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### Protecting Kentucky's Honey Bees: What's Killing the Buzz, Why it Matters, and What We Can Do to Help

Christine M. Ficker  
*University of Kentucky*

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# PROTECTING KENTUCKY'S HONEY BEES: WHAT'S KILLING THE BUZZ, WHY IT MATTERS, AND WHAT WE CAN DO TO HELP

*Christine M. Ficker\**

## I. INTRODUCTION

Honey bees are an invaluable asset to successful agriculture and are needed to pollinate crops across the United States and in Kentucky.<sup>1</sup> In the U.S. each year, bees are responsible for increasing crop value by at least \$15 billion.<sup>2</sup> One-third of the food supply consumed in the United States is generated directly or indirectly by bee pollination.<sup>3</sup> Bees are needed to pollinate many crops that add to Americans' diversified diets including almonds, apples, blackberries, cherries, kiwifruit, pears, raspberries, and strawberries.<sup>4</sup>

Currently, the number of honey bee colonies in the U.S. is around 2.66 million, a significant decrease from the 5 million colonies that existed in the 1940s.<sup>5</sup> In 2015, 42 percent of colonies in the U.S. collapsed, which is a record-high number in comparison to the average 31 percent collapse rates that had been recorded yearly for the previous decade.<sup>6</sup> The recent large-scale loss of honey bees across the nation has been labeled Colony Collapse Disorder ("CCD").

Unfortunately, scientific data has been unable to prove the exact cause of CCD.<sup>7</sup> It is believed that CCD could be triggered by a number of factors including parasites, pathogens, poor

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\* Staff Editor, KY. J. EQUINE, AGRIC., & NAT. RESOURCES L., 2016-2017; B.A. 2009, Ohio State University; J.D. expected May 2017, University of Kentucky College of Law.

<sup>1</sup> *Honey Bee Health and Colony Collapse Disorder*, U.S. DEP'T OF AGRIC., AGRIC. RES. SERV. (Oct. 1, 2105), <http://www.ars.usda.gov/News/docs.htm?docid=15572> [hereinafter *Bee Health and CCD*].

<sup>2</sup> *Id.*

<sup>3</sup> *Id.*

<sup>4</sup> *List of Pollinated Foods*, POLLINATOR P'SHIP, [http://pollinator.org/list\\_of\\_pollinated\\_food.htm](http://pollinator.org/list_of_pollinated_food.htm) (last visited Jan. 28, 2016).

<sup>5</sup> *Bee Health and CCD*, *supra* note 1.

<sup>6</sup> *Save Our Bees*, NAT'L RES. DEF. COUNCIL, <http://www.nrdc.org/wildlife/animals/bees.asp> (last visited Jan. 28, 2016).

<sup>7</sup> *Bee Health and CCD*, *supra* note 1.

nutrition, pesticides, bee management practices, habitat fragmentation, and agricultural practices.<sup>8</sup> No single factor has been proven to be the exact cause of the phenomenon.<sup>9</sup>

The United States is not the only country affected by CCD. Over the past 15 years, beekeepers in the European Union (“EU”), including France, Belgium, Switzerland, Germany, the Netherlands, Italy, and Spain as well as the United Kingdom have reported an increased number of bee losses and an overall weakening of bee colonies.<sup>10</sup> The EU has been quick to respond to the significant bee losses and has implemented actions in several policy areas to prevent further decline including beekeeping, agriculture, environment, research, pesticides, veterinary issues, and surveillance measures.<sup>11</sup>

The United States has also taken action at the federal level to help understand and combat CCD. The United State Department of Agriculture (“USDA”) is the leading authority on CCD within the U.S. and has established a Committee to research potential causes and make recommendations to beget strong colonies in the future.<sup>12</sup> The Environment Protection Agency (“EPA”) is also assisting the USDA with research efforts to protect our pollinators.<sup>13</sup>

This Note asserts that Kentucky should dedicate resources to research honey bee populations and colony health, temporarily ban the use of neonicotinoid pesticides within the state, and work to educate the public about the issues honey bees are facing within the state, nationally, and worldwide. The first part of this Note will briefly explore the history between humans and honey bees. Next, it will present an overview of CCD ranging from the symptoms indicating a colony has collapsed to an explanation of potential factors that lead to the disorder. Third, the Note will

<sup>8</sup> See CCD STEERING COMM., *Colony Collapse Disorder Action Plan*, US DEP’T AGRIC. 2 (June 20, 2007), [http://www.ars.usda.gov/is/br/ccd/ccd\\_actionplan.pdf](http://www.ars.usda.gov/is/br/ccd/ccd_actionplan.pdf).

<sup>9</sup> *Id.*

<sup>10</sup> *Bee Health*, EUROPEAN FOOD SAFETY AUTH., <http://www.efsa.europa.eu/en/topics/topic/beehealth>, (last visited Jan. 28, 2016).

<sup>11</sup> *EU Efforts for Bee Health*, EUROPEAN COMM’N, (Dec. 12, 2015) [http://ec.europa.eu/food/animals/live\\_animals/bees/health/index\\_en.htm](http://ec.europa.eu/food/animals/live_animals/bees/health/index_en.htm).

<sup>12</sup> CCD STEERING COMM., *supra* note 8, at 1.

<sup>13</sup> *Colony Collapse Disorder*, EPA (Jan. 6, 2016), <http://www2.epa.gov/pollinator-protection/colony-collapse-disorder#what>.

shift focus to the European response to CCD and describe the actions taken to protect pollinators. The fourth part of this Note will then survey the actions taken by the U.S. at the federal level to address the growing issue of CCD and honey bee population losses. Fifth, this Note will evaluate the effectiveness of the actions taken by both the EU and the US and conclude that the EU has been much more effective than the U.S. in preserving pollinator populations. Finally, this Note will make recommendations for Kentucky as to effective solutions for combating CCD and pollinator losses.

## II. A BRIEF HISTORY OF BEES

### *A. Honey Bees and Human Culture*

Humans and honey bees have shared a long-standing relationship throughout history.<sup>14</sup> Early civilizations in Africa, India, and Spain developed honey collection methods, as evidenced by rock art in those areas.<sup>15</sup> Organized beekeeping centers were established in early Egypt, Greece, Italy, and Israel and functioned until the dissolution of the Roman Empire around 400 C.E.<sup>16</sup> Following the fall of the Roman Empire, Christian convents and monasteries served as beekeeping centers until the beginning of the Reformation when they were closed by Henry VIII.<sup>17</sup> During the Enlightenment, new science and technology helped aid the development of apiculture, or beekeeping.<sup>18</sup>

During the 19th century, apiculture became commercially viable with the invention and development of specialized beekeeping tools that are still in use today.<sup>19</sup> Currently, many industrialized countries have specifically developed agricultural schemes that are dependent on bees’ efficient pollination

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<sup>14</sup> See generally Tammy Horn, *Honey Bees: A History*, N.Y. TIMES BLOG (Apr. 11, 2008, 1:05 PM), [http://topics.blogs.nytimes.com/2008/04/11/honey-bees-a-history/?\\_r=0](http://topics.blogs.nytimes.com/2008/04/11/honey-bees-a-history/?_r=0) (describing the historical relationship between humans and honeybees).

<sup>15</sup> *Id.*

<sup>16</sup> *Id.*

<sup>17</sup> *Id.*

<sup>18</sup> *Id.*

<sup>19</sup> *Id.*

methods.<sup>20</sup> Humans and honey bees will continue to have a relationship based on humans' dependence on the insects to aide in crop pollination.

