Status of Organic Production of Temperate Fruits in the USA

D. Granatstein[1] and E. Kirby[1]

Abstract

Temperate fruits are an important category for the organic consumer, led by berries and apples. Demand has generally surpassed domestic supply (including Canada) for over a decade, but growth in production area has not kept pace. Recent prices to growers for organic apples, pears, and cherries have been twice that of conventional, with a similar situation for pears and cherries. Organic blueberries have dramatically increased in production also. Organic fruit production has generally been more profitable than conventional despite typically lower yields and higher costs under organic management. The semi-arid regions of the western USA produce most of the organic temperate fruits in the country, as the climate poses fewer disease and pest challenges than in other regions.

Keywords: apple, blueberry, area, yields, economics

Introduction

Consumer demand for organic foods in the US continues to grow at approximately 11-12 % per year (OTA, 2015). In 2014, fruits and vegetables accounted for 36 % of all retail organic food sales in the country, with 90 % of sales as fresh product (OTA, 2015). However, industry leaders report that many companies face supply constraints for certified organic products, and imports from other countries are increasing. This paper will discuss recent trends and the current situation for organic temperate fruits in the US, and the opportunity that exists for growers to enter into or expand their organic fruit production.

Data and Information Sources

The Center for Sustaining Agriculture and Natural Resources at Washington State University has been compiling and analyzing statistics on the organic sector in the state, and on organic fruits nationally and globally, since 2000 (e.g., Granatstein *et al*., 2010; Kirby & Granatstein, 2012; Granatstein *et al*., 2015). Data on area of production are collected directly from certifiers each year. Organic tree fruit volume and price data are available from fruit industry organizations (Washington Growers Clearinghouse, Washington State Tree Fruit Association). The USDA collects data on sales and price of select organic fruits at retail as well as at shipping point. The USDA also has conducted two national surveys of organic growers (NASS, 2010; NASS, 2015) that provide data, but they are known to be incomplete. Previously, USDA collected data manually from all certifiers on select organic crops to attempt to track the growth of the sector (USDA-ERS, 2015). Industry meetings have been organized regularly to discuss the organic fruit sector, with the most recent in December 2015, and various companies share their current situation and outlook. All these sources have been used in developing this report.

Market Situation

Since organic agriculture is largely market-driven in the US, we begin with a look at the market. As stated in the Introduction, organic fruits and vegetables are a core purchase by organic consumers. In 2009 and 2010, the two worst years of the recession, organic

[1] Center for Sustaining Agriculture and Natural Resources, Washington State University, Wenatchee, WA 98801, USA, granats@wsu.edu

produce sales grew 10.8 % and 11.8 %, respectively, compared with growth of all organic food sales of 4.3 % and 7.2 %, respectively. According to industry data presented at the Washington State Tree Fruit Association organic fruit session (8 Dec 2015), berries were the top-selling organic fruit during the previous year, followed by apples (Table 1). The top three selling organic fruits were the same as the top three conventional fruits. But sales growth has been quite different. Conventional fresh apple sales (dollars) in the US in 2015 dropped 4.9 % compared to the previous year, while organic apple sales rose 13.7 % (H. Nager, pers. comm.). One major retailer reported annual sales increases for fresh organic fruits as follows: berries, +29 %; apples, +48 %; tropical fruits, +108 % (F. Padilla, pers. comm). Organic accounts for about 30 % of the production from the largest producer of fresh pre-sliced apples in the US. Their sales were up 21 % in the past year, and would have risen more if organic fruit was available at a viable price point (T. Freytag, pers. comm.). A large fruit processor confirmed this problem, stating that processing prices for organic fruit were at record highs, demand was increasing, but retail prices for the products (e.g., juice, puree) were less elastic and thus cheaper foreign organic fruit was being imported in some cases (C. Hales, pers. comm.). In contrast, frozen organic "superfruits" such as blueberry or cherry for "smoothie" drinks have developed as a fast-growing new market with a higher price point (A. McErlich, pers. comm.). The marketing director of a major Washington State fruit company projected that 20-25 % of the state's apple crop could be organic in the next 5-10 years, compared with 9 % currently, and go even higher if export markets develop (M. Riggan, pers. comm.). More production is needed to supply the growing demand for fresh fruit, and to stabilize prices for processors who are an essential part of the fruit business.

