Stone: On that, a couple of weeks ago when you were talking, you were talking, you had mentioned the, uh, a third-party review at UC-Davis…

Kawamura: Yes.

Stone: …of the product. What, what is the status of that review?

Kawamura: It, that's still moving forward. We're working with, we're working with UC-Davis. We've been working also with, uh, Health Services and, uh, uh, uh, DPR, Department of Pesticide Regulation and then there's the other department there which is the Office of, uh, Environmental, uh, hazard assessment.

Stone: And when do you expect those reviews to be made public.

Kawamura: Uh, I, I don't have a date for you today. Uh, it's, it's on-going, uh, they're still studying these different, these different tools that we have. Uh, uh, if I, I wish I could give you a finish date, but it kinda, it's along the lines, same along the lines of the, uh, environmental assessment process. Uh, uh, but the studies that have been done up to this time on these products, uh, uh, you know, are pretty solid, but we have already a, as, uh, was mentioned with the marine study as is mentioned with some of the review we've, we've, we've asked to be done on, uh, the inerts, um, we're, we're waiting for these answers to come from the EPA. We're waiting for some of the work that's being done with the manufaturer. And, uh, just so we can have that better understanding, uh, and, uh, it's a process. This public process is just that. We, we, we're comfortable where we are, comfortable with the science, but we see that there's enough concerns, and we're committed to try and commit to those answers. Uh, that, that's the best we can do today, and then we hope that we're able to come up with those answers, and if we come to these future town halls as you've seen over these last couple weeks, we come up with answers regularly that, uh, are better than the ones we had before in terms of more informed and backed by more information, and I know that was one of the biggest criticisms is three weeks ago, four weeks ago when we had some of those earlier, uh, meetings, uh, we, there were some hard questions asked. We didn't all that information, but we're working on that.

<Unidentified Speaker>: <unintelligible>

Beautz: Um, two more questions.

<Unidentified Speaker>: Uh, I have <unintelligible> questions. I think watching this whole process unfold over the last several weeks, um, shows me the value of CEQA, the California Environmental Quality Act, and, uh, because, uh, it, that process allows you to define the project very clearly so the public knows, um, to go ahead and define alternatives which include the alternatives of doing nothing, analyze those, put it out to public scrutiny, get public comments back and then have to answer those public comments in order to come up with a, uh, um, EIR. And, um, CDFA is relying on emergency exemption to CEQA to evade the, uh, compliance until later, uh, because of

the, um, imminent danger that has been identified by the Legislature, I believe. Um, I wanted to be clear about some of those factors, though, and one is the, the project itself. Um, I'm, I was unclear. I understand that the first application of aerial spraying of, uh, of this Checkmate product is to control the population, it's not the eradication. It is to reduce the population down, but not to eradicate it.

<Unidentified Speaker>: Actually, it's the beginning of a suppression so that a population might collapse.

<Unidentified Speaker>: Then they were talking about a <unintelligible> in '08 and '09 and actually doing additional spraying and additional things, and then there, there was talk about eradication, so, so I'm presuming there's a different product that would be sprayed than, than this product because this doesn't eradicate. This controls the population. What is, how is that transition to eradication going to take place and what exactly does that mean. What process is it you're going to, uh, take in order to, um, in order to accomplish eradication of the moth?

Kawamura: Eradication using, uh, the pheromone technology is a technology over time. The first applications in 2007 are suppressing mating to reduce the amount of population that's gonna occur when the spring comes up in 2008. The regular, uh, pheromone application and having the pheromone in the environment during 2008 as the life cycles go through is the process by which the eradication actually occurs because the confusion and the mating disruption is out there all the time as the moth is out there, and, and seeking a mate.

<Unidentified Speaker>: So there's no change in technique?

Kawamura: There is no change in technique. <speaking at the same time as Unidentified Speaker>. It's, it's another <unintelligible>.

<Unidentified Speaker>: If, if, so eventually, no moths find a mate, and so they....

Kawamura: ...and the population disappears. But it's the real difference between, between this approach and, uh, an approach even using a material such as BT. BT is an insecticide that's gonna kill the larvae, and, and, in a, still covering a certain number of life cycles, you're treating to actually kill the larvae. In this, we're not actually killing anything. We're just confusing it, so that their populations can't mate and the population collapse.

<Unidentified Speaker>: So, then, um, in addressing this, an imminent danger that causes us to have to pursue without having a full CEQA process and environmental impact report. Are, are there some factors that I don't understand how the relation is, um, we're talkin' about spraying here in Santa Cruz in November, I believe.

Kawamura: Right.

<Unidentified Speaker>: Um, my understanding is that <unintelligible> the life cycle of these moths changes, and they, you had described that they roll up in a leaf and become a larva, and their not seeking mates at that point. It's a point during the winter months, and does that reduce the danger if in fact that is not the time that they're mating?

Kawamura: In the winter months, they're in their larval form and the pheromone won't be effective for 'em. That's why the, the program proposes getting the adult population that's out now waiting for spring. Uh, you know, basically it suppress...

<Unidentified Speaker>: do you know, do you know when the larva, uh, that life cycle part starts to take place?

Kawamura: The, the, the phasing...

<Unidentified Speaker>: Is it a, is it a fact of cold? Is it a factor of....

Kawamura: The colder it gets, the longer it happens, the longer it takes to happen. Um, basically, those eggs that are out there now that are turning into larvae today will probably stay in larvae until next year...<Unidentified Speaker speaking at same time>

<Unidentified Speaker>: ...and won't be affected by the spray.

Kawamura: No. What we want to avoid is any more eggs happening in this current population. Any more mating and any more deposition of eggs to happen that will then hatch and move into 2008 as larvae.

<Unidentified Speaker>: So, do you know the amount of population that will be in larvae in early November as opposed to being, seeking mating.

Kawamura: As an actual count?

<Unidentified Speaker>: No, just as a, I mean, I, I imagine that's part of your formula to know that it, its is effective to spray during that time.

Kawamura: It's effective to spray during that time because there's still adults out right now.

<Unidentified Speaker>: Mm-hm.

Kawamura: During the wi, probably past late November, uh, there'd be no point in it because everything that's gonna be left is going to be, uh, larvae growing over the winter, uh, LBAM as larvae growing over the winter.

<Unidentified Speaker>: So that's one factor and another factor is the vast majority, um, as far as this moth being transferred out of our county, the vast majority of our crops have been shipped out by that point. Um, and there's must less being shipped, so again I'm

sort of wondering given these factors is this imminent danger that has been identified in September by the Legislature still a factor in order to not comply with CEQA.

Kawamura: I, I would say the answer is yes, and it's not just the crops, it's the nursery stock as well 'cause those larvae are still gonna be shipped out of the area. So, we're talking about suppressing the population so you have a smaller amount that comes out in 2008, so you have a better shot at actually treating eradication than not doing anything and having a much larger population facing in 2008, and that's where the risk is is that larger population in 2008, instead of waiting, uh, and not spraying now and waiting till 2008.

<Unidentified Speaker>: When in fact the EIR might be complete or at least the public would be able to comment and ask questions of the EIR that might be complete.

Kawamura: Uh, I would say even with the EIR out into the public comment phase is probably not till June or July of 2008. That's how long it would take.

<Unidentified Speaker>: And one other question about, um, there was quote used, um, in referring to a quarantine that all of California would be in perpetual quarantine, and that sort of statement which is very broad and, and, um, fearful is, uh, concerns me. My understanding is the Australia, uh, what's happening in Australia with this is quite an extensive population of the moth is a 1.3% of the gross fruit value for apples, pears, oranges, and grapes are affected and that, uh, if you add the other crops here in California, it goes up to about 2.5%. So I just wanna be clear that if 2.5% of our crops are being damaged by this, by this moth, then number one is, where does that place it in pests that damage crops in California? Is that by far the largest pest danger to crops in California or is it somewhere else on that spectrum? And at 2.5%, the specter of really shutting down and quarantine all the crops that come from California, the effect on the national economy, the effect on California's economy and jobs for about 2.5% of crops that are damaged. Is that realistic, uh, feel to, to again sort of define this imminent danger?

Pirie: Well, here's the concern. The concern is that you have states that don't want Light Brown Apple Moth, and you have other countries that don't want Light Brown Apple Moth. So they're not particularly concerned about how much actual damage is being done by the moth, only that it exists in California and they don't want it. So the quarantine imposition comes about because we have to try and protect those other states and our trading partners from getting a pest that they do not want. Australia has some of the same problems with their trade partners and so in order to ship to some countries, they have to do methyl bromide fumigations, they have to do cold treatments, they have to do a number of things in order to get their products to move.

<Unidentified Speaker>: And, and so the 2.5% damage to crops is by far the highest damage that's done in this State. It's at that level of, of concern.

Pirie: It's, it's not necessarily the damage that's done to crops. It's more the concern by other entities that do not want that pest because it's an exotic, and they want to make sure that it's contained because the potential for damage is there if it gets established.

<Unidentified Speaker>: And so those same things that are a factor in any sort of crops that come out of Hawaii.

Pirie: In Hawaii it's a little bit different because the moth exists at higher elevations because of the tropical climate. It's not down where it is affecting their crops as much. They do have a number of other pests, however. They have a number of fruit flies and virtually everything that comes out of Hawaii has to either be treated in some way, has to go through a radiation, has to come through the heat treatment, or at least a very, very intensive inspection.

<Unidentified Speaker>: So in your opinion, um, given the fact that this is, a move forward in this aerial spray of a product that the ingredients are not being identified. And actually, as a matter of public policy, is that something that was, uh, decided deliberately by the State of California that they would not demand, uh, because of the trade secret, and that there's no other recourse if that trade secret is stolen if they publish that?

Kawamura: California can decide that as matter of public policy that if they're going to spray things on a population area that all the ingredients have to be, uh, have to be given out.

<Unidentified Speaker>: And so, I, I would just wanna know if that's just sort of been, you know, that's what's been requested, but the industry of, you've actually made a po, policy....

Kawamura: <speaking at the same time> It's not request by industry whatsoever, it's, uh, the, the, in all the different eradication processes that we use with all the different products that we bring to bear on getting rid of the pests, uh, throughout this state or other states, um, we depend, uh, on our system here on Department pesticide regulation and first of all, EPA to create the science behind a registration for a product to be used in the first place. Once they have, uh, agreed with that, California has even a tougher, uh level of, of EPA registration for our own California EPA, uh, has a, a secondary back-up system to look at and review products that we use in this state that are pesticides, and so, the Department of Pesticide Regulation, uh, and other subsets of EPR charged with that one extra level of oversight on things that we use in California. We've always said that California has probably has the toughest, tightest, uh, best food system in, in, in, in the country, certainly if not the world. Uh, and that's partly driven by again, concerned citizens that push us always to do better than the rest of the other state, and so when we come up and we are able to use a pro, pro, this product, and it wasn't really mentioned today, but, it, it, should be understood that this product has certification for organic use. It's an organic u, uh, approved product.

<Unidentified Speaker>: And also, as an organic farmer, I have a question. If you had an instance of an organic farmer on the north coast in the Wilder Ranch that was certified organic, and when they actually cut their crop and shopped it off, the buyer of the crop Whole Foods Markets and said they found a pesticide that was too much, even though the sss, the Certified Organic Farmer's Association says that this is all right, in fact, are the end users that test for those standards, have they accepted that this product, exposure to this product is all right as far as organic crops are concerned?

Kawamura: The, the pheromone use has been something that this product specifically....

<Unidentified Speaker>: <speaking at the same time> ...as well as the inert ingredients.

Kawamura: The checkmate product, uh, product has been used on the twist tie level all over the country and several other countries as well, um, in terms of....

<Unidentified Speaker>: But not on this type of, uh, application.

Kawamura: I could ask Dr. Warren if he has any background on that, but I, I'm not sure I understand your question.

<Unidentified Speaker>: Uh, the question, the question is I understand and it actually gave me a lot of confidence that the Certified Organic Farmer's Association felt like this is, uh, good because the alternatives to this...

Kawamura: That's right.

<Unidentified Speaker>: ...insecticides are, are much worse. But my question is that even though it's certified by them, do the end user of this crop, such as Whole Food Market, does it meet their standards?

Kawamura: At this point, all the products that meet CCOF standards or at least, you know, the California organic standards that we have here are, are, are approved, are, you know, embraced to this point on a food system that's moving in a sustainable direction. We're, mm, mm, this is why we were, uh, uh, on the early stages, um, really quite proud that we had this product to be able to use for an eradication as opposed to some of the other, uh, materials we've had to use in the past. The, the urgency is still the same, uh, we just have better tools to use this time around for this specific pest, and I know, uh, in trying to get to the, the concerns on just what is going on with getting these ingredients, at least at this, uh, at the different levels, at the federal level and the state level, multiple agencies that are charged with again, protecting us

Kawamura: ...the public, uh, and the environment, they've, they've had this chance to review it. This process is having go down yet another step, this process here of being in a

City Council or, in, in a town meeting with the supervisor meeting is having us, uh, go down just one more step so people can be assured that a, a product is uh, uh, okay to use.

Coonerty (?): So, so wrap up my (talking over the speaker) concern about, uh, you know evading the, the CEQA requirement, um, which you have a good faith, uh, statutory basis to do so, but, given the fact that there's winter coming and thus the nature of, uh, the moth is gonna change with the, you know, the mating habits that, uh, most of the crops have been shipped, although some are still to be shipped out that this is a new application of <unintelligible> over a population, um, and given the, the, uh, if it becomes, uh, a completely invasive insect within the whole population, the amount of crop which is 2.5% is gonna be dumped, does that limited danger that allows, uh, this application in aerial spraying before the peer review independent study is done about how it's done, is that still in your best judgment necessary to move at the speed that this is moving?

Kawamura: Yes, it is, and, and, but what you've failed to mention is, is also the environmental component of this invasive. This is a invasive maybe different than a fruit fly, whereas a fruit fly will not necessarily, uh, damage, um, native vegetation, especially trees, uh, but I, I do believe in this case, you have both the food crop test and an environmental test, and in this area specifically, this region that we're in, when you know what it is, it does feed on quite a few of your native species here that could potentially could put them in jeopardy of stress and then other, uh, other, we, we call it opportunistic diseases or pests coming in, and, and affecting them. That gives it kind of a dual urgency to make sure these populations don't build. That, that's where we're at right now. We're, we're concerned about the both, both sides, certainly the food side and the environmental side. They're, they're, they're both very alarming with this kind of a pest in this kind of environment here.

