

The Talekar Challenge: What Have We Learned and Where are We Going with Practical DBM Research and Extension Since 1985?

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ABSTRACT

Dr. N.S. Talekar, an entomologist from AVRDC, was the workshop coordinator and editor of the proceedings for the first (1985) and second (1990) International Workshops on Diamondback Moth (DBM), both held in Tainan, Taiwan. For the occasion of the first and second conferences, Talekar also published an annotated bibliography that he made freely available to scientists worldwide. In 1993 he was the senior author of the first comprehensive review of DBM. Talekar has been an active researcher and promoter of applied entomology and biological control for insect pests on crucifers and other vegetables, especially in South- and Southeast Asia. His work and leadership continues to inspire us as we address the continuing challenges of managing DBM in the varied cropping systems globally. These challenges include: the continuing development of resistance to insecticides and applying strategies to delay the evolution of resistance; understanding the role biological control plays in reducing DBM populations and how biological control can be enhanced; utilizing the information from the DBM genome for creating useful management strategies; developing a better understanding of DBM ecology on a landscape level; researching genetic control strategies including modifying the insect and its host plants; and creating practical outreach programs that enable farmers to manage DBM in a more sustainable manner.

Keywords: Diamondback moth, *Plutella xylostella*, integrated pest management

My presentation honors the man who started these workshops in 1985 and asks the question he asked me several months ago: what have we learned and where are we going with practical DBM research and extension? It is appropriate that Dr. N. S. Talekar ask this question since he did so much over several decades to advance sustainable control of DBM.

Dr. N.S. Talekar is a native of India so it is appropriate that this 7th workshop be in his home country. Talekar was very proud to have received his PhD in 1973 from the University of Wisconsin, and in 1974 he began his career at the Asian Vegetable Research and Development Center (AVRDC), which was founded in 1971 in Taiwan. Dr. Robert Chandler from the International Rice Research Institute (IRRI) was appointed as the first Director General of AVRDC and appointed Talekar to a newly created program to deal with pesticide residues on vegetable crops.

Toward the end of the 1970s, DBM had developed resistance to practically all synthetic insecticides so growers increased their rates and spray frequencies. Officials in Singapore, the major market for vegetables grown in Malaysia and Indonesia,

rejected cabbage because of high insecticide residues. These two events forced farmers to start using sprays of *Bacillus thuringiensis* which resulted in increased parasitoid populations and reduced DBM damage.

The story of how Talekar came to appreciate the importance of parasitoids for DBM can best be described in Talekar's own words. "My inspiration in going for biological control came from the success of Indonesian scientists in introducing *Diadegma semiclausum* from Java to Brastagi town's intensive vegetable growing area in North Sumatra Province. Brastagi is in the highlands. That parasitoid was introduced on Java (highlands near major city of Bandung) by the Dutch, who were a colonial power in Indonesia until the early 1950s. Brastagi was then a major supplier of vegetables to Singapore. When the Singapore Government found that those farmers were using all kinds of pesticides to combat DBM, they immediately banned import of vegetables from Indonesia. That drove Indonesian scientists into action. They imported the parasitoid from Java to Brastagi and made a pact with farmers, who were badly hit by the import ban imposed by Singapore,

that they would not use any pesticide on their vegetable (crucifer) farms. They agreed and kept their promise. *Diadegma semiclausum* was immediately established and farmers never reached for pesticides again”.

Talekar continued his work on biological control of DBM but says that he just “copied the idea of biological control, tested it in farmers’ fields in Taiwan, and spread it elsewhere.” Talekar humbly claims that he did not have time for much research and published few papers on this topic, although we all now recognize the impact his work has had on biological control of DBM throughout Asia and SE Asia, and even in East Africa.

What was it that drove Talekar to work so hard on finding solutions for DBM control? In my recent correspondence with him, he described how AVRDC’s Director General, Dr. Robert F. Chandler Jr. developed and enforced the preamble for AVRDC: “The farmer is our client, it is he whom we must serve, and any other objective is trivial compared to our aim to improve the well-being of the rural population and to strengthen agricultural production”. Based on this strong philosophy of serving the grower, Talekar saw the need for collaborative efforts on a global scale.

FORMING THE DBM COMMUNITY

As Talekar tells the story, “Sometime in early 1983, I was in Indonesia on the outskirts of a town named Bhogitingi (on Sumatra Island) and saw a farmer’s field badly damaged with DBM. I stood in the farm and looked around and told myself - DBM is indeed a serious problem and I alone cannot solve it in my lifetime. I immediately decided to get all researchers together and see what they are doing and how we can learn from successes of others in combating this problem. As soon as I returned from the trip, I walked into Chandler’s office and briefed him on what I found and my feeling about the problem and explained my idea of getting all scientists together to see how we can coordinate our research to fit their needs. My Director General approved the idea immediately, and thus started the first International Workshop on DBM in 1985”. It is because of his vision that we are here today at the 7th International Workshop on Management of the Diamondback Moth and other Crucifer Insect Pests.

Besides arranging and hosting the First and Second International Workshops in 1985 and 1990, respectively, Talekar also spearheaded publication of the Proceedings for both workshops (Talekar & Griggs 1986; Talekar 1992) and the accompanying annotated bibliographies (Talekar *et al.* 1985; Talekar 1990). In 1989 he spent a year in my laboratory and we wrote the first comprehensive review of DBM (Talekar & Shelton 1993).

