristics and eight cultivars added.

Both sites are irrigated by under tree sprinklers. No special pruning practices are employed nor do varieties receive differential pest control, fertility, or other practices. The growers are responsible for decision making with UCCE staff only determining harvest timing.

Data collected for each variety/rootstock combination include bloom and set phenology, pressures and sugars 3-4 weeks prior to and at harvest, tree yield/fruit size, and trunk circumference to calculate yield efficiency. In 2006, fruit from selected, more promising cultivars was harvested at several intervals to determine optimal post-harvest quality.

For each variety, fruit from both rootstocks is combined and evaluated at the UC Davis Post-harvest Laboratory. In 2006, fruit was evaluated prior to storage and then after 1 and 3 months in storage (pre- and post-ripening for 5-7 days depending on variety). Data included days to ripen, ground color, % russeting, % blush, internal browning, decay, scald, scuffing, cork spot, % soluble solids, % Titratable acid, color (Minolta colorimeter), firmness, and starch.

Three sensory evaluation analysis events were held in 2006, two at major Lake County agricultural festivals, and one at the Ferry Building Farmers Market in San Francisco. Each event targeted 250 consumers who each tasted 4-5 varieties and completed standardized ballots. Each evaluation was staffed by Lake County Master Gardener volunteers. Every participant in the evaluation was certified by the UC Davis Human Subject Research Program. Fruit was stored until 5-7 days before each evaluation, then ripened to eating pressure of 2-3 lbs. firmness.

Each consumer "taster" received a gift bag of sample pears, recipes, and other items donated by the California Pear Advisory Board and the County of Lake Marketing program. Ballots were analyzed using the Compusense software at the Oregon State University Food Innovation Center in Portland, Oregon.

RESULTS

1) Orchard Evaluations (Tables 1a-b)

Bloom phenology - Spring 2006 on the North Coast was cold with prolonged rain. Yields and cosmetic quality, however, were higher than 2005 because major bloom was delayed until after the rains, facilitating higher yields and cosmetic quality. Full bloom dates varied little with rootstock. Varieties in Kelseyville (and rootstocks as indicated) that bloomed *before* Bartlett (April 25) were Coscia, Blanquilla/97, Louis Bonne D'Jersey, Cinnamon/BET, and Rosemarie/97. The Scotts Valley varieties (Blakes Pride, Sunrise (47)) bloomed April 25 vs. Bartlett on April 17. A minor amount of scab was noted on some varieties (Atlas Red Sensation, Cinnamon, Coscia, Louis Bonne d'Jersey, Rosemarie, Z1, and Z2), but fruit was generally clean.

Rootstocks - In contrast with 2005, yield per tree was 14% more on OHxF97 vs. BET. BET dropped 22% more fruit than OHxF97, nearly equal to its 21% fewer number of fruit. Harvest pressures were similar, but soluble solids were 5.5% lower for BET (13.8 vs. 14.6). OHxF97 fruit size was 2% larger than BET (despite the higher yield). This contrasted with 2005 when OHxF97 had lower yields than BET. Weather conditions and the higher 2005 yields were possible reasons for the lower yields. Comice yield was best on Quince and fruit size best on 97. No data was

available from Pyrodwarf in 2006 as the trees have yet to bear measurable fruit. Calipers will be taken in winter 2007 to calculate yield efficiency.

Varieties - Yields were higher than 2005, 40% higher for OHxF97. Noble Russet Bosc produced the most, but had small fruit (168 gm.). The best overall producers (yield and fruit size) were Cinnamon/BET, Abate Fetel, and Comice/97. Poorest overall producers were Blanquilla, Atlas Red Sensation/97, Comice/BET, and Z1. Other varieties had either high yield or poor size or visa versa.

Fruit Drop - The Kelseyville orchard is farmed organically so no NAA is applied. BET trees dropped 22% more fruit than did 97 trees. The PGR Retain[®] is OMRI-approved but has yet to be tested as a possible substitute for NAA in organic orchards; this will be a goal in 2007.

Harvest - Harvest pressures were about 5% lower than in 2005 and quite variable at harvest due to varying maturity. This may have negatively affected storability. There were multiple harvest dates for selected varieties in order to obtain comparative post harvest quality data.

Commercial Bartlett harvest in the Kelseyville trial block was August 30. Varieties harvested prior to this were Coscia, Blakes Pride, Sunrise (47), Dr. Jules Guyot, Comice, and Z2. Most varieties were harvested through September, with Noble Russet and Bronze Beauty Bosc the latest on September 21-22 (Bronze Beauty was not harvested in 2005) (Tables 2a and b).

Varieties already eliminated (Table 3) - Arganche (too early, falls off the tree, too small), Scarlet Comice (virused), Packham Triumph (too much competition from So. America), Taylors Gold (inconsistent russet in California). Bronze Beauty Bosc has had very little fruit until 2006, but will likely be eliminated for 2007.

Varieties to possibly be eliminated (decide after 2007) - Bella de Giugno, Blanquilla, Z1.

Varieties still lacking sensory data - Bella de Giugno, Coscia, Louise Bonne D'Jersey, Z1.

Status of varieties added in 2006 (year depends on rootstock) (Table 4) - Many newly planted trees were lost due to the prolonged period of wet weather which unexpectedly delayed transferring the trees from sawdust beds until after leafout. Sudden onset of warm weather then resulted in root dieback. Affected cultivars were Blakes Pride, Flamingo/BET, Harrow Crisp, Harrow Gold/BET, R1T15, Tosca, and Turndot. We are working with Fowler Nursery on replacements. R1T15 is currently on OHxF87, but will also be propagated on the others for the trial.

Blakes Pride and 47 wood was cut in summer 2005 and sent to Fowler for propagation. Once varieties were moved from Scotts Valley to Kelseyville, the Scotts Valley plot ended.

2) Post-harvest evaluations (Table 5a, 5b)

Fruit ripened in 5-10 days depending on cultivar, harvest date, initial firmness, and storage duration. Those taking 5 days to ripen after one month of storage (and initial firmness) were: Sunrise (47), 4th harvest (13.6); Blakes Pride, 2nd harvest (13.5); Dr. Jules Guyot (15.8); and Z2, 1st and 2nd harvest (14.7, 14.1); 6 days were: Sunrise (47), 1-3rd harvest (16.3, 16.4, 13.8); Blakes Pride, 1st

harvest (15.1), and Cinnamon, 1-3rd harvest (18.1, 17.6, 18.1); 8-10 days were Abate Fetel, 1-3rd harvest (14.6, 13.2, 13.5) and Concorde, 1-3rd harvest (13.8, 13.1, 13.2).

The varieties expressing symptoms of some type of storage breakdown (and months stored) were Sunrise (47) (3, severe decay in harvest 4), Abate Fetel (1, 3, severe decay harvest 3), Cinnamon (3, severe decay harvest 2, 3; scald harvests 1-3), Concorde (1, 3, harvests 1,3; cork spot harvest 3), Dr. Jules Guyot (3), Z1 (3), and Z2 (3, harvest 1, 2). Cinnamon and, more especially, Z1 and Z2 exhibited some degree of breakdown in 2005 as well.

Cosmetically, besides scab, the most russeted cultivars of those undergoing post-harvest evaluation were Blakes Pride, Concorde, and Abate Fetel. Sunrise, Dr. Jules Guyot, Z1, and Z2 had the cleanest fruit. Cinnamon was fully russeted, as it should be. Taylor's Gold Comice was russeted in 2006 but still lacked enough fruit for evaluation.

Soluble solids were highest in Cinnamon and also high in Sunrise (47), Cinnamon, Concorde, and late-harvested Z1.

