



INTERNATIONAL HONEY MARKET

by RON PHIPPS

From September 8-12, 2019, the World Beekeepers Congress met in Montreal. About 5,500 people participated, representing over 130 countries. The conference covered many subjects of importance to beekeepers ranging from bee health, market conditions, modes of production and apitherapy to identifying flavor profiles of honey varietals.

The burning issue of the collapse of honey prices due to various modes of adulteration was addressed more thoroughly, deeply and scientifically than ever before by Apimondia upon whose faculty I served with many distinguished and concerned colleagues. At the session on Detection and Prevention of Honey Fraud, scientific presentations were made by Prof. Stephen Schwarzsinger, Dr. Cord Luellmann, Dr. Christof Kunert, Dr. James Gawenis and others in a

session chaired by Prof. Norberto Garcia, President of the Scientific Commission on Beekeeping Economy. To everyone's surprise, mine included, the graph of honey export growth and the number of bee colonies was cited by several presenters from the honey testing laboratories. The fundamental dilemma facing the industry is captured by the contradiction, using United Nations data, among exploding exports of "honey," stable numbers of beehives and dramatic declines in productivity per hive.

The subsidiary contradiction is that honey prices have collapsed to historically low levels while the cost of production has substantially increased. As Dr. Stan Daberkow has said in other contexts, "As an economist, when the selling prices exceed the costs of production, the

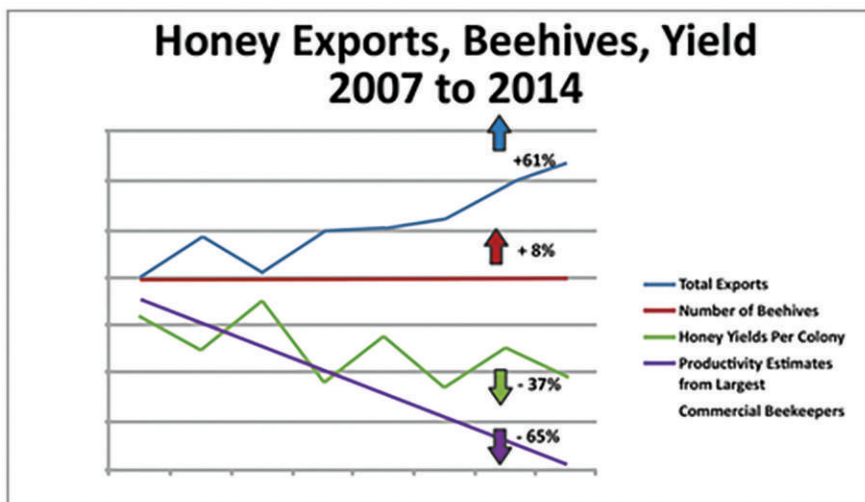
fundamental reality of adulteration is manifest."

