Applied Economics and Policy Working Paper Series

AEP WP NO. 2021-04

IMPACT ON FRUIT AND VEGETABLE MARKETS: ONE YEAR LATER

Lauren Chenarides
Timothy J. Richards
Bradley J. Rickard

Abstract

More than one year after the outbreak of COVID-19, fruit and vegetable markets continue to adjust to the evolving landscape. In this article, we focus on three key measures of input and output market performance that serve as indicators of the stability of fruit and vegetable markets in the medium-term, and offer some insight for how these markets will continue to adjust in the longer run. Specifically, we use data to highlight the most recent trends in (i) the production and aggregate movement for major fruit and vegetable crops in the United States and Canada, (ii) labour supply and immigration visa patterns, and (iii) U.S.-Canada trade patterns for fruits and vegetables. We provide evidence that the fresh produce supply chain has remained relatively robust in the months following the outbreak of COVID-19.

Charles H. Dyson School of Applied Economics and Management

School of Hotel Administration

Samuel Curtis Johnson Graduate School of Management

Cornell
SC Johnson College of Business

COVID-19 Impact on Fruit and Vegetable Markets: One Year Later

Lauren Chenarides
Assistant Professor
W. P. Carey School of Business
Arizona State University, Mesa, AZ 85212
E-mail: Lauren.Chenarides@asu.edu

Timothy J. Richards
Marvin and June Morrison Chair of Agribusiness
W. P. Carey School of Business
Arizona State University, Mesa, AZ 85212
E-mail: trichards@asu.edu

Bradley J. Rickard
Associate Professor of Food and Agricultural Economics
Dyson School of Applied Economics and Management
Cornell University, Ithaca, NY 14853
Tel: 607.255.7417
E-mail: bjr83@cornell.edu

Abstract: More than one year after the outbreak of COVID-19, fruit and vegetable markets continue to adjust to the evolving landscape. In this article, we focus on three key measures of input and output market performance that serve as indicators of the stability of fruit and vegetable markets in the medium-term, and offer some insight for how these markets will continue to adjust in the longer run. Specifically, we use data to highlight the most recent trends in (i) the production and aggregate movement for major fruit and vegetable crops in the United States and Canada, (ii) labour supply and immigration visa patterns, and (iii) U.S.-Canada trade patterns for fruits and vegetables. We provide evidence that the fresh produce supply chain has remained relatively robust in the months following the outbreak of COVID-19.

Acknowledgments: The project was supported, in part, through USDA Hatch project NYC-121864. Any opinions, findings, conclusions, or recommendations expressed in this publication are those of the authors and do not necessarily reflect the view of the United States Department of Agriculture (USDA).

JEL classification: Q13

March 2021

COVID-19 Impact on Fruit and Vegetable Markets: One Year Later

Introduction

In this article, we provide a retrospective look on the medium-term (one year) impacts that COVID-19 had on fruit and vegetable markets in North America. We focus our analysis on three key measures of input and output market performance that were highlighted in Richards and Rickard (2020): Shipments from the farm, the stability of agricultural labor markets in the U.S., and trade flows between the United States and Canada. Our objective is to examine the fundamental resilience of the North American fruit and vegetable supply chain, from a perspective one-year removed from the onset of the pandemic, and to perhaps provide some foresight on the likely longer-run impacts of the disease on the markets for fruits and vegetables.

As in our original article on this topic, we consider the resilience of the North American market for fruits and vegetables given the high degree of integration between the U.S. and Canadian markets for fresh foods. Specifically, we first focus on trends in U.S. fruit and vegetable production and shipment patterns in 2019 and 2020, given that a large share of Canada's fresh produce is produced in the United States. Second, because the greatest risk exposure from Covid-19 lies with labour-inputs, and labour is the most important input (by expenditure share) in fruit and vegetable production, we examine hiring patterns during the 2020 growing season in the U.S. in some detail, focusing on access to non-immigrant guest workers. Namely, we compare H-2A certifications from the U.S. Department of Labor with visas issued by the U.S. Department of State across the entire 2020 production season, and compare season-long visa numbers to comparable values from the 2019 season. Third, we summarize recent trade flow patterns between Canada and the U.S. for fresh and processed fruits and vegetables in 2019 and 2020. Studying shipments from the farm, labour in key production regions, and trade

between the U.S. and Canada provides key information as to the fundamental robustness of the North American fruit and vegetable supply chain throughout the Covid-19 pandemic.

Aggregate Production and Shipments of Key Fruits and Vegetables

In the United States, the market for specialty crops, which consists of fruit, tree nuts, vegetables, and pulses (including potatoes), generates a yearly average value of over $40 billion (USD) (USDA-Economic Research Service, 2020). While the majority of these cash crops produced in the U.S. is consumed domestically, foreign markets, like Canada, serve as an outlet for a sizeable portion of U.S. production volumes. In addition, Canada, in particular, serves as an important source of fruits and vegetables to the U.S. market, supplying high-quality produce from its extensive greenhouse industry.

The shock to demand during the months of March and April of 2020 that diverted sales away from foodservice to food retail tested the resilience of the supply chain for perishable foods. Although most production decisions for the 2020 growing season had been made prior to the Covid-19 outbreak and ensuing stay-at-home orders, the fruit and vegetable sector was particularly vulnerable due to the perishability of most fresh produce items. Further, supply-chain relationships between upstream suppliers and downstream buyers tend to be driven by long-standing contractual agreements and replenishment systems that are efficient, yet slow to change. To the extent that virus infection rates and stay-at-home orders also interrupted harvesting schedules in the U.S. by keeping farmworkers at home, thereby shocking the supply of fruits and vegetables, shipments from Canada and other countries served as a means to absorb some of these disruptions to U.S. domestic production.

Using data collected by the Agricultural Marketing Service (AMS) of the U.S. Department of Agriculture (USDA) from January 2, 2019 to January 5, 2021, we analyze shipping volume for six commodity markets: carrots, iceberg lettuce, onions, oranges, potatoes, and strawberries. Though selective, these six commodities provide a representative cross-section of specialty crops both produced and consumed in the U.S. As with all produce, each is highly perishable, and vary according to the level of storability, labour costs associated with production and harvest, the proportion of volume allocated to food-at-home and foodservice, and the share of production sent to foreign markets. In the remainder of this section, we compare the U.S. production volumes between 2019 and 2020 for these select commodity markets, and describe Canada's role as an import supplier during this period.

Figure 1 represents the total yearly U.S. shipment volume across the six commodities listed above, as well as the penetration of shipments from Canada and other countries (including Mexico, and other countries in Europe, Africa, Latin America, Asia, and Australia). Because a portion of U.S. production is exported, we distinguish between the total volume that was produced domestically in the U.S. but exported to countries outside the U.S. Between 2019 and 2020, we note two trends. First, U.S. production of these six commodities decreased by three percent from the prior year. Total volume fell from 5.87 billion pounds (2019) to 5.71 billion pounds (2020). At the same time, shipments from abroad increased by 44%, from 470.15 million (2019) to 677.32 million pounds (2020), with Canadian shipments accounting for 28.6% of U.S. imports across these six commodities in 2020 compared with a much smaller portion (10.2%) in the prior year.

