

APIMONDIA 2019

Honey Market Trends

Revitalizing the Honey Market

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Incentives to produce and consume

- The revitalization of the international honey industry depends upon integrating and harmonizing the incentives to produce and consume honey. That harmony requires preserving the incentives of all segments of the industry, beginning with its foundation of the beekeepers, whose labor and talents in maintaining bees create honey.
- That integration requires drawing a sharp demarcation between authentic and adulterated honey. It requires, as Eugene of the *American Bee Journal* aptly expressed it, overcoming the scourge of fake honey.

The Anomaly

1. Growth of consumption/decline of prices

- i. benefits of authentic honey and trends toward pure natural foods are the foundation of the increase in consumption

2. Irrational explosion of honey quantities

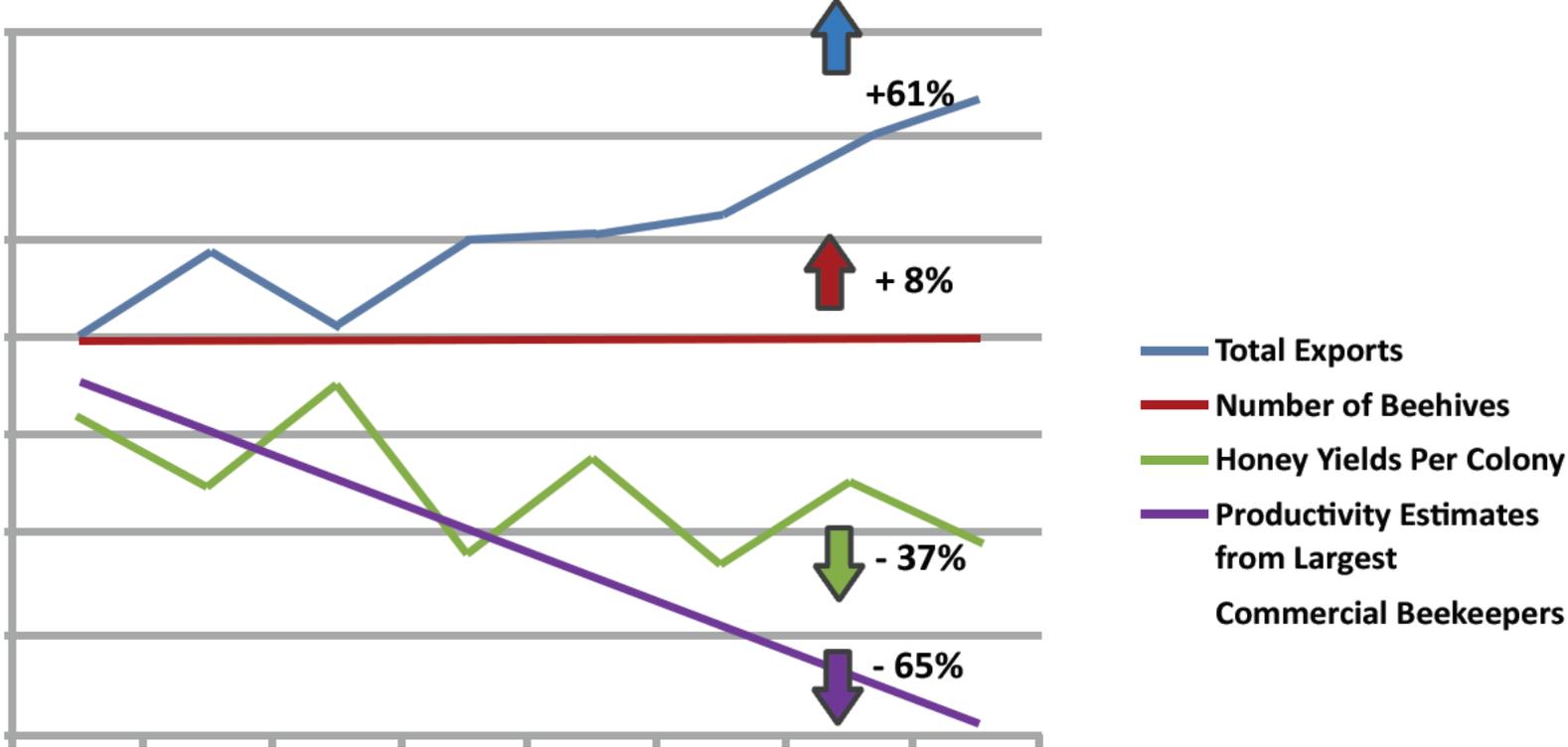
Honey Consumption Increases

- Consumption of honey in the U.S. has increased by over 40% in the past 20 years from about 400 million pounds to about 575 million pounds in 2018. The perception of benefits from authentic honey is the foundation of the increase in consumption.
- The value of global honey exports has increased significantly to reach the range of \$2 billion dollars in 2018.

