

Navel Orangeworm Pilot Project 2022 – Weekly Report

Week Ending – March 25, 2022

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I. Project Updates

Navel Orangeworm Sterile Insect Technique

The Navel Orangeworm (NOW) Pilot Project (Project) utilizes NOW sterile insect technique (SIT) moths obtained from the United States Department of Agriculture (USDA) Phoenix, Arizona Rearing Facility. Quality Control (QC) tests are performed on every shipment of NOW SIT moths used for aerial releases.

Aerial releases for 2022 began on March 15, 2022, with one magazine of approximately 750,000 moths being released over Zones 1 and 3. The start date for a second magazine of approximately 750,000 moths has not been decided yet.

Navel Orangeworm Trapping

The NOW trapping program began May 5, 2020, with an Area Wide Project site that included a total of four orchards in Fresno County: two 640-acre almond orchards and two 640-acre pistachio orchards. On May 17, 2021, the Area Wide Project site expanded to include four additional orchards in Fresno County: one 640-acre almond orchard, one 640-acre pistachio orchard, one 160-acre almond orchard, and one 160-acre pistachio orchard. All eight orchards, designated as Zones 1 through 8, continue to be serviced on a weekly basis. Listed below are any circumstances which prevented regular servicing in 2022:

- Week of January 7: No traps were serviced due to severe weather on site
- Week of January 14: No traps were serviced in Zones 1 – 4 due to staffing issues
- Week of February 25: No traps were serviced in Zone 1 due to pesticide applications on site
- Week of March 4: No traps were serviced in Zone 2 due to pesticide applications on site
- Week of March 11: Only 26 of the 72 traps were serviced in Zone 2 due to pesticide applications on site

II. Project Design

The NOW Area Wide Project site includes eight orchards located in Fresno County, identified as Zones 1 through 8. Listed below is information related to each orchard:

Zone #	Crop Type	Acres	Aerial SIT Release/Non-Release	Date Added to Area Wide Project
Zone 1	Pistachio	640	Release	May 5, 2020
Zone 2	Pistachio	640	Non-Release	May 5, 2020
Zone 3	Almond	640	Release	May 5, 2020
Zone 4	Almond	640	Non-Release	May 5, 2020

Zone 5	Pistachio	640	Release	May 17, 2021
Zone 6	Pistachio	160	Non-Release	May 17, 2021
Zone 7	Almond	640	Release	May 17, 2021
Zone 8	Almond	160	Non-Release	May 17, 2021

Each zone has a trap site ratio of approximately 1 trap site per 18 acres for a total of 36 trap sites for each 640-acre zone and 9 trap sites for each 160-acre zone. Trap sites include two traps: one trap baited with NOW pheromone/PPO lures and one trap baited with pistachio meal. All traps are serviced on a weekly basis. Servicing includes collecting trap bottoms and replacing with new trap bottoms. Bait/lure changes occur once a month, and trap tops are replaced as needed. Counts are performed on each trap collected to determine number of wild versus sterile captures and male versus female captures.

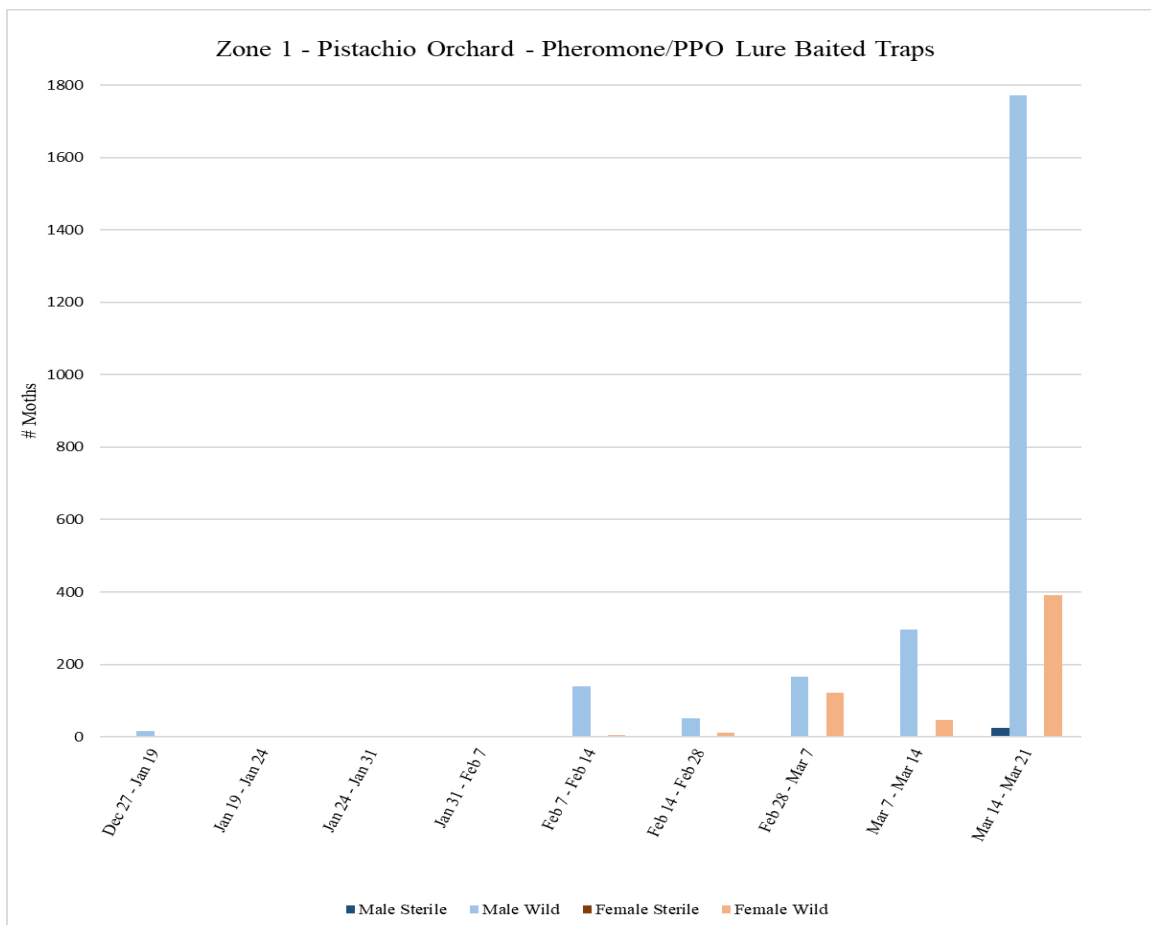
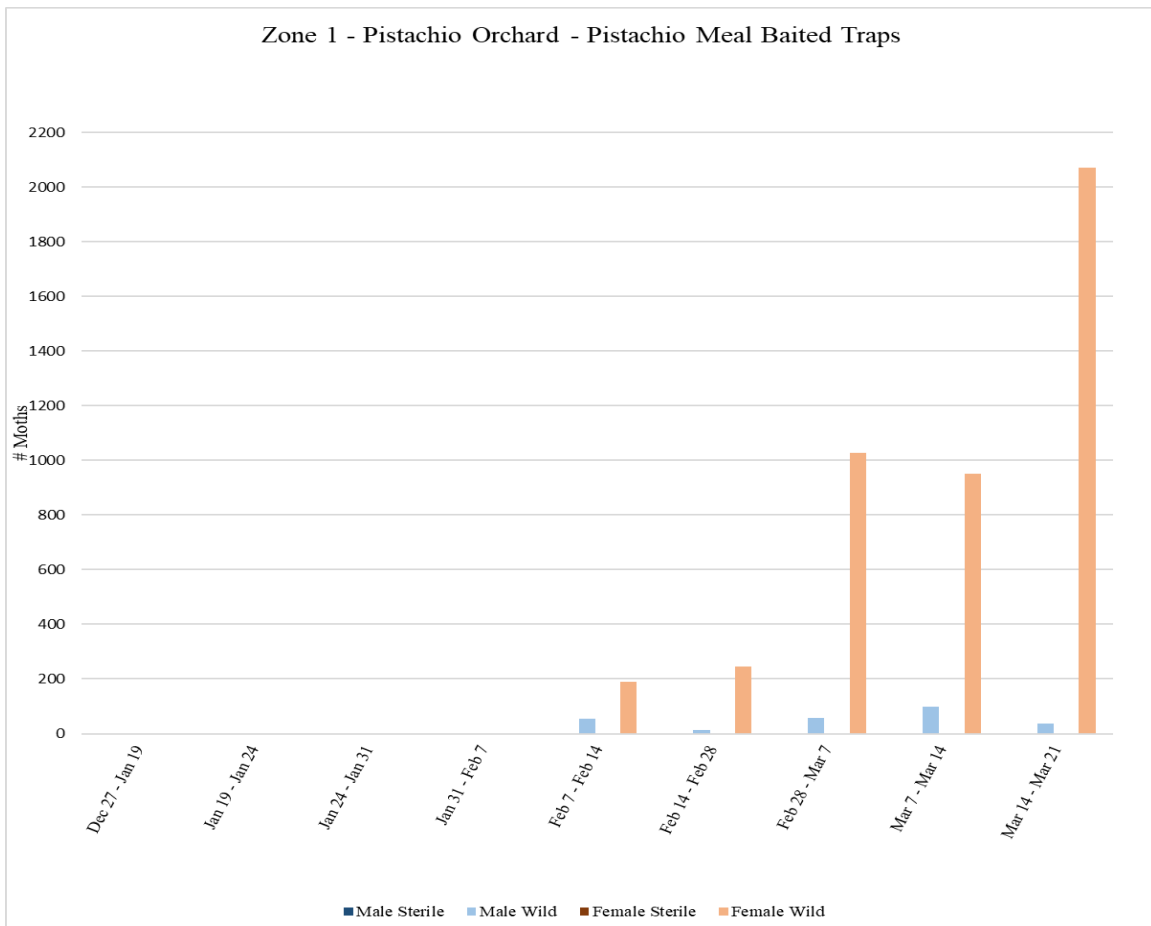
III. Trap Results for Week Ending on March 25, 2022

Zone 1

Zone 1 is a pistachio orchard where aerial NOW SIT releases are conducted. A total of **72** traps were collected from Zone 1 on Monday, March 21, with **36** pistachio meal baited traps and **36** pheromone/PPO lure traps.