[Figure 1 here]

Next, we examine weekly movement patterns in the U.S., comparing 2019 and 2020 shipment volumes (Figure 2). As noted above, yearly U.S. production volume for the six commodities fell by three percent, yet the share of the production losses was felt most by domestic consumers. In other words, despite the week-over-week changes in U.S. production volume, U.S. shipments to countries abroad remained relatively stable, with losses only amounting to two percent of the total volume of shipments, compared to eleven percent domestically. Between March and July of 2020, U.S. exported shipments fell by nearly 50% (shipment volume peeked in March at 3.54 million pounds, and dropped to its lowest shipment volume of 1.78 million pounds by July), but appeared to recover and match the previous year's average shipments (the average monthly shipments between August and December was 3.81 million pounds per week in 2019 and 3.66 million pounds per week in 2020). Nonetheless, across all commodities, it appears that most of the production losses domestically (U.S. shipments), relative to the prior year, occurred at the end of 2020, not during the weeks immediately following the stay-at-home orders (week ten). When we examine the relative differences in production for each commodity individually, however, we find that U.S. production volumes for lettuce, oranges, and potatoes experienced total losses of -5%, -12%, and -1%, respectively.

[Figure 2 here]

To illustrate Canada's importance as a key supplier to the U.S., we isolate the case of potatoes. Within the U.S., the market for potatoes is perhaps the clearest example of the shocks to demand when the foodservice sector shutdown during the months of March and April. Figure 3 depicts the weekly movement of potatoes whose production originated in the states of Colorado and Idaho (Colorado representing a source of primarily retail potatoes, and Idaho a key

source of foodservice potatoes). By the end of March, shipment volume had reached their apex for both food retail and foodservice, at 12.41 million pounds and 21.37 million pounds, respectively. Throughout the month of April 2020 (the weeks following the stay-at-home orders), shipments of potatoes from both Colorado (representing food retail) and Idaho (representing foodservice) fell for each consecutive week. By the end of the month, the foodservice sector faced substantial losses, especially when compared to the volume of shipments from the prior year (-21% in 2020; -3% in 2019).

[Figure 3 here]

Aside from this representation of the comparative losses between foodservice and food retail within the U.S., Canada shipments into the U.S. proved to be crucial during 2020 (Figure 4). During the weeks following the stay-at-home orders, shipment volume for potatoes, for instance, from Canada into the U.S. were negatively correlated with movements of potatoes originating in the U.S. and consumed domestically. We see a spike in Canadian imports of potatoes during the month of April compared to the 2019 shipment volume. By June (week 23), shipment volume in the U.S. remained at lower capacity than 2019 shipment volume, whereas Canadian potato imports remained in much higher supply throughout the remainder of the year compared to 2019.

[Figure 4 here]

Across the six commodities, Canada's increased supply of potatoes into the U.S. appeared to be the most pronounced (Figure 5). Together, these trends in the select perishables market suggest that the COVID-19 pandemic, though short-lived, did not have catastrophic

effects on the total shipment volumes in the U.S. market, and trade partners, including Canada, helped to sustain temporary shocks to demand and supply.

[Figure 5 here]

Labour Markets in the United States

As we explained in our original article (Richards and Rickard, 2020), fruit and vegetable production in the United States and, hence, exports to Canada, is critically dependent upon access to labour. Harvesting activities for many fruits and vegetables are highly labour intensive, approaching 50% of operating costs for some crops like lettuce and fresh tomatoes (USDA 2007). Therefore, as stories spread of meat-packing plant shutdowns in the midwestern U.S. in April of 2020 (Restuccia 2020), and consequent shortages of some meats, there was a well-justified fear that the fresh fruit and vegetable production season in the Southern U.S. would be similarly interrupted. In fact, there were many anecdotal reports of localized outbreaks in heavy production areas such as California and Florida (Rosenberg, Cooke, and Walljasper 2020) as well as in more local production areas, at least for some Canadians, in Southern Ontario. Fears of COVID-19-caused labour issues arose during a period of generalized confusion, and a lack of either consensus or understanding as to the appropriate policy response.

Even without the COVID-19 pandemic, farmers in the fruit and vegetable industry have had an increasingly difficult time finding workers. Not only are domestic workers less willing to do the types of jobs that are necessary (Richards 2018), but growing economic opportunities in Mexico, an increasing unwillingness to migrate from state to state in search of agricultural jobs (Fan, et al 2015), and an aging-out of the more experienced guest workers all combine to limit growers' access to not only the number of workers, but the types of skills necessary for the jobs

that have to be completed. The supply of labour in agricultural guest worker programs, such as the H-2A non-immigrant worker program, has been exploding in recent years due to the shortage of both domestic and foreign workers, but employers still complain about the paperwork and expense associated with the certification process, the inflexibility of wage-rates under H-2A, the need to maintain employment for entire seasons, and other expenses associated with hiring H-2A workers. Regardless of industry concerns with the H-2A program, requests for H-2A employees have more than doubled in the last 5 years, and growers maintain that they could absorb many more if the program were sufficiently flexible (Figure 6). But, whether the H-2A program could continue to function during the COVID-19 pandemic was only one of many labour-issues fruit and vegetable growers faced during the 2020 growing season.

As 2020 wore on, many issues emerged that threatened the viability of the agricultural labour pool in the fruit and vegetable production region of the U.S. First, the federal government stopped conducting interviews for guest worker visas (H-1B and H-2A visas) at foreign consulates, which is a necessary step in obtaining non-immigrant farm workers, in March 2020. These regulations were relaxed only after considerable industry lobbying (Beatty, et al. 2020; Farnsworth 2020). Second, as the disease spread among undocumented workers, many were either unable to access medical services, or were isolated from their own support systems out of a sense of protecting others around them (Martin 2020). Third, as in the well-documented case of slaughter-house workers in the Midwest U.S. (Taylor, Boulos, and Almond 2020), COVID-19 cases spread quickly among workers living in group housing facilities in Southern California (Fielding-Miller, et al. 2020; Neef 2020; Charlton and Castillo 2020; Beatty, et al. 2020). Although fruit and vegetable work generally takes place outside, exposures can occur in housing, transport, mealtime, and in transition between the field and packing plant. Fourth, higher rates of

unemployment compensation authorized through the CARES Act also represent a substantial negative effect on newly-unemployed workers' willingness to move into agriculture. Beatty, et al. (2020) point out that unemployment benefits in California, including both the $350 per week for their example construction worker, plus the $600 per week authorized by the CARES Act, is far above the average weekly earnings for an agricultural worker of $500 so there is literally no incentive for an unemployed worker to take an inherently-difficult farm job. Whether these issues had a material impact, however, is an empirical question.