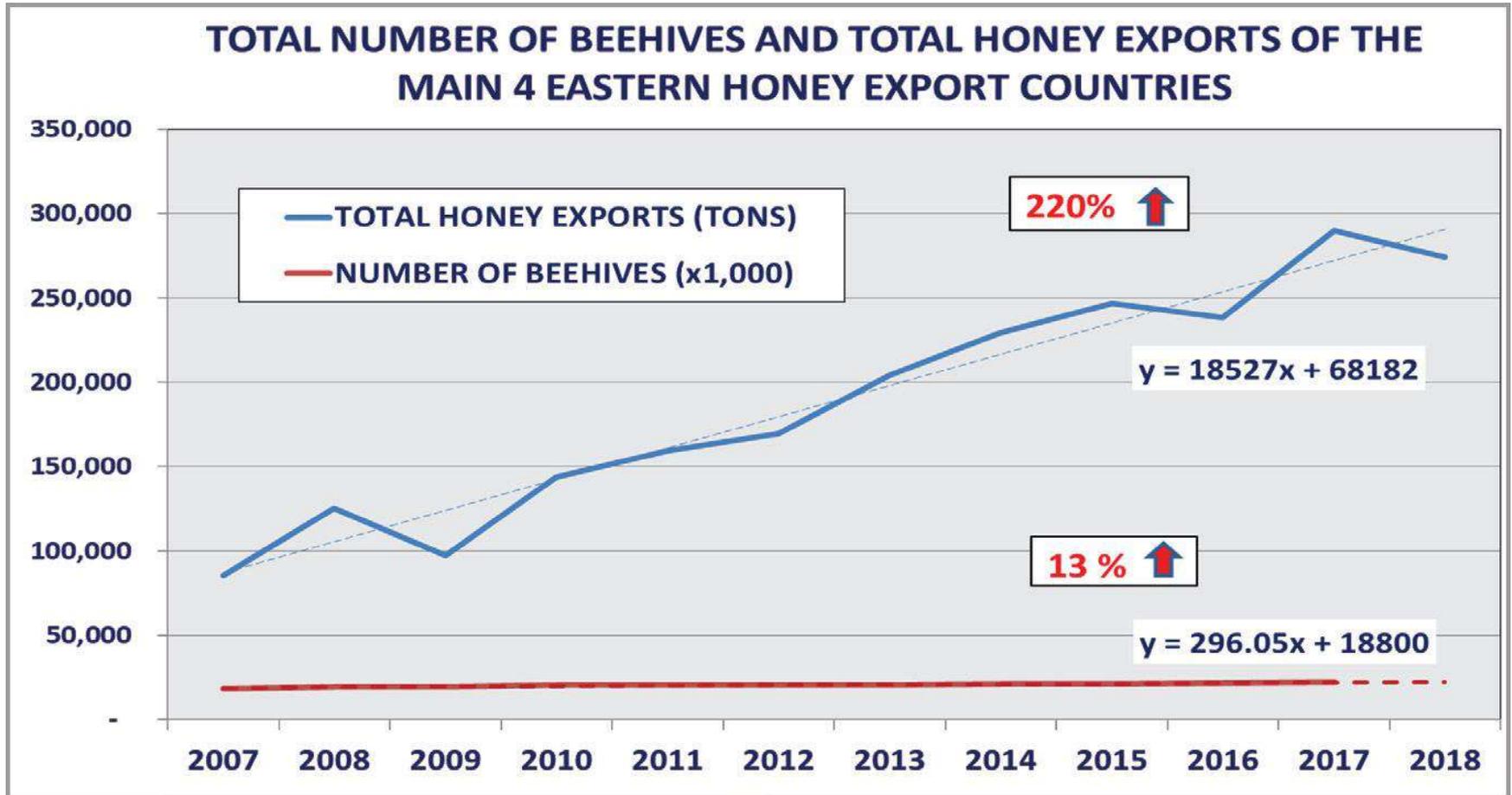
The laws of economics suggest that international honey prices would increase dramatically. An economic anomaly persists in that there is a steady erosion, indeed a collapse, of the prices for raw honey paid to beekeepers by packers, importers and exporters.

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.