Table 1: Market share of various organic fruits in the US, 2015.

Rank	Fruit	Scientific name	% of organic fruit sales
1	Berries	various	35.8
2	Apples	*Malus* x *domestica* Borkh.	24.3
3	Bananas	*Musa acumunata* Colla	12.6
4	Grapes	*Vitis* spp.	8.3
5	Avocados	*Persea americana* Mill.	4.0
6	Oranges	*Citrix* x *sinensis*	3.3
7	Pears	*Pyrus communis* L.	2.3
15	Cherries	*Prunus avium* L.	0.5

Source: IRI/Freshlook Marketing, 52 weeks ending 11/1/15, courtesy H. Nager.

Area, Production, and Value of Temperate Organic Fruits

Accurate statistics on the organic sector in the US are lacking, making it difficult to estimate the current production area of organic temperate fruits. Based on the data from the 2014 organic survey (NASS, 2015) as well as that gathered directly from certifiers in Washington and California (the two leading fruit producing states), there were at least 33,000 ha of certified organic temperate fruits in the US in 2014. The following rough estimates of area were made: grapes, 15,000 ha; apples, 7,700 ha; berries, 5,000 ha; other tree fruits, 4,000 ha. Organic apple area in Washington State, the nation's leading producer, doubled from 2007 to 2009, then declined by about 1,000 ha from its peak in 2009 to 2012, and has been flat since (Fig. 1). This likely led to a national decline in area, as no other states had any sizeable increases. In contrast, from 2008 to 2011, organic grape area grew by 37 % and organic berry area by 57 % (USDA-ERS, 2015). However, despite the drop in apple area, the shipped volume of organic apples from Washington

increased 63 % from 2009 to 2014 (Fig. 2), due to higher-yielding new orchards, and less fruit diverted to other end uses (conventional markets, processing) due to high prices and short supplies of fresh fruit (Kirby & Granatstein, 2015).

Organic fruit production for most reported crops increased from 2008 to 2014, according to the NASS surveys (Table 2), and the percent increase was often much larger than that for area as with blueberry, apple, and cherry. Percent increase in sales value generally exceeded the production increase, indicating higher prices over time. Apple was the highest value crop, followed by grapes and then the Berries group. A significant portion of US organic grapes is made into wine and thus not reflected in retail fresh produce sales. Berries are the leading organic fresh fruit sales item at retail, and a substantial quantity of imports is needed to provide the current year-round supply. Those imports would not be captured in the NASS data, which are for US production only. At approximately $704 million, the 2014 sales of organic temperate fruits grown in the US represented 21 % of all organic crops grown in the country, and 12 % of all organic crops, livestock, and livestock products, confirming the importance of temperate fruits within the organic sector.

Table 2: Change in US organic temperate fruit production and sales value, 2008-2014, and estimated sales value in 2014.

	Percent Change 2008 to 2014			Estimated 2014 sales value (million $)
	Area	Production	Sales Value	
Grapes	+1	+13	+60	195.3
Apple	-17	+16	+83	249.3
Pear	+43	+59	+89	30.4
Cherry	+17	+97	+146	38.4
Peach	+56	+72	+97	27.8
Plum/prune	-24	-7	+64	19.3
Blackberry	+23	+93	+182	12.4
Blueberry	+182	+319	+333	69.2
Raspberry	+6	+4	+11	14.1
Strawberry	+95	+34	+105	89.1
Berries	*+93*		*+74*	*143.4*

Source: NASS 2010, NASS 2015.