As COVID-19 emerged as a global problem in early 2020, concerns regarding access to labour spread to concerns regarding the viability of the H-2A program, and growers' abilities to ensure the safety of workers brought in under the program. Due to the reliance of fruit and vegetable growers on harvesting labour, and the lack of viable substitutes, there were concerns that without H-2A workers the entire production season would be lost. However, the data presented above, showing that shipments returned to near-normal after an adjustment period of perhaps 4 - 6 weeks, depending on the crop, suggests that these fears were perhaps unfounded. In fact, data gathered for the entire fruit and vegetable crop year (Figure 6) shows that growers were able to certify, and obtain visas for, more workers than they hired during the same period in 2019. In fact, the rate of growth in certifications from 2019 - 2020 (4.2%) was nearly identical the growth rate in the previous period (2019 - 2018, 4.3%). If the U.S. fruit and vegetable sector is indeed as reliant on H-2A workers as the literature suggests (Charlton and Castillo 2020), our data shows that guest-worker employment in the fruit and vegetable sector does not appear to have been constrained by the COVID-19 pandemic.

[Figure 6 in here]

While a deeper dive into the certification data does not change the COVID-19 story, it does suggest some nuance that may be of interest for more detailed research. Namely, the number of workers certified to work for farm labour contractors (FLCs) accounted for nearly 20% of all certifications in 2020. FLCs represent a more flexible form of hiring for many growers as the FLC takes care of the recruitment, certification, safety-assurance, and the other "fixed" costs of hiring seasonal and contract labour. In fact, in recent years FLCs have grown to represent the bulk of immigrant-hiring activity in California. FLCs are able to overcome one of the key burdens to hiring H-2A labour, namely the bureaucratic tangle necessary to file the paperwork (which is literally "paper" work as there was no electronic certification process in 2020) and to provide adequate assurances that all safety requirements are met. Data from USDL (2021) show quarterly trends in "crop support" labour, the classification that includes FLC hiring, and they show a dramatically different story from that in Figure 6. Namely, the growth in crop support labour, which accounts for nearly half of all labour in fruit and vegetable crops, appears to have been on a negative trend even prior to COVID-19, but then accelerated as the pandemic began.

Why would crop support labour decline so rapidly as COVID-19 advanced in California, and is the mechanism behind this decline important to absolute levels of production? While a complete answer will likely not be forthcoming until the pandemic is over, we can speculate that direct hires for production activities were a priority for employers over hires for secondary roles. What matters more to overall production is the total of support and production activities. Figure 7 shows that the total number of employees in 2020 continued a regular pattern from past years. The fact that the total number of employees shown in this figure is so close to prior years, even

with increased use of mechanized harvesting (Beatty, et al. 2020), explains why total shipments for most fruit and vegetable crops was relatively stable from 2019 to 2020.[1]

[Figure 7 in here]

North American Trade in Fruits and Vegetables

In our earlier article (Richards and Rickard, 2020), we highlighted the importance of imports of fruits and vegetables coming into Canada each year. Canada imports seven times the amount of fruits and vegetables that it produces annually (Statista 2020), and this means that there was the possibility that Canada would not be well insulated to adjust to substantial changes in trade patterns for fruits and vegetables (changes due to border restrictions and cross-border movement of goods, or changes in prices for imported products that might face higher costs of production due to COVID-19). The United States is the largest exporter of fruits and vegetables to Canada, and in 2019 Canada imported over 8.24 billion USD in fruits and vegetables from the United States (U.S. Census Bureau, 2021). Any loss in access to U.S. imports would also clearly affect the variety of fresh produce items available to Canadian consumers. As the pandemic began to unfold in March 2020, it seemed likely that U.S.-Canadian trade flows of the fruits and vegetables destined for food service markets would fall given the major reductions in sales of food consumed away from home in both countries in 2020.

Recent data describing the trade flows for fruits and vegetables between Canada and the United States suggest that patterns in 2020 were not substantially different from 2019. Figure 8 shows the monthly U.S. exports of all fruits, vegetables, and nuts to Canada. The values shown in Figure 8 and 9 include trade in fresh vegetable products (Harmonized Tariff Schedule (HTS)

[1] Note that our findings are opposite those of Ridley and Devadoss (2020), who conduct a preliminary econometric analysis of the likely impact of hypothetical labour-market scenarios on U.S. fruit and vegetable production.

code 07), fresh fruit and nut products (HTS code 08), and processed fruits, vegetables, and nuts (HTS code 20). Here we see that total exports in 2020 were approximately 8.19 billion USD which is a decrease of about 50 million USD compared to 2019 (or a decrease of less than 1%). There is a noticeable drop in U.S. exports to Canada immediately following the start of the pandemic; total exports across all fruits, vegetables and nuts (fresh and processed) in the months of May and April 2020 were down 8.0% compared to the same time period in 2019. However, this appeared to be a short-term adjustment and U.S. exports patterns to Canada returned to trends observed in 2019 beginning in July 2020.

[Figure 8 in here]

Figure 9 shows the monthly U.S. imports of fruits and vegetables from Canada in 2019 and 2020. These data show that the total flow of fruits and vegetables and nuts (fresh and processed) from Canada into the United States increased in 2020 relative to 2019 (by approximately 390 million USD), and that there was no short-term drop in total U.S. imports of fruits and vegetables from Canada in the months immediately following the outbreak (i.e., during May and April 2020). A closer look at more disaggregated data reveals that Canadian exports of fresh fruits and vegetables increased in the months of April and May in 2020 relative to 2019, but exports of processed fruits and vegetables fell during the same time period.

[Figure 9 in here]

In addition to the aggregate trade flows, we also provide details on trade patterns between Canada and the United States for specific processed fruit and vegetable categories. Following the nine sub-categories of processed fruits and vegetables (as defined by the 4-digit HTS codes), we show changes in Canadian imports from the United States and the Canadian exports to the

United States in 2019 and in 2020 (for the months of May and April). We highlight the changes for processed fruits and vegetables because this is the sub-group of products that experienced the largest percentage decline in Canadian imports from the United States, and the only sub-group of products that experienced a decline in Canadian exports to the United States in the months of May and April in 2020 relative to 2020. Table 1 shows that there was a decline in trade flows in 2020 relative to 2019 in most of the sub-categories, although the magnitude of the changes was not uniform across the categories. The category with the largest decline (in value and in percentage change) for Canadian imports was preserved vegetables (followed by frozen vegetables); whereas for Canadian exports it was frozen vegetables. In addition, Table 1 shows that there were modest increases in Canadian exports for many sub-categories of processed fruits and vegetables in the May and April timeframe in 2020 compared to 2019.