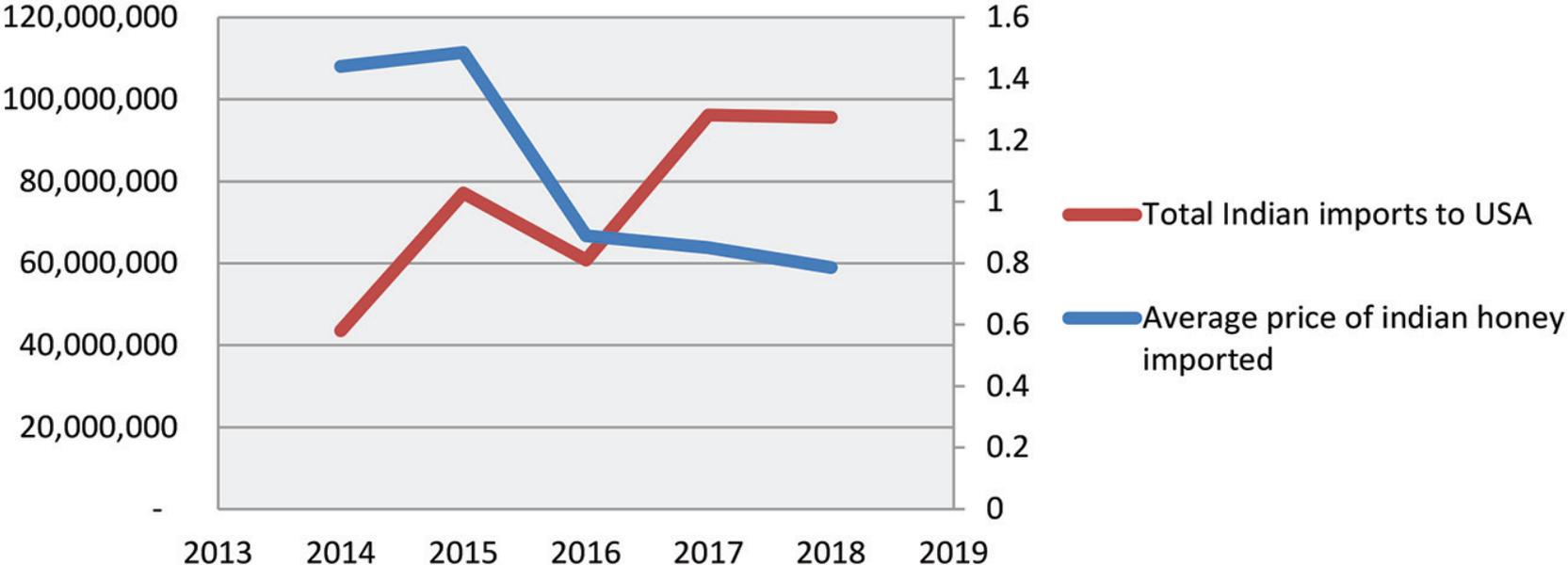
Honey Exports, Beehives, Yield 2007 to 2014



Honey Exports, Number of Beehives 2007-2018



Indian honey imports to US and average price of Indian honey imported 2014-2018



- The decline in productivity per hive has its obverse effect in the increase in the modes of illicit production and sophisticated adulteration of products fraudulently described as “honey.”

Three Uses of Science

- The revitalization, which we all should seek, requires using science in three modalities. They are:
 - 1) the use of science to promote and maintain the vigor and vitality of the global population of pollinators, including bees; there are many important talks at this conference on this topic;
 - 2) the use of science to articulate and scientifically demonstrate the positive health benefits of honey. The International committee on Honey and Health initiated this work in the first international symposium that was held in Sacramento, California in January, 2008. We hope that the Apimondia leadership will support and contribute to this positive agenda;
 - 3) the use of science to detect and expose the economically motivated adulteration of honey, in all its sophisticated modes. During this Congress, there are more discussions of the third modality for using science than ever before. This is because the problem has metastasized, assuming many forms and invading many domains of the complex international honey market.

Investigation into Chemical Composition of Honey – FDA Protocol

International Investigation Into the Chemical Composition of Honey Preliminary Collection Outline

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INTRODUCTION

Honey is a commodity that is recognized worldwide as a valuable food and sweetener. This popularity makes it a natural candidate as an internationally traded commodity. As import restrictions have been removed with the adoption of new trade agreements, questions of regarding the authenticity of commodities such as honey have come forth. The use of various isotopic methods, such as stable carbon isotope ratio analysis (SCIRA), have proved to be useful in the efforts to detect adulterated products. However, these isotopic methods are based on the database of samples used in the establishment of the test parameters. Variations in a product, such as honey, can come from differences in geographical origin, botanical source and processing technique. If the database is not representative of the particular commodity, then the method will be valid only for samples covered by the database. At the present time the database concerning the chemical composition of honey (sugars, protein, HMF, etc.) is sufficient for U.S. honeys, but is lacking with reference to samples from other countries. It is our intention with this study to provide a more international database of values for the chemical composition of honey.

Tools in the Toolbox

- 1. Nuclear Magnetic Resonance (NMR), with the Bruker database of the widest collection of 19,000 global honey samples, detects illicit modes of production and sophisticated modes of adulteration, country of origin, immature honey, resin technology
- 2. High Resolution Mass Spectrometry (HRMS) which can detect bio-engineered and extraneous sweeteners, illicit modes of production, and resin technology
- 3. Water Analysis, which can distinguish moisture content from nectar that bees gather from the industrial water used by resin technology, which literally “washes” honey
- 4. Carbon Isotope for C4/C3 sugars (LC-IRMS)
- 5. Pollen analysis
- 6. Other qualified tests for honey analysis

Canadian Study of Retail Honey Samples

- 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 in which NMR testing, based on the Bruker database of 19,000 samples, was used, to our knowledge.

