



The Keeper and The Bee

BY NANCY O. GRAHAM

AROUND THIS TIME OF year, a mass mobilization of semi-trucks from across the country delivers a billions-strong “migrant” force of honeybees—more than half of all the honeybees in the United States—to California almond orchards for the annual pollination. Each year since 2006, the year “Colony Collapse Disorder” was coined to explain the increasing rate of dying or abandoned bee colonies—anywhere from 30% to 60% annually—commercial beekeepers have reported bee shortages. Almond acreage is up, bee counts are down, and the stress on the world’s most important pollinator is pushing the American way of doing agriculture toward a tipping point.

“We’ve gone beyond the tipping point in my very strong opinion,” says bee doctor, educator, and beekeeper Chris Harp, who with his partner Grai Rice, runs HoneybeeLives in New Paltz. With thirty-three years of natural beekeeping experience between them, and 1,300 students who have benefited from their courses and lectures in small-scale beekeeping, Harp and Rice are experienced advocates on behalf of what they call “hardworking, gentle creatures who live in complex and beautiful communities.”

The bees—55 hives of them—that literally make their homes at HoneybeeLives are subject to a much less dramatic yearly die-off than is common in

the commercial sector. At 10%, the winter death rate of bees at HoneybeeLives (to starvation and other causes considered normal in optimal conditions) is much lower than what commercial beekeepers are experiencing. Harp and Rice believe that this gap is due to the principles and practices they teach. Their philosophy, shared by other natural beekeepers, may hold the key to remaking agriculture in the image of ecosystems that must survive the consequences of industrial



Chris Harp, far left, teaching a small class.

farming—if humans want to keep eating.

The stakes, solely in terms of the economic contribution of bees to US farming, are enormous. According to the Natural Resources Defense Council, the annual value of bee-pollinated crops in this country is \$15 billion. And while bees aren't the only pollinators (moths, flies, wasps, beetles, butterflies, bats, and birds are others), they are responsible for the pollination of nearly 95 crops. In New York, they make possible a multimillion dollar harvest which includes apples, cherries, pears, strawberries, pumpkins, and onions.

While researchers continue to scramble to pin CCD down to a short list of causes, Harp and Rice question the value of the designation. "It's a completely absurd term for what they don't want to admit is the problem," says Rice—namely, the exposure to risk and improper care of the honeybee by people engaged in large-scale farming. "CCD is a combination of Varroa mites and pests and diseases and stress and malnutrition and pesticides and fungicides and herbicides, which is what is rife in the commercial sector." Other aspects of the commercial sector may be at fault as well, due to the demands of monocropping. How to address CCD without reducing crop productivity, when the global demand for food is expected to increase by 14% per decade, is even less clear.

"It's nothing out of nature," Harp insists. "It's absolutely—with global warming—a man-made situation, this bee die-off. Human action has caused it." In other words, it's a possible portent of *Civilization Collapse Disorder*, as Michael Schacker, author of *A Spring without Bees*, has posed it.

Each suspected culprit of CCD can be examined to reveal dense subsets of issues that, according to Rice and Harp, are collectively having a devastating impact on the health and wellbeing of the honeybee.

The complexity of the honeybee hive is what earns its classification as a "superorganism"—a group of individuals that behave as a unified organism, cooperating socially and performing specialized tasks, such as, in the case of bees, collecting pollen or choosing a nest site. (Other superorganisms include ant colonies, termite mounds, and coral reefs.)

Aside from the workers, drones, and queen, a bee colony hosts more than 8,000 strains of microbes that live in the hives, stored food, and bodies of healthy honeybees. Expose this superorganism to fungicides and antibiotics in order to control diseases and mites, and you wipe out essential microbes. Fail to manage a hive's Varroa mites, which puncture the bee's exoskeleton, and pathogens infect the bees. Take those bees to the almond bloom, and they spread diseases to other bees that then return to their home states to spread them further. Treat the Varroa mites with miticides such as fluvalinate, and you impact the bees' learning, memory, and survival—and the mites be-



A row of hives in the HoneybeeLives Apiary.

come resistant to the chemicals. Take sick bees out to farms in order to fill pollination contracts and they get sicker. Spray crops such as corn with neonicotinoids, a class of pesticides now banned in the European Union, and you expose foraging bees to neurotoxins that damage their navigational powers. Since neonicotinoids can persist in the soil for months or years after a single application, bees tanking up on nectar from neighboring dandelions, clovers, and mullein can go on delivering toxins to their hives for an unknown period of time.

