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September 30, 2016

Teung Chin
USDA ARS Office of Pest Management Policy
1400 Independence Ave., S.W.
Room 3871 (Mail Stop 0314)
Washington, DC 20250

Subject: **Carbaryl: Benefits and Economic Information**
Comments in Response to the *Pesticide Information Request*

The attached comments are in response to the August 17, 2016 email message from David Epstein regarding OPMP's pesticide information request to gather benefits and economic information on carbaryl usage. These comments are being submitted on behalf of the Western Integrated Pest Management Center and provide input on the use of carbaryl on **vegetable crops** and **turfgrass** in Hawai'i.

Please refer to the attached document, *Pesticide Information Request*. Responses to the individual questions are indicated by bold, italics.

Input for these comments were received from Cooperative Extension Service personnel from the University of Hawai'i at Mānoa.

Comments compiled and submitted by:

Handwritten signature of Mike Kawate.

Mike Kawate
Pesticide Registration Specialist
Voice: 808-956-6008
mike@hpirs.stjohn.hawaii.edu

Handwritten signature of Cathy Tarutani.

Cathy Tarutani
Educational Specialist
Voice: 808-956-2004
cathy@hpirs.stjohn.hawaii.edu

Pesticide Information Request

Reporting Region: Hawai'i (Responses to individual questions, below, indicated in bold, italic.)

Active Ingredient: Carbaryl

Crops/Target Sites:

Currently Sold/Marketed for use in: alfalfa, almonds, apples, apricots, asparagus, avocados, beans, green, beets, blackberries, blueberries, broccoli, cabbage, caneberries, cantaloupes, carrots, cauliflower, cherries, corn, cotton, cranberries, cucumbers, dry beans/peas, eggplant, grapefruit, grapes, hay, other, lemons, lettuce, nectarines, olives, onions, oranges, parsley, peaches, peanuts, pears, pecans, peppers, pistachios, potatoes, prunes, pumpkins, rice, sod, sorghum, soybeans, spinach, squash, strawberries, sugar beets, sunflowers, sweet corn, sweet potatoes, tangelos, tangerines, tobacco, tomatoes, walnuts, watermelons, wheat (EPA, 2009)

Questions:

1. What are the benefits for the use of carbaryl?

a. What crops is carbaryl used on in your region, and for control of which pests?

- ***In Hawai'i, carbaryl is used on some small farms which produce a variety of vegetable crops to control sucking and chewing insects.***
- ***Carbaryl is also used on turfgrass; some golf courses still use carbaryl, but not as the primary pest control chemical. On turf, carbaryl is used to control some common turfgrass caterpillars (such as armyworm, cutworm, webworm, fiery skipper, etc.), some ant species, billbug, etc.***

b. What are the typical application rate(s) (may be less than the maximum label rate) for the crops of interest? Are higher rates used occasionally for specific purposes?

- ***Vegetables: Label maximum rates are typically used.***
- ***Turfgrass: The pest to be controlled determines the application rate. For turfgrass caterpillars (such as armyworm, cutworm, webworm, fiery skipper, etc.) and some ant species: 4 lb ai/acre; for billbug: 8 lb ai/acre. Higher rates are not used.***

c. If multiple applications are needed, how many applications are usually needed (do particular pests/thinning regimes typically require multiple applications) what are the usual application intervals?

- ***Vegetables: The number of applications and application intervals vary. Insect populations are monitored weekly to determine if controls need to be applied.***
 - ***Multiple applications required:***
 - ***Loopers typically require multiple applications.***

- ***Carbaryl does not kill insect eggs. Multiple applications are needed to managed newly hatched immature insects.***
- ***Turfgrass. Curative applications are made as needed. The number of applications and application intervals vary. Moreover, carbaryl is no longer a frequently used chemical in Hawai'i's golf courses.***

2. Management Options

a. What other management (pesticide/non-pesticide) options are available if carbaryl was not available?

- ***Vegetables. There are no options that control as broad a range of pests as carbaryl. Growers, especially small growers, want to minimize the amount of pesticides they store.***
- ***Turfgrass. There are some newer insecticides available to control insects in turf settings, such as clothianidin (Arena), imidacloprid (Merit), etc.***

b. How do these alternative options compare with carbaryl in terms of efficacy, cost and compatibility with current season-long pest management considerations, including resistance management?