More precise data have been established for organic temperate fruits in Washington State, where one certifier (Washington State Dept. Agriculture Organic Food Program) certifies over 95 % of the farms in the state. Also, their data system captures more crop and variety level detail than other sources and data are easily retrievable. A complete record of organic apple area since certification started in 1988 has been produced (Fig. 1). From this, a stepwise pattern of increased area (1990, 2001, 2008) followed by a plateau period can be discerned. This is likely explained by the three-year transition requirement which creates a lag between market signals regarding demand and growers' ability to respond to that demand. Increased certified apple area has come in spikes that have in the past corresponded with price drops for both conventional and organic apples. When organic prices dropped, growers were hesitant to exit organic based on one or two poor years, as they had invested resources in becoming certified, and they would miss out on expected future price premiums if they exited (D. Granatstein, unpublished data). Conventional prices were also poor in these years. Thus, there is an imperfect response on both ends of the market signal. Another spike of expansion appears to be underway, based on a January 2015 survey of growers who planned to expand certified area of apples, pear, and

cherry by 60-70 % in the next two or three years (Granatstein & Kirby, 2015a). The 2015 increase in registered transition area confirms the expansion.

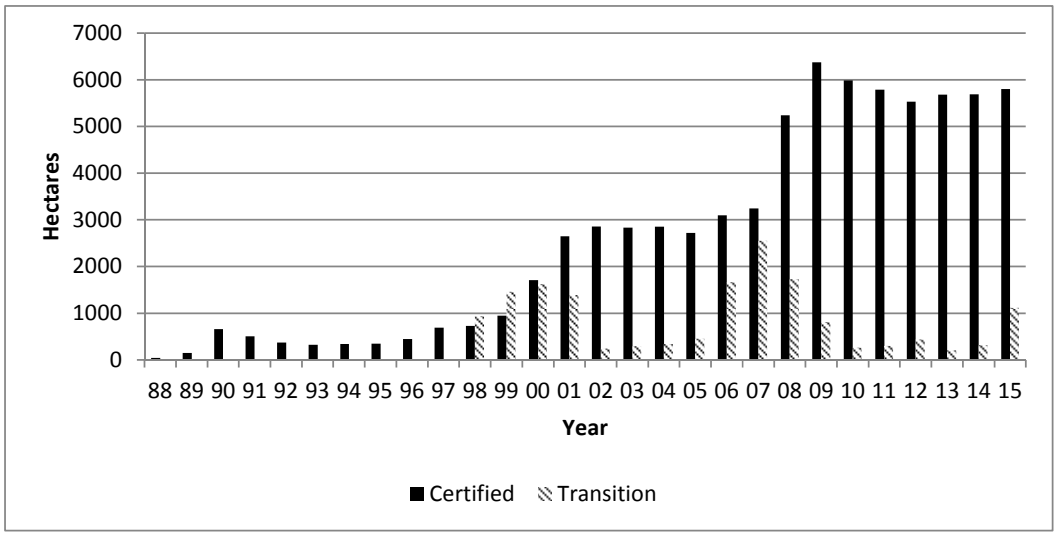

Figure 1: Historic trend of organic apple area in Washington State, USA., 1988-2015.

The data in Fig. 2 show a strong upward trend for organic apple prices along with a steady increase in shipped volume. There are apparent price responses to the varying crop size due to alternate bearing, as with the increases in price in 2013 and 2015 in anticipation of shorter supplies of US (primarily Washington) organic apples. With the projected increases in production in the next few years, there may be enough latent demand to prevent a precipitous drop in price. Many of the newly certified orchards will be modern high-density plantings with yields higher than at present. For example, organic 'Gala' apple average yield was approximately 41 MT/ha from 2009-2012, while many new plantings are yielding 80 MT/ha or more (D. Granatstein, unpublished data). It is possible that future increases in area will lead to substantially more production than has been the case previously.

