

2022

California Pesticide Residue Monitoring Program



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The 2022 California Pesticide Residue Monitoring Program Report

The Department of Pesticide Regulation's (DPR) California Pesticide Residue Monitoring Program (CPRMP) samples domestically grown and imported fresh produce at sites where produce is packed, sold, or distributed and analyzes them for pesticide residues.

CPRMP is directed towards enforcement of United States Environmental Protection Agency (U.S. EPA) tolerances to meet the goal of preventing "public exposure to illegal pesticide residues" (California Food and Agricultural Code [FAC] 12532). DPR focuses on the following high-risk commodities:

- Produce highly consumed by infants and children.
- Produce treated with pesticides listed under Proposition 65 as carcinogens or reproductive toxins.
- Produce reflective of consumption patterns among different ethnic and socioeconomic groups.
- Produce which has a history of detected illegal pesticide residues.
- Produce originating from countries with a history of detected illegal pesticide residues.

Produce sampling data is not statistically representative of the residues expected for a particular pesticide, commodity, or place of origin. As a result of collecting samples based on the factors noted above, results are biased towards finding commodities more likely to have pesticide residues than if commodities were randomly sampled.

A tolerance is the maximum residue level of a specific pesticide allowed on human or animal food. U.S. EPA establishes pesticide tolerance levels based on the following:

- pesticide toxicity,
- how much the pesticide is applied,
- how often the pesticide is applied, and
- how much of the pesticide remains in or on the commodity.

The Code of Federal Regulations, Title 40, Part 180, lists tolerances and dictates how to analyze raw agricultural commodities for pesticide residue testing. As the lead agency, DPR has the authority to levy civil penalties against anyone who packs, ships, or sells produce with illegal pesticide residues (FAC 12671).

DPR contracts with the California Department of Food and Agriculture's (CDFA) Center for Analytical Chemistry to analyze samples. Their International Organization for Standardization ISO/IEC 17025 accredited laboratories analyze samples for over 500 different pesticides and pesticide breakdown products. ISO/IEC 17025 accreditation is the standard for testing and calibration laboratories worldwide.

If illegal residues are found, DPR immediately removes the illegal produce from the channels of trade. In addition, if the owner of the commodity has additional produce from the same source, DPR quarantines those lots until subsequent laboratory testing determines they are free from illegal residues. Further, DPR traces the distribution of the illegal produce by contacting distributors and vendors throughout California, imposing quarantines, and conducting additional sampling and testing.

2022 Pesticide Residue Monitoring Sampling Results

In 2022, CPRMP staff collected 3,281 produce samples from approximately 500 different businesses throughout California (Figure 1). Businesses include wholesale and retail outlets, terminal markets, distribution centers, and roadside and farmers markets.

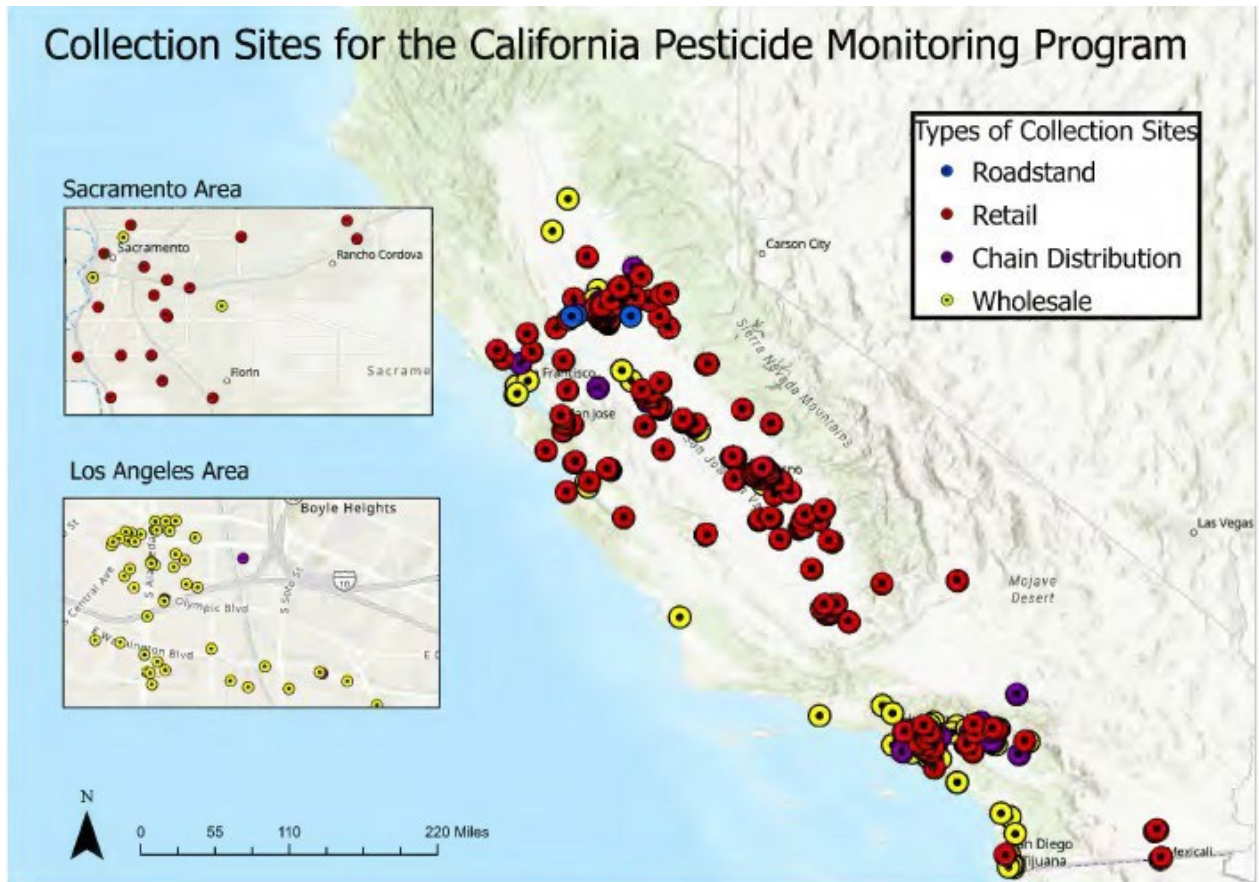


Figure 1. Map of Sampling Sites.