These issues are inextricably linked to, and in some cases caused by, monocropping, which requires the services of bees to pollinate a single crop at a particular time of year, as with the almond bloom. Monocropping often requires more pesticides. "If you saw 20,000 acres of pumpkin, and you were a pumpkin pest, wouldn't you think that was a good place to go?" asks Rice.

In addition to requiring more pesticide, monocropping contributes to the malnutrition of bees, which can't make a balanced diet for their larva from one type of pollen. Almond and apple pollen fall at the bottom of the scale for bee protein. "It's like a pregnant woman eating rice cakes and soda pop for nine months," says Harp. And there's no nectar to speak of in an almond blossom. The industry solves that problem by pumping high-fructose corn syrup into hives during the almond bloom.

Put together these and other factors, and, in the opinion of natural beekeepers, you have a recipe for superorganism collapse.

The small-scale Hudson Valley beekeepers interviewed for this article tend their bees differently, and their hives are thriving. "In the Hudson Valley, if we can keep them away from corn and pesticides, bees do great," says Sam Comfort of Anarchy Apiaries in Germantown, which has over 400 hives hosted by organic farms and CSAs.

Like HoneybeeLives, Anarchy Apiaries rejects commercial frames now sold with plastic foundations—sheets of clear plastic etched with a honeycomb design, meant to get bees started on their home construction. Plastic foundations deter

the instinctive community-building activities of bees drawing comb. Yet wax foundations, Penn State researchers have found, show evidence of contamination by chemicals that persist even after being milled and remelted to make a new foundation.

A third option, one shown by Gold Star Honeybees of Maine to result in pesticide-free wax, is to provide empty bars or frames and let the honeybees build their own comb. This is what honeybees do in the wild (though numbers of feral honeybees are dwindling), following instincts evolved over a hundred million years. Building



Above, former student, Nina, from one of the Bee Buzz for Kids classes. Left, Chris and Grai inspecting an early spring brood.

like bees to honey. According to Grai Rice, “The interest in beekeeping has burgeoned.” Honeybee-Lives offers introductory classes in organic beekeeping in New Paltz during the winter, and courses in hive maintenance throughout the year. “Our classes are creating a relationship between humankind and the bee world,” says Rice.

from scratch, they form a purse-like or oval pendant, sometimes in a shape called a “catenary curve.” (The natural shape of freely constructed comb is mimicked by the *skep*—the traditional domed, basket beehive of yore.)

The worsening plight of pollinators has led to bee-friendly practices on many Hudson Valley farms. Prospect Hill Orchards in Milton, which grows cherries, peaches, nectarines, apples, and pears, has been growing bee forages on some of its support land in the hope of attracting wild bee populations. “We don’t mow these areas until the flowers are done, and the bee activity can be tremendous,” reports farmer Steve Clarke. He also leaves brush piles for bumblebees to nest in. “We don’t expect to reduce pesticide use,” he says, “but to have native pollinators for the early blooming trees and our pumpkins and squash in the summer.” Avoiding pesticides altogether can have disastrous economic consequences for farmers, but U.S. farm subsidies at the rate of \$256 billion a year do little to address that problem.

Liberty View Farm in Highland, leases “Pick Your Own” apple trees on its 11-acre farm/Bed and Breakfast, which includes an apiary of ten hives. “The government should ban GMOs and pesticides,” says Liberty View’s co-owner, René Hronek. “They affect not only us, but imagine those tiny insects; it affects them much more. If other governments can do it, why not this one?” Each year, Hronek gives two or three colonies of bees away to friends or people interested in beekeeping.

One good thing to come out of the media attention given Colony Collapse Disorder is that it’s attracting people to bees

One student, Karen Sabath of Rainbeau Ridge Farm in Bedford Hills, loves watching and photographing her bees. Off-season, when life is quiet for a beekeeper, she reads and learns more about the insects she thinks of as “calming and magical,” traits that remind her of Rice and Harp. “I think Grai and Chris both have that personality,” she says. “They are both so clearly enamored and amazed [by bees], and they’ve done this for so many years. They don’t seem to be the least bit tired of doing it. They are so excited about sharing what they know.”

Sharing knowledge is most definitely a honeybee trait, one studied in depth by Cornell University biologist Thomas Seeley. In his book, *Honeybee Democracy*, he writes of the sophisticated repertoire of signals bees using for sharing information. A hive, he writes, is “governed collectively by the workers themselves, each one an alert individual making tours of inspection looking for things to do and acting on her own to serve the community.” He could be describing the habits of concerned citizens, and in fact he devotes an entire chapter to the similarities between swarm decision-making processes and the New England Town Meeting. Both illustrate how animals in a group are capable of solving problems by tapping into a cognitive capacity that goes far beyond the ability of an individual. “With the right organization,” Seeley says, “even we humans can achieve a high collective IQ.”