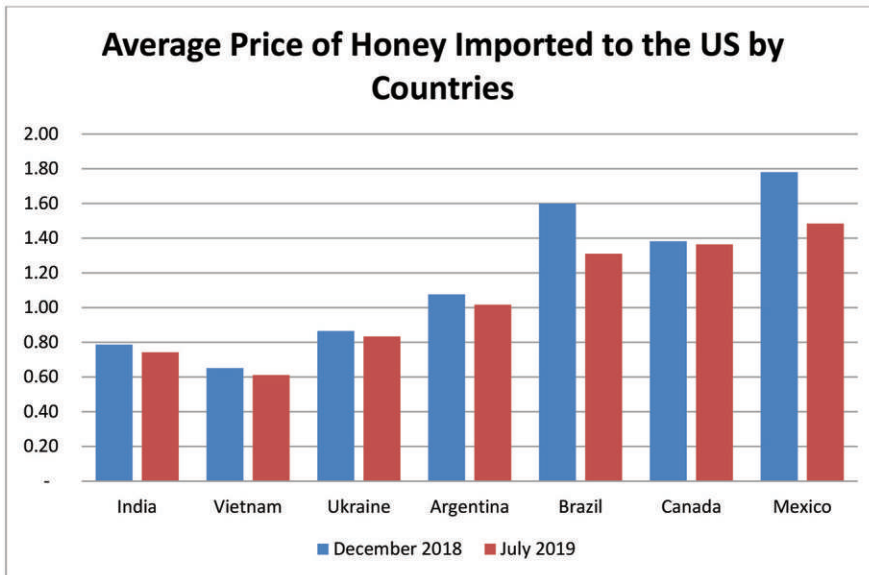
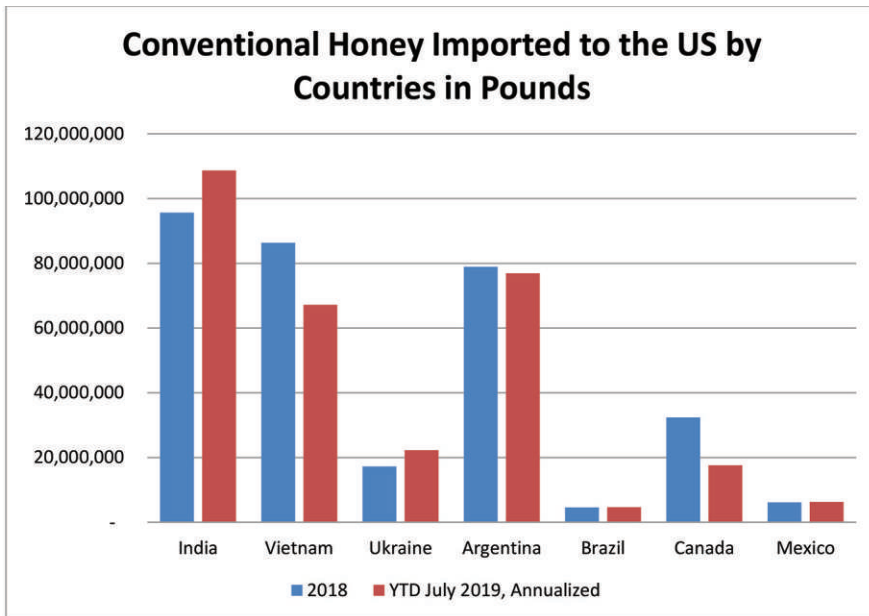
Of course, it is not merely economic analysis but advanced and sophisticated science which can and is exposing the prevalence of adulteration and fraud in the realm of honey. Witnesses have observed and scientific analysis revealed and confirmed the multiple modes of adulteration and fraud in honey. Prof. Stephan Schwarzsinger said:

Do not rely on a single method!
Vary Parameters looked at!
Use Screening Methods, to get the overall picture of the sample!

Since honey's charm resides in its unusual qualitative diversity, we need, consistent to Prof. Schwarzsinger's admonition, to "supply as much information as possible." We need to introduce and require more rigorous traceability regimes by which floral sources, geographic locations, climate, extraction methodology, etc. are taken into account. The scientific analysis of the authenticity of honey is evolving into more rigorous and comprehensive profiles. This is parallel to the development of precision medicine in diagnosing and curing disease. Modern computing capacity facilitates rigorous traceability.

At the conclusion of the session on Detection and Prevention of Honey Fraud, surveying an audience of approximately 1,000 people, Prof. Garcia said that never before in any meeting in the world had he seen so many people gathered to address the





problem of economically motivated adulteration in the honey market.

SCIENCE, BEEKEEPING AND HONEY

There are three fundamental uses of science in the beekeeping and honey industries: 1) to develop the scientific understanding of the methods and means to keep bees alive, healthy and vigorous; 2) to scientifically investigate and demonstrate the health benefits of honey and 3) to develop a scientific tool box sufficiently sophisticated and adequate to distinguish authentic pure honey from honey which in various forms or combinations of forms has been adulterated for illicit gains for the few and harm to the many.

The interest and successes in the second use of science depends upon

success in the third since the health benefits of honey do not pertain to adulterated honey whether that adulteration takes the form of extraction of immature, unripened “honey,” the illegal use of resin technology on honey and/or the blending of bio-engineered extraneous sweeteners.

For the first time, Apimondia has an American serving as the President of the organization, Dr. Jeff Pettis. We spoke with members of the leadership about the value of further integrating these three uses of science.

As with other natural products honey has great charm, qualitative diversity, a fascinating history and numerous health benefits. The creative marketing of honey has enormous potential which is being discussed among leaders of Apimondia, the

American Honey Producers Association and other national and international beekeeping organizations. In January 2008, the First International Symposium on Honey and Health was held in Sacramento, California, prior to the unified National Honey Conference. Concurrently leaders of the beekeeping community, independent university laboratories and government laboratories are looking at a more integrated scientific approach to re-invigorating this effort on Creative Marketing.

