Saving Crops with GM Moths, Instead of Pesticides

By Gil Ross — September 9, 2015

The diamondback moth, merely a rare nuisance decades ago, has become over the past sixty years one of the most feared, devastating pest scourges for America's farmers. They (actually, their very hungry caterpillar progeny) feast off cabbage, broccoli, kale and the like, costing farmers around the world over $5 billion per annum. And, worse still, they readily adapt to a plethora of chemical pesticides, requiring alternating applications of multiple chemicals. In Malaysia, the insects are resistant to all of them.

Now, an apparent, albeit preliminary, solution to this problem has been developed by scientists from Cornell University Agricultural Experiment Station in Ithaca, New York, working with biotech experts affiliated with Oxford University in the U.K., at a company called Oxitec. The U.S. scientist in the lead on this imaginative research is Dr. Anthony Shelton, an entomologist. They came up with the idea to genetically-modify the moths in such a manner as to render the female progeny unable to survive to reproduce by introducing a MS transgene, (for "male-selecting"). Their modification also allowed more effective utilization of the "Bt" GMO variety. (Bt means modified with the Bacillus thuringensis gene for insecticidal properties.)

Studies in the greenhouse last summer were successful. According to the study's authors in the Results section, "Introductions of MS-engineered P. xylostella [Ed.: diamondback moth] males into wild-type populations led to rapid pest population decline, and then elimination. In separate experiments on broccoli plants, relatively low-level releases of MS males in combination with [Ed.: GMO] broccoli (Bt broccoli) suppressed population growth and delayed the spread of Bt resistance. Higher rates of MS male releases in the absence of Bt broccoli were also able to suppress P. xylostella populations."

A clear and concise discussion of this innovation can be read in a recent New York Times article focusing on it: "Replacing Pesticides With Genetics" by Devin Powell. He (and his expert sources, including Dr. Shelton) note that the next step planned is to release the MS-moths into the study's proprietary fields and measure the survival of the females and thence of the total moth population in the wild, as it were. Of course, mention the words "genetic modification" in any
context and "the controversy" ensues. In this instance, a group called GeneWatch UK demands that "more information be collected." It posits concern that GM larvae with altered proteins might be consumed by wildlife and harmed, somehow, or that GM moths might wander into an organic farm and contaminate it.

These quibbles are swatted away thusly, as Powell reports:

"Haydn Parry, the chief executive of Oxitec, says the company addressed this concern and others in data submitted to the Department of Agriculture.

'We fed the protein to mosquitoes, fish, beetles, spiders and parasitoids,' he said. 'It s nontoxic.'

"After weighing the evidence, the department decided the planned experiments would have no significant effect on the environment."

The Times piece by Powell continues:

"A public letter signed in June by the Northeast Organic Farming Association of New York protested any outdoor trials. The association cautioned that escaping moths could contaminate nearby farms and endanger their organic certification.

"Yet studies suggest the likelihood of diamondback moths straying is low. Wild moths released into the open tend to stay put as long as they have food and company. Any that do venture farther afield are likely to be wiped out by New York’s cold winter.

"Even if strays are found, legal experts say that national organic standards penalize only the deliberate use of a genetically modified organism.

'If these moths came across into an organic field inadvertently, that would not be a problem for the farmer,’ said Susan Schneider, a professor who specializes in agriculture and food law at the University of Arkansas School of Law."