Cost of Pollination

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Cost per Colony to Pollinate Almonds up 1 Percent from Previous Year

In Region 6 & 7, the average cost per colony for almonds increased 1 percent from 165 dollars per colony to 167 dollars per colony in 2016. The average price per acre, however, decreased from 313 dollars per acre to 287 dollars per acre during that period. The total value of pollination for almonds decreased 3 percent due to less colonies used on almonds in 2016. Almonds were the highest valued crop in that region. The total value of all pollination in Region 6 & 7 for 2016 was 309 million dollars, up slightly from last year.

Blueberries had the highest total value of pollination of crops reported in Region 1 during in 2016. The price per colony for blueberries decreased 7 percent to 88.2 dollars per colony in 2016. The price per acre decreased 12 percent to 147 dollars per acre. The total value of pollination for blueberries in Region 1 for 2016 was 5.73 million dollars. The total value for pollination of all crops in Region 1 for 2016 was 18.5 million dollars, down 2 percent from a year ago.

Blueberries had the highest total value of pollination of crops reported in Region 2 during in 2016. The price per colony for blueberries increased 6 percent to 53.7 dollars per colony in 2016. The price per acre increased 6 percent to 81.8 dollars per acre. The total value of pollination for blueberries in Region 2 for 2016 was 1.77 million dollars. The total value of pollination of all crops in Region 2 for 2016 was 5.12 million dollars, down 2 percent from previous year.

Watermelons had the highest total value of pollination of crops reported in Region 3 during in 2016. The price per colony for watermelons decreased 3 percent to 58.7 dollars per colony in 2016. The price per acre increased 23 percent to 59.5 dollars per acre. The total value of pollination for watermelons in Region 3 for 2016 was 1.82 million dollars. The total value of pollination of all crops in Region 3 for 2016 was 4.71 million dollars, down 13 percent from last year.

Pumpkins had the highest total value of pollination of crops reported in Region 4 during in 2016. The price per colony for pumpkins was 80.3 dollars per colony in 2016. The price per acre was 26.7 dollars per acre. Pumpkin estimates for 2015 were not published, so no comparison can be made with the previous year. The total value of pollination for pumpkins in Region 4 for 2016 was 201 thousand dollars. The total value of pollination of all crops in Region 4 for 2016 was 2.51 million dollars, up 30 percent from a year ago.

Apples had the highest total value of pollination of crops reported in Region 5 during in 2016. The price per colony for apples decreased 2 percent to 51.5 dollars per colony in 2016. The price per acre increased 5 percent to 47.6 dollars per acre. The total value of pollination for apples in Region 5 for 2016 was 5.41 million dollars. The total value of pollination of all crops in Region 5 for 2016 was 14.7 million dollars, up 7 percent from previous year.

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Paid Pollinated Acres, Price per Acre, Colonies Used, Price per Colony, and Total Value of Pollination – Region 1: 2015

[See regional listing on page 17]

Crop	Region 1				
	Paid pollinated acres	Price per acre	Colonies used	Price per colony	Total value of pollination
	(acres)	(dollars)	(colonies)	(dollars)	(1,000 dollars)
Tree fruit					
Apple	78,300	28.3	35,000	64.6	2,261
Cherry	28,700	30.7	19,000	47.7	906
Other tree fruit [1]	3,300	29.7	2,400	55.0	132
Melons					
Watermelon	4,850	51.2	3,900	73.0	285
Berries					
Blueberry	44,900	167.0	85,000	94.7	8,050
Cranberry	30,800	166.0	72,000	70.5	5,076
Vegetables					
Cucumber	28,800	28.3	12,000	63.6	763
Pumpkin	11,500	35.4	7,500	76.7	575
Squash	8,500	27.0	4,600	57.5	265
Other vegetables [2]	2,050	25.4	2,500	49.9	125
All other [3]	4,150	46.8	7,000	65.8	461

[1] Includes other tree fruit.
[2] Includes other vegetables.
[3] Includes any crops not categorized above.

