A Reasonable Discussion in Support of the Chinese Tallow tree, Pollinator Forage, and Local Economies

Dr. William Kern, UF/IFAS Associate Professor posed his claim to support the release of a non-native flea beetle to address the opportunistic/invasive Chinese tallow tree in Florida and twelve other, mostly southern U.S. states[1] Beekeepers can agree with the designation of the Chinese Tallow tree, Triadica sebifera (Family Euphorbiaceae) as an "invasive weed" per many states' Invasive/Exotic Plant lists. Beekeepers can agree the Chinese Tallow tree, like many non-native plants grows quickly, therefore shading out native slow-growing species.

The introduction of this non-native beetle to control the Chinese tallow will result in the loss of a major forage source for honey bees and other pollinator species. This would directly affect these important pollinators, exacerbate the pollinator health crisis impacting native pollinators and honey bees, and lead to very serious economic impacts for beekeepers and farmers on a national scale. Honey bees pollinated $12.4 billion worth of directly dependent crops and $6.8 billion worth of indirectly dependent crops in 2010.[2] Native pollinators are also responsible directly and indirectly pollinating nearly $10 billion worth of crops annually.

Beekeepers rely on the American landscape for their honey bees to produce a honey crop. The 2014 National Pollinator Protection Act, and the subsequent 2015 National Strategy to Protect Honey bees and Other Pollinators recognized the dwindling pollinator forage, and encouraged an increase of pollinator forage across the US. Pollinator forage is desperately needed for honey bees and native pollinators, whether it comes from native or non-native plants. While honey bees are non-native pollinators to North America, they have adapted to the variety of invasive species that they discovered on the landscape, and to those plants humans brought in from even the bees' original non-European honey bee range. Nature found a way for the honey bees to thrive in North America, with or without beekeepers.

Beekeepers seek a reasoned approach to control this non-native, invasive plant species, which for over four hundred years contributed to the beekeepers' crop called honey. Historians note that Ben Franklin gave Chinese Tallow seeds to a Georgia farmer in 1772 as a future cash crop for the farmer and beekeeper.

As beekeepers in the affected states expressed in a letter to USDA-ARS:

> *[Chinese Tallow] "provides a major (honey) market value in at least four of these states. Tallow can be found in all 64 parishes in Louisiana and also in 55 counties of Texas. Honey sales in Louisiana contribute over eight million dollars to the state agriculture sector (NASS). In 2016, Texas produced eight million pounds of honey, with a wholesale value of $11.5 million, seven million pounds of which are attributed in part to the Chinese tallow nectar flow. Nationally, honey sales contribute roughly 336 million dollars to the value of US agriculture commodities in 2016*

(https://www.nass.usda.gov/Statistics_by_State/Louisiana/Publications/Livestock_Press_Releases/BeeHoney/2017/lahoney17.pdf). Even though this is a significant contribution to our economy, the US still remains the top national importer of foreign honey at 423 million dollars (http://agriexchange.apeda.gov.in/product_profile/Major_Imporing_Countries.aspx?categorycode=0408). The obvious conclusion is that beekeepers and honey producers in the United States need public support to preserve existing pollinator forage and nectar sources, particularly those so valuable as Chinese tallow." [3]

To remove a crop in the landscape will severely impact the beekeeper's income. When an agricultural stakeholder is not permitted to grow a specific crop, deeply impacting their livelihood, alternatives are presented. For instance, Illinois is now allowing farmers to grow hemp, again, as it can be used in a variety of products, and requires less chemical inputs to grow in a monoculture setting.[4] Beekeepers make a living off of the Chinese Tallow tree nectar. The honey produced from this crop is made as the honey bees come out of winter, and aids the early summer growth of the population within the hive organism. To remove the Chinese Tallow tree and its spring bloom from the landscape in wetlands and bottomland forests will impact the health of honey bees, and the livelihoods of beekeepers.