3) Sensory Evaluation (Table 6)

There have been three years of consumer sensory evaluations to date (two in 2004, three in 2005, and three in 2006).

Evaluations performed in 2006 were (**bolded** indicates standard comparison variety):

- September 30, Kelseyville Pear Festival
Abate Fetel, Atlas Red Sensation Bartlett, **Bartlett**, Blakes Pride, Sunrise (47),
- October 12, Steele Winery Harvest Festival, Kelseyville
Abate Fetel, **Bartlett**, Blakes Pride, Cinnamon, Sunrise (47)
- November 4, Ferry Building Farmers Market, San Francisco (winter pear emphasis)
Abate Fetel, Cascade, **Comice**, Concorde, Dr. Jules Guyot (Noble Russet Bosc failed to ripen on time for testing so was replaced by Dr. Jules Guyot).

Most panelists were between 45 and 60 years old in the two Lake County tastings. Panelists in San Francisco were younger, equally divided between 25-34 and 45-59 years. Panelists were predominantly women ($\geq 60\%$). In every case, stated annual pear consumption is relatively low ($\leq 1-3$ times a month), though again more San Francisco panelists proclaimed weekly consumption. Adults preferred medium pears for themselves and surprisingly, large for children. San Francisco panelists also expressed more knowledge of varieties other than Bartlett.

Importantly, as in 2004 and 2005, consumers were again most familiar with Bartlett, but their second choice for variety eaten most often was "don't know or other". The importance of educating consumers about other varieties cannot be overemphasized if the overall pear market share is to increase.

Only two pears at two events (Atlas Red Sensation on September 24 and Abate Fetel on October 12) scored below acceptable level for purchase intent. Sunrise (47) and Cinnamon were as, or more, acceptable than Bartlett, and were comparable to Comice, Concorde, and Cascade. Consumer approval of Abate Fetel was the lowest of all varieties this year, relative to other choices, although acceptance increased in November after long cold storage. Blakes Pride was only tested once with poorer results than in 2004 and 2005. Sunrise (47) stored well in 2006, exhibiting very little internal browning until very last (fourth) harvest date.

Rather than repeating consumer tastings as in 2004-2006, 2007 evaluations will focus on tastings in supermarket produce departments in cooperation with California Pear Advisory Board's promotional team. The cultivars most likely to be tested will be Abate Fetel, Sunrise (47), Blakes Pride, Cinnamon, and Concorde. Bartlett, Bosc, and Comice will be standards. Tastings will be held at six retail locations in the Sacramento-Davis and Bay Areas. OSU Food and Innovation Center personnel will assist UCCE and CPAB staff with some of these events. We will also plan a field day this year and also hope to have a viewing and tasting for the packinghouses and other interested industry personnel. A final report with all data from 2002-2007 will be completed after the 2007 season.

3) Varietal changes

Eliminated - Arganche (too early, falls off the tree, too small), Scarlet Comice (virused), Packham Triumph (too much competition from So. America).

Possibly eliminate (decide after 2006) - Coscia, Concorde, Blanquilla, Taylors Gold (inconsistent russet in California), Bronze Beauty (inadvertently harvested in 2006).

Still lacking sensory data - Dr. Jules Guyot, Louise Bonne D'Jersey, Blanquilla, Z1.

To be added in 2007 (year depends on rootstock) (Table 5) - Carmen, Dawn, Flamingo (So. Africa), Flemish Beauty, Harrow Crisp, Harrow Delight, Harrow Gold (Canada), Norma, R1T/15 (Winters, UC Davis), Tosca, Turnadot, and Warren.

New trees are being propagated on *P. betulaefolia*, 97, Pyrodwarf, OHF87, and OHF69 by Fowler Nurseries in Newcastle. R1T15 is currently on OHxF87, but will also be propagated on the others for the trial.

Blakes Pride and 47 wood was cut in summer 2005 and sent to Fowler for propagation. These varieties will be moved from Scotts Valley to Kelseyville and the Scotts Valley plot ended.

Post-harvest and sensory evaluation - 4-5 promising varieties will be harvested at several pressures, then evaluated after several storage intervals. This will provide more information on ideal handling procedures.

OVERALL SUMMARY

- We continue to learn more about some commercial possibilities for California, including Abate Fetel, Blakes Pride, Cinnamon, and Sunrise (47).
- OHxF97 yields were higher than BET yields this year, with slightly higher fruit size as well. BET fruit drop was **again** higher than OHxF97. Weather may have played a role, as did the large 2005 BET crop.
- Post-harvest quality appears to vary year to year and should continue to be assessed for promising cultivars. Sunrise (47), as with most early-season varieties, is likely to have limited storability (1-2 months). Optimal harvest and storage conditions for Cinnamon, Concorde, Z1, and Z2 should continue to be assessed, although Concorde appears especially problematic. Ideal harvest and ripening conditions for Abate Fetel must also continue to be researched. It appears Abate Fetel appears to be susceptible to scuffing when harvested at lower pressures.
- The sensory evaluations are both an invaluable evaluation tool and an excellent marketing opportunity for California pear growers. Evaluations at the retail level will provide new and different information.
- Urban, affluent consumers were as, or more likely, to purchase Cinnamon, Concorde, and Sunrise (47) as Bartlett. Consumers were also younger in San Francisco than in the Lake County tastings. They had more often eaten varieties other than Bartlett, and ate pears more often than older respondents. Respondents had frequently stated they did not know the name(s) of the pear varieties they ate most frequently, suggesting great need for consumer education on pear varieties, eating characteristics, and ripening/storage information.
- 11 new varieties have been, or are scheduled to be added in 2006 and 2007.

ACKNOWLEDGEMENTS

In addition to the funding agency, California Pear Advisory Board, the following individuals deserve great thanks for their interest in, and contribution to, the Lake County pear variety trial. Their efforts have made it possible to achieve the above-described results.

Funding partners: California Pear Advisory Board and County of Lake.

UCCE and OSU staff: Ann Colonna, Sensory & Consumer Program Manager, OSU Food Innovation Center Experiment Station, Portland; Steve Castagnoli, Clark Seavert, and Janet Turner, OSU Mid-Columbia Research and Extension Center, Hood River; UCCE field assistants Jim Benson, Steve D'Agostini, Casey Grubb, Amanda Kane, Frank Ley, Patty McCleary, Catherine Rose; UCCE Lake County office staff Nicole Gentry and Shirley Morse; UC Davis Institutional Review Board (IRB) staff;

UCCE Lake County Master Gardeners: Cornelia Sieber-Davis (Sensory Evaluation Coordinator), Jane Jacobs (Assistant Sensory Evaluation Coordinator) and Dick Jacobs, Karin

Armstrong, Dale Barney, Niki Brown, Dava Castillo, Catherine Clark, Jenny Clark, Steve D'Agostini, Charlotte Griswold, Dennis Hall, Denise Hanson, Jim Harrell, Shirley Kadleck, Dennis Mickelson, Gabriele O'Neill, Marian Pena, Kai Petersen, Catherine Rose, Jaclyn Schnur, Alice Tan, Linda Unruh, Dave and Lynn Vierra.

Industry Members: Ken Barr, Adobe Creek Orchards, Kelseyville (Scotts Valley trial); Lars Crail, Yoxagoi Orchards, Kelseyville (Kelseyville trial); Don and Margaret Eutenier (2005 SF sensory evaluation); Al Courchesne, Frog Hollow Farms, Brentwood (SF sensory evaluation); Mt. Konocti Growers and Scully Packing Co. (fruit storage); Marilyn Holdenried, Lake County Pear Festival; Steele Winery Harvest Festival staff; Christine Aguilar and Bob McClain, CPAB staff (gift bag items); John Ireland, Fowler Nurseries, Inc., Newcastle (advisory, provided trees, assisted at 2004 Kelseyville sensory evaluation); John Golden, Paul McElhany and Frank Ramos, Macro Plastics, Inc., Fairfield (24 half bins).