- ***Vegetables. Systemic insecticides might be more effective against some pests, but only against small insects like aphids. Control by systemics of larger loopers and beetles is poor. Systemic insecticides are considered to be too expensive.***
- ***Turfgrass. The newer insecticides (such as clothianidin and imidacloprid) are generally applied at lower rates, have better efficacy and smaller environmental impacts than carbaryl.***

3. Economic Importance

a. What are the estimated yield impacts if carbaryl was not available and there are no other efficacious alternatives?

- ***Turfgrass. There are newer insecticides available to control insects in turf settings. Impacts if carbaryl were unavailable would be negligible.***

b. What are the estimated yield impacts on a per acre basis if carbaryl was not available and the next best alternative, assuming one, is available? What is the next best alternative?

- ***Vegetables. *Bacillus thuringiensis (Bt)* is an alternative for caterpillar control. However, no alternatives were identified for the range of insects carbaryl is used to control.***
- ***Turfgrass. There are newer insecticides (such as clothianidin and imidacloprid) available to control insects in turf settings. Impacts if carbaryl were unavailable would be negligible. Clothianidin and imidacloprid are examples of newer chemistries used in turf.***

- c. How would the chemical costs per acre change? Please list by each active ingredient alternative.
- ***Vegetables. More products--individual specialized and expensive pesticides would need to be purchased. This would be highly costly. These insecticides would have to be stored and inventoried for longer periods of time, creating potential hazardous conditions.***
 - ***Turfgrass. No additional costs are anticipated.***
- d. Would there be additional costs when using the next best alternative, such as the need for additional field passes, different equipment needs, or additional labor needs?
- ***Vegetables. Yes, Bt insecticides can be used for caterpillar control but Bt does not control beetles or scales. Therefore, additional products would need to be purchased and more time would be required for pest management.***

4. Periodic or invasive pests

- a. What are the periodic or invasive pests of concern for which carbaryl is a control option and for which crop(s)?
- ***Vegetables. Sevin is a good, broad-range insecticide to test for efficacy against new invasive pests. If necessary, efficacy testing can be done using narrow-spectrum chemicals. Such chemicals are much less practical, not only because they are expensive, but they are usually sold in large quantities.***
 - ***Turfgrass. White grubs (such as Japanese beetle, masked chafer, etc.), chinch bug, etc. are episodic pests for which carbaryl is a control option.***
- b. What are the alternatives if carbaryl is not an option? Are there any yield or quality losses when using these alternatives instead of carbaryl? How would the costs per acre change?
- ***Turfgrass. There are some newer insecticides available to control insects in turf settings, such as clothianidin, imidacloprid, etc.***
- c. If there are no alternatives, what are the associated yield or quality losses resulting from these pests?
- ***Vegetables. There can be total crop losses. This was the situation when sweet potato whitefly first appeared in Hawai'i.***

Respond to: Teung.Chin@ars.usda.gov

CC to: David.Epstein@ars.usda.gov, Elizabeth.Hill2@ars.usda.gov

Deadline: Friday, September 30, 2016

Background and additional information:

September 22, 2010 Federal Register Notice announcing the opening of the registration review docket for carbaryl

<https://www.regulations.gov/document?D=EPA-HQ-OPP-2010-0230-0001>

Carbaryl Registration Review Docket

<https://www.regulations.gov/docketBrowser?rpp=25&so=DESC&sb=commentDueDate&po=0&dct=SR%2BN%2BPS&D=EPA-HQ-OPP-2010-0230>

Evaluation of Carbaryl by EPA, US Fish & Wildlife Service and the National Marine Fisheries Service

<https://www.epa.gov/endangered-species/endangered-species-litigation-and-associated-pesticide-limitations>

Novasource Sevin Label

<http://novasource.com/home/products/sevin/>

Drexel Carbaryl 4L Label

http://www.drexchem.com/products/labels/drexel_carbaryl-4l_10028_label.pdf

Loveland Carbaryl 4L Label

<http://www.lovelandproducts.com/product/carbaryl-4l-insecticide>

For more information

See attached file: Screening Level Estimates of Agricultural Uses of Carbaryl (EPA, 2009)

Contact:

Teung F. Chin, Ph.D.
USDA Office of Pest Management Policy
Teung.Chin@ars.usda.gov
(202) 222-8619

David Epstein, Ph.D.
USDA Office of Pest Management Policy
David.Epstein@ars.usda.gov
(202) 720-9877

Elizabeth Hill
USDA Office of Pest Management Policy
elizabeth.hill2@ars.usda.gov
TEL: 202-720-3846