- Similar reports of honey adulteration have reached the media and governmental authorities in Australia, India, China, the U.S., and elsewhere.
- The Netflix documentary on Food Fraud has been translated into 22 languages and distributed globally.
- Prof. Michael Roberts of the Resnick Institute of Law has just published a major White Paper on Honey Fraud and its implications to global food security, ecological sustainability, and the endangerment of the world's beekeepers.

Enhanced Traceability

An enhanced and vigorous traceability regime would include not only purchase data including quantities, prices and types of honey purchased at each level in the supply chain, but would also specify:

Floral source, geographical origin, season of production, climatic conditions, and guarantee that

- 1) no illicit modes of production have been utilized, including extraction of immature uncapped honey or blending of extraneous pollens;
- 2) no illicit modes of adulteration have been utilized, including blending of extraneous sweeteners including C3, C4 and bio-engineered sweeteners;
- 3) no resin technology has been applied at any stage during processing;
- 4) no artificial mechanical means have been utilized to reduce high moisture levels of immature, uncapped honey;
- 5) the honey has been subject to the most sophisticated, advanced scientific methodologies and analyzed with respect to those variables which indicate illicit modes of production and/or application of sophisticated modes of adulteration;
- 6) if the honey has been blended, filtered or processed, the details of such processing are accessible.

The enforcement must be done with integrity, professionalism and independence.

New Zealand's Manuka Requirements

Making sure it's authentic NZ mānuka honey

Our reputation for honey production and export rests on the integrity of our products and the credibility of our systems.

In December 2017, the Ministry for Primary Industries (MPI) finalised a robust and sophisticated scientific definition that can be used to authenticate whether or not a particular honey is New Zealand mānuka honey.

We've also introduced requirements to:

• ensure how bee products are traced through the supply chain
• ensure New Zealand bee products comply with importing country requirements.

Why the rules are needed

The science definition for mānuka honey is essential to maintain New Zealand's premium position in overseas markets. It will also help the continued growth of our export honey industry. It's important:

• overseas regulators have confidence in the assurances we give them about New Zealand mānuka honey
• consumers in export countries are confident they're getting genuine mānuka honey.

If not, our access to markets could be put at risk or we may lose the premium prices our bee products command overseas.

Tests to authenticate mānuka honey

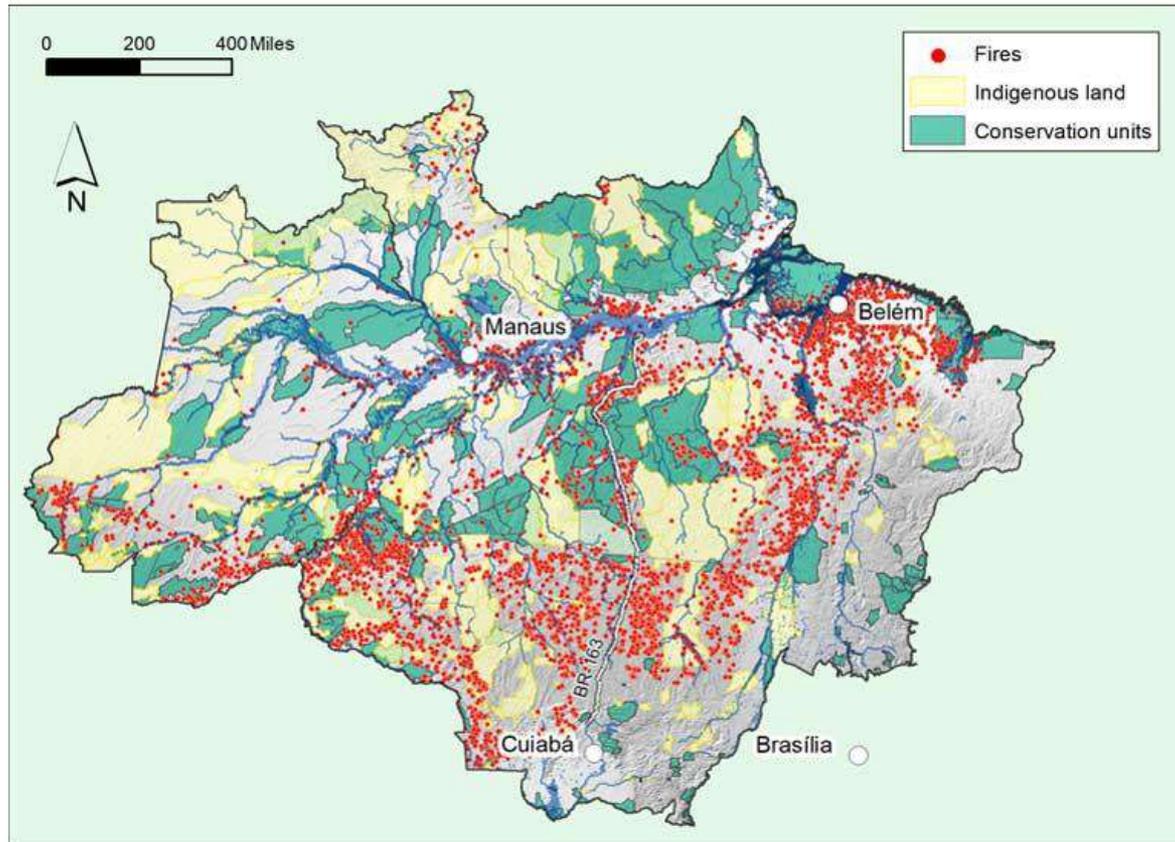
All honey labelled as mānuka for export must be tested by an MPI-recognised laboratory to make sure it meets the new mānuka honey definition.

