

2022 Asian Defoliating Moth Survey
Annual Accomplishment Report
FAIN AP22PPQFO000C399

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State:	California
Cooperative Agreement Name:	Asian Defoliating Moth Survey
FAIN:	AP22PPQFO000C399
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Quarterly Report	☐
Semi-Annual Accomplishment Report	☐
Annual Accomplishment Report	☒

A. Objective and Need for Assistance

Asian defoliating moths (ADM) were first identified in North America in late 1991 near the port of Vancouver in British Columbia, Canada. Since then, ADM were detected in Washington, Oregon, California, and British Columbia. Ships infested with ADM egg masses from ports in East Russia probably introduced the pest to North America while visiting the ports on the West Coast. Scientists believe that, while the ships were docked, larvae hatched from the eggs and were blown ashore.

California is at continual risk of introduction of ADM and gypsy moth (GM), as evidenced by most recent detections of adult moths in 2017 (one Asian gypsy moth (AGM) and one GM both in Santa Cruz County) and 2018 (one AGM in Santa Cruz County and one GM in Orange County). In 2020 one adult AGM was detected in Santa Clara County. In addition, recent detections of ADM and GM in the state of Washington indicate a pathway into the Pacific Coast in general. Gypsy moths have been detected every year in Washington since 1977. Absent of a quarantine or self-inspection program, due to geographic proximity to the state of Washington, there is a high probability that egg masses will hitchhike on outdoor items into California.

Therefore, in cooperation with the other western region states and United States Department of Agriculture (USDA), the Pest Detection/Emergency Projects branch (PD/EP) of the California Department of Food and Agriculture (CDFA) and California Agricultural Commissioners (CAC) trap for AGM (*Lymantria dispar asiatica*), GM (*Lymantria dispar dispar*), rosy moth (RM) (*Lymantria mathura*), nun moth (NUN) (*Lymantria monacha*) and Siberian silk moth (SSM) (*Dendrolimus superans sibiricus*) in and near port areas and transportation corridors and hubs receiving cargo shipments from East Asian and Russian ports located between 24 and 60 degrees North latitude. The USDA pest risk assessments over the years have concluded that, because of the similarities between Asian and North American ecosystems, left unaddressed, ADM have great potential for colonization in California.

Pest	Common Name	Scientific Name	Hosts
AGM	Asian gypsy moth	<i>Lymantria dispar asiatica</i>	Deciduous trees & conifers: oak, poplar, willow, birch & pines. Older larvae feed on spruce, apple, fir & cedar
PSM	Rosy moth	<i>Lymantria mathura</i>	Deciduous trees only: oak, apple, pear, cherry, willow, birch, hickory, walnut & beech
NUN	Nun moth	<i>Lymantria monacha</i>	Deciduous trees & conifers: oak, maple, ash, birch, apple, cherry, other fruit trees, pine, spruce, fir & larch

SSM	Siberian silk moth	<i>Dendrolimus superans sibiricus</i>	Conifers only: larch, pine, fir & spruce
GM	Gypsy moth	<i>Lymantria dispar dispar</i>	Deciduous trees & conifers: oak, poplar, willow, birch & pines. Older larvae feed on spruce, apple, fir & cedar

Deep water ports present a high risk for ADM introduction, as ships from Asia frequently carry ADM egg masses. Since the area around the port may lack sufficient host material, traps were also placed on non-hosts; spaced at least 30 meters apart. This maintains the desired trap densities and prevents moths from possibly escaping past the trap array, while preventing lures from interfering with each other due to proximity.

The objective of California's survey activities is to implement a robust survey program, especially at and near ports of entry, to detect any introduction at an early stage when eradication efforts are most effective and least costly. Early detection of these pests is critical to the ability to eradicate incipient infestations. The plan for 2021 was to: 1) continue early detection of ADM at high-risk California deep-water port sites, in adjacent urban and ornamental plantings and around transportation corridors and hubs associated with foreign containers; 2) trap for GM throughout California in urban, forests and other high-hazard locations; and 3) delimit current and new detections of these pests. Note that the traps for GM are also effective for AGM.

B. Approach and Work accomplishment

Monthly activities:

July – September - Inspected traps.

September – October - Removed traps. Finished processing samples and curated specimens, completed identifications, prepared report, cleaned, and repaired equipment, laid off seasonal personnel.

November – December – Administrative work for billing and reporting

January-May- Folded and prepared traps for deployment, Conducted survey site selection; made initial contacts to arrange for survey activities. Trained permanent personnel; obtained supplies needed for field activities. Solicited and evaluated perspective seasonal employees, hired and provided training to seasonal personnel. Began trap deployment early in some areas to make sure traps were deployed by the start of the survey season.

June- Deployed traps statewide and begin servicing traps. Traps were serviced every two weeks to monthly.