The parallel is not lost on Grai Rice, who offers an understated suggestion. “The bees work for the good of the whole, for the hive, without ego. We could actually emulate them a little bit more.” ■

How to Friend a Honeybee

Learn beekeeping. If you can't have bees in your yard, you can work with a small farm or CSA. HoneybeeLives offers classes in natural beekeeping, with the health and wellbeing of the honeybee given primary focus. For more information, go to their website at HoneybeeLives.org, or you can reach them at 845.255.6113.

Join a bee club. Here are a few local options:

Ulster County Beekeeping Association (ulsterbees.org): Open monthly meetings in Rosendale, New York.

Catskill Mountain Beekeeping Club (catskill-bees.org): Open monthly meetings in Acra, New York.

Beekeepers Association of Northern Dutchess (B.A.N.D.): Contact Sam Comfort of Anarchy Apiaries for meeting information (anarchyapiaries@hotmail.com, 406.396.8357).

Create bee houses. Untreated scrap lumber can make great homes for orchard bees. Drill eighth-inch holes about 90 percent of the way into wooden blocks three to five inches thick and hang them under the eaves of your house or garden shed where they will be shielded from sun and rain.

Get off your lawn! Our plush, well-manicured lawns may be killing bees. Harp says, "They're putting all these toxins on the ground, and the bees go to it, bring it back to the hive, and kill off the hive." Go natural—let plantains, dandelions, and clovers take over, an option that requires no work. Use nematodes, not chemicals, to control grubs. If you do garden, choose diverse, pollinator-friendly plantings, such as white Dutch clover, blackberries, and borage. According to Diane Greenberg of Catskill Native Nursery in Kerhonkson (<http://www.catskillnativenursery.com/>), "Practically every wholesaler uses chemicals."

The Phantom Gardener in Rhinebeck and Catskill Native Nursery in Kerhonkson both specialize in organically grown, native flora. Both offer consultation in ecological landscaping, which emphasizes native plants and biodiversity, and promotes the collaboration of neighbors and neighborhoods in creating wildlife corridors.

Plant for your environment. Plants evolved to thrive in your locale will grow successfully and require minimal maintenance. Get to know what birds live and migrate through; what amphibians inhabit nearby waterways and woods; what plants support the butterflies and moths that populate the area—including nectar plants for adult butterflies and host plants for their caterpillars.

"Give them what they want and they're going to show up," says Greenberg.

Avoid "eye candy" and invasive plants. Many plants have been bred to make beautiful flowers but no longer contain pollen or nectar and so are worthless to pollinators. Lists of pollinator-friendly plants by ecoregion are available at pollinator.org—just plug in your zip code.

Stop planting with deer in mind. In trying to discourage deer from grazing our yards, we created a monoculture of lawn plantings. Nature needs diversity. If you have deer, and can't fully fence, create smaller areas that can be protected with attractive or invisible fencing.

Feed nature all season long. It's important for a garden to work like a clock with a succession of leaves, blooms and fruits. Different plants nurture wildlife at different times of the year. If you look at a photo of a garden you should be able to tell the month of the year by what is in bloom or fruiting.

Support pollinator-friendly legislation. In 2008, the village of New Paltz enacted a Healthy Turf and Landscape Policy banning cosmetic pesticides on Village-owned property. Activist Alice Andrews approached the NYS Department of Environmental Conservation about extending the ban to include privately owned land in the village.

Such a measure would require the support and authority of the DEC to prevent lawsuits brought by chemical companies on the grounds of preemption law, which prevents localities from passing antipesticide ordinances more restrictive than state tolerance levels. (If the system sounds rigged against our collective health, score yourself ten points for contributing to swarm intelligence.) Follow BPUC's Facebook page for the status of this effort: Beyond Pesticides in Ulster County (<https://www.facebook.com/groups/beyondpesticidesulstercounty/>).

More resources for staying informed about local legislative initiatives in support of a clean environment: Dutchess Residents for Pesticide Alternatives (<https://www.facebook.com/dutchessresidentsforpesticidealternatives>). At the national level, the Pesticide Action Network (<http://www.panna.org/current-campaigns/bees>) has a campaign addressing pollinator decline.

Agitate for farm bill reform. The Environmental Working Group (<http://www.ewg.org/farmbill2013/ewg-farm-bill-platform>) and the Center for Science in the Public Interest advocate for safe and healthy foodways. ■



Honeybee on a Japanese Windflower at Liberty View Farm.