

Contractual arrangements in pollination services markets: The case of California almonds

Apimondia

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Almond Pollination Services

- California produces >80% of world almonds
 - Requires >68% of honey bee colonies in U.S.
 - 2018: \approx 1 million almond acres required \approx 2 million colonies
- Largest market for pollination services in the world
 - \$360 million+ in pollination contracts exchanged between beekeepers and almond growers

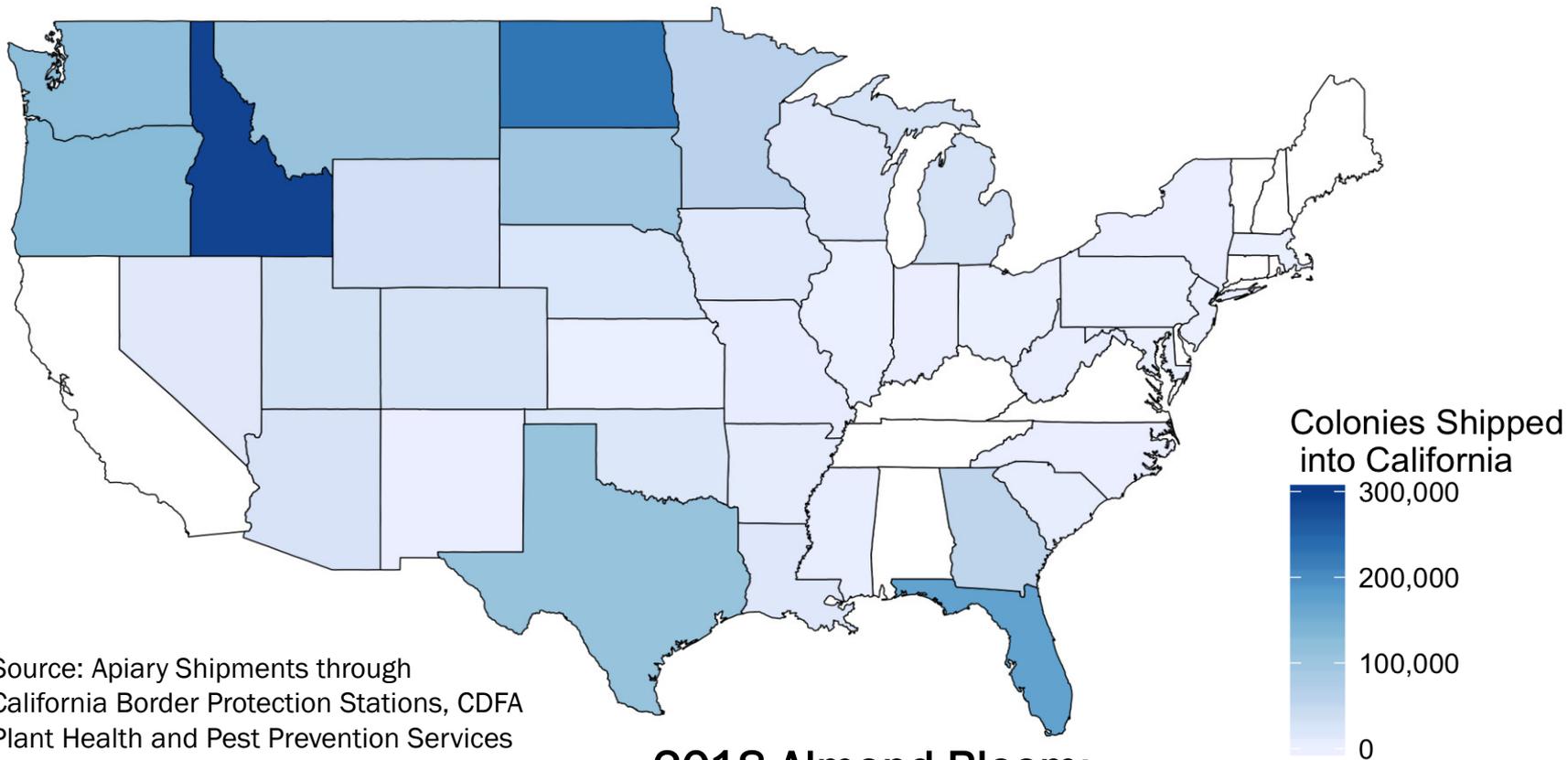


FEATURE

The Super Bowl of Beekeeping

Almond growing in California is a \$7.6 billion industry that wouldn't be possible without the 30 billion bees (and hundreds of human beekeepers) who keep the trees pollinated — and whose very existence is in peril.