Other contributors: Paul McElhany, John Golden, and Frank Ramos, Macroplastics, Inc., Fairfield, CA (harvest bins), John Norcio, owner, McDonalds Restaurant, Safeway, Lakeport and Solo Cups, Inc., Highland Park, IL (sensory evaluation supplies), Lake County Marketing Program (gift bag items); Julie Cummins (2006) and Thy Tran (2005), SF Ferry Building Farmers Market Coordinators.

Harvest Order	Trees / Row	Bloom Data ¹													Harvest Date	Pressure	Sugar	# of Fruit Harvested		# of Fruit on Ground		Weight (kg)		Calculated Yield		Size			
		3/2	3/8	3/13	3/21	3/27	4/5	4/10	4/17	4/25	5/1	5/9	5/18	5/23				Total	Average / Tree	Total	Average / Tree	Total	Average / Tree	kg/ha	ton/ac	gms./fruit	Box Size		
OHxF97																													
1	Dr. Jules Guyot	4	GT	SB	SB	BB	TC	FGB	GC	WB	FB	PF	FS	RP	RP	8/16	15.2	12.7%	375	93.8	158	39.5	85.5	21.4	18	8.2	228	90	
2	Coscia	5	GT	SB	BB	TC	FGB	WB	FB	PF	FS	RP	RP	RP	RP	8/17	12.7	11.6%	796	159.2	488	97.6	65.2	13.1	11	5.0	82	180	
3	Z2	5	GT	SB	SB	BB	TC	FGB	GC	WB	FB	FS	RP	RP	RP	8/28	15.5	13.4%	159	31.8	71	14.2	34.4	6.9	6	2.6	217	100	
4	Comice	5	GT	SB	SB	BB	TC	FGB	GC	WB	1st B	FB	FS	RP	RP	8/29	11.7	13.2%	575	115.0	25	5.0	116.7	23.3	20	8.9	203	100	
5	Taylor's Gold Comice	2	GT	SB	SB	BB	TC	FGB	GC	WB	FB	PF	FS	RP	RP	8/31	12.5	13.8%	9	4.5	1	0.5	2.0	1.0	1	0.4	222	90	
6	Concorde	4	GT	SB	SB	BB	TC	TC	FGB	GC	WB	FB	FS	RP	RP	8/31	12.5	16.0%	281	70.3	4	1.0	52.5	13.1	11	5.0	186	110	
7	Z1	5	GT	SB	SB	BB	TC	FGB	GC	1st B	FB	PF	FS	RP	RP	9/01	12.8	13.2%	23	4.6	104	20.8	5.0	1.0	1	0.4	217	100	
8	Rosemarie	5	SB	BB	TC	FGB	GC	WB	FB	PF	FS	RP	RP	RP	RP	9/06	13.7	14.2%	478	95.6	59	11.8	83.5	16.7	14	6.4	175	120	
9	Louis Bonne D'Jersey	5	GT	SB	SB	BB	TC	FGB	GC	FB	PF	FS	RP	RP	RP	9/07	13.5	14.9%	2,011	402.2	90	18.0	205.7	41.1	35	15.7	102	180	
10	Atlas Red Sensation	5	GT	SB	BB	TC	FGB	GC	WB	1st B	FB	FS	RP	RP	RP	9/09	18.0	13.5%	594	118.8	226	45.2	126.4	25.3	22	9.6	213	100	
11	Abate Fetel: (Abbe Fetel)	4	GT	SB	BB	TC	FGB	GC	WB	1st B	FB	PF	FS	RP	RP	9/11	13.4	13.4%	615	153.8	86	21.5	165.8	41.5	35	15.8	270	80	
12	Cinnamon	4	GT	SB	SB	BB	TC	FGB	GC	WB	FB	PF	FS	RP	RP	9/14	17.7	15.8%	259	64.8	158	52.7	56.6	14.2	12	5.4	219	100	
13	Conference	5	GT	GT	SB	BB	TC	TC	FGB	GC	WB	FB	FS	RP	RP	9/18	14.1	17.3%	1,102	220.4	133	26.6	176.1	35.2	30	13.4	160	135	
14	Cascade	3	GT	SB	SB	BB	TC	FGB	GC	WB	FB	PF	FS	RP	RP	9/19	12.0	16.9%	46	15.3	8	2.7	17.1	5.7	5	2.2	373	70	
15	Noble Russet Bosc	5	GT	GT	GT	SB	SB	BB	TC	FGB	WB	FB	FS	RP	RP	9/20	18.4	16.3%	1,369	273.0	355	71.0	229.9	46.0	39	17.5	168	120	
16	Bronze Beauty Bosc	5	D	D	GT	SB	SB	BB	TC	FGB	WB	FB	FS	RP	RP	9/22	15.7	17.5%	602	120.4	217	43.4	126.1	25.2	22	9.6	209	100	
----	Bella de Giugno	5	GT	SB	SB	BB	TC	FGB	GC	WB	FB	PF	FS	RP	RP	No Fruit	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
----	Blanquilla	5	GT	SB	SB	BB	TC	1st B	FB	PF	FS	RP	RP	RP	TDP	No Fruit	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
----	P15/57	5	GT	SB	SB	SB	BB	TC	GC	WB	FB	PF	-----	-----	-----	Trees Removed	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
----	Packham Triumph	5	GT	SB	SB	BB	TC	FGB	GC	WB	FB	PF	-----	-----	-----	Trees Removed	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Quince																													
1	Comice	5	D	GT	SB	BB	TC	TC	FGB	GC	WB	FB	FS	RP		8/29	11.7	12.4%	842	168.4	41	8.2	150.6	30.1	26	11.5	179	120	
2	Taylor's Gold Comice	5	GT	SB	SB	BB	TC	FGB	GC	GC	WB	FB	FS	RP		8/31	12.5	15.1%	63	12.6	2	0.4	14.6	2.8	2	1.1	222	90	
Pyrodwarf																													
1	Comice	5	D	GT	GT	SB	SB	SB	BB	TC	WB	FB	PF	RP		No Fruit	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

¹ GT = green tip SB = swollen bud BB = bud break TC = tight cluster FGB = finger bud GC = green cluster WB = white bud 1st B = first bloom FB = full bloom PF = petal fall FS = fruit set RP = red pear TDP = turn down pear

Table 1a: Seasonal bloom phenology and harvest parameters (sorted by harvest date), various rootstocks, Lake County Variety Trial, Kelseyville, 2006

