

USING BLUE ORCHARD BEES IN CALIFORNIA ALMONDS

Project Partnerships

1. **USDA-ARS Bee Biology & Systematics Lab,
Logan, Utah State University**
 - Jim Cane, Research Entomologist
 - Theresa Pitts-Singer, Research Entomologist
 - Glen Trostle, Entomologist
2. **University of California Cooperative
Extension Sutter/Yuba and Butte Counties**
 - Carolyn Pickel, Associate Director AG IPM, Statewide
IPM Program
 - Sara Goldman Smith, Staff Research Associate
3. **Almond Board of California**

Project Objectives

Develop basic guidelines, to include

- **Bee emergence in synchrony with early almond bloom.**
- **Care and handling of nests at all developmental stages:**
 - **Incubation and Emergence**
 - **Eggs and Larvae in nest straws**
 - **Development of pupae to adult in nest straws**
 - **Pre-wintering and wintering**
- **Separate rearing practices for BOBs from different origins.**

Two years with the blue orchard bee (BOB) in almond orchards

2008

- **Begin demonstration of on-farm use of managed populations.**
- **Three release sites using 3 separate populations.**

ORIGIN	RELEASE SITE	RELEASE DATE	1 ST COMPLETED NEST
Utah	North Butte Co.	Feb 20, 2008	Mar 9, 2008
Washington	South Butte Co.	Feb 17, 2008	Mar 4, 2008
California	Turlock	Feb 19, 2008	--

Recovered BOB Releases in 2008

ORIGIN	# NESTS	# PROGENY		# DEAD	PARA-SITES	TOTAL CELLS
		FEMALES	MALES			
Utah	82	111	206	148	0	465
Wash.	389	653	1223	453	12	2341
Calif.	516	618	1020	1039	3	2679

- **300 females released at each site**
- **Sampled 400-500 cells causing higher mortality**
- **Doubled population in one year at 2 of 3 sites**

2009

- **Five release sites**
- **Encourage input/participation from growers**
- **Release offspring from 2008 – 2nd year in almonds**
- **Add 2 new populations purchased commercially – 1st year in almonds**
- **Recover or increase populations for use in 2010**

Observations & Field Data Collection

Observe Daily & Record:

- Emergence (chewing noises inside straws?)
- First flight, pre-nesting behavior
- Identify males and females, watch for mating
- Count flowers, estimate % bloom
- Timed counts
 - Number and type of bees on flowers
 - Number of BOB actively nesting
- Count plugged (completed) nests
- Night counts: females resting inside nest holes

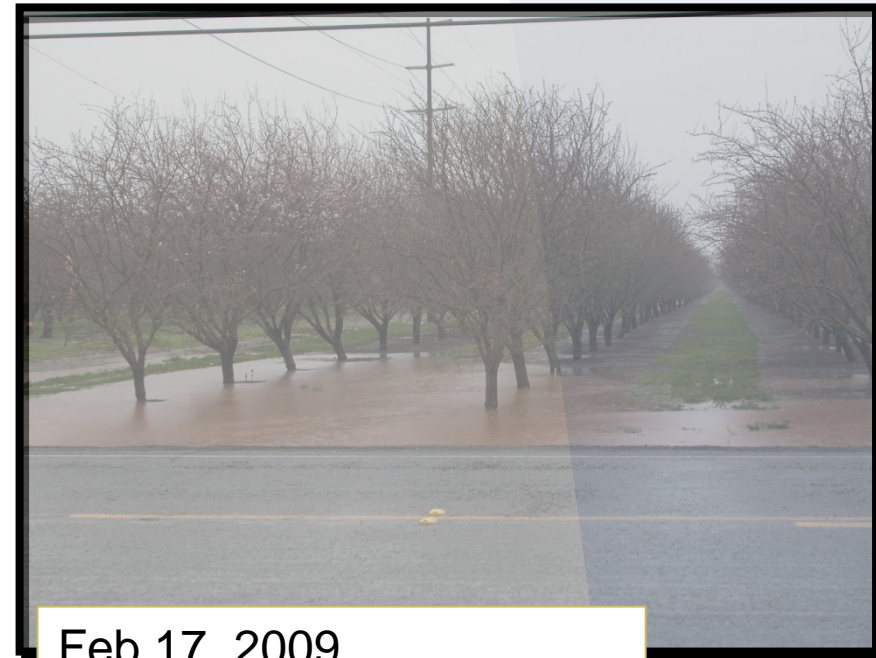
Blue Orchard Bee Demonstration Kit

Prototype notebook created by Logan Bee Lab

Scout for appropriate locations; Adverse weather conditions

Feb 7, 2009

Much rain/few flowers



Feb 17, 2009

More rain/still few flowers

Nesting Shelter Design & Placement

- **Protection from rain**
- **Face early morning sun**
- **Avoid sprinklers hitting nests**
 - Irrigation for frost protection
- **Outside edge of orchard?**
 - More sunlight
 - Less chance of fungicide exposure?
- **Distant from honeybee hives**
 - Reduce possible competition
- **Nearby to wild habitat if possible**
 - Access to plants blooming before and after almonds



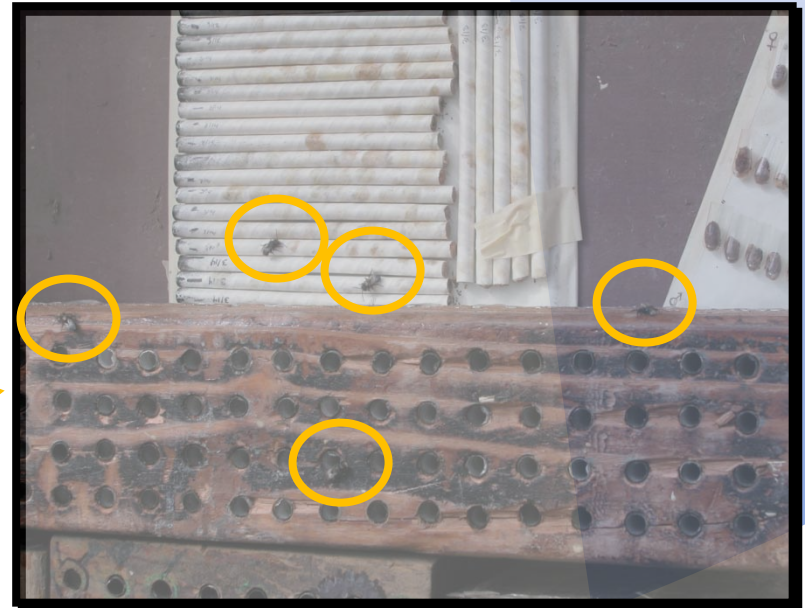
Release and Emergence



Encourage emergence:
warm straws in sun



Emergence
!



Bloom late in 2009.

Frequent storms.



Feb 20, 2009



Feb 25, 2009



Collect completed nests



Handle gently, these
are next year's bees!

Recovered BOB Releases in 2009

ORIGIN	1 ST FLIGHT (observed)	10% BLOOM (Approx.)	# FEMALES RELEASED	# PROGENY		TOTAL CELLS
				FEMALE	MALE	
Wash. year1 (purchased new)	Feb 19	Feb 15	300	66	144	233
Wash. year2 (2008 progeny)	Feb 8	Feb 18	553	333	702	1176
Utah year1 (purchased new)	Feb 24	Feb 19	300	6	16	26
Utah year2 (2008 progeny)	Feb 12	Mar 1	78	180	357	572
Calif. year2 (2008 progeny)	Feb 19	Feb 10	191	11	17	30

Bees released on Feb 6 & 7, 2009