Zone 1 - Pistachio							
Pistachio Meal Baited Traps							
Dates Traps in Field	# of Releases During Trap Period	Male Sterile	Male Wild	Male Total	Female Sterile	Female Wild	Female Total
¹ Dec 27 - Jan 19	0	0	1	1	0	1	1
Jan 19 - Jan 24	0	0	0	0	0	0	0
Jan 24 - Jan 31	0	0	0	0	0	0	0
Jan 31 - Feb 7	0	0	0	0	0	0	0
Feb 7 - Feb 14	0	0	54	54	0	191	191
² Feb 14 - Feb 28	0	0	13	13	0	245	245
Feb 28 - Mar 7	0	0	57	57	0	1028	1028
Mar 7 - Mar 14	0	0	99	99	0	950	950
Mar 14 - Mar 21	7	0	36	36	0	2070	2070
¹ 18 of the 36 traps in field since Dec 20; 18 of the 36 traps in field since Dec 27							
² Traps in field for two weeks							

Zone 1 - Pistachio							
Pheromone/PPO Lure Baited Traps							
Dates Traps in Field	# of Releases During Trap Period	Male Sterile	Male Wild	Male Total	Female Sterile	Female Wild	Female Total
¹ Dec 27 - Jan 19	0	0	15	15	0	0	0
Jan 19 - Jan 24	0	0	1	1	0	0	0
Jan 24 - Jan 31	0	0	3	3	0	0	0
Jan 31 - Feb 7	0	0	0	0	0	0	0
Feb 7 - Feb 14	0	0	139	139	0	4	4
² Feb 14 - Feb 28	0	0	52	52	0	12	12
Feb 28 - Mar 7	0	0	166	166	0	121	121
Mar 7 - Mar 14	0	0	297	297	0	48	48
Mar 14 - Mar 21	7	24	1772	1796	0	391	391
¹ 18 of the 36 traps in field since Dec 20; 18 of the 36 traps in field since Dec 27							
² Traps in field for two weeks							

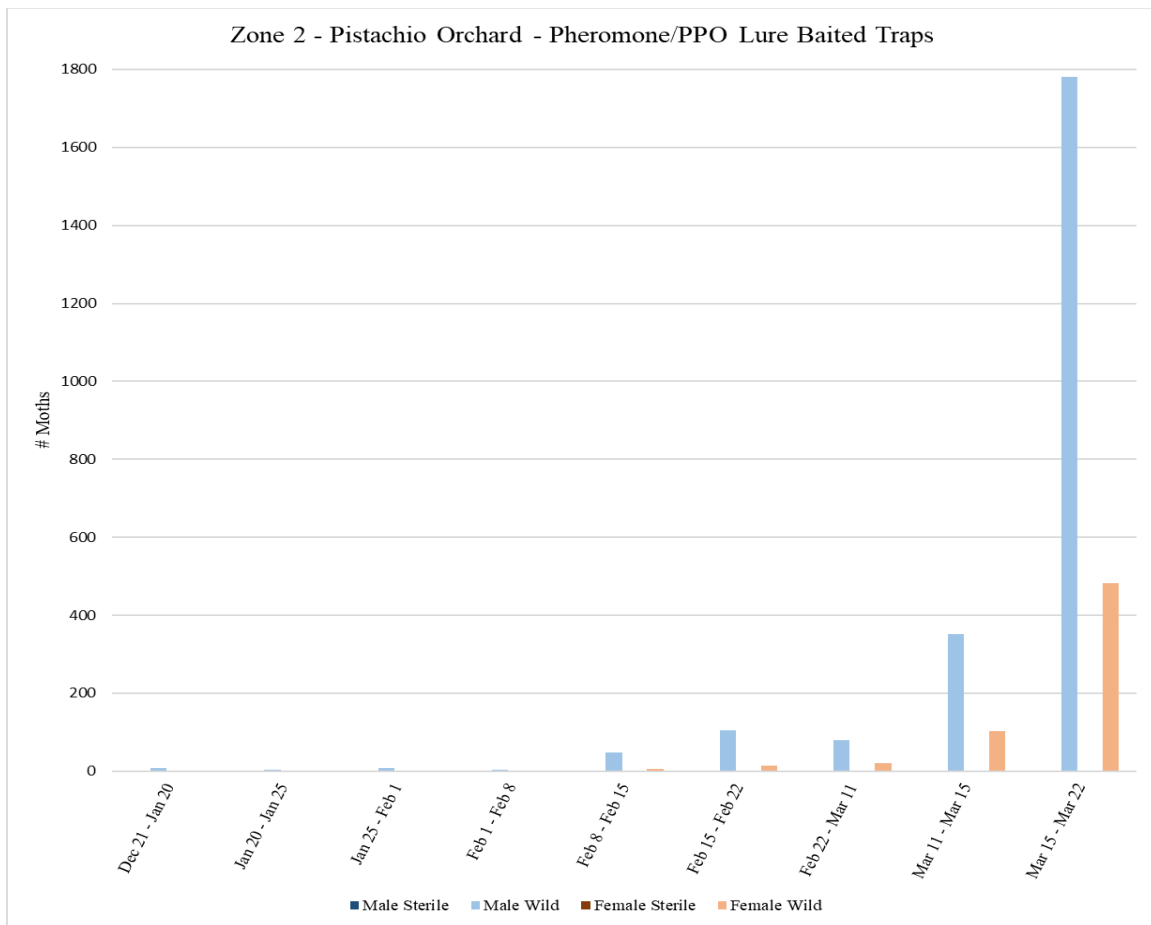
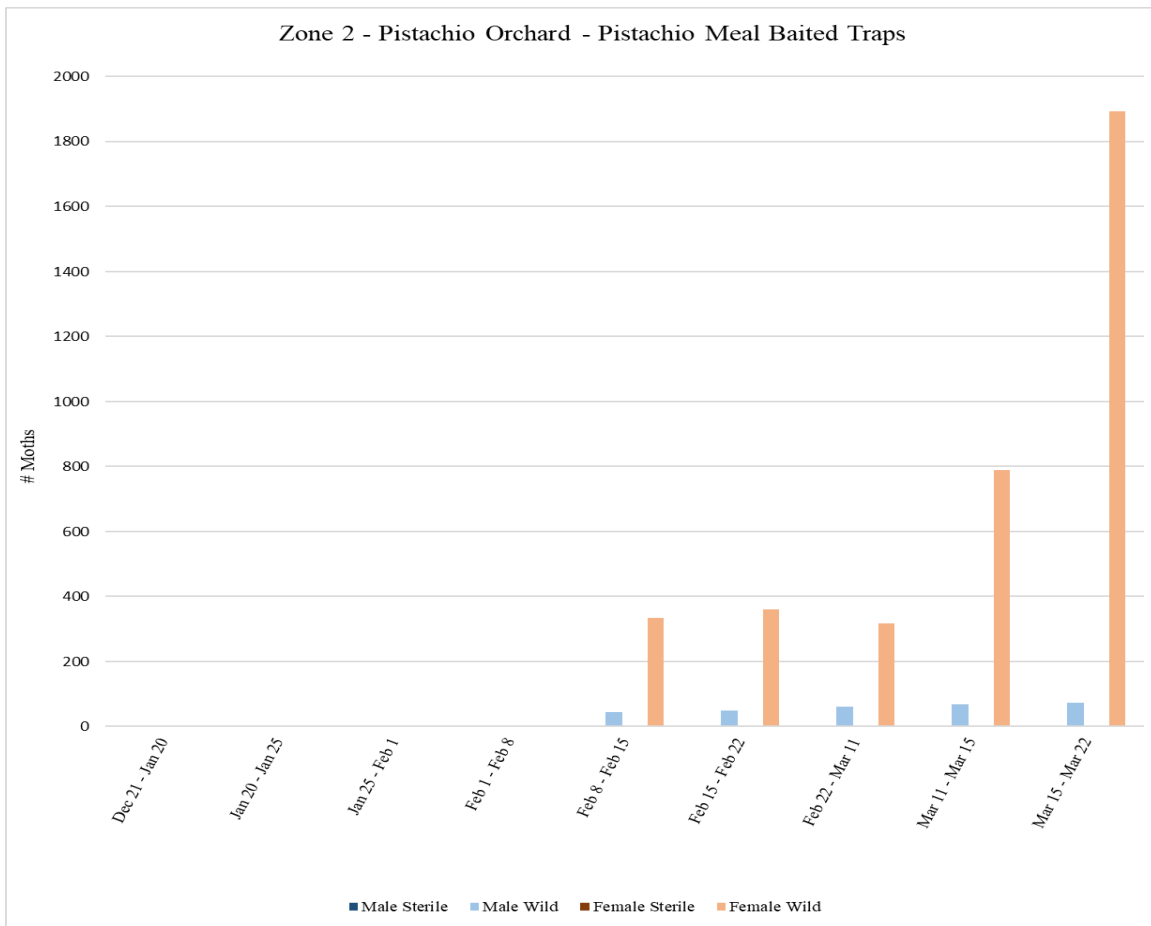


