Nov/Dec 2004

Guaranteeing Pure Honey

On December 2nd and 3rd, the National Honey Board (NHB) sponsored an "Industry Roundtable" on ways to ensure that honey provided to consumers is pure. Much of the program dealt with types of economic adulteration and accidental contamination, as the bees conducted their business inside and outside the hive.

The first thing that has to be accomplished is to develop a set of criteria that define what pure honey is. A committee of the NHB developed a "Standard of Identity" for U.S. honey and sent it to U.S. Food and Drug Administration (FDA) for review. A response was not forthcoming.

At the Roundtable, a couple speakers from outside our industry related their experiences with trying to get standards adopted by the federal government. Briefly, the government has no desire to set any new standards. In fact, they are trying to eliminate the current standards, when the opportunities arise. This may be due to the fact that many imports are supposed to be monitored as they come into the country. When new standards are developed, they tend to require elaborate, expensive testing with state-of-the-art instrumentation. FDA feels that it can not keep up, especially financially.

So, if new standards are not apt to be adopted, what other choice is available? For years the Europeans have included the standards for many products in their Codex Alimentarius. The European Union now uses those criteria for allowing, or not allowing, honey to be imported. Exporters from the U.S. have battled those criteria for years, because much of our honey, right out of the comb cells, does not meet their

criteria. The glaring example is their tolerance for hydroxymethylfurfural (HMF). HMF develops naturally in liquid suspensions of fructose, like honey. Heat accelerates the process. Frequently, our honey is rejected for too much HMF, and we are chastised for "heating" our honey. However, one has to remember that the criteria came from countries where 90 degrees Fahrenheit caused drastic loss of lives, buckled roads, etc. not long ago. Honey in the combs in California sits in hives where the outside temperatures can reach 110-120 degrees for weeks on end. So, it is not surprising that the HMF levels will be elevated compared to honeys of more northern latitudes. Does that mean that we "cooked" our honey or used excessive heat during processing? No, it simply means that pure honey can have naturally occurring levels of HMF that exceed the Codex standards. Codex standards can be changed, but usually not to the detriment of the countries they are protecting.

As a result of the Roundtable discussions, an attempt will be made to adopt most of the Codex criteria for honey and use them as U.S. standards of purity. This approach is much more likely to be accepted by the federal government, since the U.S. wishes to pursue their "globalization" effort under Article III of the General Agreement on Tariff and Trade (GATT).

It seems that as fast as we can develop new tests to demonstrate economic adulterants in honey, others find new adulterants that escape detection. The most recent attempt to make money on "funny honey" was to try to sell maltose as honey. Although it passes the carbon ratio test, and the other tests that we use for adulteration, it is very viscous and doesn't taste like honey. And, as I mentioned in an earlier newsletter, "agave nectar" is promoted as doing all things that honey can, but better, being about 90% or more fructose in solution. Another sweetener that bears watching is Likewise® Honey Product, a blend of honey and non-honey sweeteners meant to substitute for honey. According to Cargill North America's Web information, this … "unique honey product matches the sweetness, taste, color and mouthfeel of USDA Grade A Honey. This affordable alternative offers a 1:1 replacement and can easily be substituted in existing products. It can also be used in new or reformulated products to get the same great taste of honey while ensuring formulation competitiveness."

As for contamination, I was asked to prepare a short topic for discussion. I don't need to go into detail, here, but honey bees perform their duties in two environments – inside and outside the hive. Being little flying dust mops, they tend to bring into the hive whatever is around them outdoors. That includes bacterial and fungal spores. Researchers in Europe recently cultured about a half dozen species of spore-forming, soil inhabiting *Bacillus* from many samples of honey. They didn't look for anaerobes in their samples. The genus *Clostridium* is nearly identical to *Bacillus* in every way except that the vegetative stage cannot grow in the presence of oxygen. So, there may have been another half dozen bacterial species in their samples.

The foraging environment of honey bees may be contaminated with industrial pollutants, residues of agricultural pesticides, hydrocarbon emissions from vehicles, or pollens from genetically modified (GM) plants, such as canola, corn, soybeans, or cotton. Even naturally occurring toxins can be found in plants visited by honey bees in California: California buckeye, corn lily, death camas and locoweed.

Inside the hive, we are responsible for providing the bees with various carbohydrate and protein feeds, antibiotics, and mite control materials. With today's abilities to extract and identify chemicals in the parts per trillion (nearly molecules per drum), in some cases, it is hard to imagine that any honey produced in regions with high human populations (like California) will not reflect the presence of contaminants in our environment.