The mānuka honey definition is made up of a combination of 5 attributes (4 chemicals from nectar and 1 DNA marker from mānuka pollen). This allows industry to:

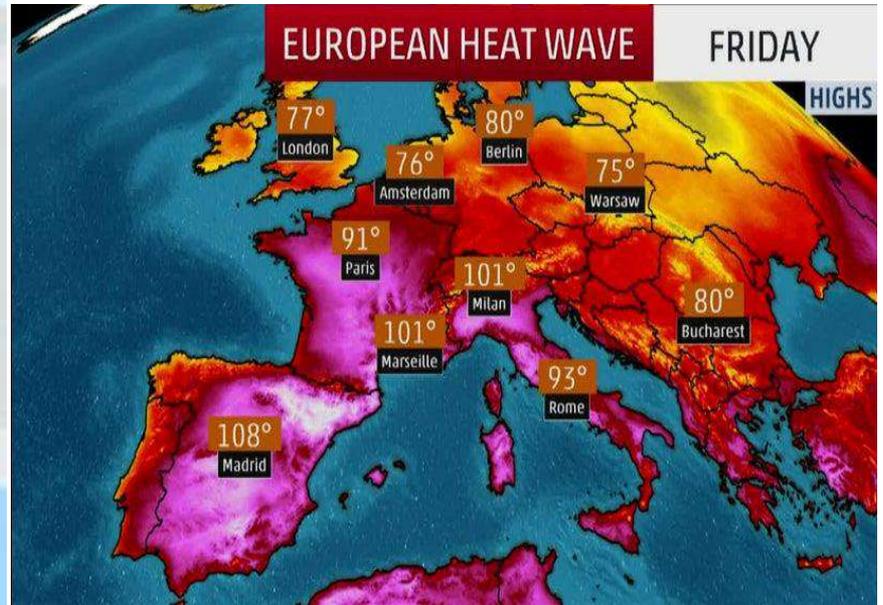
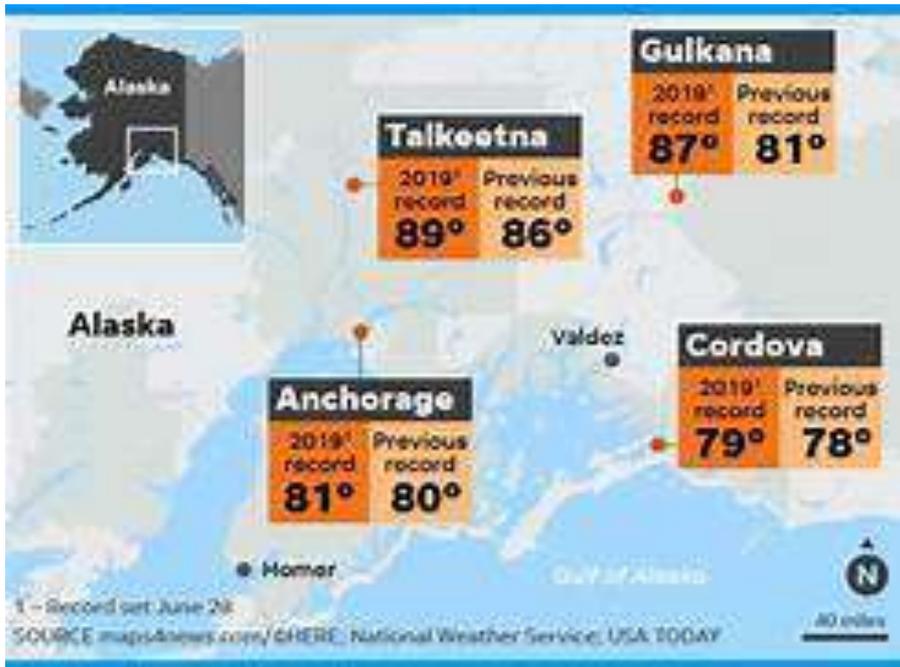
• differentiate mānuka honey from other honey types
• identify it as either monofloral or multifloral mānuka honey.

