



INTERNATIONAL HONEY MARKET

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*International Honey Market Report:
“To bee or not to bee”*

*Based on a report presented at Apimondia in
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Introduction

The international and American honey industries remain in a state of instability and stress. If, and when, the most sophisticated technologies for assessing purity, adulteration and country of origin are utilized at all levels of the industry, the situation has the best opportunity to evolve into a level playing field which integrates incentives to produce and consume honey. All levels of the industry and consumers will benefit from the use

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Mr. Phipps is president and founder of CPNA International, Ltd. and is currently on the National Honey Board. He is an importer of honey, natural foods and tea from various international producers. Ron is also the former personal research assistant to the president of the American Philosophy Association. He is a recipient of the National Science Foundation fellowship for philosophy of theoretical physics. His chapter on Integral Philosophy was published in the book *Intuition in Mathematics and Physics* in 2016. Mr. Phipps is a founding member of the Tea & Health Committee, which organized three major scientific symposiums on tea and health and the role of antioxidants in the prevention of disease. He has worked with FDA to develop a research protocol for the global diversity of honey. Currently, Mr. Phipps is president of the Chamber Players International.

of the most sophisticated analytic tools. Two events of international reach were the starting point of changes in the international honey market, with consequences that still persist:

- 1) The financial crisis of 2007–2008, and the crisis in the banking system of the European countries using the Euro. This crisis started a weakening of the Euro and an abrupt shift of European honey imports. Importers and packers started focusing their imports on cheaper Chinese honey compared to more scarce and expensive honeys from other traditional exporting countries.
- 2) After the imposition of high anti-dumping duties on imports of Chinese honey by the U.S. in 2001, dishonest actors started to collude to develop fraudulent schemes to evade these duties. By 2007, large volumes

of low-priced Chinese honey were being illegally imported through evasion schemes and drove prices in the U.S. honey market to levels below the cost of production. In 2008, agents from U.S. Immigrations and Customs Enforcement launched what became known as “Honeygate” – the largest food fraud in U.S. history. In 2010, the U.S. authorities indicted a German-based firm for fraudulent schemes of honey circumvention to the U.S.

This means from 2007 to 2015, European imports of Chinese honey grew dramatically as a percentage of total European honey imports.

Both the weakening of the Euro and the Honeygate scandal (regarded as the biggest food fraud in U.S. history) provoked a clear change of destination of Chinese honeys to the European market (Figure 1), which also meant a clear change of