HONEY STANDARDS

Honey is an internationally traded product and its definition must be independent of both a) where it was produced; and b) the uses to which it is put. There are some who put forward notions of a “China model,” an “Asian model,” a “tropical model,” and an “industrial model” for honey. These various models serve as masks for what the editor of the American Bee Journal calls the “scourge of fake honey.” But the masks are fraying and becoming transparent. More and more investigators are helping to remove these masks.

We anticipate that Apimondia, the U.S. Pharmacopeia, the UN Food and Agriculture Organization, and other organizations and governments will shortly put forward strong, comprehensive, and rigorous definitions for authentic pure honey. The importance of these standards is made clear in Prof. Michael Roberts’ new and important White Paper in which he states, “As long as adulterated imported honey floods the domestic market, U.S. honey producers will find it very difficult to build a sustainable business model predicated on authentic honey.”

We are happy to report that in June 2019, Prof. Michael Roberts, on behalf



Prof. Michael Roberts and the President of the UN FAO

of the Law School of UCLA, signed a memorandum with the President of the United Nations Food and Agriculture Organization to fight food fraud, including honey adulteration.

NMR UPDATE

Nuclear Magnetic Resonance testing (NMR), High Resolution Mass Spectrometry (HRMS) and other emerging scientific methodologies are essential tools for detecting adulteration of honey. The industry has witnessed, over the past five years and more, consistent attempts to disparage, delay, deny, boycott and isolate NMR and those other techniques precisely because they are most relevant and powerful at exposing the insidious modes of illicit production and sophisticated methodologies of adulteration of honey. These efforts have been pathetic and purposeful. Scientifically and logically, the arguments against NMR testing are extraordinarily weak and the persistence of ill-founded arguments is purposeful precisely because NMR is so powerful.

Thomas Spengler and Eduardo Nascimento, PhD, of Bruker Biospin, and other scientists have made recent presentations on NMR. NMR can analyze 36 to 38 parameters found in honey. The reports of patterns of peaks are about 25 pages long. NMR is useful for exposing many of the most prevalent modes of adulteration of honey. Based upon the parameters of how the nuclei of atoms resonate, a database, even though it is present, is not scientifically necessary for the identification of various modes of adulteration.

Bruker Biospin has the largest global database ever assembled for honey, including over 19,000 samples of primary honeys and blends of honey. NMR is utilized in coffee, wine, dairy, olive oil and other industries plagued by food fraud. It is also used to distinguish organic from non-organic eggs, previously frozen from fresh foods, and free range poultry from confined animals. It is also being used as an important tool in the analysis of medical drugs and other medical applications.

The marketing of fake honey as honey, frozen fish as fresh fish, confined animals as free range, conventional products as organic products, all fall within the scope of economically motivated adulteration. As has been pointed out in previous market reports and in the public media,

the phenomenon of the adulteration of honey has plagued the domestic markets of Australia, New Zealand, India, China, Canada and the U.S. To address not only export markets but their own domestic markets, the governments of those and other countries are in discussions to adopt NMR as a crucial tool in the fight to have authenticity prevail over adulteration, integrity over duplicity. NMR, if fully and accurately employed, is an essential tool for combatting global food and drug fraud in general and honey fraud in particular. Those who have tried to isolate NMR are themselves becoming increasingly isolated.

Foxes are a very cunning and clever species. There was a photo of a fox brightly and brazenly strolling past 10 Downing Street, London. The Masters of Market Manipulation, who through various examples of disinformation have engineered the collapse of prices, are losing their mojo. Foxes are not the most intelligent and insightful species in the zoological kingdom. The confluence of expertise which has emerged and continues to deepen is changing this picture.

INTERNATIONAL HONEY MARKET

In the third quarter report of the American Honey Producers Association, President Kelvin Adee cites, "Without a huge increase in crop production, one would think the price for U.S. honey would increase to prior year levels, however, the opposite is true. There is a never-ending supply of 'honey' being imported at consistently lower prices. We believe that some of this honey is transshipped, adulterated with syrups, or washed through a resin filter."