Paid Pollinated Acres, Price per Acre, Colonies Used, Price per Colony, and Total Value of Pollination – Region 1: 2016

[See regional listing on page 17]

Crop	Region 1				
	Paid pollinated acres	Price per acre	Colonies used	Price per colony	Total value of pollination
	(acres)	(dollars)	(colonies)	(dollars)	(1,000 dollars)
Tree fruit					
Apple	83,400	33.0	46,000	69.9	3,215
Cherry	26,600	21.9	15,000	55.0	825
Peach	2,150	33.9	2,200	58.5	129
Melons					
Watermelon	5,600	40.4	3,700	78.1	289
Berries					
Blueberry	37,500	147.0	65,000	88.2	5,733
Cranberry	30,300	167.0	66,000	77.9	5,141
Vegetables					
Cucumber	29,100	29.4	15,000	62.7	941
Pumpkin	11,200	32.4	11,000	76.8	845
Squash	9,400	32.3	7,500	74.1	556
All other [1]	7,100	31.0	17,500	49.9	873

[1] Includes any crops not categorized above.

Paid Pollinated Acres, Price per Acre, Colonies Used, Price per Colony, and Total Value of Pollination – Region 2: 2015

[See regional listing on page 17]

Crop	Region 2				
	Paid pollinated acres	Price per acre	Colonies used	Price per colony	Total value of pollination
	(acres)	(dollars)	(colonies)	(dollars)	(1,000 dollars)
Tree fruit					
Apple	20,900	15.1	7,500	47.9	359
Melons					
Watermelon	25,100	66.1	23,000	64.6	1,486
Berries					
Blueberry	15,800	77.0	31,000	50.9	1,578
Vegetables					
Cucumber	18,300	49.6	15,500	55.1	854
Pumpkin	3,100	24.9	2,000	60.3	121
Squash	6,900	50.8	7,000	57.5	403
All other [1]	5,800	35.6	10,000	42.8	428

[1] Includes any crops not categorized above.

Paid Pollinated Acres, Price per Acre, Colonies Used, Price per Colony, and Total Value of Pollination – Region 2: 2016

[See regional listing on page 17]

Crop	Region 2				
	Paid pollinated acres	Price per acre	Colonies used	Price per colony	Total value of pollination
	(acres)	(dollars)	(colonies)	(dollars)	(1,000 dollars)
Tree fruit					
Apple	21,200	15.9	8,500	48.6	413
Melons					
Cantaloupe	2,200	43.0	2,500	56.1	140
Watermelon	15,300	71.6	17,000	69.8	1,187
Berries					
Blueberry	15,900	81.8	33,000	53.7	1,772
Vegetables					
Cucumber	9,300	45.7	9,000	55.2	497
Pumpkin	5,200	31.6	4,600	63.0	290
Squash	5,600	37.2	5,500	47.9	263
Other vegetables [1]	2,000	44.9	2,000	85.6	171
All other [2]	2,050	39.3	6,500	59.6	387

[1] Includes other vegetables.
[2] Includes any crops not categorized above.

Paid Pollinated Acres, Price per Acre, Colonies Used, Price per Colony, and Total Value of Pollination – Region 3: 2015

[See regional listing on page 17]

Crop	Region 3				
	Paid pollinated acres	Price per acre	Colonies used	Price per colony	Total value of pollination
	(acres)	(dollars)	(colonies)	(dollars)	(1,000 dollars)
Tree Fruit					
Other tree fruit [1]	5,500	16.9	4,800	26.7	128
Melons					
Watermelon	29,600	48.5	26,000	60.4	1,570
Other melons [2]	2,450	71.0	3,200	58.6	188
Berries					
Blueberry	4,650	90.0	13,000	48.1	625
Vegetables					
Cucumber	9,900	40.7	14,000	46.7	654
Pumpkin	3,000	68.3	3,000	70.3	211
Squash	2,650	65.1	4,300	49.5	213
All other [3]	4,300	25.4	47,000	38.7	1,819

[1] Includes other tree fruit.
[2] Includes other melons.
[3] Includes any crops not categorized above.