Ninety-seven percent of the produce samples collected by DPR had either no detectable pesticide residues or legal residue levels below the applicable U.S. EPA tolerance (Figure 2).

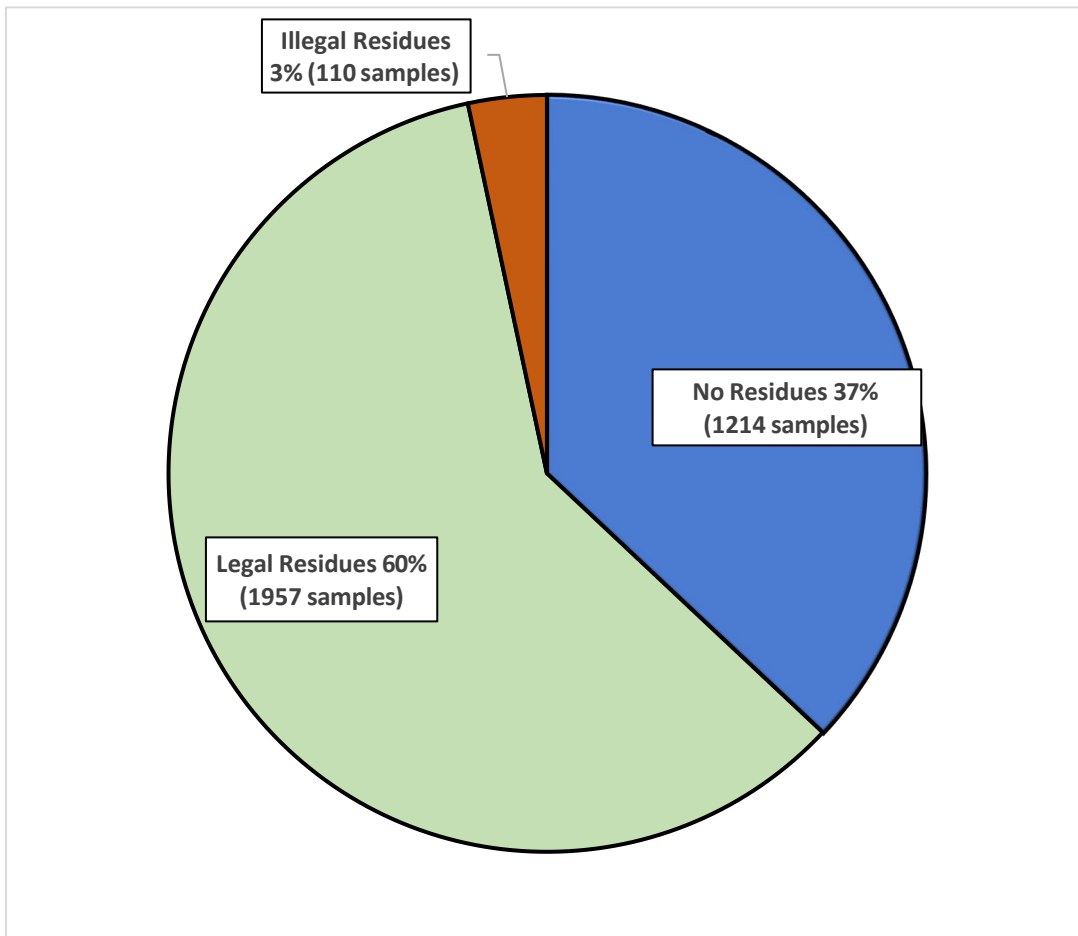


Figure 2. Percentage of produce samples with no residues, legal residues, or illegal residues detected in 2022.

Illegal pesticide residues were found on 110 samples (3% of total samples collected, see Appendix 1 for the table of all illegal samples). Of the 110 illegal samples, 78 samples contained residues that had no tolerance established (NTE), while 41 of the 110 illegal samples had residues over the established tolerance (OT). The total number of OT and NTE residues exceeds the total number of samples with illegal residues, as some samples contain multiple illegal residues.

Country of Origin

DPR collected 1,902 domestically grown produce samples (58%) and 1,349 (41%) imported produce samples (Figure 3). The remaining 30 samples (1%) were of undetermined origin due to a lack of information on the containers. See Table 1 for the list and count of samples.