Chris Hiatt, Vice President of the AHPA, participated in Apimondia,

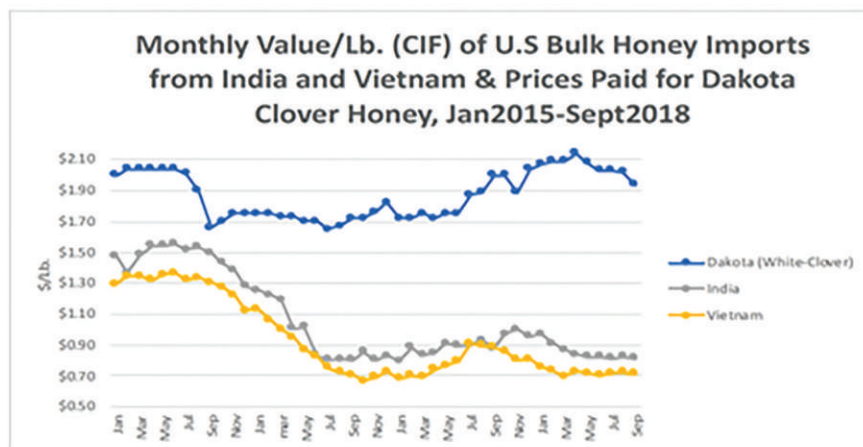
speaking in a section dealing with modes of honey production. In his report on Apimondia, Chris states, "Norberto Garcia from Argentina estimated that worldwide, honey fraud has cost beekeepers \$1.1 billion."

The correlative phenomenon, which some economists are currently looking at, is how much illicit profit has been generated for the few who have or are colluding to conduct honey fraud through economically motivated adulteration. Dr. Daberkow previously provided a graph illustrating the rise in wholesale prices for honey that occurred concomitant with a total collapse of prices to beekeepers and exporters. The graph makes clear the economic motivation which has distorted and threatened the honey market, beekeepers, global food supply and ecological sustainability. We believe that the increased awareness of this gap has awakened other segments of the industry, including retailers and manufacturers, and will inevitably result in increased difficulty for bad actors to reap illicit profits from honey fraud. A healthy industry benefits all integrated segments.

Dr. Stan Daberkow, Economist Emeritus of the USDA, has recently provided comments on the current honey market.

1) Data from August 2019 for Dakota-White showed a decline from around \$1.90/lb. to nearly \$1.60 — a 15% drop in one month. Possibly the domestic harvest is expected to be very large this year leading to lower prices paid to beekeepers, but I suspect the growth in record low-priced imports at or below \$.75/lb. is the real culprit.

2) A longer-term trend over the last two years indicates that Brazilian organic honey prices have declined



Prepared by Dr. Stan Daberkow

nearly \$1/lb. or 45% — the other price patterns on the chart are no longer news:

3) India and Vietnam remain the major sources of rock-bottom priced “honey” which, given the nearly 50% price decline since 2015, I believe is an indicator of “fake” honey.

4) The decline in domestic honey prices as well as falling prices of imported Argentinian and Canadian honey between 2015 and 2017 is likely associated with the increased quantities of cheap imported “honey.” People have said much of the Argentine price decline during this time was due to forced sales into the U.S. of their large honey stocks.

5) While there has been some recovery in the Argentinian and Canadian prices since 2017, these prices are well below the historical levels of 2015 and continue to be influenced by the further declines in prices of imported Indian and Vietnamese “honey.”

Argentina

Argentina’s 2018-2019 crop has largely been exported or committed for sale and 53,000 tons (117,000,000 pounds) were exported in the first 9 months, about 90% of the production. Remaining stocks are primarily dark colors. Weather conditions are normal, but rains are needed. Argentina is finding the European, Japanese and Middle East markets far more attractive than the U.S. market, where they compete with extraordinarily low-priced honey from Vietnam, Ukraine and India.

The inflation rate of 40% per year and the dramatic weakening of the currency contributed to a change of government in the October elections. Markets slowed down in anticipation of the election outcome and the final dollar exchange rate, and indeed, results confirm that the Macri government has lost and Fernandez and Kirchner have won, which will likely reduce pro-business policies. The big question remains, what will be the impact on Argentina’s international debt and the export tax? Argentina has experienced political uncertainties largely as a result of the inability to resolve its international debt requirements. Neither external lenders nor the Argentine people have given an adequate restoration of confidence in the economy. This has led to increasing gaps in the value of the peso in the official and black markets.