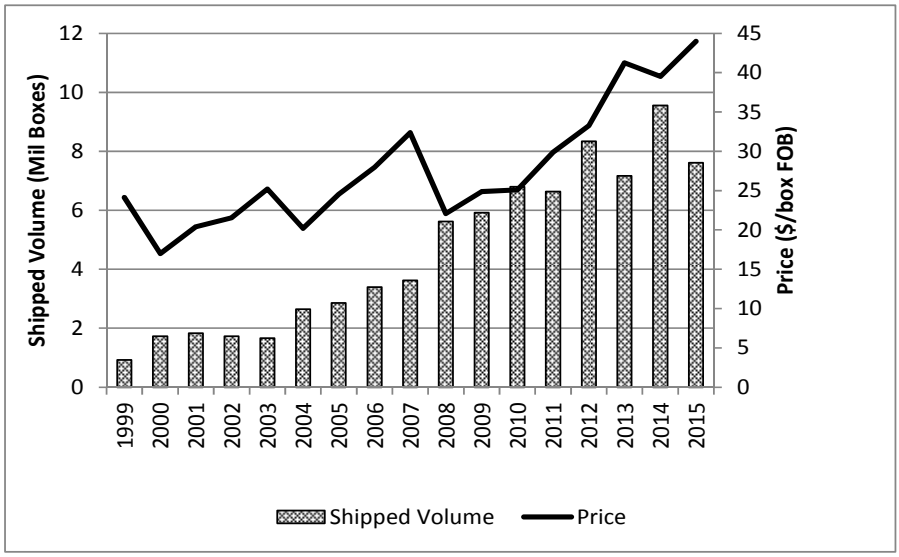

Figure 2: Shipped volume and prices of organic apples, Washington State, 1999-2015. Volume is in million boxes, 1 box=18 kg. Price is in US$ per box, at the shipping point with the cost of shipping not included. Data for 2015 are estimates.

A similar experience is occurring with organic blueberry production, where new plantings are being made in the irrigated region of Washington State and yields are far exceeding those of the traditional blueberry production regions in cooler and more disease-prone western Washington and Oregon. Average organic blueberry yields for 2009-2012 were 220 % higher in eastern Washington than in western Washington (Brady *et al*., 2015). Washington and California currently rank as first and second for fresh organic blueberry shipments in the US, with production centered in semi-arid environments under irrigation (Granatstein, 2015). Oregon and Georgia have also expanded organic blueberry production. In Washington, area of conventional blueberries expanded 30 % per year from 2004 to 2014 while organic area expanded at 60% per year, showing the market interest in the organic version of this "superfruit."

Economics

Several studies have examined the economics of organic temperate fruit production in the US. Some (Reganold *et al*., 2001; Peck *et al*., 2010), were systems comparison studies with replicated plots of organic production compared with other non-organic production. Yields, fruit quality, costs, and net returns were then calculated. Other studies were standard cost of production or enterprise budgets, with one "conventional" and another "organic" for the same crop under similar production conditions.

Apples have been examined more than any other organic fruit crop. In most cases, organic production in more humid regions has led to equal or lower total yield, lower marketable yield, smaller fruit size, and higher costs. This was the case in New York State, where Peck *et al*. (2010) reported lower marketable yield of organic apples than the integrated "standard" system due to more disease and insect damage, 9 % higher total operating costs for organic, and an estimated 56 % price premium for organic. With direct marketing, both systems were highly profitable (>$40,000 / ha returns over total operating costs) with organic moreso. If the fruit were sold through wholesale channels, organic was less profitable in one year and greater in another, while integrated delivered a similar $5,000 / ha return over total operating costs both years. The Reganold *et al*. (2001) study was done in the contrasting semi-arid environment of eastern Washington with limited diseases and compared conventional, organic, and an integrated system that used practices from the other two. There were no significant yield differences among systems over five years. Total costs for organic were similar or lower than in the other systems, and net returns for organic were general significantly greater.

Enterprise budgets for 'Gala' apple in Washington state were developed for conventional and organic management for 2014 (Galinato & Gallardo, 2015a, b). Total costs for organic were only 1 % higher than conventional on a per hectare basis, but 10 % higher on a per metric ton basis, given the assumed 7 % lower organic yield. Organic had notably higher costs for maintenance, repair, fuel (+8 %); labor (+16 %); and pest/disease control and fertilizers (+25 %). Using these data, breakeven cost per 18 kg box of packed apples was $20.79 for conventional and $22.76 for organic, and these compared with the 2014 market season average prices of $19.53 and $38.55 for conventional and organic 'Gala' respectively. Thus, organic was considerably more profitable with nearly twice the price, slightly higher costs and slightly lower yields.