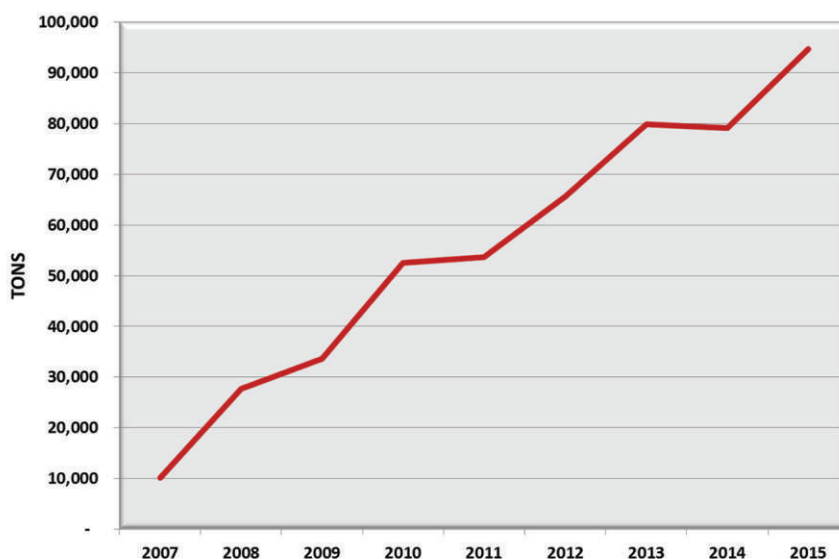


Figure 1: Evolution of Chinese honey exports to the European Union

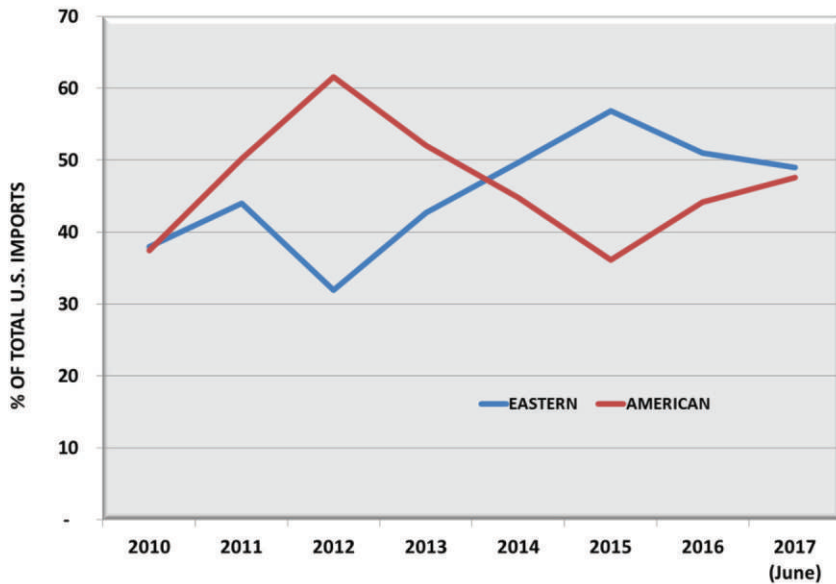


Figure 2: U.S. honey imports from the 5 main eastern (India, Vietnam, Ukraine, Thailand and Taiwan) and the 5 main American (Argentina, Brazil, Canada, Mexico and Uruguay) honey export countries.

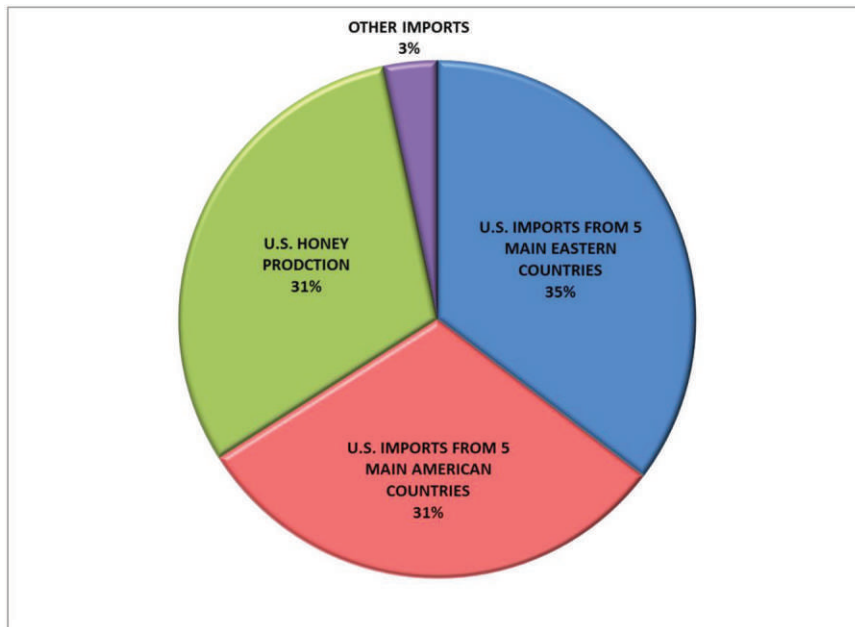
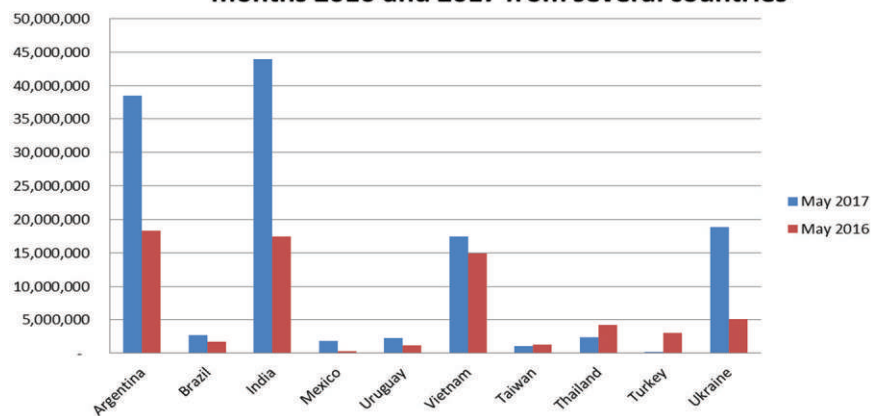


Figure 3: 2016 U.S. honey needs coverage by different origins

Figure 4: Comparison of U.S. import volumes in pounds during 5 months 2016 and 2017 from several countries



the honey-purchasing policy by the old continent, now prioritizing price above their historical demands of quality during this global economic downturn. That general European trend had an exception: Germany, which maintained its high quality standards. New honey exporting countries appeared in Europe, taking advantage of the heterogeneity of honey prices according to their geographic origin, which created a financial incentive for some European countries to import cheap honey from China and then re-export it as locally produced (García, 2016).