Zone 2

Zone 2 is a pistachio orchard where aerial NOW SIT releases are not conducted. A total of **72** traps were collected from Zone 2 on Tuesday, March 22, with **36** pistachio meal baited traps and **36** pheromone/PPO lure traps

Zone 2 - Pistachio							
Pistachio Meal Baited Traps							
Dates Traps in Field	# of Releases During Trap Period	Male Sterile	Male Wild	Male Total	Female Sterile	Female Wild	Female Total
¹ Dec 21 - Jan 20	0	0	0	0	0	2	2
Jan 20 - Jan 25	0	0	0	0	0	0	0
Jan 25 - Feb 1	0	0	0	0	0	0	0
Feb 1 - Feb 8	0	0	0	0	0	0	0
Feb 8 - Feb 15	0	0	45	45	0	335	335
Feb 15 - Feb 22	0	0	49	49	0	360	360
² Feb 22 - Mar 11	0	0	61	61	0	318	318
³ Mar 11 - Mar 15	0	0	69	69	0	790	790
Mar 15 - Mar 22	0	0	73	73	0	1893	1893
¹ Traps in field since 12/21							
² Only 13 of the 36 traps serviced this week due to pesticide applications on site							
³ 13 of the 36 traps in field since Mar 11; 23 of the 36 traps in field since Feb 22							

Zone 2 - Pistachio							
Pheromone/PPO Lure Baited Traps							
Dates Traps in Field	# of Releases During Trap Period	Male Sterile	Male Wild	Male Total	Female Sterile	Female Wild	Female Total
¹ Dec 21 - Jan 20	0	0	9	9	0	0	0
Jan 20 - Jan 25	0	0	3	3	0	0	0
Jan 25 - Feb 1	0	0	8	8	0	0	0
Feb 1 - Feb 8	0	0	3	3	0	0	0
Feb 8 - Feb 15	0	0	49	49	0	7	7
Feb 15 - Feb 22	0	0	106	106	0	15	15
² Feb 22 - Mar 11	0	0	80	80	0	20	20
³ Mar 11 - Mar 15	0	0	351	351	0	103	103
Mar 15 - Mar 22	0	0	1781	1781	0	483	483
¹ Traps in field since 12/21							
² Only 13 of the 36 traps serviced this week due to pesticide applications on site							
³ 13 of the 36 traps in field since Mar 11; 23 of the 36 traps in field since Feb 22							

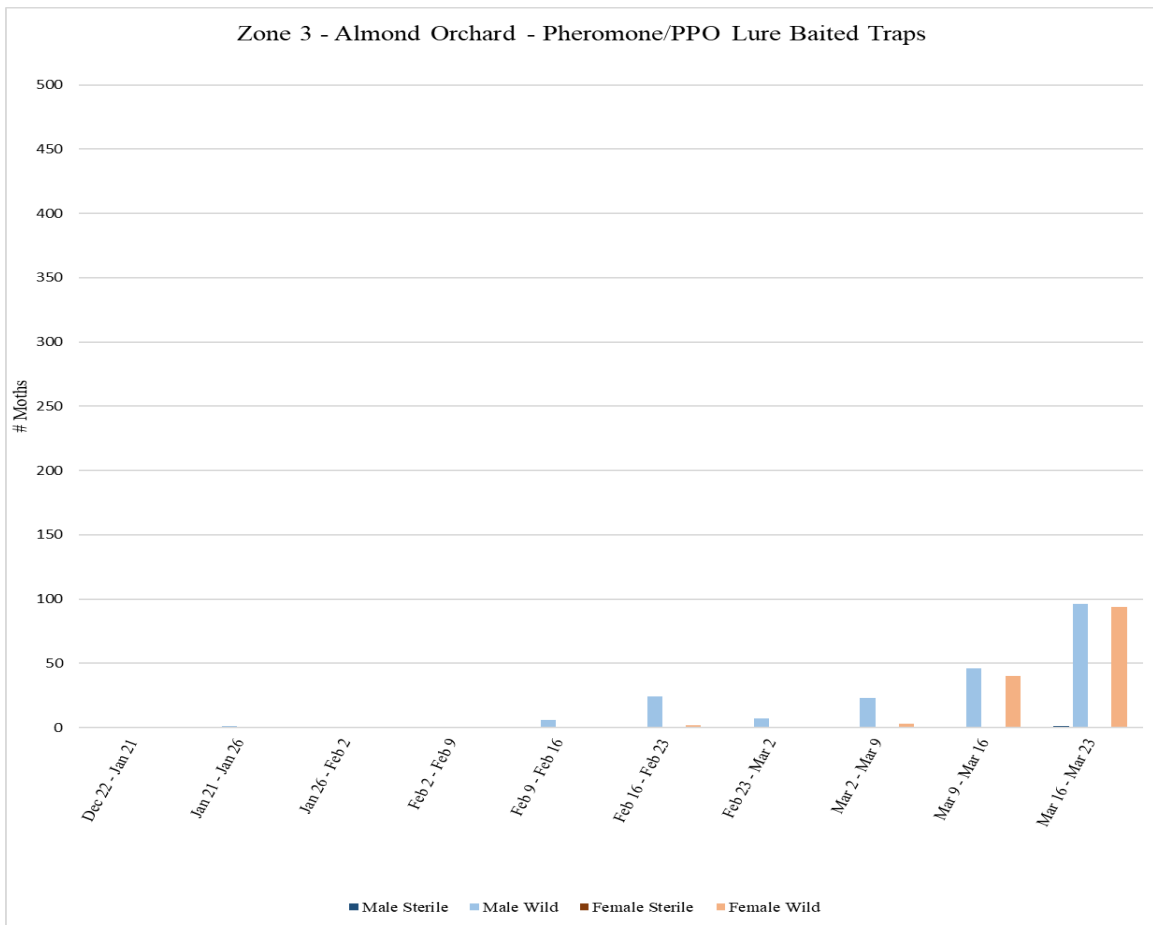
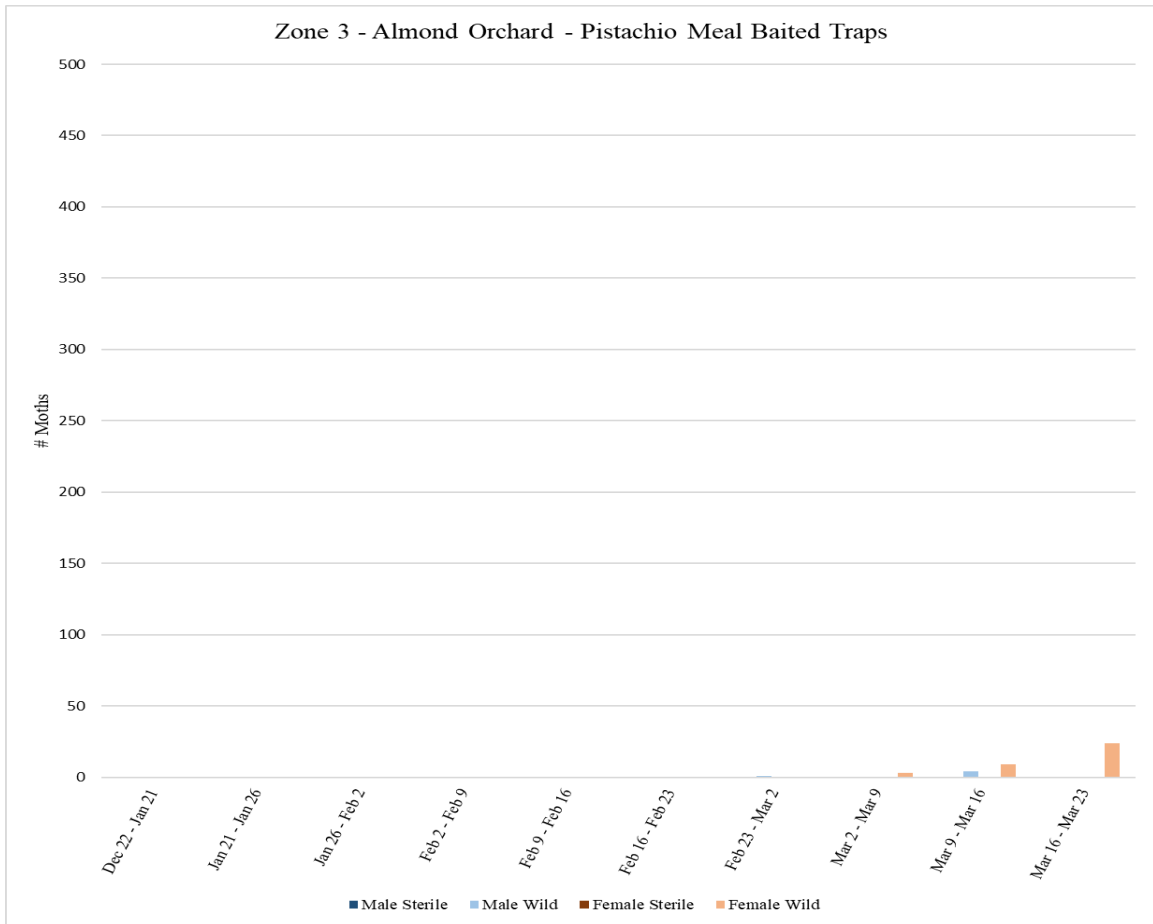


Zone 3

Zone 3 is an almond orchard where aerial NOW SIT releases are conducted. A total of **72** traps were collected from Zone 3 on Wednesday, March 23, with **36** pistachio meal baited traps and **36** pheromone/PPO lure traps.