Coonerty (?): Okay, thank you for answering questions. Thank you (both talking at once)

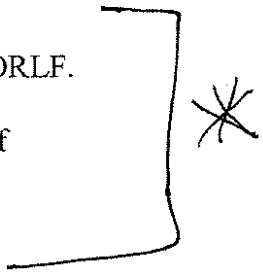
Kawamura: I hope I answered those.

Pirie: I wanna thank you first for coming down here tonight, and I know this is not, um, how you would like spend your Tuesday night, but it's really important for us to hear what you have to say and hear your answers to any questions, to our questions, so I really do appreciate that. Um, are there any, m-maybe this has been asked <unintelligible>, are, are there any situations where this Checkmate L-BAM-F has been applied, um, to a place where a lot of people live, and parks and yards and kinda stuff?

Kawamura: <Unidentified Speaker makes comment over his> The question was if LBAM-F been used in air application in <someone else makes an unintelligible remark over his comments> urban area, the answer is not.

Pirie: Right, okay. And, and –

Kawamura: <unintelligible> except, no, no, in, in Monterey we used Checkmate ORLF.



Pirie: Okay. And you're not, uh, uh, and the idea is to not apply this over bodies of water.

Kawamura: Correct.

Pirie: So, one, one, one man who has brought up this situation of a rain, a rain water catchment system --

Kawamura: Mm-hmm.

Pirie: ...which is basically a cistern, so, so, um, this person gathers rain water in the gutters and it goes into a large tank, a 30,000-gallon tank, or something, so presumably, it'll fall on his roof, it will come off in the rain and into his water system. Is that, uh, so he's drinking this. Is, is drinking some tiny concentration of this a problem?

Kawamura: I don't know John, if you can answer that, perhaps?

Connell: <Connell begins speaking at the same time> ...this could be in a system like what you're talkin' about that especially in a catchment system that my guess is I'm not familiar with these systems, that, that they're gonna have some sort of filtration system that probably would capture a lot of, you know, detritus and other materials which could, you know, would capture, my guess is m—microcapsules. Uh, in the case that there could be some ingestion, uh, the, the risks of, of any effects are extremely, extremely low, number one because of the concentration that we're talkin' about with these materials that I talked about earlier and then also the non-toxicity, not only of, of the pheromone, but also the <unintelligible> that we talked about have been evaluated by other, uh, regulatory agencies. So the risk would be extremely, extremely low from an exposure standpoint, and even if there is exposure, from a risk standpoint because of the, the effects aren't, aren't, are, or the probably of effects is very, very low because of the low toxicity.

Pirie: I, I guess I, I believe that you believe that, um, that this is safe, and, and I'm convinced that there is a need, eh, there's a need to get rid of this pest or to try to get rid of this pest even if locally we decided we could live with it, I understand that if it spread to the state, other states and other countries can make the decision that we won't take your crops anymore, and, and that would be a problem, but I, I, uh, and I think you're probably right that it's safe, but I, I have that five percent doubt in my mind and I'm also concerned about people who are, um, particularly sensitive. So, people who have, um, compromised immune systems or people who have chronic obste, uh, uh, buh, buh, COPD. Thank you. Um, uh, uh, <unintelligible> and young children, perhaps, and the very elderly. So, I'm concerned about that there, there isn't enough information about what the effects might be on those people, and then when you add that <audience applause>, when you add that to the whole trade secrets, um, that really is just really creepy <audience laughter> to people. You know.... <audience applause> It is. And,

and it, it seems like, I mean, at a minimum, if they're gonna say we're gonna spray something on you that we have to be able to tell people exactly, exactly what it is we're gonna spray on them. And that just seems like, uh, um, a minimal kind of, um, compromise which the State needs to make to say to these people, to say to Suterra, we're gonna, you know, if you want us to buy your product, we need to be able to tell people what it is. And then my other, um, um, two other things, quick point. Uh, Assembly member, uh, John Laird sent another letter to you, David, on the 16th, so I hope you got it. It's....

David: I did get it today <he and Pirie are both speaking at the same time>.

Pirie: And they included, um, uh, about three or four pages of questions that I thought were really good questions, and so, my que--, so, my question to you is are you going to be answering those, and, and, if so, when do you expect to be able to do that?

Kawamura: We would hope to have the response to the response to the response pretty shortly here. We, we'll be, we, we, we certainly, uh, respect, uh, Chairman Laird's, uh, attention of this, is, is actually supportive of, uh, of getting rid of the moth, but is, has clear, uh, concerns that were raised because of, really, the concerns of this area that have come about, uh, and this has been the public process that we were using to try and get to a, a, a, an answer set that...

Mauriello (?): So, I appre, so, I appreciate... <speaking at the same time>

Kawamura: ...people could...

Mauriello (?): ...you're being responding....

Kawamura: <speaking at the same time> Yes, we will.

Mauriello (?): ...do you think it will be by the end of the month, or the week?

Kawamura: Uh, if not, early into the next week. Uh, some of the questions we, we, are, are, I think we've addressed some of them today. I think some of these might have been drafted before we were able to, uh, even before we, you, you know, came up today. So, yes, the answer to that is, uh....

Mauriello (?): <speaking at the same time> And then the last one is just, uh, I wondered if you, if it would be possible to think of a compromise where there was spraying over, um, rural and ag areas, and use the twist ties in the really, um, heavily populated urban areas. And, you know, maybe there really are people who will go out and put the twist ties out and maybe we could send one to every household and ask them to put it up. You know, I understand that that's not reasonable when we're talking about acres and acres of, of farm land or forest land environment, maybe it is, so I would just ask you to think about that.

<audience applause>

Beautz: Tony?

Campos: Mr. Secretary, thank you for being here. Um, one, one of the things that, um, I agree with Supervisor Pirie, uh, on the part where we have some people that are very, um, sensitive to, uh, respiratory and so forth. I have a few very good friends that, um, can't be around anybody that, that's had perfume, can't be around everybody that has regular soap, um, and we do a lot of business with this person, so we always have to be careful not to have no cologne, use the right soap when we visit him because he, det, does get very, very sick. Um, I think you, you've noticed, you know, you've come to the i--, I mean, <unintelligible>, we have some very passionate people here that feel very strongly about their stand for safety. And, and I think the, the big killer here that I see is the unknown. Um, it's a little scary when you don't know the unknown, and we may never know the unknown. It's, it's just one of those things, um, that we can, one of the things that we can do is try to get a mu--, as much information to the folks so they could at least have an opportunity to look at 'em. I think we're trying to do that. Um, and, and I did mention to you earlier about the importance of trying to address Mr. Kee, uh, Mr., um, now my mind went blank here, Mr. Laird's, uh, paper to get all that, um, answered and try to work forward. Um, and, you know we'll hear from, uh, uh, I think a Steve Bruno that lives in Monterey that he was feeling sick. Uh, we also talked earlier at a meeting that we had a little earlier, and, uh, and, uh in discussion that I, that I brought up that maybe we should look at some kind of a method so if people do get sick, we have a, an opportunity to go somewhere or get somebody to talk to because the worst thing to do is that I, I was in a situation where I drank, uh, some, some tea out of a bottle, and I didn't know there was a, when I, I couldn't see it, but when I drank it all the way down, I found a bunch of stuff at the bottom, and the old mind played, made me sick. I, I didn't know if was because I drank the stuff or because I got scared and didn't know the unknown. The next day I still felt bad. I felt that way for two or three days and eventually it went away, but I did go through that, and so, the scary part is, you know, we need to try to get some answers for the folks that are, that have come out here, um, there's a lot of, lot of folks that will probably feel re--, respiratory is probably the scariest one where you can't breathe, but there's other issues that I think and, and you and you indicated that you'd try to work on, anoun--, along those lines to make sure. One of the things that I was kinda concerned about is, you know, I live in an agricultural community in Watsonville, the Pajaro Valley, and, um, I was looking at a letter that, that Dale Skillicorn wrote to us and, uh, he stated here that, uh, the ag business is multi-million dollar industry in our local area. I know we don't like to ta--, care about monies and so forth when we're talkin', but in reality, um, we're not looking at the losses and money that the farmers are losin', that , you know, we, we have to be realistic that, uh, tens of millions and even hundreds of millions of dollars in losses in added on costs could really affect our area, and I think that, um, when we look at the people that worked in the ranches, you know, we're real concerned about those folks because we're, we're sprayin' malathion, we're, we're lookin' at methylbromide and so forth, and we're tryin' to get better chemical, but we still have these folks pickin' our fruits, packin' 'em, workin' in this environment. Um, but these folks don't have a job. They're not going to be able to go out and buy the

merchandise. We're not going to be able to generate the sales tax. We're not going to be able to give the, the health services or social services that the people have depended on in this community. So, i--, i--, it, it, it's important that we work together, and I think there was a lady, and I, I didn't catch her name, but she was lady who was dressed in pink. She real--, real--, really made a lot of sense because she said that we can't get into hysteria, we gotta look at the facts and try to make decisions that are as honest as we can get 'em and try to move ahead, and I don't know if the lady is still here or not, but, yes, there you are. And I, I thought she made a lot of sense. You know, she wasn't here rammin' us over the head even though she may want to, but I think the important thing is that, uh, we're lookin' at information, and after a little while, uh, uh,
c--, uh, Secretary, you and I talked about it yesterday and the day before, people get little, you know, uh, perceptions sometimes, you know. The perception that they're trying to pull the wool over our eyes. You know, this is a community that's very, uh, boisterous, they, they voice their concerns, they show up where they <unintelligible> they're gonna tell you how they feel which is good. That's why we all live here. Uh, it never bothers me when people wanna voice their concerns and so forth, and I really feel that this meeting today – I, I, I, I feel that our chair really ran a very good job for everybody, gave everybody an opportunity....

Unidentified Speaker: Good job. <audience applause>

Campos: Even though some of us get a little <unintelligible> once in a while, but I, I think she did an outstanding job, and it's not a, it's not a, an easy job for you because you have a hard job. The thing that really concerns me is that for some reason, we <unintelligible> right away, and this moth becomes a little stronger <unintelligible> whatever you call it...

Unidentified Speaker: <speaking at the same time> ...that's why we all live here.

Campos: There you go. Um, it doesn't work. I'm really concerned what the alternative's going to be, and that's going to be regular pesticides, and I don't think anybody here wants that. I know I don't. Sometimes, we have to look at things and say, you know, let's get as much information, let's get it to the people, let's get honest information, and I'm not saying you didn't get honest information, but sometimes you tell me something, and I'll go tell my fellow members what you said, and then I add my little two bits to it, and when it comes out at the end, it's nuthin' like you told me. And so, we have to be very careful to get the true information out and also be able to say let <unintelligible>, and we shouldn't have done it this way, but you don't, we can't go back, and I don't think you'd wanna go back to three weeks, uh, or four weeks or whatever it is, so, I really think you got a tough job, but I think you tried to handle it in the right way, and, and I appreciate that personally, and I think, uh, it's not hard to get hammered, but you gotta understand that the people asking the questions are kinda scared right now, and I think you can deal with people that have some concerns, and you can deal with people that maybe don't trust people, and I gotta be able to satisfy everybody, but let's try to take care of the problem as, as best as we can and don't be afraid to come up and say, look, this is some more information we have. You may not like it, but here it

is, and I think people will appreciate that, and I appreciate you guys taking the time for this, uh, th, th, this evening, and I think it's been very informative, and I, I appreciated the meetings you've been able to give me. Thank you very much.

Kawamura: Thank you, um, can I <unintelligible> comment? I wanted the people that came up and, and mentioned <unintelligible> that carries over, uh, but listening to a fellow named Dave Loman mentioned, uh, the <unintelligible> EPA and FDA is over, um, that there, there, there's been mistakes made by governments, by federal agencies at the time, um, and I think we all recognize that there's any number of, eh, uh, errors, uh, uh, either errors of judgment, uh, miscalculations, mis, misjudgments in terms of science or new science that has come along that's proven that things that we thought were perfectly safe are not that safe after all. We, we know, uh, it's one of the biggest challenges we have when suddenly, uh, you ask people are scientists okay, uh, and people say, no, uh, there's people that say is agriculture okay, no, do you like farmers, yes. Uh, we're, we're in a difficult time right now where there's a lot of lack of confidence, and, and I can just acknowledge that I, I, I, I certainly recognize by some of the comments here that people don't trust our Department of Agriculture to do the right thing in this occasion. Uh, I, I, I, I will com--, commit to continuing to come back here with as much information as we have to make a decisions based on facts, uh, based on what we think is the right thing to protect this area, as well as protect the state, not the economy, but protect this area and this environment. I, it's something that we do. It's the mission that, that comes with my title, comes with our department, a, and also <unintelligible> that we, we've learned these experiences the hard way, um, because there's a lot of, uh, different kinds of invasive disease, and, and, and, uh, animal pr--, animals and, and plants and insects that have shown up and will continue to show up, and this is what we're gonna commit to do is try and keep them all out of your lives and keep them so they don't impact us, uh, as a, as a state or as a nation, and, and thank you again for just this opportunity to present. We do have some work to do, we'll come back with some more information. We'll be, uh, here next week on several, uh, uh, listening sessions, town hall listening sessions and trying to continue to present the information that we do have, uh, and that's, that's my commitment to make this public process, uh, uh, as, as, as transparent as possible.

Pirie: Thank you.

Beautz: Thank you. Thank you all for coming. Thank you for the public for coming and <unintelligible> thank you for cooperating, so everyone got a chance to talk, and, um, we appreciate you input and appreciate your, um, all of our representatives from the, um, State also and the team that you brought. I mean, I think information is what we're all looking for, and I think this is good process. Our Board will obviously be following this, um, also. So, thank you.

Unidentified Female Speaker: Make a motion! Make a motion!

Male Unidentified Speaker: Please do not let them spray.

Unidentified Female Speaker: Somebody make a motion!

Group of Unidentified Speakers: No, spray, no spray, no spray, no spray

Unidentified Female Speaker: Please make a motion!

Group of Unidentified Speakers: No spray, no spray....

Unidentified Female Speaker: Please make a motion to act!

Group of Unidentified Speakers: No spray, no spray.

Unidentified Female Speaker: <unintelligible> No motion? Omigosh!