The College of Agriculture of Louisiana State University examined a different benefit of the Chinese Tallow tree. " . . *the tallow tree promises to become the second or third most productive source of vegetable oil for biodiesel, after oil palm and possibly algae. This tree can be grown on marginal land and therefore would not compete with food production for limited cropland. Currently, naturalized stands of the tallow tree occupy tens of thousands of acres throughout Louisiana. Converting these lands to commercial production of the tallow tree as a feedstock for biodiesel production offers many potential benefits."*[5]

Beekeepers have continually partnered with other agricultural stakeholders to support agricultural commodities. With the Chinese Tallow tree beekeepers can help pollinate a tree that would be the crop for biodiesel. *"In many respects, the tallow tree offers the ideal energy crop for biodiesel production along the gulf coast. It thrives in wet areas that cannot be farmed profitably with conventional crops. It has few insect pests and diseases and is tolerant of salt, prolonged flooding and occasional freezing temperatures. It has low nutrient and other management requirements. These characteristics as well as the tallow tree's exceptional ability to produce high-quality vegetable oil underscore its commercial potential as a low-input, high-return biodiesel crop for Louisiana."*[6] *"Per acre, these oil yields are 15 times more than soybeans, 10 times more than sunflower or safflower, seven times more than peanuts and five times more than rape seed. Annual commercial production averages about 645 gallons – the equivalent of 15.4 barrels of oil per acre. Some experts cite figures as high as 970 gallons or 23.1 barrels of oil per acre."*[7]

Beekeepers and environmental advocates present the concern that releasing another non-native biological control will create other problems. Will the non-native flea beetle introduce diseases to native flea beetles, or a disease that infects another species? Will the non-native flea beetle begin to seek alternate food sources and begin to attack the very native species USDA-ARS is trying to support? While USDA-ARS research shows lab experiments that the flea beetle prefers the Chinese Tallow tree, a lab test is not the rich, diverse ecosystem in which the non-native flea beetle will be released. Nature finds a way to enjoy diverse food sources, or to protect its eggs from predators by adapting to plants predators do not favor. With the many failed examples of the release of non-native species into just the North American landscape, why does USDA still believe it can control nature? Research presented at an International Symposium on Biological Control of Weeds, researchers postulated

> *agents may be released on the wrong species of plant as occurred in the early stages of the leafy spurge program (Harris 1984), at the wrong time of day or year, or they may develop disease while being reared for release.*
> *Another technical problem that has occurred is the mixing of two species of agents prior to release. This occurred with the two Urophora species on knapweed (Harris 1980a) and the two Galerucella species on purple loosestrife, Lythrum salicaria L., (Blossey et al. 1996).*[8]

From that same 2000 research analysis the author states, *"To make judgements on whether non-target attacks are acceptable requires an analysis of the cost of the weed and the benefit of controlling it as compared to the environmental cost associated with the potential impact of agents on native species of plants (Harris 1990). This is not a simple process and different interest groups will have different values to apply to the cost-benefit analysis."*[9]

What is the cost to beekeepers who lose a vital honey crop plant? What is the cost to the pollinators, native and managed, to this reduction of spring blooming forage, with no replacement forage planned/implemented? What is the cost of the replacement forage? Cost benefit analysis is compiled for pesticide use against crop pests. The value of the crop to the farmer is a very high USDA concern. Beekeepers continue to argue, the honey crops for their livestock should receive the same cost benefit analysis, for planting and protecting it, as any other agricultural stakeholder.

At this time beekeepers and their honey bees need the Chinese Tallow tree to make a honey crop and support their bees during the critical spring bee population increase. Beekeepers understand the value of a diverse landscape, more than any other farmer, but they cannot support the removal of a honey crop, invasive or not, until a restoration plan for a replacement honey crop with a spring bloom accompanies the invasive control actions.

Beekeepers cannot support the use of herbicides to control invasive plant species as that increases the loss of other pollinator forage through pesticide drift. With studies showing glyphosate residues appearing in honey, (a pesticide not used for control of any bee pests) glyphosate applications must be reduced and better controlled to prevent drift onto pollinator forage and water.