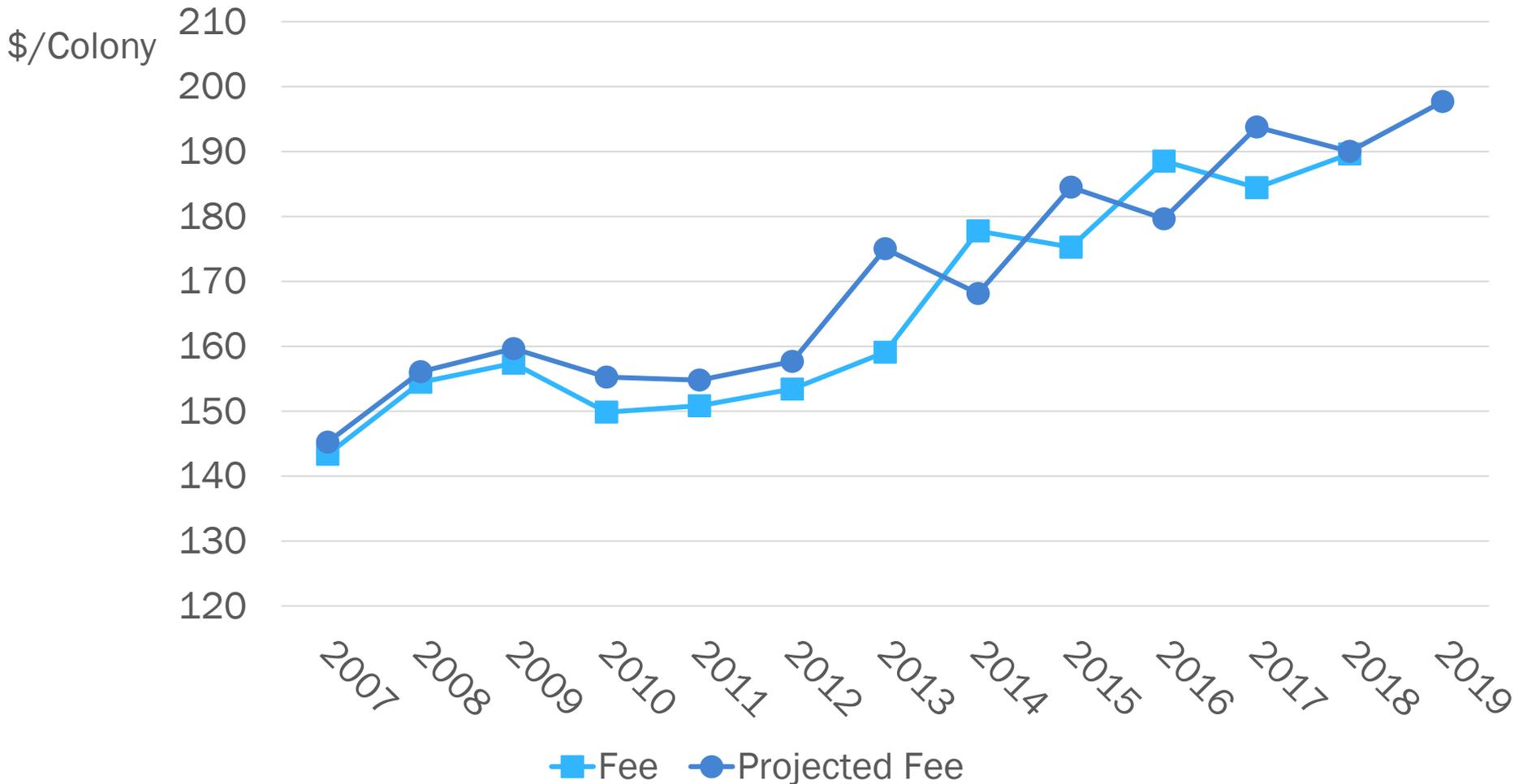
2018 Colony Shipments into California for Almond Pollination



Source: Apiary Shipments through California Border Protection Stations, CDFA Plant Health and Pest Prevention Services