[Table 1 in here]

Overall, the trade data presented here indicates that COVID-19 did dampen total trade flows of fruits and vegetables from the United States to Canada for approximately a three-month period following the initial outbreak. Although the aggregate data do not show a similar decline in total traded fruits and vegetables from Canada to the United States, there was a short-term decline in processed (frozen) vegetable exports to the United States immediately following the outbreak of COVID-19. These adjustments were non-trivial, but they were closer to the lower end of the range of effects that we suggested in our earlier article. This result is likely due to a mix of market reactions, but largely linked to a relatively robust production system and supply chains in both Canada and the United States. It is also due, in part, to the limited disruption observed in the U.S. labour market during the months following the outbreak of COVID-19. Given that the change in the U.S. labour supply was not as pronounced as some had predicted,

the total supply of fruits and vegetables, and the total exported quantity to Canada, was very similar in 2020 as it was in 2019. We expect that the reduction in U.S. exports of fruits and vegetables to Canada in May and April of 2020 was due to lower foodservice demand in Canada and some diversion of available U.S. supplies to U.S. food retailers.

Discussion

In general, our analysis reveals a surprising level of resilience in the North American supply chain for fresh fruits and vegetables. While producers, and exporters, were somewhat slow to adjust to the shift to a near-total retail market for fresh foods, production, shipments, and exports returned to near-normal levels after a relatively short period of time (6 – 8 weeks). We also show that the number of agricultural workers hired by U.S. farmers changed very little in 2020 compared to 2019, suggesting that production capacity was surprisingly robust to the spread of the pandemic. From our previous perspective of April 2020, we expected that access-to-labor issues in key production areas in the U.S. would have dramatic effects on production levels and, given the strength of retail demand for fresh food within the U.S. domestic market, we expected trade flows to be significantly impacted. However, the trade data show that trade flows were reduced in May and April of 2020, but that they returned to normal patterns by June 2020.

References

Beatty, T., Hill, A., Martin, P., & Rutledge, Z. (2020). COVID-19 and farm workers: challenges facing California agriculture. ARE Update, 23(5), 2-4.

California Farm Bureau Federation. (2020). Survey shows strains on rural California. (https://www.cfbf.com/wp-content/uploads/2020/05/2020-Coronavirus-farmer-survey-report.pdf). Accessed February 9, 2021.

Charlton, D., & Castillo, M. (2020). Potential Impacts of a Pandemic on the US Farm Labour Market. Applied Economic Perspectives and Policy, 43(1), 39-57.

Escalante, C. L., Luo, T., & Taylor, C. E. (2020). The availability of H-2A Guest Farm Workers during the COVID-19 Pandemic. Choices, 35(3).

Fan, M., Gabbard, S., Alves Pena, A., & Perloff, J. M. (2015). Why do fewer agricultural workers migrate now? American Journal of Agricultural Economics, 97(3), 665-679.

Farnsworth, D. (2020). US Covid-19 Policy affecting agricultural labour. Choices, 35(3), 1-6.

Fielding-Miller, R. K., Sundaram, M. E., & Brouwer, K. (2020). Social determinants of COVID-19 mortality at the county level. PloS One, 15(10), e0240151.

Flocks, J. (2020). The potential impact of COVID-19 on H-2A agricultural workers. Journal of Agromedicine, 25(4), 1-3.

Martin, P. (2020). COVID-19 and California farm labour. California Agriculture, 74(2), 67-68.

Neef, A. (2020). Legal and social protection for migrant farm workers: lessons from COVID-19. Agriculture and Human Values, 37, 641-642.

Restuccia, A. (2020). Trump takes executive action to keep meat-processing plants open. (https://www.wsj.com/articles/11588099443). Accessed February 10, 2021.

Richards, T.J., and B.J. Rickard. 2020. COVID-19 impact on fruit and vegetable markets. *Canadian Journal of Agricultural Economics/Revue Canadienne d'Agroéconomie* 68(2): 189–194.

Ridley, W., & Devadoss, S. (2020). The Effects of COVID-19 on Fruit and Vegetable Production. Applied Economic Perspectives and Policy, 43(1), 329-340.

Rosenberg, M., Cooke, K. & Walljasper, C. (2020). Coronavirus spreads among fruit and vegetable packers, worrying U.S. officials. (https://www.reuters.com /article/us-health-coronavirus-usa-farmworkers/). Accessed February 10, 2021.

Taylor, C. A., Boulos, C., & Almond, D. (2020). Livestock plants and COVID-19 transmission. Proceedings of the National Academy of Sciences, 117(50), 31706-31715.

U.S. Census Bureau (2021). USA Trade® Online, Available at: https://usatrade.census.gov/index.php Accessed on February 15, 2021.

USDA, Agricultural Marketing Service. USDA Farmers to Families Food Box. (https://www.ams.usda.gov/selling-food-to-usda/farmers-to-families-food-box). Accessed February 9, 2021.

USDA, Economic Research Service. Fruit and Tree Nuts Outlook: September. (https://www.ers.usda.gov/publications/pub-details/?pubid=99457). Accessed February 25, 2021.

USDA, Economic Research Service. Vegetables and Pulses Outlook: Report. (https://usda.library.cornell.edu/concern/publications/cj82k729x?locale=en). Accessed February 25, 2021.

U.S. Department of Labor (2021). Performance Data. https://www.dol.gov/agencies/eta/foreign-labor/performance. Accessed Feb. 17, 2021