(tape ends with background noise)

STATE OF CALIFORNIA
DEPARTMENT OF FOOD AND AGRICULTURE
Plant Health and Pest Prevention Services
1220 N Street, Room A-316
Sacramento, CA 95814
Phone: (916) 654-0317
Fax: (916) 654-1018

ARNOLD SCHWARZENEGGER, Governor
A.G. KAWAMURA, Secretary

October 26, 2007

Ken Corbishley, Agricultural Commissioner
Santa Cruz County
175 Westridge Drive
Watsonville, CA 95076

Dear Commissioner Corbishley,

The California Department of Food and Agriculture (CDFA) requests the issuance of a section 18 permit to apply the restricted material (Checkmate LBAM-F) in Santa Cruz County to accomplish the ongoing eradication efforts of the pest light brown apple moth (*Epiphyas postvittana*) in California.

The treatment (aerial application) over the Santa Cruz area would occur only one time in November 2007 (planned for November 4th-9th weather dependent). The application will occur during the hours of 8pm and 5am in order to lessen any inconvenience to areas residents. Please see attached map no. 1 for the prescribed area. Affected areas residents have been notified via first class mail, press events, media including: radio and television, newspaper and public meetings in advance of this activity.

Thank you for your prompt action in this matter.

Sincerely,

John Hooper
Program Supervisor
Plant Health and Pest Prevention Services
Pest Detection / Emergency Projects Branch

APPLICATION-RESTRICTED MATERIALS PERMIT

☐ FOR POSSESSION ONLY ☒ FOR POSSESSION AND USE

PERMITTEE _____

PERMIT NO. _____

PERMITTEE ADDRESS	CITY	ZIP	PHONE	TYPE OF PERMIT	EXPIRATION
CDFA Emergency Project	1220 N Street	Sacramento	Ca 95814	☒ SEASONAL ☐ JOB	DATE 12/31/2008

☐ PRIVATE APPLICATOR ☐ STRUCTURAL PCO ☐ AGRICULTURAL PCO ☐ COMMERCIAL APPLICATOR

NOTICE OF INTENT REQUIRED ☐ MUST BE SUBMITTED AT LEAST _____ HOURS PRIOR TO APPLICATION. METHOD: _____

Received Time Oct. 29. 10:45AM

A. PESTICIDES/PESTS

1. Z-11-Tetradecen-1-yl Acetate	7.	13.
2. E-9-11-Tetradecadien-1-yl-Acetate	8.	14.
3. Z-11-Tetradecen-1-yl-Acetate	9.	15.
4.	10.	16.
5.	11.	17.
6.	12.	18.

B. LOCATION

	SEC	TWN	RNG	MAP ID	COMMODITY	ACRES/ UNITS	PESTICIDES	PESTS	F*	M**	RATE	DILUTION/ VOLUME	APPL	DATE/ TIMING
1. Santa Cruz County	01	11S	01W		LBAM	26560	CheckMate LBAMF	LBAM	O	A	297 g/32 oz			
2. - Treatment Area							CheckMate OLR-F		O	A	2.92 g/32 oz			
3.														
4.														
5.														
6.														
7.														

PCO NAME	ADDRESS	PHONE	PCO NAME	ADDRESS	PHONE
Dynamis Aviation	3802 Constitution Ave	Los Alamitos Ca	(540)828-6070		

C. JUSTIFICATION FOR NON-AG USE: _____

D. CONDITIONS:

LBAM Section 18's
Aerial Application of Pheromones

I understand that this permit does not relieve me from liability for any damage to persons or property caused by the use of these pesticides. I waive any claim of liability or damages against the County Department of Agriculture based on the issuance of this permit. I further understand that this permit may be revoked when pesticides are used in conflict with the manufacture's labeling or in violation of applicable laws, regulations and specific conditions of this permit. I authorize inspection at all reasonable times and whenever an emergency exists, by the Department of Pesticide Regulation or the County Department of Agriculture of all areas treated or to be treated, storage facilities for pesticides or emptied containers and equipment used or to be used in the treatment.

*FORMULATION: L–LIQUID B–BAIT D–DUST F–FUMIGANT G–GRANULES WP–WETTABLE POWDER O–OTHER

**METHOD: A–AIR GR–GROUND F–FUMIGATION O–OTHER

PERMIT APPLICANT Robert Luna / Arturo Castello SIGNATURE Robert Luna / Arturo Castello TITLE Ag. Pest Cont Specialist / Ag. Pest Control Supervisor DATE 10/26/07

☐ RESTRICTED MATERIAL PERMIT IS HEREBY GRANTED FOR THE ABOVE MATERIALS. ☐ APPLICATION DENIED.

BY _____ DATE _____

DISTRIBUTION: WHITE & YELLOW-COUNTY; PINK & GOLD-PERMITTEE OSP 02 67174

PESTICIDE ENFORCEMENT BRANCH PR-ENF-125 (Rev. 9/00)

10/29/2007 11:37 8314958255 SANTA CRUZ CO AG PAGE 03/03

BILL NUMBER: SB 556 AMENDED
BILL TEXT

AMENDED IN SENATE MAY 9, 2007
AMENDED IN SENATE APRIL 19, 2007

INTRODUCED BY Senator Wiggins

FEBRUARY 22, 2007

An act to add ~~Section 8546.10 to the Government Code, relating to the State Auditor.~~ *Article 10 (commencing with Section 6049.5) to Chapter 9 of Part 1 of Division 4 of the Food and Agricultural Code, relating to the Light Brown Apple Moth, and declaring the urgency thereof, to take effect immediately.*

LEGISLATIVE COUNSEL'S DIGEST

SB 556, as amended, Wiggins. ~~State Auditor: Veterans' Home of California.~~ *The Light Brown Apple Moth.*

Existing law provides for the control and abatement of plant pests.

This bill would make various findings and declarations relating to the Light Brown Apple Moth. This bill would create the Light Brown Apple Moth Advisory Task Force to advise the Secretary of the Department of Food and Agriculture on the environmental and economic impact of the potential spread of the Light Brown Apple Moth in California on or before September 1, 2007. This bill would provide that appointments to the task force would be made by the secretary.

This bill would declare that it is to take effect immediately as an urgency measure.

~~Existing law provides for the establishment and operation of the Veterans' Home of California at various sites for aged and disabled veterans who meet certain eligibility requirements.~~

~~The bill would require the State Auditor to conduct an audit of the Veterans' Home of California, Yountville, to verify compliance with the Americans with Disabilities Act of 1990.~~

Vote: ~~majority~~ *2/3* . Appropriation: no. Fiscal committee: yes. State-mandated local program: no.

THE PEOPLE OF THE STATE OF CALIFORNIA DO ENACT AS FOLLOWS:

SECTION 1. The Legislature hereby finds and declares all of the following:

(a) On March 22, 2007, the U.S. Department of Agriculture's Animal and Plant Health Inspection Service (APHIS) confirmed the presence of Light Brown Apple Moth (LBAM), Epiphyas posvittan, in California.

(b) Since then, the presence of this invasive species has been detected in portions of Alameda, Contra Costa, Marin, San Francisco, San Mateo, Santa Clara, Santa Cruz, and Monterey Counties.

(c) This moth is originally from Australia, and has become established in New Zealand, New Caledonia, Hawaii, and the British Isles. Its discovery in California is a new North American record.

(d) The presence of the Light Brown Apple Moth has been recorded in over 200 plants in 120 plant genera in 50 families. Notable trees are apple, pear, peach, apricot, nectarine, citrus, persimmon, cherry, almond, avocado, oak, willow, walnut, poplar, cottonwood, coast redwood, pine, and eucalyptus. Common shrub and herbaceous hosts are grape, kiwifruit, strawberry, blackberry, blueberry, boysenberry, raspberry, corn, pepper, tomato, pumpkin, beans, cabbage, carrot, alfalfa, rose, camellia, jasmine, chrysanthemum, clover, and plantain.

(e) Development of the Light Brown Apple Moth is continuous, with no true dormancy. In Australia, this moth typically has three generations per year and over-winters as a larva. Adults deposit egg masses containing 20-50 eggs on the upper leaf surface or on fruit. Larvae disburse and construct silken shelters on the undersides of leaves, usually near a midrib or large vein. Older larva roll together leaves and buds or fruit with webbing.

(f) Damage to fruit occurs as surface feeding by the larva. Pupation takes place within the larval nests. The pest destroys, stunts, or deforms, young seedlings, spoils the appearance of ornamental plants, and injures deciduous fruit-tree crops, citrus, and grapes.

(g) California is the nation's leader in agricultural exports and in 2003 shipped more than $7.2 billion in both food and agricultural commodities around the world.

(h) The Light Brown Apple Moth has the potential to cause significant economic losses due to increased production costs and the possible loss of international and domestic markets.

SEC. 2. Article 10 (commencing with Section 6049.5) is added t o Chapter 9 of Part 1 of Division 4 of the Food and Agricultural Code , to read:

Article 10. Light Brown Apple Moth

6049.5. (a) The Light Brown Apple Moth Advisory Task Force is hereby created. The task force shall advise the Secretary of the Department of Food and Agriculture on the environmental and economic impact of the potential spread of the Light Brown Apple Moth in California.

(b) The task force shall report it findings to the secretary on or before September 1, 2007.

(c) Appointments to the task force shall be made by the Secretary of the Department of Food and Agriculture.

SEC. 3. This act is an urgency statute necessary for the immediate preservation of the public peace, health, or safety within the meaning of Article IV of the Constitution and shall go into immediate effect. The facts constituting the necessity are:

The Light Brown Apple Moth is a new exotic pest that is not yet established in the United States. In order that swift action to assess its potential impact on the environmental and economic health of California can be taken as soon as possible, it is necessary that this act take effect immediately.

~~SECTION 1. Section 8546.10 is added to the Government Code, to read:~~

~~8546.10. The State Auditor shall conduct an audit of the Veterans' Home of California, Yountville, to verify compliance with the Americans with Disabilities Act of 1990 (42 U.S.C. Sec. 12101 et. seq.).~~

BILL NUMBER: SB 556 AMENDED
BILL TEXT

AMENDED IN ASSEMBLY JUNE 21, 2007
AMENDED IN SENATE MAY 9, 2007
AMENDED IN SENATE APRIL 19, 2007

INTRODUCED BY Senator Wiggins

FEBRUARY 22, 2007

An act to add *and repeal* Article 10 (commencing with Section ~~6049.5)~~ *6050)* to Chapter 9 of Part 1 of Division 4 of the Food and Agricultural Code, relating to the Light Brown Apple Moth, and declaring the urgency thereof, to take effect immediately.

LEGISLATIVE COUNSEL'S DIGEST

SB 556, as amended, Wiggins. The Light Brown Apple Moth.

Existing law provides for the control and abatement of plant pests.

This bill *, the Light Brown Apple Moth Act of 2007,* would make various findings and declarations relating to the ~~Light Brown Apple Moth~~ *agricultural pest* . This bill would create the Light Brown Apple Moth ~~Advisory Task Force to advise the Secretary of~~ *Program in* the Department of Food and Agriculture ~~on the environmental and economic impact of the potential spread of the Light Brown Apple Moth in California on or before September 1, 2007. This bill would provide that appointments to the task force would be made by the secretary~~ *and the Light Brown Apple Moth Account in the Department of Food and Agriculture Fund. This bill would require the department to report to the Legislature on January 10, 2008, and on each January 10th thereafter while these provisions are operative, re garding its expenditures, progress, and ongoing priorities in combating the Light Brown Apple Moth in California. This bill would provide that these provisions would become inoperative on March 1, 2018, and as of January 1, 2019, would be repealed unless a later enacted sta* tute extends that date.

This bill would declare that it is to take effect immediately as an urgency measure.

Vote: 2/3. Appropriation: no. Fiscal committee: yes. State-mandated local program: no.

THE PEOPLE OF THE STATE OF CALIFORNIA DO ENACT AS FOLLOWS:

SECTION 1. This act shall be known as the Light Brown Apple Moth Act of 2007.

SEC. 2 Article 10 (commencing with Section 6050) is added to Chapter 9 of Part 1 of Division 4 of the Food and Agricultural Code , to read:

Article 10. Light Brown Apple Moth

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6050. The Legislature hereby finds and declares all of the following:

(a) The introduction of the Light Brown Apple Moth represents a clear, present, significant, and imminent danger to California's natural environment and agricultural industry. This is an insect species that feeds on over 250 species of native and ornamental plants, fruits, and vegetables.

(b) The introduction of the Light Brown Apple Moth also represents a clear, present, significant, and imminent threat to California's native areas as it will feed on alder, ceanothus, columbine, cottonwood, cypress, ferns, fir, hawthorn, honeysuckle, lupine, madrone, oak, pine, poplar, redwood, spruce, and willow.

(c) The general area of the infestation contains numerous sensitive plant and animal species and habits. There is an imminent threat for adverse effect and ultimate extinction to some of these sensitive species if this pest becomes permanently established in California.

(d) The State of California has a great interest in protecting its native species and agricultural products from further harm caused by the introduction of the Light Brown Apple Moth.

(e) The Light Brown Apple Moth is currently found in the urban and natural areas in all parts of nine California counties and could move into agricultural croplands.

(f) Valued at $31.7 billion in 2005, California's agricultural economy continues to rank first in the nation constituting 13.3 percent of the total United States agricultural economy value in 2005. It is estimated to have a minimum potential impact of $133 million to only four of the potentially impacted crops, apples, pears, oranges, and grapes, and environmental impact from increased pesticide use.

(g) To avoid potentially catastrophic loss to some of California's most important industries and to native species, the Legislature declares that this article is in the interest of the public health and welfare.

(h) This article is not intended to establish a precedent, or to supersede, reduce, or in any way alter government funding related to plant pest eradication and control in this state.

6050.1. (a) There is hereby created in the Department of Food and Agriculture the Light Brown Apple Moth Program.

(b) The Secretary of Food and Agriculture shall provide an appropriate level of support staffing and logistical support for eradicating the Light Brown Apple Moth.

(c) (1) There is hereby created the Light Brown Apple Moth Account in the Department of Food and Agriculture Fund.

(2) The account shall consist of money made available from the federal government and other sources or transferred from the General Fund. Money made available from the federal government and other sources shall be available for expenditure without regard to fiscal years for the purpose of eradicating the Light Brown Apple Moth.