Because of similar botanical sources and proper professional modes of

production of honey, the quality of Argentine honey and its flavor profiles are highly compatible with the flavors found in U.S. domestic honey. As a result, Argentine honey is a preferred honey for the European and North American markets. There is a significant contrast between these authentic honeys and some products which have been exported as “honey.” Argentine honey meets the most rigorous quality standards, including the standards presented by Apimondia. The qualitative difference and the extraordinarily low prices of honey from these other sources have put the Argentine honey industry into a quandary: “Meet the low prices or no export sales to the U.S.”

Brazil

The profound collapse of organic honey prices startled the honey world. Brazilian Organic honey is being sold at lower prices than conventional Argentine and Canadian honey and prices remain much lower than prices of two years ago. However, the prices are marginally firming with the beekeepers, especially now that Europe is more active in the market with prices that are competitive for them as well. Stocks are lower than last year. The U.S. and Canada together make up the vast majority of exports from Brazil for the first nine months of 2019, about 17,700 metric tons (39,000,000 lbs.).

Polyfloral crops are coming next in the South, especially in the state of Rio Grande do Sul. The spring crop brings Organic Light Amber but it’s not nearly as big as the crop which starts in March. Up until now it looks like it will be a standard crop.

Rare and beautiful Organic White varietal honeys, as well as Orange conventional, are being collected and are expected to sell at higher prices. Rain forest honey is also being collected.

Concerns emerged in the summer of this year as the Amazon experienced huge forest fires, some of which were provoked by clear cutting and burning to open up land for soybean production for export to China. The fear is that the “Lungs of the World” are being converted by agribusiness to feed the growing demand for meat in the most populous nation in the world.

Canada

Canadian beekeepers, like U.S. beekeepers, are under great duress. The contradiction between the cost

of production and selling prices are reaching a breaking point for many beekeepers.

The fact that the Canadian government investigated and found 22% of honey on the retail shelves in Canada to be adulterated has sent shock waves. Even more startling is the fact that the most powerful and sophisticated methods for detecting adulteration were not used in that study. It is our understanding that the Canadian authorities are in discussion to require and utilize more powerful technologies in the battle against adulterated honey.

The international honey industry is appreciative of the immense efforts the Honey Council of Canada and Montreal made to host this historic Apimondia.

India

The huge quantity of imports from India, especially of honey suitable for the retail trade, remains astonishing. Over 200 million pounds of White and Extra Light Amber (ELA) have been imported from India in the last 4½ years, at prices dropping from \$1.55 to below \$0.80/lb.

Investigations and reports from numerous sources regarding Indian modes of production continue. For a country that is largely tropical and semitropical, not to mention a country with no history of exporting honey to the world prior to 2001, to produce this amount of honey suitable for the retail market strikes many beekeepers as a complete anomaly. Furthermore, various packers have reported buying Light Amber from India and finding a predominance of White honey, which should be more expensive. The total amount of White and ELA honey, therefore, may be considerably larger than what the statistics indicate. Such an anomaly is consistent with numerous reports of the wide availability of resin technology, which as the Indian exporters have publicly noted, lightens the color of honey, thereby increasing its versatility and marketability.

Complaints from Indian beekeepers about adulterated honey in the Indian marketplace was reported September 24th in the Indian newspaper The Tribune: “Owing to rampant adulteration of honey with different types of syrups (sugar and corn syrups), beekeepers ... are not getting remunerative prices for their genuine product.” They also charge that “unscrupulous industrialists and traders” have been

creating hindrances in the implementation of new honey standards by the Indian government agency, the FSSAI.

Neither the consumer nor the beekeepers benefit from honey adulteration.

Vietnam

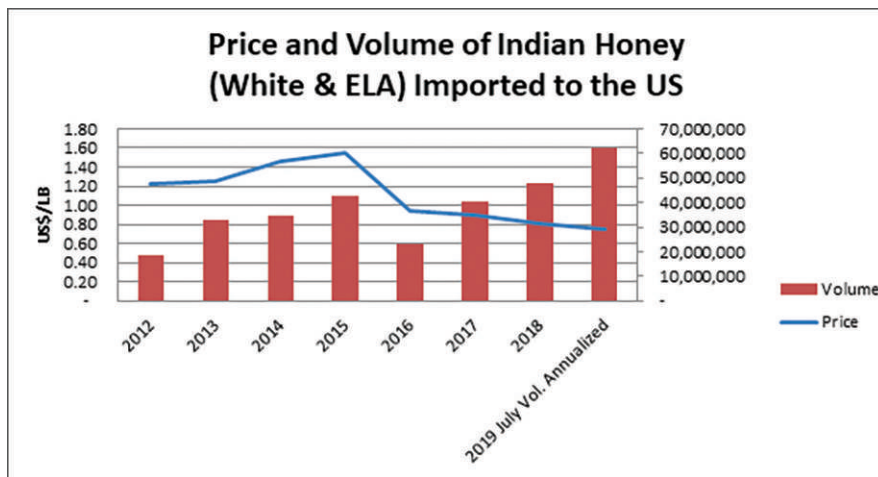
In the last 18 months, prices of Vietnamese Light Amber honey dropped about 20%, and volumes increased to 86 million pounds in 2018.