2018 Almond Bloom:
>4600 truckloads of
1.8 million colonies

Almond Pollination Fees

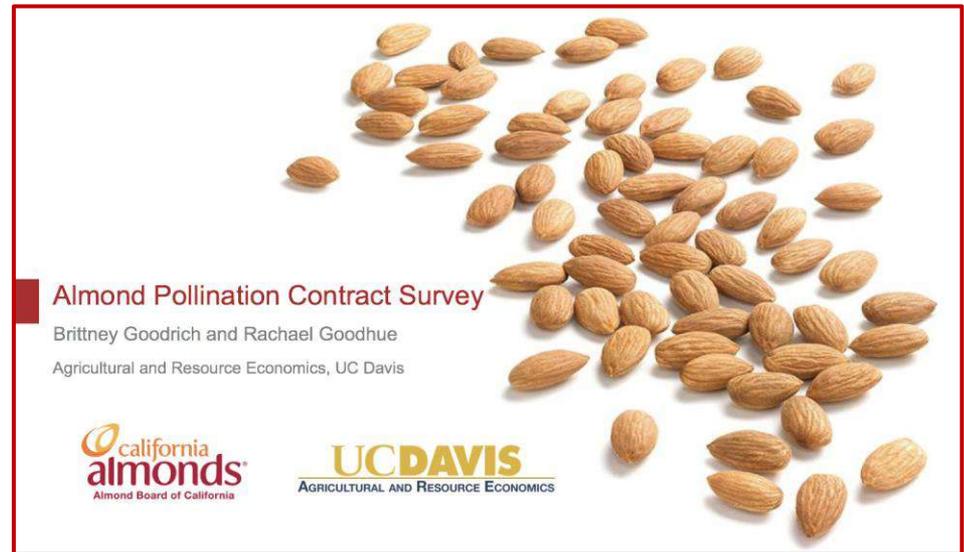


Source: California State Beekeeper's Association

2015 Almond Pollination Contract Survey

- Surveyed 114 growers at the 2015 Almond Conference about:

- 2015 contract provisions
- Other pollination variables
- Operation characteristics

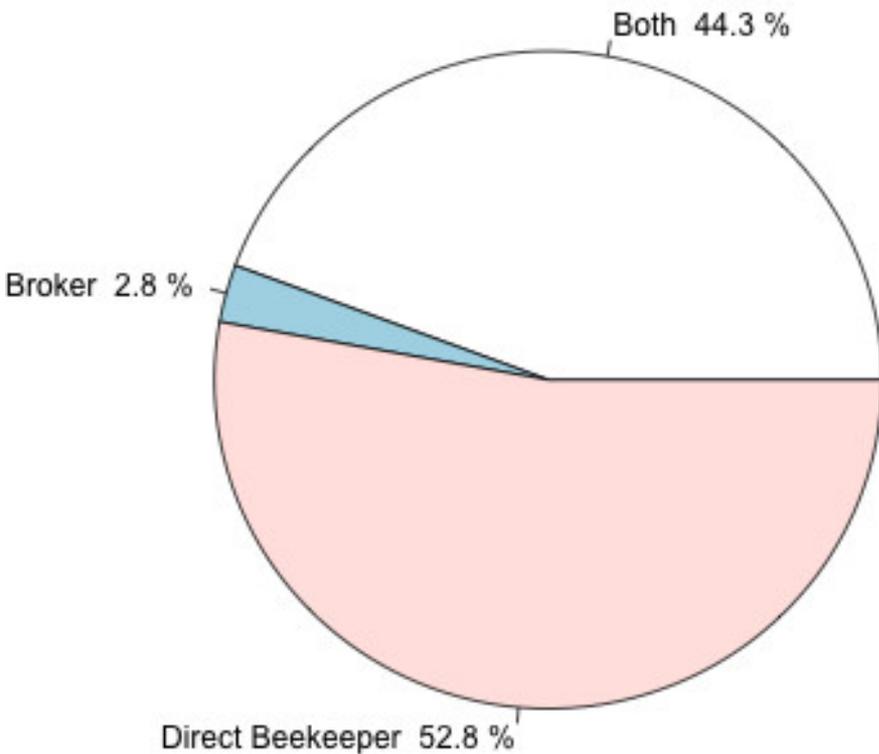


- Survey respondents:

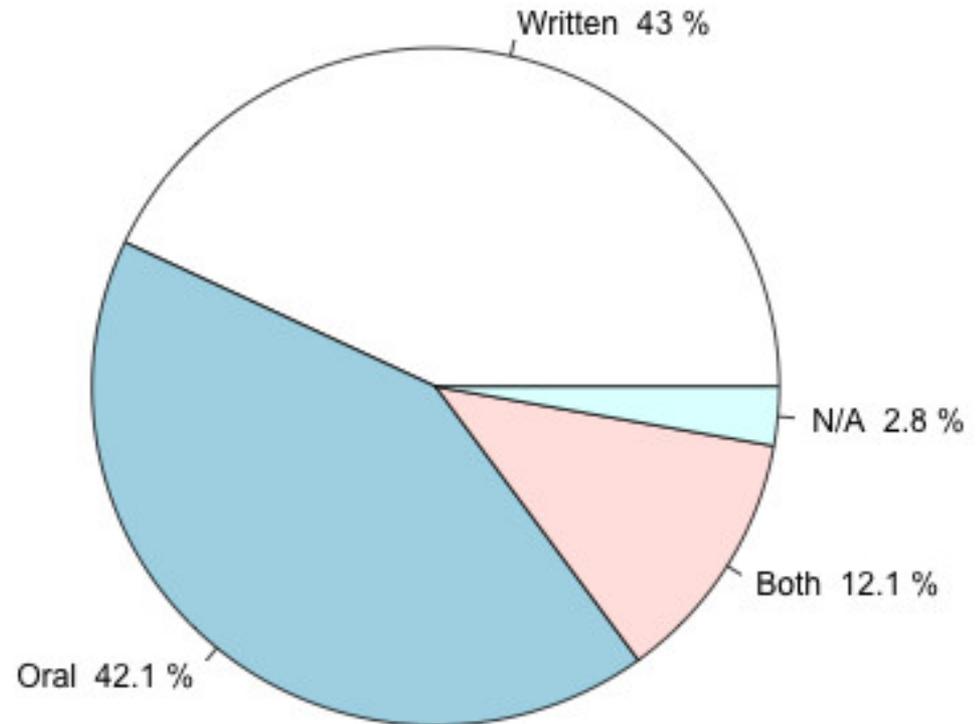
- Overrepresentation of large growers
 - Overrepresentation of contract formality