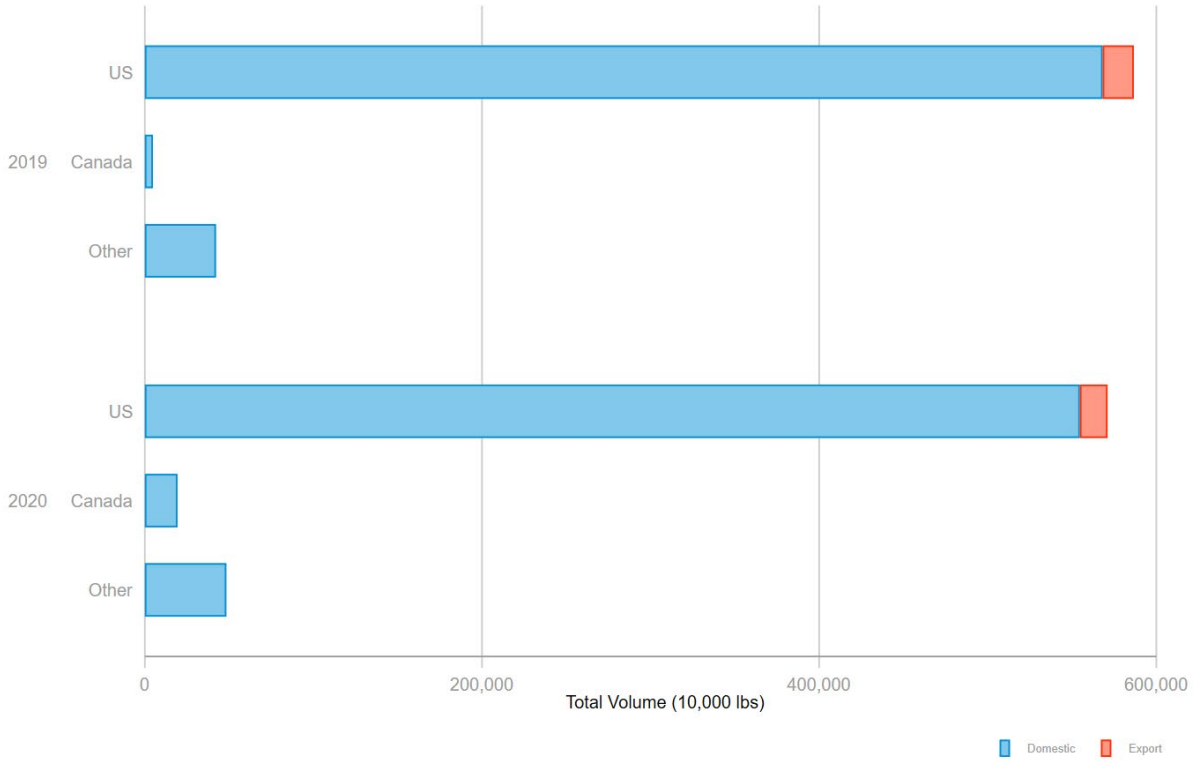

Figure 1. Total Shipment Volume by Origin, Domestic vs. Exported

Source: USDA-AMS Market News Service

Note: U.S. production volume includes the portion of produce that was consumed domestically or exported; Canadian and other volume is the amount that was imported and consumed in the U.S.; Commodities: Carrots, Iceberg Lettuce, Onions, Oranges, Potatoes, Strawberries; Conventional and organic varieties

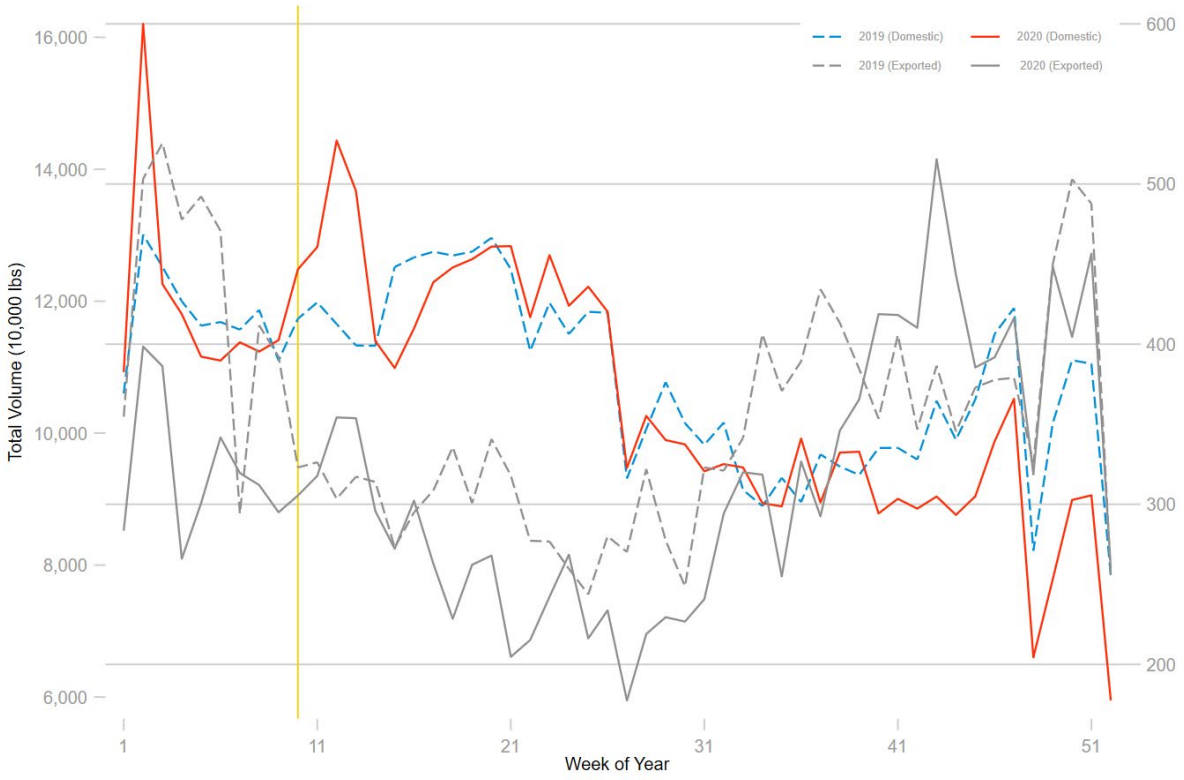

Figure 2. Total Shipment Volume, U.S. Origin, Weekly Movement

Source: USDA-AMS Market News Service

Note: Total volume is separated by what was produced domestically in the U.S. and remained in the U.S. (domestic, left-axis) and what was produced domestically but exported (exported, right-axis); Commodities: Carrots, Iceberg Lettuce, Onions, Oranges, Potatoes, Strawberries; Conventional and organic varieties; Vertical line represents week 10 of the calendar year.

Figure 3. Movement: Potatoes - Retail (Colorado) vs. Foodservice (Idaho)

Source: USDA-AMS Market News Service

Note: U.S. production of potatoes (conventional and organic varieties) consumed domestically, excludes what was produced domestically and exported; Vertical line represents week 10 of the calendar year.