### *B. Honey Bees in North America and the United States*

Honey bees first came to North America during the 17th century when many Europeans were fleeing poverty, religious persecution, and war.<sup>21</sup> Most notably, settlers of Jamestown and Williamsburg brought honey bees to the New World to provide honey for the developing settlements.<sup>22</sup> Over the next two centuries, a plethora of apiculture knowledge and skills were brought to the United States by European immigrants.<sup>23</sup>

North America is home to approximately 4,000 species of bees, most of which are native to the continent.<sup>24</sup> But, *Apis mellifera*, the European honey bee, is the most colonized crop pollinator in the United States.<sup>25</sup> Today, it is estimated that there are roughly 2.5 million bee colonies in the U.S.<sup>26</sup> Bee pollination of crops is responsible for \$15 billion in increased crop value each year, meaning that roughly one mouthful of food out of every three is the direct or indirect result of bee pollination.<sup>27</sup> Common crops in the United States that rely on bees for pollination include: almonds, apples, melons, plums, avocados, cherries, pears, cucumber, cranberries, and kiwis.<sup>28</sup> Without bee

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<sup>20</sup> *Id.*

<sup>21</sup> *Id.*

<sup>22</sup> Sharon Levy, *The Vanishing Bee*, ONEARTH MAG., Summer 2006, <http://archive.onearth.org/article/unearth-the-vanishing>.

<sup>23</sup> *Id.*

<sup>24</sup> Jennifer Hopwood et al., *Are Neonicotinoids Killing Bees? A Review of Research Into the Effects of Neonicotinoid Insecticides on Bees, with Recommendations for Action*, XERCES SOC'Y FOR INVERTEBRATE CONSERVATION 2 (2012), [http://www.xerces.org/wp-content/uploads/2012/03/Are-Neonicotinoids-Killing-Bees\\_Xerces-Society1.pdf](http://www.xerces.org/wp-content/uploads/2012/03/Are-Neonicotinoids-Killing-Bees_Xerces-Society1.pdf).

<sup>25</sup> *Id.*

<sup>26</sup> *Bee Health and CCD*, *supra* note 1.

<sup>27</sup> *Id.*

<sup>28</sup> Roger A. Morse & Nicholas W. Calderone, *The Value of Honey Bees as Pollinators of U.S. Crops in 2000*, BEE CULTURE MAG. (Mar. 2000), <https://www.beyondpesticides.org/assets/media/documents/pollinators/documents/ValueofHoneyBeesasPollinators-2000Report.pdf>.

pollination, American diets would lack nutrition, diversity, and flavor.<sup>29</sup>

### III. AN OVERVIEW OF COLONY COLLAPSE DISORDER

#### A. Background

Colony Collapse Disorder is a phenomenon where a bee colony is found dead – lacking adult bees or with an abundance of dead adult bee bodies – yet the colony still contains a living queen and young bees with honey reserves present in the colony.<sup>30</sup> Additionally, the dead colony does not show signs of destruction by a food robber or other pest, despite the honey and pollen supply.<sup>31</sup> Also, common parasites are not present in the colony at levels typically needed to cause such a sharp decline in colony population.<sup>32</sup>

In 2006, some beekeepers in the U.S. began reporting substantial losses in their hives, reporting anywhere between 30 to 90 percent loss of colony populations.<sup>33</sup> While it is true that since 1947, bee populations have been steadily declining around 1 percent per year, the steeper yearly declines since 2006, ranging between 29 to 36 percent per year, have been alarming.<sup>34</sup> Unfortunately, no scientific cause for CCD has been definitively proven.<sup>35</sup> Many scientists, however, agree that CCD is most likely caused by a combination of factors that can act together to affect and weaken the colony to the point that it collapses.<sup>36</sup> The potential causes of CCD include environmental and nutritional stress, pathogens, and pesticides.

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<sup>29</sup> *Bee Health and CCD*, *supra* note 1.

<sup>30</sup> *Id.*

<sup>31</sup> *Id.*

<sup>32</sup> Heather Pilatic, *Pesticides and Honeybees: State of the Science* PESTICIDE ACTION NETWORK 1, 2 (May 2012), [http://www.panna.org/sites/default/files/Bees&Pesticides\\_SOS\\_FINAL\\_May2012.pdf](http://www.panna.org/sites/default/files/Bees&Pesticides_SOS_FINAL_May2012.pdf).

<sup>33</sup> *Bee Health and CCD*, *supra* note 1.

<sup>34</sup> Pilatic, *supra* note 32, at 2.

<sup>35</sup> *Bee Health and CCD*, *supra* note 1.

<sup>36</sup> Pilatic, *supra* note 32, at 2.

*B. Potential Causes of Colony Collapse Disorder**i. Environmental and Nutritional Stress*

Over the last 50 years, habitat loss for bees has steadily increased while areas of increased human development often has resulted in higher numbers of collapsed colonies.<sup>37</sup> Additionally, the recent advent of genetically engineered crops leaves bees without the natural plant varieties that pad their diet.<sup>38</sup> The decrease in honey bee habitats often leads to a less varied and nutritious diet for bees.<sup>39</sup> Without a balanced diet, bees suffer from decreased reproductive viability and lack the immune system strength needed to protect the colony from other outside factors, such as pathogens and pesticides that could cause the colony to become weak and die.<sup>40</sup>

*ii. Pathogens*

Pathogens that affect bee colonies include parasitic mites, viruses, and fungi.<sup>41</sup> First, Nosema is a disease affecting adult European honey bees.<sup>42</sup> Nosema disease is caused by a spore that forms the microsporidian *Nosema apis*.<sup>43</sup> If a bee ingests a spore that contains *Nosema apis*, the spore begins to germinate and penetrates the cells of the stomach lining in the bee.<sup>44</sup> Over time, the spore grows and uses the contents of the cell as a food source.<sup>45</sup> Normally during digestion, cells within the stomach lining of an adult bee are shed into the stomach where they open and release digestive enzymes.<sup>46</sup> But, if stomach cells are infected with spores, the spores are released into the stomach instead of

<sup>37</sup> *Id.*<sup>38</sup> *Id.*<sup>39</sup> *Id.*<sup>40</sup> *Id.*<sup>41</sup> *Id.*

<sup>42</sup> *Nosema Disease of Honey Bees*, AGRIC. VICTORIA (June 22, 2015), <http://agriculture.vic.gov.au/agriculture/pests-diseases-and-weeds/animal-diseases/bees/nosema-disease-of-honey-bees>.