U.S. honey imports have shown a changing pattern during the last few years. After 2010 there was an initial increase of imports into the U.S. from the main honey-producing countries of the Americas. But, starting in 2013, a gradual increase of imports from several Asian countries replaced the imports of the more traditional honey-producing countries of the Americas. Currently, the volumes imported from both groups of countries are about equal (Figure 2).

In 2016 U.S. domestic honey production only represented around 31 % of total U.S. needs (consumption + exports); the rest was covered by imports (Figure 3). A two-tiered market has re-emerged in the American honey market, between prices for domestic and international honey.

The majority of Eastern export countries that currently export honey to the U.S. are generally regarded as “high risk” countries. Excepting Ukraine, the other Eastern exporting countries cannot sell significant quantities to Europe. Aberrational historic trends of exports to the U.S. continue. Most notably India and Vietnam have established pre-eminence not seen historically in the USA market before 2001.

The two-tiered market between U.S. domestic and imported honey, which emerged in the summer of 2017, followed public discussion in early 2017 of the possibility of an antidumping suit against a global group of honey-exporting countries. The possibility of an effective global antidumping suit was based upon the persistence of low prices for imported honey.

Among recent aberrational trends is a surge of U.S. imports of Indian honey in May 2017 (Figure 4). These statistics are somewhat puzzling because Indian exports had reported a late crop and poor production conditions in the 4th Quarter of 2016 and first months of 2017 when a firming market was reported. The prices of May imports fell for White, ELA, and LA. The quantities of May imports, if annualized, would lead to almost 100 million lbs. of Indian honey (see Figure 7). It was reported that tax and/or currency changes made the domestic market less attractive which is offered as explanation of the significant surge. Ironically, some Indian packers have reported that the Indian domestic market was becoming more attractive and remunerative for them than the export market. We also note that some Indian exporters are

working hard to obtain European organic certificates.

The average price of Vietnamese honey is somewhat lower than that of Indian honey; but when we consider the color instability and the typically extremely dark colors coming from Vietnam, the price of Indian honey stands out as the lowest based on India's much lighter colors.

The global picture of honey offers also changed around 2010. While the total exports of the main five honey exporters from the Americas remained stable throughout the period 2001-2016 at an average of ca. 146,000 tons/year, the total exports of the main honey-export countries of the Eastern Hemisphere showed a very different evolution (Figure 6). From 2001 to 2009 the total honey exports of those eastern honey exporters remained quite stable with an average of around 108,000 tons/year, but starting in 2010, the total exports of those countries sharply increased at a rate of 22,000 tons/year. While Ukraine has a strong market in the EU, Asian countries such as India and Vietnam do not.

In search of a balanced fair price

The advance of agriculture, the destruction of natural environments, the contamination of bee forage lands with pesticides, in conjunction with the appearance of new bee diseases, make honey an increasingly scarce, difficult and expensive-to-produce, natural food.

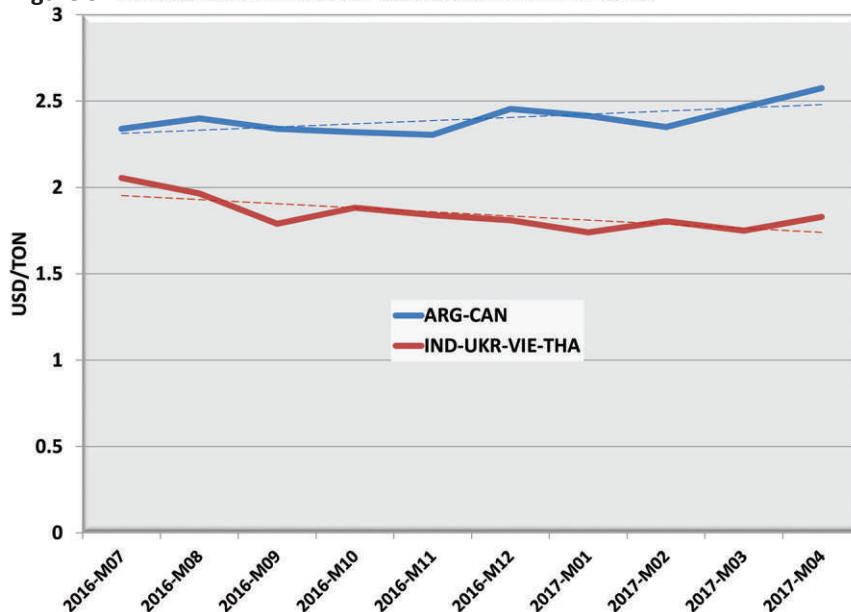
Another worrying factor is the increasing average age of beekeepers around the world, with new generations preferring less difficult and more profitable activities. The number of beekeepers seems to be growing, especially in some developed countries, where most of them are hobby producers. However, the number of professional beekeepers, who mainly depend on the production of honey is severely challenged by non-remunerative and non-sustainable prices of honey.