Paid Pollinated Acres, Price per Acre, Colonies Used, Price per Colony, and Total Value of Pollination – Region 3: 2016

[See regional listing on page 17]

Crop	Region 3				
	Paid pollinated acres	Price per acre	Colonies used	Price per colony	Total value of pollination
	(acres)	(dollars)	(colonies)	(dollars)	(1,000 dollars)
Tree Fruit					
Other tree fruit [1]	7,000	16.5	7,500	38.0	285
Citrus					
Orange	6,700	1.3	38,000	16.4	623
Melons					
Cantaloupe	3,650	47.1	4,100	49.8	204
Watermelon	28,200	59.5	31,000	58.7	1,820
Berries					
Blueberry	3,150	87.5	8,500	43.3	368
Vegetables					
Cucumber	5,700	56.8	7,500	47.5	356
Pumpkin	2,250	73.4	2,400	74.0	178
Squash	3,700	67.3	7,500	41.7	313
All other [2]	2,100	39.0	14,500	38.7	561

[1] Includes other tree fruit.
[2] Includes any crops not categorized above.

Paid Pollinated Acres, Price per Acre, Colonies Used, Price per Colony, and Total Value of Pollination – Region 4: 2015

[See regional listing on page 17]

Crop	Region 4				
	Paid pollinated acres	Price per acre	Colonies used	Price per colony	Total value of pollination
	(acres)	(dollars)	(colonies)	(dollars)	(1,000 dollars)
Tree fruit					
Apple	2,750	34.7	4,100	38.0	156
Cherry	3,600	19.5	3,200	27.0	86
Other crops					
Misc. crops [1]	2,950	28.1	29,000	48.0	1,392
All other [2]	2,650	39.7	7,000	42.9	300

[1] Includes miscellaneous crops.
[2] Includes any crops not categorized above.

Paid Pollinated Acres, Price per Acre, Colonies Used, Price per Colony, and Total Value of Pollination – Region 4: 2016

[See regional listing on page 17]

Crop	Region 4				
	Paid pollinated acres	Price per acre	Colonies used	Price per colony	Total value of pollination
	(acres)	(dollars)	(colonies)	(dollars)	(1,000 dollars)
Tree fruit					
Apple	3,000	32.5	3,900	45.5	177
Cherry	3,100	27.5	3,100	34.3	106
Vegetables					
Pumpkin	3,850	26.7	2,500	80.3	201
All other [1]	3,400	71.9	35,000	57.9	2,027

[1] Includes any crops not categorized above.

Paid Pollinated Acres, Price per Acre, Colonies Used, Price per Colony, and Total Value of Pollination – Region 5: 2015

[See regional listing on page 17]

Crop	Region 5				
	Paid pollinated acres	Price per acre	Colonies used	Price per colony	Total value of pollination
	(acres)	(dollars)	(colonies)	(dollars)	(1,000 dollars)
Tree fruit					
Apple	104,200	45.2	91,000	52.7	4,796
Cherry	40,000	67.1	62,000	46.5	2,883
Pear	27,800	56.0	30,000	52.0	1,560
Other tree fruit [1]	3,250	52.0	7,500	51.9	389
Melons					
Watermelon	2,250	50.4	2,600	44.9	117
Berries					
Blueberry	14,600	87.2	33,000	39.4	1,300
Cranberry	4,950	114.0	8,500	69.3	589
Raspberry	6,700	42.0	8,000	36.8	294
Other berries [2]	3,150	31.8	5,000	28.1	141
Vegetables					
Squash	3,550	45.2	6,000	35.0	210
Other vegetables [3]	5,100	78.2	9,500	48.8	464
Other crops					
Clover	7,600	38.8	10,000	35.7	357
Misc. crops [4]	5,900	82.3	13,000	44.2	575
All other [5]	2,600	20.3	1,200	71.2	85

[1] Includes other tree fruit.
[2] Includes other berries.
[3] Includes vegetables crops.
[4] Includes other miscellaneous crops.
[5] Includes any crops not categorized above.