Harvest Order	Trees / Row	Bloom Data ¹													Harvest Date	Pressure	Sugar	# of Fruit Harvested		# of Fruit on Ground		Weight (kg)		Calculated Yield		Size		
		3/2	3/8	3/13	3/21	3/27	4/5	4/10	4/17	4/25	5/1	5/9	5/18	5/23				Total	Average / Tree	Total	Average / Tree	Total	Average / Tree	kg/ha	ton/ac	gms./fruit	Box Size	
1	Blake's Pride (S.V.)	5	GT	SB	BB	TC	FGB	GC	WB	1st B	FB	PF	FS	RP	RP	8/11	15.9	10.7%	740	148.0	34	6.8	116.7	23.3	19	8.3	157	135
2	66170-47 (S.V.)	5	GT	SB	SB	BB	TC	GC	WB	1st B	FB	FS	RP	RP	TDP	8/16	15.3	13.9%	1,149	229.0	104	20.8	227.2	45.5	36	16.2	199	110
3	Dr. Jules Guyot	5	GT	SB	BB	TC	FGB	GC	WB	1st B	FB	PF	FS	RP	TDP	8/16	14.4	13.7%	653	130.6	643	128.6	121.8	24.4	21	9.3	187	110
4	Coscia	5	GT	SB	BB	TC	FGB	GC	FB	PF	FS	RP	RP	RP	RP	8/17	13.8	9.4%	206	41.2	197	39.4	11.9	2.4	2	0.9	58	180
5	Z2	5	D	GT	SB	SB	BB	TC	FGB	GC	WB	FB	FS	RP	RP	8/28	15.8	14.3%	278	55.6	168	33.6	66.4	13.3	11	5.1	239	90
6	Comice	5	GT	GT	GT	SB	BB	TC	FGB	GC	WB	FB	FS	RP	RP	8/29	11.0	13.9%	60	12.0	12	2.4	11.9	2.4	2	0.9	199	110
7	Bartlett	5	GT	SB	SB	BB	TC	FGB	GC	1st B	FB	PF	FS	RP	RP	8/30	Not Harvested		-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
8	Bartlett (S.V.)	5	GT	SB	BB	TC	FGB	GC	WB	FB	PF	FS	RP	RP	RP	8/30	Not Harvested		-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
9	Taylor's Gold Comice	1	GT	SB	BB	TC	FGB	GC	GC	WB	FB	PF	FS	RP	RP	8/31	12.0	11.2%	22	22.0	2	2.0	4.9	4.9	4	1.9	223	90
10	Concorde	5	GT	SB	SB	BB	TC	TC	FGB	GC	WB	FB	FS	RP	RP	8/31	13.8	15.7%	386	77.2	24	4.8	80.4	16.1	14	6.1	209	100
11	Z1	5	D	GT	SB	SB	BB	TC	FGB	GC	FB	PF	FS	RP	RP	9/01	12.9	12.8%	134	26.8	223	44.6	23.7	4.8	4	1.8	179	120
12	Rosemarie	5	SB	BB	TC	FGB	GC	WB	FB	PF	FS	RP	RP	RP	RP	9/06	13.9	12.9%	411	82.2	75	15.0	68.6	13.7	12	5.2	167	120
13	Louis Bonne D'Jersey	5	D	GT	SB	BB	BB	TC	GC	FB	PF	FS	RP	RP	RP	9/07	15.3	13.4%	1,323	264.6	63	12.6	133.8	26.8	23	10.2	101	180
14	Atlas Red Sensation	5	GT	SB	BB	TC	FGB	FGB	GC	WB	FB	FS	RP	RP	RP	9/09	19.8	13.4%	456	91.2	235	47.0	85.3	17.1	15	6.5	188	110
15	Abate Fetel: (Abbe Fetel)	4	GT	SB	BB	TC	FGB	GC	WB	1st B	FB	FS	RP	RP	RP	9/11	14.2	12.6%	581	145.3	97	24.3	154.9	38.7	33	14.7	266	80
16	Cinnamon	5	GT	SB	BB	TC	FGB	GC	WB	FB	PF	FS	RP	RP	RP	9/14	16.7	14.6%	509	101.8	369	73.8	119.7	23.9	20	9.1	235	90
17	Conference	5	GT	SB	SB	BB	TC	FGB	GC	WB	FB	FS	RP	RP	RP	9/18	14.0	15.0%	807	161.4	223	44.6	148.3	29.7	25	11.3	184	110
18	Cascade	5	D	GT	SB	SB	BB	TC	GC	WB	FB	PF	FS	RP	RP	9/19	12.7	16.0%	84	16.8	21	4.2	28.4	5.7	5	2.2	339	70
19	Noble Russet Bosc	5	D	GT	SB	SB	BB	TC	FGB	GC	FB	PF	FS	RP	RP	9/20	16.3	15.0%	1,219	243.8	386	77.2	238.3	47.7	41	18.2	196	110
20	Bronze Beauty Bosc	4	D	D	GT	SB	SB	BB	TC	FGB	WB	FB	FS	RP	RP	9/22	14.7	17.0%	204	51.0	49	12.3	43.1	10.8	9	4.1	212	100
----	Bella de Giugno	5	GT	SB	BB	TC	FGB	GC	WB	1st B	FB	FS	RP	RP	TDP	No Fruit	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
----	Blanquilla	5	GT	SB	SB	BB	FGB	WB	FB	PF	FS	FS	RP	RP	TDP	No Fruit	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
----	Std. Bosc	5	D	GT	GT	SB	SB	BB	TC	FGB	WB	FB	-----	-----	-----	Trees Removed	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
----	Packham Triumph	5	GT	SB	SB	BB	TC	FGB	FGB	WB	FB	PF	-----	-----	-----	Trees Removed	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

¹ GT = green tip SB = swollen bud BB = bud break TC = tight cluster FGB = finger bud GC = green cluster WB = white bud 1st B = first bloom FB = full bloom PF = petal fall FS = fruit set RP = red pear TDP = turn down pear

Table 1b: Seasonal bloom phenology and harvest parameters, sorted by harvest date, *Pyrus betulaefolia* rootstock, Lake County Variety Trial, Kelseyville and Scotts Valley, 2006

2006 Harvest Order	Variety / OHxF97	2002 to 2006 Harvest Dates				
		2002	2003	2004	2005	2006
1	Dr. Jules Guyot	Missing Fruit ¹	8/07	7/28	8/15	8/16
2	Coscia	Missing Fruit ¹	8/07	7/20	8/04	8/17
3	Z2	No Fruit	No Fruit	8/03	9/13	8/28
4	Comice	9/03	8/14	8/03	9/02	8/29
5	Taylor's Gold Comice	9/03	8/14	7/28	No Fruit	8/31
6	Concorde	9/03	No Fruit	7/20	8/15	8/31
7	Z1	No Fruit	No Fruit	No Fruit	8/24	9/01
8	Rosemarie	9/03	8/14	7/28	9/02	9/06
9	Louis Bonne D'Jersey	9/03	8/14	7/28	9/09	9/07
10	Atlas Red Sensation	9/16	9/03	8/26	9/16	9/09
11	Abate Fetel (Abbe Fetel)	9/03	8/14	7/28	9/13	9/11
12	Cinnamon	9/16	9/03	8/12	9/21	9/14
13	Conference	9/11	8/14	7/28	9/16	9/18
14	Cascade	9/11	8/14	7/28	9/16	9/19
15	Noble Russet Bosc	9/11	9/03	8/12	9/21	9/20
16	Bronze Beauty Bosc	9/16	9/03	8/26	Not Harvested	9/22
-----	Bella de Giugno	No Fruit	No Fruit	No Fruit	No Fruit	No Fruit
-----	Blanquilla	9/03	8/14	7/28	8/24	No Fruit
-----	P15/57	No Fruit	No Fruit	No Fruit	9/13	Trees Removed
-----	Packham Triumph	9/11	No Fruit	8/12	Not Harvested	Trees Removed
Variety / Quince						
1	Comice	9/03	8/14	8/03	9/02	8/29
2	Taylor's Gold Comice	No Fruit	No Fruit	8/03	No Fruit	8/31
Variety / Pyrodwarf						
1	Comice	No Data	No Data	No Fruit	No Fruit	No Fruit

¹ All fruit from this rootstock was removed from orchard before harvest date.