<sup>43</sup> *Id.*<sup>44</sup> *Id.*<sup>45</sup> *Id.*<sup>46</sup> *Id.*

the enzymes.<sup>47</sup> Upon release, the spores infect other healthy cells in the stomach lining and the process continues.<sup>48</sup> Nosema disease is then spread to other members of the colony through the excrement of infected bees.<sup>49</sup> If a colony is infected with Nosema disease, the loss of adult bees can occur rapidly, and typically the infected bees die while away from the colony leaving only a limited number of infected or dead bees within the hive.<sup>50</sup>

The second major pathogen that affects honey bees is the Varroa mite. The Varroa mite is an external parasite that attaches to a bee and feeds by sucking the bee’s blood.<sup>51</sup> An infected bee suffers from a weakened immune system and a shortened life span.<sup>52</sup> Varroa mites can also develop on the bee brood, or eggs, which results in deformed young that are often smaller than average, missing wings or legs, or have shortened abdomens.<sup>53</sup> Once present among adult bees within the colony, the mites can rapidly spread to infect the healthy bees in the colony.<sup>54</sup> If a Varroa mite infestation is not treated, most infected colonies die within one to two years as a result of the parasite.<sup>55</sup>

### *iii. Pesticides*

Many indicators point to pesticides as a cause of CCD, specifically neonicotinoids, which are synthetic chemical insecticides designed to be similar to nicotine in both structure and action.<sup>56</sup> Honey bees can become exposed to neonicotinoids in variety of ways, but are most commonly brought into contact through the ingestion of nectar or pollen from plants treated with

<sup>47</sup> *Id.*

<sup>48</sup> *Id.*

<sup>49</sup> *Id.*

<sup>50</sup> *Id.*

<sup>51</sup> Ric Bessin, UNIV. KY. COLL. AGRIC., *Varroa Mites Infesting Honey Bee Colonies*, <http://www2.ca.uky.edu/entomology/entfacts/ef608.asp> (last visited Jan. 28, 2016).

<sup>52</sup> *Honey Bee Disorders: Honey Bee Parasites*, UNIV. GA. COLL. AGRIC. ENVTL. SCI. (May 29, 2015), <http://www.ent.uga.edu/bees/disorders/honey-bee-parasites.html>.

<sup>53</sup> *Id.*

<sup>54</sup> *Id.*

<sup>55</sup> *Id.*

<sup>56</sup> *Pesticides and Pollinators*, BEYOND PESTICIDES, <https://beyondpesticides.org/assets/media/documents/pollinators/pollinators.pdf> (last visited Jan. 28, 2016).



these pesticides or through direct contact with spray residue on plants.<sup>57</sup> Pesticides can have lethal, sublethal, and synergistic effects on honey bees.<sup>58</sup> A pesticide that is acutely toxic to honey bees and would result in the death of the bee is considered lethal.<sup>59</sup> A pesticide is considered to be sublethal if the toxin level does not cause death, but hinders necessary survival skills such as olfactory learning, foraging, and reproduction.<sup>60</sup> Finally, a synergistic effect occurs when bees are exposed to sublethal levels of pesticides and an individual bee or colony is exposed to another CCD contributing factor such as a pathogen or nutritional stress.<sup>61</sup>

#### IV. EUROPEAN UNION EFFORTS FOR IMPROVING BEE HEALTH

##### *A. Background and Reasoning*

The European Union is home to roughly 630 thousand beekeepers and about 16 million beehives.<sup>62</sup> Honey bees and other pollinators contribute an estimated €22 billion each year to the agriculture industry in the EU.<sup>63</sup> Honey bees, wild bees, and bumblebees pollinate about 80 percent of all crops throughout the Union.<sup>64</sup> Honey bees in particular are a valued species because in addition to providing about 234 thousand tons of honey each year,<sup>65</sup> they also provide pollen, wax for food processing, propolis in food technology, and royal jelly to be used as a dietary supplement and a food ingredient.<sup>66</sup>

Starting in 2010, the European Commission, a sector of the EU responsible for drafting legislation, enforcing decisions,

<sup>57</sup> Hopwood, *supra* note 24, at 6.

<sup>58</sup> *Id.*

<sup>59</sup> *Pesticides and Pollinators*, *supra* note 56.

<sup>60</sup> *Id.*

<sup>61</sup> *Id.*

<sup>62</sup> *EU Efforts for Bee Health*, *supra* note 11.

<sup>63</sup> *Id.*

<sup>64</sup> *EU Efforts for Bee Health*, *supra* note 11.

<sup>65</sup> *Honey Bees*, EUROPEAN COMM'N, [http://ec.europa.eu/food/animals/live\\_animals/bees/index\\_en.htm](http://ec.europa.eu/food/animals/live_animals/bees/index_en.htm) (last visited Jan. 28, 2016).

<sup>66</sup> *Id.*

and managing the business of the EU, began taking actions to diagnose potential causes of bee mortality and develop a plan to help prevent colony loss after professionals and members of the public expressed concerns about recent pollinator losses.<sup>67</sup> The European Commission understood that bee health is related to a multitude of factors, so its actions cover multiple policy areas including beekeeping and agriculture, veterinary issues, environment, pesticides, research, and surveillance measures in many EU member states.<sup>68</sup> Additionally, the Commission has acknowledged that the existing data recording bee losses is inconclusive regarding the exact reasons why pollinator populations are in decline, and, therefore, it has commissioned a variety of research projects to study bee health.<sup>69</sup>

### *B. Actions Taken by the European Union Through the European Commission*

In 2010, the European Commission addressed a Communication, COM(2010) 714, to the European Parliament and the Council in an effort to direct attention concerning bee mortality across the EU.<sup>70</sup> The Communication highlighted the importance of honey bees to the EU while outlining the key issues and actions that the Commission planned to address through a series of future actions.<sup>71</sup> On February 2 of the following year, the Commission passed Commission Regulation No 87/2011 which designated the Agence Nationale de Securite Sanitaire de l'alimentation, de l'environnement et du travail (“ANSES”) in France as the EU reference laboratory for bee health that would be responsible for working with member states to collect data on bee populations and health.<sup>72</sup> In addition to establishing the reference laboratory, the regulation also laid down the laboratory’s general duties.<sup>73</sup> Later in 2013, this Regulation was repealed and replaced with Regulation No 415/2013, which

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<sup>67</sup> *EU Efforts for Bee Health*, *supra* note 11.

<sup>68</sup> *Honey Bees*, *supra* note 65.

<sup>69</sup> *Id.*

<sup>70</sup> *EU Efforts for Bee Health*, *supra* note 11.

<sup>71</sup> *Id.*

<sup>72</sup> Commission Regulation 87/2011, of Feb. 2, 2011, O.J. (L 29) 1, 2.

<sup>73</sup> *Id.* at 1, 3–4.

simplified the 2011 Regulation while providing more clarification on the actions that the Commission wanted ANSES and member states to take.<sup>74</sup>

In 2012, the Commission designated €3.3 million to fund surveillance studies in seventeen member states on bees throughout the EU.<sup>75</sup> The purpose of these studies was to gather an extensive amount of data on honey bee colonies across a large geographical area, and to compare bee mortality rates across the member states.<sup>76</sup>

On December 3, 2013, the Commission restricted the use of three neonicotinoids: <sup>77</sup> clothianidin, imidacloprid, and thiamethoxam.<sup>78</sup> This ban was in reaction to a study published in January by the European Food Safety Authority (“EFSA”) evaluating whether the chemicals had an acute or chronic effect on colony survival.<sup>79</sup> Scientific experts were not able to definitively answer all questions related to the neonicotinoids due to a lack to information, but they were able to conclude that bees were at risk from exposure to these chemicals through pollen and nectar, dust, and plant guttation.<sup>80</sup> In order to combat negative effects of the pesticides on bees from exposure from pollen and nectar, the EFSA concluded that the chemicals should only be used on crops that are not attractive to honey bees.<sup>81</sup> The EFSA also concluded that honey bees were only at risk of exposure from dust for a limited number of crops, specifically sugar beets or crops planted in greenhouses.<sup>82</sup>

In May of 2013, the EFSA released another study that highlighted the affect of fipronil, another type of pesticide, on

<sup>74</sup> Commission Regulation 415/2013, 2013 O.J. (L 125) 7, 7–8.

