

Light Brown Apple Moth Eradication Program

Key Questions and Issues

Presented by Assemblymember John Laird, October 16, 2007

Response by the California Department of Food and Agriculture, October 26, 2007

1. INERT INGREDIENTS

1.1 How will CDFA and USDA resolve the controversial issue of the inert ingredients being part of a trade secret in advance of further spraying?

On October 19, Monterey County Superior Court Judge Robert O'Farrell lifted a restraining order after determining that the ingredients used in the pheromone Checkmate LBAM-F did not contain chemicals known to be harmful to the public.

On October 20, Governor Schwarzenegger directed CDFA to make public the list of all ingredients in the Checkmate product.

All the ingredients in Checkmate LBAM-F are:¹

- 1) Water—the main ingredient.
- 2) (E)-11-Tetradecen-1-yl Acetate—the pheromone.
- 3) (E,E) -9,11 Tetradecadien-1-yl Acetate—the pheromone.
- 4) Ammonium phosphate—commonly used in "crystal growing" kits for children and as a plant nutrient.
- 5) 1,2-benzisothiazol-3-one—used as antibacterial and antifungal agents in a variety of products.
- 6) 2-hydroxy-4-n-octyloxybenzophenone—used in sunscreen and in lots of products made of plastics, including food containers; useful for its UV-blocking properties.
- 7) Crosslinked polyurea polymer—commonly used in manufacturing of plastics such as polyurethane foam production, waterproofing, insulation, and micro encapsulation agent for pesticides.
- 8) Butylated Hydroxytoluene—common food preservative.
- 9) Polyvinyl Alcohol—Odorless, non-toxic polymer commonly used in shampoos and cosmetics, feminine hygiene and incontinence products, children's play putty, glue, lubrication drops for hard contact lens wearers and other products.
- 10) Tricaprylyl Methyl Ammonium Chloride—commonly used in the manufacture of various pesticides and pharmaceuticals; contributes to product purity.
- 11) Sodium Phosphate—a sodium salt, naturally occurring substance important in every cell in the human body, helps regulate pH. Sodium phosphate is also an additive in egg products and is a prescribed laxative prior to procedures such as colonoscopy.

¹ Note: One point of controversy has been a news report—now established as erroneous—that the chemical polymethylene polyphenyl isocyanate (PPI) was an inert ingredient in the Checkmate formulation. The U.S. EPA has confirmed that this chemical is not a part of the products being used in the eradication project. The U.S. EPA further clarified that all of the actual ingredients "have been evaluated for safety and have been found to meet the agency's requirements for the protection of human health and the environment."

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As Secretary Kawamura has stated, “The Governor supports the public's right to know every ingredient in the product and is confident that full disclosure will confirm what my Department, the California Environmental Protection Agency and California Department of Pesticide Regulation established before treatment began—that Checkmate LBAM-F poses no risk to human health, plants, animals and insects.”

California has what is considered the strictest and most comprehensive state pesticide regulatory program in the nation. The Department of Pesticide Regulation will continue to perform further analysis and monitoring to ensure that the community's concerns are fully considered.

1.2 Is CDFA and USDA considering review of the ingredients by an independent third party?

U.S. EPA has stated that, “Based on low toxicity in animal testing, and expected low exposures to humans, no risk to human health is expected from the use of these pheromones.” DPR concurs with this conclusion. These agencies are third-party reviewers and are independent of CDFA and USDA. Further, they are charged with the evaluation of products, such as Checkmate, and have the authority to require all information to conduct a complete review. This includes all the confidential details of the materials that go into the manufacturing process. CDFA and USDA do not have such authority.

Since the list of all the ingredients was made public, the local media has asked several chemists and toxicologists to comment on the nature of the ingredients. None of these outside reviewers have indicated any concern for the safety of the product. In the October 23, 2007, [Santa Cruz Sentinel](#), Harry Elston, a chemist with Midwest Chemistry Safety, stated that, “These compounds have a long history of safe use in this and many other applications.”

CDFA and the Monterey Bay National Marine Sanctuary agreed to an independent laboratory test of the pheromone used in the eradication project, Checkmate LBAM-F. The UC Davis Marine Pollution Studies Laboratory conducted this test in early October and confirmed that the pheromone would not be injurious to sea life. Beyond this study, neither CDFA nor USDA is currently considering another third-party review.