Talks at Apimondia with leaders from Vietnam indicated that Vietnamese beekeepers are committed to 1) producing fully ripened and mature honey; 2) prohibiting the blending of other sweeteners with honey; and 3) prohibiting the use of resin technology. Meanwhile the collapse of prices for Vietnamese honey continues, and the quantities remain huge. The U.S. remains the dominant export destination for Vietnamese honey. The plight of the beekeepers of Vietnam, brought about by low and non-remunerative prices, is acknowledged by all Vietnamese honey exporters. To use Prof. Roberts' phrase, we could say of Vietnamese beekeepers that they, too are "an endangered species."

The current trade war between the U.S. and China is causing manufacturing of many products, currently made in China, to shift to Vietnam and other low cost markets. Geopolitical tensions between Vietnam and China co-exist with significant Chinese investment in Vietnam.

China

It is interesting that during recent months it has been re-affirmed in China's honey sector that almost all of the honey produced is in the form of "water honey." Typically honey is extracted at over 40% moisture and sent to large factories for moisture reduction by means of large scale modern vacuum chambers. The premature extraction of immature honey intervenes in the natural processes by which, through the interaction of bees and nectar, mature authentic honey is produced in its diversity with natural variations in enzymes, aromatic chemicals, flavor components, minerals, anti-oxidants, etc. Such pseudo honey can be produced in vast quantities and at low prices. These modes of adulteration prevalent in China have been widely exported to several other Asian nations exporting pseudo honey as "honey." The continued attempts to sell resin technology and bio-engineered sweeteners through



VIETNAMESE HONEY IMPORTS TO US			
	YTD Dec 2017	YTD Dec 2018	YTD Dec 2019
YTD Pounds	77,585,227	86,323,234	39,164,459
Price/LB	0.75	0.65	0.61

Chinese websites brazenly show how such technologies allow fraudulent products to elude detection by U.S. authorities.

The degree of moisture in extracted honey can naturally vary as a consequence of climate and season. It requires patience and discipline to extract only fully ripened and fully worked honey. Leaders of Apimondia, I believe, are in the process of making this crystal clear — a position which will apply to all honey from all countries.

Chinese companies recently offered to export authentic, fully ripened and mature honey. Indeed, some companies have displayed many single floral mature honey types, which have not been treated by resin technology nor to which bio-engineered sweeteners, or C3 or C4 sugars, have been added. This path is open to the Chinese honey industry and it will benefit Chinese consumers, who are increasingly concerned with food fraud, and China's export markets. There is potential for the transformation of China's production of honey, which contributes to ecological sustainability and global food security, if illicit methods of production cease.

Earlier this year there was a seizure and destruction by U.S. Customs of a shipment of a million pounds of pork from China. China has been suffering from highly contagious African swine disease which has resulted in the culling of millions of pigs in China, and the government has tapped into pork

reserves. There is a serious shortage of pork in China and prices are soaring, making this export extremely aberrational. The export of this frozen pork involved all kinds of disguises and customs fraud, as the product was entered with fraudulent descriptions of the product. There is a major lesson to be drawn here. The frozen pork held the threat of containing the African swine virus.

The entering into U.S. Customs of adulterated honey as honey is another case of fraud and, as American beekeepers have pointed out, it is a case which endangers American food security and ecological sustainability.

MACROECONOMIC ENVIRONMENT

The macroeconomic situation is extraordinarily tense due to numerous factors, including the U.S.-China trade war and the tremendous growth in international debt levels. Many countries have assumed debt which exceeds their gross national product. This creates extreme volatility in respect to currency relations. The inability to pay IMF debt, World Bank loans, and loans to China for infrastructural projects, has created economic, fiscal and social peril in many countries such as Argentina, Greece, Italy and Sri Lanka.