Climate Issues

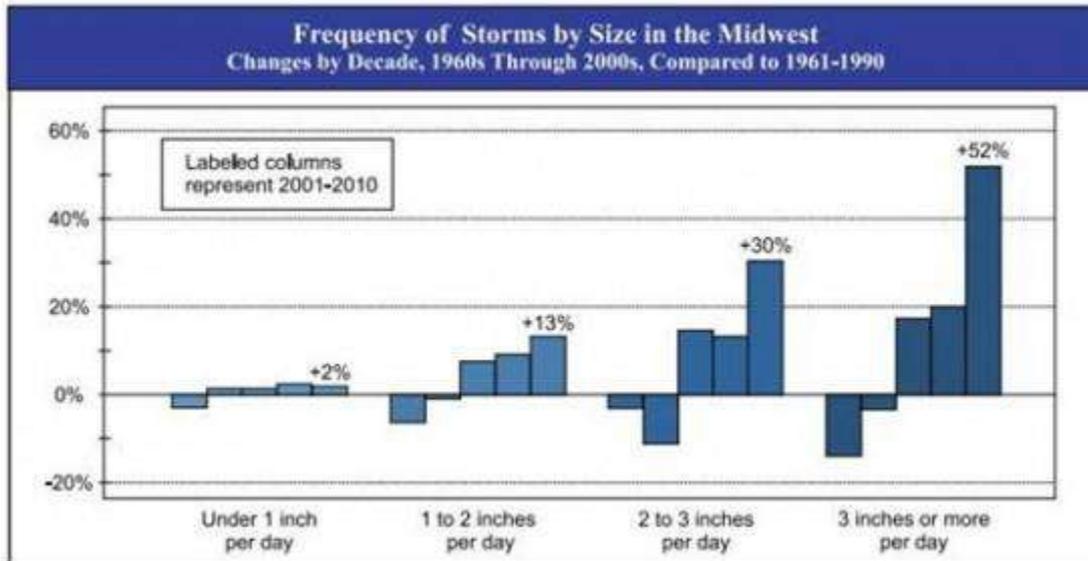
The wellbeing of bees and the security of the food supply are obviously linked to whether or not there is intensification, volatility and frequency of extreme weather events. This year we are witnessing the hottest July on record in France, the hottest month, massive forest fires in the Amazon, the melting of the arctic oceans with the highest temperatures recorded in the arctic, massive fires in Siberia and Russia's arctic forest, the most intense hurricane winds ever recorded of over 200 mph, and the massive floods in the US Midwest.



Fires in the Amazon jungle 2019



2019 record breaking high temperatures around the world



Higher rainfalls in Midwest

Underlying these events are self-feeding processes such as

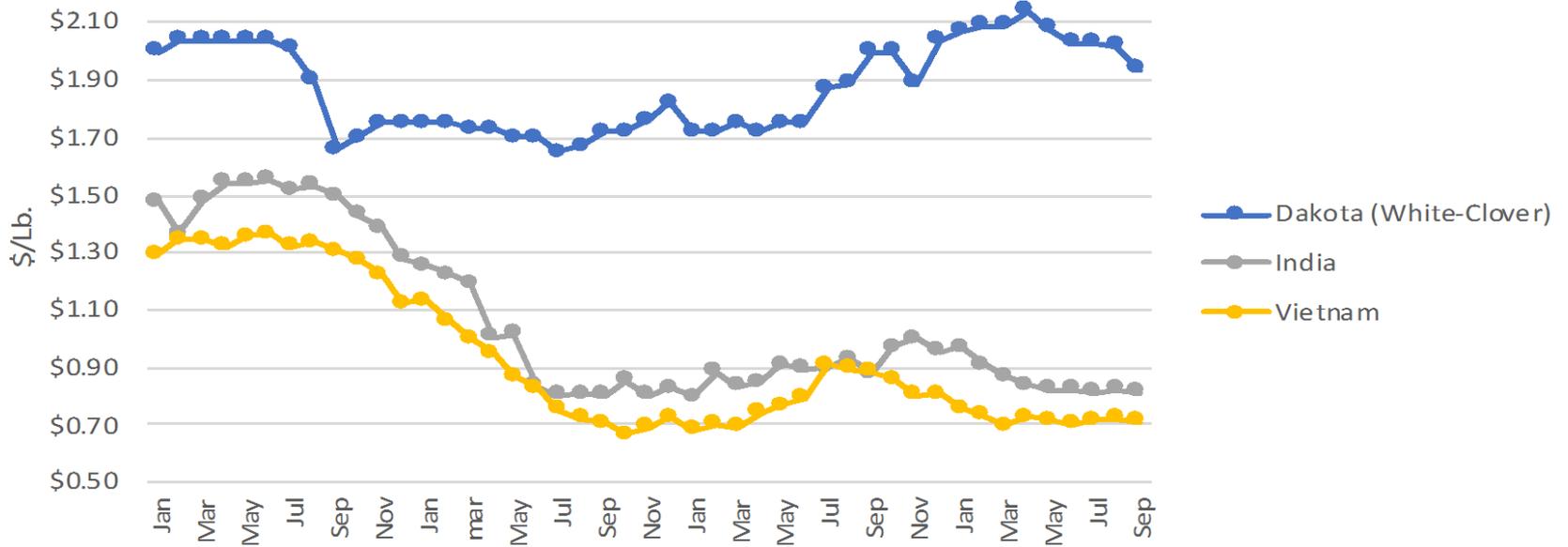
- 1) solar energy is not being reflected into outer space but is being absorbed by the planet.
- 2) carbon is not being sequestered by the great forested jungles but is being released through forest fires, increasing the presence of heat trapping gases in the atmosphere.