Almond Pollination Agreements

Beekeeper vs Broker (N=106)



Form of Agreement (N=107)



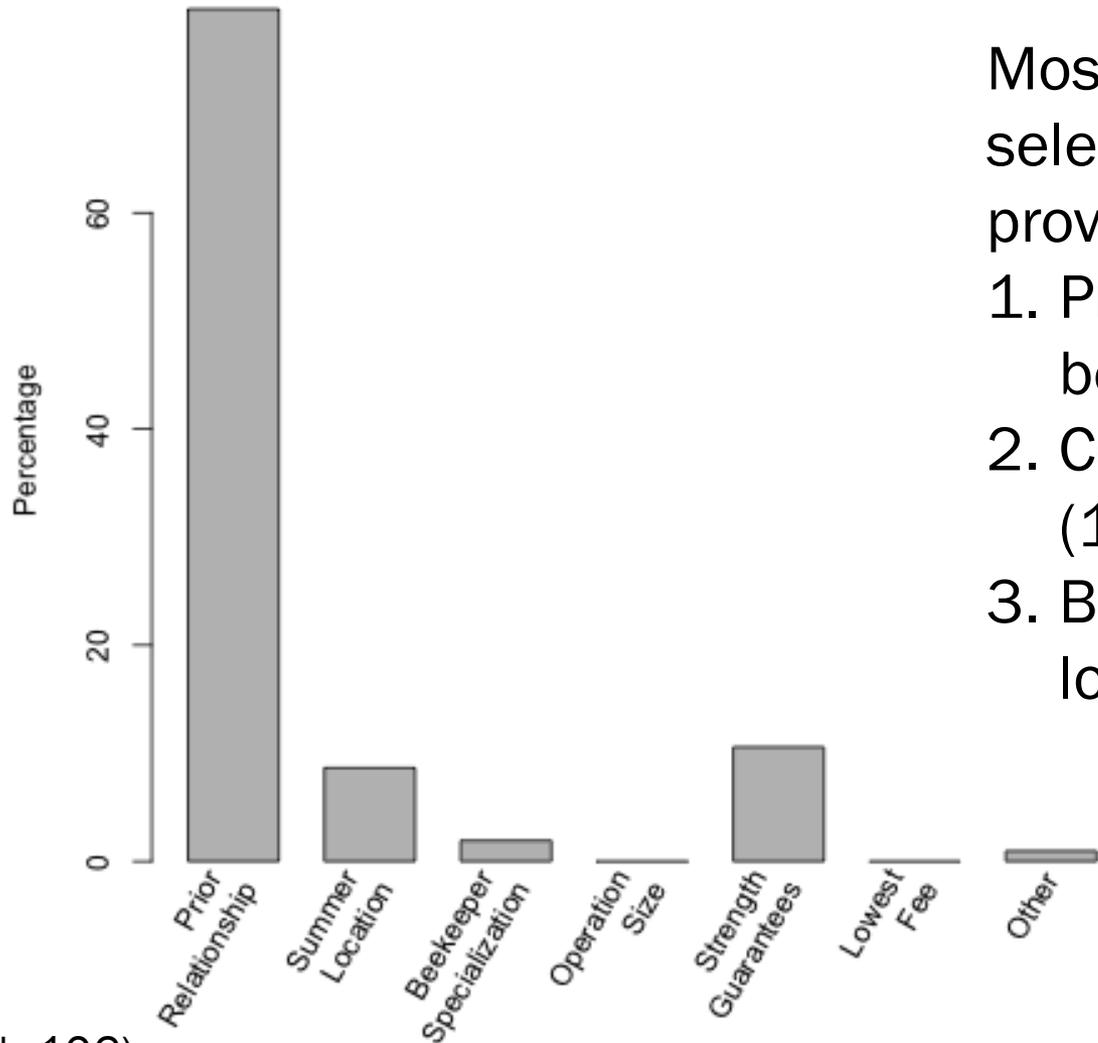
Written vs Handshake Agreements

- Growers with **more acreage**, **more experience** and/or **higher yields** more likely to use **written** contracts
 - Suggests over time trend towards more formal contracts

Agreement Form	Years Experience	Yield (lbs per acre)	Acreage
Written	24	2,151	716
Oral	15	1,927	346
Both	23	2,282	1,694

Note: Using ANOVA methods, differences are statistically significant at the 10% level