2. HEALTH COMPLAINTS

2.1 When and how will results of the Department of Pesticide Regulation-led taskforce analyzing the epidemiology be reported? Will it be before the next round of spraying?

It is a misconception that the Department of Pesticide Regulation-led group is, in fact, a formal task force. This ad hoc group of state scientists, led by DPR, is tasked with developing a scientific consensus of DPR and the Office of Environmental Health Hazard Assessment, with

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input from scientists from the Department of Public Health, on the available health and safety data of the pheromone products and on the health complaints taken as a whole. This document is not intended to be a detailed human health risk assessment, an epidemiological study of exposed individuals, nor an analysis of alternative approaches. This group will be issuing a "white paper" presenting their conclusions and recommendations for the signatures of the appropriate executives. The next round of spraying is not dependent on these deliberations.

2.2 Will CDFA implement a long-term study of health effects before, during and after spraying, as suggested by a number of health and elected officials?

The conduct of health studies is not within CDFA's sphere of operational capacity. Instead, the department relies on experts in the public health sector for such studies. CDFA is working with the public health community and fully supports their efforts to establish appropriate health monitoring aimed at the detection of possible unforeseen adverse health events as a consequence of the LBAM eradication program. The department is doing—and will continue to do—all it can to facilitate studies that public health authorities regard as appropriate for evaluation of potential health impacts resulting from the LBAM eradication program.

2.3 Will CDFA be ready to commence this study in advance of any further spraying?

The determination that spraying the LBAM pheromone does not pose a health threat to the public or environment is based on thorough evaluations done by the U.S. EPA and California Department of Pesticide Regulation. For the past decade, there have been no indications of adverse environmental or human health incidents from past uses in which exposures occurred. Further spraying is not dependent on this study.

2.4 In light of the more than 200 health complaints in Monterey County, do you believe it is accurate to state there are no reported adverse effects to humans when DPR's epidemiological analysis is ongoing and the possibility of undertaking a long-term study is being considered?

Complaints are not the same as a medical determination based on objective criteria. CDFA is making every effort to keep track of all such complaints and continues to work with the public health community so that all illness complaints can be properly analyzed within the overall assessment of LBAM eradication activities. All toxicity data objectively developed to date strongly indicate that the probability that these complaints are pharmacologically linked to a toxic exposure is very unlikely.

3. ERADICATION PLAN AND ENVIRONMENTAL REVIEW

3.1 When will the eradication plan be available?

An overall programmatic eradication plan is currently being developed. CDFA is targeting late-December for completion. When completed it will be promptly made available to the public.

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3.2 When will the CEQA review be completed?

CDFA has now a signed contract for development of the environmental impact report. A draft should be available for public review by mid-summer 2008. It is targeted for completion in December 2008.

4. ENVIRONMENTAL ADVISORY TASK FORCE

4.1 Who will serve on the Environmental Advisory Task Force (EATF)?

The Environmental Advisory Task Force is currently being formed. Letters inviting participants were mailed on October 25, 2007.

Task force invitations were sent to the following:

- Alliance for Food and Farming
- Cal Poly San Luis Obispo
- California Association of Winegrape Growers
- California Department of Fish and Game
- California Department of Forestry and Fire Protection
- California Department of Pesticide Regulation
- California Department of Public Health
- California Farm Bureau Federation
- Citrus Research Board
- Environmental Defense
- Monterey Bay National Marine Sanctuary
- Monterey County Resource Conservation District
- Natural Resources Defense Council
- Nature Conservancy
- Organic Farming Research Foundation
- Pesticide Action Network of North America
- Santa Clara University Environmental Studies Institute
- Sierra Club-Ventana Chapter
- Sustainable Conservation
- University of California Aquatic Toxicology Research Group

4.2 When will their work be underway?

The first meeting of the Environmental Advisory Task Force will be held in mid-November.

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4.3 What can we expect in terms of results?

The goals of the Environmental Advisory Task Force are to:

- Foster two-way communication between CDFA and environmental stakeholders.
- Discuss environmental issues and make recommendations.
- Provide third-party participation in the CEQA process.
- Recommend future research strategies.
- Provide recommendations regarding environmental issues.