(d) During the first 36 months of the operation of the Light Brown Apple Moth Program the department's actions pursuant to this act shall be deemed an emergency response for the benefit of the environment under Division 13 (commencing with Section 21000) of the Public Resources Code. During this period, the department shall complete the statutorily required environmental documentation.

(e) Notwithstanding Section 7550.5 of the Government Code, the department shall report to the Legislature on January 10, 2008, and on each January 10th thereafter while this section is operative, regarding its expenditures, progress, and ongoing priorities in combating the Light Brown Apple Moth in California.

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(f) This article shall become inoperative on March 1, 2018, and as of January 1, 2019, is repealed, unless a later enacted statute that is enacted before January 1, 2019, deletes or extends that date

SEC. 3. This act is an urgency statute necessary for the immediate preservation of the public peace, health, or safety within the meaning of Article IV of the Constitution and shall go into immediate effect. The facts constituting the necessity are:

To protect, as soon as possible, the 250 host commodities, their associated industries, and native species from the Light Brown Apple Moth, it is necessary that this act take effect immediately.

~~SECTION 1. The Legislature hereby finds and declares all of the following:~~

~~(a) On March 22, 2007, the U.S. Department of Agriculture's Animal and Plant Health Inspection Service (APHIS) confirmed the presence of Light Brown Apple Moth (LBAM), Epiphyas postvittan, in California.~~

~~(b) Since then, the presence of this invasive species has been detected in portions of Alameda, Contra Costa, Marin, San Francisco, San Mateo, Santa Clara, Santa Cruz, and Monterey Counties.~~

~~(c) This moth is originally from Australia, and has become established in New Zealand, New Caledonia, Hawaii, and the British Isles. Its discovery in California is a new North American record.~~

~~(d) The presence of the Light Brown Apple Moth has been recorded in over 200 plants in 120 plant genera in 50 families. Notable trees are apple, pear, peach, apricot, nectarine, citrus, persimmon, cherry, almond, avocado, oak, willow, walnut, poplar, cottonwood, coast redwood, pine, and eucalyptus. Common shrub and herbaceous hosts are grape, kiwifruit, strawberry, blackberry, blueberry, boysenberry, raspberry, corn, pepper, tomato, pumpkin, beans, cabbage, carrot, alfalfa, rose, camellia, jasmine, chrysanthemum, clover, and plantain.~~

~~(e) Development of the Light Brown Apple Moth is continuous, with no true dormancy. In Australia, this moth typically has three generations per year and over-winters as a larva. Adults deposit egg masses containing 20-50 eggs on the upper leaf surface or on fruit. Larvae disburse and construct silken shelters on the undersides of leaves, usually near a midrib or large vein. Older larva roll together leaves and buds or fruit with webbing.~~

~~(f) Damage to fruit occurs as surface feeding by the larva. Pupation takes place within the larval nests. The pest destroys, stunts, or deforms, young seedlings, spoils the appearance of ornamental plants, and injures deciduous fruit tree crops, citrus, and grapes.~~

~~(g) California is the nation's leader in agricultural exports and in 2003 shipped more than $7.2 billion in both food and agricultural commodities around the world.~~

~~(h) The Light Brown Apple Moth has the potential to cause significant economic losses due to increased production costs and the possible loss of international and domestic markets.~~

~~SEC. 2. Article 10 (commencing with Section 6049.5) is added to Chapter 9 of Part 1 of Division 4 of the Food and Agricultural Code, to read:~~

~~Article 10. Light Brown Apple Moth~~

~~6049.5. (a) The Light Brown Apple Moth Advisory Task Force is~~

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~~hereby created. The task force shall advise the Secretary of the Department of Food and Agriculture on the environmental and economic impact of the potential spread of the Light Brown Apple Moth in California.~~

~~(b) The task force shall report it findings to the secretary on or before September 1, 2007.~~

~~(c) Appointments to the task force shall be made by the Secretary of the Department of Food and Agriculture.~~

~~SEC. 3. This act is an urgency statute necessary for the immediate preservation of the public peace, health, or safety within the meaning of Article IV of the Constitution and shall go into immediate effect. The facts constituting the necessity are:~~

~~The Light Brown Apple Moth is a new exotic pest that is not yet established in the United States. In order that swift action to assess its potential impact on the environmental and economic health of California can be taken as soon as possible, it is necessary that this act take effect immediately.~~

BILL NUMBER: SB 556 AMENDED
BILL TEXT

AMENDED IN ASSEMBLY JULY 2, 2007
AMENDED IN ASSEMBLY JUNE 21, 2007
AMENDED IN SENATE MAY 9, 2007
AMENDED IN SENATE APRIL 19, 2007

INTRODUCED BY Senator Wiggins

FEBRUARY 22, 2007

An act to add and repeal Article 10 (commencing with Section 6050) ~~to~~ *of* Chapter 9 of Part 1 of Division 4 of the Food and Agricultural Code, relating to the light brown apple moth, and declaring the urgency thereof, to take effect immediately.

LEGISLATIVE COUNSEL'S DIGEST

SB 556, as amended, Wiggins. The light brown apple moth.

Existing law provides for the control and abatement of plant pests.

This bill, the Light Brown Apple Moth Act of 2007, would make various findings and declarations relating to the agricultural pest. This bill would create the Light Brown Apple Moth Program in the Department of Food and Agriculture and the Light Brown Apple Moth Account in the Department of Food and Agriculture Fund. This bill would require the department to report to the Legislature on January 10, 2008, and on each January 10th thereafter while these provisions are operative, regarding its expenditures, progress, and ongoing priorities in combating the light brown apple moth in California. This bill would provide that these provisions would become inoperative on March 1, 2018, and as of January 1, 2019, would be repealed unless a later enacted statute extends that date.

This bill would declare that it is to take effect immediately as an urgency measure.

Vote: 2/3. Appropriation: no. Fiscal committee: yes. State-mandated local program: no.

THE PEOPLE OF THE STATE OF CALIFORNIA DO ENACT AS FOLLOWS:

SECTION 1. This act shall be known as the Light Brown Apple Moth Act of 2007.

SEC. 2 Article 10 (commencing with Section 6050) is added to Chapter 9 of Part 1 of Division 4 of the Food and Agricultural Code, to read:

Article 10. Light Brown Apple Moth

6050. The Legislature hereby finds and declares all of the following:

(a) The introduction of the light brown apple moth represents a clear, present, significant, and imminent danger to California's natural environment and agricultural industry. This is an insect species that feeds on over 250 species of native and ornamental

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plants, fruits, and vegetables.

(b) The introduction of the light brown apple moth also represents a clear, present, significant, and imminent threat to California's native areas as it will feed on alder, ceanothus, columbine, cottonwood, cypress, ferns, fir, hawthorn, honeysuckle, lupine, madrone, oak, pine, poplar, redwood, spruce, and willow.

(c) The general area of the infestation contains numerous sensitive plant and animal species and habits. There is an imminent threat for adverse effect and ultimate extinction to some of these sensitive species if this pest becomes permanently established in California.

(d) The State of California has a great interest in protecting its native species and agricultural products from further harm caused by the introduction of the light brown apple moth.

(e) The light brown apple moth is currently found in the urban and natural areas in all parts of nine California counties and could move into agricultural croplands.

(f) Valued at $31.7 billion in 2005, California's agricultural economy continues to rank first in the nation constituting 13.3 percent of the total United States agricultural economy value in 2005. It is estimated to have a minimum potential impact of $133 million to only four of the potentially impacted crops, apples, pears, oranges, and grapes, and environmental impact from increased pesticide use.

(g) To avoid potentially catastrophic loss to some of California's most important industries and to native species, the Legislature declares that this article is in the interest of the public health and welfare.

(h) This article is not intended to establish a precedent, or to supersede, reduce, or in any way alter government funding related to plant pest eradication and control in this state.

6050.1. (a) There is hereby created in the Department of Food and Agriculture the Light Brown Apple Moth Program.

(b) The Secretary of Food and Agriculture shall provide an appropriate level of support staffing and logistical support for eradicating the light brown apple moth.

(c) (1) There is hereby created the Light Brown Apple Moth Account in the Department of Food and Agriculture Fund.

(2) The account shall consist of money made available from the federal government and other sources or transferred from the General Fund *designated for the Light Brown Apple Moth Program* . Money made available from the federal government and other sources shall be available for expenditure without regard to fiscal years for the purpose of eradicating the light brown apple moth.

(d) During the first ~~36~~ *24* months of the operation of the Light Brown Apple Moth Program the department's actions pursuant to this act shall be deemed an emergency response for the benefit of the environment under Division 13 (commencing with Section 21000) of the Public Resources Code. During this period, the department shall complete the statutorily required environmental documentation.

(e) Notwithstanding Section 7550.5 of the Government Code, the department shall report to the Legislature on January 10, 2008, and on each January 10th thereafter while this section is operative, regarding its expenditures, progress, and ongoing priorities in combating the light brown apple moth in California.

(f) This article shall become inoperative on March 1, 2018, and as of January 1, 2019, is repealed, unless a later enacted statute that is enacted before January 1, 2019, deletes or extends that date

SEC. 3. This act is an urgency statute necessary for the immediate

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preservation of the public peace, health, or safety within the meaning of Article IV of the Constitution and shall go into immediate effect. The facts constituting the necessity are:

To protect, as soon as possible, the 250 host ~~commodities~~ *species of native and ornamental plants, fruits, and vegetables* , their associated industries, and native species from the light brown apple moth, it is necessary that this act take effect immediately.

BILL NUMBER: SB 556 AMENDED
BILL TEXT

AMENDED IN ASSEMBLY SEPTEMBER 4, 2007
AMENDED IN ASSEMBLY JULY 2, 2007
AMENDED IN ASSEMBLY JUNE 21, 2007
AMENDED IN SENATE MAY 9, 2007
AMENDED IN SENATE APRIL 19, 2007

INTRODUCED BY Senator Wiggins

FEBRUARY 22, 2007

An act to add and repeal Article 10 (commencing with Section 6050) of Chapter 9 of Part 1 of Division 4 of the Food and Agricultural Code, relating to the light brown apple moth, and declaring the urgency thereof, to take effect immediately.

LEGISLATIVE COUNSEL'S DIGEST

SB 556, as amended, Wiggins. The light brown apple moth.

Existing law provides for the control and abatement of plant pests.

This bill, the Light Brown Apple Moth Act of 2007, would make various findings and declarations relating to the agricultural pest. This bill would create the Light Brown Apple Moth Program in the Department of Food and Agriculture and the Light Brown Apple Moth Account in the Department of Food and Agriculture Fund , *from which the department may allocate funds to local agencies for activities to eradicate the Light Brown Apple Moth* . This bill would require the department *to annually review the progress made by each local agency to which funds have been allocated and make recommendations, as needed, to improve individual local agency eradication efforts. This bill would also require the department* to report to the Legislature on January 10, 2008, and on each January 10th thereafter while these provisions are operative, regarding its expenditures, progress, and ongoing priorities in combating the light brown apple moth in California. This bill would provide that these provisions would become inoperative on ~~March 1, 2018~~ *October 1, 2009* , and as of January 1, ~~2019~~ *2010* , would be repealed unless a later enacted statute extends that date.

This bill would declare that it is to take effect immediately as an urgency measure.

Vote: 2/3. Appropriation: no. Fiscal committee: yes. State-mandated local program: no.

THE PEOPLE OF THE STATE OF CALIFORNIA DO ENACT AS FOLLOWS:

SECTION 1. This act shall be known as the Light Brown Apple Moth Act of 2007.

~~SEC. 2.~~ *SEC. 2.* Article 10 (commencing with Section 6050) is added to Chapter 9 of Part 1 of Division 4 of the Food and Agricultural Code, to read:

Article 10. Light Brown Apple Moth

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6050. The Legislature hereby finds and declares all of the following:

(a) The introduction of the light brown apple moth represents a clear, present, significant, and imminent danger to California's natural environment and agricultural industry. This is an insect species that feeds on over 250 species of native and ornamental plants, fruits, and vegetables.

(b) The introduction of the light brown apple moth also represents a clear, present, significant, and imminent threat to California's native areas as it will feed on alder, ceanothus, columbine, cottonwood, cypress, ferns, fir, hawthorn, honeysuckle, lupine, madrone, oak, pine, poplar, redwood, spruce, and willow.

(c) The general area of the infestation contains numerous sensitive plant and animal species and ~~habits~~ *habitats* . There is an imminent threat for adverse effect and ultimate extinction to some of these sensitive species if this pest becomes permanently established in California.

(d) The State of California has a great interest in protecting its native species and agricultural products from further harm caused by the introduction of the light brown apple moth.

(e) The light brown apple moth is currently found in the urban and natural areas in all parts of nine California counties and could move into agricultural croplands.

(f) Valued at $31.7 billion in 2005, California's agricultural economy continues to rank first in the nation constituting 13.3 percent of the total United States agricultural economy value in 2005. It is estimated to have a minimum potential impact of $133 million to only four of the potentially impacted ~~crops, apples,~~ *crops (apples,* pears, oranges, and ~~grapes,~~ *grapes)* and environmental impact from increased pesticide use.

(g) To avoid potentially catastrophic loss to some of California's most important industries and to native species, the Legislature declares that this article is in the interest of the public health and welfare.

(h) This article is not intended to establish a precedent, or to supersede, reduce, or in any way alter government funding related to plant pest eradication and control in this state.

6050.1. (a) There is hereby created in the Department of Food and Agriculture the Light Brown Apple Moth Program.

(b) The Secretary of Food and Agriculture shall provide , *subject to available funding and other resources,* an appropriate level of support staffing and logistical support for eradicating the light brown apple moth.

(c) (1) There is hereby created the Light Brown Apple Moth Account in the Department of Food and Agriculture Fund.

~~(2) The account shall consist of money made available from the federal government and other sources or transferred from the General Fund designated for the Light Brown Apple Moth Program. Money made available from the federal government and other sources shall be available for expenditure without regard to fiscal years for the purpose of eradicating the light brown apple moth.~~

~~(d) During the first 24 months of the operation of the Light Brown Apple Moth Program the department's actions pursuant to this act shall be deemed an emergency response for the benefit of the environment under Division 13 (commencing with Section 21000) of the Public Resources Code. During this period, the department shall~~

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~~complete the statutorily required environmental documentation.~~

(2) (A) The funds in the Light Brown Apple Moth Account shall be available for expenditure without regard to fiscal year for activities by local agencies to eradicate the Light Brown Apple Moth. Funds allocated by the department to a county for local assistance in eradicating the Light Brown Apple Moth shall be allocated to a local agency or local agencies designated by that county's board of supervisors.

