Many people don’t give bees a second thought except as stinging pests to be avoided. But they’ve become top of mind as their numbers have suddenly dwindled and their true value and importance to the entire food chain has emerged – we can’t eat without them. Bees pollinate food crops including apples, blueberries, cucumbers, almonds and much more. The increasing rates of colony collapse, or death of a hive, and diminishing population of bees is alarming to scientists and the worldwide food industry where 70 of the top 100 food crops have suffered losses due to the bee crisis. The problem has become so severe that millions of bees are shipped to California each February and March to help with the pollination of the almond crops since bees are in such short supply in the state.

Since the late 1990s, beekeepers worldwide have observed the sudden disappearance of bees and an unusually high rate of decline in honeybee colonies, referred to as “Colony Collapse Disorder” (CCD). In fact, in the U.S., bee colonies have declined by 90% since 1962. The cause is believed to be pesticides, lack of wild forage, disease and parasites. Varroa destructor mites are thought to be the primary cause and the most serious threat to western honey bee colonies, and unfortunately, they have required harmful pesticides for elimination.

Gemalto M2M technology helps solve honey bee crisis

IoT solution enables agriculture innovation
According to Marla Spivak, Distinguished McKnight University Professor of Apiculture/Social Insects at the University of Minnesota, beekeepers and researchers need a non-chemical way to control mites in order to help turn back the destruction of our bee colonies.

Eltopia Teams Up with Gemalto for Easy-to-Use, Pesticide-Free, Compostable Solution

Machine-to-machine (M2M) technology holds the key to a groundbreaking solution being developed to terminate varroa destructor mites in beehives. Eltopia, an innovative agricultural communications leader, is working with Gemalto, the global leader in digital security and M2M technology, to develop a new pesticide-free solution to sterilize mites preventing them from breeding and taking over hives. Currently being tested at the University of Minnesota, the “MiteNot” solution uses a compostable “smart bee hive frame” that can automatically monitor and manage the temperature of beehives. By applying heat at a specific temperature and time during the mite breeding cycle, the solution is able to interrupt fertilization and prevent further mite reproduction.

Easy to use, biodegradable and non-toxic, the MiteNot smart frame is essentially a flexible screen printed circuit camouflaged and discreetly designed to look and act just like a traditional frame used for bee reproduction. Beekeepers simply swap out one frame within the beehive with a reusable MiteNot frame, which is composed of renewable resources such as cornstarch and covered in wax to blend into a standard honeycomb. The “smart foundation” is embedded with sensors that monitor the temperature of 32 specific elements of the hive that indicate brood status and different stages of the mite reproductive cycle. A controller sends sensor data to Gemalto’s M2M Module, which acts as a cellular gateway to send data over the Internet to Eltopia’s BeeSafe application. When specific thresholds are met, BeeSafe sends commands back to the M2M Module, which in turn communicates with the controller to elevate heat in the specific region of the hive, sterilizing mite larva. The elegant solution works when just one frame per beehive is swapped out for a “MiteNot” frame and each cellular gateway is capable of communicating 24/7 with a full commercial pallet of be hives.

Gemalto Technology Brings Buzz to Saving Bees

“MiteNot” is powered by Gemalto’s rugged Cinterion® PHS8, the slimmest M2M module on the market providing secure wireless connectivity, GPS capabilities plus easy integration for even the most size constrained products. By enabling a full range of M2M features and functionality for all 3G technologies (HSPA+ and five band UMTS) plus a path to next generation technologies, PHS8 ensures reliable global communications today while ensuring room for growth to 4G networks in the future which protects the long-term technology investment. The module features two antenna pads to optimize consistency and 3G data speeds, up to 14.4 Mbps for downlink and 5.7 Mbps for uplink, even across country and network borders.

The easy to use, Gemalto-powered “MiteNot” solution by Eltopia may be the most innovative, effective solution to turn the bee crisis around to date, according to Spivak. Corporate responsibility is always top of mind with Gemalto and utilizing its M2M technology to help improve the bee crisis and, ultimately, help ensure the food supply. Testing continues at the University of Minnesota Bee Lab with the product release slated for fall 2015, at which point the bee crisis may be on its way to turning around.