Zone 3 - Almond							
Pistachio Meal Baited Traps							
Dates Traps in Field	# of Releases During Trap Period	Male Sterile	Male Wild	Male Total	Female Sterile	Female Wild	Female Total
¹ Dec 22 - Jan 21	0	0	0	0	0	0	0
Jan 21 - Jan 26	0	0	0	0	0	0	0
Jan 26 - Feb 2	0	0	0	0	0	0	0
Feb 2 - Feb 9	0	0	0	0	0	0	0
Feb 9 - Feb 16	0	0	0	0	0	0	0
Feb 16 - Feb 23	0	0	0	0	0	0	0
Feb 23 - Mar 2	0	0	1	1	0	0	0
Mar 2 - Mar 9	0	0	0	0	0	3	3
Mar 9 - Mar 16	2	0	4	4	0	9	9
Mar 16 - Mar 23	8	0	0	0	0	24	24
¹ Traps in field since 12/22							

Zone 3 - Almond							
Pheromone/PPO Lure Baited Traps							
Dates Traps in Field	# of Releases During Trap Period	Male Sterile	Male Wild	Male Total	Female Sterile	Female Wild	Female Total
¹ Dec 22 - Jan 21	0	0	0	0	0	0	0
Jan 21 - Jan 26	0	0	1	1	0	0	0
Jan 26 - Feb 2	0	0	0	0	0	0	0
Feb 2 - Feb 9	0	0	0	0	0	0	0
Feb 9 - Feb 16	0	0	6	6	0	0	0
Feb 16 - Feb 23	0	0	24	24	0	2	2
Feb 23 - Mar 2	0	0	7	7	0	0	0
Mar 2 - Mar 9	0	0	23	23	0	3	3
Mar 9 - Mar 16	2	0	46	46	0	40	40
Mar 16 - Mar 23	8	1	96	97	0	94	94
¹ Traps in field since 12/22							

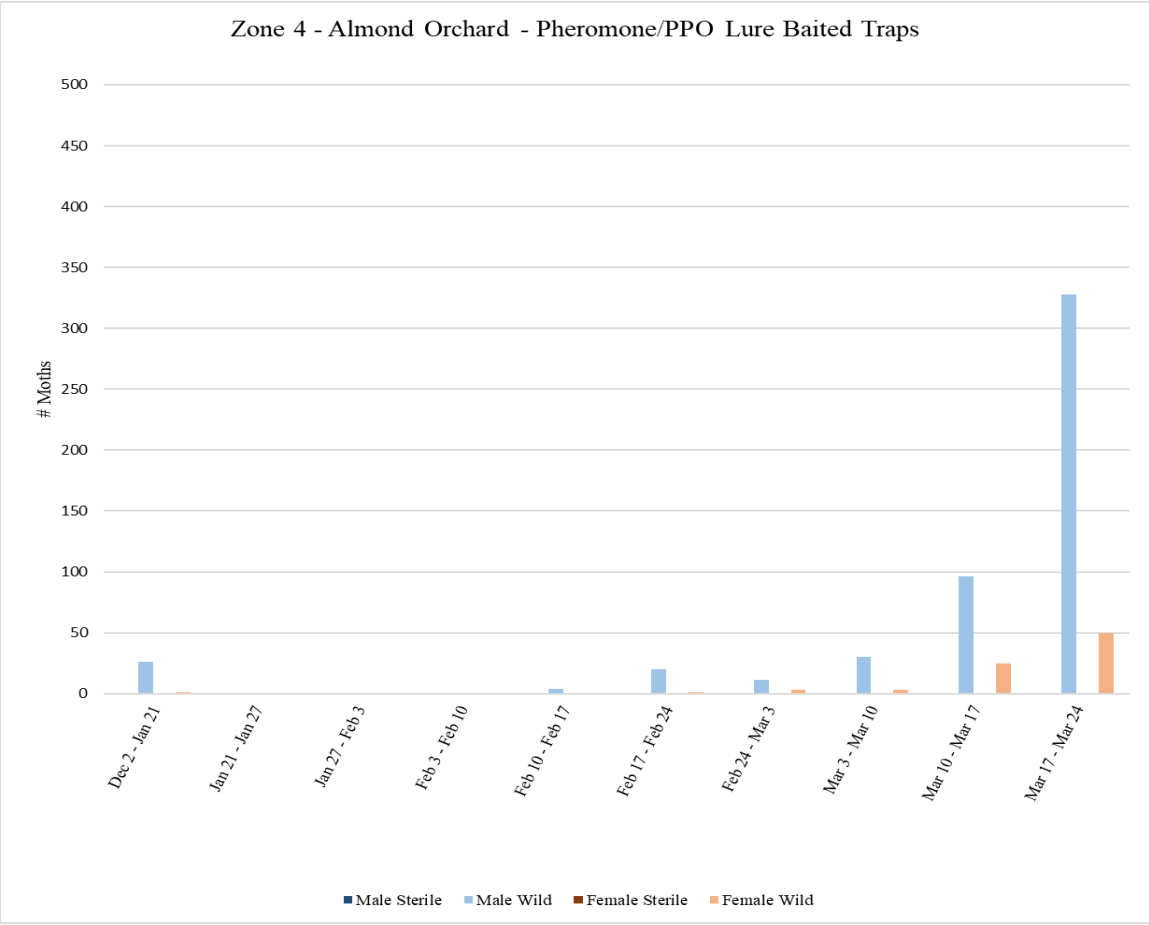
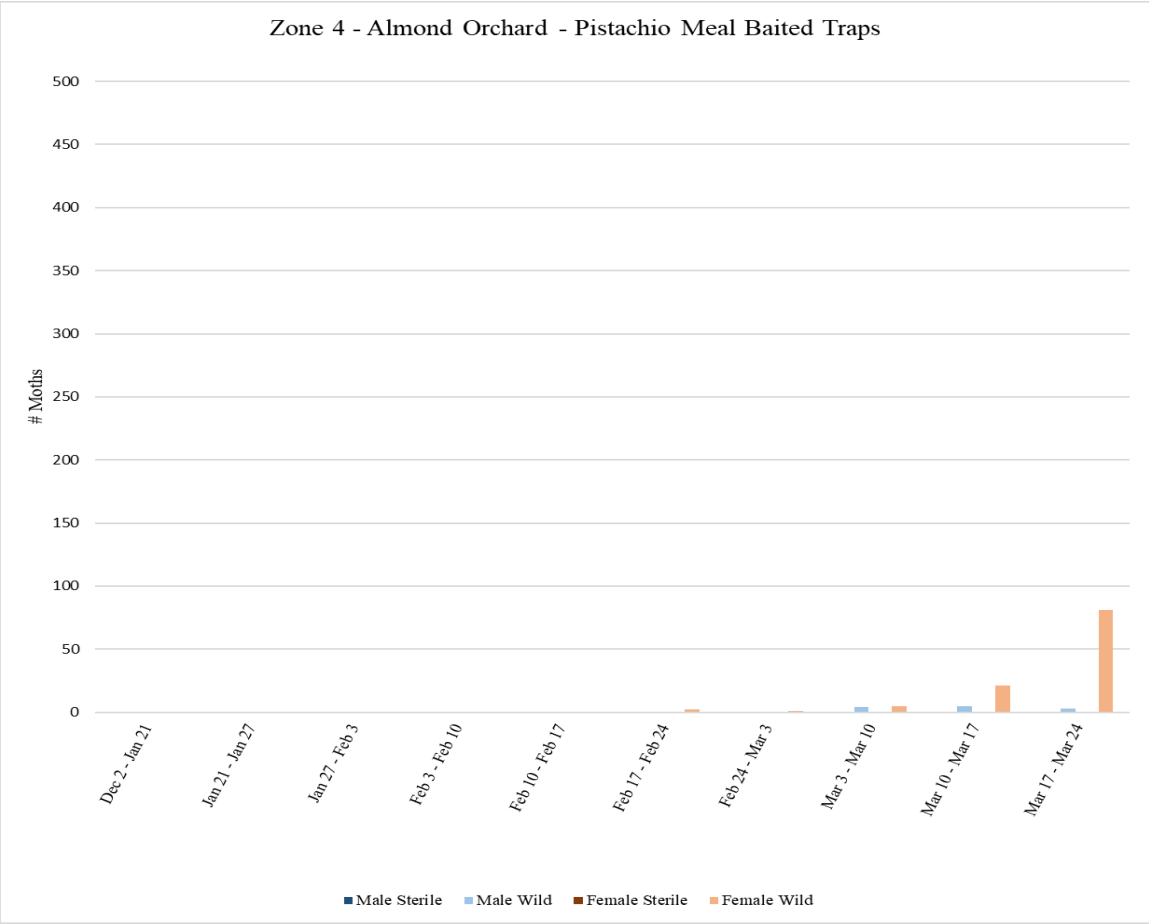


Zone 4

Zone 4 is an almond orchard where aerial NOW SIT releases are not conducted. A total of **72** traps were collected from Zone 4 on Thursday, March 24, with **36** pistachio meal baited traps and **36** pheromone/PPO lure traps.