(B) The department shall, for local agencies to which funds have been allocated pursuant to subparagraph (A), annually review the progress made by each local agency in eradicating the Light Brown Apple Moth, and make recommendations, as needed, to improve individual local agency eradication efforts.

(C) Eradication activities undertaken pursuant to this article shall comply with all applicable laws and regulations and shall be conducted in an environmentally responsible manner.

~~(c)~~

(d) Notwithstanding Section 7550.5 of the Government Code, the department shall report to the Legislature on January 10, 2008, and on each January 10th thereafter while this section is operative, regarding its expenditures, progress, and ongoing priorities in combating the light brown apple moth in California.

~~(f)~~

(e) This article shall become inoperative on ~~March 1, 2018~~ *October 1, 2009* , and as of January 1, ~~2019~~ *2010* , is repealed, unless a later enacted statute that is enacted before January 1, ~~2019~~ *2010* , deletes or extends that date .

SEC. 3. This act is an urgency statute necessary for the immediate preservation of the public peace, health, or safety within the meaning of Article IV of the Constitution and shall go into immediate effect. The facts constituting the necessity are:

To protect, as soon as possible, the 250 host species of native and ornamental plants, fruits, and vegetables, their associated industries, and native species from the light brown apple moth, it is necessary that this act take effect immediately.

BILL NUMBER: SB 556 ENROLLED
BILL TEXT

PASSED THE SENATE SEPTEMBER 7, 2007
PASSED THE ASSEMBLY SEPTEMBER 6, 2007
AMENDED IN ASSEMBLY SEPTEMBER 4, 2007
AMENDED IN ASSEMBLY JULY 2, 2007
AMENDED IN ASSEMBLY JUNE 21, 2007
AMENDED IN SENATE MAY 9, 2007
AMENDED IN SENATE APRIL 19, 2007

INTRODUCED BY Senator Wiggins

FEBRUARY 22, 2007

An act to add and repeal Article 10 (commencing with Section 6050) of Chapter 9 of Part 1 of Division 4 of the Food and Agricultural Code, relating to the light brown apple moth, and declaring the urgency thereof, to take effect immediately.

LEGISLATIVE COUNSEL'S DIGEST

SB 556, Wiggins. The light brown apple moth.

Existing law provides for the control and abatement of plant pests.

This bill, the Light Brown Apple Moth Act of 2007, would make various findings and declarations relating to the agricultural pest. This bill would create the Light Brown Apple Moth Program in the Department of Food and Agriculture and the Light Brown Apple Moth Account in the Department of Food and Agriculture Fund, from which the department may allocate funds to local agencies for activities to eradicate the Light Brown Apple Moth. This bill would require the department to annually review the progress made by each local agency to which funds have been allocated and make recommendations, as needed, to improve individual local agency eradication efforts. This bill would also require the department to report to the Legislature on January 10, 2008, and on each January 10th thereafter while these provisions are operative, regarding its expenditures, progress, and ongoing priorities in combating the light brown apple moth in California. This bill would provide that these provisions would become inoperative on October 1, 2009, and as of January 1, 2010, would be repealed unless a later enacted statute extends that date.

This bill would declare that it is to take effect immediately as an urgency measure.

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BILL NUMBER: SB 556 CHAPTERED
BILL TEXT

CHAPTER 190
FILED WITH SECRETARY OF STATE SEPTEMBER 7, 2007
APPROVED BY GOVERNOR SEPTEMBER 7, 2007
PASSED THE SENATE SEPTEMBER 7, 2007
PASSED THE ASSEMBLY SEPTEMBER 6, 2007
AMENDED IN ASSEMBLY SEPTEMBER 4, 2007
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Table of Contents

Light Brown Apple Moth in California:

Quarantine, Management, and Potential Impacts

MARSHALL W. JOHNSON, CE Specialist & Entomologist, Entomology, UC Riverside; **CAROLYN PICKEL,** IPM Advisor, UC Statewide IPM Program and UC Cooperative Extension, Sutter/Yuba Counties; **LARRY L. STRAND,** Principal Editor, UC Statewide IPM Program; **LUCIA G. VARELA,** IPM Advisor, UC Statewide IPM Program and UC Cooperative Extension, Sonoma County; **CHERYL A. WILEN,** IPM Advisor, UC Statewide IPM Program and UC Cooperative Extension, San Diego County; **MARK P. BOLDA,** Farm Advisor, UC Cooperative Extension, Santa Cruz County; **MARY LOUISE FLINT,** CE Specialist, Entomology, UC Davis and Associate Director, UC Statewide IPM Program; **W. K. FRANKIE LAM,** Staff Entomologist, UC Cooperative Extension, Monterey County; **FRANK G. ZALOM,** Professor, Entomology, UC Davis

In March 2007 the presence of the light brown apple moth (LBAM), *Epiphyas postvittana*, was confirmed in California by the U.S. Department of Agriculture Animal and Plant Health Inspection Service (APHIS). This is the first time this pest has been detected in the continental United States. It was first found in Alameda County and as of July 2007 has been found in the San Francisco Bay area counties of Alameda, Contra Costa, Marin, Napa, San Francisco, Santa Clara, San Mateo, and Solano, in the central coast counties of Monterey and Santa Cruz, and in Los Angeles County. APHIS considers LBAM to be a High-Risk pest and the California Department of Food and Agriculture (CDFA) considers it to be a Class A pest. Because of this, CDFA issued a State Interior Quarantine order restricting intrastate shipment of plant material from counties where LBAM has been found. APHIS later issued a Federal Domestic Quarantine order on May 2, 2007, with restrictions on interstate shipment of plant material.

The purpose of this publication is to help readers:

- Understand why LBAM is subject to quarantine regulations
- Understand the difference between controlling pests that are regulated under a quarantine and managing them in an integrated pest management program
- Learn about LBAM biology and identification
- Learn how to send in a sample for identification
- Become familiar with potential IPM alternatives that might be used in conjunction with eradication efforts
- Learn about possible pesticide treatments for LBAM and how to mitigate their impact on the environment
- Understand possible impacts on various sectors of agriculture and residential areas

While the document generally describes current CDFA and APHIS quarantine regulations and the LBAM situation in California, the legal and latest information, including maps of quarantined areas, can be found on the CDFA LBAM Web site (http://www.cdfa.ca.gov/phpps/PDEP/lbam/lbam_main.html).

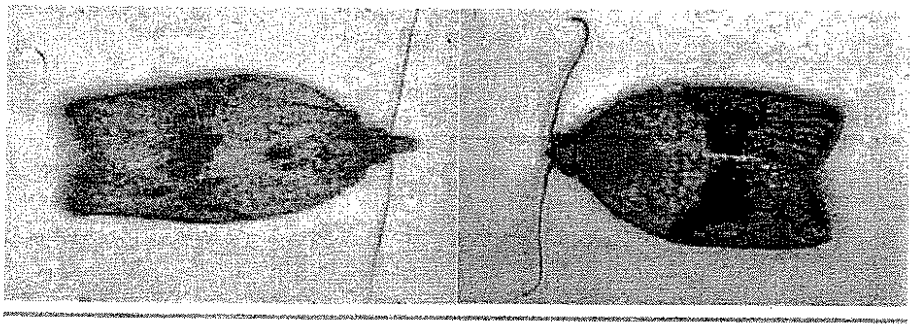

Figure 1. Female (left) and male light brown apple moths. Used with the permission of D. Williams, State of Victoria Department of Primary Industries.

University of California Agriculture and Natural Resources
UC Statewide Integrated Pest Management Program

This publication is available online at http://www.ipm.ucdavis.edu/EXOTIC/lightbrownapplemoth.html
Published Sept. 12, 2007

LBAM: A Class A Pest

Pests are classified by CDFA according to their potential to cause harm to California's agriculture and environment. Five classifications are defined. Class A pests are defined as organisms "of known economic importance subject to state (or commissioner when acting as a state agent) enforced action involving: eradication, quarantine regulation, containment, rejection, or other holding action." For definitions of all pest classes, see the PlantPestRatings.pdf file (using the search function) on the CDFA Web site (http://www.cdfa.ca.gov).

The A classification is designed to prevent further spread to other parts of the state and expansion of quarantine regulations to those areas and possibly the entire state. The classification also allows implementation of efforts to eradicate it from the locations where it currently occurs.

CDFA classifies LBAM as a Class A pest because

- It is potentially damaging to a wide range of plant species.
- It does not occur elsewhere in the U.S. or in most other countries.
- Were it to become established in California, quarantine restrictions and prohibitions on shipments would likely have severe impacts on agricultural industries.

Because LBAM occurs in only a limited number of locations (Australia, New Zealand, New Caledonia, Hawaii, Great Britain, Ireland), international quarantines, prohibitions against shipments, or phytosanitary certification of fresh plant products from infested locations within California have been instituted and will most likely continue to be. The primary reason for the A classification is the severe economic loss that such measures would cause industries that ship fresh plant products.

LBAM has a host range that includes many trees and ornamental species, giving it the potential to cause serious damage to natural areas and urban settings as well as to agricultural crops. Nursery products are particularly affected because many of them are LBAM hosts that are shipped outside the affected counties, to other states, and on the international market. It is not known how damaging the pest would be if it were to become established in California. LBAM is a serious pest of grapes, citrus, pome fruits, stone fruits, and kiwifruit in Australian areas that have a climate similar to that of California's Central Valley and is a major introduced pest in New Zealand, where it is favored by the cooler climate. LBAM has not become a serious pest in Hawaii and is common only at higher elevations there. If eradication of LBAM is unsuccessful and it does become established in California, quarantine restrictions and export prohibitions would likely be devastating to some commodity industries. For example, Mexico suspended importation of a number of commodities from quarantined counties on May 10, 2007. Canada implemented quarantine restrictions effective on June 25, 2007.

Quarantine Regulation of LBAM

Quarantine regulations instituted by CDFA and APHIS are aimed at preventing spread of LBAM to other areas of California and to other states. The Administrator of APHIS lists as regulated those areas of the state where LBAM has been confirmed to be present, where the Administrator has reason to believe LBAM is present, or areas that cannot be separated for quarantine enforcement purposes from infested areas. **APHIS will not quarantine the entire state** if CDFA adopts quarantine regulations that are essentially the same as those imposed by APHIS, and if those regulations are considered sufficient to prevent interstate spread of LBAM. Under the quarantine regulations, there is a zero tolerance for LBAM in plant products being shipped from quarantine areas.

As of September 10, 2007, the counties of Alameda, Contra Costa, Los Angeles, Marin, Monterey, Napa, San Francisco, Santa Clara, Santa Cruz, San Mateo, and Solano had been designated as quarantined areas by APHIS and CDFA. The quarantine orders specify the areas designated as quarantined, what products are regulated by the quarantine, and what conditions must be met for movement of regulated products from the quarantine areas. **Check the CDFA Web site regularly for updates.**

- Federal Domestic Quarantine Order for LBAM
  (http://www.cdfa.ca.gov/phpps/PDEP/lbam/pdfs/LBAM_FederalOrder.pdf)

- State Interior Quarantine for LBAM (http://pi.cdfa.ca.gov/pqm/manual/htm/419.htm)

The quarantine orders affect the following plant products:

- Nursery stock
- Cut flowers, garlands, wreaths or greenery of any plants
- Trees and bushes, including cut Christmas trees
- Green waste (dead or dying plants and plant parts)
- Fruits and vegetables
- Any other harvested plant parts capable of sustaining LBAM
- Possible carriers including equipment used in growing, harvesting, processing, and transporting host plants, plant parts, and green waste residues

REGULATORY REQUIREMENTS

Specific procedures for compliance with the LBAM quarantine are spelled out in Light Brown Apple Moth Regulatory Proceedures Manual (http://www.cdfa.ca.gov/phpps/PDEP/lbam/pdfs/LBAMTOC.pdf). This advisory includes information on the following subjects:

Production and retail nurseries and producers of cut flowers and greenery

- trapping and inspection
- procedures for dealing with infestations
- compliance and certification

Green waste

- compliance and certification

Community gardens

- inspection
- compliance

Harvested fruits and vegetables

- trapping and inspection
- compliance and certification

ERADICATION OR MANAGEMENT?

APHIS has called together experts from the United States, Australia, and New Zealand to form a Technical Working Group (TWG) to advise APHIS and CDFA on steps for managing the LBAM infestation in California. The TWG has recommended that the agencies adopt a long-term goal of eradicating LBAM. Because there are no single tools or methods that can be relied upon to quickly eliminate LBAM from all infested areas, the proposed eradication program will integrate a number of strategies. It was recommended that such an eradication program include the following:

- Limiting and containing the LBAM population to its present distribution
- Monitoring to appraise changes in LBAM distribution and numbers
- Reduction of higher-density populations
- Suppression of low-density LBAM populations at the edges of quarantined areas

Quarantine restrictions are aimed at limiting and containing the LBAM populations. Keeping the pest from spreading to other areas of the state is a critical element of the program, and this will be accomplished by regular monitoring with pheromone traps, inspection, treatment of infested nursery stock or other commodities, and destruction of green waste.

Eradication programs will first be focused on the most highly infested areas including agricultural crops and residential areas. When LBAM infestations are confirmed in nurseries, regulations recommend treatment with the fast-acting insecticide chlorpyrifos before plant materials can be shipped. This material is effective at destroying eggs and larvae (it kills larvae hatching from eggs but not eggs directly). Chlorpyrifos has a long residual and some fuming action that allows it to penetrate larval shelters.

More environmentally compatible control methods will be used to support eradication efforts by keeping LBAM numbers low across broader areas. Pheromone mating disruption (PMD) is currently the primary method being used in the CDFA eradication program; products may be applied either by ground or air, depending on the size of the area being treated. A number of biologically-based, reduced-risk insecticides may be used in some infested areas. These include *Bacillus thuringiensis* (Bt), spinosyns, and insect growth regulators. For example, outlying infestations are being treated with foliar sprays of Bt. Outlying infestations are defined as moth finds several miles away from other finds, and therefore are areas not likely to be naturally reinfested. The goal of treatment is to eradicate the outlying infestations before they can grow and spread. Bt also is being used to treat more heavily infested locations within areas where PMD is being applied to enhance the effectiveness of the mating disruption. Release of sterile males (SIT) and biological control are two other strategies that may become major components of the eradication or long-term management program. Successful implementation of these biologically-based tactics will require further research to adapt them for use against this pest in California.

