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NABC UPDATE

To: Blueberry Industry Members
From: Mark Villata
Date: May 18, 2010

RE: ADHD and Pesticide Exposure

Media coverage of a recent study titled, "Attention-Deficit/Hyperactivity Disorder and Urinary Metabolites of Organophosphate Pesticides" published in the May 17, 2010 issue of *Pediatrics*, the official journal of the American Academy of Pediatrics, has been generating considerable media coverage. However, the study is not nearly as conclusive as the media stories portray. The following background information is provided to help you answer inquiries concerning this issue.

It is important to note that at this time this is an observational study. While the researcher found a statistically significant relationship between pesticide residue exposure and children with ADHD, causality could not be established. The study concludes "These findings support the hypothesis that organophosphate exposure, at levels common among U.S. children, may contribute to ADHD prevalence. Prospective studies are needed to establish whether this association is casual."

This study analyzed several data sets, looking for relationships in one snapshot in time. Most scientists agree that to determine a cause-and-effect relationship, research must be conducted over a number of years and consider relevant factors like diet and medical records review.

Dr. Robert Krieger from the University of California, Riverside has provided the following statement regarding the current study. Dr. Krieger is a pesticide scientist with a degree in environmental toxicology from Cornell University and currently heads the Personal Chemical Exposure Program at University of California, Riverside.

He is co-author of a study titled "DAPs in Fruits and Vegetable May Confound Bio-monitoring in Organophophorus Insecticide Exposure and Risk Assessment" (*Journal of Agricultural and Food Chemistry,* Volume 56, 2008) which is one of the referenced studies in this ADHD study.

Statement by Dr. Robert Krieger, Head of the Personal Chemical Exposure Program at the University of California, Riverside Re: Attention-Deficit/Hyperactivity Disorder and Urinary Metabolites of Organophosphate Pesticides

It would be a mistake to conclude that a urine breakdown product of organophosphorous pesticides found on fresh fruits and vegetables caused ADHD. In fact, the authors clearly state their study does NOT conclusively find that association.

As a toxicologist I first want consumers to know that the breakdown products (DAPs) found in urine as part of this study are NOT pesticides and they are NOT toxic on produce.

Measuring breakdown products in tiny amounts in urine is not a measurement of risk. Detectable levels are far below amounts that have any effects in well-designed toxicity studies.

It should also be noted that human exposure to organophosphates from all sources has declined significantly over the past 20 years as a result of reduced and discontinued use of this pesticide class by farmers, industry and in the home. Therefore, it is highly unlikely that any reported increase in ADHD could be attributed to increased exposure to organophosphates.

The North American Blueberry Council feels it is important to note that:

- As an industry that strives to deliver a healthy and nutritious product to the consumer, we agree that this is an important area of concern and encourage additional studies in this area.

- More research needs to be done to determine cause and effect before any causal relationship can be established.

- Exposure to pesticides can be though air, water or food and the origins of the exposure can only be postulated. Even if it is reasonable to assume that most of the exposure is food-borne, actual food patterns of these children were not determined in the study.

- According to the FDA, you can reduce and often eliminate pesticide residues if they are present on fresh fruits and vegetables by washing them with cold or warm tap water.

- The study discusses organophosphate use in agriculture and references the 2008 USDA Pesticide Data Report noting that the organophosphate malathion was found in 28% of frozen blueberry samples, 25% of strawberry samples and 19% of celery samples. It is important to note that the percentage for frozen blueberries was based on a very small sample size of just 18 samples. Of the 18 samples collected in 2008 a total of 5 had

detection of malathion (27.8 % of samples as noted in the ADHD study) with a range of values detected at from 0.003 parts per million to 0.005 parts per million, which is well below the EPA tolerance level of 8 parts per million. For reference, a total of 22 samples were collected in 2007, which was the first year that blueberries were added to the USDA report, and only one sample of frozen blueberries had a detection of malathion at 0.005 parts per million.

- According to the USDA Pesticide Data Report, *"Pesticide Data Program laboratory operations are designed to detect the smallest possible levels of pesticide residues possible, even when those levels are well below the safety margins established by EPA. It is important to note that the mere presence of a pesticide on food does not indicate the food is unsafe." (PDP Annual Summary Calendar Year 2008- Executive Summary Page XI)*

- Major health organizations as well as scientific and health authorities agree the health benefits of eating fruits and vegetables far outweigh any hypothetical risk that may be associated with pesticide residues.

- As an industry, we care about providing a healthy and safe food to the consumer. Research is showing that our fruit, which consumers enjoy, is providing unique contributions to a healthy diet, especially through its antioxidant content.

- The blueberry industry strives to provide consumers with safe, high-quality products. The industry supports growers in following standards/guidelines that ensure the safe application of pesticides with a careful eye to tolerance levels, worker safety and environmental sensitivity.

- Right now, it takes safe application of chemicals to produce a healthy, economical pest-free blueberry crop. The blueberry industry believes in using Integrated Pest Management techniques and other new technologies will continue to be adopted into our management practices as they become available. Organic blueberries are also an option for consumers who wish to purchase them.