Industrial agricultural practices also have their hand in these processes.

- Just as we need Science, not Silence in respect to Climate Issues, we now need Science, not Silence with respect to adulteration of honey.

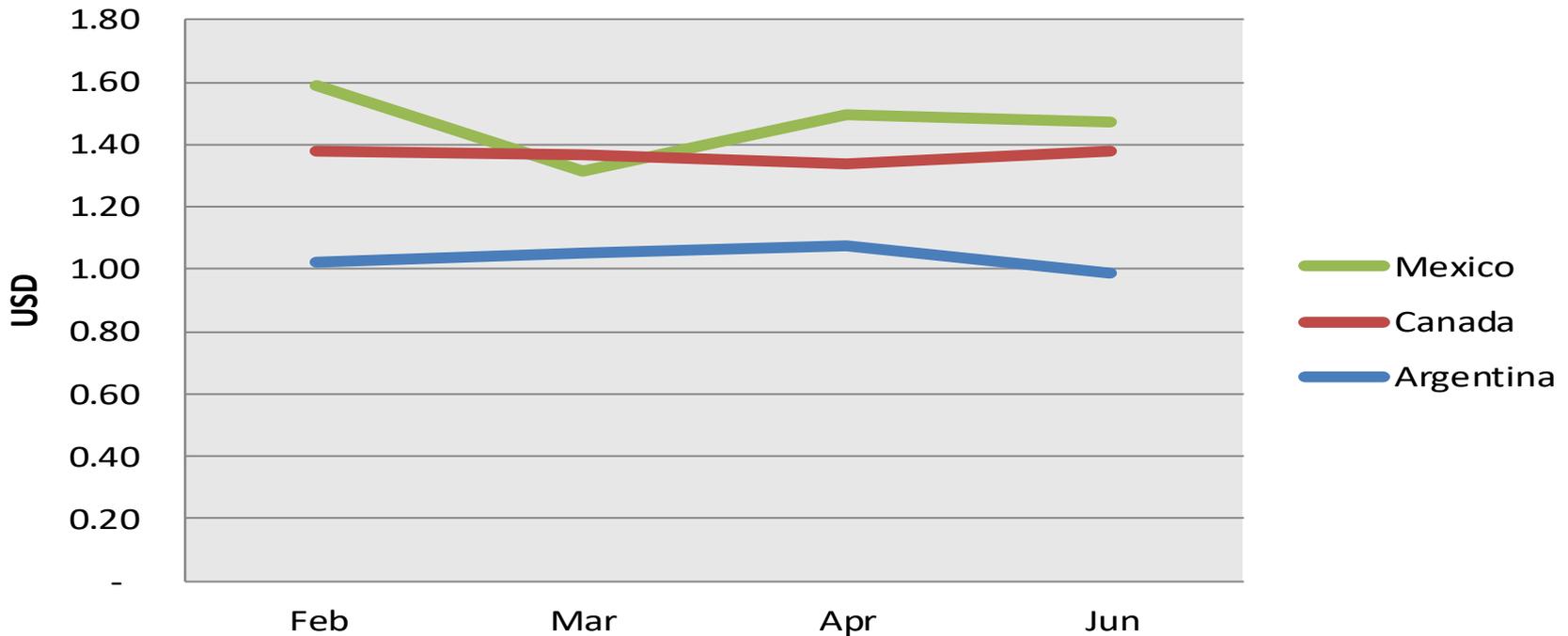
Prepared by Dr. Stan Daberkow

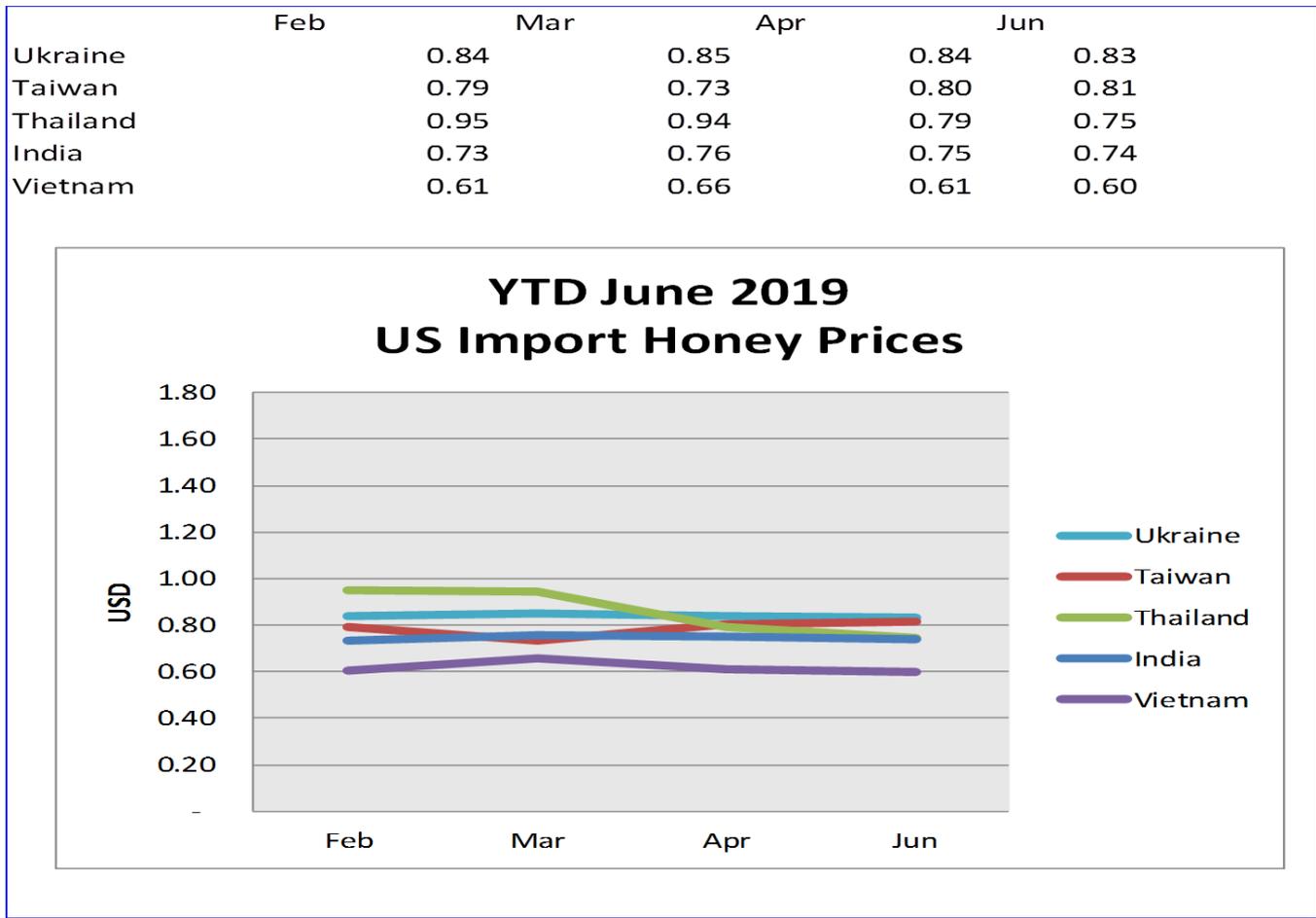
Monthly Value/Lb. (CIF) of U.S Bulk Honey Imports from India and Vietnam & Prices Paid for Dakota Clover Honey, Jan2015-Sept2018



| | Feb | Mar | Apr | Jun |
|-----------|------|------|------|------|
| Argentina | | | | |
| Canada | 1.38 | 1.37 | 1.34 | 1.38 |
| Mexico | 1.59 | 1.32 | 1.49 | 1.47 |

YTD June 2019 US Import Honey Prices from the Americas





Transformation

- There is always resistance to changing established ways to new ways. This is especially true when economically motivated adulteration creates new modes of illicit production and sophisticated modes of adulteration.
- The “fast honey model” has been based upon premature extraction of honey, the use of vacuum chambers to artificially reduce moisture, and more recently the use of ultrafiltration, resin technology and blending bio-engineered extraneous sweeteners.

- China is a predominantly temperate country which has the capacity to produce a high range of world class honey types, based upon its diverse and favorable botanical sources. This includes, Acacia, Milkvetch, Linden, Clover and Alfalfa, Rape seed from the roof of the world, Sunflower, and Chaste.
- China has the capacity to produce mature honey. Changes in the global marketplace with clear, definitive standards for honey, incentivizes Asian countries to join the fight against fake honey.

- It is my personal expectation that Apimondia will show good will and assistance to accomplish this transformation which will benefit the beekeepers and honey consumers of the world.
- The standard for authentic honey does not depend upon whether the honey is from a tropical, subtropical or temperate region. Nor does it depend upon whether honey is used for retail, industrial, food service, or cosmetic purposes.

Flowing into a mighty river

- During the past few years, there have been countless efforts to deny, disparage, delay and delimit the use of NMR and other advanced techniques. Those who have tried to isolate NMR and suppress awareness of adulteration are becoming isolated.
- We have reached an historic moment, thanks to the important work on NMR and the Bruker data base, as well as HRMS, and other tools in the toolbox.
- There are many tributaries, flowing into a mighty river, which include:
 - 1) collaboration between government, private, and academic laboratories,
 - 2) beekeeping organizations,
 - 3) the media,
 - 4) the legal system and
 - 5) responsible members of the honey industry.

- This is not merely a national but it is an international effort, as it must be because honey is a globally traded commodity. The success of the effort depends upon integrating bottom up and top down pressure.
- All those concerned with honey authenticity, global food security, ecological sustainability, and the beekeepers of the world, look forward to the revitalization of the honey industry.

Bees contribute to the aesthetics of
our natural world!