Zone 4 - Almond							
Pistachio Meal Baited Traps							
Dates Traps in Field	# of Releases During Trap Period	Male Sterile	Male Wild	Male Total	Female Sterile	Female Wild	Female Total
¹ Dec 2 - Jan 21	0	0	0	0	0	0	0
Jan 21 - Jan 27	0	0	0	0	0	0	0
Jan 27 - Feb 3	0	0	0	0	0	0	0
Feb 3 - Feb 10	0	0	0	0	0	0	0
Feb 10 - Feb 17	0	0	0	0	0	0	0
Feb 17 - Feb 24	0	0	0	0	0	2	2
Feb 24 - Mar 3	0	0	0	0	0	1	1
Mar 3 - Mar 10	0	0	4	4	0	5	5
Mar 10 - Mar 17	0	0	5	5	0	21	21
Mar 17 - Mar 24	0	0	3	3	0	81	81
¹ Traps in field since 12/2							

Zone 4 - Almond							
Pheromone/PPO Lure Baited Traps							
Dates Traps in Field	# of Releases During Trap Period	Male Sterile	Male Wild	Male Total	Female Sterile	Female Wild	Female Total
¹ Dec 2 - Jan 21	0	0	26	26	0	1	1
Jan 21 - Jan 27	0	0	0	0	0	0	0
Jan 27 - Feb 3	0	0	0	0	0	0	0
Feb 3 - Feb 10	0	0	0	0	0	0	0
Feb 10 - Feb 17	0	0	4	4	0	0	0
Feb 17 - Feb 24	0	0	20	20	0	1	1
Feb 24 - Mar 3	0	0	11	11	0	3	3
Mar 3 - Mar 10	0	0	30	30	0	3	3
Mar 10 - Mar 17	0	0	96	96	0	25	25
Mar 17 - Mar 24	0	0	328	328	0	50	50
¹ Traps in field since 12/2							

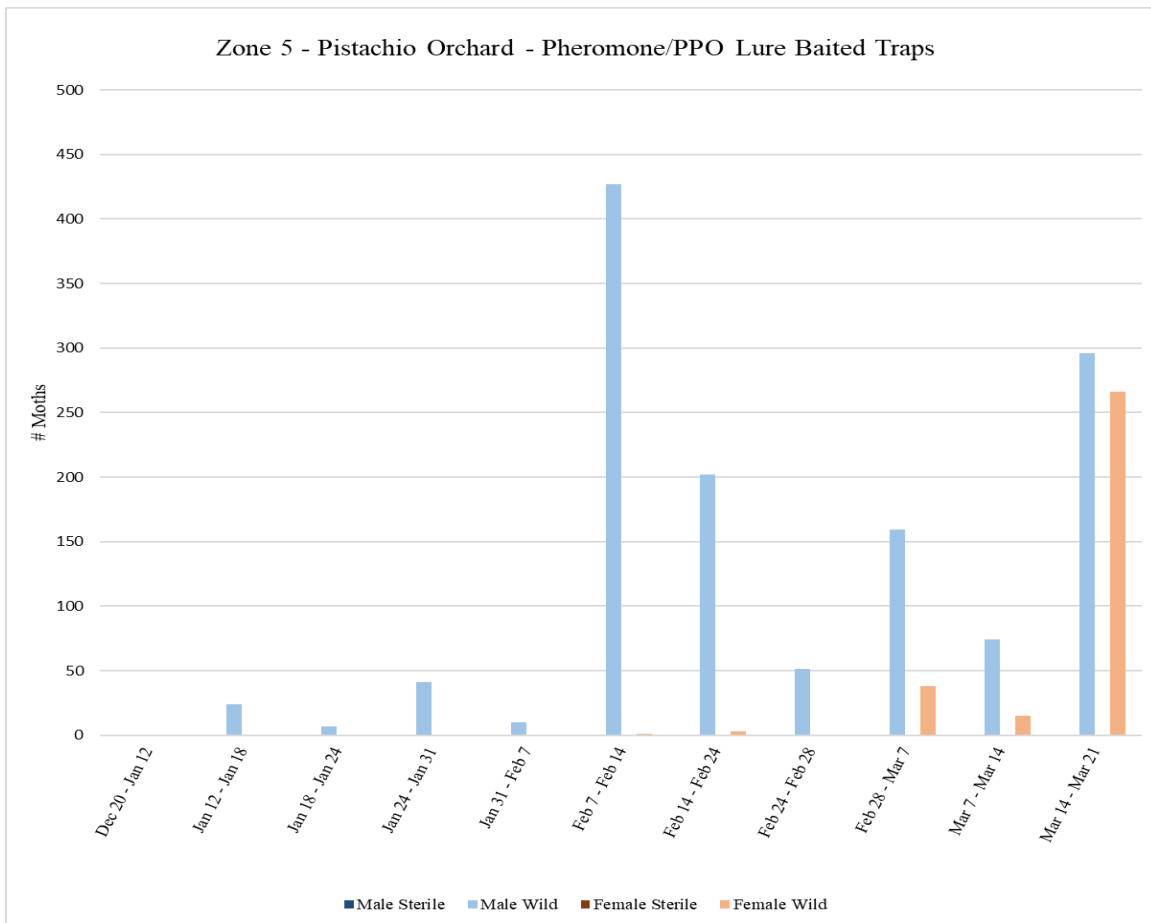
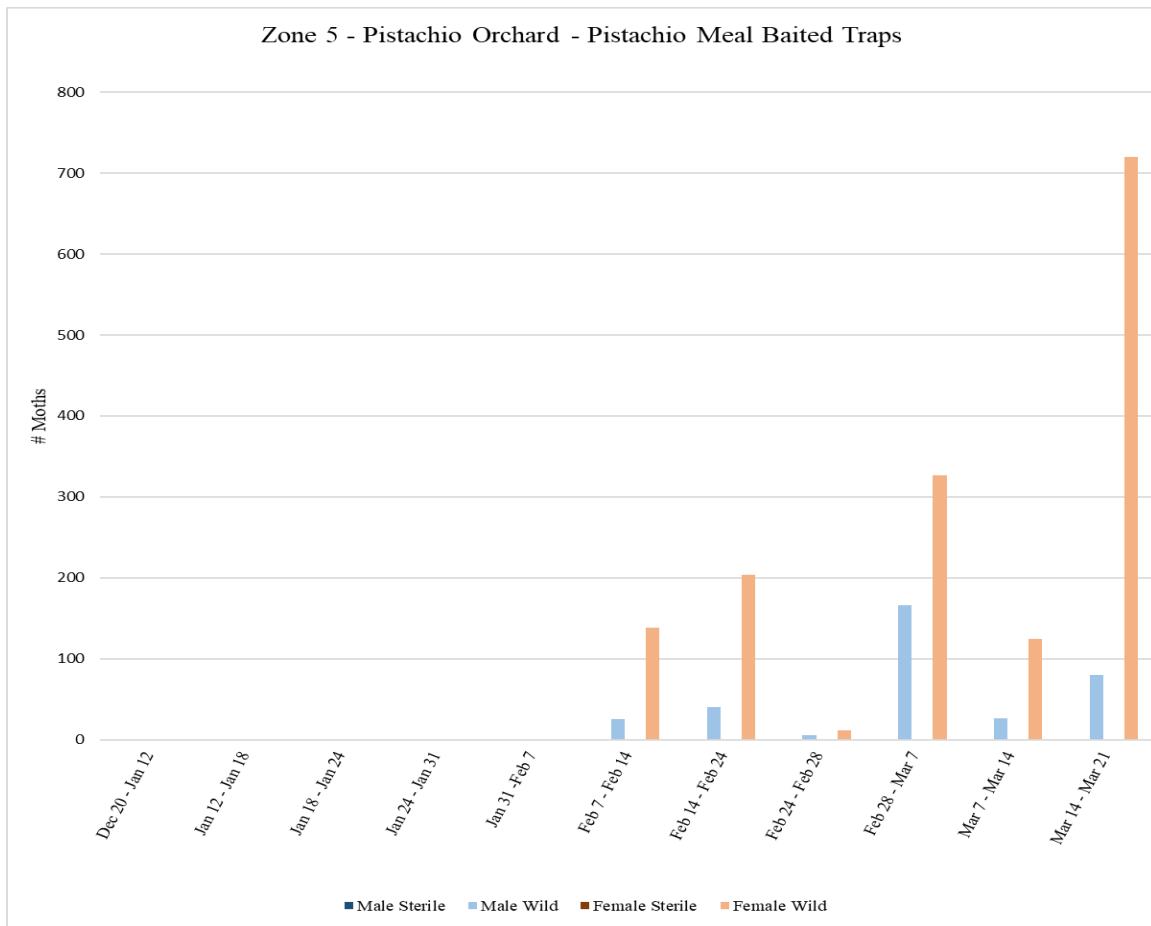


Zone 5

Zone 5 is a pistachio orchard where aerial NOW SIT releases will be conducted. A total of **72** traps were collected from Zone 5 on Monday, March 21, with **36** pistachio meal baited traps and **36** pheromone/PPO lure traps.