Beginning in the spring of 2022, traps targeting ADM were placed at ports in the following ten counties: Alameda, Contra Costa, Humboldt, Los Angeles, San Diego, San Francisco, San Joaquin, Solano, Ventura and Yolo. Traps were already in place at the start of this agreement of July 2022 and removed after the last servicing in September of 2022. Traps were re-deployed in June 2023 and remained in the field at the end of this agreement period. San Joaquin, Solano and Yolo County ports are inland along the Sacramento and San Joaquin River Delta but are regularly visited by deep water vessels via shipping channels. Traps for GM were placed in urban areas and other high-hazard locations throughout the state.

Protocols for trap placement by targeted insect:

	AGM	PSM	NUN	SSM	GM
Traps / square mile	25	5	5	5	2
Trap type	delta	Pherocon IIC	delta	milk carton	delta
Placement	trunk	canopy	trunk	canopy	trunk
Note: ALL TRAPS MUST BE AT LEAST 30 METERS AWAY FROM EACH OTHER					
Servicing schedule	2-week	2-week	2-week	2-week	2-week
Baiting schedule	once/season	once/season	once/season	4-week	once/season
Trap replacement schedule	as needed				
Vaportape II (DDVP insecticide strip)	n/a	n/a	n/a	lasts 12 weeks	n/a

Traps were serviced every two weeks in both Northern and Southern California. ADM trap servicing's were extended to three weeks in Alameda County and less traps were deployed at the port due to the inability to hire sufficient staff. The total number of GM traps deployed in Glenn, Kern, Napa, and San Diego counties was lower than stated in the commitment due to increased urbanization, lack of available hosts and other factors which limited the available locations where traps could be deployed. Fewer GM trap were deployed in Colusa, Merced and Sonoma counties due to issues the counties faced hiring sufficient seasonal staff to service traps. Not all traps could be placed in Ventura, San Bernardino, Orange, San Diego, San Francisco and Riverside counties due to inability to hire sufficient trappers and competing priorities, including responding to plant pest emergencies. Fewer traps were placed in San Joaquin and Trinity counties due to insufficient staff and inability to access some sites. Tulare county was unable to deploy all GM traps due to wildfires and weather in the county which prevented placement of all traps and access to all sites. Yolo County had issues with their trapping and invoicing which

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resulted in fewer traps being placed. These issues have been remedied for FY 23/24. In a few counties from 1-4 fewer traps were placed (less than 5% of the commitment) due to year-to-year variations in host presence, lack of site access or other unknown reasons. Overall, 19,165 ADM trap were deployed throughout the state.

In Contra Costa County, traps in the core area of the delimitation project in response to the GM detected in 2022 were serviced weekly and outer buffer traps were serviced bi-weekly. In Santa Clara County, traps in the core area of delimitation project in response to AGM detected in 2020 were serviced weekly and outer buffer traps were service bi-weekly.

The table on the following page shows numbers of traps placed in 2022 by county. The key below applies to that table:

*Total ADM (Asian defoliating moth) is the sum of Asian gypsy moth (AGM), rosy moth (RM) (Due to RM moth lure shortage, traps count was lower than the previous season), nun moth (NUN) and Siberian silk moth (SSM) traps. Gypsy moth (GM) traps and delimitation are counted separately.

**Total includes the sum of all ADM and GM traps.

***Total AGM delimitation traps or total GM detection and delimitation traps

Trap placement by county:

Trap placement by county: County	Number of Traps – Proposed (Total)		Number of Traps Placed -Actual						
	ADM*	GM	AGM	RM	Nun	SSM	Total ADM*	GM	Total**
Alameda	340	532	99	20	20	15	154	541	695
Amador	NA	120	NA	NA	NA	NA	0	150	150
Butte	NA	213	NA	NA	NA	NA	0	214	214
Calaveras	NA	185	NA	NA	NA	NA	0	225	225
Colusa	NA	50	NA	NA	NA	NA	0	32	32
Contra Costa	52	624 ***	31	5	8	8	52	624 ***	676
Del Norte	NA	97	NA	NA	NA	NA	0	105	105

