International Honey Market

by RON PHIPPS

This report reflects many themes presented at the annual convention of the American Honey Producers Association, as well as the important statement by the Congress of the World's Beekeepers (Apimondia) regarding the adulteration of honey.

The Plight of the Beekeepers

At the prelude to their new crop, Vietnamese beekeepers asked, "Please advise us regarding the market. Our beekeepers are afraid to invest any more money and keep losing their investment."

Canadian and U.S. beekeepers over the past year have lamented their difficulties to pay loans, threats of bankruptcy and the lack of incentive to produce honey. According to several reports, there are beekeepers in North America who still have unsold stocks from 2018 and 2019 crops. Any industry which de-incentivizes the producers of their crop is an industry which has entered a severe state of tension. Healthy and vigorous industries integrate the incentives to produce and to consume.

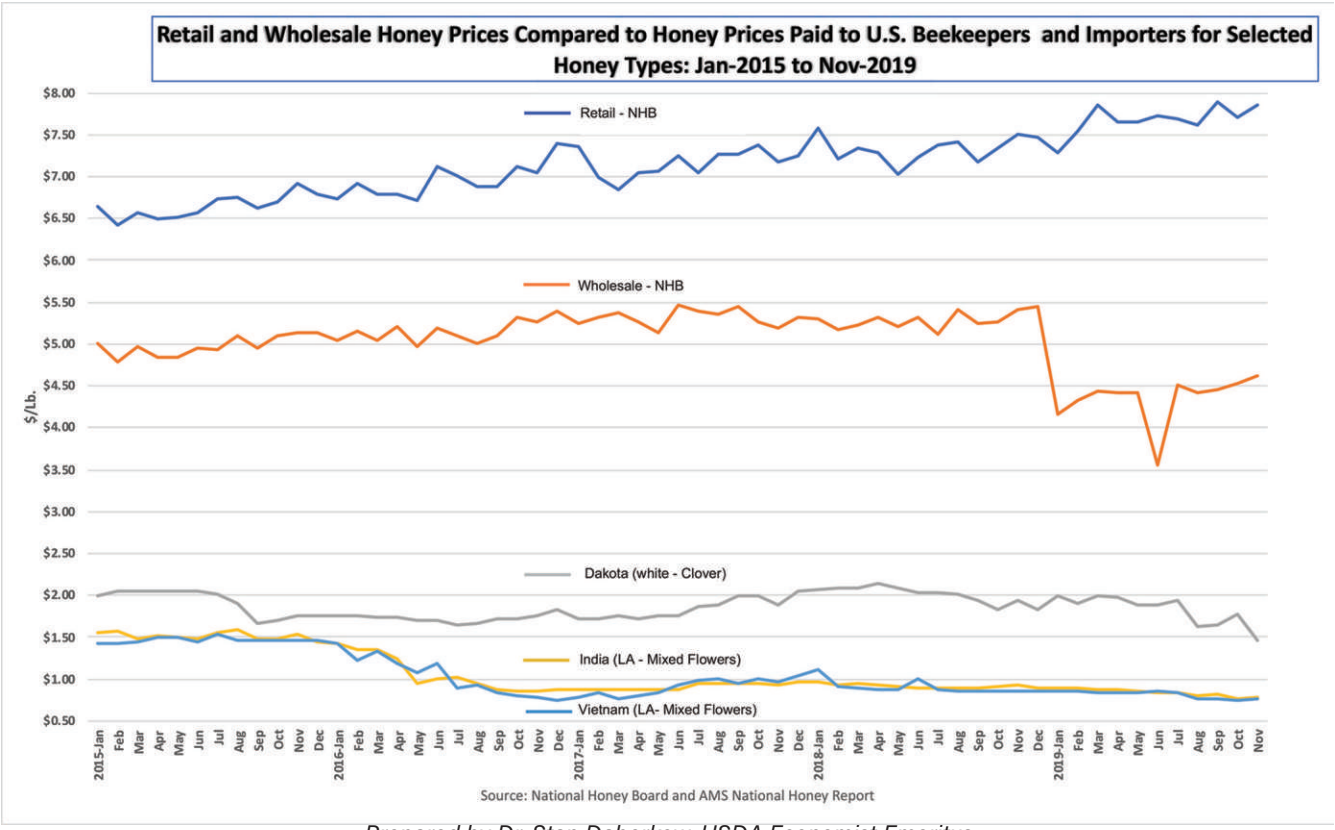
The fundamental cause of the dilemma facing beekeepers is the continuing collapse of honey prices. Condemning problems is not effective unless we understand the fundamental causes which create the crisis, making it possible to craft solutions which cure the problem and prevent its recurrence. The international honey industry is distorted by the emergence of huge quantities of adulterated honey with which authentic honey cannot compete. Modern modes of illicit production have created a situation in which there are no ceilings to quantities and no floors to prices.