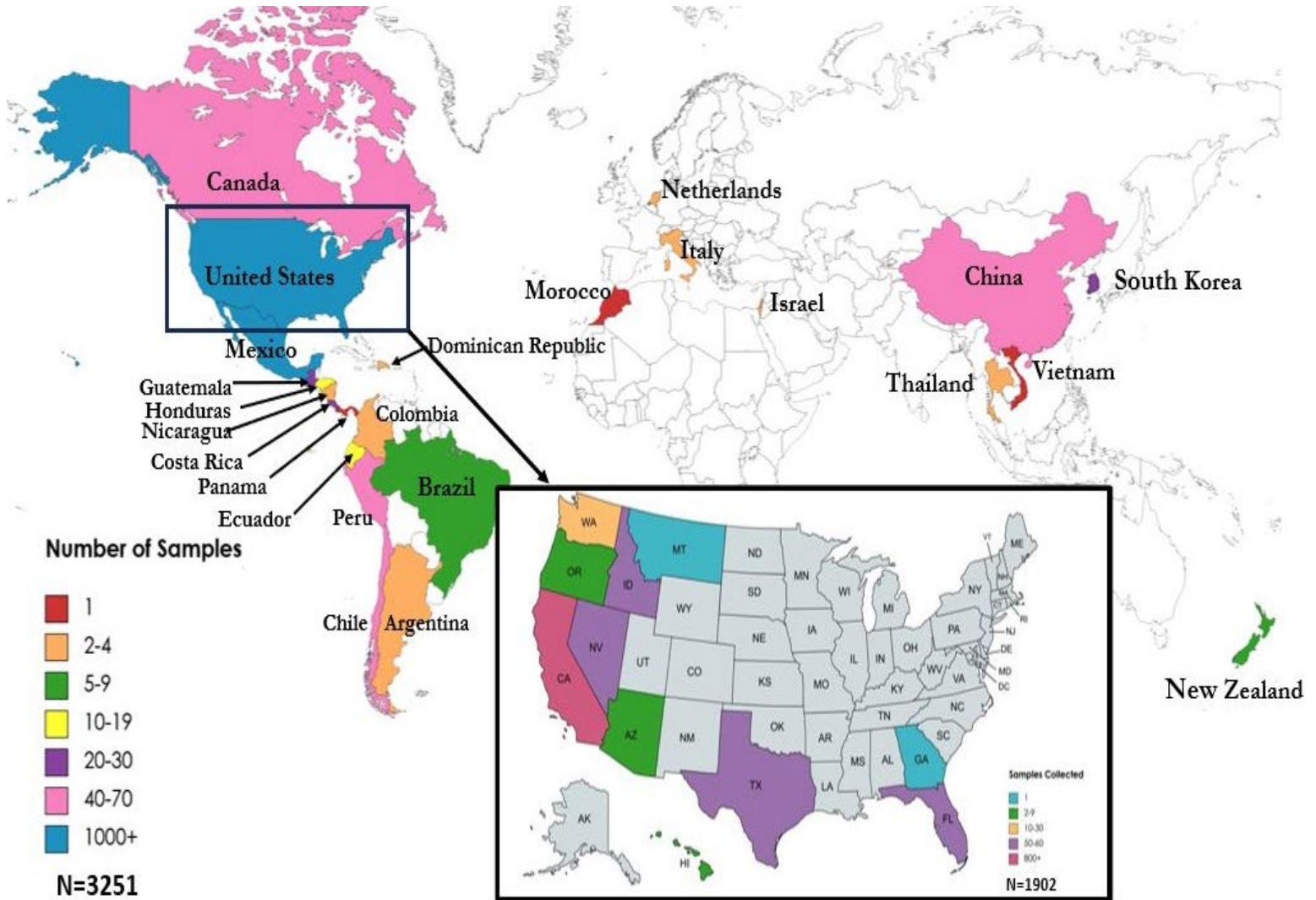


Figure 3. Map of Origins of Produce Sampled in 2022.

Table 1. Number of produce samples collected in 2022 by country or state of origin.

Country or State of Origin	Total Collected
Argentina	4
Brazil	3
Canada	56
Chile	64
China - mainland	46
Colombia	2
Costa Rica	17
Dominican Republic	3
Ecuador	12
Guatemala	22
Honduras	14
Israel	3
Italy	2
Korea	21
Mexico	1012
Morocco	1
Netherlands	2
New Zealand	8
Nicaragua	2
Panama	1
Peru	50
Thailand	3
Vietnam	1
US, Arizona	15
US, California	801
US, Florida	4
US, Georgia	1
US, Hawaii	15
US, Idaho	7
US, Montana	1
US, Nevada	4
US, Oregon	21
US, Texas	7
US, Washington	57
United States	969

*State not specified

Most illegal residues were found on imported produce and accounted for 82% (90 of the 110) of illegal residue samples (Figure 4). The violation rate for imported produce samples (6.7%) is six times higher than domestic samples (1.1%). Illegal residues were found on commodities originating from nine different countries (Table 2).

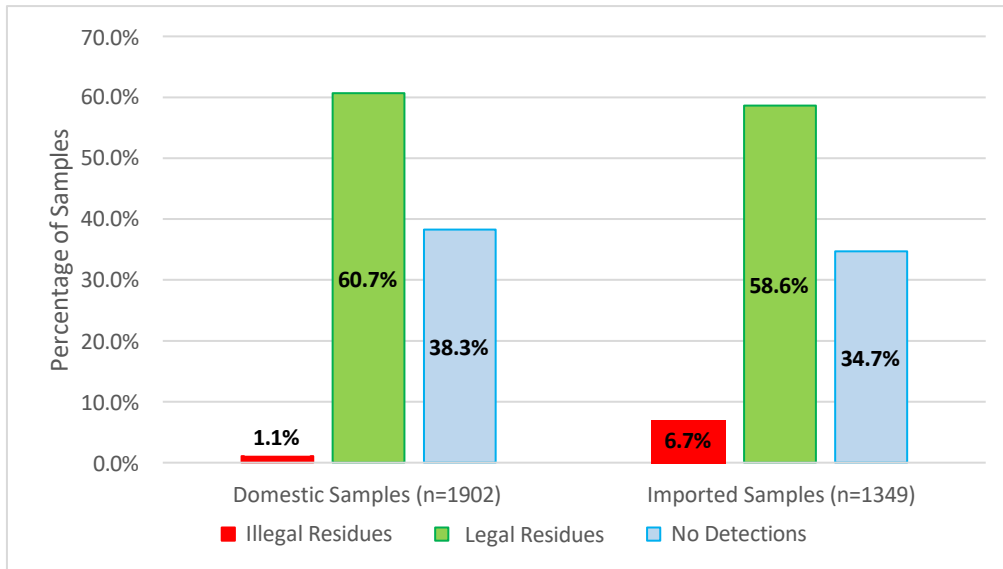


Figure 4. Sample result comparison between domestic and imported produce samples.

Over the past decade, the rate of violations for illegal residues has remained steady, with imported produce having the highest percentage of violations (Figure 5).

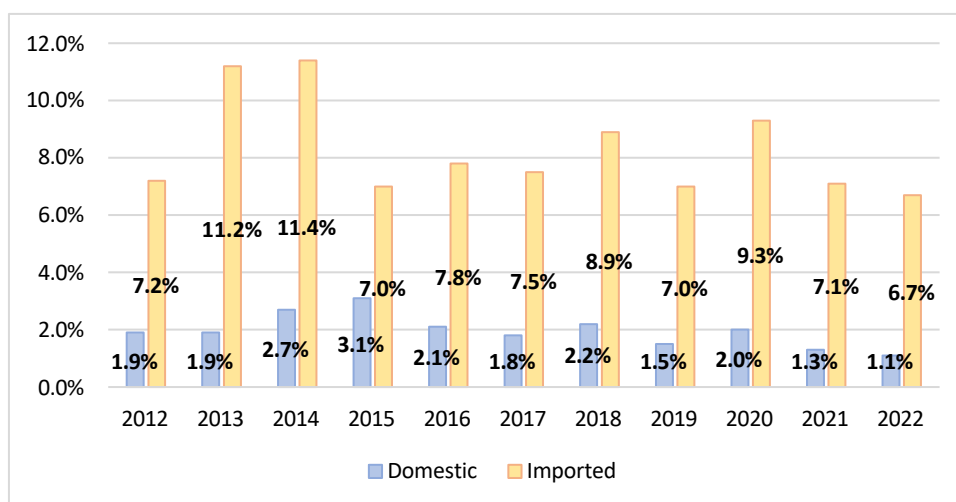


Figure 5. Summary of rates of illegal residues on domestic and imported samples, 2012-2022.