5. PHEROMONE MATING DISRUPTION EFFICACY

5.1 Can you provide information on the effectiveness of PMD to eradicate, not just control, an invasive species?

Pheromone mating disruption is a proven insect control technique. The recommendation to use PMD as a primary tool for LBAM eradication in California came from the USDA-Technical Working Group. This recommendation is a direct result of their first-hand knowledge of the available scientific literature, personal research experience and the efficacy of mating disruption in field applications in Australia and New Zealand when used in control programs. The TWG recommended an overall strategy of containment, suppression and eradication using an integrated approach, primarily employing pheromone release for mating disruption.

The TWG's overriding recommendation is that the CDFA and USDA adopt a long-term goal of eradicating LBAM from the U.S. This is based on the available knowledge of the current distribution and population levels in California and the likely impacts to agricultural and natural systems. LBAM has a continuous life cycle with no true dormancy. Projections made with developmental data from Australia suggest that the moth could complete four to five generations annually along the Central Coast and San Francisco Bay Area.

Because this is a newly introduced pest, overall population levels are still relatively low. Low population levels are critical to the success of the PMD strategy. Another critical factor is that the LBAM population in California is isolated and not prone to continual reestablishment.

Allowing these densities to build up by not maintaining pheromone levels could necessitate insecticide use. The intent is to keep the LBAM population down to a point more responsive to mating disruption.

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5.2 Can you specifically describe and assess the damage currently being inflicted in Santa Cruz County (where the infestation is most acute) in terms of both nurseries/crops and non-commercial/public/backyard areas?

In Santa Cruz County, the primary damage has been economic in nature due to the LBAM quarantine. The quarantine is in place to protect the rest of California and the nation. Since this infestation is in its early stages, the pest is just beginning to establish itself. More larval feeding damage, both in the environment and in food crops, will be apparent as the population builds.

In Australia, when insecticides are not applied, typically between 5 percent to 20 percent of fruit is damaged, but this can exceed 30 percent. In New Zealand, damage to unsprayed crops commonly reaches 50 percent (Wearing et al., 1991). More information regarding potential economic impact in California may be found in the environmental assessment prepared by USDA at www.aphis.usda.gov/plant_health/ea/downloads/lbam_ea_sc.pdf.

In 10 of California's affected counties², it is estimated that LBAM could cause \$160 to \$640 million in losses. These estimates were derived from the agricultural impacts in Australia and New Zealand.

5.3 With regard to the sanctuary permit, how will LBAM be eradicated within the "buffer zone" along the coastline?

CDFa maintains protocols designed to prevent drift movement into the Monterey Bay National Marine Sanctuary. In recognition of these protocols, the sanctuary provided CDFa with a permit allowing treatment activities in the Monterey/Seaside area.

The protocols include use of specially designed nozzles, wind speed application restrictions and buffer zones. Aerial applications will be made with the following buffer zones designed to prevent drift out of the treatment area:

- 100 meters at average wind speeds of zero miles per hour (mph).
- 200 meters at average wind speeds of four mph.
- 300 meters at an average wind speed of eight mph.
- No applications will be made at average wind speeds of 10 mph or higher.

CDFa and USDA will develop ground-based alternatives limited to use within the buffer zones.

5.4 When and how frequently will CDFa report on the efficacy of spraying?

The Light Brown Apple Moth Act of 2007 (SB 556, Wiggins) requires CDFa to report to the Legislature on January 10, 2008, and annually thereafter while the program is ongoing, regarding its expenditures, progress and priorities in combating LBAM in California.

² Alameda, Contra Costa, Marin, Monterey, Napa, San Francisco, San Mateo, Santa Clara, Santa Cruz and Solano.

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In preparation of this reporting requirement, the USDA and CDFA will meet in late-December 2007 with the USDA's Technical Working Group to review the trapping data following each round of aerial pheromone releases.

5.5 When will the results of the first Monterey County spraying be released?

It will take time to evaluate the effectiveness of pheromone mating disruption as monitored by trapping. LBAM is a new introduction to North America, and we are learning more about the moth's biology in this new environment. CDFA will continue to collect and analyze the trapping data to help determine the efficacy of the spraying program, with results available in spring 2008.