Report to Apimondia, 2019, by Federico Berron, Honey Authenticity Project

Studies of Honey Samples

The manifestations of honey fraud include a study presented at Apimondia in 2019 by Federico Beron of samples taken at retail from around the world which failed to pass adulteration tests. The conclusion of the report was that up to ⅓ of honey showed indications of adulteration.

In July 2019, the Canadian government released results of a study indicating that 22% of the 244 honey samples pulled from retail, wholesale and bulk stocks were adulterated. The traditional Carbon Isotope test for cane and corn sugars and the Nuclear Magnetic Resonance (NMR) testing for authenticity were both used. The countries of origin of the adulterated products were outside Canada. It is important to note that exports from five of these countries constitute about half of the imports to the USA. This was the first official report, to our knowledge, in which



Prepared by Dr. Stan Daberkow, USDA Economist Emeritus

NMR testing, based on the Bruker database of 19,000 samples, was used.

Trends in Honey Prices in the U.S.

The growing gap between retail and wholesale honey prices has been analyzed by Dr. Stan Daberkow, Economist (USDA, retired), in the above chart.

Given the steep and relentless price drops that have resulted from market manipulation and adulteration, there are reports of potential antidumping lawsuits of either a global scope or a more targeted focus on the sources of the largest quantities and lowest prices. Some lawyers have argued that the conditions are ripe, since the data is overwhelmingly favorable.

From a broader perspective, there is debate among lawyers about whether the issue is the dumping or adulteration of honey. This is an interesting and relevant point, due to the fact that modern modes of adulteration of honey allow for huge quantities with extremely low costs of production. Therefore, the fundamental question may not be selling below the cost of production but rather food fraud in selling products that are mislabeled. To enter into the country and into commerce products which are not authentic honey, and label them as honey, is an example of customs and food fraud.

Consumption of honey in the U.S. has increased by almost 50% in the past 20 years, from about 400,000,000 pounds to about 600,000,000 pounds per year. The variety of ways in which honey is used has also increased. The total value of global honey exports reached the range of $2 Billion in 2018, despite the collapse of honey prices during the past three years. Consumer perception of the benefits of authentic honey is the basis of the increase in consumption. There has never been a greater awareness of the importance of bees to society, global food security and environmental sustainability than there is today. Nor has there ever been greater concern with food authenticity. Bees are the subject of global empathy. The plight of bees is of deep concern, including to new generations of consumers.

At the same time, the vulnerabilities of bees and the cost of keeping bees healthy and vigorous have never been greater. For numerous reasons, the productivity per hive has reduced. With increasing demand, increasing cost of production, and declining productivity, the laws of economics imply that international honey prices would have increased dramatically. The opposite is the case.

This is true for both conventional and organic honey. In 2019, the consumption of organic honey at retail increased by 7.8% compared to a loss of 3.7% for non-organic honey according to the Nielsen Scantrak report to the National Honey Board. Concurrently, the import price of organic honey has fallen by 50%. Over the past five years, retail sales of organic honey grew by 12.5%. The laws of economics suggest that the price of organic honey should be much greater than it currently is. The anomaly is further illustrated by the fact that the price of conventional honey has ironically with some frequency been higher than the price of organic honey, despite such facts that in the U.S. only 1% of agricultural land is certifiable as organic.

The only explanation for this vexing anomaly is found in the prevalence of adulterated honey in the international market, which artificially increases supply of products which are fraudulently marketed as honey, and with which authentic high quality honey cannot compete.

The Struggle Against Food Fraud

During the past four years, the battle to overcome food fraud and attain food authenticity has strengthened. Apimondia is finalizing a formal statement on Adulteration of Honey.

This statement will be formulated with the expertise of the beekeeping community from five continents, and will be published in four languages.