A similar comparison was done for blueberry production in western Oregon (Julian *et al*., 2011a, b). Yields at full production between the two systems were assumed to be the same, based on actual field trials. Cumulative variable costs and total costs in years 0 to 7 were 12 % and 10 % greater, respectively, under organic management versus conventional. At full production in year 7 using hand harvest and selling to the fresh

market, net returns over all costs were 125 % greater for organic than conventional, and the organic planting had a breakeven point (where total returns had paid for all expenses since planting) of 8 years compared to 11 years for the conventional planting.

Several budgets for organic fruits have been done for California. Organic apples grown for processing on the central coast of California had a net return of $454 / ha versus $2,371 / ha for conventional (Klonsky & Stewart, 2014a, b). Total cost per hectare for organic was 8 % lower than conventional, mostly related to lower harvest costs from lower yields. Overall, the organic apples cost 36 % more to produce per tonne of fruit. The higher price for organic fruit (+18 %) did not make up for the lower yield (-32 %). Total costs for organic pear production in the Sacramento Valley, California, were 11 % higher than conventional, with higher costs for fertilizer, pest management, and weed control being the main reasons (Ingels & Klonsky, 2012; Ingels *et al*., 2010). Net returns between the two management systems could not be compared since the studies looked at different pear cultivars that typically receive different prices.

With increasing global production of organic temperate fruits (Granatstein *et al*., 2015), US growers will need to remain cost-conscious as they may compete more with lower-cost foreign growers in the future; this is already happening with organic processed fruits. Profitability of organic fruit currently depends on a high price premium in most cases. However, the ease, cost, and yield of organic fruit production varies considerably with agroclimatic location, as seen in the US with many organic temperate fruits concentrated in irrigated semi-arid regions that typically have fewer pest and disease problems. Several of the budgets described above show that costs for organic are not necessarily substantially higher than conventional, and comparable yields can be achieved.

Conclusions

Organic temperate fruit area and production volume are expected to increase in the coming years to meet continued growth in consumer demand. Organic production is currently more profitable than conventional for a number of these products. The coupling of the organic identity with the increased focus on fruits and vegetables, anti-oxidants, and unprocessed foods as part of a healthy diet will likely lead to demand growth for the foreseeable future. Organic production is now concentrated largely in semi-arid regions with fewer pest and disease problems. Future research may create opportunities for organic production in more humid regions, and it will also be needed to keep the current production viable in light of new pests such as Spotted Wing Drosophila (*Drosophila suzukii*) and Brown Marmorated Stinkbug (*Halyomorpha halys*), changing climate, and shifts in the organic regulations that affect production practices.

Acknowledgements

The authors would like to acknowledge the Washington Dept. of Agriculture Organic Food Program, Oregon Tilth Certified Organic, and California Certified Organic Growers, in particular, for their willingness to provide data on organic fruit production.

References

Brady, M., Kirby, E., & Granatstein, D. (2015). *Trends and economics of Washington State organic blueberry production*. Washington State Univ. Extension FS154E, Pullman, WA. 8 pp. http://cru.cahe.wsu.edu/CEPublications/FS154E/FS154E.pdf.

Galinato, S.P. & Gallardo, R.K. (2015a). 2014 Cost Estimates of Establishing, Producing and Packing Gala Apples in Washington. Working Paper. School of Economic Sciences, Washington State University, Pullman, WA.

Galinato, S.P. & Gallardo, R.K. (2015b). 2014 Cost Estimates of Establishing, Producing and Packing Organic Gala Apples in Washington. Working Paper. School of Economic Sciences, Washington State University, Pullman, WA.

Granatstein, D. (2015). Trends and opportunities with organic blueberries, p. 10-11. In: *Oregon State Univ. Blueberry School Proceedings*, Corvallis, 16-17 Mar. 2015.

Granatstein, D. & Kirby, E. (2015). Another burst of organic fruit? *Good Fruit Grower*, Wenatchee, WA. May 1, 2015. P. 36-37. www.goodfruitgrower.com.