The Roundtable would have been an exercise in futility had it just been an airing of concerns. However, the sponsors forced the issue, and a number of assignments were delegated to various participants to try to accomplish the goals that were prioritized. One committee will be working on developing guidelines for the producer (beekeeper) to try to keep contamination minimal from the hive to the barrels. From there, a second group will be working on keeping honey pure as it is processed, blended, and packed. A third group is going to work on seeing if we can "co-opt" the Codex criteria and use it for U.S. honeys. Another group is going to request that, when the word "Honey" is used in the brand name of a product, the % of honey in the product be listed on the FRONT PANEL of the packaging.

The time deadlines for a few of these efforts are very short. The Honey Board is hoping to have a draft document prepared on the Codex issue in time for it to be reviewed by the beekeepers at the American Honey Producers Association and American Beekeeping Federation conventions in very early January. It will take a combined thrust by both of those two organizations to get the attention of Congress.

Another issue that will be coming to the two major commercial beekeeping groups for consideration will be a proposed letter from the Roundtable participants, written by Bob Coyle (already "in the loop"), to the U.S. Department of Commerce requesting that they meet with the Chinese Ministry of Commerce to transition from the current anti-dumping order to a new bi-lateral agreement. The current problem is that the price of imported honey is allowed to be adjusted, based on the price of current sales. The price is allowed to be a % of the past average. Each time a shipment enters at the minimum price, the average is adjusted downward. Imported honey is down in the 50-60 cent range and continuing to go decline. A bi-lateral agreement would fix the price of honey at an agreed upon amount, for a number of years.

News on Tylosin

While we were at the Roundtable meeting, we were informed that Elanco, the producer of tylosin, will be submitting the paperwork shortly for registration of Tylan® for use in honey beehives. Mann Lake Ltd. will be selling the product in bulk and in tea bag-like individual packets. Mann Lake will not be the sole source of the product.

When Elanco is given permission to sell the product for use in beehives, there will be a tolerance established, for tylosin in honey, only in the United States. Remember that the antibiotic will be registered only for therapeutic use (after you see the disease signs) and for use only in "dust" formulations. Yes, tylosin is very stable in syrup. And, yes, if you feed it to your bees in syrup you will very likely exceed the tolerance level in your honey crop. Believe me; they are going to be looking for that substance in honey.

More from Past WAS Conference

Jim Bach, former state apiarist in Washington State, shared a few comments on what you see in the field with

honey bee kills due to insecticides. If the chemical is toxic to foraging bees, dead bees accumulating around the hive on the ground are apt to be older bees, with noticeably ragged trailing edges on their wings. They tend to accumulate in front and somewhat to the sides of hive entrances. If tracheal mites are the problem, dead and dying bees tend to be scattered much further, with some occurring behind the hives. If the bees on the ground are young bees, then you have to take a serious look at the pollen stores. Lack of pollens can result in starving young bees dying in front of the hives. Besides dead bees "out front," poisoned bees tend to be disorganized, form "patches" of clustered bees inside and outside the hives, and often there are dead bees clustered around the edges of outside combs. Bees dying with their "tongues sticking out" are not a very good diagnostic sign of poisoning. Dan Mayer said that in his experience 20-40% of naturally dying bees do so with their tongues stuck out. In Washington, there has to be an estimated loss of at least $1,000, or at least a pint of bees per colony, before the state feels that an analysis is justified. [Author's note: Our experience with a bee kill, at our "control" location in a pesticide study, demonstrated that a light (handful) kill of bees in front of the hive equated to four frames of bees missing during a thorough hive examination. With 2,000 bees per frame, we lost about 8,000 bees and that might have been a pint, if we could have found them all.]

Edith Ladurner, a scientist at the USDA ARS bee lab in Tucson, spoke on the topic "Improved Methods for Evaluating Pesticide Effects on Solitary and Social Bees." Laboratory tests were conducted in "natural flowers." They weren't quite natural, however, because the centers of the flowers had been replaced with narrow tubes containing sugar syrup laced with various concentrations of different fungicides. Honey bees were really easy to train to artificial flowers, like plastic 35mm film canisters or glass vials with capillary tubes protruding into them. However, solitary pollinators, like *Osmia lignaria* (the blue orchard bee) wanted nothing to do with the fakes, even when they were surrounded with painted petals, had scents added to the syrups, etc. Captan fed bees regurgitated for a number of days after treatment, and finally died. Trilogy® (neem oil) fed bees began showing negative effects 4-7 days after ingesting the chemical.