The starting point of Apimondia's important statement is that honey is an historic product, resulting from the complete interaction of botanical and zoological life. That interaction transforms nectar into honey, with its rich and diverse chemical profiles and complex composition. The production of honey through evolutionary history has involved the transformation by bees of nectar and other botanical secretions. Honey is not nectar. The attributes of honey depend upon the completed interactions of botanical and zoological life. The production of honey by bees is biochemically designed to preserve the quality of honey and its stability as a food supply for bees during periods when blossoms and nectar are not available. These natural processes cannot be circumvented.

The Apimondia statement is a result of extensive observation of beekeeping practices and methods of adulteration which have taken center stage during recent decades. Those methods include extraction of immature, unripened pseudo honey which lacks the chemical profile of genuine honey, the use of resin technology, and the blending of bio-engineered sweeteners including C3 and C4 sugars (beet, rice, sugar, cane, corn, etc.), and false labeling of floral sources and/or geographic origin. The Apimondia statement recognizes that adulteration is very fluid as the fraudsters continually seek to elude detection. This requires staying ahead of the game and using multiple sophisticated tools for detection of adulterated honey.

The U.S. Pharmacopeia is formulating a document regarding the demarcation between authentic and adulterated honey. The U.S. Department of Agriculture issued a Commercial Item Description (CID) for honey in late 2019.

All of these recent works are consistent with the mandate that underlies the U.S. FDA's honey research protocol, which I worked on with Dr. Samuel Page and others two decades ago. The goal of all these efforts is to create standards and analytic techniques which are strong rather than weak, comprehensive rather than narrow, relevant to the contemporary realities rather than archaic.

Of great significance, the United Nations Food and Agricultural Organization has entered the effort to prevent adulteration of honey. Professor Michael Roberts, distinguished Professor of Law at the Resnick Center for Food Law & Policy at the UCLA School of Law, has signed a memorandum with the UNFAO regarding global Food Fraud. He has also served as an adjunct of law at China's prestigious Renmin University. In that capacity he has been engaged in fighting food fraud within China itself. Laws concerning food fraud are evolving rapidly in national and international arenas.

The media, local beekeeping associations, consumer advocates, and the legal system have turned more attention to the adulteration of honey than has ever been seen in human history. This national and international coalition reflects the growing awareness of the imperative to defend food authenticity, global food security and ecological sustainability.

Professor Michael Roberts

Traceability

In the modern era of economically motivated adulteration (EMA) it has become clear that more rigorous and intrusive traceability regimes are necessary. Those regimes must include the multiple variables which influence the chemical profiles of authentic honey. Those variables include geographic origin, botanical origin, typical climatic conditions, specific weather patterns during production, methods of extraction, methods of processing, methods and conditions of storage, and moisture levels.

Step by step the science of honey authenticity is evolving so that a more thorough understanding of the conditions of production creates the opportunity to develop detailed chemical profiles of honey. With modern computerization it is relatively easy to have a wide range of complex profiles which can be wedded to rigorous traceability regimes. In agricultural products, such as wine, coffee, tea and honey, where there is immense and charming diversity, the above wedding is desirable. In fact, consumers' demand for local products and deeper understanding of the products they consume supports this scientific position. The evolution of more powerful methods to affirm authenticity can be integrated with global consumer demand for a more thorough and romantic understanding of the products they consume.

In the history of the fight against adulteration of honey, Dr. Jonathan White originally sought a particular number of the carbon isotope ratio to determine authentic honey from honey adulterated with corn or cane syrup. The White study was based on 100 samples, mainly submitted by American beekeepers. The second year, the same areas and floral sources were resampled, but the results, which were not published, were completely different. Dr. Joseph Bowden attributed that to the changed weather conditions, which were dry and sunny one year, and rainy and cloudy the other year. This change in conditions naturally affected the rate at which different carbon isotopes were fixed through photosynthetic processes. In dry years, sage honeys produce sugar profiles that inhibit crystallization. In rainy years, when wild sage bushes have many flowers in bloom, the sage honey is both darker and crystallizes more rapidly. We have discussed with scientists, including with the Bruker group, the need to use enhanced traceability and NMR to detect multiple illicit modes of adulteration and production.

Contractual Obligations

As retailers, manufacturers, food service, cosmetic and pharmaceutical industries become increasingly aware of the phenomena of food fraud and economically motivated adulteration, they have every right to demand of their suppliers the prohibition of illicit modes of production and adulteration, and include adequate testing using the most sophisticated modes of detection for adulteration.

