California Melon Research Advisory Board's 2006 Strategy

Strategic Approach

The California Melon Research Advisory Board has taken a long-term approach to reducing pesticide risk by funding Integrated Pest Management and other research projects that are regional in scope for melon growers and handlers, and their Pest Control Advisers. The board sponsors projects for cantaloupe, honeydew, and mixed melon production that are also geared toward reducing the risk to workers and the environment in the three major melon growing regions in the state. In 2006, the board will also be focusing on education regarding the mode of action of registered pesticides and the need to prevent pest resistance.

Progress on 2005 Activity 1

Research work on the "Investigation of the distribution of new races of powdery mildew, mating type and fungicide resistance in melon" will continue in 2005. With the surprise development of a new race (A22) of powdery mildew on melons in 2003, a priority will be to identify and geographically map the mildew races found on melons in California. This activity will develop an information database on the pathogenic races present on melons, including honeydew melons, and their distribution. This database will take into account the potentially dynamic nature of the powdery mildew population.

Research continued on the investigation of the distribution of new races of powdery mildew caused by the fungus Podosphaera xanthii. A new race, designated A22, overcame all known sources of commercially available resistance including the United States, European, and Japanese race differentials that were previously used to type existing races on a worldwide basis. The research team includes members from the University of California, the United States Agricultural Research Station in Salinas, and several Farm Advisers with the U.C. Cooperative Extension. Prolonged high air temperatures during the summer of 2005 seemed to inhibit the development of mildew infections in the San Joaquin Valley. Thus, the prevalence of new mildew races in the Central Valley is still unknown. Powdery mildew on melons is vulnerable to the development of fungicide resistance as benzimidazole and triadimefon resistance has been detected in the United States for over 10 years. In California, resistance to fungicides benzimidazole (Topsin), a strobilurin (Flint), and a demethylase inhibitor (Rally) has been studied the last three years. A mixture of fungicides with different modes of action is being recommended to reduce the selection pressure for fungicide resistance. This is leading to the need for education on the features of the Fungicide Resistance Action Committee (FRAC) codes.

Progress on 2005 Activity 2

Research will continue in 2005 for alternatives to carbamate baits such as carbaryl (Sevin Bait) for soil dwelling insects on melon crops. With the FQPA review of both Diazinon and Carbaryl still in progress, this activity was designated as a top priority in the 2003 Pest Management Strategic Plan. The University of California liaison to the melon board has suggested that research be performed with a bait formulation made from buffalo gourds, which are supposedly very attractive to soil-borne insect pests.

Research for alternatives to carbamate baits such as carbaryl (Sevin bait)and the organophosphate Diazinon for soil dwelling insects on melon crops focused on control of darkling ground beetle (Blapstinus spp.). The suggestion that a bait formulation made from buffalo gourds was very attractive to soil-borne insects has been refined to suggest that the material curcurbitacin found in buffalo gourds is a feeding stimulant for cucumber beetles but not for other insect pests. A new project will be started in 2006 for control of cucumber beetles with the material curcurbitacin. Nine different insecticide baits were evaluated for efficacy against darkling ground beetles. Some of the baits consisted of
pre-gelatinized corn flour granules with 20% montmorillonite clay and cantaloupe rind juice along with carbaryl, imidacloprid, or spinosad. All bait formulations controlled darkling ground beetles in the field study. The research needs to continue in 2006 to refine bait formulations to increase attractiveness to beetles and other insect pests.

Progress on 2005 Activity 3

An evaluation of new pre-plant and seed coating nematicides for plant protection from root-knot nematodes that was started in 2004 will continue with field trials in 2005 with melon seeds. The research team believes that yield losses from root knot nematodes, Meliodogyne incognita, occurs very early in the season. Research in 2005 will center around cantaloupe and honeydew melons grown under actual field conditions in California with abamectin treated seeds from Syngenta.