Paid Pollinated Acres, Price per Acre, Colonies Used, Price per Colony, and Total Value of Pollination – Region 5: 2016

[See regional listing on page 17]

Crop	Region 5				
	Paid pollinated acres	Price per acre	Colonies used	Price per colony	Total value of pollination
	(acres)	(dollars)	(colonies)	(dollars)	(1,000 dollars)
Tree fruit					
Apple	112,600	47.6	105,000	51.5	5,408
Cherry	39,900	75.4	61,000	49.3	3,007
Peach	2,900	38.5	2,500	48.1	120
Pear	24,300	65.4	30,000	53.1	1,593
Melons					
Watermelon	2,750	74.8	4,200	51.8	218
Berries					
Blueberry	14,200	106.0	33,000	46.5	1,535
Cranberry	5,700	118.0	9,000	74.3	669
Raspberry	6,400	46.9	8,000	40.0	320
Vegetables					
Other vegetables [1]	6,700	47.2	9,500	35.9	341
Other crops					
Clover	8,300	34.9	10,500	33.6	353
Misc. crops [2]	10,900	69.2	18,500	47.9	886
All other [3]	5,600	32.3	6,500	35.6	231

[1] Includes other vegetables.
[2] Includes miscellaneous crops.
[3] Includes any crops not categorized above.

Paid Pollinated Acres, Price per Acre, Colonies Used, Price per Colony, and Total Value of Pollination – Region 6 & 7: 2015

[See regional listing on page 17]

Crop	Region 6 & 7				
	Paid pollinated acres	Price per acre	Colonies used	Price per colony	Total value of pollination
	(acres)	(dollars)	(colonies)	(dollars)	(1,000 dollars)
Tree nuts					
Almond	921,200	313.0	1,760,000	165.0	290,400
Tree fruit					
Apple	6,100	45.5	11,000	29.4	323
Avocado	8,600	74.2	52,000	27.7	1,440
Cherry	25,400	129.0	51,000	67.6	3,448
Plum	13,000	117.0	20,000	85.5	1,710
Other tree fruit [1]	4,650	74.2	10,500	60.9	639
Other fruit					
Kiwi	2,450	86.8	6,500	33.6	218
Melons					
Cantaloupe	27,300	46.3	28,000	45.1	1,263
Honey dew	8,700	45.8	8,000	49.9	399
Watermelon	10,300	82.2	20,000	46.8	936
Berries					
Blueberry	2,450	269.0	12,500	91.8	1,148
Raspberry	3,100	159.0	6,500	147.0	956
Vegetables					
Cucumber	3,150	83.4	8,000	36.7	294
Other vegetables [2]	3,800	89.2	14,500	36.1	523
Other crops					
Alfalfa	27,900	80.2	46,000	48.8	2,245
Sunflower	21,400	53.3	36,000	35.6	1,282
All other [3]	7,800	42.7	27,000	36.3	980

[1] Includes other tree fruit.
[2] Includes other vegetables.
[3] Includes any crops not categorized above.

