

1 **Testimony Submitted in Edna Williams, et al., v. California Department of Food**  
2 **and Agriculture, A.G. Kawamura, et. al., Case No. 07-05587, U.S. District Ct. for**  
3 **the Northern District of California**  
4

5 I, James R. Carey, hereby declare:

6 1. I am a Professor of Entomology at the University of California, Davis with  
7 entomology degrees from Iowa State University (BS in 1973; MS in 1975) and the  
8 University of California, Berkeley (PhD in 1980). I specialize in both insect demography  
9 and invasion biology. I have particular interest in understanding the nature of pest  
10 invasions and the feasibility of eradication. I am not an advocate for any environmental  
11 and/or citizen group. I support eradication efforts in situations where I believe it is  
12 feasible. This position is reflected in a symposium that I organized in 1999 and the paper  
13 that I co-authored from this symposium the following year (Myers JH, Simberloff D,  
14 Kuris A, Carey JR (2000), *Eradication revisited--dealing with exotic species in Trends in*  
15 *Ecology and Evolution*. 15, 515-516. It is also reflected in my service on the Medfly  
16 Scientific Advisory Committee for the California Department of Food and Agriculture  
17 from 1987 to 1994. Although I continue to question whether the medfly was ever truly  
18 eradicated in the state, I none-the-less have always supported eradication efforts against  
19 this important agricultural pest.

20 2. Some key relevant information from my biography: I served on the  
21 California Department of Food and Agriculture's Medfly Scientific Advisory Panel from  
22 1987-1994, testified to the California Legislature "Committee of the Whole" in 1990 on  
23 the Medfly Crisis in California, authored the paper "Establishment of the Mediterranean  
24 Fruit Fly in California" (1992, Science 258, 457), and have studied tephritid fruit flies in  
25 Greece, Hawaii, Pakistan, China, and Mexico. I was one of the main organizers of an

1 international workshop on invasion biology held at UC Davis in 1995 and the senior  
2 Guest Editor of the Proceedings of this workshop published as a Special Issue of  
3 Biological Conservation (1997). I was elected a AAAS Fellow in 2000, was a co-  
4 organizer of the workshop “Life Span: Evolutionary, Ecological and Demographic  
5 Perspectives” held in May, 2001 (in Santorini, Greece) sponsored by the National  
6 Institute on Aging, and author of the book Demography for Biologists (1993; Oxford  
7 Univ. Press) and the monograph “Longevity” (2003, Princeton University Press). I am  
8 currently director of an NIH-funded program project on the demography and  
9 evolutionary biology of life span. I have taught both undergraduate and graduate courses  
10 in insect ecology and a graduate course in insect demography (source of the Oxford book  
11 material). I have also served on and/or chaired several major university committees at  
12 UC Davis including the College of Agriculture and Environmental Sciences Executive  
13 Committee, and the UCD University Council (to the Chancellor) and was Vice-Chair of  
14 the Department of Entomology at UC Davis from 1997-99. I am currently Vice-Chair  
15 (2007-08) and Chair-elect (2008-09) of the UC Systemwide University Committee on  
16 Research Policy which, when Chair, will place me on the UC Systemwide Academic  
17 Council. I am the author of over 150 scientific papers most of which are on either the  
18 biology, demography, and ecology of fruit flies (e.g., Mediterranean fruit fly) or  
19 principles of invasion biology.

20 3. Successful eradication of any invasive species is an enormous challenge,  
21 even under the best of circumstances (e.g. small, well-delineated population; effective  
22 eradication 'tool'; highly-effective monitoring techniques; support of multi-year  
23 programs). Eradication of populations of exotic insect species is especially difficult for

1 the same reason that metastatic cancer is so difficult to cure--anything short of 100%  
2 elimination is control (management) and not eradication (cure). Thus even a 99%  
3 success in the elimination of metastases is ultimately a failure in the sense that small  
4 residual pockets of insects can regenerate the entire population. This is the situation with  
5 the light brown apple moth (LBAM) with thousands or even tens of thousands of small  
6 populations spread over a multi-county region in California.

7 4. There are several specific aspects of the LBAM invasion that reduce to  
8 near zero the likelihood of successful eradication.

9 (a). The invasion of the LBAM is so widespread that eradication is not feasible  
10 regardless of the eradication tool used. Although it is now confirmed to be present in 9  
11 counties, it is highly likely to also be present in many more counties.

12 (b). To my knowledge the use of a pheromone to disrupt mating has never been  
13 used in any insect eradication attempt. And, I am virtually certain that there has never  
14 been a successful program of eradication based on mating disruption via pheromone. The  
15 likely reason for this is that there are shortcomings with the use of this technology in  
16 insect control. Thus it follows that the use of this mating disruption strategy is an  
17 inadequate tool to use in insect eradication.

18 (c). Detection of insects at low population levels is exceedingly difficult and the  
19 LBAM is no exception. This is important at the outset of an eradication program since  
20 detection allows entomologists to delineate the population. But good detection is equally  
21 important at advanced stages of eradication since it is needed to identify the location of  
22 pockets or residual populations. An additional complication is that the pheromone used  
23 to disrupt mating is also used as the attractant in traps for monitoring. Pheromones

1 cannot be used simultaneously for both population control and population monitoring  
2 since each cancels out the effectiveness of the other.

3           5.       In my view these three factors--extent of spread, faulty eradication tool  
4 (use of pheromone for mating disruption), and difficulty of detection--make it virtually  
5 impossible to eradicate the LBAM in California. Since it is virtually impossible to  
6 eradicate the LBAM, any emergency program with this goal is highly unlikely to  
7 succeed.

8           I declare under penalty of perjury under the laws of the State of California the  
9 foregoing is true and correct and that this Declaration was executed on this 14<sup>th</sup> day  
10 November 2007 at Davis, California.

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DR. JAMES R. CAREY