Production costs constantly increase and honey yields per hive have been decreasing globally, making professional beekeeping a less attractive activity, at least economically speaking. With no doubt, cunning schemes of honey adulteration are the main cause of the current apparent excess of pure honeys from some traditional producing countries.

But, what would be a fair price for honey that covers production costs and leaves a reasonable earning for the producer? Of course, fair prices are not homogeneous because production costs and living standards widely differ from one country to another. Taking that into consideration, let's try to find an average balanced price through the use of linear regression applied to historical prices of honey.

As we all know, adulteration of honey has a long history. Pure and adulterated honeys always co-existed, but in recent years the increase of international trade and the development of new methods and products used to adulterate honey have reached

Figure 5: AVERAGE UNIT PRICES OF U.S. BULK HONEY IMPORTS



a magnitude that severely depresses prices and challenges the survival of a great number of beekeeping operations around the world.

If we consider the evolution of the price of bulk conventional honey from the major exporting countries, we can see a clear upward trend of prices, probably due to the increase of global demand and the increasing production difficulties (Figure 8). In a non-regulated market, offer and demand interact and finally reach fair and sustainable prices which maintain the incentive to produce without discouraging consumption.

When for any reason the market price is less than the fair price, production is then discouraged, a lower volume is offered after some time, and a reverse cycle of increasing prices starts. This is the old agricultural

adage: Low prices are their best cure; high prices are their best cure. But, when the price is higher than the balance price, consumption may be affected and prices go down again. On the other hand, there is probably room for increasing honey prices since honey does not make an important contribution to the consumer's economy.

Dr. Stan Daberkow has reported that even when prices rose significantly, there was not a decline in consumption, showing the elasticity of honey prices. The upward elasticity of honey prices increases as the creative marketing of honey and higher quality standards for honey develop. Creative marketing and stricter quality control are the key factors in establishing fair, sustainable and balanced prices.

All that may be true as long as production

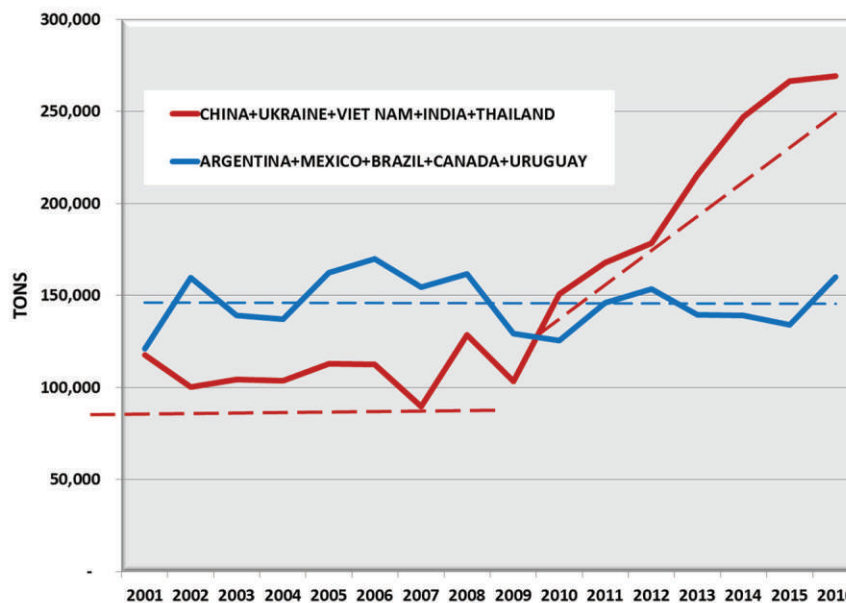


Figure 6: Evolution of honey exports of the main five honey export countries of the Americas versus the main five honey export countries of the Eastern Hemisphere.