An evaluation of new pre-plant and seed coating nematicides for plant protection from root knot nematodes (Meliodogyne incognita) was continued in 2005 from the original project in 2004. Abamectin treated seeds from Syngenta were used in the research project. The lead researcher notified the melon board that he was not satisfied with the formulation and had requested refinements by Syngenta before continuing the project with field studies. We are still waiting for word on the possibility of a better formulation so that the research can continue.

Progress on 2005 Activity 4

The melon board has expanded a research project on the "Evaluation of new insecticide alternatives for insect management in melons" to include work with cucumber beetles. One of last year's projects in the desert growing region was aimed at identifying alternatives to leafhopper control. That work will now be centered in the San Joaquin Valley where cucumber beetles have also been a problem.

The proposed expansion of a research project on the evaluation of new insecticide alternatives for insect management in melons to include work with cucumber beetles in the San Joaquin Valley was not started in 2005. The lead researcher from the University of Arizona was unable to commit any time to the expanded project area in the San Joaquin Valley. A new project with an IPM Advisor from California will be used for the cucumber beetle project in 2006.

Activities for the Coming Year

Activity 1

The top priority for 2006 will be aimed at education of melon growers and handlers, and their Pest Control Advisers, in how to rotate materials in and out of different modes of action to reduce pest resistance. The melon board along with the California Minor Crops Council is making a shortened version of the Pest Management Strategic Plan that will identify pest management options. Pesticides will be listed with their mode of action and the letter and/or number designation proposed by the Fungicide Resistance Action Committee and the Insecticide Resistance Action Committee.

This educational effort will concentrate on fungicides and insecticides for 2006. All researchers under contract with the melon board are also being asked to use the FRAC and IRAC codes in their written mid-season and final technical reports to the board.

How does this activity reduce pesticide risk?

Grower education is needed to slow down and hopefully reduce pest resistance that is favored when the same type of pesticides are used across a growing region. The melon industry has already seen pest resistance in powdery mildew and in whiteflies. With grower education aimed at using a pesticide rotation that uses materials from varying modes of action, it is hoped that growers will gain a better understanding of pest management concerns.

How will you measure the risk reduction gained from this activity?

This activity has a long-range goal of educating growers and Pest Control Advisers in the proper usage of pesticides for a reduction in pest resistance. When growers utilize

materials with various modes of action, usage of individual pesticides may go down due to the use of rotational materials. To be most effective, growers from the entire melon industry will have to be contacted through outreach efforts with our researchers and melon board activities. It has become obvious that the knowledge of FRAC and IRAC codes and what they mean to pest management has been extremely limited in the past. We intend to change that with this activity becoming top priority.

Activity 2

Research on powdery mildew caused by the fungus Podosphaera xanthii continues with the screening of melon germplasm and the evaluation of new fungicide chemistry. The research team is looking to develop a disease management program that includes the biofungicide AQ10 (Ampelomyces
quisqualis) that would reduce the pressure exerted on the pathogen for development of resistance. AQ10 has not been previously tested in melon production regions in the state.

How does this activity reduce pesticide risk?

If AQ10 provides adequate control of powdery mildew, it could be used in a fungicide rotation based on various modes of action. This would reduce the pressure for pest resistance that has occurred in previous years, especially in the desert growing region.

How will you measure the risk reduction gained from this activity?

Growers are hesitant to try new pesticides if they aren't known to provide adequate control. If the research team can identify fungicides that offer control and can be registered in the state of California, additional materials could be used in a rotation with the currently registered systemic fungicides. The mandatory pesticide use reporting system in California allows for a review of materials across several years. This remains the best way to see if individual growers are adopting new chemistries while reducing the use of older materials.

Activity 3

A new project with three IPM Advisors from California will be started for management of cucumber beetles. Attractants for trapping both the western spotted and western striped cucumber beetles are available as Cidetrak from Trece. Trapping has previously been reported to be useful in reducing damage to melons but many growers have no experience with this pest control strategy for cucumber beetles. Cidetrak will be used in bait traps for monitoring of the pests. The project also looks to evaluate spinosad (Success or Entrust) in a combination spray with Cidetrak for a control option.