Zone 5 - Pistachio							
Pistachio Meal Baited Traps							
Dates Traps in Field	# of Releases During Trap Period	Male Sterile	Male Wild	Male Total	Female Sterile	Female Wild	Female Total
¹ Dec 20 - Jan 12	0	0	0	0	0	0	0
Jan 12 - Jan 18	0	0	0	0	0	0	0
Jan 18 - Jan 24	0	0	0	0	0	0	0
Jan 24 - Jan 31	0	0	1	1	0	0	0
Jan 31 -Feb 7	0	0	0	0	0	0	0
Feb 7 - Feb 14	0	0	25	25	0	138	138
Feb 14 - Feb 24	0	0	40	40	0	204	204
Feb 24 - Feb 28	0	0	6	6	0	12	12
Feb 28 - Mar 7	0	0	166	166	0	327	327
Mar 7 - Mar 14	0	0	26	26	0	124	124
Mar 14 - Mar 21	0	0	80	80	0	720	720
¹ Traps in field since 12/20							

Zone 5 - Pistachio							
Pheromone/PPO Lure Baited Traps							
Dates Traps in Field	# of Releases During Trap Period	Male Sterile	Male Wild	Male Total	Female Sterile	Female Wild	Female Total
¹ Dec 20 - Jan 12	0	0	0	0	0	0	0
Jan 12 - Jan 18	0	0	24	24	0	0	0
Jan 18 - Jan 24	0	0	7	7	0	0	0
Jan 24 - Jan 31	0	0	41	41	0	0	0
Jan 31 - Feb 7	0	0	10	10	0	0	0
Feb 7 - Feb 14	0	0	427	427	0	1	1
Feb 14 - Feb 24	0	0	202	202	0	3	3
Feb 24 - Feb 28	0	0	51	51	0	0	0
Feb 28 - Mar 7	0	0	159	159	0	38	38
Mar 7 - Mar 14	0	0	74	74	0	15	15
Mar 14 - Mar 21	0	0	296	296	0	266	266
¹ Traps in field since 12/20							

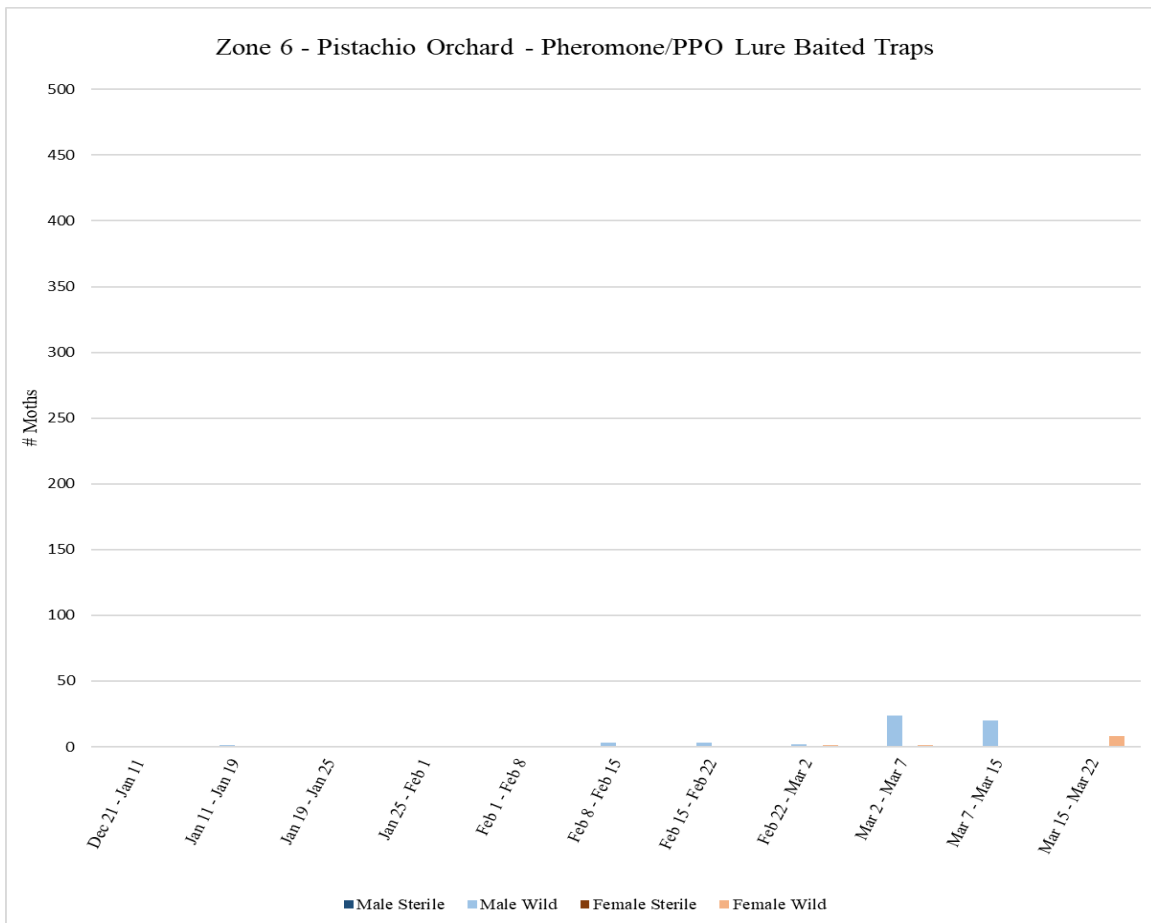
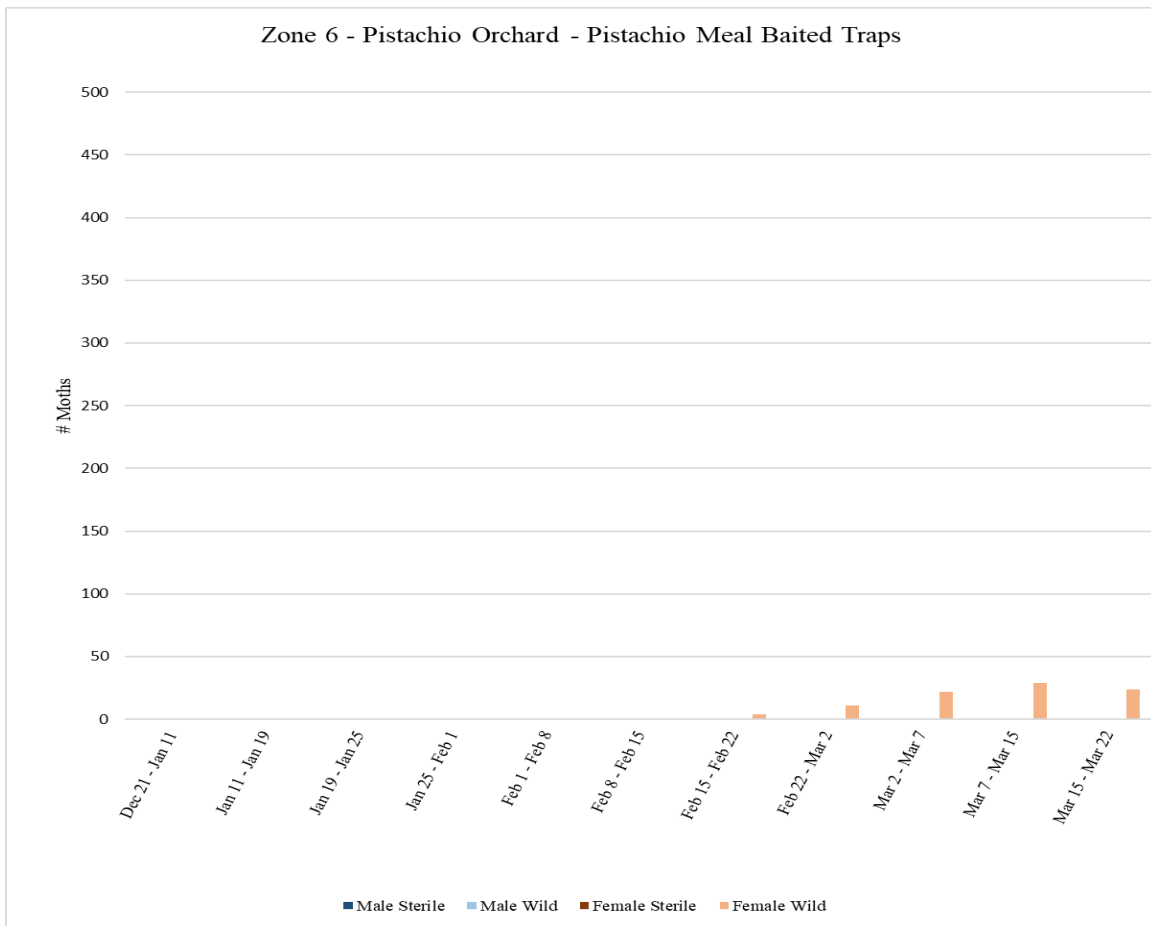


Zone 6

Zone 6 is a pistachio orchard where aerial NOW SIT releases are not conducted. A total of **18** traps were collected from Zone 6 on Tuesday, March 22, with **9** pistachio meal baited traps and **9** pheromone/PPO lure traps.