Table 2a: 2002 to 2006 Harvest Dates, OHxF97, Quince, and Pyrodwarf, Lake County Variety Trial

2006 Harvest Order	Variety / <i>P. betulaefolia</i>	2002 to 2006 Harvest Dates				
		2002	2003	2004	2005	2006
1	Blake's Pride (<i>Scotts Valley</i>)	No Data	8/25	7/26	8/12	8/11
2	66170-47 (<i>Scotts Valley</i>)	No Data	8/25	7/20	8/22	8/16
3	Dr. Jules Guyot	Missing Fruit ¹	8/07	7/28	8/15	8/16
4	Coscia	Missing Fruit ¹	8/07	7/20	8/04	8/17
5	Z2	9/03	No Fruit	8/03	9/13	8/28
6	Comice	No Fruit	8/14	No Fruit	9/02	8/29
7	Bartlett (<i>Kelseyville</i>)				8/17	8/30
8	Bartlett (<i>Scotts Valley</i>)				8/12	8/30
9	Taylor's Gold Comice	9/11	8/14	7/28	No Fruit	8/31
10	Concorde	9/03	No Fruit	7/20	8/15	8/31
11	Z1	No Fruit	No Fruit	8/03	8/24	9/01
12	Rosemarie	9/03	8/14	7/28	9/02	9/06
13	Louis Bonne D'Jersey	9/03	8/14	7/28	9/09	9/07
14	Atlas Red Sensation	9/11	9/03	8/26	9/16	9/09
15	Abate Fetel (<i>Abbe Fetel</i>)	9/03	8/14	7/28	9/13	9/11
16	Cinnamon	9/16	9/03	8/12	9/21	9/14
17	Conference	9/11	8/14	7/28	9/16	9/18
18	Cascade	9/11	8/14	7/28	9/16	9/19
19	Noble Russet Bosc	9/16	9/03	8/12	9/21	9/20
20	Bronze Beauty Bosc	9/16	9/03	8/26	Not Harvested	9/22
-----	Bella de Giugno	No Fruit	No Fruit	No Fruit	No Fruit	No Fruit
-----	Blanquilla	No Fruit	8/14	7/28	8/24	No Fruit
-----	Std. Bosc	No Data	No Data	No Fruit	No Fruit	Trees Removed
-----	Packham Triumph	9/11	9/03	8/12	Not Harvested	Trees Removed

¹ All fruit from this rootstock was removed from orchard before harvest date.

Table 2b: 2002 to 2006 harvest dates, *P. betulaefolia* rootstock, Lake County Variety Trial

Name	Origin	Sensory Evaluation		2006 Status
		No.	Year(s)	
Kelseyville				
Abate Fetel (Abbe Fetel)	Italy	4	2004,2005, 2006	Keep (1 year)
Arganche (Klementinka)	Bulgaria		N/A	Removed 2005
Atlas Red Sensation	U.S.		2006	Keep (1 year)
Bartlett	U.S.	4	2004,2005, 2006	Keep
Bella de Giugno	Italy			Keep (1 year)
Blanquilla	Spain			Removed 2006
Bronze Beauty Bosc	Hood River, OR		N/A	Remove 2006
Cascade	Medford, OR	1	2005, 2006	Keep
Cinnamon	Hood River, OR	2	2004,2005, 2006	Keep
Comice	France	1	2005, 2006	Keep
Concorde	England (East Malling)	1	2004,2005, 2006	Keep
Conference	France, Eng., Hol., Belg.	1	2004	Keep (1 year)
Coscia	Italy	1	2005	Keep (1 year)
Dr. Jules Guyot	Europe (Fr., It., Llimonera Spain)		2006	Keep (1 year)
Louis Bonne d'Jersey	France		gift fruit 2005 sensory 2006	Keep
Noble Russet Bosc	Okanogan Valley, WA	1	2005	Keep
Packham Triumph	Australia			Removed 2006
Rosemarie	South Africa	2	2005	Keep (1 year)
Scarlet Comice	Medford, OR		N/A	Removed 2005
Taylor's Gold Comice	New Zealand			Remove 2006
Z1 (green pear)	Modesto, CA			Keep (1 year)
Z2 (red pear)	Modesto, CA	1	2005	Keep (1 year)
Scotts Valley (fire blight resistant, move Blakes Pride and 47 to Kelseyville in 2006 or 2007)				
Blakes Pride (66131-21)	USDA, Kearneysville, WVA	3	2004,2005, 2006	Keep
Potomac (US625 37-048)	USDA, Kearneysville, WVA		N/A	Removed 2005
76115-10	USDA, Kearneysville, WVA		N/A	Removed 2005
Sunrise (66170-47)	USDA, Kearneysville, WVA		2006	Keep
67218-83	USDA, Kearneysville, WVA		N/A	Removed 2005

Table 3: Status of current selections, Lake County Variety Trial, 2006 (commercial standards bolded)

Name	Origin	Planting Year	Survival
Angelys	France		
Banjo (Lariza)	Hood River, OR		
Best Ever	Medford, OR		
Carmen	Italy	2006 (97)	good
Chateau Royale	Belgium		
Dawn	USDA, WVA	2007	
Elliot	UC Davis, CA		
Flamingo	South Africa	2006	BET-dead, Pyro-good
Flemish Beauty	Belgium	2007	
Harrow Crisp	Ontario, Canada	2006	BET-dead; 97-poor; Pyro-dead
Harrow Delight	Ontario, Canada	2007	
Harrow Gold	Ontario, Canada	2006	BET-dead; 97-poor; Pyro-good
Harvest Queen	Ontario, Canada		
Honey Sweet	Purdue, IN		
Louis Pasteur	France		
Moore Red	Hood River, OR		
Norma	Italy	2006	97-good
R1T15	UC Davis, CA	2006	87-dead
Rescue	Canada		
Rocha (Madeira)	Portugal		
Shenandoah	USDA, WVA		
Tosca	Italy	2006	97-dead
Turnadot	Italy	2006	97-poor
Warren	Mississippi, US	2007	

In addition, there are new Asian x European hybrids from New Zealand and Australia which should be pursued by the California industry.

Blakes Pride/69 and /97 trees planted in Kelseyville died in 2006.

Table 4: Planting status of new and potential varieties (not all suitable; need to be researched), Lake County Variety Trial, 2006

	8/09		8/14		8/17		8/21		8/22		8/28		8/30		8/31		9/01		9/05		9/07		9/14		9/21		
	Pressure	Sugar	Pressure	Sugar	Pressure	Sugar	Pressure	Sugar																			
Sunrise (66170-47) (<i>Scotts Valley</i>)	17.0	12.3%	15.9	14.2%			14.7	16.0%					12.8	14.8%													
Abate Fetel (<i>Abbe Fetel</i>)					16.2	11.9%									14.7	15.5%					13.5	12.8%					
Blake's Pride (<i>Scotts Valley</i>)	15.7	9.7%							14.7	13.2%																	
Cinnamon																					16.7 ¹	14.6%	17.7 ¹	15.8%	16.4	15.9%	
Concorde								15.4	16.8%					13.6	15.9%						13.6	14.3%					
Dr. Jules Guyot ²			14.9	12.4%																							
Z1 ²																12.8	13.0%										
Z2										15.6	13.8%										13.1	14.5%					

¹ Due to a light crop, the pears harvested on 9/07 were from P. betulaeolia rootstock. The pears harvested on 9/14 were from OHx97 rootstock.
² Due to a very light crop, there was only enough fruit for one harvest for this variety.