<sup>75</sup> *EU Efforts for Bee Health*, *supra* note 11.

<sup>76</sup> *Id.*

<sup>77</sup> *Id.*

<sup>78</sup> European Commission Press Release IP/13/457, Bee Health: EU-wide Restrictions on Pesticide Use to Enter into Force on 1 December (May 24, 2013).

<sup>79</sup> *EFSA Identifies Risks to Bees from Neonicotinoids*, EUROPEAN FOOD SAFETY AUTH. (Jan. 16, 2013), <http://www.efsa.europa.eu/en/press/news/130116> [<https://perma.cc/2M9W-D45U>].

<sup>80</sup> *Id.*

<sup>81</sup> *Id.*

<sup>82</sup> *Id.*

honey bees.<sup>83</sup> This study was only able to conclude that bees were at risk from the effects of fipronil when it was used as a seed treatment on maize.<sup>84</sup> In June, the Commission proposed a regulation restricting the use of fipronil within the EU to the Standing Commission on the Food Chain and Animal Health.<sup>85</sup> However, even with twenty-three of the twenty-eight member states supporting the regulation, it was not passed that day.<sup>86</sup> The Commission ended the year by continuing to provide financing for member states to conduct voluntary surveillance studies on colony losses.<sup>87</sup>

In April 2014, the Commission hosted the Conference for Better Bee Health.<sup>88</sup> The conference was an open forum to allow individuals and groups from different sectors to engage in the discussion of bee health.<sup>89</sup> The transfer of knowledge about actions that could be taken within the EU to help protect pollinators was primary objective of the conference.<sup>90</sup>

In 2014, the Commission announced that the number of seasonal mortality rates were lower than winter mortality rates by 0.3 percent to 13.6 percent in colonies located within the member states that participated in surveillance studies.<sup>91</sup> While the Commission noted that lower mortality rates were encouraging, the long-term effects of the Commission’s actions could not be properly assessed with the limited data that they

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<sup>83</sup> *EFSA Assesses Risks to Bees from Fipronil*, EUROPEAN FOOD SAFETY AUTH. (May 27, 2013), <https://www.efsa.europa.eu/en/press/news/130527> [<https://perma.cc/E839-6ZZX>].

<sup>84</sup> *Id.*

<sup>85</sup> European Commission Press Release IP/13/708, *Bee Health: EU Takes Additional Measures on Pesticides to Better Protect Europe’s Bees* (July 16, 2013).

<sup>86</sup> *Id.*

<sup>87</sup> *Id.*

<sup>88</sup> *European Commission Announces Conference for Better Bee Health*, EUROPEAN COMM’N DIRECTORATE GEN. FOR HEALTH AND FOOD SAFETY (Nov. 3, 2014), [http://ec.europa.eu/dgs/health\\_consumer/dyna/enews/enews.cfm?a\\_id=1462](http://ec.europa.eu/dgs/health_consumer/dyna/enews/enews.cfm?a_id=1462) [<https://perma.cc/34V7-V38A>].

<sup>89</sup> *Id.*

<sup>90</sup> *Id.*

<sup>91</sup> Memorandum from the European Commission, *Bee Health: What is the EU doing?* 1 (2014), [http://europa.eu/rapid/press-release\\_MEMO-14-260\\_en.htm](http://europa.eu/rapid/press-release_MEMO-14-260_en.htm) [<https://perma.cc/CLC8-D6NY>].

had collected.<sup>92</sup> Also, the Commission noted that the neonicotinoid ban would be kept in place.<sup>93</sup>

## V. ACTIONS TAKEN TO PROTECT BEES IN THE UNITED STATES

### A. Federal Action

#### i. United States Department of Agriculture

In 2007, in response to reports of extensive honey bee losses, the United States Department of Agriculture announced that it would prepare to take action to help eradicate the effects of CCD on honey bee populations within the United States.<sup>94</sup> The USDA is the leading federal authority addressing CCD, and in 2007, two agencies within the USDA, the Agricultural Research Service (“ARS”) and the National Institute of Food and Agriculture (“NIFA”), worked to organize a collaborative effort to help define the actions that the USDA would take to combat CCD.<sup>95</sup> At the direction of the Deputy Secretary of Agriculture, the ARS and NIFA acted as program leaders to organize the CCD Steering Committee.<sup>96</sup> In addition to the ARS and NIFA, the CCD Steering Committee was also comprised of members of the Animal and Plant Health Inspection Service (“APHIS”), the Natural Resources Conservation Service (“NRCS”), and the Office of Pesticide Programs from the U.S. Environmental Protection Agency (“OPP-EPA”).<sup>97</sup>

The Steering Committee requested information from apiculture experts concerning recommendations on how to approach the CCD problem and address the issue.<sup>98</sup> Using the information that was provided the Committee created the first CCD Action Plan.<sup>99</sup> The original CCD Action Plan focused on four

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<sup>92</sup> *Id.* at 3.

<sup>93</sup> *Id.*

<sup>94</sup> See CCD STEERING COMM., *supra* note 8, at 2.

<sup>95</sup> *Id.* at 1.

<sup>96</sup> *Id.*

<sup>97</sup> *Id.*

<sup>98</sup> *Id.*

<sup>99</sup> *Id.*

main components: 1) survey and data collection to determine the extent that CCD had affected honey bee populations and the status of honey bee colony health and production; 2) sample analysis to determine the presence of pests and pathogens, exposure to pesticides, and bee colony immunity and stress levels; 3) research on factors that could be contributing to CCD, including pests, pesticides, new and reemerging pathogens, and nutritional and environmental stress; and 4) preventative and mitigating measures to improve bee health in order to combat mortality factors.<sup>100</sup>

Despite the extensive research efforts undertaken by the Steering Committee, persistent high losses of bees reported in the U.S. continued.<sup>101</sup> The Committee moved to organize two conferences in order to gather data to reassess research efforts on the primary causes of losses.<sup>102</sup> The first conference was the National Stakeholder Conference on Honey Bee Health held in October 2012.<sup>103</sup> The second, the Varroa Mite Summit, held in February 2014, focused on the needs of beekeepers and growers to help develop best management practices for both groups.<sup>104</sup> The information gathered at the two conferences was used to help develop a new Committee action plan.<sup>105</sup>

Recently, the CCD Steering Committee was renamed the CCD and Honey Bee Health Steering Committee to more accurately reflect the increased knowledge and understanding that bee health factors play on current bee populations.<sup>106</sup> The new action plan now has six main focuses: 1) surveys, 2) nutrition, 3) pests, 4) pathogens, 5) genetics, breeding, and biology, and 6) economics.<sup>107</sup> The new action plan addresses the problems associated with each focus, goals to be accomplished relating to the problem, and a plan of action for accomplishing the related goals.<sup>108</sup>

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<sup>100</sup> *Id.* at 2–3.

<sup>101</sup> *Id.* at 11.

<sup>102</sup> *Id.*

<sup>103</sup> *Id.*

<sup>104</sup> *Id.*

<sup>105</sup> *Id.* at 12.

<sup>106</sup> *Id.* at 1.

<sup>107</sup> *Id.* at 2.

<sup>108</sup> *Id.* at 12.