U.S. HONEY IMPORTS FROM INDIA DURING THE FIRST SEMESTERS OF THE LAST FIVE YEARS

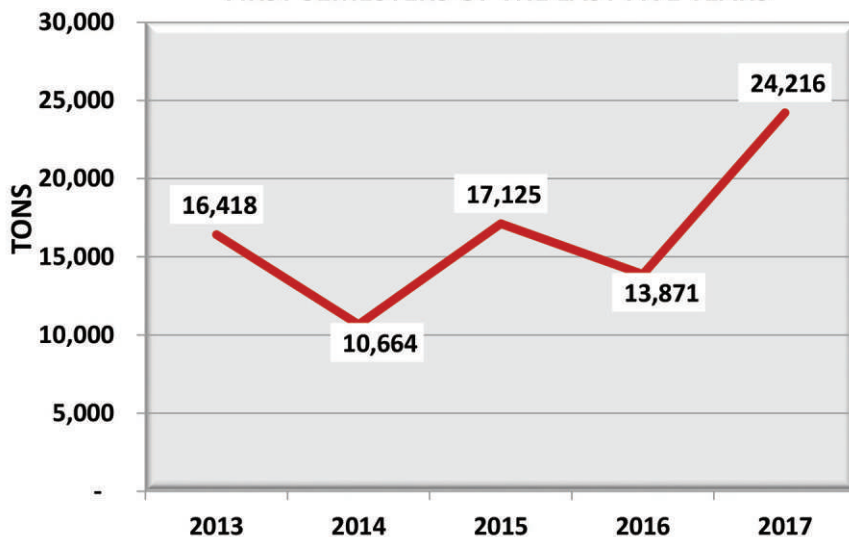


Figure 7: Comparison of imports from India during the first 6 months for 5 years to the U.S.

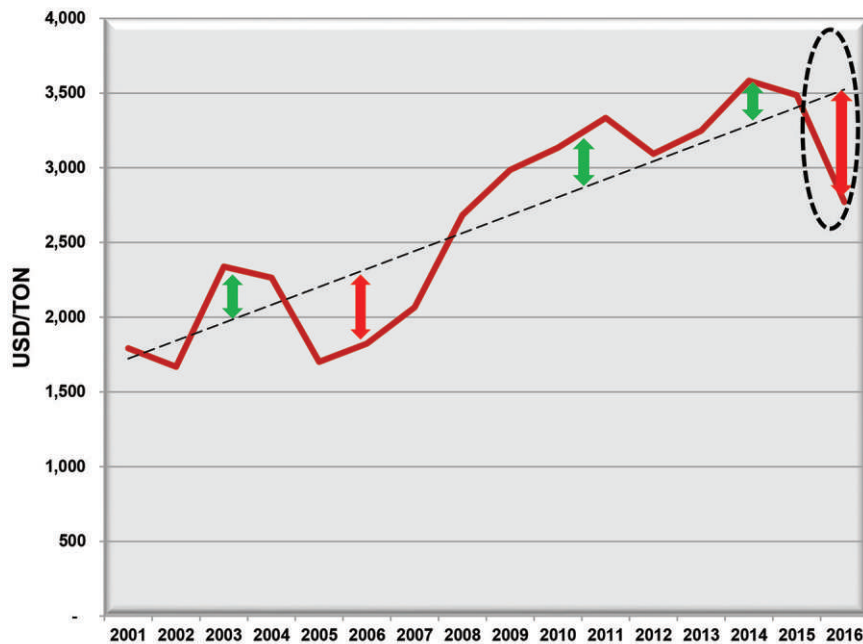


Figure 8: Evolution of the average bulk conventional honey prices of the main seventeen honey-exporting countries.

factors and consumption are not seriously affected by any external factor; that is what we believe has prevailed during the past. However, in recent years, the abusive and widespread use of adulteration acted as an external factor which unbalanced the market and if not stopped soon, the damage to honey production may be irreversible.

The dotted line shown in Figure 8, which illustrates the regression line of conventional bulk honey, would be a good estimate of the evolution of the balanced price for this type of honey.

According to this approach through linear regression, the balanced market price for 2001 was around \$1,600/ton, while in 2017 the balanced price would be approxi-

mately \$3,520/TON when in fact the average market price was \$ 2,770/ton. This deviation between a theoretical balanced price and the actual market price is of a magnitude not found in recent history and gives us a good estimation of the seriousness of the problem that the producers of honey are currently facing. We must never forget that the vitality of the honey trade is a dominating factor for the number of managed colonies (Moritz and Erler, 2016). Beekeepers replace colony losses, or increase their colony counts, only if prices are favorable.

To achieve a level playing field and a stable, healthy market there must be use of more advanced technologies to assess

honey purity, country of origin and authenticity (Phipps, 2016).

Honey adulteration, the most disturbing factor of recent years.

The amazing increase in the volume of honey exports from the main honey-exporting countries of the Eastern Hemisphere cannot be explained by a parallel increase in the number of beehives, which is a shocking abnormality that also goes completely against world trends of lower productivity per hive. It can be more easily explained by new honey adulteration schemes based on the use of C3 syrups (mainly from rice and undetectable by the official method C13-IRMS) and the use of resin technology (García, 2016).