Table 5a: Harvest dates for U.C. Davis postharvest lab evaluations, Lake County Variety Trial, 2006

Variety	# Fruit	Harvest	Storage Time	Days Ripened	Date	Ground Color	% Russetting	% Blush	IB		Decay		Scald		Scuffing		Cork Spot		%SS	%TA	Firmness (lbf)	Starch scores
									Incidence	Severity												
47	30	1	initial		8/10/2006	1.0	0.9	2.8	0.0	0.0	0.0	0.0							12.0	0.350	16.3	0.2
47	30	1	initial+6d20c	6d	8/16/2006	2.6	0.7	2.6	0.0	0.0	0.0	0.0							13.6	0.310	1.8	
47	30	1	1m0c		9/8/2006	1.1	0.0	3.5	0.0	0.0	0.0	0.0							13.0	0.298	15.2	
47	30	1	1m0c+6d20c	6d	9/14/2006	2.6	0.2	7.0	0.0	0.0	0.0	0.0							14.2	0.286	2.0	
47	30	1	3m0c		11/8/2006	2.1	0.2	1.0	0.0	0.0	3.3	1.0									15.4	
47	30	1	3m0c+5d20c	5d	11/13/2006	3.7	0.7	2.3	0.0	0.0	3.3	1.0									1.4	
47	30	2	initial		8/15/2006	1.0	0.0	3.0	0.0	0.0	0.0	0.0							13.2	0.346	16.4	0.6
47	30	2	initial+6d20c	6d	8/21/2006	1.0	0.8	2.7	0.0	0.0	0.0	0.0							12.0	0.356	2.7	
47	30	2	1m0c		9/13/2006	1.1	0.3	3.2	0.0	0.0	0.0	0.0							13.6	0.281	15.9	
47	30	2	1m0c+6d20c	6d	9/19/2006	3.6	0.3	4.0	0.0	0.0	0.0	0.0									2.3	
47	30	2	3m0c		8/15/2006	1.7	0.3	3.7	0.0	0.0	0.0	0.0									15.0	
47	30	2	3m0c+5d20c	5d	11/20/2006	3.4	0.3	2.2	0.0	0.0	0.0	0.0									1.6	
47	30	3	initial		8/22/2006	1.0	0.5	1.3	0.0	0.0	0.0	0.0							12.6	0.304	13.8	1.2
47	30	3	initial+6d20c	6d	8/28/2006	3.4	0.7	0.7	0.0	0.0	0.0	0.0							13.9	0.258	2.4	
47	30	3	1m0c		9/21/2006	1.2	0.3	2.7	0.0	0.0	0.0	0.0									13.7	
47	30	3	1m0c+6d20c	6d	9/27/2006	3.5	1.3	2.2	0.0	0.0	0.0	0.0									1.9	
47	30	3	3m0c		11/22/2006	2.2	0.2	1.0	0.0	0.0	3.3	1.0									13.4	
47	30	3	3m0c+5d20c	5d	11/27/2006	3.8	0.3	2.3	0.0	0.0	3.3	1.0									2.0	
47	30	4	initial		8/31/2006	1.4	0.2	2.7	0.0	0.0	0.0	0.0							12.8	0.276	13.6	1.3
47	30	4	initial+6d20c	6d	9/6/2006	3.5	0.3	2.8	0.0	0.0	0.0	0.0							13.8	0.249	3.4	
47	30	4	1m0c		9/29/2006	1.6	0.0	3.0	0.0	0.0	0.0	0.0									13.6	
47	30	4	1m0c+5d20c	5d	10/4/2006	3.8	0.7	3.8	0.0	0.0	0.0	0.0									2.7	
47	30	4	3m0c+0d20c		11/30/2006	2.5	0.2	1.8	0.0	0.0	6.7	1.5									13.5	
47	30	4	3m0c+5d20c	5d	12/5/2006	4.0	0.3	1.0	0.0	0.0	30.0	1.1									2.5	
Abate Fetei	30	1	initial		8/18/2006	1.0	5.7	2.3	0.0	0.0	0.0	0.0			0.0	0.0			11.3	0.190	14.6	2.3
Abate Fetei	30	1	initial+10d20c	10d	8/28/2006	3.2	5.2	2.7	0.0	0.0	0.0	0.0			0.0	0.0			12.5	0.180	2.3	
Abate Fetei	30	1	1m0c		9/18/2006	1.0	7.0	1.8	0.0	0.0	0.0	0.0			0.0	0.0			11.8	0.158	13.8	
Abate Fetei	30	1	1m0c+10d20c	10d	9/28/2006	3.8	5.8	0.8	0.0	0.0	0.0	0.0			0.0	0.0					2.0	
Abate Fetei	30	1	3m0c		11/21/2006	1.4	4.5	1.8	0.0	0.0	0.0	0.0			0.0	0.0					12.2	
Abate Fetei	30	1	3m0c+9d20c	9d	30-Nov	3.9	3.2	2.5	0.0	0.0	3.3	2.0			0.0	0.0					0.0	
Abate Fetei	30	2	initial		9/1/2006	1.0	7.5	3.7	0.0	0.0	0.0	0.0			0.0	0.0			11.9	0.158	13.2	2.9
Abate Fetei	30	2	initial+10d20c	10d	9/11/2006	1.1	15.7	0.4	0.0	0.0	0.0	0.0			0.0	0.0			13.3	0.167	3.4	
Abate Fetei	30	2	1m0c		10/3/2006	1.0	5.5	2.3	0.0	0.0	0.0	0.0			0.0	0.0					12.1	
Abate Fetei	30	2	1m0c+8d20c	8d	10/10/2006	3.9	4.6	1.1	0.0	0.0	6.7	1.0			0.0	0.0					1.9	
Abate Fetei	30	2	3m0c		12/4/2006	1.8	6.0	5.8	0.0	0.0	3.3	1.0			0.0	0.0					10.3	
Abate Fetei	30	2	3m0c+10d20c	10d	12/14/2006	3.9	5.0	2.5	13.3	1.0	3.3	1.0			90.0	1.2					3.8	
Abate Fetei	30	3	initial		9/8/2006	1.0	6.0	3.2	0.0	0.0	0.0	0.0			0.0	0.0			12.5	0.150	13.5	3.1
Abate Fetei	30	3	initial+10d20c	10d	9/18/2006	3.8	10.8	2.5	0.0	0.0	0.0	0.0			0.0	0.0			13.6	0.148	2.3	
Abate Fetei	30	3	1m0c		10/9/2006	1.0	6.2	2.5	0.0	0.0	0.0	0.0			0.0	0.0					11.9	
Abate Fetei	30	3	1m0c+9d20c	9d	10/18/2006	4.0	6.3	5.2	0.0	0.0	0.0	0.0			0.0	0.0					1.9	
Abate Fetei	30	3	3m0c		12/11/2006	1.9	6.7	4.5	0.0	0.0	6.7	1.0			0.0	0.0					11.0	
Abate Fetei	25	3	3m0c+9d20c	9d	12/21/2006	3.9	9.0	6.8	30.0	1.1	46.7	1.3			100.0	1.2					4.3	
Blake's Pride	30	1	initial		8/10/2006	1.0	6.5	1.0	0.0	0.0	0.0	0.0							10.0	0.459	15.1	0.7
Blake's Pride	28	1	initial+6d20c	6d	8/16/2006	3.1	21.3	1.4	0.0	0.0	0.0	0.0							12.0	0.411	2.3	
Blake's Prnde	30	1	1m0c		9/8/2006	1.0	11.7	0.5	0.0	0.0	0.0	0.0							11.2	0.436	14.6	
Blake's Pride	30	1	1m0c+6d20c	6d	9/14/2006	4.0	10.4	0.7	0.0	0.0	0.0	0.0							12.0	0.368	2.1	
Blake's Pride	30	1	3m0c		11/15/2006	1.6	19.2	0.5	0.0	0.0	0.0	0.0									15.0	
Blake's Pride	30	1	3m0c+5d20c	5d	11/20/2006	3.4	20.5	0.7	0.0	0.0	0.0	0.0									2.0	
Blake's Pride	30	2	initial		8/23/2006	1.0	8.5	0.3	0.0	0.0	0.0	0.0							12.0	0.421	13.5	1.8
Blake's Pride	30	2	initial+6d20c	6d	8/29/2006	3.8	17.8	2.2	0.0	0.0	0.0	0.0							13.2	0.351	2.5	
Blake's Pride	30	2	1m0c		9/21/2006	1.2	10.7	1.0	0.0	0.0	0.0	0.0									12.5	
Blake's Pride	30	2	1m0c+5d20c	5d	9/26/2006	3.7	14.5	0.2	0.0	0.0	0.0	0.0									3.0	
Blake's Pride	30	2	3m0c		11/22/2006	2.3	19.7	0.8	0.0	0.0	0.0	0.0									12.3	
Blake's Pride	30	2	3m0c+5d20c	5d	11/27/2006	3.9	19.0	0.2	0.0	0.0	0.0	0.0									3.3	

