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Travel: Sharon Downes-ICE2008 Durban, South Africa

Brief Report

23rd International Congress of Entomology (ICE2008)
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http://www.ice2008.org.za/

The major output from this trip was to disseminate my latest research results to peers by presenting a spoken paper entitled "Frequency and characteristics of alleles conferring resistance to the Bt toxin Cry2Ab in populations of the low profile target pest *Helicoverpa punctigera*". In this talk I presented the first information on Cry2Ab resistance in *H. punctigera* in a context that complimented a prior presentation by Rod Mahon on Cry2Ab resistance in *H. armigera*. These presentations were attended by leading experts throughout the world in the field of Bt resistance, and were well received. Since returning from South Africa I have written some of this work into a scientific paper[1] that is currently in internal review within CSIRO.

The talks that I attended in the symposia on "Pesticides, Resistance and Transgenics" gave an international overview of the latest thinking in this field. Many of the presentations were review papers rather than disseminations of empirical data. Stimulated largely by a recent controversial paper by Tabashnik et al.[2], there was considerable discussion about the definition of resistance and the merits of different approaches for measuring it. A couple of presenters noted that the significant workload involved with performing F_2/F_1 screens precluded them from being a preferred method, and highlighted the potential danger of focusing on one gene(s) using the F_1 tests while neglecting others. However, the feedback from these people after our talks was positive and complimentary of our approach, and acknowledged the appropriateness of the method for our situation.

I established new contact with key international researchers in Bt resistance including Tony Shelton (USA), Bruce Tabashnik (USA) and Willliam Moar (USA).

I met with Carlos Blanco from the USDA, with who I have been in regular contact since the Society for Invertebrate Pathology Meetings in China in 2006. In particular, Carlos and I discussed a potential collaboration to follow up on some of his work that I reviewed on an empirical test of the appropriateness of the F_2 screen for detecting Bt resistance alleles in Tobacco Budworm. This collaborative work would relate to our perplexing finding of different frequencies of Cry2Ab resistance alleles using F_1 vs. F_2 screens in *Helicoverpa armigera* and *H. punctigera*. We are currently writing-up protocols for this potential work to assess its scale and achievability. Funds may be available from the USDA to support technical assistance for the Australian component of the work.

Rod Mahon and I met with Graham Head (Monsanto, USA) and discussed a number of key issues about our collaboration with his Australian colleagues around Bt resistance monitoring. We discussed the collation of available data by both organizations on Cry2Ab resistance alleles, and the subsequent analysis of this information for broad trends. Graham told us about recent work by Monsanto which contradicts the findings of previous work by CSIRO by suggesting that there is a fitness cost associated with Bt resistance in *H. armigera.* This work was performed using a different design and approach to the work by CSIRO and we discussed the merit of repeating the work using reciprocal protocols. We will revisit this idea at REFCOM in February 2009. Graham indicated that he would seek to promote sharing of appropriate data by his Australian colleagues with CSIRO and the cotton industry. We agreed to support Monsanto's endeavors to determine whether Cry2Ab resistance in *H. armigera* results from the modification of a binding site.

1. Downes SJ, Parker T, Mahon R, Frequency of alleles conferring resistance to the Bt toxins Cry1Ac and Cry2Ab in Australian populations of *Helicoverpa punctigera* (Wallengren) (Lepidoptera: Noctuidae).
2. Tabashnik B, Grassmann A J, Crowder D W, Carriere Y, 2008, Insect resistance to Bt crops: evidence versus theory, Nature Biotechnology 26:199-202