Zone 6 - Pistachio							
Pistachio Meal Baited Traps							
Dates Traps in Field	# of Releases During Trap Period	Male Sterile	Male Wild	Male Total	Female Sterile	Female Wild	Female Total
¹ Dec 21 - Jan 11	0	0	0	0	0	0	0
Jan 11 - Jan 19	0	0	0	0	0	0	0
Jan 19 - Jan 25	0	0	0	0	0	0	0
Jan 25 - Feb 1	0	0	0	0	0	0	0
Feb 1 - Feb 8	0	0	0	0	0	0	0
Feb 8 - Feb 15	0	0	1	1	0	0	0
Feb 15 - Feb 22	0	0	0	0	0	4	4
Feb 22 - Mar 2	0	0	1	1	0	11	11
Mar 2 - Mar 7	0	0	1	1	0	22	22
Mar 7 - Mar 15	0	0	0	0	0	29	29
Mar 15 - Mar 22	0	0	0	0	0	24	24
¹ Traps in field since 12/21							

Zone 6 - Pistachio							
Pheromone/PPO Lure Baited Traps							
Dates Traps in Field	# of Releases During Trap Period	Male Sterile	Male Wild	Male Total	Female Sterile	Female Wild	Female Total
¹ Dec 21 - Jan 11	0	0	0	0	0	0	0
Jan 11 - Jan 19	0	0	1	1	0	0	0
Jan 19 - Jan 25	0	0	0	0	0	0	0
Jan 25 - Feb 1	0	0	0	0	0	0	0
Feb 1 - Feb 8	0	0	0	0	0	0	0
Feb 8 - Feb 15	0	0	3	3	0	0	0
Feb 15 - Feb 22	0	0	3	3	0	0	0
Feb 22 - Mar 2	0	0	2	2	0	1	1
Mar 2 - Mar 7	0	0	24	24	0	1	1
Mar 7 - Mar 15	0	0	20	20	0	0	0
Mar 15 - Mar 22	0	0	0	0	0	8	8
¹ Traps in field since 12/21							

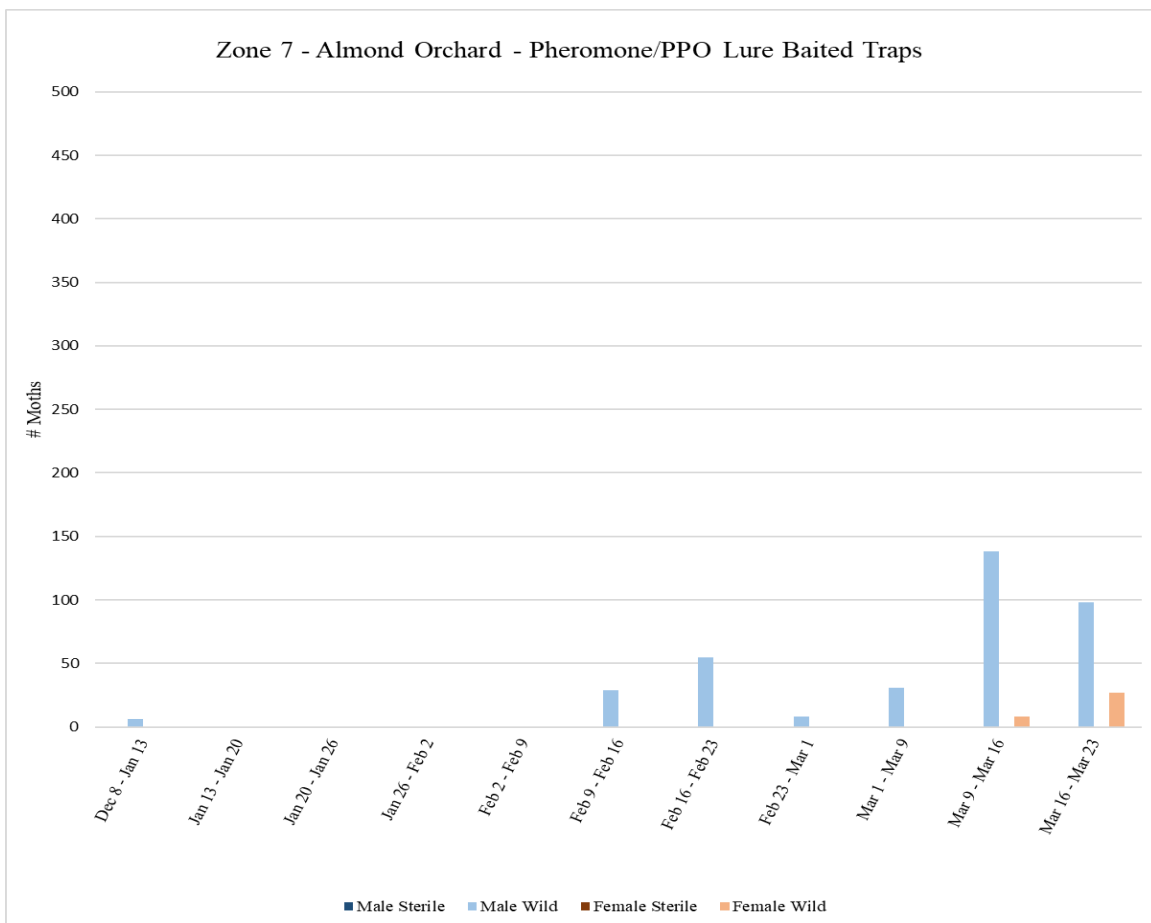


Zone 7

Zone 7 is an almond orchard where aerial NOW SIT releases will be conducted. A total of **72** traps were collected from Zone 7 on Wednesday, March 23, with **36** pistachio meal baited traps and **36** pheromone/PPO lure traps.

Zone 7 - Almond							
Pistachio Meal Baited Traps							
Dates Traps in Field	# of Releases During Trap Period	Male Sterile	Male Wild	Male Total	Female Sterile	Female Wild	Female Total
¹ Dec 8 - Jan 13	0	0	0	0	0	0	0
Jan 13 - Jan 20	0	0	0	0	0	0	0
Jan 20 - Jan 26	0	0	0	0	0	0	0
Jan 26 - Feb 2	0	0	0	0	0	0	0
Feb 2 - Feb 9	0	0	0	0	0	0	0
Feb 9 - Feb 16	0	0	0	0	0	0	0
Feb 16 - Feb 23	0	0	3	3	0	1	1
Feb 23 - Mar 1	0	0	0	0	0	0	0
Mar 1 - Mar 9	0	0	1	1	0	7	7
Mar 9 - Mar 16	0	0	6	6	0	13	13
Mar 16 - Mar 23	0	0	0	0	0	10	10
¹ Traps in field since 12/8							

Zone 7 - Almond							
Pheromone/PPO Lure Baited Traps							
Dates Traps in Field	# of Releases During Trap Period	Male Sterile	Male Wild	Male Total	Female Sterile	Female Wild	Female Total
¹ Dec 8 - Jan 13	0	0	6	6	0	0	0
Jan 13 - Jan 20	0	0	0	0	0	0	0
Jan 20 - Jan 26	0	0	0	0	0	0	0
Jan 26 - Feb 2	0	0	0	0	0	0	0
Feb 2 - Feb 9	0	0	0	0	0	0	0
Feb 9 - Feb 16	0	0	29	29	0	0	0
Feb 16 - Feb 23	0	0	55	55	0	0	0
Feb 23 - Mar 1	0	0	8	8	0	0	0
Mar 1 - Mar 9	0	0	31	31	0	0	0
Mar 9 - Mar 16	0	0	138	138	0	8	8
Mar 16 - Mar 23	0	0	98	98	0	27	27
¹ Traps in field since 12/8							