Table 2. Number of and percent illegal of produce samples collected in 2022 by country of origin.

Country of Origin	Number Illegal	Total Collected	Percent Illegal
Brazil	1	3	--
China	6	46	13%
Costa Rica	1	17	6%
Ecuador	2	12	17%
Guatemala	3	22	14%
Honduras	1	14	7%
Mexico	75	1012	7%
Peru	1	50	2%
United States	20	1902	1%

percentages not calculated for samples sizes <10.

In 2022, DPR tested 127 different types of fresh fruits and vegetables. Out of these, illegal residues were detected on 49 different commodities, Table 3. Apart from the targeted commodities, DPR staff also collect samples based on seasonal and availability factors. The complete list of all commodities can be found in Appendix 2.

Table 3. Commodity list of samples with illegal pesticide residues.

Commodity	Number of Illegal Samples
Arugula	1
Asparagus	1
Banana	2
Basil	1
Beans (Green, Snap, String)	4
Beans, Asparagus	5
Beet, Tops	1
Bitter Melon	2
Blackberry	12
Blueberry	1
Bok Choy	1
Broccoli	1
Cactus Pads	2
Cactus Pear	1
Chayote	3
Chinese Radish/Daikon	1
Chive	1
Cilantro	2
Collards	2

Cucumber (All)	3
Dragonfruit	2
Ginger Root	1
Guaje, Legume	1
Honeydew	1
Jackfruit	1
Lime (Mexican, Persian)	9
Malabar Spinach	1
Mango	2
Marjoram (Oregano)	1
Mushrooms	1
Okra (Gumbo)	1
Onion (Dry)	1
Onions (Green)	1
Papaya	4
Pear, Asian	4
Peas, Sugar Snap	1
Peppers (Bell, Non-Chili)	3
Peppers (Chili Type)	7
Raspberry	1
Romano Bean	2
Spinach	4
Squash (Winter)	1
Strawberry	4
Swiss Chard	2
Tangerine	1
Tomato	1
Turnip Greens	3
Water Spinach/Ong Choy	1
Watermelon	1
Total	110

Dietary Risk Assessments

DPR’s Human Health Assessment Branch (HHA) reviews the toxicity for each illegal pesticide residue. A dietary risk assessment, based on consumption rates and acute reference doses for the pesticide or combination of pesticides, is conducted to determine whether the residues pose a potential acute health risk to consumers. A human health risk is determined by measuring the level of residue in the produce eaten at a defined consumption level (mg/kg) in a single day. If HHA determines the produce may pose a potential health risk to consumers, DPR notifies and collaborates with the California Department of Public Health (DPH) and the U.S. Food and Drug Administration (USDA) to remove it from the channels of trade.

Dietary risk analyses by HHA determined that 17 samples (11 different commodities) were potential acute health risks to consumers (Table 4). These samples originated from three different countries and in each case, the illegal residues detected were organophosphates or carbamates (Table 5).

Table 4. Commodities determined to pose a potential acute dietary health risk.

Commodity	Health Risk Cases	Total Samples	Percent Health Risk Cases
Blackberry	5	95	5%
Cactus Pads	1	2	---
Cactus Pear	1	1	---
Chayote	3	12	25%
Cucumber (All)	1	100	1%
Guaje, Legume	1	1	---
Honeydew	1	18	6%
Lime (Mexican, Persian)	1	82	1%
Mango	1	29	3%
Pear, Asian	1	54	2%
Watermelons	1	88	1%

percentages not calculated for samples sizes <10.

Table 5. Commodities, origin, and pesticide determined to be potential health risks in 2022.

Commodity	Origin	Pesticide
Blackberry	Mexico	Monocrotophos
Blackberry	Mexico	Methamidophos
Blackberry	Mexico	Acephate, Dimethoate, Methamidophos
Blackberry	Mexico	Formetanate HCl
Blackberry	Mexico	Methamidophos
Cactus Pads	Mexico	Chlorpyrifos
Cactus Pear	Mexico	Dimethoate
Chayote	Mexico	Monocrotophos
Chayote	Mexico	Monocrotophos
Chayote	Costa Rica	Methamidophos
Cucumber (All)	Mexico	Methamidophos
Guaje, Legume	Mexico	Acephate, Dimethoate, Methamidophos
Honeydew	Mexico	Methamidophos
Lime (Mexican, Persian)	Mexico	Monocrotophos
Mango	Mexico	Dimethoate
Pear, Asian	China	Chlorpyrifos
Watermelons	Mexico	Methamidophos

California Grown Sample Results

California grown produce samples (801) accounted for nearly 25% of all samples collected and for more than 42% of the total domestic-grown samples collected. This count likely under-represents the true number of California-grown produce collected because some items labeled "product of US" may be grown in California.

Over 97% of the samples labeled as grown in California had legal or no residues detected on them. Of the 801 California samples tested, 2.4% of the samples had illegal residues (19 samples). Of the 84 different types of California-grown commodities tested, eleven different commodities had at least one sample with illegal pesticide residues (Table 6).

Table 6. Commodities grown in California with illegal pesticide residues detected in 2022.

Commodity	Illegal Samples	County Grown	Pesticide Detected
Arugula	1	Monterey	Propyzamide
Basil ¹	1	Ventura	Ametoctradin, Bifenthrin, Dimethomorph
Beet, Tops	1	Santa Barbara	DCPA
Broccoli	1	Monterey	Chlorpropham
Cilantro	1	San Benito	Bensulide, Propyzamide
Collard	1	San Joaquin	Bifenazate, Cyflumetofen, Thiamethoxam
Malabar Spinach	1	Riverside	Lambda-cyhalothrin
Spinach	4	Imperial, Monterey, San Luis Obispo	DCPA, Dicloran, Linuron, Novaluron
Strawberry	4	Kern, San Luis Obispo, Santa Barbara, Ventura	Bifenazate, Cyflumetofen, Methomyl, Thiamethoxam
Swiss Chard	1	Stanislaus	DCPA
Turnip (Tops)	3	San Joaquin	Ametoctradin, Cypermthrin, Thiamethoxam
Water Spinach/ White Ong Choy	1	Riverside	Azoxystrobin, Indoxacarb, Lambda-cyhalothrin

¹ Basil sample collected by CDFA's California State Organic Program.