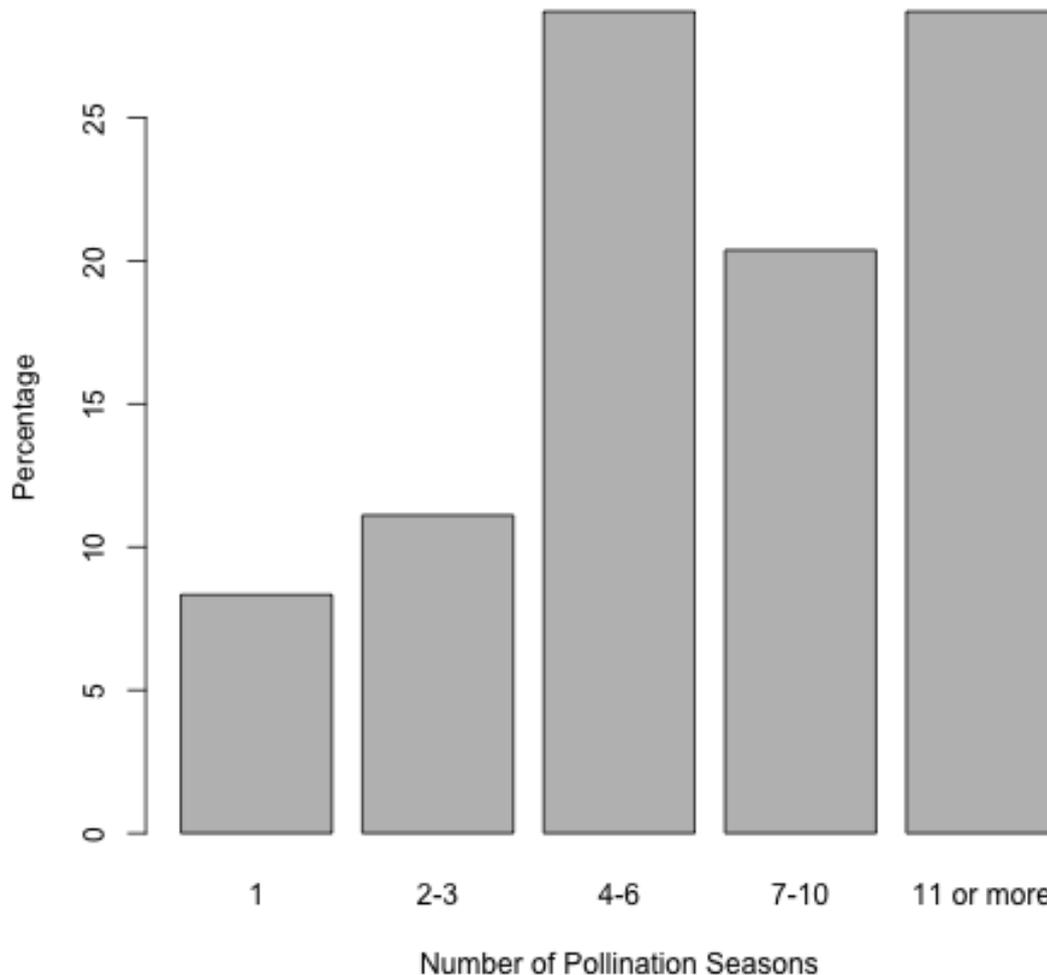
Selection Preferences



- Most important factor in selecting a beekeeper to provide pollination services:
1. Prior relationship with beekeeper (80%)
 2. Colony strength guarantees (11%)
 3. Beekeeper's summer location (9%)

(N=106)

Length of longest pollination relationship



Nearly 80% worked with beekeeper or broker for 4+ pollination seasons

(N=108)

Colony Strength Requirements

- **Minimum #** brood frames covered with adult bees
 - Coverage specifics: at least 75% or 4 bees/square inch
- **Minimum Average #** frames covered
 - Standard: 6 - 8 frames
- Per-frame incentives