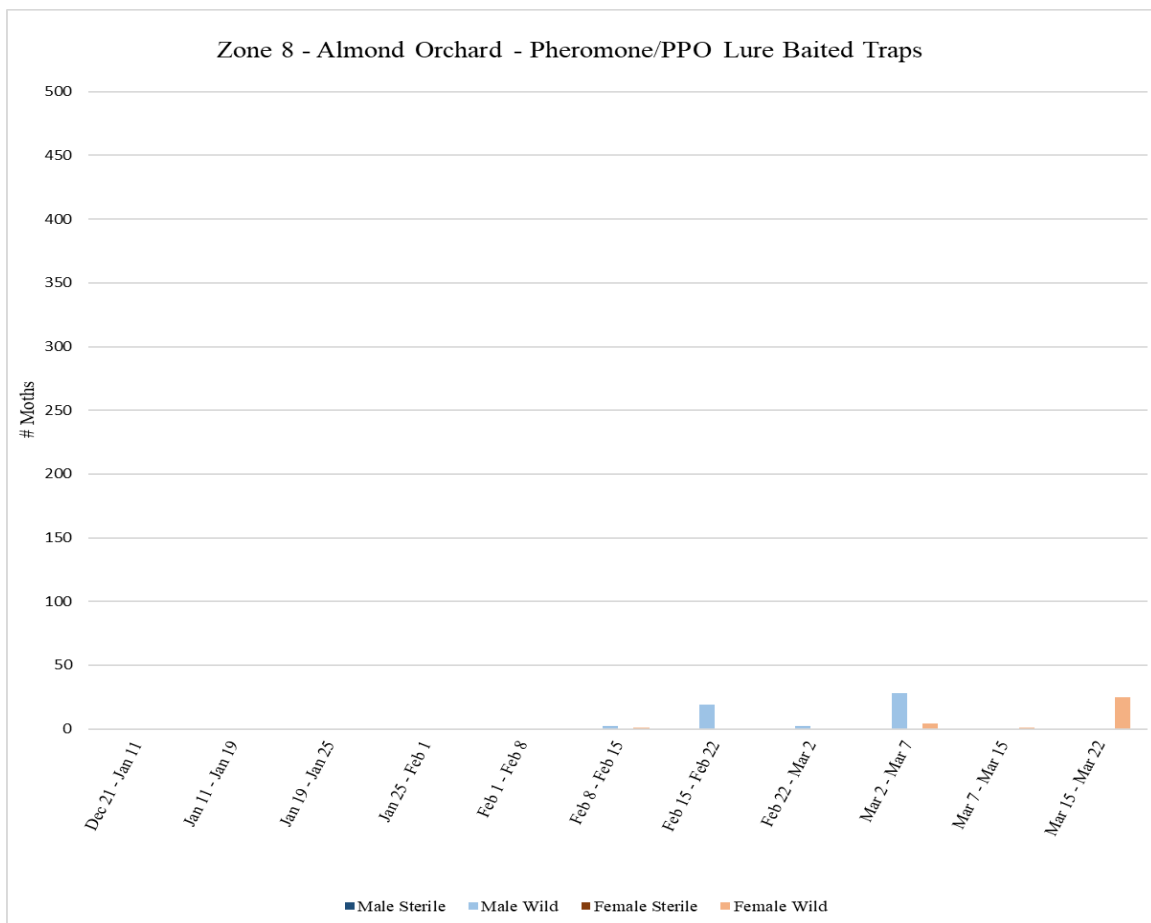
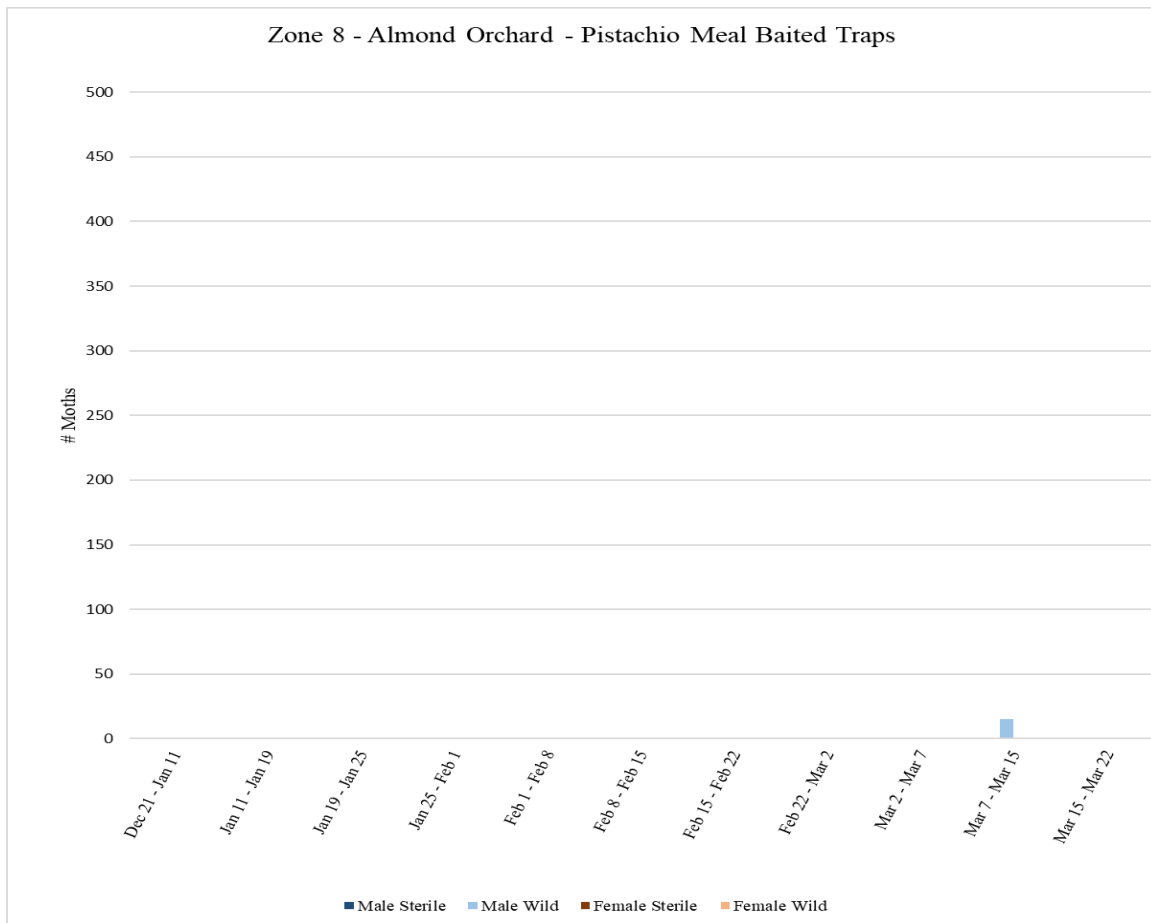


Zone 8

Zone 8 is an almond orchard where aerial NOW SIT releases are not conducted. A total of **18** traps were collected from Zone 8 on Tuesday, March 22, with **9** pistachio meal baited traps and **9** pheromone/PPO lure traps.

Zone 8 - Almond							
Pistachio Meal Baited Traps							
Dates Traps in Field	# of Releases During Trap Period	Male Sterile	Male Wild	Male Total	Female Sterile	Female Wild	Female Total
¹ Dec 21 - Jan 11	0	0	0	0	0	0	0
Jan 11 - Jan 19	0	0	0	0	0	0	0
Jan 19 - Jan 25	0	0	0	0	0	0	0
Jan 25 - Feb 1	0	0	0	0	0	0	0
Feb 1 - Feb 8	0	0	0	0	0	0	0
Feb 8 - Feb 15	0	0	0	0	0	0	0
Feb 15 - Feb 22	0	0	1	1	0	0	0
Feb 22 - Mar 2	0	0	0	0	0	0	0
Mar 2 - Mar 7	0	0	1	1	0	0	0
Mar 7 - Mar 15	0	0	15	15	0	0	0
Mar 15 - Mar 22	0	0	0	0	0	1	1
¹ Traps in field since 12/21							

Zone 8 - Almond							
Pheromone/PPO Lure Baited Traps							
Dates Traps in Field	# of Releases During Trap Period	Male Sterile	Male Wild	Male Total	Female Sterile	Female Wild	Female Total
¹ Dec 21 - Jan 11	0	0	0	0	0	0	0
Jan 11 - Jan 19	0	0	0	0	0	0	0
Jan 19 - Jan 25	0	0	0	0	0	0	0
Jan 25 - Feb 1	0	0	0	0	0	0	0
Feb 1 - Feb 8	0	0	0	0	0	0	0
Feb 8 - Feb 15	0	0	2	2	0	1	1
Feb 15 - Feb 22	0	0	19	19	0	0	0
Feb 22 - Mar 2	0	0	2	2	0	0	0
Mar 2 - Mar 7	0	0	28	28	0	4	4
Mar 7 - Mar 15	0	0	0	0	0	1	1
Mar 15 - Mar 22	0	0	0	0	0	25	25
¹ Traps in field since 12/21							



IV. Quality Control

QC tests are performed on samples taken from each shipment of sterile NOW moths. These tests include: zero-hour mortality rates, zero-hour mating dissections, forty-eight-hour mating dissections, seven-day longevity monitoring, and crush tests. Throughout the span of a week, Monday through Sunday, the results of each test are averaged. Below are the results for the week of Tuesday, March 15, 2022 to Sunday, March 20, 2022:

- 4% of moths from samples found dead at zero hour
- 2% of moths from samples found to have mated at zero hour
- 7% of moths from samples found to have mated after forty-eight hours
- 81% of moths from samples remained alive after seven days in BioChamber
- 95% of moths from samples found to have distinct red dye markings