There must be 1) sophisticated tools within the toolbox for detecting economically motivated adulteration and 2) those tools must be used, when possible, to investigate potentially multiple modes of adulteration which may be co-present. For example, NMR can detect nearly 40 parameters in the profile of honey. NMR is being developed in such a way that it can detect multiple modes of adulteration, making it the most powerful of methods. The honey industry is learning about the wide range of uses of NMR in juice, olive oil, wine, coffee, fish and other industries which are attaining global acceptance. What is not fully appreciated is that NMR profiles are lengthy, and Bruker, the holder of the world's biggest honey database, encourages that clients have access to all aspects of their reports.

Contractual obligations can include not only the use of all appropriate methods of detection, but the use of those methods to detect multiple modes of adulteration.

Industries Policing Themselves

Industries that are permeated by adulteration are notoriously incapable of effectively policing themselves. As data provided in previous reports have indicated, the wholesale price of honey has steadily risen while the prices of honey imports have severely collapsed. The growth in those gaps constitute the economic motivation in EMA, which is substantial.

This means that it is absolutely essential that attempts to combat adulteration and the harm it does to honest producers requires auditors which are totally independent, professional and who have absolute integrity. Industries which are targets of EMA cannot effectively determine 1) the questions asked, 2) the methods used to detect adulteration, and 3) what information to suppress or release.

At recent national meetings, beekeepers and other participants within the honey industry were shocked to hear those who had for the past five years disparaged advanced techniques such as Nuclear Magnetic Resonance testing suddenly embracing and applauding those techniques. The isolators had become isolated. Science and facts, observations and analysis, increasing cooperation among government, academic and private laboratories, and the sheer negative consequences of adulteration on the industry, have caused the colluding players to sing a different song. Foxes and farmers cannot cooperate to protect the chickens in the henhouse.

In the battle against EMA there are many tributaries which include: 1) collaboration between government, private, and academic laboratories, 2) beekeeping organizations actively addressing adulteration, 3) the media exposing the subterfuge, 4) the legal system addressing fraud the consequences of EMA, and 5) responsible members of the honey industry demanding a level and fair playing field, which are coming together in a mighty river which has the potential to sweep away adulteration.

Prof. Roberts' second White Paper, we point out, makes clear the growing interest by major retailers to avoid food fraud. Some major retailers have illustrated how much food in their supermarkets would be absent except for the pollination provided by bees.

At recent meetings of state beekeeping associations, there were very vivid examples described of the top down pressure from major retailers and industrial users of agricultural products. It is anticipated that such pressure will be brought to bear in solving the problem of economically motivated adulteration.

An Inflection Point

After a long period of steady price growth at retail, and steady prices on the wholesale level, both of which exist in contradiction to the collapse of prices experienced by beekeepers and exporters during the past three years, a potential inflection point has been reached. While retail prices remain steady, there has been a decline in wholesale prices for honey. The data covers a short time span and the explanation of the aberration is not clear. However, as a consequence of the Netflix documentary on honey adulteration, other media events, the allegations of adulteration in Canada, the U.K., Australia, the U.S., China and India and the extensive discussions during Apimondia and among U.S. beekeeping associations, U.S. retailers are becoming more aware of qualitative problems and the collapse of prices.

The good news is despite steady retail prices, demand for honey has been steady. At the same time, prices at farmer's markets, gourmet shops and other outlets outside the mass market have witnessed significant increases.

A growing concern has been that some regions that have been innovators for natural products have seen declines in honey consumption. Beekeepers and experts in the quality of honey attribute this to the decline in quality of honey and the ubiquitous presence of adulterated honey. Consumers will pay a high price for authentic high quality honey and will in fact increase consumption of high quality honey. The general hypothesis among beekeepers is that when honey becomes sold as a commodity indifferent to quality, consumption will inevitably decline.

At Apimondia's session on the Value of Bees, it was made clear that the benefits of honey depend upon the authenticity and the quality of honey.

Beekeepers in Australia provided a sobering report about the 120 fires which have engulfed the continent nation. New South Wales has declared a state of emergency and Victoria was declared a state of disaster. Beekeepers have been forced to travel as far as 1600 km in search of bee sites, and to move their bees from sites suffering the devastating fires. Safe havens have quickly turned into endangered zones, from which cattle and horses also have to be removed. Australian beekeepers have said that the devastation is so extensive and severe that Australia will not be able to produce any honey for the export market for at least a decade. That assessment is based upon the presumption that during that decade such devastating fires will not recur.