THE TALEKAR CHALLENGE

Over the last couple of years of correspondence with Talekar, I have heard him questioning whether the global DBM community is as focused on long-term solutions for the DBM problem as it should be. Many of us continue to introduce new insecticides into our integrated pest management (IPM) programs only to find out that they are harmful to the natural enemy population and the DBM quickly evolves resistance to them. It is an old story for DBM and one that is well documented in the DBM proceedings and reviews. Why don’t we hear more stories about more sustainable approaches such as the introduction of *Diadegma semiclausum* into the highlands and *Oomyzus sokolowskii* into the lowland areas of Taiwan where they continue to provide control of DBM? Is it possible to enhance this biological control program even more by introducing pupal parasitoids into the lowlands? Why is not more of this work being done?

Talekar also cooperated with scientists in other countries to help establish parasitoids that provided successful control in the Philippines, Malaysia, Lao PDR, Indonesia, India, Kenya, China, Japan and Korea.

It has been 30 years since the first DBM workshop and now is an appropriate time to ask: what have we learned and where are we going with practical DBM research and extension? While our knowledge of DBM has certainly increased, has it led to better management of this devastating pest? Another way of asking this question is whether our increased knowledge of DBM over the last 30 years has been incorporated into extension programs that helped us move toward more sustainable IPM programs for DBM.

Talekar constructed a figure to illustrate this question. Fig.1 shows the relationship between the number of papers published on DBM over time and the control cost plus yield loss. Based on this figure, the data suggest that there is an unfortunate relationship between papers published and increasing control costs and damage. One could look at this relationship several ways. The first is that despite the increased number of papers, and presumably the increased knowledge about DBM, the losses to this pest continue to increase. However, one might argue that losses would be even greater if people didn't publish on this subject. Or perhaps what is being published has not yet made its way into useable management strategies. Both views are optimistic ways of viewing this seemingly unfortunate relationship.

But another way of viewing this relationship is more troubling and should cause us to examine why we choose to do certain research projects. Is the work that the DBM community is doing contributing to solving the DBM problem? Many of the papers being published now document cases of resistance (Fig. 2) and, while useful for justifying abandoning a particular insecticide in a specific area, we have heard that story too many times before. Shouldn't we be reading more publications about how resistance was managed properly so that judicious use of an insecticide led to its long-term place in an IPM program? Likewise, some of the published work over the last 30 years describes elegant biological phenomena but has it been incorporated into extension programs adopted by farmers? As we decide our research and extension agenda, we should ask what is the proper balance for basic and applied research that will lead to sustainable contributions for DBM management?

Times have certainly changed since Talekar first began his career at AVRDC with the mandate of dramatically reducing the pesticide residues on vegetables shipped to Singapore. Such problem-oriented work may not be fully appreciated by administrators in universities or lead to articles in high-impact journals that help advance one's career. But nevertheless such work is needed and should be recognized as contributing to food security, environmental benefit and healthier food for a growing population.

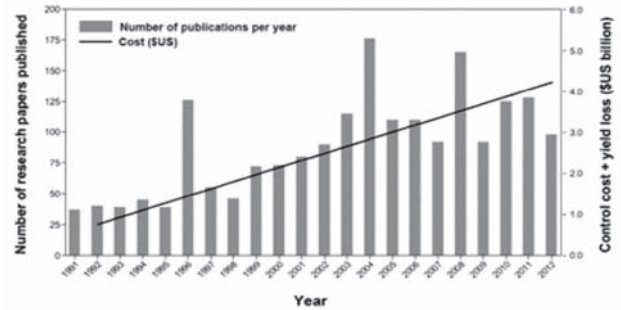


FIGURE 1

Relationship between number of research publications and cost of pest control and yield loss for DBM per year.

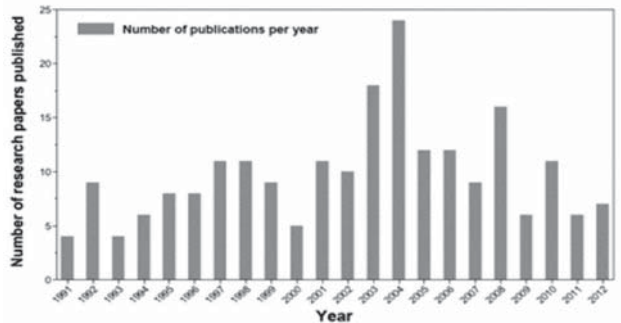


FIGURE 2

Number of research publications on insecticide resistance per year.

FINAL THOUGHTS

Talekar had a mandate from his Director General to solve a problem. The message given to him was clear: his client was the farmer who needed help in controlling DBM.

During his career at AVRDC, according to Talekar, he worked on "strictly applied research" that was initially confined to Southeast Asia. His contributions in enhancing biological control of DBM in Southeast Asia are legendary and inspirational. With new funding, he was able to expand his work subsequently into South Asia and East Africa where again he emphasized biological control as the most essential component in IPM.

Talekar retired from AVRDC in July 2005 and is a visiting professor at the National Chung Hsing University, Taichung, Taiwan where he teaches courses to undergraduate and graduate students.

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