Currently, honey ranks number 3 amongst the most adulterated foods, which poses an urgent need to restore integrity to the international honey trade (Luellmann, 2017). This concern is rising to broad public awareness, including the business community. The July 2016 issue of *Forbes* magazine contained an article stating, "Honey is the 3rd most faked food." Larry Olmsted writes in his new book *Real Food, Faked Food*, "My book explains how the golden honey in your kitchen cabinet may be deceiving you....countries like China use ultrafiltration to mask the origin of the honey which is then transshipped to disguise the real origin and sometimes with a mix of small amounts of pollinated honey to throw off testers." As *Real Food, Faked Food* and many other articles and media reports manifest, concern about adulteration is in the regulatory realm, the business realm and the realm of consumers.

The honey industry needs both more powerful scientific methodologies and greater integrity to overcome the adulteration and circumvention which have plagued and haunted the industry through the collusions of cunning and unscrupulous players.

The development of Nuclear Magnetic Resonance (NMR) for testing honey purity and its botanical-geographical origin, with a currently increasing number of European supermarkets already requiring the test for their purchases, is the most outstanding development to defend honey purity and integrity in recent years. That initiative from Europe should be implemented by U.S. supermarkets due to their corporate social responsibility and their commitment to preventing consumer fraud. They have a responsibility in maintaining honest honey producers which indirectly helps to maintain overall agricultural production and the health of the global environment.

NMR is a sophisticated tool to deal with different kinds of honey fraud:1) dilution with C3 and C4 syrups, 2) the use of vacuum technology to reduce high moisture content of immature honeys, and 3) the use of ultrafiltration and resin technology to mask the botanical or the geographical origins of honey. NMR simultaneously measures 36 substances and their ratios, and it is sufficiently complex not to be easily cheated.

With the promise of NMR as one of the most powerful and sophisticated tools in the tool box for detecting economically motivated adulteration, a Great Wall has been built around China for the export of honey adulterated with extraneous sweeteners like rice and beet sugars, honey “washed” by resin technology and honey which is harvested immaturely and, thus, not authentic honey. NMR has also created an openly two-tiered price structure for Chinese honey to Europe, i.e. honey which cannot pass the NMR test is offered in larger quantities and substantially lower prices than honey which passes the tests.

There has been a river of water honey from China flowing South with tributaries flowing east and west. During the period of 2009-2016 there was a correlative flood of resin technology from China to numerous honey-producing nations. The confluence of these two factors – the River and the Flood – is shaping the current honey market.

The effect of the requirement of NMR by some European supermarkets can be seen in the steep decline of European honey imports from China during 2015 (Figure 9). Packers and importers in the United Kingdom have a different policy regarding honey adulteration testing compared to the rest of Europe, and continued the upward trend of honey imports from China. This is a great anomaly.

We are entering an era of enhanced Traceability and more sophisticated scientific methodology. While traceability is relevant, it is more important to employ more sophisticated scientific methodology to detect adulteration, transshipment and circumvention. Those engaged in collusion to circumvent and/or adulterate honey know it is easier to elude effective traceability regimes than it is to elude the most powerful scientific technologies like NMR applied to detection of adulteration of honey in each of its three modes.

The role of national authorities

The issue of food fraud is a global concern. It is estimated in a recent report that at least \$8.5 billion will be spent globally and annually to detect food fraud.

Appropriate honey testing alone will not solve the problem of fraud; effective enforcement is needed. The role of national authorities becomes absolutely necessary to protect our beekeeping activity, which has an immense and not fully appreciated role in the preservation of biodiversity and in the production of many important crops which are sources of phyto-chemically vital foods, fruits, vegetables and nuts.

In many honey-importing countries the industry is not united. Some stakeholders have no interest to change the current situation, which is giving them an excellent opportunity to obtain private economic gains. A unified industry would be more effective in putting pressure on the authorities to have a stronger enforcement to combat honey fraud.

The E.U. and the U.S. authorities and institutions are increasingly aware of the

"Certified Pure Honey" sold in Europe. This honey is tested by Nuclear Magnetic Resonance (NMR) spectroscopy.



tremendous negative impact that honey adulteration has on the future of beekeeping and the food security of their countries.

In 2015, the European Commission started a coordinated monitoring plan to study the prevalence of adulterated honeys in the European market. In December 2016 results were published (European Commission, 2016). The first report showed that 15% of samples were non-compliant with the Honey Directive (110/2001). The samples recognized as compliant were then sent to the Commission’s Research Center for further examinations with LC-IRMS. Test results showed that 14% of the samples had added sugars according to LC-IRMS, which only detects some types of adulteration. What we don’t know is the part of the iceberg that remains immersed below the surface. In April 2017, the E.U. Directorate-General for Health and Food Safety also sent an alert to stakeholders on the use of Ion-exchange Resins to Purify Honey and Beeswax. The European Commission alerted that “honey and beeswax products may not be sold as organic products after

having been purified with the use of ion-exchange resins to adulterate the origin and to remove possible residues of antibiotics and pesticides. Moreover, the use of these ion-exchange resins could be harmful to consumers’ health», and invites ...« Should you or your members be aware of concrete cases and have samples, then please inform us as well as in that case, we will investigate whether further analysis is possible.”