However, in the proposal by USDA-ARS to reduce the growth rate of the Chinese Tallow tree there is no restoration plan. *"Without question, the tallow tree can rapidly colonize poorly managed pastures, fence rows, clear-cut forests and other areas that offer adequate sunlight."*[10] Therefore, what is the restoration plan for "poorly managed pastures, fence rows, and clear-cut forest areas?"

The LSU College of Agriculture further postulates, and beekeepers agree, *"The invasive potential of the tallow tree merits serious consideration. So does the opportunity to restore economic prosperity to many of the most impoverished areas of Louisiana by converting many thousands of acres of marginal land currently colonized by the tallow tree to a highly profitable, low-input bioenergy crop. Because of the ability of the tallow tree to flourish on marginal land, it can be produced without adversely affecting our ability to produce food. This perennial oilseed crop does not require routine cultivation of the soil and therefore also can serve to prevent soil erosion and reduce pollution of surface waters while sequestering atmospheric carbon dioxide in its biomass. Harvesting the fruit before it is fully mature can serve to reduce rather than enhance its spread by birds and other means from areas heavily colonized with the tallow tree."*[11]

If we are to support the growth of native plant species, therefore the sustainability of native pollinators, land managers must be involved to restore the land for and with native species in order to reduce the opportunity of a different invasive overtaking the Chinese Tallow tree range. However, we cannot ignore the contributions of the Chinese Tallow tree to the local economy, and other stakeholders like managed pollinators and beekeepers.

1 A Reasonable Argument in Support of the Chinese Tallow Flea Beetle, Mary Bammer, Aug. 31, 2018, http://blogs.ifas.ufl.edu/entnemdept/2018/08/31/a-reasonable-argument-in-support-of-the-chinese-tallow-flea-beetle/

[2] Insect pollinators contribute $29 billion to U.S. farm income, Krishna Ramanujan, May 22, 2012, Cornell Chronicle, http://news.cornell.edu/stories/2012/05/insect-pollinators-contribute-29b-us-farm-income

[3] Louisiana Beekeepers Association, Dec. 12, 2017, http://pollinatorstewardship.org/wp-content/uploads/2018/09/Flea-beetle-letter-2-Date-Revised.pdf

[4] Illinois Farmers Get Permission to Grow Hemp, WQAD, Aug. 29, 2018, https://wqad.com/2018/08/29/illinois-farmers-get-permission-to-grow-hemp/

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[8,9] What Can We Learn From Biological Control Failures?, J. H. MYERS, Department of Zoology and Faculty of Agricultural Sciences, University of British Columbia, Vancouver, B.C. V6T 1Z4 Canada, *Proceedings of the X International Symposium on Biological Control of Weeds*, Neal R. Spencer [ed.]. 4-14 July 1999, Montana State University, Bozeman, Montana, USA
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U.S. EPA requires ag companies to better manage pesticides in California and Arizona

SAN FRANCISCO – Today, (September 24, 2018) the U.S. Environmental Protection Agency (EPA) announced settlements with two companies for the improper storage and labeling of agricultural pesticides. Nutrien Ag Solutions, Inc., formerly doing business as Crop Production Services, Inc., and Colusa County Farm Supply, Inc., a distributor of chemicals and fertilizers in Northern California, have agreed to pay a total of $345,148 in civil penalties. The firms have corrected all identified compliance issues.

"Companies that produce or refill pesticide products are required to carefully follow FIFRA requirements to ensure the public and the environment are protected," **said EPA Pacific Southwest Enforcement Division Director Kathleen Johnson.** "Improper storage of pesticides can lead to spills or leaks that may adversely affect human health and the environment."

EPA asserted both companies had multiple violations under the Federal Insecticide, Fungicide, and Rodenticide Act, which regulates the distribution, sale and use of pesticides in the United States. Nutrien Ag Solutions agreed to pay $331,353; Colusa County Farm Supply will pay $13,795.