

Putting Biopesticides to Work in the Field

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Today's PCAs need to provide growers with viable pesticide alternatives, resistant pest management and early-entry harvest solutions with low-to-zero pesticide residues for market flexibility and export accessibility. Biopesticides help us meet those challenges on conventionally grown acres, as well as organic. More than 90 percent of biopesticide usage is on conventionally produced crops.

As the crop protection industry loses certain chemistries that we've always relied on to control insects and pathogens, we still need to protect the crop. The biopesticide industry has provided products to fill that void both with efficacy, safety and ultimately profitability.

Biopesticides help Hector Mariscal do a better job for his clients. Mariscal is the PCA/CCA owner and operator of Devan, Inc. His company protects caneberrys and strawberries in the Salinas and Watsonville production areas for both conventional and organic operations.

"Biopesticides are a key component in our ever-growing requirements to comply with laws and regulations that protect cities, counties, schools and the environment," Mariscal says. Additionally, biopesticides help him provide his grower customers with export flexibility, safety, tank-mixing flexibility and are an element in overall good crop health.

Export Flexibility

"One of the main reasons we use them," Mariscal says, "is that they don't limit export shipments to key, strategic places around the world."

A maximum residue level (MRL) is the level of pesticide residue that is legally allowed in or on food or feed by an importing country. Most biopesticides are residue exempt, therefore their use does not increase the residue tally. This makes the crops they treat available for export to more countries. The result is more marketplace flexibility for growers.

ACTIVE INGREDIENTS From Nature to Your Fields

Biological Plant Activator

Bacillus mycooides isolate J

Biolarvicides

Bacillus thuringiensis var. *aizawai*

Bacillus thuringiensis var. *kurstaki*

Bacillus thuringiensis var. *tenebrionis*

Bioinsectide

Isaria fumosorosea Apopka strain 97

Insect Growth Regulator

Azadirachtin

Insecticidal Viruses

Cydia pomonella GV

Helicoverpa zea NPV

Cydia pomonella CpGV

Insecticidal Soap

Potassium salts of fatty acids

Insecticidal Baits

Spinosad

Iron phosphate

Biofungicides

Bacillus amyloliquefaciens

Polyoxin D zinc salt

Gliocladium virens

Clarified hydrophobic extract of neem oil

Nematicide

Paecilomyces lilacinus

Bioherbicide

Ammoniated soap of fatty acids



Gina Colfer, PCA/CCA and key account manager for organics for Wilbur-Ellis in Salinas, agrees. “Most biopesticides have a four-hour reentry interval and a zero-day preharvest interval. If you have an issue close to harvest, you won’t have a problem with using a microbial too close to harvest. You don’t have to worry about MRLs.

“If you have a harvest foreman needing a close-to-harvest insecticide or fungicide, a biopesticide is a good option,” Colfer says.

Safety

Mariscal says it is important to him that biopesticides offer a high degree of safety for workers, growers and the environment.

Colfer says, “Most have caution signals, so they are the lowest in toxicity. Worker safety is first and foremost. For bees, they keep our pollinators safe, and also for our waterways. Some of our chemistries are under the gun for threatening our waterways.”

Plants, too, are safe when most biopesticides are used. “They are pretty safe for the plant,” explains Colfer, who points out that most biopesticides are not phytotoxic to crops.

Tank-Mix Flexibility

Mariscal believes that biopesticides are the ideal tank-mix partner. They can be used to extend

the control of pests during a season and help preserve the useful life of synthetic pesticides by helping to hold resistance at bay through the use of their unique mode of actions.

“When we have a long season, like 12 months,” Mariscal says, “we’re limited on the quantities or rates per acre of the pesticides we can use. We can introduce a biopesticide at a more frequent rate throughout the season to help us combat disease.”

Mariscal adds, “On conventional fields where I spray conventional materials for powdery mildew, I may not get full control. Biopesticides help us reduce the development of disease resistance.”

Biopesticides bring different and more complex modes of action to the table. There are a myriad of types of biopesticides, including beneficial bacteria, fungi, nematodes, protozoa, viruses and yeasts. These biological active ingredients use different modes of action that, when used in a tank mix with synthetic chemistries, can help delay the development of resistance. Biopesticide mode of actions are often multi-site and novel when compared to chemical mode of actions. They may include the release of metabolites to kill pathogens by disrupting cell membranes and cell walls (*Bacillus amyloliquefaciens*), activating induced resistance by the plant (*Bacillus mycooides* isolate J) or viral infection of a specific insect (*Cydia pomonella* granulovirus).

Using Biopesticides

Mariscal is a strong proponent of biopesticides, appreciating the additional tools they provide him. But he stresses the need to work with the materials: “You have to understand how the biopesticides work. Understand how they function and then you can strategically place them in your pest management programs.”

Mariscal educates his growers that using any pesticide on a preventive basis will be more cost-efficient and effective.

Colfer agrees: “You have to know your pest target when using these materials. It’s also important to use them as preventives rather than curatives. You don’t want the pest population to get so high that you are already behind when you introduce your microbial. If there’s a major outbreak, the microbials can’t catch up as well.

“Start early and then reapply in short intervals, say seven to 14 days to re-inoculate the leaves,” Colfer says. “Relative humidity is important. If it’s a dry environment, you might need a shorter interval.

“If used properly, they can be efficacious,” she says. “Timing is critical. Know your target pest. Do proper evaluations. And don’t give up on using them. It’s just a matter of finding out where their fit is in your programs.”