Field studies with various fungicides produced

some interesting effects. Orbit® and Rovral® temporarily reduced foraging on the crop, but eventually the bees came back. Captan and Benlate®, mixed, (Benlate is no longer on the market in the US) drove bees off the crop and they did not come back.

There was a time component to these studies, also. If the sprays were applied at night, *O. lignaria* was likely to cease foraging for a few days, then return to normal. If the sprays were applied in the morning, just before *O. lignaria* began foraging, they left the field, never to return.

A Note on Bears

Montana, like other mountainous regions of the West, raises a lot of bears, both brown (black) and grizzlies – the campus mascot. Being naturally attracted to nests of insects, effective bear fences are a must in this area. An invited speaker, as much cowboy as fence expert, shared his thoughts and experiences with bear fences. His most important message was that for a bear fence to be effective, it really has to pack a wallop. For that to be true, the fence needs a really good charger like the Gallagher from New Zealand with at least 0.7 joules. The amperage is more important than the voltage (less expensive US chargers tend to be higher in voltage, lower in amperage). With his system, the wire length doesn't matter. Obviously, there must be a good "ground" for the bear to stand on. On a dry site, Larry suggests welded wire panels for the ground. The fence, itself, should be six stranded to an upper height of 42 inches. Bears are a lot taller than that, but they come in on all fours and you want to zap them on the face. The fence posts should be fiberglass rods with holes drilled through them for the wires. Wood posts can be used in corners, only. Insulators will be cuffed by bears until the strands are down. Steel posts short out after the bears knock off the insulators. Weeds may short out the fence for a short while, but they become dehydrated by the discharges and wilt pretty quickly.

Honey Bee Olfaction

Andrew Durford, from England, showed pictures and explained how honey bees can be used in a box to detect odors – good or bad. Actually, the US federal government is very interested in a system that can detect odors of interest very quickly and extremely accurately with very little instrumentation, thus, the interest in this

"instrument." Inside the box are a pump to slowly draw an air sample over the enclosed bees, a camera that "watches" the heads of the bees and notices when the mouthparts are extended, and either a connection to a computer display or a connection to a lamp bulb that indicates a response. The bees are pre-trained to an odor of interest, strapped down in bee holders, and can be inserted or removed in "cassettes." They can remain immobilized for up to a week at a time, as long as they are fed sugar syrup, and they don't forget what they were trained to for four to five weeks, without reinforcement. Much of this information is available to you on an interesting Website: www.inscentinel.com. It takes a honey bee only about 15 minutes to learn the desired odor, but you have to be careful not to have any extraneous odors in the training area (like human scent). Honey bees can differentiate between various brands of whiskeys and vodkas, food quality (fresh *vs*. old strawberries), drugs, tobacco, explosives, etc.

It appears that, like dogs (that also have an unbelievably sensitive sense of smell), most honey bees can be trained to detect human diseases by smelling the breath of patients (cancers, lung disease, prostate, etc.). About one colony in 20 does not seem to have this ability. Jerry's lab has discovered that free-flying bees learn more quickly than restrained bees, but learning can be enhanced by various chemicals. After trying neurotransmitters with some positive results, they tried caffeine. Talk about a "buzz!" Bees learn and respond to trained odors much more strongly when "under the influence" of caffeine. Nicotine has the same sort of effects on humans. Maybe they will try nicotine on the bees, next.

Bee Masters Course

The 2005 Bee Masters Short Course is scheduled for Monday, February 28th, through Friday, March 4th, at Simon Fraser University, in Burnaby, British Columbia, Canada. Sponsored jointly by the British Columbia Ministry of Agriculture, Food and Fisheries, and Simon Fraser University, this is the 53rd meeting, every second year, of this intensive course in advanced beekeeping.

Participants are expected to have had experience keeping bees, but hobbyists, sideliners and commercial beekeepers all are invited to attend.

Session lecturers include: Rob Currie, University of Manitoba; Keith Delaplane,

Univ. of Georgia; Steve Pernal, Agriculture Canada; Tanya Pankiw, Texas A&M University; Mark Winston, Simon Fraser University; Paul van Westendorp, BC MAFF; and Margiet Dogterom, Crop Pollination Consultants; and many more.

For a program or Registration, contact Conferences Services, Simon Fraser University, Halpern Centre, 8888 University Drive, Burnaby, B.C., Canada V5A 1S6. Phone: (604) 291-4910 or 3012 – FAX (604) 291-3420. E-mail: conference_services@sfu.ca. Web site: www.sfu.ca/beemasters2005.

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