Research on LBAM management strategies in California will be difficult under quarantine regulations. To test control techniques, researchers must have populations or laboratory colonies of a pest that the state is trying to eradicate. It is unlikely that pesticide testing, for example, would be possible in facilities established for the study of quarantine pests because of the possibility of the pesticides affecting other organisms within the facility. Unfortunately, research results from other locations such as New Zealand, Australia, and Hawaii may not be applicable to California conditions. However, some testing may be possible in locations with the highest populations of LBAM, before intensive area-wide eradication treatments begin in those areas. APHIS will be conducting insecticide trials in Australia, beginning in July.

Following recommendations of the TWG, APHIS and CDFA are formulating traditional IPM alternatives, such as applying materials effective on the life stages present, to suppress LBAM populations in areas not yet under intensive eradication, until intensive eradication can be implemented.

A Section 18 emergency exemption has been obtained for Isomate LBAM Plus and CheckMate LBAM-F for pheromone mating disruption to manage LBAM and for eradication. The exemptions have allowed for immediate use of these potentially effective, low-risk management tools in the eradication program.

If APHIS and CDFA decide LBAM can no longer be eradicated, then management of the pest will move to a traditional IPM program, which would probably include pheromone mating disruption, monitoring and use of a degree-day model to target young larvae with less-toxic materials, and biological control (possibly *Trichogramma* releases and importation of parasites from Australia).

Biology and Identification of the Pest

LBAM is a tortricid leafroller moth native to Australia. It is now established in New Zealand, New Caledonia, Great Britain, Ireland, and Hawaii. It has a broad range of plant hosts, including landscape trees, ornamental shrubs, fruit and certain vegetable crops. It is known to feed on 250 plant species in over 50 families with preference for plants in the aster (Asteraceae), legume (Fabaceae), knotweed (Polygonaceae), and rose (Rosaceae) families. LBAM has been reported as a pest on apple, pear, peach, apricot, citrus, persimmon, avocado, walnut, grape, kiwifruit, strawberry, caneberries, and cole crops. It may also infest oak, willow, poplar, cottonwood, alder, pine, eucalyptus, rose, camellia, jasmine, chrysanthemum, clover, plantain, and many other plants. In California it may encounter additional hosts it was not previously known to infest.

LBAM is found throughout Australia but it does not survive well at high temperatures and is a more serious pest in cooler areas with mild summers. The pest performs best under cool conditions (mean annual temperature of approximately 56°F) with moderate rainfall (approximately 29 inches) and moderate-high relative humidity (approximately 70%). Hot, dry conditions may reduce populations significantly.

LBAM is capable of flying only short distances to find a suitable host. Most moths fly no further than 330 feet (100 meters), but some may fly as far as 2000 feet (600 meters). Dispersal is most likely by movement of infested nursery

plants or green waste, and on equipment and containers.

DESCRIPTION

Like other tortricids, LBAM adults hold their wings over their abdomen in a bell shape when at rest and have protruding mouthparts that resemble a snout. The antennae are simple, not feather-like. The length of a resting moth is about half its wingspan. Adult size may vary during the season, with larger individuals present during cool, wet months and smaller individuals present during warm, dry months. The length of the forewing (front wing—the one on top when the moth is at rest) in the male is approximately 0.3 inch (8 mm), with a range of 0.23 to 0.4 inch (6–10 mm), and in the female the length is 0.27 to 0.5 inch (7–13 mm).

There is a considerable variation in the coloration of the wings, especially on the males (Fig. 2). The basal half (closest to the head) of the male forewing may be light brown (Fig. 2A) to pale yellow (Fig. 2D), while the distal half (farthest from the head) is reddish-brown. In strongly marked forms the distal half of the forewing may vary from reddish-brown (Fig. 2A) to blackish with purplish mottling (Fig. 1), and the basal half is sparsely speckled with black. In some males this two-tone wing coloration of the forewings may be absent. Instead, they are light brown with a slightly darker oblique marking (Fig. 2B, 2E). In the female, forewing color varies from uniform light brown, with almost no distinguishing markings or with a dark spot in the center front of the folded wings, to the typical oblique markings of the male but with less contrast between the basal and distal halves. Hind wings (back wings) of both sexes are pale brown to gray, either uniform in color or mottled with wavy dark brown markings.

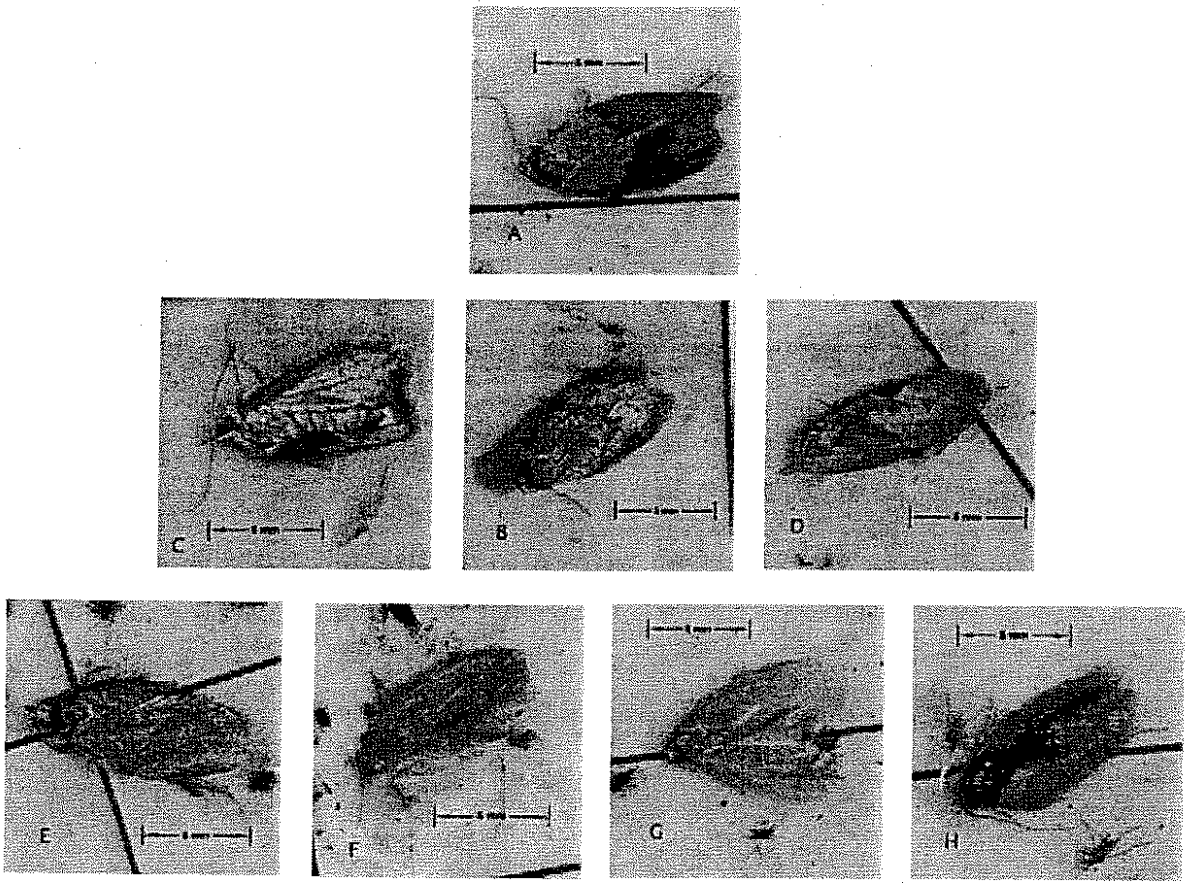

Figure 2. The wing color pattern of LBAM adults, such as those shown here in pheromone traps, can be highly variable. Photos by J. K. Clark.

Males have an extension of the outer edge of the forewing called the costal fold that runs from the base of the wing to two-fifths of the length of the wing edge (Fig. 3). This is an expanded part of the wing that folds up over the front edge of the wing as a flap. Females do not have the costal fold.

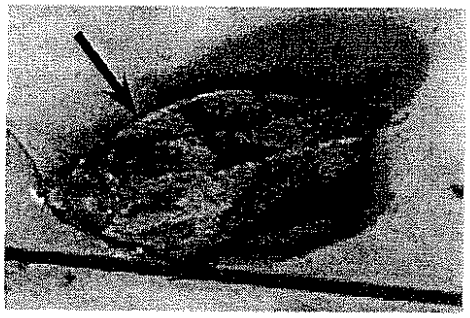

Figure 3. The costal fold along the basal two-fifths of the wing of the male LBAM helps distinguish this species from other tortricid moths. Photo by J. K. Clark.

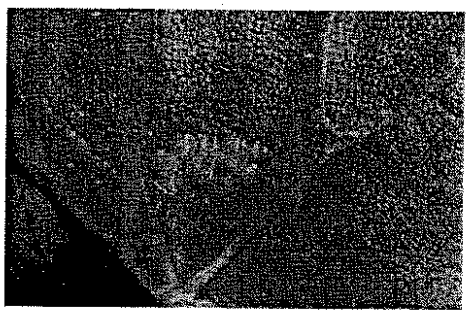

Figure 4. Newly laid LBAM eggs are covered with a greenish, transparent coating. Photo by A. Loch, © 2007 State of New South Wales Department of Primary Industries. Used with permission of A. Loch.

The eggs are white to light green, broadly oval, flat with a pebbled surface, and are laid slightly overlapping each other. The egg mass is covered with a greenish transparent coating (Fig. 4). An egg mass may contain from 2 to 170 eggs, but typically has 20 to 50 eggs. Egg masses are deposited on the upper surface of host leaves and occasionally on fruit and young stems. As the eggs develop, they change to paler yellow-green. Immediately prior to hatching, the dark head of the developing caterpillar is visible.

The newly hatched larva is pale yellow-green, 0.06 to 0.08 inch (1.5–2 mm) long and has a dark brown head. There are 5 to 6 larval instars or stages. Mature larvae range from 0.4 to 0.7 inch (10–18 mm). The head is light yellow-brown, and the prothoracic shield (segment behind the head) is light greenish-brown with no dark markings (Fig. 5). The body is medium green with a darker green central stripe that may continue to the prothoracic shield; larvae may also have darker stripes on both sides. The hairs on the body are whitish. The thoracic legs are the same color as the head, but paler, and are also unmarked. In the anal region there is a greenish anal comb—a comb-shaped structure at the tail end of the larva. An overwintering larva may have a darker head and prothoracic shield.

The pupa is found in a thin-walled silken cocoon between two leaves webbed together. The pupa turns from green to brown as it matures (Fig. 6). It is dark reddish-brown and 0.4 to 0.6 inch (10–15 mm) long.

LIFE CYCLE

A degree-day model used for predicting LBAM development indicates that there will most likely be 2 generations a year in the central and north coast areas of California, and 3 or 4 generations a year in the Central Valley and southern California. In Australia, New Zealand, and the British Isles, generations overlap. LBAM does not have a winter resting stage (diapause). Cold winter temperatures slow larval development considerably. Thus, the pest overwinters as a second to fourth instar larva feeding on herbaceous plants, on the buds of deciduous trees or shrubs, on mummified fruit, and other plant material. Larvae may survive for up to 2 months in the winter without feeding.

Adult moths emerge after one to several weeks of pupation and mate soon after emergence. They stay sheltered in the foliage during the day, resting on the undersides of leaves. Moths fly 2 to 3 hours after sunset and before daybreak. Females begin to lay eggs 2 to 3 days after emerging, depositing eggs at night. The majority of the eggs are laid between day 6 and 10 after emergence, but females can continue to lay eggs for 21 days. Females prefer to deposit their eggs on smooth leaf surfaces. Females usually lay a total of 120 to 500 eggs, but can lay up to 1500 eggs.

Males disperse farther than females. Adults are less likely to leave areas with high-quality hosts. Adult life span is 2 to 3 weeks, with longevity influenced by host plant and temperature.

An egg takes from 5 to more than 30 days to hatch, depending on temperature, with an average of 5 to 7 days at 82°F. The lower and upper developmental thresholds for LBAM are 45° and 88°F, respectively. Larvae emerge from

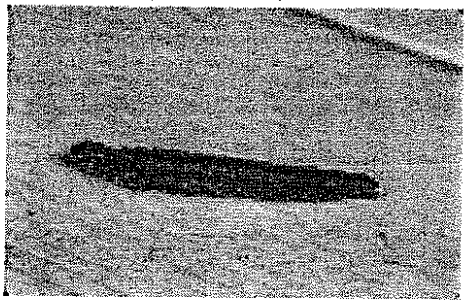

Figure 5. Mature LBAM larva. Used with permission of D. Williams, State of Victoria Department of Primary Industries.

Figure 6. Pupa of fruittree leafroller. The pupae of all leafrollers, including LBAM, appear virtually identical. Photo by J. K. Clark.

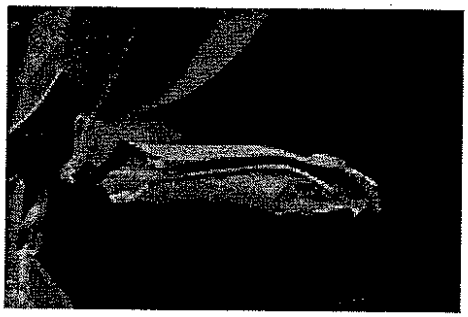

Figure 7. All leafroller larvae use webbing to roll leaves into shelters. Photo by J. K. Clark.

eggs after 1 to 2 weeks and spread out in search of suitable feeding sites. When a larva finds a feeding site, it forms a silken shelter near the mid-rib on the underside of the leaf and begins to feed (Fig. 7). Second and later stages feed between two to several leaves webbed together, a leaf webbed to a fruit, or in the center of a cluster of fruits. The larvae feed within these shelters, and they may feed on fruit when it touches a leaf. Larvae on fruit are most likely to be found near the calyx. When disturbed they wriggle violently, suspend themselves from a silken thread, and drop to the ground where they feed on groundcover hosts. Larval development can take from 3 to 8 weeks, depending on temperature.