5.6 What would constitute a successful "eradication" of LBAM (e.g., zero captures over a certain period)?

As we anticipate that this will be a multi-year program, success will be evidenced by fewer and fewer trap catches. Ultimate success is declared after no insects are trapped for a prescribed number of life-cycle generations.

5.7 What is your "Plan B" if PMD fails to eradicate LBAM?

Please see question 7.4 for a description of the LBAM research plan. CDFA will continue to fast-track research into additional eradication options. Any "Plan B" would involve a reassessment of the eradication methodologies based on the tools that we have available.

5.8 If rain or other weather/seasonal conditions impede your ability to spray, how will CDFA respond?

If rain or other seasonal conditions impede CDFA's ability to apply the pheromone by air, then we will reschedule the application for the next fair-weather evening.

5.9 Under what circumstances (i.e., what, when, where, how) would CDFA use insecticides in residential areas in conjunction with or following PMD or instead of PMD?

Except as described in 5.3, the program will reevaluate its efficacy and options during the winter. In addition, the USDA's Technical Working Group will meet again in December 2007 to evaluate the program.

5.10 Would insecticide applications be conducted under the department's existing emergency authority?

Yes, as described in the Proclamation of an Eradication Project. The following is a list of options for eradication of LBAM: 1) foliar application of an organic pesticide by ground; 2) foliar application of an organic pesticide or a pheromone by air; 3) mating disruption using pheromone-infused plastic twist ties; 4) mass trapping; and 5) quarantine measures.

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6. THIRD-PARTY REVIEW

6.1 When will specific and detailed information on the third-party data that exists be available in a format understandable and accessible by the general public?

The joint USDA/CDFFA LBAM program is in the process of contracting with the U.S. Geological Survey (USGS) to provide third-party review of existing environmental data relevant to the use of pheromones. The USGS should have a review ready for the public by summer 2008. CDFFA public affairs staff will work to ensure the report's readability.

A report of third-party analysis on aquatic toxicity from the UC Davis Marine Pollution Studies Laboratory and the UC Davis Department of Environmental Science should be available by mid-November 2007.

7. ALTERNATIVES TO AERIAL SPRAYING

7.1 Can you be more specific on why implementing a twist tie approach is "impossible" with respect to efficacy, labor and funding?

CDFFA, in conjunction with USDA and TWG, have evaluated alternatives to aerial release of the LBAM pheromone in this area and believe this is the most effective strategy for application of mating disruption over such a large area. Mass trapping is not known to be effective, and ground release of the pheromone using the available twist-tie technology is not logistically feasible in the Monterey and Santa Cruz areas. These moths mate where there is tree foliage for egg laying. We estimate for an area the size of the Monterey/Seaside zone (38,000 acres) it would require four-to-five days, 9.5 million twist ties and 62,000 people. The large area requiring treatment in Santa Cruz, along the Central Coast and San Francisco Bay Area precludes the use of this approach.

7.2 Under what circumstances could CDFFA move from aerial spraying to twist ties?

A decision to employ twist ties or other pesticides will be made based on moth population levels and proximity to sensitive and buffer areas.

7.3 While waiting for alternatives such as sterile moths, could a "contain and control" program be implemented?

CDFFA believes that we currently have viable tools for eradication. Waiting until sterile moth technology is available would guarantee permanent establishment and spread of LBAM in California.

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7.4 Has the department developed an LBAM research plan with clear objectives and timelines?

California Department of Food and Agriculture staff is undertaking a research program on alternative methods to eradicate LBAM from California. The principle CDFA investigator has been in contact with LBAM researchers in Australia, New Zealand and Hawaii (USDA). Last month, in order to assess the feasibility for release of sterile male LBAM, researchers looked at the Pink Bollworm Sterile Insect Technique in Phoenix, Arizona. In addition, CDFA staff will keep the Environmental Advisory Task Force updated and apprised as to the status of this research as well as work with them to develop any new research ideas.