Organic Sample Results

As part of the residue monitoring program, DPR samples organic produce for pesticide residues. It is legal for [some pesticides](#) to be found on organic produce, as USDA permits certain pesticides for use in organic farming. In addition, certified organic produce may have residues of other pesticides at less than 5% of the U.S. EPA tolerance for conventionally grown commodities ([Code of Federal Regulations, Title 7, Part 205.671](#)).

DPR and CDFA's California State Organic Program (SOP) share test results for organic produce. DPR refers any organic sample that contains detected pesticides to the SOP. In turn, the SOP refers their findings to DPR for further investigation when residues exceed the U.S. EPA tolerance of conventionally grown produce.

DPR collected 320 samples labeled as organic. These samples represented 68 different commodities from 10 different countries. Of the 320 organic samples collected, 65% (210) were domestic and 35% (110) were imported; pesticide residues were detected on 57 samples (Table 7). Of the organic samples with residues that exceeded the U.S. EPA tolerance for conventionally grown produce, two samples were grown in California. One organic blackberry sample was imported from Mexico and had illegal residues of methamidophos, dimethoate,

omethoate, carbendazim, and acephate residues which were considered a potential acute health risk to consumers. Finally, the SOP referred a basil sample to DPR for further investigation. More information about the State Organic Program is available on their [website](#).

Table 7. Pesticides detected on organic commodities sampled in 2022. Asterisks (*) denote the pesticide residues that exceeded the federal conventional tolerance threshold for the commodity and were considered illegal under the CPRMP.

Commodity	Pesticide	Origin
Arugula	Spinosad	United States
Avocado	Imidacloprid, Lambda-Cyhalothrin	Mexico
Banana	Pyriproxyfen	Ecuador
Blackberry	Acephate, Boscalid, Carbendazim, Dimethoate, Fenpyroximate, Imidacloprid, Malathion, Methamidophos, Pyraclostrobin	Mexico
Blackberry	Boscalid, Cypermethrin, Cyprodinil, Fenhexamid, Fludioxonil, Mefenoxam, Pyraclostrobin, Spinetoram	Mexico
Blackberry	Spinosad	Mexico
Blackberry	Azoxystrobin, Imidacloprid, Pyraclostrobin	Mexico
Blackberry	Cypermethrin	Mexico
Blackberry	Azoxystrobin, Imidacloprid, Thiamethoxam	Mexico
Blackberry	Azoxystrobin, Bifenthrin, Imidacloprid, Malathion	Mexico
Blackberry	Spinosad	United States
Blackberry	Spinosad	California
Blackberry	Captan	Mexico
Blackberry	Spinosad	California
Blueberry	Phosmet	Chile
Blueberry	Spinosad	United States
Broccoli	Chlorpropham	California
Brussels Sprouts	Imidacloprid	Mexico
Brussels Sprouts	Lambda-Cyhalothrin	Mexico
Cherry	Fludioxonil, Spinosad	United States
Cilantro	Bensulide, Propyzamide	California
Cucumber (All)	Ametoctradin, Imidacloprid	Mexico
Cucumber (All)	Spinosad	Mexico
Cucumber (All)	Metalaxyl	Mexico
Grapes	Boscalid, Cyprodinil, Imidacloprid	United States
Kale	DDE	California
Lemon	Fludioxonil, Imazalil, Thiabendazole	United States
Nectarine	Fludioxonil	California
Nectarine	Spinosad	United States

Papaya	Azoxystrobin, Fludioxonil, Thiabendazole	Mexico
Peach	Fludioxonil	California
Peach	Fludioxonil	California
Peach	Spinosad	California
Peach	Spinosad	United States
Pear	Thiabendazole	Washington
Pear	Thiabendazole	Washington
Pear	Fludioxonil, Thiabendazole	United States
Peppers (Bell, Non-Chili)	Flonicamid	Mexico
Peppers (Bell, Non-Chili)	Pyrethrins	Canada
Potato (Red, Russet, Etc.)	Chlorpropham	United States
Potato (Red, Russet, Etc.)	Chlorpropham	United States
Radish Tops	Chlorthal-Dimethyl	United States
Raspberry	Azoxystrobin	United States
Raspberry	Spinosad	California
Spinach	Spinosad	Arizona
Spinach	Permethrin, Spinosad	United States
Spinach	Spinosad	California
Spinach	DDE	United States
Spinach	Spinosad	United States
Spinach	Spinosad	United States
Spinach	Spinosad	United States
Spinach	Spinosad	United States
Strawberry	Acetamiprid, Captan, Chlorantraniliprole, Fluopyram, Flupyradifurone, Novaluron, Trifloxystrobin	United States
Swiss Chard	Cyprodinil	California
Tomato	Thiamethoxam	Mexico
Tomato	Pyridalyl	Mexico
Tomato	Pyrethrins	Mexico

¹ Basil sample collected by CDFA's California State Organic Program.

DPR Enforcement on Illegal Pesticide Residues

When illegal pesticide residue(s) is detected, DPR quarantines the produce containing the illegal residue(s). The owner of the quarantined produce has three options: to securely dispose of the produce on site; to recondition the produce; or to dispose of the produce for byproducts purposes if the byproducts can lawfully contain the pesticide residue found. Reconditioning can include washing, peeling, or waiting for the pesticide residue to break down to acceptable

tolerance levels or be eliminated if the illegal residue(s) has no established tolerance. After reconditioning, the owner must pay for the sample to be reanalyzed. If test results show the pesticide residue below the legal tolerance, DPR may allow the sale of the produce. If not, the produce cannot be sold and remains under quarantine.

DPR staff trace the movement of the produce with illegal residues by contacting distributors, retailers, and wholesalers throughout California. DPR quarantines any additional remaining cases of produce found with illegal pesticide residues. As part of the trace-back enforcement investigations, DPR issued 120 quarantine notices on more than 100,000 pounds of produce.

To prevent the sale of produce with illegal residues in California, DPR offers compliance guidance to businesses that repeatedly sell produce with illegal residue(s). Companies that are identified three or more times in a 12-month period as the first point of sale (an importer or grower) of produce containing illegal pesticides may be placed in the Repeat Residue Offender Program (RRO). Furthermore, a company found to be selling produce with illegal residues that could pose a potential acute health risk to consumers may also be placed in the RRO program with a single violation.