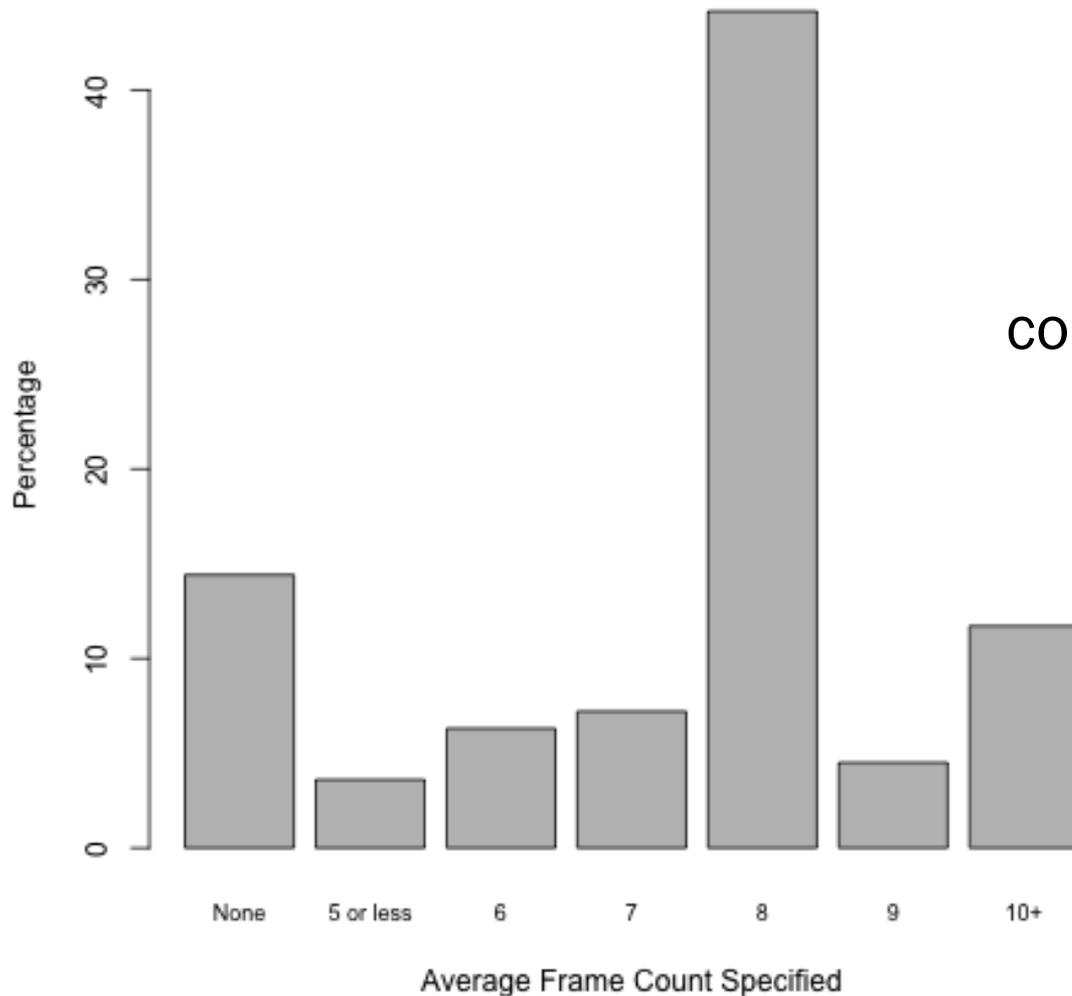
Grower view



Beekeeper view



Minimum Average Frame Count



86% of 2015 contracts contained a minimum average frame count requirement

(N=111)

Colony Strength and Fees

2015 Almond Pollination Fees by Colony Strength Contract Type

Almond Pollination Fee/Colony Summary

Colony Strength Requirement:	Average	Min	Max
None	\$165.20	\$140.00	\$180.00
Average of 8 frames or less	\$169.70	\$135.00	\$215.00
Average of more than 8 frames	\$179.40	\$150.00	\$200.00