VALUE OF BEES TO THE WORLD

At Apimondia a session on the Value of Bees to the World was chaired by Dr. Miriam Bixby of the University of British Columbia, with

Currencies of Major Honey Producers - US Dollars



Chart 1: Big jump in global debt as financial conditions ease



Source: IIF, BIS, IMF

participants including M. Bocquet (Apimedia, France), W. Thurman (North Carolina State University), Y. Gao (Chinese Academy of Social Sciences), Kirsten Traynor (Flickerwood Apiary) and myself.

The role of bees in contributing to global food security, biodiversity and ecological sustainability is increasingly well known. What is not adequately appreciated is the fact that bees' contribution to agriculture is not merely quantitative but it is also qualitative. In some countries, bees contribute to about 70% of total agricultural production, in other countries, over 34%. Among those crops are some of those most relevant to provide polyphenols, phytochemicals and antioxidants relevant to the prevention of major diseases. These crops include oranges, lemons, cran-

berries, blueberries, almonds, and those which contribute to a balanced human diet. It was also noted that pollinators enhance the aesthetics of our landscapes, benefitting all.

The growing appreciation of the importance of bees and pollinators to the environment is manifested in a report on "Pollinator Biodiversity" issued by the National Science Foundation in July 2018. The report states the generic phenomenon: "Pollination is an ecological service — a role an organism plays in its ecosystem that is essential to human life." To disincantize beekeepers is to imperil human life in its organic and interdependent relations with the global environment. This fact cannot be underestimated, since as the National Science Foundation reports bees "increase production of about 75% of our crop species."

CREATIVE MARKETING OF HONEY

Apimondia, the AHPA and various beekeeping associations around the world are interested in developing the creative marketing of honey, as has happened for many other natural foods. This has resulted in dramatic increases in per capita consumption, substantial increases in prices, higher qualities and increased varieties. The romance, history and charm of products are better understood.

The Creative Marketing of honey should be wedded to the health benefits of honey. Linking and communicating scientifically established health benefits have led to positive transformations of many industries. Health benefits pertain to authentic honey only.

This prospect is a continuation of many earlier efforts. It will be discussed in January 2020 at the AHPA Annual Convention. It is appropriate, since the first scientific symposium on Honey and Health was held in Sacramento 11 years ago. There were many interesting presentations from scientists around the world. One presentation by Prof. Shona Blair was particularly relevant, poetic and timely, and cited animal studies in which the consumption of honey reduced both weight and anxiety. In the question and answer period it was asked, how do you measure the reduction of anxiety? Hormone levels, blood pressure and other biofeedback parameters are relevant. The answer for the animals which were the subject of this year-long study was that they tend to hide in the shadows. However, those consuming honey spent much more time in the light. Those who have perpetuated honey adulteration and honey fraud have spent their time colluding in the dark places. We should draw the lesson that we need to consume more honey to achieve illumination.

CONCLUSION

The issues of fighting Food Fraud and Honey Adulteration have risen to the greatest prominence in history. The means of conducting such fraud are exposed as never before. The scientific methodologies of exposing economically motivated adulteration have never been more comprehensive and sophisticated. Those methods are being perfected and new methods added as I write this report. The analysis of water isotopes and the genetics of enzymes are being added to the tool box.

Vigorous and intrusive modes of traceability are entering the global food chain. More rigorous and comprehensive contractual obligations are being formulated and promoted to ensure food authenticity. There were cunning and cruel, arrogant and determined efforts to isolate and boycott the methodologies as well the companies and people who have championed food authenticity. But the “isolators are becoming isolated.” And it is the trafficking in adulterated honey which is becoming boycotted.

All great rivers are confluences of tributaries. Presently, a mighty river is being formed whose tributaries include:

- 1) Private, academic and governmental laboratories
- 2) Beekeepers, honest exports, importers and packers
- 3) The media
- 4) International organizations including the UN Food and Agriculture Organization, Apimondia, the U.S. Pharmacopeia, and other international standard setting organizations
- 5) The legal systems
- 6) Consumers, including young, health conscious consumers
- 7) Retailers, manufacturers and food service corporations committed to exercising their social responsibility

The future and validity of beekeepers depends upon the Quest for Justice and Integrity in the global food supply.

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