*ii. The Environmental Protection Agency*

The Environmental Protection Agency has also played an active role in gathering data on bee health in the U.S. The EPA has been a major contributor to the Steering Committee.<sup>109</sup> In particular, the EPA has focused its efforts on investigating the effects of pesticides on honey bees and other pollinators by completing pesticide risk assessment processes.<sup>110</sup> Historically, the EPA pesticide risk assessment processes were not quantified but focused on developing an understanding of the types of effects on pollinators that were caused by pesticides using toxicity studies.<sup>111</sup> But in 2011, the risk assessment process began gathering quantified data to help understand the actual effects on bee colonies and on individual bees.<sup>112</sup>

In June 2014, President Barack Obama issued a Presidential Memorandum with the goal of expanding federal efforts to decrease pollinator losses and restore healthy population levels.<sup>113</sup> The Memorandum directed the Administrator of the EPA to co-chair a “Pollinator Health Task Force” with the help of at least fifteen other federal agencies.<sup>114</sup> The task force was charged with developing a “National Pollinator Health Strategy” which included a “Pollinator Research Action Plan,” public-private partnerships, a public education program, and measures to increase and improve habitats for pollinators.<sup>115</sup> Since the creation of the task force, the EPA has taken several actions to help better protect bee populations. It created the Proposal to Protect Bees from Acutely Toxic Pesticides in which it proposed new regulations to prohibit the application of highly toxic pesticides directly to crop leaves,

<sup>109</sup> See *id.* at 1.

<sup>110</sup> See *How We Assess Risk to Pollinators*, EPA, <https://www.epa.gov/pollinator-protection/how-we-assess-risks-zapollinators> (last visited Aug. 27, 2016) [<https://perma.cc/EBY5-M3ER>].

<sup>111</sup> *Id.*

<sup>112</sup> *Id.*

<sup>113</sup> CCD STEERING COMM., *supra* note 8, at 2.

<sup>114</sup> *Id.* at 2–3.

<sup>115</sup> *Id.* at 3.

during bloom, that bees would come into direct contact with.<sup>116</sup> Under the proposal, the EPA also planned to work with state and tribal agencies to develop pollinator protections plans for more localized areas.<sup>117</sup>

Additionally, the EPA placed a temporary halt on the approval of new registrations of neonicotinoids.<sup>118</sup> The agency contacted registrants of neonicotinoids and informed them that applications for use of those pesticides would not be likely to occur until further data on the effects of the pesticides on honey bees was collected and analyzed.<sup>119</sup> In 2015, the EPA also worked to expedite the registration review for pesticides and the review of new varroa mite control products.<sup>120</sup>

In early 2016, the EPA released the results of the first of four preliminary risk assessments of insecticides that were considered by scientists to be harmful to bees.<sup>121</sup> The agency announced that imidacloprid, a neonicotinoid insecticide, potentially posed a threat to pollinators that came into contact with it on certain types of crops.<sup>122</sup> The risk assessment identified that a residue level of imidacloprid at twenty-five parts per billion could affect the honey bees population numbers as well as the amount of honey being produced in colonies.<sup>123</sup> Imidacloprid residue primarily affects crops that bare pollen and nectar, such as citrus and cotton, with which bees come into contact.<sup>124</sup> The EPA will continue risk assessments for three other neonicotinoids

<sup>116</sup> *Proposal to Protect Bees from Acutely Toxic Pesticides*, EPA, <https://www.epa.gov/pollinator-protection/proposal-protect-bees-acutely-toxic-pesticides> (last visited Aug. 27, 2016) [<https://perma.cc/8ZJA-DCTV>].

<sup>117</sup> *Id.*

<sup>118</sup> *EPA Actions to Protect Pollinators*, EPA, <https://www.epa.gov/pollinator-protection/epa-actions-protect-pollinators> (last visited Aug. 27, 2016) [<https://perma.cc/5NBL-TW3Z>].

<sup>119</sup> *Federal Pollinator Health Task Force: EPA's Role*, EPA, <http://www.epa.gov/pollinator-protection/federal-pollinator-health-task-force-epas-role> (last visited Aug. 27, 2016) [<https://perma.cc/CH7P-CG4F>].

<sup>120</sup> *See id.*

<sup>121</sup> *See EPA Releases the First of Four Preliminary Risk Assessment for Insecticides Potentially Harmful to Bees*, EPA, <https://yosemite.epa.gov/opa/admpress.nsf/0/63E7FB0E47B1AA3685257F320050A7E3> (last visited Aug. 27, 2016).

<sup>122</sup> *Id.*

<sup>123</sup> *Id.*

<sup>124</sup> *See id.*



– dinotefuran, clothianidin, and thiamethoxam – and release analytical reports in December 2016.<sup>125</sup>

*iii. Congress*

Following concerns about honey bee population losses, Congress has been very involved in coordinating efforts between federal agencies to build farm support programs to protect bees.<sup>126</sup> Congress's first piece of legislation that addressed bee colony losses was the Food, Conservation, and Energy Act of 2008 (P.L. 110-246) ("2008 Farm Bill").<sup>127</sup> The 2008 Farm Bill focused on research, conservation, and insurance and disaster measures to be taken and completed between 2008 and 2013.<sup>128</sup> Congress also passed the Agricultural Act of 2014 (P.L. 113-79, H.Rept. 113-333) ("2014 Farm Bill") to succeed the 2008 Farm Bill to continue efforts until 2018.<sup>129</sup>

Both Farm Bills have had heavy emphasis on research efforts to be undertaken in order to collect and survey data on bee colony health and production.<sup>130</sup> The 2008 Farm Bill provisions provided \$10 million in grants annually to conduct the requested research.<sup>131</sup> It appropriated an additional \$10 million annually to the USDA to conduct CCD research and honey bee pest and pathogen surveillance.<sup>132</sup> The 2008 Farm Bill also required the USDA to present annual reports to Congress to specifically address CCD and recommend strategies to eradicate the disorder.<sup>133</sup> The 2014 Farm Bill reiterated the emphasis on research on honey bee populations and again appropriated \$20 million annually through 2018 to fund grants to provide the

<sup>125</sup> *Id.*

<sup>126</sup> See generally RENEE JOHNSON & M. LYNNE CORN, *Bee Health: Background and Issues for Congress*, CONG. RESEARCH SERV., R43191, 25–30 (2015), <https://www.fas.org/sgp/crs/misc/R43191.pdf> (explaining the bills adopted to coordinate efforts of federal agencies to build farm support programs) [<https://perma.cc/VA6M-GVNQ>].

<sup>127</sup> *Id.* at 23.

<sup>128</sup> *Id.* at 24.

<sup>129</sup> *Id.* at 23.

<sup>130</sup> *Id.* at 24–25.

<sup>131</sup> *Id.* at 24.

<sup>132</sup> *Id.*

<sup>133</sup> *Id.*

needed research data.<sup>134</sup> The conservation provisions of both the 2008 and 2014 Farm Bills included language that directed the USDA to work on habitat development and protection for managed and native bee populations.<sup>135</sup> In applying these instructions, the 2014 Farm Bill provided approximately \$7 million in funding to farmers to implement conservation practices in order to promote honey bee colony health.<sup>136</sup>

The 2008 Farm Bill also allowed the USDA to establish the Emergency Assistance for Livestock, Honey Bees, and Farm-Raised Fish Program (“ELAP”) to provide emergency support to farmers in case of a disaster which resulted in animal losses.<sup>137</sup> Under the ELAP, honey bee producers are eligible to recover funds for physical losses to colonies that were lost to CCD.<sup>138</sup> The 2014 provision provided \$20 million annually to ELAP-eligible farmers facing losses due to disaster.<sup>139</sup>

## VI. EVALUATION OF THE EFFECTIVENESS OF ACTIONS TAKEN TO PROTECT HONEY BEE POPULATIONS

### A. *The European Union*

The European Union has been very proactive in taking steps to protect pollinators in its members states since news of large spread losses first began emerging; those actions have been successful thus far. Most recently, the European Commission has released data collection results from its first collective epidemiological surveillance program on honey bee mortality (“EPILOBEE”) in response to the call of action issued by the European Union Reference Laboratory for honey bee health.<sup>140</sup> Historically, the EU had not collected wide spread data on honey

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<sup>134</sup> *Id.* at 25.