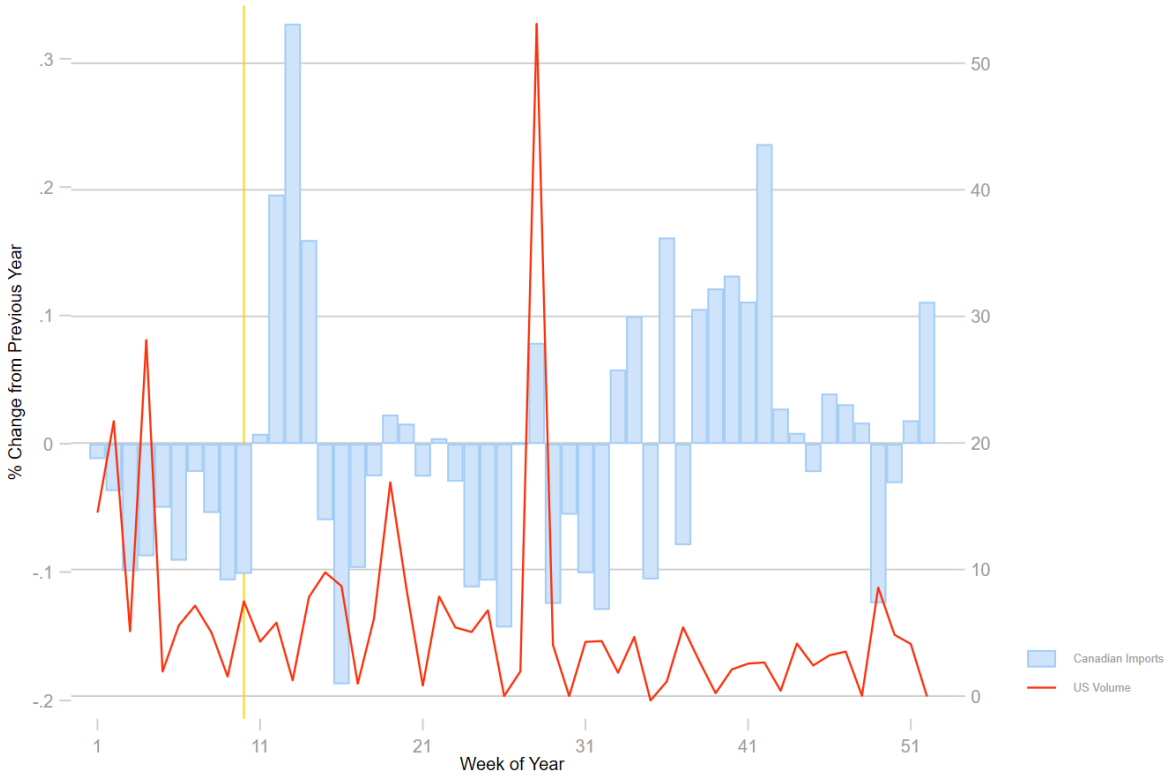

Figure 4. Movement: Potatoes, U.S. Origin

Source: USDA-AMS Market News Service

Note: Line graph depicts the percentage change in the movement of U.S. potatoes (conventional and organic varieties) consumed domestically between 2019 and 2020 (right-axis); Bar chart depicts the percentage change in the total volume of Canadian imports during the same period (left-axis); Vertical line represents week 10 of the calendar year.

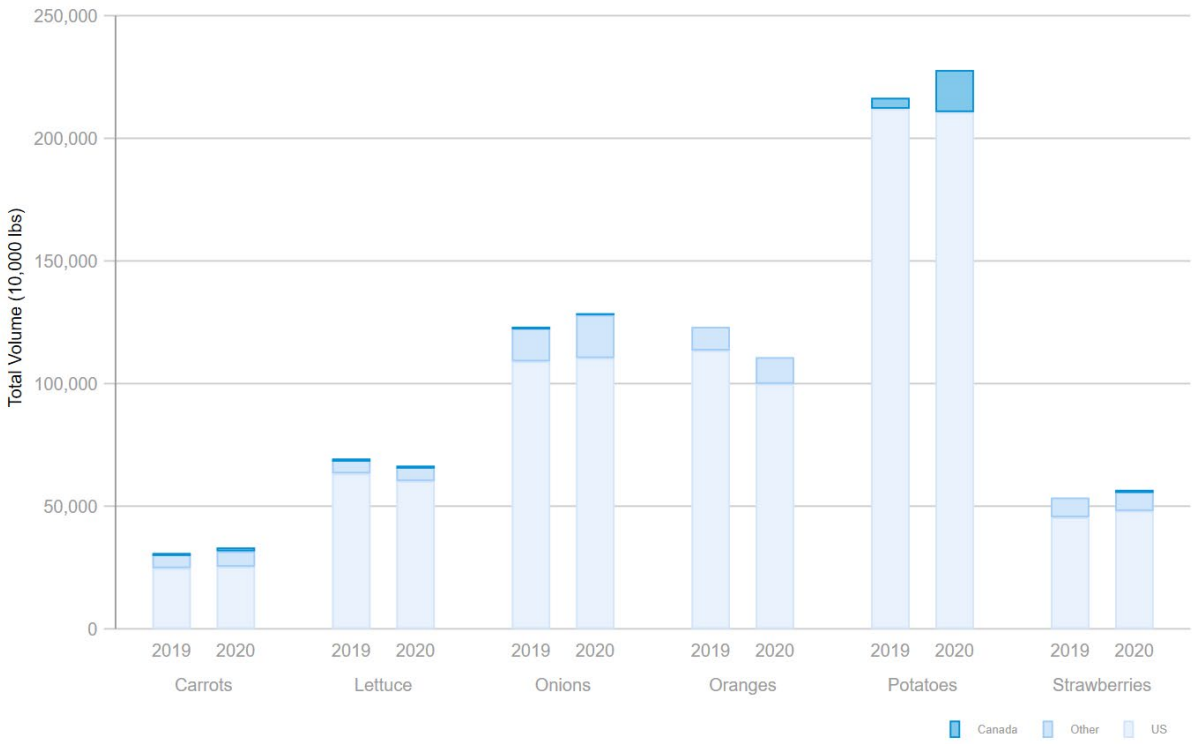

Figure 5. Total Shipment Volume by Origin, by Commodity

Source: USDA-AMS Market News Service

Note: U.S. volume excludes what was produced domestically but exported; Canadian and other imports reflect what was shipped into the U.S. and consumed domestically; Conventional and organic varieties.