Paid Pollinated Acres, Price per Acre, Colonies Used, Price per Colony, and Total Value of Pollination – Region 6 & 7: 2016

[See regional listing on page 17]

Crop	Region 6 & 7				
	Paid pollinated acres	Price per acre	Colonies used	Price per colony	Total value of pollination
	(acres)	(dollars)	(colonies)	(dollars)	(1,000 dollars)
Tree nuts					
Almond	971,400	287.0	1,680,000	167.0	280,560
Tree fruit					
Apple	10,400	89.2	20,000	47.7	954
Avocado	12,800	103.0	69,000	40.8	2,815
Cherry	29,800	127.0	55,000	68.6	3,773
Plum	29,700	89.9	46,000	64.4	2,962
Other tree fruit [1]	6,200	59.0	12,800	48.2	617
Citrus					
Orange	2,700	130.0	11,000	103.0	1,133
Other fruit					
Kiwi	2,800	217.0	4,800	205.0	984
Melons					
Cantaloupe	36,900	53.3	40,000	49.3	1,972
Honey dew	9,300	55.8	10,000	51.3	513
Watermelon	13,000	63.4	21,000	38.7	813
Berries					
Blueberry	3,050	240.0	7,500	101.0	758
Cranberry	3,300	285.0	13,000	71.5	930
Raspberry	5,100	220.0	14,000	92.3	1,292
Vegetables					
Cucumber	3,750	82.4	11,000	28.9	318
Squash	2,800	64.4	6,500	27.3	177
Other crops					
Alfalfa	42,700	137.0	92,000	63.6	5,851
Sunflower	22,800	36.8	30,000	28.8	864
Misc. crops [2]	11,700	14.6	5,500	32.1	177
All other [3]	7,900	71.2	28,000	42.4	1,187

[1] Includes other tree fruit.
[2] Includes miscellaneous crops.
[3] Includes any crops not categorized above.

Statistical Methodology

Survey Procedures: The *Cost of Pollination* survey, conducted annually in all 50 states, collects information on acreage pollinated, colonies used, and dollars spent for a variety of different crops. The target population for *Cost of Pollination* estimate program is all farms and ranches with at least one acre of a crop determined to be potentially pollinated by honey bees. There were 33 specific crops targeted in the *Cost of Pollination* sampling scheme, but additional crops were allowed to be reported individually on the questionnaire (see "Included Crops".). Any other reported commodity not included in these lists were grouped as miscellaneous and summarized together. The *Cost of Pollination* samples were selected using a Multivariate Probability Proportional to Size (MPPS) sampling scheme. Each record was assigned a measure of size based on the record's data for multiple specified commodities. The 2015 sample size was 42,165 and the 2016 sample size was 19,931. All sampled operations were mailed a questionnaire and given adequate time to respond by mail or electronic data reporting (EDR). Those that did not respond by mail or EDR were telephoned or enumerated in person.

Estimation Procedures: Estimates were prepared by the Agricultural Statistics Board after reviewing recommendations and analysis submitted by each Regional Field Office. All data were analyzed for unusual values. Data from each operation were compared to their own past operating profile and to trends from similar operations. Data for missing operations were covered by weighting positive data of similar operations based on location and strata. National and State survey data were reviewed for reasonableness with each other, estimates from the previous year, and other USDA, NASS reports.

In order to be published individually, a crop must have an appropriate threshold of paid pollinated acres in a region and meet USDA, NASS's confidentiality policy. If a crop did not meet either of these requirements, it was combined with similar crops into an aggregate estimate. If the aggregate estimate still did not meet publishable standards, then it was combined with all other unpublished crops under the "All Other" heading. Due to the differences in regions and years, the aggregate and other published estimates may include different crops.

Revision Policy: The previous year's estimates are subject to revision when current year's estimates are made. Revisions are the result of late reports or corrected data.

Reliability: Estimates were created by reviewing rounded indications from the survey and the associated measures of error. Due to the sampled population differing from other USDA, NASS surveys, estimates on this report may differ from other published numbers. Since all operations with crops were not included in the sample, survey estimates are subject to sampling variability. The measurement of error due to sampling in the current period is evaluated by the coefficient of variation for each estimated item. For individually published crops, coefficients of variation can be found using USDA, NASS's Quick Stats searchable database.

