COOPERATIVE EXTENSION SERVICE: Building Partnerships and a Network with the Pesticide Industry

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Why do we need to build partnerships and network?

- Networks play an essential role in how and where Extension carries out its outreach programs.
  - It reflects an organization’s outreach structure, types of connections, and the symbiotic relationships through which participants influence each other.
  - Sense of sharing and cooperation among agencies, organizations and people.
    - Share similar goals.
Process of how to build Partnerships and Networks?

• As an Agriculture Extension Agent – the individual is hired to serve a specific stakeholder/clientele group.
  • IE. Maui County – Edible Crops Industries
  • The clientele/stakeholder consisted of vegetable growers on Maui.
• Conduct Stakeholder Needs Assessment
  • Identify who are your stakeholders, collaborators, people associated with and serve the industry.
  • Identify the needs of the industry through mail outs surveys, interviews, grower meetings, etc.
    • IE. Insect and disease management.
      • What are the major pests affecting the crop.
• Develop Extension Plan of Work, Program &/or Project.
  • Identify how are your collaborators? Who are you going to work with to address industry needs.
Example of extension projects - building partnerships and network

- Diamondback Moth Resistant Management Program
Background of Crucifer Industry

• In Hawaii, the farm gate value of crucifer industry is approximately $5.772 million and consists primarily of head cabbage, Chinese cabbage, broccoli and mustard cabbage with approximately 855 acres planted each year (2010 Statistics of Hawaii Agriculture).

• Primary production areas located in Kamuela, Hawaii; Kula, Maui and Kunia, Oahu.

• In the early 1990’s Maui produced 2/3 of the total production of head cabbage statewide.
Development of the Diamondback Moth Resistance Management Program

Background cont.

- In Hawaii, the major pest of crucifers is the diamondback moth (DBM), *Plutella xylostella* (Linnaeus). In the 1980’s, DBM had reached epidemic proportions due to increased pesticide resistance. Head cabbage growers experienced yield losses of 20 to 40%, and in some cases up to 100%.
DBM Resistance in Hawaii

• Organophosphates – parathion, diazinon, malathion, etc.
• Organochlorines - thiodan
• Carbamates - sevin
• Synthetic Pyrethroids
• Bacillus thuringiensis
• Spinosad/Spinetoram
• Indoxacarb
• Novarulon
In 1994, I began working collaboratively with Dr. Ron Mau, entomology extension specialist, UHM, CTAHR, PEPS, to address industry concerns regarding the reduced effectiveness of the registered insecticides for the control the DBM.

From 1994 to 1998, with increasing resistance of the DBM to registered insecticides, we began evaluating new biorational products for the control of DBM.

These products include PROCLAIM 5SG, ALERT 2 SC, FIPRONIL 1.67 SC, FIPRONIL 80 WDG, AND SUCCESS, all of which have novel modes of action.

Field trials were conducted to compare the efficacy of these new biorational products to commercial standard insecticides for the control of the DBM and other lepidopteran pests.

Results indicated all the new biorational products provided good to excellent control of the diamondback moth throughout the entire crop’s season.
Development of Diamondback Moth Resistance Management Program

• In 1994, the product closest registration status was PROCLAIM® a new biorational product for the control of DBM.

• In July 1995, we worked with HDOA- Pesticide Branch and received an EUP (experimental use permit) from EPA for PROCLAIM® (Emamectin Benzoate) on cole crops due to the severe problems growers were having in the control of DBM with existing insecticides.

• In fall of 1995, we worked Merck research representative to obtain a FIFRA section 18 emergency exemption for PROCLAIM® (emamectin benzoate) which was submitted to HDOA and EPA for review.

• In February of 1996, the section 18 specific exemption petition was obtained.

• In 1999, PROCLAIM® was registered for use in Hawaii and is one of the biorational products used by growers today as part of their resistance management program for cole crops.
Development of the Diamondback Moth Resistance Management Program

• Meanwhile, in April of 1998, the other new biorational product, SUCCESS®, became registered for use in Hawaii. This product provided excellent control of the DBM and was used by cole crop growers statewide.

• During the summer of 2000, we were getting calls from growers in Kunia and Kula indicating that they were not getting control of the DBM with the use of SUCCESS® insecticide.

• The entomology extension specialist collected some DBM samples and ran preliminary laboratory tests.
  – Results indicated that the DBM had developed a very high amount of resistance to the Success insecticide (230 fold increase in resistance). Resistant DBM populations were also found in Ewa, Oahu and Kula, Maui.

• Dow Agrosciences, the manufacture of SUCCESS®, were very concerned about the rapid resistance buildup and was considering removing the product label for Hawaii because of the potential movement of the resistant DBM to mainland cole crop production areas.
Diamondback Moth Resistance Management Program cont.

• In attempt to eliminate the resistant DBM populations in cole crop production areas, we worked with Dow AgroSciences Technical Representatives (Gary Thompson, John Descary, and Mike Lees) and IRAC (insecticide resistance action committee) to develop and implement a Hawaii diamondback moth resistance management program.
DBM Resistance Management Program

- Growers were instructed to immediately stop using the Success insecticide on cole crops.
- The IRAC committee recommended growers rotate insecticides with different chemistries on a 2 week rotation.
- As other insecticides became available, growers will rotate insecticides in conjunction with each new generation of DBM.
- After a year of not using Success, the resistance population of the DBM to Success disappeared, and Success was put back into insecticide spray rotation for resistance management.
DBM Resistance Management Program

- Uses IRAC principles of limiting selection of resistance by rotating the use of insecticide with different mode of action groups.
- Ongoing outreach educational program on DBM resistance management for crucifer growers in Hawaii.
- Regional RM insecticide spray windows - monthly
- Resistance screening (monitoring) are conducted twice a year on diamondback moth (DBM) populations from the major production areas.
  - For each new insecticide group - establish baseline toxicity rate to DBM.
  - Allows for the detection of increased resistance and possibly allow for remediation.
- Population bioassay testing to monitor changes
- Conduct efficacy insecticide field evaluation trials of new and novel insecticides that will be registered for use in the near future.
Diamondback Moth Resistance Management Program

• CTAHR Collaborators on the Project:
  – Dr. Ron Mau, retired entomology specialist, PEPS, CTAHR.
  – Vegetable Agents:
    • Steve Fukuda, Jari Sugano and Jensen Uyeda, extension agents, Oahu County.
    • Randy Hamasaki, extension agent, Hawaii County.
**Diamondback Moth Resistance Management Program**

- In this project, you can start to understand how we went about building our partnerships and network.
- Cooperative Extension’s outreach programs is based on addressing the needs of our stakeholders.
  - In this case, it is the head cabbage growers having a major problem controlling the diamondback moth.
- The agent worked in collaboration with the entomology extension specialist to help address the needs of industry.
- We began collaborating with the Ag Chemical Companies and IRAC committee
  - Evaluating the efficacy of new biorational insecticides.
  - Developing an Insecticide Resistance Management Program.
  - Assisted in the registration of their products.
- By building partnerships with the Pesticide Industry, we were able to resolve the DBM problem facing the crucifer industry.
  - There was a symbiotic relationships with the pesticide industry and CES with sharing similar goals.