Pupation is completed within the shelter made from rolled-up leaves. The pupal stage lasts 1 to 3 weeks. Completion of the entire life cycle requires 620 degree-days above 45°F.

MONITORING

An effective sex pheromone for attracting male LBAM is commercially available. It is used in delta traps to detect the presence of the moth. These pheromone traps detect and monitor the male moths and are deployed at one per 5 acres in commercial crops, with at least one in every field no matter how small.

LBAM larvae are present for most of the year, either in trees or shrubs or on herbaceous plants. To detect the eggs and larvae, examine leaves. Look for the characteristic webbing at the mid-rib vein on the underside of leaves and between leaves. At flowering, check blossom clusters for webbing and larvae. In trees they are more commonly found in the lower half and central part of the tree, closer to the trunk. In shrubs they are found mostly on the developing leaves on branch terminals. When fruit is present, examine clusters of fruit by separating and looking between the fruit. In the winter, check the ground cover and herbaceous plants for webbing. Look for larvae in fruit mummies.

DAMAGE

Like other leafroller tortricids, LBAM feeds from within the sheltering nest it constructs. Foliar feeding is usually considered minor in fruit crops, though it might be of economic importance on ornamentals. On fruit crops the primary concern is fruit damage. Larvae remove the outermost layers of the fruit surface as they feed. Superficial feeding injury to the fruit is typically caused by later immature stages. Young larvae may enter the interior of a pome fruit through the calyx. They can cause internal damage to stone fruits as well. Minor feeding damage can take the form of pinpricks or "stings" on the fruit surface. In grape, larvae can cause extensive loss of flowers or newly set berries in the spring. Later in the season, grapes can be severely damaged by larvae feeding among the berries, allowing mold organisms to enter. In citrus, larval feeding causes fruit drop or halo scars around the stem end of fruit. In crops such as kiwifruit, plum, citrus, and pome fruit, the maturing fruit produces a layer of corky tissue over the leafroller damage. Buds of deciduous host plants are vulnerable to attack in the winter and early spring.

Conifers are damaged by larval activity such as needle tying, chewing of buds, and boring into stems. In tree nurseries, damage to terminal buds on seedlings and saplings can cause multiple or crooked leaders.

IDENTIFICATION

Positive identification of LBAM can be made with certainty **only** by examining an adult.

The most efficient and reliable way of obtaining male adults is with the use of LBAM pheromone traps. The pheromone is specific for this pest and attracts males. There are many native tortricids that can be confused with LBAM. If you find a tortricid moth in a LBAM pheromone trap take it to your county agricultural commissioner's office for positive identification.

LBAM are rarely attracted to pheromone traps that target other species of leafroller. Other leafroller pheromone traps, yellow sticky cards, and McPhail traps do not effectively detect LBAM.

Suspect larvae should be delivered to the county agricultural commissioner for proper identification. Some specimens of non-LBAM larvae will have morphological characters that are never present in LBAM larvae, and can therefore be ruled out as possible LBAM. Otherwise, LBAM larvae cannot be reliably identified using morphological characters with our current knowledge. There are several reasons for this. In California there are many native tortricids, and while there is a key for identifying the adult tortricids of California, there is no comprehensive key for the larvae. There is a key of the tortricid larvae of New Zealand that includes LBAM, but it does not include native species of California and **cannot** be used to identify leafroller larvae in California. Furthermore, available descriptions of larvae are frequently made from specimens that have been preserved in alcohol, causing some characters to be lost. Lastly, the more reliable larval characters are found in the larger immature stages, but suspect LBAM larvae of all ages are being collected and submitted for identification. Work is under way to improve larval diagnostics based on morphological characters in fresh samples.

Molecular diagnostics based on PCR amplification of mitochondrial DNA were recently developed for immature specimens and are now being used to reliably identify suspected LBAM larvae. Larvae are screened using morphological characters, then DNA patterns from suspected LBAM larvae are compared to patterns of known LBAM DNA. If the patterns match, suspect larvae are considered likely LBAM. Absolute certainty is not possible because there are still many California tortricids whose DNA has not been sequenced so the reference database is incomplete. Minor genetic variation has been noted among LBAM specimens, but it is not yet known whether this is normal population variation or an indication of multiple introductions.

HOW TO SEND A SAMPLE FOR IDENTIFICATION

Suspected LBAM larvae should be brought **alive** to the county agricultural commissioner's office. If possible, bring the live larvae inside the webbed nests of rolled-up leaves, flowers, or fruit clusters. For viewing larval morphological characters, the specimen has to be a late instar and must have been properly preserved by experts. County agricultural commissioners offices have the equipment and expertise to do this. Moths caught in pheromone traps should be submitted still in the traps. Specific procedures for submitting samples are spelled out in the Light Brown Apple Moth Regulatory Procedures Manual (http://www.cdfa.ca.gov/phpps/PDEP/lbam/pdfs/LBAMTOC.pdf).

Potential IPM Alternatives

The current long-term goal is to eradicate LBAM from California. However, no single control technique currently exists that can be practically, safely, and effectively implemented over the entire LBAM-infested area. Because of this, current recommendations to successfully eradicate LBAM are multi-phase in nature.

Eradication efforts using available technologies (e.g., pheromone mating disruption) will focus initially on specific localities such as extremely infested areas. If initial eradication attempts are successful and deemed feasible for expansion, then additional LBAM infestations will be eradicated as quickly as conditions, technology, logistics, and fiscal support permit. While eradication attempts are under way, it is important that LBAM infestations throughout the infested range do not continue to increase in size and expand to uninfested areas such as the Central Valley and

southern California. Pest management tactics that rely on more environmentally compatible methods are desirable to support the eradication effort by keeping LBAM at low numbers across agricultural, urban, and natural areas.

Fortunately, the biology and ecology of LBAM make it susceptible to a variety of potential control methods that are less environmentally harmful and more socially acceptable than highly toxic, broad-spectrum insecticides such as chlorpyrifos. However, these alternatives do not generally act as quickly (i.e., less than 72 hours) as the insecticides they replace (organophosphates, carbamates, pyrethroids). Some alternative controls developed in Australia and New Zealand, such as pheromone mating disruption, will have to be modified for California conditions while others (e.g., sterile insect technique, augmentative biological control) will require various levels of development, experimentation, and validation to make them functional and effective.

Lastly, the effectiveness of these alternative controls may be influenced by the manner in which they are implemented. Mating disruption and sterile insect release will be more successful when applied over large areas (e.g., square miles). Classical biological control is an area-wide management tactic. Also, these large-scale approaches generally require government support for successful development and implementation. In contrast, reduced-risk chemicals, insect pathogens or their by-products (e.g., *Bacillus thuringiensis* ssp. *kurstaki*), and augmentative releases of natural enemies (e.g., *Trichogramma* egg parasitoids) can be effective on a small scale, such as acres, and implemented with minimal effort. Discussion of the availability and effectiveness of these management approaches follows.

SMALL-SCALE APPROACHES

Reduced-Risk Pesticides. These compounds offer an alternative to organophosphate, carbamate, and pyrethroid insecticides that are potentially a human health risk, an environmental threat, or highly disruptive to beneficial species such as bees or biological control agents. Some may meet requirements for organic production. Only those compounds that have shown good effectiveness against LBAM in Australia and New Zealand are discussed below. Because timing spray applications to target susceptible life stages is highly important for control, the validation and adaptation of a LBAM phenology model under California conditions will be important for predicting generation cycles.

Insect growth regulators (IGRs). This group of compounds is derived from naturally occurring hormones that insects use to trigger molting events during their development from egg to adult. Thus, they work only on the immature stages. These compounds may be applied to the foliage, and timing of applications is important to contact the susceptible life stages. Tebufenozide is active against larvae and may be applied to crops using the formulation Confirm 2F; a formulation for ornamentals is pending registration. Methoxyfenozide (Intrepid 2F) is active against both eggs and larvae, but is registered for use only on some crops. For methoxyfenozide to be effective on eggs, they must contact the chemical residue as they are laid. Because leafroller eggs are laid in overlapping layers, not all eggs will contact the chemical, so control of eggs is not complete. Care must be taken when using this product around bodies of water where runoff may impact aquatic invertebrates.

Spinosad. This insecticide is produced by a fermentation process using the microorganism *Actinomycetes spinosa.* It is applied as a foliar spray at low field rates, targets only larvae, and is most effective when eaten by the larvae. It is available under various trade names including Success and Entrust (organic formulation) for crops and Conserve for nursery, ornamental, and greenhouse plants. Although generally safe for predators, it may impact hymenopteran parasitoids (wasps) that are useful biological control agents.

Insect pathogens. Commercially available insect pathogens for LBAM suppression are limited to *Bacillus thuringiensis* ssp. *kurstaki* (Bt). This product is effective only on larvae. The formulation is mixed with water and applied to infested plants. The Bt residue must be eaten by the larvae; contact alone will not kill LBAM larvae. Because Bt must be ingested, the leaf-rolling or leaf-tying behavior of the insect may help protect the larva from this material. Bt is most effective on young larvae. Nuclear polyhedrosis virus (NPV) that infects LBAM does exist, but it is not commercially available. Development is necessary to improve the mass production methods for the NPV. Codling moth granulosis virus does not appear to be effective against LBAM.

Augmentative Biological Control. This approach relies on the use of beneficial insects (predators or parasitoids) that are typically mass produced and released in the infested areas at rates that vary from hundreds to millions of individuals per acre. Predators attack and quickly devour their prey either by eating the pest (e.g., ladybugs) or sucking out the body liquids (e.g., lacewings). Parasitoids (or parasites) are insects that deposit their eggs inside the body or on the surface of their host insect, and the hatched immature insect feeds on the host to complete its development to the adult stage. Parasitoids do not immediately kill their host; death may require several days or more. Many effective parasitoids are tiny wasps that can barely be seen by the unaided eye. *Trichogramma* wasps are some of the smallest insects known, and they attack the egg stage of their hosts. Augmentative releases may be made in conjunction with the use of reduced-risk insecticides if timed correctly.

Predators. Presently, no information is available on using mass-reared predators for LBAM suppression.

Parasitoids. The only parasitoids that may be useful are the *Trichogramma* egg parasitoids. These biological control agents parasitize the eggs of their host insects and the *Trichogramma* larvae complete their entire developmental cycle (egg to adult) within the host egg. *Trichogramma carverae* is used in augmentative releases in some crop systems in Australia, but is not present in the U.S. Various *Trichogramma* species are commercially available in the U.S., but their effectiveness in suppressing LBAM is unknown. Although *Trichogramma* appear to have a wide preference for the various moth species they attack, their searching behavior for eggs may better define which species are attacked. Some *Trichogramma* prefer to search for eggs in tree canopies while others prefer plants that are low to the ground. No guidelines are available for *Trichogramma* use in inundative releases against LBAM in California. Research is needed to determine the preference of the wasps for LBAM eggs, the numbers of wasps required to effectively suppress LBAM in a locality, the optimal timing of releases, and the types of crops (e.g., vegetable crops, vineyard, orchard, nursery, etc.) in which releases would be effective.

AREA-WIDE APPROACHES

These approaches may be beyond the scope of individual growers or groups and usually need significant financial and logistic support to be successful. They typically have large-scale government and private industry involvement.

Pheromone Mating Disruption. Female moths commonly emit chemicals known as pheromones to attract males to them for mating. Many pheromones have been chemically analyzed and can be synthetically produced. Some pheromones are highly specific, attracting only one species, and others are more general in nature, attracting more than one insect species. Pheromone specificity is gained by varying mixtures of the chemical components. LBAM pheromone has two key components. **Both components must be present** for the material to be highly attractive to LBAM males and effective as a mating disruption tool. Man-made pheromones are used with traps to monitor moth activity, for trapping moths for control, and for interfering with the ability of male moths to locate females for mating. As greater numbers of females go unmated within an area, fewer fertilized eggs will be laid to produce a new generation of offspring. Mating can be disrupted by saturating the air with large quantities of pheromone, thereby interfering with the ability of males to follow aerial scent trails to emitting females.

Many factors influence the success and cost of mating disruption. These include access to enough pheromone to saturate targeted areas; a practical and inexpensive method to dispense pheromone over long periods such as weeks or months; correct timing of the pheromone release; the inability of affected males to locate females within the treated area; low densities of the target pest; and low wind speeds.

Mating disruption is commonly used in California fruit orchards for peach twig borer, oriental fruit moth, and codling moth. Mating disruption has not worked well with various leafroller species. However, in Australia LBAM has been managed in citrus, grapes, and other crop systems using mating disruption. Mating disruption currently is the primary tool being used by the CDFA for the eradication effort in California. Novel strategies to employ synthetic pheromones for LBAM suppression are being investigated in Australia and New Zealand, and these may be available in the future for California.

Sterile Insect Release. Sterile insect release (SIT) is commonly used to eradicate Mediterranean fruit fly (Medfly) infestations in California. Basically, millions of Medfly individuals are reared in colonies and irradiated to make

them sterile. These are then released in areas where Medfly infestations have been found, and sterile males mate with wild females and prevent the females from laying viable eggs. This technique may hold promise for LBAM if mass rearing systems can be developed to produce the needed numbers of LBAM males to sterilize for release. These studies are currently under way.

Classical Biological Control. This tactic is commonly employed when

- An invasive species has established in a new location.
- It is extremely difficult or expensive to control due to various factors (e.g., high levels of pesticide resistance, significant economic damage to low-value crops or natural ecosystems, large plant host range and presence in unmanaged land, or pesticides are ineffective because of the organism's biology).
- Effective natural enemies exist in other locations where the organism is found in low numbers.

If these criteria are met, natural enemies may be collected in the former home of the invasive species and imported to the new location and released to control the invasive species. Highly successful biological control introductions can lead to complete control of the target pest such that the pest no longer causes economic injury. Although the target pest may be reduced to very low numbers, it will not be eradicated from the area. Additionally, imported natural enemies may impact organisms that are not the intended target. Because of this, natural enemies that may be considered for a classical biological control program must undergo tests, which may take several years, to determine whether they attack more than one insect species. If the candidate natural enemy does not target a very limited range of hosts or prey, there is a lesser chance that it will be approved for release in the new location.