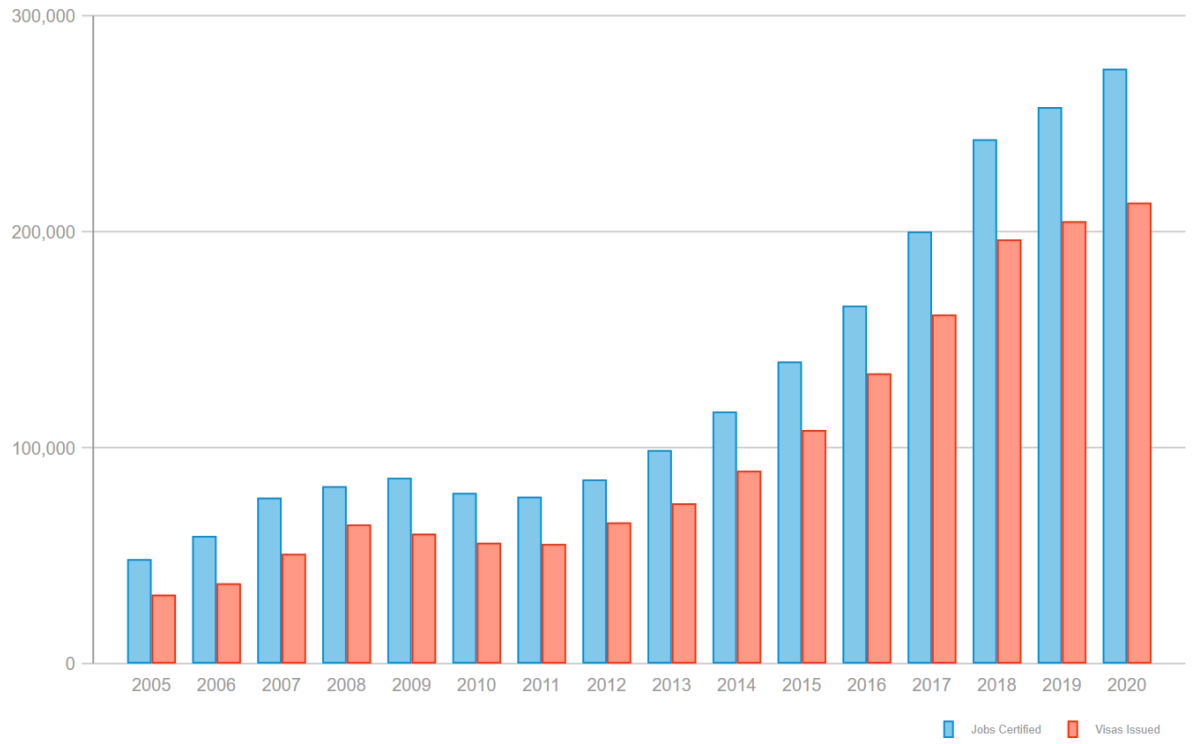

Figure 6. H-2A Jobs Certified and Visas Issued

Source: Dept. of Labour OFLC, and Dept. of State

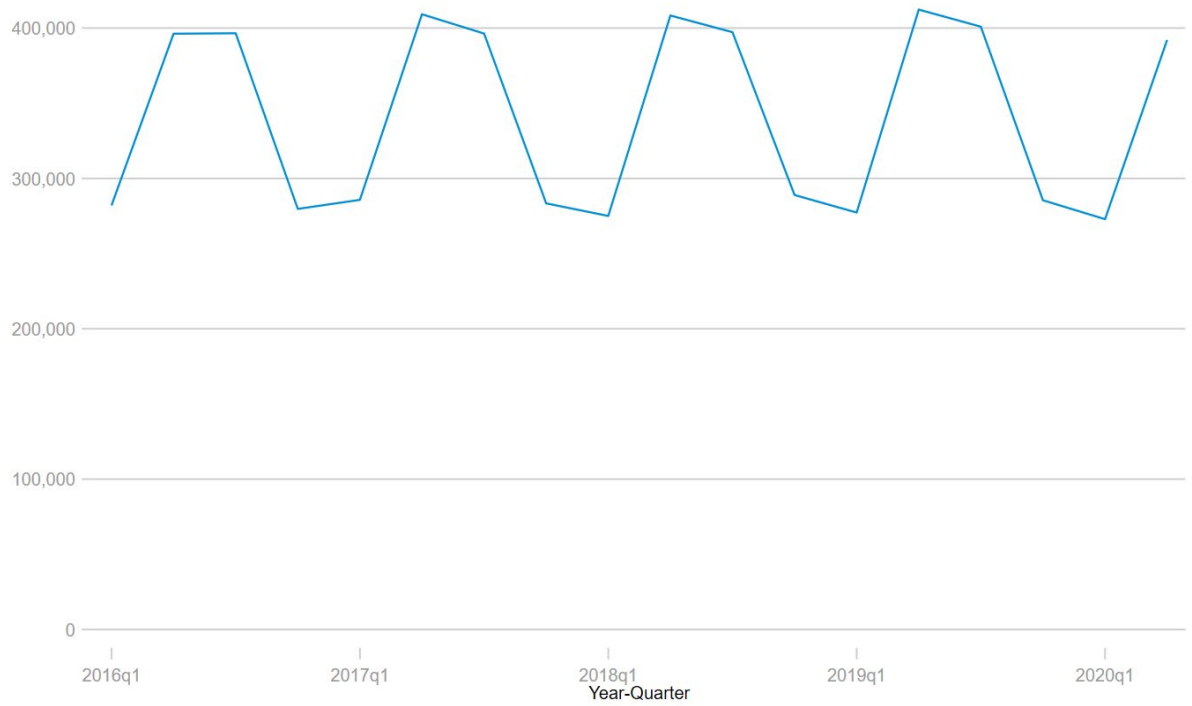

Figure 7. California Total Agricultural Employment in the Fruit and Vegetable Industry

Source: U.S. Dept. of Labor, QCEW, NAICS 1112, 1113, 1151

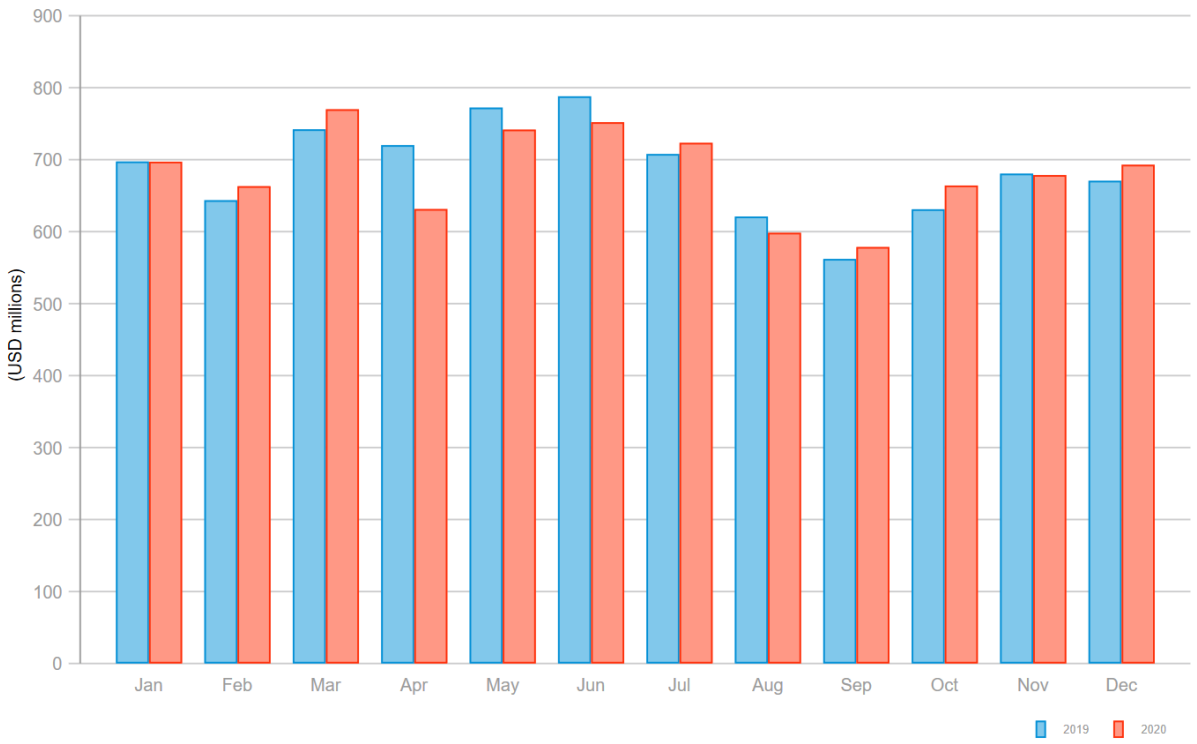

Figure 8. Monthly U.S. Exports to Canada in 2019 and 2020: Fresh and processed fruits, vegetables, and nuts (USD millions)