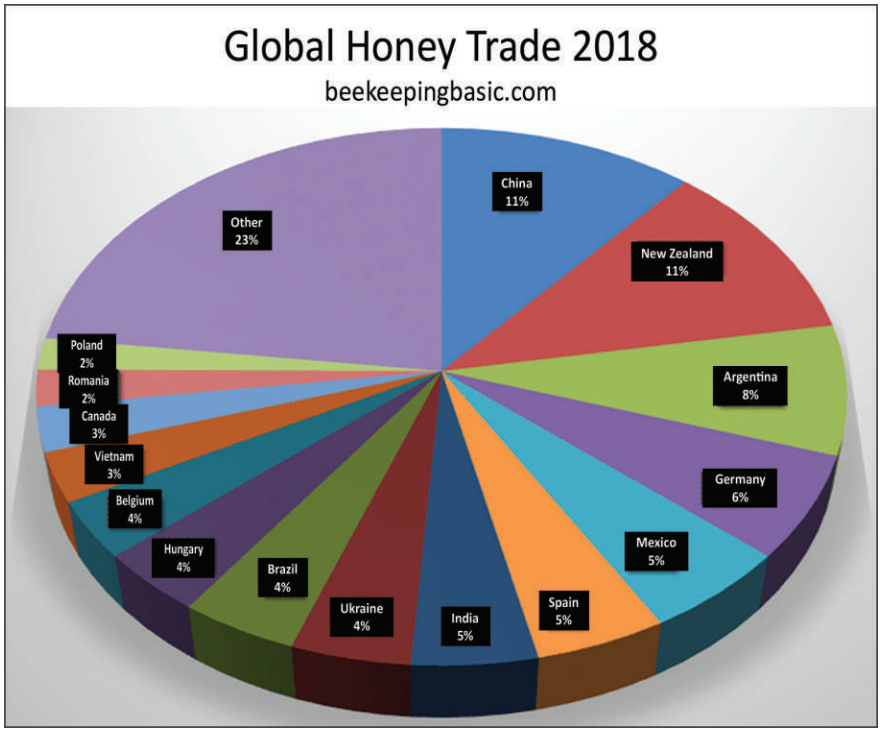
In the past, migratory beekeeping practices were guided by the succession of blooms. The current tragedies of Australia have given a new meaning to migratory beekeeping. The devastation in Australia was so severe and intense that a billion wild animals, excluding insects and pollinators, were destroyed. Scientists told us that the cries of animals were like the cries of Dante's Inferno. Jodie Goldsworthy of Beechworth Honey, Australia, the President of the Oceania section of Apimondia, poignantly describes the crisis to bees and their shepherds in a letter which is posted on the Apimondia website.

The health of any species, whether bees or humans, cannot be abstracted from the health of the Biosphere as a whole, including its botanical and zoological life. This concept I have introduced within a larger theory of "Integral Medicine."

Bret Adee shared an article in the Atlantic which indicated that the green revolution did produce more

food, but at the expense of the soil, which became depleted of organic matter, minerals and micro-organisms important to the health of bees. The re-introduction of soil organisms is now possible through biofertility products, a $500 million dollar industry.

It is becoming increasingly clear that the toxicity of the soil, water and air is directly linked with the decline in productivity of beehives. We see this phenomenon in countries with extremely experienced and disciplined beekeeping industries such as the U.S. and Argentina. It is also well known that India and China have many of the most toxic environmental conditions of any countries in the history of human civilization. It would stand to scientific reasoning to expect the same, if not even more severe declines in productivity per hive, in India and China.



HONEY MARKETS

Argentina

Recent reports from Argentina indicate that the majority of the preceding crop was sold, and availability is primarily for darker colors. Conditions for production are good but prices remain already depressed compared to three years past.

Brazil

Average import prices of Brazilian Organic honey have declined by 50% in the past two years from $2.09/lb. to $1.07/lb. The Brazilian real has declined relative to the U.S. dollar since early 2018.

Canada

The Canadian Honey Council did a beautiful job in hosting Apimondia, whose new President is Dr. Jeff Pettis of the U.S. Canada's exports reached about 12,000,000 pounds as of October 2019. The province of Alberta suffered a drop of 20% in their 2019 crop. The Canadian government is continuing a program to sample honey at different stages within the distribution channels, and in March of 2020 new results will be released.