The RRO program includes a compliance assistance meeting with the company. During these meetings, DPR staff review the illegal residue cases with company representatives and identify steps the company can take to prevent the future sale of produce with illegal pesticide residues. The company is given three months to implement changes, after which, the company is placed on probation for twelve months. Any company that is found to violate its probationary period is subject to enforcement actions. Information on penalty actions can be found on [DPR's Produce with Illegal Pesticide Residue Fines and Settlements](#) webpage.

If it is determined that the produce with illegal pesticide residues was grown in California, the County Agricultural Commissioner (CAC) in the county where the produce was grown will also investigate to determine the source of contamination. Frequently, DPR Enforcement staff assist CAC staff with the county investigation. CACs have the authority to levy civil penalties for the illegal use of pesticides.

The California CAC's took enforcement actions against two companies for illegally using pesticides. A grower in Ventura County was fined \$2,000 for using ametoctradin, dimethomorph, and bifenthrin on organic basil. This investigation and subsequent enforcement action resulted from a referral from the California State Organic Program. Another grower in Kern County received a fine of \$10,000 for illegally applying methomyl on strawberries. Further enforcement actions and investigations are ongoing.

All 2022 CPRMP produce sampling results, as well as previous years' data and reports, are available for download on [DPR's Residue Monitoring Program](#) website.

Appendix 1. 2022 Origin of CPRMP commodity samples containing illegal pesticide residues.

Origin	Pesticide	Commodity	Residue Amount	Tolerance
Brazil	Propamocarb	Papaya	0.011	NTE
China	Endosulfan Sulfate	Ginger Root	0.011	NTE
China	Carbendazim	Mushrooms	0.018	NTE
China	Chlorfenapyr	Pear, Asian	0.026	0.01
China	Chlorfenapyr	Pear, Asian	0.02	0.01
China	Chlorpyrifos	Pear, Asian	0.13	0.05
China	Paclobutrazol	Pear, Asian	0.015	NTE
Costa Rica	Methamidophos	Chayote	0.029	NTE
Ecuador	Acetamiprid	Dragonfruit	0.034	0.01
Ecuador	Imidacloprid	Dragonfruit	0.031	NTE
Ecuador	Iprodione	Dragonfruit	0.06	NTE
Ecuador	Prochloraz	Dragonfruit	1.2	NTE
Ecuador	Thiabendazole	Dragonfruit	0.8	NTE
Guatemala	Buprofezin	Banana	0.27	0.2
Guatemala	Buprofezin	Banana	0.32	0.2
Guatemala	Difenoconazole	Peas, Sugar Snap	0.012	NTE
Honduras	Fipronil	Okra (Gumbo)	0.013	NTE
Mexico	Lambda-Cyhalothrin	Asparagus	0.029	0.01
Mexico	Abamectin	Basil	0.099	0.03
Mexico	Ametoctradin	Basil	42	NTE
Mexico	Cyantraniliprole	Basil	0.044	NTE
Mexico	Dimethomorph	Basil	4.7	NTE
Mexico	Thiophanate-Methyl	Basil	0.038	NTE
Mexico	Dinotefuran	Beans (Green, Snap, String)	0.029	0.01
Mexico	Dinotefuran	Beans (Green, Snap, String)	0.051	0.01
Mexico	Dinotefuran	Beans (Green, Snap, String)	0.072	0.01
Mexico	Thiamethoxam	Beans (Green, Snap, String)	0.027	0.02
Mexico	Fipronil	Beans, Asparagus	0.015	NTE
Mexico	Hexythiazox	Beans, Asparagus	0.45	0.3
Mexico	Thiamethoxam	Beans, Asparagus	0.032	0.02
Mexico	Thiamethoxam	Beans, Asparagus	0.041	0.02
Mexico	Thiamethoxam	Beans, Asparagus	0.048	0.02
Mexico	Thiamethoxam	Beans, Asparagus	0.023	0.02

Mexico	Thiamethoxam	Beans, Asparagus	0.029	0.02
Mexico	Imazalil	Bitter Melon	0.064	NTE
Mexico	Imazalil	Bitter Melon	0.045	NTE
Mexico	Acephate	Blackberry	0.51	0.02
Mexico	Acephate	Blackberry	0.058	0.02
Mexico	Carbendazim	Blackberry	0.053	NTE
Mexico	Dimethoate	Blackberry	0.19	NTE
Mexico	Formetanate HCl	Blackberry	0.11	NTE
Mexico	Lambda-Cyhalothrin	Blackberry	0.16	0.01
Mexico	Lambda-Cyhalothrin	Blackberry	0.1	0.01
Mexico	Lambda-Cyhalothrin	Blackberry	0.011	0.01
Mexico	Methamidophos	Blackberry	0.6	NTE
Mexico	Methamidophos	Blackberry	0.02	NTE
Mexico	Methamidophos	Blackberry	0.25	NTE
Mexico	Methamidophos	Blackberry	0.032	NTE
Mexico	Methamidophos	Blackberry	0.015	NTE
Mexico	Methamidophos	Blackberry	1	NTE
Mexico	Monocrotophos	Blackberry	0.031	NTE
Mexico	N6-Benzyl Adenine	Blackberry	0.018	NTE
Mexico	Novaluron	Blackberry	0.065	0.01
Mexico	Permethrin	Blackberry	1.0	NTE
Mexico	Spirotetramat	Blackberry	0.018	NTE
Mexico	Thiabendazole	Blackberry	0.067	NTE
Mexico	Thidiazuron	Blackberry	0.022	NTE
Mexico	Fluoxastrobin	Blueberry	0.18	NTE
Mexico	Thiabendazole	Blueberry	0.13	NTE
Mexico	Permethrin	Bok Choy	0.19	NTE
Mexico	Acetamiprid	Cactus Pads	0.025	0.01
Mexico	Chlorpyrifos	Cactus Pads	0.11	NTE
Mexico	Methomyl	Cactus Pads	0.061	NTE
Mexico	Carbendazim	Cactus Pear	0.44	NTE
Mexico	Dimethoate	Cactus Pear	0.02	NTE
Mexico	Monocrotophos	Chayote	0.023	NTE
Mexico	Monocrotophos	Chayote	0.19	NTE
Mexico	Methamidophos	Chinese Radish/Daikon	0.013	NTE
Mexico	Methomyl	Chive	0.023	NTE
Mexico	Carbendazim	Cilantro	2.9	NTE
Mexico	Tebuconazole	Cilantro	0.15	NTE
Mexico	Pyridalyl	Collards	0.13	NTE
Mexico	Captan	Cucumber (All)	0.057	0.05