On the other coast of the Atlantic Ocean, the FDA clarified that honey that has been treated with ion-exchange resins cannot be sold as “honey.” Additionally, the U.S. Department of Agriculture has initiated a Commercial Item Description (CID) for honey. Currently the proposed CID, which includes NMR testing for honey, is open for public comments by specialists of the industry. A CID for honey, although not a standard for honey, is a very important reference tool to start improving honey quality in the U.S.

The U.S. National Honey Board is also currently working on the honey purity testing issue by hiring the advisory service of a

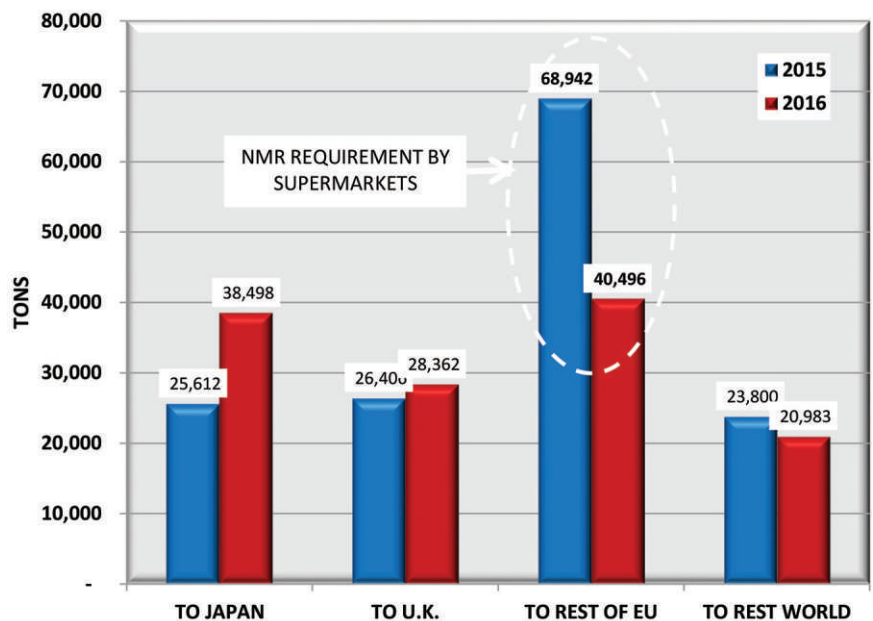


Figure 9. Change in exports from China

food fraud specialist, Dr. Michael Roberts, executive director of the Resnick Program for Food Law and Policy, who will be the keynote speaker at the American Honey Producers Association 2018 Convention to be held in San Diego.

Late Summer Market Conditions

The Ukrainian exporters report that the current crop may be down 30%. Concurrently, the EU has significantly increased the quota for Ukrainian exports in 2017 to the EU. Given the facts that the EU market is more remunerative and the quota has been increased, the beekeepers are patiently waiting for an update on the market. Because of this, Ukrainian exporters have a much smaller percentage of the Ukrainian honey crop in their hands as the big majority of the crop remains in the hands of Ukrainian beekeepers or is already destined for the EU market.

Brazil's economic and political scene has been one of some turmoil. The current honey crop has largely been sold and offerings and pricing will depend upon the October – December Spring crop in Brazil. Mexico is sold out and beekeepers are patiently waiting clarification of the international market.

The total current Argentine crop from September – April was approximately 65,000 tons. Only 10,000 tons remain to be sold, at the end of August. By the end of June, approximately 51,000 tons were exported:

Argentine Exports to the World by June 2017(Metric Tons)	
US	28,000
Germany	9,500
Japan	4,000
Spain	1,500
France	1,000

Figure 10. Exports from Argentina

Exports to the US and Japan increased, whereas exports to Germany, Spain and France decreased compared to the previous year. Regarding the issue of using new vs. recycled drums, there are conflicting opinions within Argentina, influenced by the fact that the new drums are moderately more expensive and superior in quality. The low prices for the past two crops have made Argentine beekeepers especially sensitive to the cost of all inputs. Recycled drums will be diminished but not completely phased out by all exporters until 2019.