<sup>135</sup> *Id.* at 25–26.

<sup>136</sup> *Id.* at 26.

<sup>137</sup> *Id.*

<sup>138</sup> *Id.* at 26–27.

<sup>139</sup> *Id.* at 27.

<sup>140</sup> MARION LAURENT ET AL., *A Pan-European Epidemiological Study on Honeybee Colony Loss 2012-2014*, EPILOBEE 9 (Apr. 10, 2015), [http://ec.europa.eu/food/animals/live\\_animals/bees/docs/bee-report\\_2012\\_2014\\_en.pdf](http://ec.europa.eu/food/animals/live_animals/bees/docs/bee-report_2012_2014_en.pdf) [<https://perma.cc/TX89-DNXB>].

bee populations.<sup>141</sup> Prior to the EPILOBEE study, individual member states had the freedom to choose to monitor and track honey bee populations within their own borders.<sup>142</sup> EPILOBEE also aimed to assist member states to establish scientific and technical measures that could be implemented in order to collect accurate data that could be easily used to compare across member states.<sup>143</sup> The participants in EPILOBEE were: Belgium, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Italy, Latvia, Lithuania, Poland, Portugal, Slovakia, Spain, Sweden, and England and Wales.<sup>144</sup>

The data collected in the study focused on winter and seasonal colony mortality rates for two separate timeframes: 2012 to 2013 and 2013 to 2014.<sup>145</sup> In the first year of the study, winter mortality rates ranged from 3.2 percent to 32.4 percent among the member states.<sup>146</sup> Five of the member states had winter mortality rates that exceeded 20 percent of total colony populations and only one member state had a winter loss of less than 5 percent.<sup>147</sup> The study revealed in the second year that winter mortality rates ranged between 2.4 percent and 15.4 percent among the member states.<sup>148</sup> In the second year of the study, winter mortality rates of less than 10 percent were considered acceptable.<sup>149</sup> Five member states displayed mortality rates lower than 5 percent and six states exceed 10 percent in losses, with data indicating that winter mortality rates significantly decreased in the EU between the two study years.<sup>150</sup> But, it should be noted that winter mortality rates often reflect the harshness of the winter that is experienced in different geographical areas, so winter rates should also be analyzed in conjunction with spring mortality rates.

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<sup>141</sup> *Id.*

<sup>142</sup> *Id.* at 33.

<sup>143</sup> *Id.* at 9.

<sup>144</sup> *Id.*

<sup>145</sup> *Id.*

<sup>146</sup> *Id.*

<sup>147</sup> *See id.* at 19.

<sup>148</sup> *Id.* at 15.

<sup>149</sup> *Id.* at 9.

<sup>150</sup> *See id.* at 6, 15.

In the first year of the study, seasonal mortality rates ranged from 0.02 percent to 10.5 percent among the member states.<sup>151</sup> In the second year, seasonal mortality rates ranged from 0.04 percent to 11.1 percent.<sup>152</sup> In 2014, mortality rates of less than 5 percent were reported in thirteen of the member states while only one member state had a seasonal mortality rate of more than 10 percent.<sup>153</sup> During the second year, nine of the member states reported decreases in seasonal mortality rates.<sup>154</sup> The data shows that from the first year to the second year of the study, a very slight decrease in seasonal mortality rates were reported.<sup>155</sup>

Winter and seasonal mortality rates were also combined in the EPILOBEE study to show the overall trend in honey bee health. In the first year, annual colony mortality rates ranged from 3.1 to 35.9 percent.<sup>156</sup> In the second year, mortality rates ranged from 2.6 to 23.4 percent.<sup>157</sup> From 2013 to 2014, rates of below 10 percent were reported for nine member states, however, two member states reported loss rates of above 20 percent.<sup>158</sup> The statistical data shows that there was a significant trend toward decreasing mortality rates between the two years.

The data, although not definitively conclusive, shows the beneficial impact on honey bee populations due to the extensive actions taken by the EU. The focus on data-gathering and surveillance across the EU has proven to be an effective first step in truly understanding colony numbers while providing insight into the geographical locations offering the safest and most threatened dwelling areas for honey bees. Also, the EU’s emphasis towards education and understanding of the factors affecting bee populations seems to have played a role in the decrease in pollinator losses. The research conducted on factors relating to CCD and colony loss in response to the Commission directives lead to the EFSA ban on neonicotinoids in 2013. Current

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<sup>151</sup> *Id.* at 9.

<sup>152</sup> *Id.* at 6.

<sup>153</sup> *Id.* at 17.

<sup>154</sup> *Id.* at 15.

<sup>155</sup> *See id.* at 19–20.

<sup>156</sup> *Id.* at 19.

<sup>157</sup> *Id.*

<sup>158</sup> *Id.*

data indicates this ban has been statistically effective thus far. The actions taken by the EU show that, at least in the short run, proactive measures to study bee colonies, studying the effects of the factors contributing to CCD, educating representative of the Member States about the plight of pollinators, and the ban of neonicotinod pesticides are effective in reducing the loss of honey bees throughout Europe.

### *B. United States Federal Actions*

The U.S. has made strides to create an action plan to help protect pollinators. The primary goals of Congress and federal agencies have been to collect data on honey bee colony numbers and devote resources to researching the causes of CCD and the factors that affect overall honey bee mortality. Federal agencies have been collecting data on bee mortality rates since 2006 and 2007.<sup>159</sup> Reports showed that, nationally, total honey bee winter losses were measured at 32 percent in 2006 to 2007, 36 percent in 2007 to 2008, 29 percent in 2008 to 2009, and 34 percent in 2009 to 2010.<sup>160</sup> The winter of 2010-2011 showed honey bee mortality at 30 percent, which demonstrated a lack of any substantial increase in pollinator losses compared to earlier years of the study.<sup>161</sup> While an encouraging sign that the problem of massive bee losses was not getting worse, such large losses still posed a threat to the continued sustainability of commercial beekeeping needed to support the federal agricultural system.<sup>162</sup> Beekeepers reported that losses around 13 percent were acceptable for the winter of 2010-2011, but over 60 percent of beekeepers reported losses much higher than the acceptable rate with 31 percent of beekeepers reporting colony losses to CCD that winter.<sup>163</sup>

Winter mortality rates for 2011-2012 were reported at 21.9 percent, which is a considerable drop from the losses

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<sup>159</sup> *Id.*

<sup>160</sup> Kim Kaplan, *USDA/AIA Survey Reports 2010/2011 Winter Honey Bee Losses*, USDA (May 23, 2011), <http://www.ars.usda.gov/is/pr/2011/110523.htm> [https://perma.cc/5FYG-BCC4].