In particular, CDFA staff has started the following projects:

1) Use of Trichogramma wasps as a biocontrol agent

CDFA scientists are working with USDA scientists in Albany, California, to develop an LBAM colony as the first step in conducting this research. The initial collections of suspect LBAM larvae have been made, and these larvae have developed into moths that are laying eggs. Tests will be started as soon as sufficient eggs are available to continue the colony and provide “excess” eggs for testing. Trichogramma wasps will be procured to determine if the wasps will attack LBAM eggs and, if so, whether the wasp larvae can complete their development in the LBAM eggs and produce viable adults. Our initial plan is to release large numbers of the Trichogramma wasps in areas to reduce LBAM numbers either alone or in conjunction with pheromone disruption or attract and kill treatments. We hope to have this technology, if feasible, available by summer 2008.

2) “Attract and kill” technology

USDA Agricultural Research Service (ARS) scientists will work with their colleagues in Australia and New Zealand to evaluate an attract and kill technology for use against LBAM male moths. This would involve depositing large numbers of spots of LBAM pheromone mixed with a carrier and a contact insecticide throughout an area. The male moths would be attracted to the spots and killed as they moved over the pheromone spot looking for the female moth they believe is there. Attract and kill has been used to control other moths in the eastern United States. Attract and kill technology could be used in conjunction with the release of Trichogramma wasps. If feasible, it is anticipated that this technology might be available in late 2008.

3) Use of sterile male moths

USDA ARS scientists will work with their colleagues in Australia and New Zealand to continue efforts to develop sterile moth technology for LBAM. At present this technology is at least two to three years away. The technology lacks a mechanized diet mixing and dispensing system, larval rearing system and moth sterilizing system as well as a mechanized system to disperse the sterile moths. Both the Australian and New Zealand governments are moving forward on this front. The USDA ARS and CDFA scientists are bringing their expertise on the mass rearing and release of fruit flies and moths to bear on this effort.

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4) Classical biological control

CDFA scientists are working University of California researchers and LBAM scientists in Australia and New Zealand to import LBAM parasites to evaluate their ability to attack LBAM and their preference for LBAM compared to native or naturalized leafroller moth larvae. These tests require a colony of LBAM and colonies of native leafrollers. CDFA and USDA scientists are developing the necessary colonies in Sacramento and Albany. USDA requires the preference tests before they will approve the release of exotic wasps in the United States. It is anticipated that no releases of these wasp will occur before spring 2009.

7.5 Have any of the USDA funds been designated for LBAM research in California or the U.S.?

Yes, see question 7.4.

8. ERADICATION ZONES

8.1 What are the protocols for expanding the spray area when there are new LBAM finds beyond, but in proximity to, the existing perimeter?

Treatment areas are expanded as new moths are identified. The expansion is generally based on a 1.5-mile radius from the new find, but the proximity to prior finds and other treatment zones may influence the determination of the new boundary.

8.2 If the spray area is expanded, how and when will residents be notified?

All residents in the affected area will be notified by first-class mail, followed by an informational open house.

9. MONITORING

9.1 When will the DPR monitoring data from Monterey County (September 9-12) be available?

Under DPR supervision, CDFA's Center for Analytical Chemistry has completed the analysis of the samples. DPR is still evaluating the data. There has been a delay in issuing a report because DPR staff have been in the field and have not met to correlate field and analytical data. The report should be issued in November.

9.2 What was the methodology?

The Department of Pesticide Regulation has performed tests on samples that were taken from all treatment equipment used for the aerial application operations (tanks, pumps, hoses, valves, spray booms, water trucks, etc.). Specific tests were:

- A pesticide screen test was performed at the Center for Analytic Chemistry. This test detects pesticides or contaminants prior to the commencement of treatment.

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- Following the mixing and loading of the pheromone into the aircraft, a tank sample was taken from each nozzle on the spray boom.
- Deposition cards were placed in various situations, such as schools, public areas, tops of hills and private property. These cards indicate the quantity of pheromones that reach the ground. These cards are under the control of DPR for use in any analysis it might conduct. These results are used to make any calibration changes to the aircraft equipment, buffer areas or flight lines, if necessary.
- Each sample was tagged with a unique number and an associated chain of custody form.

