

About This Issue

This is a single article IRAC eConnection to advise on a developing resistance situation with diamide chemistry and *Plutella xylostella*, Diamondback Moth (DBM) in the Southern United States. IRAC provides some important resistance management recommendations.



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Plutella xylostella Resistance Alert!

A field incident prompted DuPont, Bayer CropScience, and Syngenta to investigate allegations of poor product performance where samples of *Plutella xylostella*, Diamondback Moth (DBM) were collected and analyzed. These analyses confirmed the presence of genetic markers indicating target-site resistance to diamide class chemistries. The diamide class of chemistry includes the following active ingredients: chlorantraniliprole, cyantraniliprole and flubendiamide (IRAC MoA Group 28). Following are more details on this incident and our response.

In August of 2013, a crop consultant managing about 200 acres of cole crops in Mississippi reported failure to control diamond back moth in fields that received chlorantraniliprole (Coragen – Group 28 MOA) and flubendiamide (BELT – Group 28 MOA) foliar applications. This was reported to the registrants, and subsequently to the IRAC-US Diamide Working Group (the Diamide Working Group contains representatives of the Diamide registrants: Bayer, DuPont, Nichino and Syngenta). The field failure was reported to the registrants by a University researcher at Mississippi State University (MSU). According to a verbal report from University scientists and further follow-up discussions with the crop consultant who reported field failure, the following treatment program was followed.

Treatment history: Applications of diamide chemistry (primarily chlorantraniliprole) were applied in rotation with other products such as methoxyfenozide (IRAC MoA Group 18) (Intrepid) and *Bacillus thuringiensis*, subsp. *kurstaki* (IRAC MoA Group 11) (DiPel) over a 4 year period. In 2013, after applications of Coragen failed to provide control, follow-up applications of spinetoram (IRAC MoA Group 5) (Radiant), and then Coragen + Belt + Dipel, also provided unsatisfactory control of DBM.

In response to this report – a conference call meeting of the IRAC Diamide Working Group was held on August 28, 2013. The purpose of this meeting was to develop an IRAC response to this report. The decision was taken to gather samples of suspected resistant DBM larvae to determine, by means of molecular diagnostics, if resistance was present and the mechanism of resistance. The samples were analyzed by pyrosequencing and results confirmed the presence of a target-site mutation that confers resistance to diamide chemistry (Group 28). This mutation affects all diamide chemistries (Group 28) thus conferring cross-resistance to this class of chemistry.

If a DBM control failure occurs with an MOA, rotate to an alternate MOA. Apply insecticides at labeled rates. Rotate insecticides with different IRAC groups to each DBM generation (4 weeks in mild to 2½ weeks in hot seasons). Reserve the most effective insecticides to protect the harvested portion of the crop. Never use insecticides off-label, especially in transplant production. Following labels helps to manage resistance. Where year-round crop production occurs, use a host-free period during the warmest months of the year (2 or more DBM generations). Consider using a regional selection-free period of one MOA to reduce the carryover of DBM resistant to a specific MOA from one season to the next. If sequential plantings of cole crops are required, then avoid adjacent plantings and rotate IRAC groups per DBM generation time across all plantings.¹

In 2014, the IRAC Diamide Working Group will work with local experts to develop practical pest and resistance management strategies, which could include rotational recommendations and a treatment window approach for controlling DBM in cruciferous crops. There are also plans to collect additional DBM samples in order to evaluate the level of susceptibility.

¹ http://www.caes.uga.edu/publications/pubDetail.cfm?pk_id=7458#Moth



Disclaimer

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