Table 5b: Quality evaluation averages, Lake County Variety Trial, 2006

Variety	# Fruit	Harvest	Storage		Date	Ground Color	% IB			Decay		Scald		Scuffing		Cork Spot		%SS	%TA	Firmness (lbf)	Starch scores	
			Time	Ripened			Russetting	Blush	Incidence	Severity	Incidence	Severity	Incidence	Severity	Incidence	Severity	Incidence					Severity
Cinnamon	25	1	initial		9/8/2006	3.9	100.0	0.0	3.3	1.0	0.0	0.0	0.0	0.0			13.6	0.380	18.1	1.4		
Cinnamon	25	1	initial+6d20c	6d	9/14/2006	4.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			14.9	0.374	3.3			
Cinnamon	30	1	1m0c		10/6/2006	3.7	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0					15.8			
Cinnamon	30	1	1m0c+6d20c	6d	10/12/2006	4.0	100.0	0.0	16.7	2.0	0.0	0.0	0.0	0.0					2.4			
Cinnamon	30	1	3m0c		12/8/2006	4.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0					16.5			
Cinnamon	30	1	3m0c+5d20c	5d	12/13/2006	4.0	100.0	0.0	0.0	0.0	0.0	0.0	43.3	1.3					3.3			
Cinnamon	30	2	initial		9/15/2006	3.7	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			16.0	0.418	17.6	1.8		
Cinnamon	30	2	initial+6d20c	6d	9/21/2006	4.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			16.7	0.363	3.4			
Cinnamon	30	2	1m0c		10/13/2006	3.9	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0					15.5			
Cinnamon	30	2	1m0c+6d20c	6d	10/19/2006	4.0	100.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0					2.6			
Cinnamon	30	2	3m0c		12/15/2006	4.0	100.0	0.0	0.0	0.0	3.3	1.0	0.0	0.0					14.2			
Cinnamon	30	2	3m0c+5d20c	5d	12/20/2006	4.0	100.0	0.0	0.0	0.0	20.0	1.0	30.0	9.0					4.2			
Cinnamon	30	3	initial		9/21/2006	3.8	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			14.5	0.277	18.1	3.5		
Cinnamon	30	3	initial+6d20c	6d	9/27/2006	4.0	100.0	0.0	0.0	0.0	3.3	2.0	0.0	0.0			15.1	0.304	2.5			
Cinnamon	30	3	1m0c		10/19/2006	3.8	100.0	0.0	3.3	3.0	0.0	0.0	0.0	0.0					12.3			
Cinnamon	30	3	1m0c+6d20c	6d	10/25/2006	4.0	100.0	0.0	0.0	0.0	3.3	2.0	0.0	0.0					2.3			
Cinnamon	30	3	3m0c		12/15/2006	4.0	100.0	0.0	3.3	1.0	20.0	1.2	0.0	0.0					10.0			
Cinnamon	30	3	3m0c+5d20c	5d	12/20/2006	4.0	100.0	0.0	0.0	0.0	60.0	1.4	70.0	1.5					3.4			
Concorde	30	1	initial		8/23/2006	1.0	12.7	0.0	0.0	0.0	0.0	0.0					0.0	0.0	13.4	0.199	13.8	2.0
Concorde	30	1	initial+9d20c	9d	9/1/2006	1.0	14.8	0.5	0.0	0.0	0.0	0.0					0.0	0.0	14.5	0.201	7.1	
Concorde	30	1	1m0c		9/25/2006	1.0	15.3	1.5	0.0	0.0	0.0	0.0					0.0	0.0			13.2	
Concorde	30	1	1m0c+10d20c	10d	10/5/2006	1.3	18.0	0.0	0.0	0.0	10.0	1.0					0.0	0.0			3.9	
Concorde	30	1	3m0c		11/21/2006	1.2	13.2	0.0	0.0	0.0	0.0	0.0					0.0	0.0			12.2	
Concorde	30	1	3m0c+9d20c	9d	11/30/2006	3.5	15.8	1.0	20.0	2.7	10.0	1.3					0.0	0.0			2.6	
Concorde	30	2	initial		9/1/2006	1.0	14.7	0.2	0.0	0.0	0.0	0.0					0.0	0.0	12.9	0.187	13.1	3.0
Concorde	30	2	initial+10d20c	10d	9/11/2006	3.9	7.5	4.3	0.0	0.0	0.0	0.0					0.0	0.0	12.9	0.142	2.4	
Concorde	30	2	1m0c		10/3/2006	1.0	15.3	1.0	13.3	2.5	0.0	0.0					0.0	0.0			11.2	
Concorde	30	2	1m0c+10d20c	10d	10/12/2006	2.6	19.5	0.5	0.0	0.0	0.0	0.0					0.0	0.0			2.5	
Concorde	30	2	3m0c		12/4/2006	1.8	15.2	1.2	0.0	0.0	0.0	0.0					0.0	0.0			10.5	
Concorde	30	2	3m0c+9d20c	9d	12/13/2006	2.9	15.7	1.2	26.7	2.0	3.3	3.0					0.0	0.0			2.2	
Concorde	25	3	initial		9/8/2006	1.0	9.6	0.2	0.0	0.0	0.0	0.0					0.0	0.0	13.6	0.137	13.2	3.6
Concorde	25	3	initial+10d20c	10d	9/18/2006	1.9	18.0	2.6	0.0	0.0	0.0	0.0					0.0	0.0	14.2	0.176	3.0	
Concorde	26	3	1m0c		10/9/2006	1.1	13.4	0.8	44.0	1.8	0.0	0.0					0.0	0.0			12.4	
Concorde	25	3	1m0c+10d20c	10d	10/19/2006	2.8	17.5	3.8	57.7	1.7	7.7	1.0					0.0	0.0			3.1	
Concorde	24	3	3m0c		12/11/2006	1.7	13.4	2.6	0.0	0.0	10.0	1.0					33.3	1.5			11.4	
Concorde	25	3	3m0c+9d20c	9d	12/20/2006	3.1	14.6	1.5	13.3	2.5	6.7	1.0					23.3	1.6			3.1	
Dr. Jules Guyot	30	1	initial	initial	8/15/2006	1.2	0.5	3.0	0.0	0.0	0.0	0.0							10.1	0.249	15.8	0.9
Dr. Jules Guyot	30	1	initial+6d20c	6d	8/21/2006	3.4	0.8	1.5	0.0	0.0	0.0	0.0							11.5	0.271	2.4	
Dr. Jules Guyot	30	1	1m0d		9/13/2006	1.3	0.0	4.7	0.0	0.0	0.0	0.0							11.5	0.263	14.7	
Dr. Jules Guyot	30	1	1m+5d20c	5d	9/18/2006	3.9	0.0	3.3	0.0	0.0	0.0	0.0							11.7	0.266	2.4	
Dr. Jules Guyot	30	1	3m0d		11/15/2006	3.3	0.8	8.0	0.0	0.0	6.7	1.0									13.1	
Dr. Jules Guyot	30	1	3m0c+5d20c	5d	11/20/2006	4.0	0.2	7.0	0.0	0.0	36.7	1.0									3.2	
Z1	20	1	initial		9/1/2006	1.5	0.5	15.5	13.3	2.0	0.0	0.0							13.8	0.236	12.3	4.0
Z1	20	1	initial+5d20		9/6/2006	3.4	1.3	11.3	30.0	3.0	0.0	0.0							13.6	0.253	2.9	
Z1	20	1	3m0d		11/30/2006	3.3	0.0	13.3	50.0	2.4	13.3	1.3									12.1	
Z1	20	1	3m5d	5d	12/5/2006	4.0	0.0	10.3	50.0	2.8	36.7	1.5									3.6	
Z2	30	1	initial	initial	8/29/2006	1.1	0.0	78.3	0.0	0.0	0.0	0.0							11.8	0.183	14.7	3.4
Z2	30	1	initial+7d20c	7	9/5/2006	4.0	0.0	85.8	73.3	2.2	0.0	0.0							12.8	2.370	1.9	
Z2	30	1	1m0c		9/27/2006	1.3	0.0	70.3	13.3	2.5	0.0	0.0									14.0	
Z2	30	1	1m0d+5d20c	5	10/3/2006	4.0	0.0	81.7	26.7	2.0	0.0	0.0									2.6	
Z2	30	1	3m0c		11/30/2006	3.4	0.0	85.7	23.3	2.4	3.3	1.0									14.5	
Z2	30	1	3m0d+5d20c	5d	12/5/2006	4.0	0.0	88.4	16.7	2.8	30.0	2.0									3.3	
Z2	30	2	initial		9/6/2006	1.2	0.0	60.7	0.0	0.0	0.0	0.0							11.9	0.212	14.1	4.7
Z2	30	2	initial+5d20c	5d	9/11/2006	3.3	0.0	76.5	50.0	2.3	0.0	0.0							13.1	0.204	2.5	
Z2	30	2	1m0c		10/5/2006	1.5	0.0	77.2	76.7	2.2	0.0	0.0									11.9	
Z2	30	2	1m0c+5d20c	5d	10/10/2006	3.7	0.0	68.5	76.7	2.1	0.0	0.0									2.9	
Z2	28	2	3m0c+0d		12/6/2006	3.6	0.0	78.4	60.0	3.3	46.7	1.9									12.3	
Z2	30	2	3m0c+5d	5d	12/11/2006	4.0	0.0	79.7	70.0	2.7	66.7	1.8									2.6	