<sup>161</sup> *Id.*

<sup>162</sup> *Id.*

<sup>163</sup> *Id.*

reported in the previous five surveys.<sup>164</sup> However, the winter of 2011-2012 was recorded as the fourth warmest winter in U.S. history.<sup>165</sup> Warm winter weather could have been a contributing factor in the lower recorded losses, but there is no scientific evidence to confirm a link between the weather and the lower mortality rates.<sup>166</sup> The ARS speculates that warmer weather could have contributed to reduced stress levels on colonies which would aid in resistance to parasites and pathogens.<sup>167</sup> Unfortunately, half of all surveyed beekeepers still reported losses above the acceptable loss rate of 13.6 percent for that winter.<sup>168</sup>

While colony losses rose to 30.6 percent the following winter of 2012-2013, it is still on par with losses that occurred in the previous five years.<sup>169</sup> More than 70 percent of beekeepers reported losses over the acceptable loss-rate of 14 percent.<sup>170</sup> Beekeepers reported that colonies dwindled over the winter and did not seem to exhibit signs of CCD, such as rapid colony collapse and an abundance of dead bee carcasses.<sup>171</sup> Alternatively, hives that had traveled to California to pollinate almond crops showed massive die-offs. Almost 20 percent of beekeepers reported a loss of 50 percent or more of colonies.<sup>172</sup>

During the winter of 2013-2014 a noticeable drop in honey bee mortality rates were reported at around 23.2 percent.<sup>173</sup> This number was much lower than the previous year, and also lower than the average reported in the previous seven winters.<sup>174</sup> There was no scientific method that could have been used to prove exactly why the winter rates had dropped so dramatically in

<sup>164</sup> Kim Kaplan, *Survey by USDA and Collaborators Reports Fewer Winter Honey Bee Losses*, USDA (May 31, 2012), <http://www.ars.usda.gov/is/pr/2012/120531.htm> [<https://perma.cc/H8XZ-ZN8V>].

<sup>165</sup> *Id.*

<sup>166</sup> *Id.*

<sup>167</sup> *Id.*

<sup>168</sup> *Id.*

<sup>169</sup> Kim Kaplan, *Fact Sheet: Survey of Bee Losses During Winter of 2012/2013*, USDA (Mar. 19, 2015) <http://www.ars.usda.gov/is/br/beelosses/>.

<sup>170</sup> *Id.*

<sup>171</sup> *Id.*

<sup>172</sup> *Id.*

<sup>173</sup> Kim Kaplan, *Survey Reports Fewer Winter Honey Bee Losses*, USDA (May 15, 2014), <http://www.ars.usda.gov/is/pr/2014/140515.htm> [<https://perma.cc/DRB4-SN8S>].

<sup>174</sup> *Id.*

comparison to years past, but yearly fluctuations show that the issue of bee health is very complex.<sup>175</sup> Nearly two-thirds of beekeepers surveyed continued to report losses above the acceptable loss rate of 18.9 percent.<sup>176</sup> Queen failure, varroa mites, and harsh winter conditions were cited as some of the most harmful factors on colony health.<sup>177</sup>

While winter losses continued to decrease to a loss rate of 23.1 percent, this was the first time since the compilation of colony data that summer loss rates eclipsed winter losses at 27.3percent.<sup>178</sup> The overall trend in the decrease in winter losses is a promising sign, but when considered with the incredibly high number of summer losses, the average yearly loss increased to 42.1 percent.<sup>179</sup> Again, a lower number of beekeepers reported evidence of CCD in colonies during the year.<sup>180</sup> The trend continued where almost two-thirds of beekeepers reported losses greater than the acceptable loss rate of 18.7 percent.<sup>181</sup> This most recent data raises some questions about overall U.S. bee health, considering that traditionally experts have been more concerned with winter losses than with summer losses.<sup>182</sup>

The data that has been collected and processed by U.S. agencies has shown that the actions taken nationally have not been very effective. The data exhibits mild fluctuations from year to year, but overall there is not a significant decrease in total losses of honey bees. Currently, the actions taken by these agencies are focused on data-gathering, and they are still in the preliminary stages of drawing conclusive explanations for the die-offs of pollinators. It is clear that the U.S. could be doing more to actually protect honey bees against the massive number of losses that have been reported year after year. While it is helpful that the USDA and the EPA have followed Congress's directives to

<sup>175</sup> *Id.*

<sup>176</sup> *Id.*

<sup>177</sup> *Id.*

<sup>178</sup> Kim Kaplan, *Bee Survey: Lower Winter Losses, Higher Summer Losses, Increased Annual Losses*, USDA (May 14, 2015), <http://www.ars.usda.gov/is/pr/2015/150513.htm> [<https://perma.cc/3ELD-5NKW>].

<sup>179</sup> *Id.*

<sup>180</sup> *Id.*

<sup>181</sup> *Id.*

<sup>182</sup> *Id.*

devise action plans to help save bees, the numbers do not reflect the effectiveness of the actions taken by the agencies thus far. Each year, the majority of beekeepers consistently report losses above acceptable levels while the acceptable level continued to balloon yearly. The U.S. has taken the necessary preliminary steps to help protect pollinators, however, after years of disappointing colony-loss statistics, its actions translate to inaction.

## VII. RECOMMENDATIONS FOR THE PROTECTION OF KENTUCKY'S POLLINATORS

### *A. Kentucky Agricultural Background*

Kentucky maintains 13.9 million acres of farmland, which covers 54 percent of the Commonwealth's total acreage.<sup>183</sup> It is also ranked as one of the top five states in the nation with the highest number of farms.<sup>184</sup> In 2013, Kentucky had a net farm income valued at \$2.74 billion yearly.<sup>185</sup> The state's top five agricultural exports are soybeans, other livestock products, wheat, poultry products, and other plant products.<sup>186</sup> In 2013, cash receipts for the sale of nuts and fruits were valued at \$11.535 million along with all other crops, including melon and vegetable crops valued at \$156.508 million.<sup>187</sup> Additionally, in 2012 alone, honey produced cash receipts of \$811,000.<sup>188</sup> Therefore, it is clear that Kentucky has a rich history in agriculture, and many crops within the state require honey bees for pollination.

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<sup>183</sup> *A Look at Kentucky Agriculture*, AG CLASSROOM (July 2011), <https://www.agclassroom.org/teacher/stats/kentucky.pdf> [<https://perma.cc/KUA9-QEUD>].

<sup>184</sup> *Id.*

<sup>185</sup> *Kentucky Agriculture Facts*, 2 KY. FARM BUREAU 4, <https://cdn.kyfb.com/KYFB/assets/File/Federation/Kentucky%20Ag/CommodityBooklet2015.pdf> (last visited Jan. 28, 2016) [<https://perma.cc/QBR4-G6NK>].

<sup>186</sup> *See generally id.*

<sup>187</sup> *Id.* at 8.