China's policy of aggressive Direct Outside Investment continues, attaining record levels of acquisition of foreign agricultural lands, mines, energy reserves, high tech companies and other "glamour properties." The speculative nature of some of these investments caused the Chinese government in August to put curbs on speculative investments which are inconsistent with China's national macro economic agenda. That agenda remains focused upon securing vertical, horizontal and international integration of strategic

assets which include, as example, the \$43 billion acquisition by China of Syngenta in Switzerland. The acquisition of honey companies, large beekeeping operations, dairy farms, soybean properties, fisheries, etc. remains vigorous.

Global Warming and Climate Change

Overall trends of a warming climate with increased volatility and frequency of severe weather events continue. Perhaps most notable are the trends for increased melting of both ocean and land (mountain) based glaciers. While at a conference in Europe, we visited the Mer de Glace (Sea of Ice) in the French Alps. The retreat of the glaciers in Europe and in Argentina (Patagonia) is alarming. The retreat of both the world's glaciers and the permafrost contribute to the self-feeding nature of global warming. At home we see the stress on glaciers in Glacier National Park in Montana.

Severe heat waves, droughts and forest fires have been reported in southern Europe (Tuscany, Italy, Provence, France, Portugal), British Columbia, and elsewhere. Severe typhoons have affected Hong Kong and North China. In the next report we can further articulate, document and quantify these trends which have effects upon global eco-systems, global agriculture and bees and other pollinators within the interacting ecological systems.

On August 24, the front page of the *New York Times* featured a report on the retreat of the permafrost in Alaska. This retreat is occurring much faster than expected one or two decades ago. It is very significant since in geological history there are huge amounts of biological material which decayed and were buried under the permafrost. As the permafrost retreats, large amounts of methane gas, which is a heat-trapping gas approximately 25 times stronger than carbon dioxide, will be released into the atmosphere contributing to the self-feeding nature of global warming.

Final Words

As long as economically motivated adulteration, food fraud, customs fraud and the violation of international and national trade laws persist, the wellbeing and stability of world beekeepers remains in jeopardy. However, there is always space for being optimistic and continuing to be proactive

Strong and effective technologies to detect honey fraud are available. The world is becoming aware of the problem of honey fraud and its impact on the sustainability of beekeeping. Many honey consumers recognize the importance of bees to maintain biodiversity and many important crops, and last but not least, the governments are becoming each day more proactive to prevent further food fraud.

The Chinese government has hired American scientists and academic experts to help establish a sophisticated regime for preventing the food fraud which plagues their own population. Like the extreme toxicity which plagues the soil, water systems

and air, in China and India, food fraud and food safety issues have aroused popular demands for progressive change to protect both the environment and the safety of the food supply. It is estimated that the extreme pollution and toxicity of the environments in China and India are already causing annually between one and two million premature deaths, including many children.

For a decade we have been asserting the principle, "Science First, Standards Second." We now have greatly enhanced the integration of scientific research among private, academic and government laboratories on the chemistry of honey.

In fact, the most extensive and diverse data base of primary samples of honey from around the globe has been established. American, Argentine, Canadian, Mexican, Brazilian and other international beekeepers, apiculturists and responsible members of the international honey trade have contributed to this data base. The wheel does not need to be invented; it needs to be utilized along with other techniques of detection.

In the Era of Traceability, the enhanced demand for traceability in honey can be wedded to nuclear magnetic resonance analysis. Both the complexity and the charm of honey derive from the immense chemical diversity of honey. We can utilize modern computing capacities and the comprehensive data basis of the chemical and physical profiles of the global supply of honey. These techniques are eminently possible and will provide the most powerful methods to prevent economically motivated adulteration of honey. Wedding traceability and advanced science with comprehensive data bases is the most compelling strategic opportunity.

The 2017 Apimondia Congress in Istanbul and the American Honey Producers Association Convention that will take place in January 2018 will be outstanding and decisive forums to discuss the future of the honey industry.

An opportunity and a need clearly exist for top-down and bottom-up pressure to prevent the adulteration of honey and prevent harm to the integrity of the industry and beekeepers worldwide.

Tribute

We must conclude this report with a short tribute to Joe Graham who has faithfully served American beekeepers and the honey industry, and therefore, American agriculture more generally, for so long, as editor of the *American Bee Journal*. Joe is a person of great intelligence, courage and integrity. We wish Joe and his wife, a dedicated teacher, the best in retirement. Joe's son is a Postdoctoral researcher of Physics who is a lead author of research in the "Hyperentanglement of Protons" which is an important paper in quantum physics and a theoretical step toward quantum computing. Joe is rightfully proud of his accomplished family. As one door closes, a new door opens. There are new "articles"

in Joe's future. His integrity and unfailing courage have won from so many love and respect.

The new editor of the *American Bee Journal*, Dr. Kirsten Traynor, is a person long dedicated to American beekeeping and an expert in agriculture. We look forward to continuing our cooperation begun with Joe with Kirsten.

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