India

A PTI news report from New Delhi on November 24, 2019, stated:

> The government has asked the Export Inspection Council (EIC) that comes under the Commerce Ministry to make NMR-testing mandatory for honey exported from India to ensure quality as part of its efforts to boost outward shipments.
>
> The NMR (Nuclear Magnetic Resonance) screening technique is used to test for adulterations and other manipulations. Industry experts believe that this test will ensure quality of honey and help exporters in getting a better price in the international market.
>
> According to representatives from the apiculture industry, the Agricultural and Processed Food Products Export Development Authority (APEDA) — which comes under the Commerce Ministry — had called a meeting of honey exporters on November 18, and a honey export body was set up.
>
> During the meeting, the participants had an unanimous view that the NMR testing should be made mandatory.

A National Bee Board executive member stated that due to adulterated honey, Indian honey prices dropped by about 50%. They anticipate that by testing their exported honey, their prices will increase by 25% or more.

The effectiveness of this change remains to be seen but it is worth noting that it emerged after 1) the Indian government found 100% of the honey at retail in India was adulterated, and 2) protests from Indian beekeepers that they cannot compete with the adulterated honey in the honey market. Let us be hopeful, but vigilant.

China

As is well known, the China model of production has been exported to many countries, principally, but not exclusively, in Asia. Some believe that it underlies the low prices that led to the successful U.S. antidumping order against Chinese honey, the phenomena of circumvention and customs fraud, including the legal event of Honeygate.

Upon reflection, China's disruption and depression of the international honey market is less about selling honey below the cost of production and more about selling adulterated honey, whose cost of production is very low. Some members of China's honey industry are beginning to see the imperative of producing authentic honey and abandoning an archaic model. As had been noted in other contexts, the Chinese themselves call the product they produce "water honey." Many beekeepers and members of the industry from around the world have witnessed the extraction of immature honey and its moisture reduction in huge modern factories with sophisticated systems of vacuum chambers. The problem is, water honey is not authentic honey.

Conclusion

Through discussions with the honey industries and exporters of

Ron Phipps, AHPA January 2020

low-priced honey to the U.S., it has become clear that modes of production and beekeeping practices can be adjusted. Key players in these honey exporting countries have said that they have no fundamental problem in producing fully ripened, mature honey. The problem is, if we do so, it will take much more time, the quantities will be much smaller, and the prices much higher than the prices which importers and packers demand. What is happening now in the international market, including the U.S. market, is that the demand is fundamentally shifting to authentic and pure honey, not its bland imitators. So many who have been victims of and or colluded with masters of market manipulation see clearly that there must be change.

The phenomenon of adulteration has been sustained through systems of "bribes and boycotts." The masters of market manipulation have lured many producers and exporters into the use of illicit modes of production, while the collusion of exporters, importers and end users has provided illicit economic benefit for some. The overall effect has been devastating to the sustainability of the international beekeeping community. The concerted efforts from American beekeepers, Apimondia and other groups are transforming the situation and creating hope that 2020 will be the commencement of a decade in which the fortune will belong to those who produce and creatively market authentic high-quality honey.

It is poetic that in the Dakotas, the world's premier producer of clover honey, is found Mount Rushmore, upon whose cliffs are found the faces of four U.S. presidents: Washington, Jefferson, Lincoln and Theodore Roosevelt. Teddy Roosevelt led the nation in creating anti-trust and anti-monopoly law, establishing the National Park System to protect and preserve the natural beauty of the nation, and creating the U.S. Food and Drug Administration to protect the purity, authenticity and safety of the nation's food and drug supply. Prof. Roberts, in his book "Food Law in the United States," recognizes TR's historic role in protecting the food supply.

That imperative has never been more urgent in our country and our world than it is now.

Mr. Phipps is President and founder of CPNA International, Ltd. He is a former member of the National Honey Board and Co-Chairman of the Committee for the Promotion of Honey and Health. He was a recipient of a National Science Foundation Fellowship in the Philosophy of Theoretical Physics. In 2017 he was appointed Vice President of the Apimondia Scientific Commission on Beekeeping Economy. He has worked with FDA to develop a research protocol for the global diversity of honey. e-mail: **info@cpnaglobal.com**