How does this activity reduce pesticide risk?

The research team hopes to show that trapping of cucumber beetles is an effective monitoring technique, and that the attractant added to the reduced risk material spinosad offers effective control of the pest. If successful, this control strategy could be used instead of combination sprays that may include organophosphates.

How will you measure the risk reduction gained from this activity?

If the research team is successful in identifying a reduced risk alternative to category one materials for control of cucumber beetles, a review of the state's pesticide usage reporting system would identify use patterns across upcoming years.

Activity 4

Research continues into alternative insecticide baits for darkling ground beetle (Blapstinus spp.). The project looks to identify alternatives to carbamates (carbaryl) and the organophosphate Diazinon that have been used for control of soil-borne insects.

How does this activity reduce pesticide risk?

The research work continues with attempts to refine the bait formulations to increase attractiveness while also identifying materials with favorable mammalian, environmental, and toxicological profiles needed for registration of new insecticides in California.

How will you measure the risk reduction gained from this activity?

The development of alternatives for carbaryl and diazinon has been a priority for the melon industry for several years. If the materials lose registration due to the FQPA review, growers would face mounting losses due to soil-borne insects. If the project is successful in developing alternatives, a reduction in the use of carbaryl and diazinon would be seen in the state's pesticide usage reporting system.

Activity 5

Although preplant fumigation is efficacious in reducing the population of pathogens in soil, it is costly and only used by growers using drip irrigation. With the recent interest in the use of solarization to control weeds in the melon production region of the low desert, an integrated solarization/chemical strategy may be able to provide an alternative to chloropicrin applications.

How does this activity reduce pesticide risk?

A new project has been started to evaluate the effect of solarization combined with Basamid G (dazomet) to control melon diseases caused by Monosporascus cannonballus and Macrophomia phaseolina. Solarized treatments would be covered with a clear plastic film left on the melon
beds for 30 days during the hot summer days of mid to late July.

How will you measure the risk reduction gained from this activity?

Fumigants are known to reduce but not eliminate pathogen populations in soil. Under favorable conditions, pathogen density eventually increases to
damaging levels which necessitates reapplication of fumigants. An alternative strategy using solarization would be able to reduce the amount
of fumigants used. This could be verified by checking the state's pesticide usage reporting system.

Activity 6

While the nematode research team waits for news of a new formulation for the abamectin seed treatment from Syngenta for root knot nematode control (2005 Activity 3), another control strategy has been started in 2006. A product named MicroLife Plus will be evaluated as it reportedly increases the chitinase activity in the soil environment. Because the eggshell of nematodes contains chitin, it is believed that the destruction of protective nematode eggshells would result in the prevention of further egg development and hatching. The active ingredients of the material are listed as natural and extracted poly-D-glucosamines of varying degrees of polymerization of N-acetyl compositions and amino acids. MicroLife Plus inactive ingredients include nitrate, sulfate, phosphate macronutrients, micronutrients, and water as a carrier.

How does this activity reduce pesticide risk?

Management of root knot nematodes in California melon production has been based on broad spectrum fumigants and soil-applied nematicides. MicroLife Plus may be able to control nematodes as an alternative biologically based product with low mammalian toxicity. MicroLife Plus is currently not registered in California for use in melons but the procedure to obtain a California registration for melons has been initiated.

How will you measure the risk reduction gained from this activity?

No immediate reduction in the use of broad spectrum fumigants and soil-applied nematicides would be expected until California registration of MicroLife Plus for use with melons was achieved. Trials in California have already been performed with grape, carrot, and tomato crops with favorable results reported. Thus, this activity is a longer term project and a single season of research work can not provide for measurement of reduced risk. But the project does show the commitment of the melon industry to reduced risk projects that offer potential benefits.