Incentive-Based Contracts

≈20% of growers offered per-frame incentive contracts in 2015

Sample Almond Pollination Incentive-Based Contract

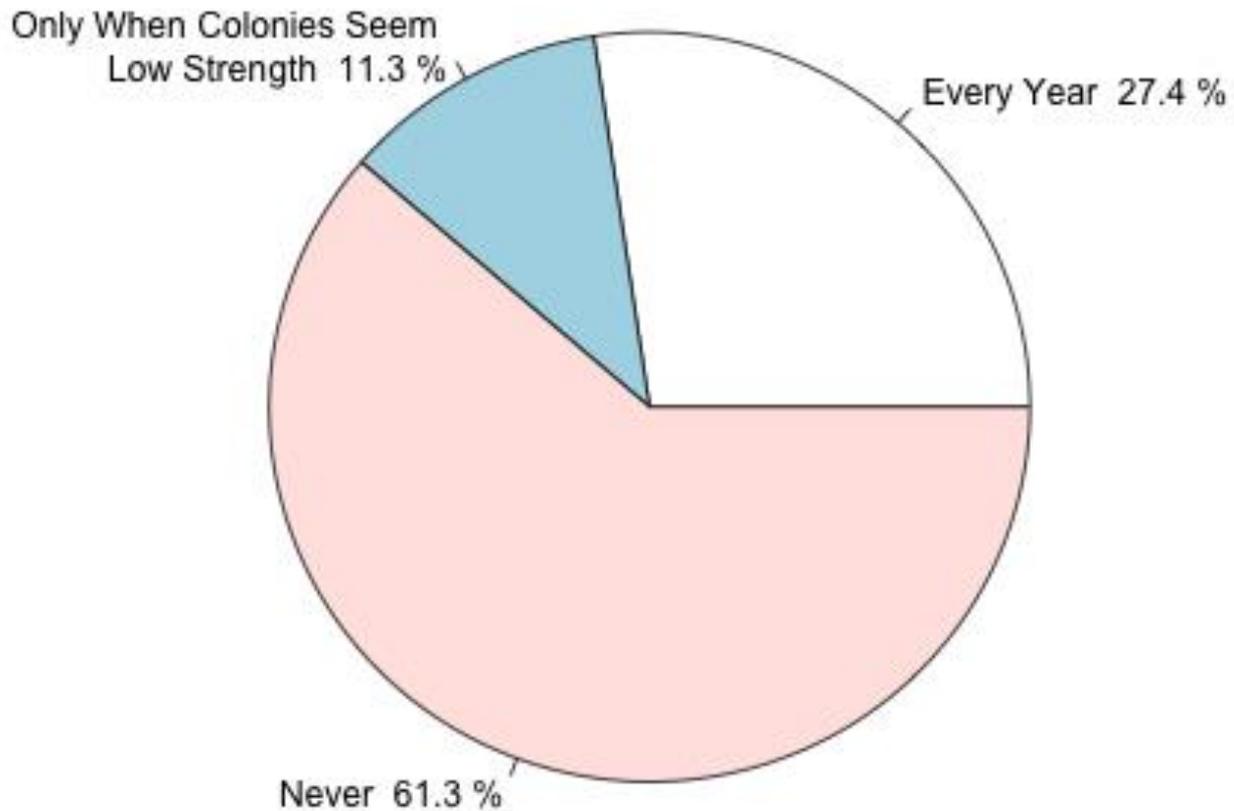
Almond Pollination Pricing Schedule

Benchmark Colony Strength: 8-frame average	Bonus/frame above benchmark (<i>Max Bonus=\$20</i>)	Penalty/frame below benchmark
\$175	\$10	\$15

Beekeeper Per-Hive Payments

Beekeeper	Average Frame Count	Price/Hive
Beekeeper #1	9.5 frames	$(1.5 \times 10) + 175 = \190
Beekeeper #2	7 frames	\$160
Beekeeper #3	11.5 frames	\$195

Inspection Frequency



(N=106)

Response to Low Colony Strength

Actions Allowed by Pollination Agreements in Response to Low Delivered Colony Strength (N=105)

Action	Percentage
Communicate with Beekeeper to Bring More Colonies to Compensate	74%
No Longer Contract With in Future	41%
Impose Percentage of Total Pollination Expense or Fixed Penalty	28%
Impose Per-Frame Penalty (For Number of Frames Below Average)	22%
Remove Colonies and Replace with Others	8%
Impose Another Penalty	3%
No Action	1%

Note: Respondents were allowed to select multiple actions, so these percentages sum to more than 100 percent.

Additional Contract Components

Percentage of Respondents Whose Contracts Included Various Clauses (N=95)

Clause	Percentage
Beekeeper Access After Colony Placement	34%
Pesticide Application	30%
Late Colony Placement	29%
Inspection Specifics	26%
Bloom Percentages for Approximate Move-in/Move-out Dates	24%
Minimum Number of Colonies per Drop	24%
Colony Theft	18%
Unpaid Balances	14%
Colony Collapse Disorder (CCD)	7%
None of the Above	37%

Note: Respondents selected all provisions in their pollination agreements so the percentages sum to more than 100.

What do I absolutely *need* to have in my pollination contract?

- The following can be contained within a one page contract:
 - Specification for entry/exit from orchard or field
 - Number of colonies & per-colony fee
 - Minimum colony strength requirements
 - Payment dates & penalties for default
 - Pesticide spraying
- If you're really opposed to a written contract, it could help to discuss these with the grower beforehand
 - **BUT** oral agreements are not as enforceable as written!
- Seek legal advice when developing your contracts
 - **Disclaimer:** I am not a lawyer! These are in my opinion what a beekeeper should have to keep from taking on too much risk in their pollination agreements.

Sample Pollination Contracts

- Project Apis m.
 - <https://www.projectapism.org/uploads/1/0/5/7/105706229/pollination-contract-template.pdf>
- Penn State Extension
 - <https://extension.psu.edu/hives-for-hire-are-you-getting-your-moneys-worth>
- University of Florida Extension
 - <http://edis.ifas.ufl.edu/aa169>
- Do NOT copy and paste together sections from different sample contracts
 - These contracts are not substitutes for legal advice!

Sample Pollination Services Contract

This sample contract is provided as a service and is not a substitute for legal advice.