Samples from these tanks and equipment were directly taken by DPR and were tested by CDFA's Analytical Chemistry laboratory under DPR supervision for the presence of any other pesticides. All tests were negative. Further, DPR took tank samples of the Checkmate product mix during aircraft loading procedures to test for the proper concentrations of active ingredients. These samples were taken and processed under a strict chain of custody, under the supervision of DPR. The results were reported to both CDFA and DPR.

During each spray application, monitoring dye cards were placed throughout the application area to ensure evenly distributed coverage throughout the area, and if any spray droplets are observed outside target areas.

9.3 Will all future applications be monitored by DPR?

Yes, testing and monitoring are standard operating procedures for all CDFA eradication programs.

10. LBAM ECONOMIC IMPACTS

10.1 What do we know today about actual economic losses caused directly by the pest itself?

See answer to question 5.2.

10.2 How are LBAM-related economic losses being monitored and reported?

There is no process to monitor LBAM-related losses.

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11. NURSERY INDUSTRY IMPACTS

11.1 What research is being fast tracked?

CDFA requested that USDA fast track research to identify alternatives to organophosphates, such as chlorpyrifos, that are effective against the LBAM eggs.

Specifically, we requested that the research trials fast track horticultural oils, since preliminary screening results showed that many oils were as effective, if not more effective, as chlorpyrifos against LBAM eggs. The preliminary screening results did not provide sufficient data for the USDA to authorize this use as an alternative. However, because these oils showed early promise, CDFA requested that USDA follow-up with additional trials to determine their usefulness as an alternative.

11.2 What monitoring and reporting requirements does CDFA or growers have with respect to the use of chlorpyrifos?

The Department of Pesticide Regulation (DPR) oversees a multi-tiered enforcement program. The U.S. Environment Protection Agency enacts laws covering minimum pesticide requirements that are enforced at the state and county levels through cooperative agreements. Over the years, the California Legislature has passed more stringent laws covering pesticide registration, licensing, the sale and use of pesticides, and worker protection.

DPR has primary responsibility to enforce pesticide laws and regulations in California. The Enforcement Branch oversees compliance with pesticide use requirements, has overall responsibility for pesticide incident investigations, administers the nation's largest state monitoring program for analyzing domestic and imported produce for pesticide residues, and ensures compliance with pesticide product registration and labeling requirements.

County agricultural commissioners enforce federal and state pesticide laws and regulations at the local level. Agricultural commissioners issue site-specific local permits for the use of restricted materials, conduct on-site application inspections, administer full pesticide use reporting, conduct worker safety inspections, and investigate pesticide incidents. More information is available at the department's Web site:

www.cdpr.ca.gov/docs/enforce/enf_auth.htm.

11.3 What are the potential "downstream" impacts on the region's water quality and the sanctuary?

Due to increased regulated and nonregulated pesticide use, the potential for negative downstream impact increases if eradication is not successful.

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- 11.4 Local nursery owners are spending considerable funds to implement regulations requiring the spraying and quarantines of infected stock. Has CDFA set aside funds from the USDA monies to provide financial assistance to the nursery industry (and other growers) impacted or potentially impacted by LBAM?**

Not at this time. USDA funding for LBAM is approved for the following: eradication operations, research into alternative eradication methods and public outreach.

- 11.5 What is CDFA's plan to work with the retail and wholesale nursery industry to expeditiously implement greener and less costly alternatives?**

CDFA plans to continue to cooperate with the USDA and Australian researchers working on the organophosphate alternatives research. We intend to review all data with the USDA as soon as it is available to determine if new products can be incorporated into our current list of authorized treatment options.

Treatment options available to infested wholesale nurseries are the same as they have been since the infested nursery protocols were developed. They are available for review in our Online regulatory procedures manual. There is one extra treatment/systems approach option available to retail nurseries that is not available to wholesale nurseries, because retail nursery stock is not as likely to leave the quarantine area as is wholesale nursery stock.

- 11.6 What is the process for growers and nursery owners to provide input that could impact CDFA/USDA protocol?**

There is an LBAM Nursery Task Force in Santa Cruz County comprised of nursery growers, UC Cooperative Extension specialists and Natural Resource Conservation Service staff. Nursery stakeholders in Santa Cruz developed the task force for the purpose of providing input to CDFA and USDA regarding regulatory protocols. CDFA intends to continue working with this group until we have developed a mutually agreeable program.