

## FROM US TO YOU

## COMMENT

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**The Problem With Pesticides**

**A**GRICULTURAL pesticides... specifically those chemicals used to reduce pathogens that affect the productivity of our crop plants and animals are simultaneously a blessing and a curse. For the most part the pathogens attacked by these chemicals are even more varied than the crops they protect and include other plants (weeds), viruses, bacteria, fungi, mites, insects, birds, small and even large animals. Anything, in fact, that could potentially reduce the yield of the crop we want to protect.

In the United States, thousands and thousands of tons of these products are used annually to protect the food and the animals we eat, the foods that our food animals eat, and the fiber plants we use for clothing; a vast number of plant and animal products that we use and eat every day. We have designed our agricultural industry so that it could not function cost effectively if these chemicals were not an integral part of production. Without them our food supply would be significantly diminished and what there was would not be as good, as safe, as plentiful, as available or as inexpensive as what we now enjoy. Whether you agree with this philosophy or not we have allowed this to be made, and now we must lie in it. So it goes.

Of course some food and fiber plants are grown without the use of agricultural chemicals. Those organic food and fiber producers, sanctioned by a government agency, certainly aren't bothered by residues and recalls due to pesticide use or misuse. And fortunately even more food is produced by organically-minded individuals and corporations that, though not meeting every letter of the laws that govern these things, absolutely meet the good intentions, the spirit and the IPM guidelines of producing products that are raised chemical-free or nearly so. And each season these organic and nearly organic producers are increasing production at a feverish pace...often in

double digit percentages - but they are still only a small part of our daily bread, corn, cotton, vegetables, soybeans, sunflowers, pine trees, cattle feed and yes, even honey.

It is an interesting irony that chemicals designed to kill are an integral part of our lives.

Each year in the U.S. someone in the Department of Agriculture is charged with counting out the pounds of poison we use here. It approaches a billion pounds, a staggering amount when you think about it. But the amount of safe, clean food that is produced using those chemicals is even more staggering, and more profound. US farmers feed a lot of people here at home. And our fields and forests, animal pens and orchards produce more than we can use at home, letting us be net exporters of agricultural products. In fact, it is these very products that help keep our import deficit in check. Well, kind of anyway.

There is no question but that we are a productive land. This is due to government subsidies and other assistance programs, efficient mechanization, a large and fertile countryside, a sophisticated, yet practical agricultural education system, an ever increasing information resource using Federal, State and County Extension programs, the internet, National agricultural support organizations, global-sized multi-product agriculture corporations, and, of course a huge and profitable Agriculture-Chemical Complex.

It is this complex that influences our government from the highest position we have all the way down to the individual farmer spraying for weed control and trying to earn a living off the land. It is at once mystical and threatening, beguiling and necessary. It is evil and it is a god send, it is without doubt one of the most powerful industries in the global marketplace, controlling health care, lawn care, the productivity of farms and fields, and the very seeds which grow the plants they then sell their chemicals to protect. They own the food chain and we are but slaves bound within.

**Difficult to Quantify Pesticide-Honeybee Problems**

Because of the diverse geographic areas within the borders of the US, coupled with the nearly endless list of agricultural crops (both plant and animal) able to be grown here, categorizing any one problem with honeybees and pesticides is nearly impossible. Certainly the list of potential problems is longer than you can imagine... if there's a crop, there are several chemicals available to protect it from its many pests.

Moreover, the cropping practices within individual states or even areas as small as counties are constantly evolving as demand for certain crops changes (think of the decline in tobacco in the south eastern part of the US, and the increase in almonds on the west coast). So with crop changes there are pesticide changes...sometimes rapidly, sometimes ever so slowly. Cotton is probably the best example of this. It was once THE crop, King Cotton it was called. But The King had more pesticides per acre applied to protect it from the legions of its particular pests than any three or four crops grown in the US. But with new IPM techniques, protective genetic engineering now in full force, plus the success of the boll weevil eradication program, cotton has almost become the beekeeper's friend rather than the killing fields it once was. It again is a source of honey and serves as a good place to keep bees and make honey.

**Consumers Change Too**

Another component of the honeybee/pesticide picture is the changing climate regarding the consumer's attitude toward pesticides in general, and specifically those used in food production and around the home. The dramatic rise in demand for organic, and organically-produced crops speaks volumes about what people want, and don't want to eat.

Additionally, there is the government's view of which pesticides will continue to be used, and on what crops existing pesticides

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should be used. Shifting at glacial speed from the once-common organochlorides and organophosphates that are environmentally unfriendly to more specific, short term and apparently less toxic products has been at once instituted by, and then equally hampered by the very government agency charged with these tasks, our Environmental Protection Agency.