Source: U.S. Census Bureau, USA Trade® Online, Available at: https://usatrade.census.gov/index.php

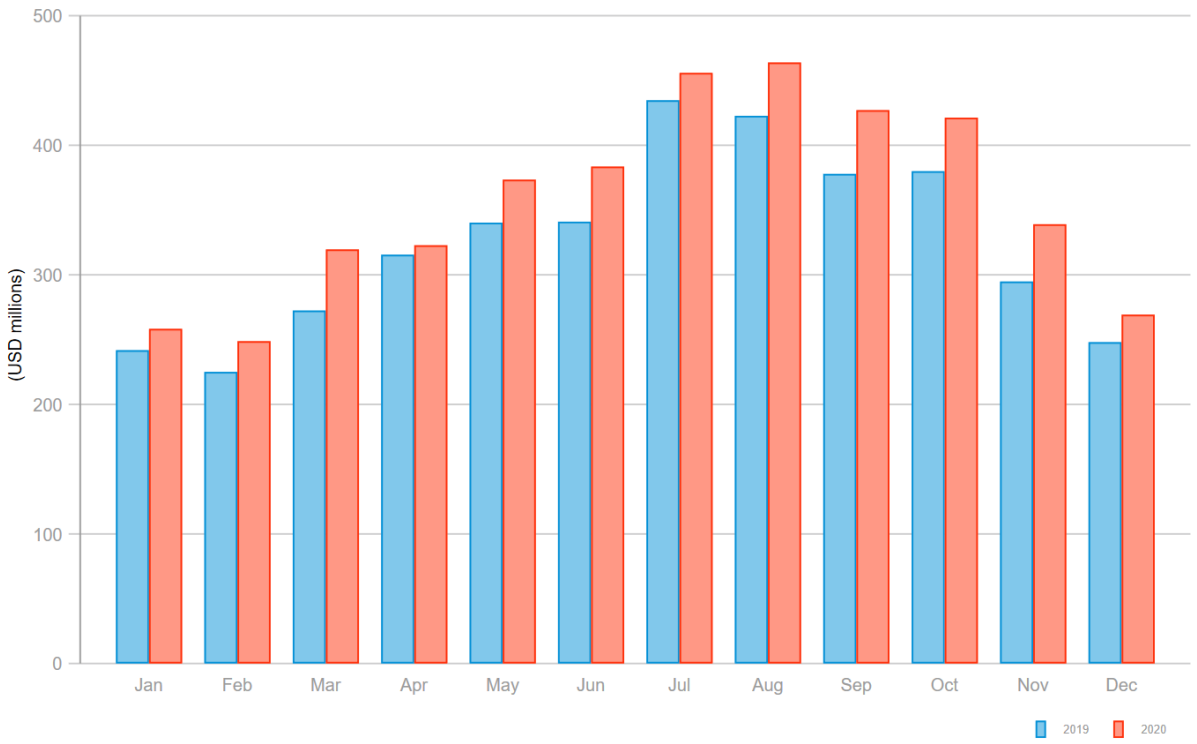

Figure 9. Monthly U.S. imports from Canada in 2019 and 2020: Fresh and processed fruits, vegetables, and nuts (USD millions)

Source: U.S. Census Bureau, USA Trade® Online, Available at: https://usatrade.census.gov/index.php

Table 1. Canada-U.S. Trade in Processed Fruits, Vegetables, and Nuts: Comparison of May and April 2019 and 2020.

		U.S. Exports to Canada May & April (USD millions)			*U.S. Imports from Canada May & April (USD millions)*		
HTS code	*Category Description* [a]	*2019*	*2020*	*% Change*	*2019*	*2020*	*% Change*
20	All Processed Fruit, Vegetables, Nuts (F&V&N)	298.5	254.3	-14.8%	269.5	250.3	-7.1%
2001	Preserved Vegetables	18.3	4.7	-74.4%	1.8	2.0	11.5%
2002	Prepared Tomatoes	11.9	11.1	-6.3%	1.1	0.6	-47.8%
2003	Prepared Mushrooms	0.2	0.1	-60.6%	0.3	0.3	-12.0%
2004	Frozen Vegetables	22.1	11.5	-47.7%	159.7	130.6	-18.2%
2005	Other Processed Vegetables	41.3	37.6	-9.1%	27.2	30.5	12.1%
2006	Processed F&V&N with sugar	0.5	0.3	-35.4%	0.0	0.0	-74.3%
2007	Jams and Jellies	11.5	15.1	32.0%	7.5	9.6	27.3%
2008	Other Processed Fruits and Nuts	113.6	103.1	-9.2%	64.0	66.7	4.2%
2009	Fruit Juice	79.2	70.7	-10.8%	7.9	10.1	27.8%

Source: U.S. Census Bureau, USA Trade® Online, Available at: https://usatrade.census.gov/index.php

[a] The complete HTS descriptions are as follows. 20: Preparations of vegetables, fruit, nuts or other parts of plants, 2001: Vegetables, fruit, nuts and other edible parts of plants, prepared or preserved by vinegar or acetic acid, 2002: Tomatoes prepared or preserved otherwise than by vinegar or acetic acid, 2003:Mushrooms and truffles, prepared or preserved otherwise than by vinegar or acetic acid, 2004: Other vegetables prepared or preserved otherwise than by vinegar or acetic acid, frozen, other than products of heading 2006, 2005: Other vegetables prepared or preserved otherwise than by vinegar or acetic acid, not frozen, other than products of heading 2006, 2006: Vegetables, fruit, nuts, fruit-peel and other parts of plants preserved by sugar (drained, glacé or crystallized), 2007: Jams, fruit jellies, marmalades, fruit or nut pureé and fruit or nut pastes, obtained by cooking, whether or not containing added sugar or other sweetening matter, 2008: Fruit, nuts and other edible parts of plants, otherwise prepared or preserved, whether or not containing added sugar or other sweetening matter or spirit, not elsewhere specified or included, 2009: Fruit juices (including grape must) and vegetable juices, not fortified with vitamins or minerals, unfermented and not containing added spirit, whether or not containing added sugar or other sweetening matter