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The Road to Pollinator Health

AGRICULTURAL PRODUCTION IS A BALANCING ACT. ON ONE SIDE IS SUSTAINABLE PRODUCTION OF food and biobased products for a growing population. On the other is protecting our natural resources and the environment. The global decline of the honey bee, a major domestic pollinator of many crops, exemplifies how complex the factors are that contribute to maintaining this balance. Overall bee colony decline, including loss from colony collapse disorder (CCD), poses a serious challenge to agricultural research worldwide. The causes are still not definitive, but stress from pesticides may be a factor. This spring, the European Commission temporarily restricted the use of three neonicotinoid pesticides for specific applications (pending more research). Last year, the U.S. Environmental Protection Agency (EPA) and U.S. Department of Agriculture (USDA) formed a bee health task force to take an even broader look at the pollinator crisis, with a plan to collect interagency input and develop a federal Pollinator Roadmap before the end of 2013.

The United Nations Food and Agriculture Organization has noted that 71 of the 100 crops that provide 90% of human food are pollinated by bees, and the estimated value of those crops is as much as $200 billion annually.* In the United States, honey bees contribute over $17 billion to the nation's economy and are vital to keeping fruits, nuts, and vegetables in our diets. Since 2006, U.S. beekeepers have seen colony loss rates increase to 30 to 35% per year, as compared to historical loss rates of 10 to 15%, a situation that requires beekeepers to rapidly, and at great expense, rebuild their colonies. The honey bee declines have been associated with a combination of many factors, such as poor nutrition, parasites, pests, pathogens, pesticides, and stress from colony transport.

In May, the USDA, EPA, and Pennsylvania State University released a comprehensive scientific report† that focuses on four areas for concentrated work: nutrition; pathogens and arthropod pests; pesticides; and bee genetics, breeding, and biology. We need to examine the interactions of these factors. Because honey bees are social insects, assessing the impact of pesticide exposure, especially at sublethal amounts, requires a different metric that accounts for colony survival. And a decline in nutrient availability in the environment could cause bees to respond poorly to environmental challenges. The symbiotic microbiota that bees need to process and store their food also might be affected by the environment. These impacts could contribute to colony losses weeks or months after exposure.

To fully address the range of interacting factors that contribute to bee declines, and building on the work of the Honey Bee Health and CCD Action Committee that reports to Congress yearly, the EPA-USDA task force is taking a landscape-level systems approach to bee research and rescue, examining land-use patterns, nutritional stress associated with available forage, exposure and susceptibility to parasites and pathogens, bee genetic diversity, and the means to augment pollinator forage in all landscapes, in addition to minimizing pesticide exposures. A meta-analysis should guide attention to the most urgent research. Steps to improve collaboration and information sharing among commercial beekeepers, agricultural producers, the research community, and other stakeholders will also be laid out. The task force's goal is to turn around this decline as we proceed with our work over the next 5 to 10 years. As our knowledge increases during this time, there will be constant evaluation of research priorities and actions.

Exploring the causes of bee colony declines and specifically CCD remains a priority for the USDA, even as funding for agricultural research has been reduced by almost 20%. Our health and environmental well-being are related to the health of honey bees in the complex web of interconnectedness that is our world. Their crisis is ours as well.

– Catherine Woteki

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*www.fao.org/ag/magazine/0512sp1.htm. †www.usda.gov/documents/ReportHoneyBeeHealth.pdf.

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