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El Dorado/ Alpine	NA	247	NA	NA	NA	NA	0	279	279
Fresno	NA	185	NA	NA	NA	NA	0	441	441
Glenn	NA	45	NA	NA	NA	NA	0	19	19
Humboldt	189	190	129	20	20	20	189	192	381
Imperial	NA	57	NA	NA	NA	NA	0	58	58
Inyo/ Mono	NA	90	NA	NA	NA	NA	0	90	90
Kern	NA	530	NA	NA	NA	NA	0	474	474
Kings	NA	83	NA	NA	NA	NA	0	82	82
Lake	NA	92	NA	NA	NA	NA	0	88	88
Lassen	NA	69	NA	NA	NA	NA	0	102	102
Los Angeles	563	2563	364	67	67	67	565	2592	3157
Madera	NA	181	NA	NA	NA	NA	0	181	181
Marin	NA	70	NA	NA	NA	NA	0	157	157
Mariposa	NA	175	NA	NA	NA	NA	0	200	200
Mendocino	NA	218	NA	NA	NA	NA	0	230	230
Merced	NA	107	NA	NA	NA	NA	0	94	94
Modoc	NA	75	NA	NA	NA	NA	0	73	73
Monterey	NA	67	NA	NA	NA	NA	0	215	215
Napa	NA	185	NA	NA	NA	NA	0	81	81
Nevada	NA	197	NA	NA	NA	NA	0	197	197
Orange	NA	908	NA	NA	NA	NA	0	813	813
Placer	NA	275	NA	NA	NA	NA	0	275	275
Plumas/ Sierra	NA	130	NA	NA	NA	NA	0	130	130
Riverside	NA	743	NA	NA	NA	NA	0	722	722
Sacramento	NA	550	NA	NA	NA	NA	0	659	659

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San Benito	NA	40	NA	NA	NA	NA	0	48	48
San Bernardino	NA	637	NA	NA	NA	NA	0	439	439
San Diego	200	1096	93	20	26	24	163	907	1070
San Francisco	112	101	31	5	4	4	44	95	139
San Joaquin	185	250	121	24	23	23	191	216	407
San Luis Obispo	NA	133	NA	NA	NA	NA	0	138	138
San Mateo	NA	400	NA	NA	NA	NA	0	404	404
Santa Barbara	NA	188	NA	NA	NA	NA	0	201	201
Santa Clara	NA	608	1010 ***	NA	NA	NA	1010	615	1625
Santa Cruz	NA	243	0	NA	NA	NA	0	242	242
Shasta	NA	350	NA	NA	NA	NA	0	415	415
Siskiyou	NA	330	NA	NA	NA	NA	0	330	330
Solano	90	240	72	18	18	18	126	240	366
Sonoma	NA	325	NA	NA	NA	NA	0	214	214
Stanislaus	NA	201	NA	NA	NA	NA	0	204	204
Sutter	NA	61	NA	NA	NA	NA	0	61	61
Tehama	NA	216	NA	NA	NA	NA	0	220	220
Trinity	NA	110	NA	NA	NA	NA	0	101	101
Tulare	NA	202	NA	NA	NA	NA	0	177	177
Tuolumne	NA	210	NA	NA	NA	NA	0	222	222

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Ventura	113	255	37	9	8	9	63	281	344
Yolo	159	145	151	20	20	21	212	136	348
Yuba	NA	44	NA	NA	NA	NA	0	155	155
Grand Total	2003	15963	2138	208	214	209	2769	16215	19165

C. Results of survey

A single male GM was detected in Contra Costa County on 7/28/2022. There were no new AGM, RM, NUN or SSM detections in 2022. Delimitation traps were deployed around the GM detection site with no additional finds during the agreement period. Delimitation traps were redeployed again at the beginning of the 2023 season.

Moth	County	City	# Collected	Trap/Lure
GM	Contra Costa	Clayton	1	Delta / Disparlure

Delimitations:

- Santa Clara County: Delimitation traps were deployed and serviced around the 2020 (one AGM) detection site with no additional finds in the agreement period. Traps were deployed in 2022 but at a lower density (13 traps/sq. mile) since there were no new finds in 2021.

Taxonomic Support: The CDFA's Plant Pest Diagnostic Center (PPDC) identifies all suspected samples as either GM or non-target species.

D. Outreach and Education

Residences and businesses within the past and current AGM and GM delimitation projects received notifications of trap placements (hand delivered) and informational flyers about the threat posed by AGM and GM. The flyers included descriptions of the pest life stages and information on how to report any suspect pests to the CDFA's exotic pest hotline. The State Survey Coordinator presented on November 2, 2022 at the Annual Lymantria Dispar Review meeting in Minneapolis, Minnesota and at the CA Forest Pest Council Meeting on November 17, 2022 about the ADM activities the CDFA conducted in 2021 and 2022. CDFA Senior Environmental Scientist provided training regarding this pest at the Pest Prevention University Training on November 17, 2022.

E. Training

Survey staff were trained by district entomologists and trapping supervisors trained trappers on proper trap assembly and deployment, preliminary insect identification, and proper sample submission.

F. Database submissions

A total of 2 suspect SSM samples, 1 RM suspect and 15 GM suspects were submitted to CDFA's Plant Pest Diagnostic Lab (PPDL) and were identified as non-target moths. One suspect was confirmed to be an GM male and was detected on 7/28/2022. All positive and negative data obtained in this survey will be entered into NAPIS prior to the submission of the final report by October 28, 2023.

Approved and signed by

Andrew R.
Cline

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Andrew R. Cline, Acting ROAR Date
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AHPIS, Plant Protection & Quarantine