Mexico	Methamidophos	Cucumber (All)	0.19	NTE
Mexico	Propamocarb	Cucumber (All)	2.7	1.5
Mexico	Chlorothalonil	Guaje, Legume	0.58	NTE
Mexico	Sulfoxaflor	Guaje, Legume	0.47	NTE
Mexico	Thiophanate-Methyl	Guaje, Legume	1.1	NTE
Mexico	Methamidophos	Honeydew	0.062	NTE
Mexico	Thiabendazole	Jackfruit	0.16	NTE
Mexico	Bifenthrin	Lime (Mexican, Persian)	0.093	0.05
Mexico	Carbendazim	Lime (Mexican, Persian)	0.12	NTE
Mexico	Carbendazim	Lime (Mexican, Persian)	0.011	NTE
Mexico	Carbendazim	Lime (Mexican, Persian)	0.014	NTE
Mexico	Diazinon	Lime (Mexican, Persian)	0.011	NTE
Mexico	Diazinon	Lime (Mexican, Persian)	0.031	NTE
Mexico	Monocrotophos	Lime (Mexican, Persian)	0.019	NTE
Mexico	Propamocarb	Lime (Mexican, Persian)	0.011	NTE
Mexico	Tebuconazole	Lime (Mexican, Persian)	0.018	NTE
Mexico	Dimethoate	Mango	0.017	NTE
Mexico	Pyrimethanil	Mango	0.024	NTE
Mexico	Buprofezin	Marjoram (Oregano)	10	NTE
Mexico	Propamocarb	Onion (Dry)	0.092	NTE
Mexico	Propamocarb	Onions (Green)	1.9	NTE
Mexico	Trifloxystrobin	Onions (Green)	0.015	NTE
Mexico	Ametoctradin	Papaya	0.37	NTE
Mexico	Carbendazim	Papaya	0.059	NTE
Mexico	Carbendazim	Papaya	0.088	NTE
Mexico	Carbendazim	Papaya	0.17	NTE
Mexico	Prochloraz	Papaya	0.17	NTE
Mexico	Prochloraz	Papaya	0.041	NTE
Mexico	Prochloraz	Papaya	0.35	NTE
Mexico	Carbendazim	Peppers (Bell, Non-Chili)	0.013	NTE
Mexico	Cypermethrin	Peppers (Bell, Non-Chili)	0.43	0.2
Mexico	Thiamethoxam	Peppers (Bell, Non-Chili)	0.31	0.25
Mexico	Carbendazim	Peppers (Chili Type)	0.053	NTE

Mexico	Carbendazim	Peppers (Chili Type)	0.91	NTE
Mexico	Fipronil	Peppers (Chili Type)	0.013	NTE
Mexico	Fipronil	Peppers (Chili Type)	0.016	NTE
Mexico	Fipronil	Peppers (Chili Type)	0.041	NTE
Mexico	Fipronil	Peppers (Chili Type)	0.021	NTE
Mexico	Pyrimethanil	Peppers (Chili Type)	0.14	NTE
Mexico	Spirodiclofen	Peppers (Chili Type)	0.25	NTE
Mexico	Cypermethrin	Raspberry	0.85	0.8
Mexico	Carbendazim	Romano Bean	0.011	NTE
Mexico	Thiamethoxam	Romano Bean	0.062	0.02
Mexico	PCA	Squash (Winter)	0.013	NTE
Mexico	Myclobutanil	Swiss Chard	0.46	0.03
Mexico	Carbendazim	Tomato	0.015	NTE
Mexico	Methamidophos	Watermelons	0.018	NTE
Peru	Carbendazim	Tangerine	0.03	NTE
United States	Pyrimethanil	Peppers (Chili Type)	0.50	NTE
United States	Thiacloprid	Peppers (Chili Type)	0.55	NTE
US, California	Propyzamide	Arugula	0.016	NTE
US, California	DCPA	Beet, Tops	0.021	NTE
US, California	Chlorpropham	Broccoli	0.01	NTE
US, California	Bensulide	Cilantro	0.23	NTE
US, California	Propyzamide	Cilantro	0.026	NTE
US, California	Bifenazate	Collards	0.01	NTE
US, California	Lambda-Cyhalothrin	Malabar Spinach	0.024	0.01
US, California	DCPA	Spinach	0.028	NTE
US, California	Dicloran	Spinach	0.028	NTE
US, California	Linuron	Spinach	0.014	NTE
US, California	Novaluron	Spinach	0.016	0.01
US, California	Bifenazate	Strawberry	1.8	1.5
US, California	Cyflumetofen	Strawberry	0.72	0.6
US, California	Methomyl	Strawberry	0.037	NTE
US, California	Thiamethoxam	Strawberry	0.39	0.3
US, California	DCPA	Swiss Chard	0.11	NTE
US, California	Ametoctradin	Turnip Greens	0.035	NTE
US, California	Thiamethoxam	Turnip Greens	0.14	0.02
US, California	Thiamethoxam	Turnip Greens	0.30	0.02
US, California	Thiamethoxam	Turnip Greens	0.098	0.02
US, California	Lambda-Cyhalothrin	Water Spinach/ Ong Choy	0.061	0.01

Appendix 2. 2022 CPRMP sample test results by commodity type, number of illegal pesticide residues, and total number of samples collected.

Commodity	Illegal Samples	Total collected	Percent Illegal
Alfalfa Sprouts	0	1	0%
Apple	0	115	0%
Apricot	0	12	0%
Arugula	1	3	33%
Artichoke (Globe)	0	12	0%
Asparagus	1	29	3%
Avocado	0	60	0%
Banana	2	19	11%
Basil	1	1	100%
Bean, Broad, (Fava)	0	1	0%
Beans (All Or Unspec)	0	1	0%
Beans (Green, Snap, String)	4	55	7%
Beans, Asparagus	5	13	38%
Beet Roots	0	8	0%
Beet, Tops	1	7	14%
Bitter Melon	2	3	67%
Blackberry	12	96	13%
Blueberry	1	99	1%
Bok Choy	1	41	2%
Broccoli	1	38	3%
Brussels Sprouts	0	56	0%
Cabbage	0	40	0%
Cactus Pads	2	2	100%
Cactus Pear	1	1	100%
Cantaloupe	0	22	0%
Cardoon	0	1	0%
Carrots	0	19	0%
Cauliflower	0	36	0%
Celeriac	0	2	0%
Celery	0	19	0%
Chayote	3	12	25%
Cherry	0	20	0%
Chinese Broccoli (Gai Lon)	0	2	0%