Survey results were also subject to non-sampling errors such as omissions, duplication, and mistakes in reporting, recording, and processing the data. While these errors cannot be measured directly, they were minimized through strict quality controls in the data collection process and a careful review of all reported data for consistency and reasonableness.

Estimation Regions

To improve the reliability and increase the number of estimates which can be published, estimates are published at regional level, based on the regions used for the 2012 Census of Agriculture. Regions 6 and 7 were combined. The states in each region are as follows:

Region 1: Connecticut, Illinois, Indiana, Iowa, Kansas, Massachusetts, Maine, Michigan, Nebraska, New Hampshire, New Jersey, New York, Ohio, Pennsylvania, Rhode Island, Vermont, Wisconsin.

Region 2: Alabama, Delaware, Georgia, Kentucky, Maryland, North Carolina, South Carolina, Tennessee, Virginia, West Virginia.

Region 3: Arkansas, Florida, Louisiana, Missouri, Mississippi, New Mexico, Oklahoma, Texas.

Region 4: Colorado, Minnesota, Montana, Nevada, North Dakota, South Dakota, Utah, Wyoming.

Region 5: Alaska, Idaho, Oregon, Washington.

Region 6 & 7: Arizona, California, Hawaii.

Terms and Definitions of Cost of Pollination Estimates

Paid Pollinated Acres: Acreage that an operation paid money to be pollinated by honey bees.

Dollars per Acre: The average price paid by operations to pollinate an acre of crop. Acres pollinated for free or on a non-monetary basis were not included in this calculation.

Colonies Used: The total colonies used to pollinate a crop; regardless of ownership or if on a paid basis.

Dollars per Colony: The average price paid by operations to use a colony for pollination. Colonies owned by the operation or used on a non-monetary basis were not included.

Total Value of Pollination: The total valuation of all pollination, calculated by multiplying the price per colony by colonies used.

Included Crops

Sampled Crops:

Tree nuts
- Almonds
- Macadamia nuts

Tree fruit
- Apples
- Avocados
- Cherries
- Mangos
- Peaches
- Pears
- Plums
- Prunes

Citrus
- Nectarines
- Oranges

Other fruit
- Grapes
- Kiwi

Melons
- Cantaloupes
- Honeydew
- Watermelons

Berries
- Blueberries
- Boysenberries
- Cranberries
- Raspberries
- Strawberries

Vegetables
- Cucumber
- Pumpkins
- Squash
- Turnips

Other Crops
- Alfalfa
- Buckwheat
- Canola
- Clover
- Sunflowers

Additional Crops:

Tree nuts
- Chestnuts
- Hazelnuts
- Pecans
- Pistachios
- Walnuts

Tree fruit
- Bananas
- Papayas
- Persimmons
- Pomegranates

Citrus
- Grapefruit
- Lemons
- Limes
- Kumquats
- Mandarins
- Tangelos
- Tangerines

Other fruit
- Pineapples

Berries
- Currants
- Loganberries

Vegetables
- Artichokes
- Asparagus
- Beets
- Broccoli
- Brussel sprouts
- Cabbage
- Carrots
- Cauliflower
- Celery
- Eggplant
- Garlic
- Kale
- Lettuce
- Lima beans
- Okra
- Peas
- Peppers
- Potatoes
- Snap beans
- Spinach

Other Crops
- Barley
- Beans
- Coffee
- Cotton
- Hops
- Oats
- Peanuts
- Sorghum
- Soybeans
- Tobacco

Information Contacts

Listed below are the commodity specialists in the Livestock Branch of the National Agricultural Statistics Service to contact for additional information. E-mail inquiries may be sent to nass@nass.usda.gov

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- Alissa Cowell-Mytar – Cold Storage ..... (202) 720-4751
- Tom Kruchten – Census of Aquaculture ..... (202) 690-4870
- Kim Linonis – Layers, Eggs ..... (202) 690-8632
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