In Australia, as many as 25 different parasitoid species have been reared from LBAM collected in the field. However, there apparently are no "silver bullet" species that are well recognized for suppressing LBAM populations across a wide variety of crops. Because of this, the success of a classical biological control program may be doubtful if eradication is the goal. The resources that would be directed towards a classical biological control program would probably be better used in developing and refining effective eradication techniques.

One advantage in California is that there are numerous leafroller species established within the state and many of these have effective parasitoids (e.g., *Cotesia, Exochus, Macrocentrus, Nemorilla, Trichogramma*) and predators (spiders, minute pirate bug, lacewings, *Phytocoris* bugs), including some in the same genera (e.g., *Exochus*) as those found in Australia. It is highly probable that some of the California native predators will expand their prey ranges to include LBAM eggs, larvae, and pupae. However, this may require a few years to occur, given the time required for these natural enemies to discover and exploit LBAM infestations across the range of potential habitats (urban, natural, agricultural).

Pesticides for Controlling LBAM

Listed below are examples of regulated products for control or prevention of LBAM at nurseries and crop production areas. Establishments where LBAM infestation has been detected must follow procedures outlined in the Light Brown Apple Moth Regulatory Manual. **(Check the CDFA LBAM Web site frequently for updates.)** Users must follow all label restrictions. Many active ingredients are in multiple products, each with specific site recommendations. If your crop (site) does not appear, alternative products may be available for your situation. Search products based on multiple categores (site and chemical code) at www.cdpr.ca.gov/docs/label/m4.htm.

Table 1. LBAM Regulated Treatments for Nurseries and Host Crops
Source: California Department of Food and Agriculture (June 25, 2007)

Active Ingredient	Product	Sites	Target Life Stage	EPA Reg No
BT	Crymax Lepinox	Ornamentals & crops	Larvae	70051-86 70051-89
	Dipel DF Pro	Ornamental Organic		73049-39
	Dipel DF	Crops Organic		73049-39
Carbaryl	Sevin 4F	Ornamentals & crops	Adults [1]	264-349-ZB
Carbaryl	Sevin SL	Ornamentals & crops	Adults[1]	432-1227-ZA
Carbaryl	Sevin Brand 80S	Crops	Adults[1]	264-316-ZC
Chlorpyrifos	DuraGuard ME	Ornamentals & greenhouses	Eggs[2]	499-367-ZA
	Chlorpyrifos Pro 2 Chlorpyrifos Pro 4	Ornamentals		51036-152-AA 51036-154-AA
	Chlorpyrifos 4E AG Dursban 2.5G Durban 4E[3] Dursban 50W Dursban Pro Prentox Dursban 4E	Greenhouses		66222-19-AA 62719-276-AA 62719-11-AA 62719-72-AA 62719-166-ZA 655-499-AA
Deltamethrin	Suspend SC	Ornamentals	Adults	432-763-ZB
Dimethoate	Clean Crop Dimethoate 400	Ornamentals & crops		34704-207-AA
Lambda-cyhalothrin	Warrior with Zeon	Crops	Larvae	100-1112-AA
Methoxyfenozide	Intrepid 2F	Crops	Larvae[4]	62719-442-AA
Phosmet	Imidan 70 W Imidan 70WP	Ornamentals Crops	Eggs, larvae	10163-169-ZA 10163-169-AA
Spinosad	Conserve Entrust	Ornamentals Crops	Larvae	62719-291 62719-282
Tebufenozide	Confirm 2F	Ornamentals & crops	Larvae	62719-420

Footnotes added by University of California authors. More information on use of these pesticides can be found in the pesticide treatment tables for leafrollers in various crops in the *UC IPM Pest Management Guidelines* at http://www.ipm.ucdavis.edu/PMG/ or by searching the UC IPM Web site for the active ingredients.

[1] Carbaryl is active against leafroller larvae.

[2] Kills first instar larvae as they chew through their egg shells when hatching. Also kills older larvae and adults. These chlorpyrifos products are registered for use on LBAM host crops:
Lorsban 50W (62719-39-AA), Lorsban-4E (62719-220-ZA), Lorsban-75WG (62719-301-AA), Lorsban 15G (5481-525-AA).

[3] Dursban 4E under review at EPA for cancellation.

[4] Does not control eggs completely because the overlapping nature of the eggs prevents contact of the pesticide with all the eggs in an egg mass.

MITIGATING MEASURES TO REDUCE THE IMPACT OF PESTICIDES ON THE ENVIRONMENT

Several of the insecticides available for LBAM management, including spinosad, *Bacillus thuringiensis* ssp. *kurstaki*, and the IGR methoxyfenozide (Intrepid), have minimal negative impacts on human health and the environment, including water quality. The mating disruption technology that has been implemented for this pest is also an environmentally sound approach.

Chlorpyrifos (Lorsban, Dursban)is labeled for use on ornamental nursery stock in nurseries in California. Chlorpyrifos is an option for treating nursery stock in nurseries where LBAM immature life stages have been found. Chlorpyrifos controls all stages of the pest including hatching eggs and has a longer residual than the reduced-risk products mentioned above. Chlorpyrifos must be used with care because of its potential for contaminating surface water. This material is **not** being used for eradications in urban areas.

If using a broad-spectrum pesticide (organophosphate, pyrethroid, carbamate), consider management practices that reduce pesticide movement off-site and protect other sensitive areas:

- Identify and take special care to protect sensitive areas, for example waterways, riparian areas, or residential or school buildings, near your site.
- Choose sprayers and application procedures that keep pesticides on target.
- Install an irrigation recirculation or storage and reuse system.
- Use drip rather than sprinkler or flood irrigation.
- If using overhead irrigation, do not irrigate pesticide-treated foliage until treated foliage dries.
- Limit irrigation to amount required using soil moisture monitoring and evapotranspiration measurements.
- Use pulsed irrigation—several shorter irrigation runs rather than one long run to allow soil to absorb water between runs.
- Consider vegetative filter strips or ditches.
- Redesign inlets into tailwater ditches to reduce erosion. Ditches should not be lower than furrows.

Impacts on Specific Industries and Situations

The quarantine requirements for LBAM will be updated regularly by the CDFA. For the latest information, check the CDFA LBAM Web site listed below.

CURRENT IMPACT ON NURSERIES AND ORNAMENTALS

The majority of LBAM detections on agricultural lands in the infested areas have been in production and retail nurseries located near urban areas, and therefore these nurseries are heavily impacted by LBAM quarantine regulations. Since nursery stock is often grown in one location and shipped or moved to distant locations, it is easy for LBAM and other pests to be moved along with the nursery stock. In addition, green waste such as vegetative clippings, leaf litter, or propagative materials might harbor LBAM and be moved inadvertently off-site.

Retail nursery operators may have a particularly complicated set of burdens and associated decisions to make with a LBAM infestation. Often retail nurseries do not possess the spray equipment necessary for widespread application of a pesticide as would be required by a quarantine-mandated pesticide application. In that case, a private pest control company might have to be hired to make the pesticide application. Retail nurseries must be closed for business during the pesticide application, the restricted entry period, and until reinspected and found free of LBAM. In addition, retail nurseries usually have a very wide range of edible and ornamental material further complicating the selection of a registered pesticide.

Quarantine Requirements. All nursery operations within quarantined counties must follow quarantine requirements. Current maps of quarantined areas can be found on the CDFA LBAM Web site (http://www.cdfa.ca.gov/phpps/PDEP/lbam/lbam_main.html). Nursery material affected by the quarantines includes:

- Production and retail nursery stock, cut flowers, garlands, wreaths, greenery of any plants
- Garlands, wreaths, greenery, and cut Christmas trees
- All green waste

Details of current quarantine requirements for trapping, inspection, treatment of infestations, and certification are spelled out in Light Brown Apple Moth Regulatory Proceedures Manual, available on the CDFA LBAM Web site (http://www.cdfa.ca.gov/phpps/PDEP/lbam/pdfs/LBAMTOC.pdf). **Check the Web site frequently for updates.** A summary of the current requirements is given here; because quarantine requirements may be modified, check the CDFA site for updated information or talk with your county agricultural commissioner's office.

If possible, incoming shipments, especially from known LBAM-infested areas, should be isolated in a quarantine area away from production and inspected and possibly treated prior to moving them into the production area.

Inspection and Treatment Recommendations. Inspect nurseries every 3 days or at least twice per week. Randomly check 10 to 50 plants per variety for the green leaf-rolling caterpillar. Look for webbed young leaves and white to pale green overlapping masses of LBAM eggs on the upper surface of leaves. Check leaves at branch terminals in particular. The preferred egg-laying sites are the leaves, especially young leaves, although eggs can occasionally be found on fruit and tender young stems. Larvae construct silken shelters on the underside of leaves. Older larvae roll together leaves and buds; look for rolled leaves held together with webbing. Young larvae are tiny and are often difficult to see. Look for webbing in leaves hiding green caterpillars.

If you find eggs or larvae that you suspect are LBAM, place the **live** specimens in a vial or small jar and send them to your county agricultural commissioner's office for identification. There are many species of leaf-rolling moths in the area, and they are very similar in size and appearance. The Light Brown Apple Moth Regulatory Procedures manual has instructions for how to prepare specimens and submit them for identification.

If any of the collected specimens are confirmed to be LBAM, all plants in the nursery are subject to quarantine action, which may include treatment, a holding period, and re-inspection. Quarantine action must take place before plants can be shipped from the infested nursery. Chlorpyrifos has been determined to have efficacy against eggs and larvae. Treatment with chlorpyriphos may be selected as the quarantine action by growers wishing to move their plants from the nursery as soon as possible.

After the expiration of the restricted entry interval, the nursery must be inspected by the local agricultural commissioner. If the inspection is negative for LBAM, the nursery can adopt its usual integrated pest management program.

However, if LBAM larvae are found during the re-inspection, a second treatment of the plants where the larvae were found must be made until a negative result is attained. Furthermore, after the last treatment that yields negative LBAM, another re-inspection of the nursery will be made as determined by the agricultural commissioner and CDFA.

A table listing states requesting pre-shipment notification of nursery stock from quarantined areas can be found on the CDFA Web site: (http://www.cdfa.ca.gov/phpps/PDEP/lbam/pdfs/LBAM_PreshipmentNotification.pdf)

If growers within or near a quarantine county wish to proactively spray their commodities, CDFA has prepared a list of treatments (Table 1).

POSSIBLE IMPACT ON VEGETABLES

The only significant leafroller pest of vegetable crops in California is omnivorous leafroller on peppers. LBAM attacks a number of vegetables such as broad bean, carrot, cole crops, parsley, pepper, potato, sweet pea, and tomato. Although it is impossible to predict how LBAM will affect California vegetable-growing systems, in Australia LBAM is only a minor pest of vegetable crops.

The best strategy for growers and pest control advisors is to follow the procedures for sampling caterpillars on vegetables found in the *UC IPM Pest Management Guidelines* (http://www.ipm.ucdavis.edu/PMG/). Check for signs of leafroller activity when monitoring fields. Look for leafroller egg masses, webbed leaves, and leaves webbed against fruit surfaces.

Materials available to control leafrollers and other caterpillar pests on vegetable crops are also effective on LBAM. In quarantine zones, treatments may be warranted to prevent the presence of leafrollers in harvested vegetables. Formulations of *Bacillus thuringiensis* ssp. *kurstaki* and spinosad are available for organic vegetable growers. Control weeds in and around fields to reduce survival and overwintering of leafroller larvae.

If a suspected caterpillar is found, collect it and webbed leaves and take the sample to the local agricultural commissioner. For information about chemical treatments for a vegetable field suspected to be infested by LBAM, contact the local UC Cooperative Extension Office or the local agricultural commissioner.

POSSIBLE IMPACT ON STRAWBERRIES

Strawberry fruit are not considered to be preferred host material for LBAM, and current California production practices already use measures that are effective at suppressing LBAM. However, there is potential to confuse larvae of endemic leafrollers with LBAM larvae. The species that occurs most commonly is garden tortrix. Others are apple pandemis, orange tortrix, omnivorous leafroller, and strawberry leafroller. These leafrollers have life cycles and feeding patterns similar to each other and to LBAM. Their primary damage occurs when they feed on the surface of fruit.

Begin a monitoring program by examining leaves for leafroller egg masses and larvae, especially the characteristic webbing together of leaf surfaces. Destroy any fruit showing evidence of larval feeding. Because it is difficult to distinguish larvae of LBAM from endemic leafroller species, special care should be taken to keep all leafrollers from contaminating fruit, baskets, or boxes, and to keep any leaves or other materials that might harbor leafrollers out of the pack.

Several chemicals registered for use on strawberries for endemic leafrollers and other caterpillar pests are named as controls for LBAM in Australian studies. These include *Bacillus thuringiensis* ssp. *kurstaki* (various formulations of Bt), spinosad (Entrust and Success), methoxyfenozide (Intrepid), bifenthrin (Brigade), and methomyl (Lannate). Organic growers can use approved formulations of Bt and spinosad. However, additional care may be needed to prevent infestations of LBAM in organic production fields because other insect pests are not being managed with conventional products that would incidentally control LBAM.

Second-year production fields should be closely monitored and plowed under if abandoned during the season to prevent them from becoming a potential source of LBAM infestations. Controlling weeds and removing trash in and around strawberry fields helps reduce survival and overwintering of leafrollers. For more information on managing leafrollers in strawberries, see the *UC IPM Pest Management Guidelines: Strawberry* at http://www.ipm.ucdavis.edu/PMG/.

If a suspected caterpillar is found, collect it and any webbed leaves or fruit where it is feeding and take the sample to the local agricultural commissioner.

POSSIBLE IMPACT ON CANEBERRIES

Several leafrollers, including apple pandemis, omnivorous leafroller, and orange tortrix, are pests in California caneberries. They are especially common in blackberries. Although it is impossible to predict, LBAM is likely to become a significant pest of these crops if it becomes established in California. Management of leafrollers in quarantine zones is aimed at preventing any leafrollers in harvested berries.

Monitor caneberries for any leafroller infestation by looking for evidence of egg masses, larvae, pupae, pupal cases, webbing, and feeding damage regularly during the season. Destroy fruit with signs of larval feeding.

Materials registered for leafroller control in caneberries will also control LBAM. Formulations of *Bacillus thuringiensis* ssp. *kurstaki* and spinosad are available for organic growers. All pesticide applications will be more effective when targeted at the early instars of the larvae. Because generations can overlap, it may be useful for growers to repeat applications if evidence of tortricids continues to be found during the season.