To all this add the acute situations in very localized areas where specific agricultural crops are threatened by new pests (think 'greening' in Florida citrus, or the 'Brown Apple Moth' in California's orchards). Then emergency protection is required to save a crop or to destroy a small infestation of a newly introduced pest. When this occurs, too often other crops, pollinator insects and even, sometimes, peoples' safety takes second place in the voting.

Add to this the opposite, the always present problem of public health concerns... spraying for mosquitoes infested with West Nile virus or any of the many insect vectored diseases we humans are prone to. This, too, always take precedence...people are more important than...well, than almost anything else, sometimes. These situations are routine in some parts of the country where seasonal mosquito problems occur with predictable regularity and controls are just as routine. But there are often emergencies in other places, when, for instance whole counties are flooded after spring rains and mosquitoes become even more of a nuisance than normal because of the many breeding pools left behind receding flood waters. Emergency sprays are necessary...and honeybees are again second on the list.

Add to this list the many occasions that government intervention takes place to save government investments. Gypsy moth infestations are a good example; these moths will kill trees-trees in public areas, trees in areas where forest crops are harvested, and trees in private landscapes. Dead trees result in reduced value of the land, and public spraying saves that value, regardless of where the sprays go.

**Problems**

There are, of course chronic situations where honeybees (and thus beekeepers) and pesticides are in conflict. Interestingly these problems often occur on crops that have chronic problems in one part of the country but are not a problem at all in other places. Field corn is the classic example. In some of the plains states lethal exposure to pesticides applied to field corn during bloom when bees are foraging is the norm, and has been for

decades. There, corn has been a high value crop and pest pressure is severe. Chemical protection was financially feasible and exposure to these chemicals by honeybees was a given. Support from those directed to protect people and beneficial insects from the misuse of these chemicals was minimal because beekeepers were few in number and unorganized in their protests. And, as most beekeepers know, proving who did what, when, was difficult, if not impossible even under ideal circumstances, let alone when the officials in charge turned a blind eye to the problem.

The solution? Beekeepers have moved out. There are very few commercial, or even sideline beekeepers in that part of the corn belt in the US because placing bees there is essentially suicide...or some might say murder.

In other parts of the country, where corn is not a high value crop, problems occur less often, but occasional outbreaks of pests happen, new farming techniques spring up, and beekeepers occasionally take a hit. Now, however, with the value of corn increasing on an almost daily basis due to the ethanol foolishness, encountering pesticide sprays on these crops may become more common, and, as always, beekeepers should be aware of what their neighbors are doing.

Almost anywhere sweet corn is produced there are encounters of the deadly kind with bees and sprays. Sweet corn, strictly raised for human consumption, generally has a no-tolerance limit for corn earworms. Few things will reduce sales in the grocery store as fast as a bin full of wormy corn. And corn earworm must, yes must be treated exactly when corn is in bloom which is when honeybees are sometimes present. Well, they are present if there is nothing else in bloom nearby, and corn is it for a pollen source. That happens some years and lots of bees can die, and some years it isn't a problem at all.

Sweet corn sprays can safely be applied late in the day because bees visit during the early morning hours before the pollen is finished dehiscing. But generally honeybees and sweet corn are a problem waiting to happen no matter where the corn is grown. Making this even harder to control is the fact that much of the sweet corn produced is not grown on easy-to-find huge-acre farms but rather in small farm-market stands of only a very few acres. These are nearly invisible and a misapplied spray is nearly impossible to track down. Of course a small plot of corn only attracts a small number of bees, so generally only one individual is affected. A single voice in the middle of a corn field is seldom heard.

Another occasional problem arises when the use of the chemical changes. For instance, many chemicals are initially tested and approved for a particular use on a specific crop if no honey bee problems show up. However, if one of the variables initially tested for changes, honeybee problems may arise. One situation worth noting is the type of granular or foliar-applied insecticide applied on citrus trees that is absorbed by the tree giving it protection from any insect that tries to feed on it. This systemic action is great for a grower and generally safe and sane for the environment. That is, until it is used for a new pest and it is applied at a different time of the season, before the plant blooms. Then it is found that the insecticide makes its way to the nectar of the plant... threatening the honeybees that are feeding there.

This is the case with some of the pesticides used to control the insect that spreads greening disease in citrus in the US. What was once a viable and profitable crop for beekeepers overwintering in Florida – orange blossom honey – is so no longer, and in fact has become a toxic lunch for bees. It is, however, legal to use because the label says it is not illegal to use in the manner suggested. This paradox is not uncommon with pesticides and crops when new pests or new crops come along. Sometimes the label can be changed and sometimes not. Beekeepers and their bees lose in either case.