<sup>188</sup> *Id.*



*B. Kentucky Should Dedicate Resources to Research Honey Bee Populations and Colony Health*

Kentucky should follow the lead set by both the EU and the U.S. government and take the necessary steps to begin collecting accurate data about bee populations, along with gathering information concerning the prevalence of pests and diseases in colonies. Currently, the state does not have information tracking honey bee populations or colony health. Kentucky already has most, if not all, of the needed tools to carry out these research tasks set up within the state government. The Department of Agriculture, under the Office of the State Veterinarian, has a specialized position for the State Apiarist, whose official duties include identifying and eradicating infectious disease in honey bee colonies.<sup>189</sup>

The State Apiarist is in a position to work closely with the Commissioner of Agriculture to quickly and effectively take the necessary steps to begin gathering this data. Historically, Kentucky has not collected data on hive numbers. But, since 2015, the State Apiarist has set into motion a plan to collect data on hive counts from around the state.<sup>190</sup> The data being collected includes the county where the hives are located, winter mortality rates, and mid-year mortality rates.<sup>191</sup> But beekeepers from around that state are not currently obligated by law or regulation to complete these forms and submit them to the Department in a timely or accurate manner. Farmers within the state, however, have a greater incentive to complete hive count reports and submit them to a USDA Farm Assistance office in order to become eligible for federal ELAP benefits.<sup>192</sup>

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<sup>189</sup> *Honey Bees*, KY. DEPT OF AGRIC. 3, <http://www.kyagr.com/statevet/honeybees.html> (last visited Jan. 28, 2016) [<https://perma.cc/VUN2-RLXB>].

<sup>190</sup> *Full Slate of Beekeeping Schools Scheduled this Winter in Kentucky*, KY. DEPT OF AGRIC., <http://www.kyagr.com/statevet/honeybees.html> (last visited Jan. 28, 2016) [<https://perma.cc/84YD-HENU>].

<sup>191</sup> *2016 Hive Count Form*, KY. DEPT OF AGRIC., [http://www.kyagr.com/statevet/documents/OSV\\_Bee\\_Hive-Count-2016.pdf](http://www.kyagr.com/statevet/documents/OSV_Bee_Hive-Count-2016.pdf) (last visited Jan. 28, 2016) [<https://perma.cc/B2NX-BESR>].

<sup>192</sup> *Hive Count Reports Due*, KY. ST. BEEKEEPERS ASS'N, <http://www.ksabeekeeping.org/hive-count-reports-due/> (last visited Jan. 28, 2016) [<https://perma.cc/SYA6-L75X>].

The Commissioner of the Department of Agriculture should order all beekeepers to file hive reports with the state. While the push by the State Apiarist to collect data is a solid first step in the right direction, greater action should be taken to ensure that state officials are collecting the most complete and accurate data possible. Under Kentucky law, the Commissioner has the power to order persons that own or possess bees to submit reports to the Department.<sup>193</sup> Therefore, the Commissioner should order all beekeepers to submit reports outlining geographic location, winter mortality losses, summer mortality losses, and average yearly mortality losses, along with information concerning any signs that may be evidence of the existence of CCD within their hives.

Also, the Commissioner should work with the State Apiarist to organize studies on the prevalence of disease and pests within hives. One of the State Apiarist’s duties is to develop an understanding of the diseases and pests that are affecting honey bee populations within the state. Additionally, the Commissioner has the statutory power to establish administrative regulations that determine how funds in the Kentucky Beekeeping fund are used and dispersed.<sup>194</sup> The goal of the Kentucky beekeeping fund is to improve, promote, protect, and support the beekeeping industry within the state.<sup>195</sup> A full understanding of the types of diseases and pests that may be affecting colonies would protect the industry by allowing beekeepers from across the state to have access to information concerning these threats. Statutes that concern honey bees allow the Department to work with the Kentucky State University’s (“KSU”) apiculture extension program to advance these goals.<sup>196</sup> The Commissioner should establish a grant to fund KSU in undertaking and coordinating a disease and pest study.

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<sup>193</sup> KY. REV. STAT. ANN. § 252.190(3) (West 2016).

<sup>194</sup> KY. REV. STAT. ANN. § 252.190(4) (West 2016).

<sup>195</sup> KY. REV. STAT. ANN. § 252.185(2) (West 2016).

<sup>196</sup> KY. REV. STAT. ANN. § 252.185(5) (West 2016).

*C. Kentucky Should Place a Temporary Ban on the Use of Neonicotinoids Within the State*

Kentucky should follow the example set by the EU and the EPA and place a ban on the use of neonicotinoid pesticides within the state. Kentucky can start with a temporary ban until further definitive testing on a variety of neonicotinoids is completed by the USDA and EPA. In recent years since the ban of neonicotinoids within the EU, member states have reported a decrease in the number of colonies lost. Currently, there are no bans on these types of pesticides within the state. But, with the newly released reports from the EPA showing a causal link between poor honey bee health and neonicotinoids, temporarily halting the use of these harmful chemicals would be a responsible first step. The goal should be to stop any potential threat to honey bees until final and definitive information on the chemicals can be determined.

Some farmers within the state that use these chemicals may object to the temporary ban. These farmers might argue that some of Kentucky's cash crops including tobacco, corn, and wheat do not require insect pollination and rely solely on wind pollination. Thus, they may ask that the ban only be placed on farmers using the pesticides on crops that require insect pollination. But, this argument would not be persuasive enough to halt the temporary ban because pollinators still come into contact with wind pollinated crops while they are in bloom and can suffer the negative effects from even small amounts of exposure to neonicotinoids. Additionally, if at some point in the future it was discovered that these insecticides were not as harmful as originally reported, the temporary ban could be lifted. On the other hand, if the EPA released further information about the negative effects of these chemicals on pollinators, a state regulation could be passed to permanently ban the use of these substances.

*D. Kentucky Should Educate the Public as to the Plight of Honey Bees*

The Department of Agriculture should work with the State Apiarist to educate members of the public on the issues that honey bees and other pollinators face. One of the State

Apiarist’s duties is to educate the non-beekeeping public on the importance of honey bees within our agricultural system.<sup>197</sup> It has become common knowledge that bee populations within the U.S. and worldwide have been decreasing at unusually high rates for nearly the past decade, but many members of the public are not educated about the factors that could be causing these significant drops in honey bee numbers. The State Apiarist should focus on publishing information regarding these issues and making the information widely available throughout the state. In particular, the information presented to the public should include information on CCD and honey bee population decline regionally and worldwide. In addition, the types of crops that honey bees pollinate, the affect of pesticides on bees, environmental factors concerning pollinators, bee diseases, and pests should also be disclosed.

Citizens that are fully informed as to the issues surrounding bees and their overall health will be more inclined to take steps to support the honey bees’ cause. Additionally, if citizens are informed they will be more likely to communicate with state and federal elected representatives to advocate for further measures to be taken to protect honey bees. A fully informed public can be the most powerful ally to honey bees during this time of crisis.

### VIII. CONCLUSION

Honey bees are an essential link in the agricultural system in Kentucky, the United States, and worldwide. Without bees, crop sustainability and a wide variety of food in human’s diets would not be possible. But, it is clear that honey bees are disappearing and dying in massive numbers.

Humans can take action to protect this vital species before it vanishes completely. The European Union is making great strides in developing plans to understand CCD and combat the negative effects the factors traditionally considered to cause the disorder have on pollinators. The federal action from the U.S. has been slow and somewhat ineffective, but with recent research

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<sup>197</sup> KY. REV. STAT. ANN. § 252.185(5) (West 2016).

developments by the Environmental Protection Agency addressing the negative effects of neonicotinoids, there is real promise for the U.S. to develop a more effective plan to combat CCD and other loss factors. Finally, Kentucky should take action to dedicate resources to research honey bee populations and colony health, temporarily ban the use of neonicotinoid pesticides within the state, and work to educate the public about the issues that honey bees are facing within the state, nation, and world. If humans work towards protecting honey bees, their colonies can thrive and continue doing what they do best. And that's a sweet reward we can all benefit from.