Granatstein, D., Kirby, E., Ostenson, H. & Willer, H. (2015). Global situation for organic tree fruits. *Scientia Hort*. DOI 10.1016/j.scienta.2015.12.008.

Granatstein, D., Kirby, E. & Willer, H. (2010). Current world status of organic temperate fruits. *Acta Hort*. **873**: 19-36.

Ingels, C.A. & Klonsky, K.M. (2012). *2012 Sample costs to produce organic pears, Sacramento Valley*. Univ. Calif. Coop. Ext., Davis, CA. 21 pp. http://coststudyfiles.ucdavis.edu/uploads/cs_public/98/4c/984cc236-f5bc-4385-a5d3-ad1c9d1fe75d/pearsorg_sv2012.pdf.

Ingels, C.A., Klonsky, K.M., & de Moura, R. (2010). *2010 Sample costs to produce pears, Sacramento Valley*. Univ. Calif. Coop. Ext., Davis, CA. 21 pp. http://coststudyfiles.ucdavis.edu/uploads/cs_public/3d/89/3d892a7b-b898-466c-9024-2d8d3efc04c3/pearsv2010.pdf.

Julian, J., Strik, B., Pond, E., & Yang, W. (2011a). *Blueberry economics: The costs of establishing and producing organic blueberries in the Willamette Valley*. Oregon State Univ. Ext. AEB0023.

Julian, J.,Strik, B., Pond, E., & Yang, W. (2011b). Blueberry economics: The costs of establishing and producing blueberries in the Willamette Valley. Oregon State Univ. Ext. AEB0022.

Kirby, E. & Granatstein, D. (2015). Recent trends in certified organic tree fruit, Washington State 2014. CSANR Organic Trends Report, Wenatchee, WA. http://csanr.wsu.edu/wp-content/uploads/2015/01/WA_OrgTreeFr2014_annotate_final.pdf.

Kirby, E. & Granatstein, D. (2012). *Status of organic tree fruit in Washington State*. WSU Extension EM046E, Pullman, WA. 32 pp. http://cru.cahe.wsu.edu/CEPublications/EM046E/EM046E.pdf.

Klonsky, K.M. & Stewart, D. (2014a). *2014 Sample costs to produce organic processing apples, Central Coast, Santa Cruz County, California*. Univ. Calif. Coop. Ext., Davis, CA. 21 pp. http://coststudyfiles.ucdavis.edu/uploads/cs_public/fe/91/fe916bab-978e-474f-ac30-30ff498aa569/apples-santa-cruz-org-processing.pdf.

Klonsky, K.M. & Stewart, D. (2014b). *2014 Sample costs to produce processing apples, Central Coast, Santa Cruz County, California*. Univ. Calif. Coop. Ext., Davis, CA. 20 pp. http://coststudyfiles.ucdavis.edu/uploads/cs_public/9c/bf/9cbfcb79-c037-47fe-af0b-79ec2edb4031/apples-santa-cruz-conv-processing.pdf.

NASS. (2010). 2008 Organic Survey. National Agricultural Statistics Service, USDA, Washington, D.C. http://www.agcensus.usda.gov/Publications/2007/Online_Highlights/Organics/.

NASS. (2015). 2014 Organic Survey. National Agricultural Statistics Service, USDA, Washington, D.C. http://www.agcensus.usda.gov/Publications/2012/Online_Resources/Organics/.

OTA. (2015). 2015 Organic Industry Survey. Organic Trade Assoc., Brattleboro, VT, USA. 139 pp.

Peck, G.M., Merwin, I.A., Brown, M.G., & Agnello, A.M. (2010). Integrated and organic fruit production systems for 'Liberty' apple in the northeast United States: a systems-based evaluation. *HortScience* **45**: 1038-1048.

Reganold, J.P., Glover, J.D., Andrews, P.K., & Hinman, H.R. (2001). Sustainability of three apple production systems. *Nature* **410**: 926-930.

USDA-ERS. (2015). Table 11. Certified organic fruit. Organic production data set. Washington, DC. http://www.ers.usda.gov/data-products/organic-production.aspx#25762.