This agreement dated _____ is made between the following parties:

Beekeeper's name: _____ **Grower's name:** _____

CONTACT INFORMATION	
Beekeeper	Grower
Mailing address:	
Phone number(s):	
Emergency phone number:	
Email address:	

The parties agree to the following terms

CROP AND COLONY OVERVIEW			
This agreement involves the 20__ growing season			
Crop to be pollinated by honey bee colonies. This agreement is for crop varieties that are in flower.			
Address and/or GPS coordinates of orchard/field where the hives will be placed			
Date of colony placement*		Date of colony removal*	
* If actual flowering dates differ from dates above, the grower will provide __ hours notice to the beekeeper regarding when colonies should be placed and removed			
No. of hives rented		Price of a standard hive rental	\$
Total anticipated rental price	\$	Date(s) on which the rental fee is payable to the beekeeper	
Describe in detail or illustrate the colony placement in the orchard			
The grower will provide right of entry at all times to beekeepers visiting the property so that s/he can manage colonies		<input type="checkbox"/> Yes	<input type="checkbox"/> No
Before services are provided, the beekeeper will locate a holding yard to place colonies in the event that they require movement to avoid a pesticide spray		<input type="checkbox"/> Yes	<input type="checkbox"/> No
A water source will be provided to the honey bee colonies by the following party		<input type="checkbox"/> Beekeeper	<input type="checkbox"/> Grower
		<input type="checkbox"/> No water will be provided	
The grower and beekeeper agree to comply with all applicable federal, state and local laws.			

The **beekeeper** agrees to provide colonies of the following standards:

COLONY STATUS OF A STANDARD HIVE	
Colony configuration (2 deeps, 1 deep, etc.)	
Minimum frames of bees in each hive	
Minimum frames of brood in each hive	
Pounds of food stores	lbs
Presence of a laying queen	
Colonies are free of American Foulbrood	
The beekeeper agrees to open and demonstrate the health and status of colonies randomly selected by the grower at least one (1) time following placement of the hives and thereafter as reasonably requested by the grower.	
The beekeeper will maintain colonies in good pollinating condition by providing feed, medication, and mite treatments as needed	

This document was prepared by the Dyce Lab of Honey Bee Studies, Cornell University ©2018

The **grower** agrees to the following responsibilities:

GENERAL RESPONSIBILITIES
The grower will provide a suitable place(s) for the hives that are accessible by truck or other vehicles
The grower will hold the beekeeper harmless from any and all claims of injury or property damage arising from beekeeper's performance of this contract, including but not limited to, claims arising from bee stings to animals or people, and claims for field or crop damage or loss resulting from the use of beekeepers vehicle(s).

MINIMIZING RISK OF PESTICIDE EXPOSURE	
The following pesticides or agricultural chemicals are mutually agreed to be used while the bees are on the crop:	
1.	2.
3.	4.
5.	6.
7.	8.
9.	10.
The beekeeper will be notified of an application of a pesticide in this above list	<input type="checkbox"/> Yes <input type="checkbox"/> No
The beekeeper will be notified at the emergency contact (number/email address) provided above of an application of a pesticide that is not included in this above list	<input type="checkbox"/> Yes <input type="checkbox"/> No
The number of hours notice the grower agrees to give the beekeeper before a pesticide is applied to a crop (e.g., 48 hrs)	_____ hrs
If a pesticide not included in the above list will be applied during pollination, the grower shall assume the costs to move the colonies away from and back to the crop. State the cost of moving colonies	\$ _____
The grower will compensate the beekeeper for any colonies that died from acute pesticide poisoning events while present or within one month of pollinating this crop. Cause of death must be verified by the state apiculturist, state inspector, or Department of Environmental Conservation. State the cost of compensation per colony	\$ _____
The grower will dispose of all pesticide products in a manner that bees will not be able to contact it while searching for a source of water	

Additional agreements:

ADDITIONAL CONSIDERATIONS
Prior to placing colonies for pollination, either party can terminate this contract should events occur beyond his/her control that prevent him or her from fulfilling the obligations as outlined (e.g., unexpected colony deaths, unexpected damage or disease of crops, etc.).
If disputes arise that cannot be resolved through communication or small claims court, they will be settled by arbitration. Either party may request arbitration by providing written notice to the other at the contact information provided above by certified mail, return receipt requested. Within 10 days of receipt of such written request, each party will select one arbitrator and the two arbitrators will select a third. After reviewing the case, the decision of any two arbitrators will be binding. Cost of arbitration will be equally divided between the two parties. This contract shall be governed by New York law.

Signature of beekeeper: _____ Date: _____

Signature of grower: _____ Date: _____

Almond Pollination Resources:

- 2018 Almond Pollination Market Outlook in Bee Culture Magazine
 - <https://www.beeculture.com/2018-almond-pollination-market-outlook-demand-supply-contracts/>
 - 2020 update coming soon!
- Honey Bee Colony Strength in the California Almond Pollination Market (Goodrich and Goodhue, 2016)
 - Univ of California Giannini Foundation *ARE Update* Vol 19, No. 4
<https://giannini.ucop.edu/publications/are-update/issues/2016/>
- Almond Board of California- Pollination Info
 - <https://www.almonds.com/pollination>