Department of Pesticide Regulation

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MEMORANDUM

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DATE: April 27, 2016

SUBJECT: REVIEW OF THE PROPOSED FIELD TRIAL FOR THE BIOPESTICIDE XYLPHAGE FOR THE CONTROL OF *XYELLA FASTIDIOSA* INFECTION ON MATURE GRAPEVINES

The Human Health Assessment Branch (HHAB) reviewed the proposed field trials of the biopesticide XylPhage proposed by Dr. Carlos Gonzalez (Texas A&M University) on April 11, 2016. This study proposes to do a small field trial to see the effectiveness of a formulation of bacteriophages (a biopesticide) on controlling *Xylella fastidosa*, a gram negative xylem limited bacterium that is responsible for Pierce's Disease of grapevines.

The formulation of bacteriophages was not provided in the document, but it is a mixture of naturally occurring bacteriophages isolated from environmental samples (plant or water) that specifically target *X. fastidosa*. The investigator indicated that this bacteriophage formulation has been demonstrated to be effective in greenhouse experiments with young plants, and the current study is to validate the efficacy under field conditions by taking advantage of a small set of mature vines in the Montebello area of the Santa Cruz Mountain Range that are already infected with Pierce's Disease. It is unclear whether this field trial will involve new inoculation of *X. fastidiosa* deliberately before the application of bacteriophages. Drift to adjacent grapevines is proposed to be prevented through monitoring for insect vectors, focused treatments and aggressive weeding.

Bacteriophages are viruses that attack bacteria and they are ubiquitous in the environment. Humans are routinely exposed to bacteriophages at high levels through food and water without adverse effect. In Federal Register of August 18, 2006, FDA approved the use of Listeria-specific bacteriophage preparation on ready-to-eat meat and poultry products. U.S. EPA has registered bacteriophages as biopesticides for bacterial diseases on plants (tomatoes and peppers) and considered them to pose no risk to human health based on the following criteria: 1) bacteriophages are non-toxic, non-pathogenic, and non-infective to mammals; 2) bacteriophages are ubiquitous in environment; 3) bacteriophages are host specific as specific phages attack only

one bacterial species and most frequently only one strain of a bacterial species; 4) bacteriophages are biodegradable and usually inactivated 24-48 hours after application; and 5) there are no known published reports of adverse effects of bacteriophages. U.S. EPA's evaluation on bacteriophages specific targeting two strains of bacteria on tomatoes and peppers can be generalized to other naturally occurring bacteriophages, as all share common traits.

In conclusion, HHAB agrees with U.S. EPA's comments that bacteriophages used as biopesticides pose no harmful health effects to humans. Furthermore, because fruit produced by these treated grapevines will not be used for human consumption regardless of experimental outcome, the concern of potential human health risk is minimal.

References:

Gonzalez, C.F.; Pesticide Research Authorization (DPR-REG-027a) for XylPhage; 05 April 2016

Gonzalez, C.F., R. Young, M. Das, T.S. Bhowmick, S.J. Ahern; Virulent phages of *Xylella fastidiosa*: prophylactic and therapeutic evaluation. CDFA Pierce's Disease Control Program, Proceedings of the 2013 Pierce's Disease Research Symposium, December 16-18, 2013, page 173

Department of Health and Human Service-FDA, Food additives permitted for direct addition to food for human consumption; bacteriophage preparation. Federal Register, Vol 71, No. 160, August 18, 2006

US Environmental Protection Agency; Office of Pesticide Programs; BIOPESTICIDES REGISTRATION ACTION DOCUMENT (*Xanthomonas campestris* pv. *vesicatoria* and *Pseudomonas syringae* pv. tomato specific Bacteriophages) (Chemical PC Codes 006449 and 006521)