Ground color: 1=green; 2=light green; 3=light yellow; 4=yellow. Starch scores: 0=no clearing; 6=all starch cleared.

IB, Decay, Scald, Scuffing, Cork Spot severity scores: 0 = none; 1 = slight; 2 = moderate; 3 = severe.

Table 5b (cont'd.)

Table 6: 2006 Sensory Evaluation Summary

Event #1 - Kelseyville Pear Festival - September 30 (N=234)

Event #2 - Steele Winery Harvest Festival - October 12 (N=240)

Event #3 - San Francisco Ferry Building - November 4 (N=213)

1) **appearance and color** (best → worst)

#1: Bartlett = Atlas Red Sensation > Sunrise (47) > Blakes Pride = AF
#2: Bartlett > Dr. Jules Guyot > Cinnamon = Sunrise (47) > Abate Fetel
#3: Dr. Jules Guyot > Abate Fetel > Concorde = Cascade > Comice
color - Dr. Jules Guyot > Abate Fetel > Cascade ≥ Concorde ≥ Comice

2) **preferred size for self**

#1: 110 > 135 > 80
#2: 110 > 135 > 80
#3: 110 > 135 > 80

3) **preferred size for children**

#1: 80 > 110 > 135
#2: 80 > 110 > 135
#3: 80 > 110 > 135

4) **overall taste preference** (scale 1-10; want > 5)

#1: Sunrise (47) = Bartlett > Blakes Pride = Abate Fetel ≥ Atlas Red Sensation
7.4 6.8 5.7 5.4 4.8
#2: Cinnamon > Bartlett = Dr. Jules Guyot = Sunrise (47) > Abate Fetel
7.9 6.5 6.0 5.8 4.9
#3: Concorde > Comice = Cascade = Dr. Jules Guyot = Abate Fetel
7.1 6.2 6.2 5.9 5.8

5) **purchase intent** (scale 1-5; want > 3)

#1: Sunrise (47) > Bartlett > Blakes Pride = Abate Fetel ≥ Atlas Red Sensation
3.9 3.6 3.2 3.0 2.8
#2: Cinnamon > Bartlett = Dr. Jules Guyot ≥ Sunrise (47) > Abate Fetel
4.1 3.5 3.2 3.2 2.7
#3: Concorde > Cascade = Comice = Dr. Jules Guyot = Abate Fetel
3.8 3.3 3.1 3.1 3.0

6) **taste rank**

#1: 47 = Bartlett > Blakes Pride > Abate Fetel = Atlas Red Sensation
#2: Cinnamon > Bartlett > Dr. Jules Guyot = Sunrise (47) > Abate Fetel
#3: Concorde > Cascade = Comice = Dr. Jules Guyot = Abate Fetel

7) **reason for liking your favorite**

#1: sweetness >> texture > juiciness = tartness/sourness > aroma > skin color
#2: sweetness >> texture > juiciness > tartness > aroma > skin color
#3: sweetness >> texture > juiciness > tartness > aroma

Table 6: 2006 Sensory Evaluation Summary (continued)

8) reason for disliking your least favorite

- #1: lacks flavor >> gritty texture > lacks sweetness = too tart = lacks juiciness >> not tart enough = skin color
- #2: lacks flavor >> gritty texture > lacks sweetness > lacks juiciness > too tart > not tart enough = skin color
- #3: lacks flavor >> gritty texture >> lacks sweetness > too tart > lacks juiciness > not tart enough

9) frequency of eating pears

- #1: 1-few x/month > ≤ few times/year > 1-3x/week > around holidays > daily
- #2: 1-few x/month > ≤ few times/year > 1-3x/week > holidays > daily
- #3: 1-few x/month > 1-3x/week = ≤ few x/year > holidays > daily

10) variety eaten most often

- #1: green/yellow Bartlett >> other/don't know >> Bosc > Red Anjou > green Anjou > Comice
- #2: green/yellow Bartlett >> other/don't know >> Bosc > Red Anjou = green Anjou = Comice
- #3: other/don't know > yellow/green Bartlett = Bosc > Red Anjou = green Anjou = Comice

11) age (years)

- #1: 45-59 >> 60+ > 35-44 > 25-34 > 18-24
- #2: 45-59 > 60+ >> 25-34 = 35-44 > 18-24
- #3: 25-34 = 45-59 > 35-44 > 60+ > 18-24
(31%) (28%) (20%) (14%) (7.5%)

13) gender

- #1: female = 65% male = 35%
- #2: female = 66% male = 34%
- #3: female = 63% male = 37%