**Speaking of labels.**

There has been a concerted effort on the part of some pesticide manufacturers and their representative organizations to change the basic label language that protects honeybees from their products. The worst case scenario that has been suggested is that the specific protective language on pesticide labels...that is, 'do not apply when bees are foraging'...be changed to essentially a 'suggestion', rather than a law. This has met, obviously, with extreme (but perhaps not enough) resistance from the beekeeping industry, and slowly from other groups who finally have seen the responsibility-creep that this would imply. The basic tenet of our pesticide label regulations is that bees should not be sprayed. But local state officials, who have the responsibility of enforcing these federal laws, have made sausage of these laws to protect not the bees, but the applicators spraying their crops, whether or not bees are present.

A case in point is the law in the state of Ohio. There, an apiary must have a sign posted naming the owner of the bees

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and a contact phone number, and the bees must be registered with the Department of Agriculture. If not, you can spray to your heart's content and kill all the bees you want because the beekeeper broke the law... not the applicator. And, have you ever seen a hollow tree containing a colony of bees with someone's name on it? Ohio farmers are free to kill all the pollinators they want, whenever they want, unless the pollinators have name tags. Other states have equally absurd laws that allow spraying any crop any time no matter how many bees are present. It is clear who has the legislative support for agriculture, at least in Ohio.

Equally obtuse is the support given to beekeepers that have had their bees illegally sprayed and killed by an agricultural pesticide. Bees are of low priority in the ag system and when a complaint is filed in most states (some are quite good at applying justice, however), it is met with resistance to do anything at all, to outright hostility toward the beekeeper for taking time away from the real work needing to be done. Needless to say, after only a very few encounters with this sort of enforcement most beekeepers move their bees, or at best, pick up the pieces and try and start over.

There have been some spectacular cases where a beekeeper has persevered and actually won a case such as this in court. They are so rare that they are legend, and they serve two warnings. The first of course is that given enough drive a beekeeper can and will triumph because the law is actually on his side. The second is somewhat darker - maybe sinister is a better word - when beekeepers win a case like this, selective and secretive enforcement of other laws will follow. Payback can be dear when it comes from the government.

On the rare occasions where an applicator is actually found guilty of harming honeybees in violation of label laws, a wide range

of sanctions and punishments can occur. Generally, a warning is first given; no matter how many bees have died, the cost to the beekeeper, or the seriousness of the action. A second violation often draws a fine, unless a human has been injured, again regardless of the bees. The beekeeper has some latitude in that there is action that can be taken in a civil court, rather than in a criminal court, but if the proper samples weren't taken according to the chain of custody and a bazillion of other technical and legal things...the likelihood of winning is slim...it happens, but not often.

### The Neonics

Which brings us to the newest way to kill insects, the neonicotinoids. This family of chemicals became popular beginning in the early 1990's, right about the time that EPA began phasing out the older, harsher chemicals in use, mentioned earlier. This group, in general, is the devil's own companion when it comes to killing bees.

Maryann Frazier, the Senior Extension Associate at Penn State, who has been involved in the ongoing Colony Collapse Disorder study here in the states has studied these chemicals and I summarize here her findings:

The EPA identifies both imidacloprid and colthianidin (both neonicotinoids) as highly toxic to honey bees because when applied to plants they are translocated to both pollen and nectar. This can be lethal to larvae and can affect reproduction of the queen. Enzyme activity is compromised, olfaction memory is too, and behavioral effects are reported on motor activity that impact navigation and orientation and feeding. They can also impair the memory and brain metabolism of bees.

Sunflower and corn seeds treated with these chemicals have levels high enough to pose a threat to honey bees.

In addition, says Frazier, there is concern about the practice of combining certain insecticides and fungicides because when that occurs the toxicity of the neonic increases over 1,000 fold, in lab studies.

Additional studies are pointing toward the belief that once applied to plants, these chemicals remain in the soil for several seasons, and there may be bioaccumulation in next season's plants. Pumpkins, when planted on ground that last season held sweet corn treated with these chemicals had three to four times the level of chemical in their tissues that they should have had after being treated only once.

The list of sins arising from these chemicals continues to grow, and is either not being investigated, or investigations have only now just begun.

### What can beekeepers do?

Practically every university entomology department that has anything to do with honeybees has published a document on how to protect honeybees from pesticides. They are all about the same. I'm sure you have read one sometime in the past. They all have a list of chemicals as long as your arm relating their toxicity to bees and humans, and they all tell you how to protect your bees by moving them, by covering them, by feeding them, by closing the front door, by pouring water all over them, by .... the list goes on and on.

The trouble is just that, however: We have to protect our bees from applications of pesticides, when labels quite plainly state that bees should not be sprayed. What's wrong with this picture? What am I missing?

Personally, I think there should be a manual on protecting spray applicators from irate beekeepers that have had their bees sprayed.

What do you think?