Chinese Cabbage (Nappa Cabbage)	0	31	0%
Chinese Okra (Hechima)	0	1	0%
Chinese Radish/Daikon	1	6	17%
Chive	1	1	100%
Cilantro	2	6	33%
Coconut	0	1	0%
Collards	2	40	5%
Corn, Sweet	0	8	0%
Cranberry	0	1	0%
Cucumber (All)	3	100	3%
Dragonfruit	2	2	100%
Eggplant	0	21	0%
Endive	0	1	0%
Fennel	0	39	0%
Fig	0	3	0%
Gai Lon	0	1	0%
Garbanzos (Chickpeas)	0	1	0%
Garlic	0	11	0%
Ginger Root	1	5	20%
Gooseberry (Cape)	0	1	0%
Grapefruit	0	68	0%
Grapes	0	108	0%
Guaje, Legume	1	1	100%
Guava	0	3	0%
Honeydew	1	18	6%
Jackfruit	1	3	33%
Jerusalem Artichoke	0	1	0%
Jicama	0	2	0%
Kale	0	13	0%
Kiwi Fruit	0	27	0%
Kohlrabi	0	1	0%
Kumquat	0	3	0%
Leek	0	2	0%
Lemon	0	37	0%
Lettuce, Head	0	21	0%
Lettuce, Leaf	0	25	0%
Lime (Mexican, Persian)	9	82	11%
Longan	0	1	0%
Malabar Spinach	1	1	100%
Mango	2	29	7%

Mangosteen	0	1	0%
Manioc (Cassava)	0	1	0%
Marjoram (Oregano)	1	1	100%
Melons (All Or Unspec)	0	4	0%
Mushrooms	1	85	1%
Mustard Greens	0	2	0%
Mustard, Chinese	0	1	0%
Nectarine	0	24	0%
Okra (Gumbo)	1	33	3%
Onion (Dry)	1	54	2%
Onions (Green)	1	57	2%
Orange	0	43	0%
Papaya	4	71	6%
Parsley	0	3	0%
Passion Fruit	0	1	0%
Peach	0	52	0%
Pear	0	74	0%
Pear, Asian	4	54	7%
Peas, Sugar Snap	1	12	8%
Peppers (Bell, Non-Chili)	3	136	2%
Peppers (Chili Type)	7	36	19%
Pineapple	0	22	0%
Plantain	0	1	0%
Plum	0	56	0%
Pluot	0	2	0%
Pomegranate	0	4	0%
Pomelo	0	3	0%
Potato (Red, Russet, Etc.)	0	48	0%
Pumpkin	0	1	0%
Quince	0	1	0%
Radish	0	17	0%
Radish Tops	0	9	0%
Rambutan	0	2	0%
Raspberry	1	70	1%
Romano Bean	2	2	100%
Rutabaga	0	2	0%
Shallot, Onions	0	2	0%
Soybean Sprouts	0	1	0%
Spinach	4	123	3%
Squash (Summer)	0	38	0%

Squash (Winter)	1	14	7%
Starfruit	0	1	0%
Strawberry	4	69	6%
Sweet Potato	0	85	0%
Swiss Chard	2	10	20%
Tangelo	0	2	0%
Tangerine	1	93	1%
Tomatillo	0	9	0%
Tomato	1	119	1%
Turmeric	0	1	0%
Turnip Greens	3	17	18%
Turnip Roots	0	51	0%
Water Spinach/Ong Choy	1	1	100%
Watermelon	1	88	1%

Appendix 3. Commodities with illegal pesticide residues, by origin in 2022.

Commodity	Number Illegal	Total number	Percent Illegal	Origin
Arugula	1	3	33%	US, California
Asparagus	1	29	3%	Mexico
Banana	2	19	11%	Guatemala
Basil	1	1	100%	Mexico
Beans (Green, Snap, String)	4	55	7%	Mexico
Beans, Asparagus	5	13	38%	Mexico
Beet, Tops	1	7	14%	US, California
Bitter Melon	2	3	67%	Mexico
Blackberry	12	96	13%	Mexico
Blueberry	1	99	1%	Mexico
Bok Choy	1	41	2%	Mexico
Broccoli	1	38	3%	US, California
Cactus Pads	2	2	100%	Mexico
Cactus Pear	1	1	100%	Mexico
Chayote	3	12	25%	Costa Rica, Mexico
Chinese Radish/Daikon	1	6	17%	Mexico
Chive	1	1	100%	Mexico
Cilantro	2	6	33%	US, California, Mexico
Collards	2	40	5%	US, California, Mexico
Cucumber (All)	3	100	3%	Mexico
Dragonfruit	2	2	100%	Ecuador
Ginger Root	1	5	20%	China - mainland
Guaje, Legume	1	1	100%	Mexico
Honeydew	1	18	6%	Mexico
Jackfruit	1	3	33%	Mexico
Lime (Mexican, Persian)	9	82	11%	Mexico
Malabar Spinach	1	1	100%	US, California
Mango	2	29	7%	Mexico
Marjoram (Oregano)	1	1	100%	Mexico
Mushrooms	1	85	1%	China - mainland
Okra (Gumbo)	1	33	3%	Honduras
Onion (Dry)	1	54	2%	Mexico
Onions (Green)	1	57	2%	Mexico
Papaya	4	71	6%	Brazil, Mexico
Pear, Asian	4	54	7%	China - mainland
Peas, Sugar Snap	1	12	8%	Guatemala
Peppers (Bell, Non-Chili)	3	136	2%	Mexico

Peppers (Chili Type)	7	36	19%	Mexico, United States
Raspberry	1	70	1%	Mexico
Romano Bean	2	2	100%	Mexico
Spinach	4	123	3%	US, California
Squash (Winter)	1	14	7%	Mexico
Strawberry	4	69	6%	US, California
Swiss Chard	2	10	20%	US, California, Mexico
Tangerine	1	93	1%	Peru
Tomato	1	119	1%	Mexico
Turnip Greens	3	17	18%	US, California
Water Spinach/Ong Choy	1	1	100%	US, California
Watermelons	1	88	1%	Mexico

