"A beekeeping sensor deep inside a Flow Hive detected the death of the Queen."

I was introduced to beekeeping and thousands of others when Cedar and his father, Stuart Anderson, announced the Flow Hive on Kickstarter. I was one of the early backers and excited when my Flow Hive arrived, and I could add it to the two frames hive I had started earlier in the year.

Beekeeping involves regular hive maintenance to ensure the hive's health, and I try to check on my bees every couple of weeks. The death of a queen in a hive can have devastating effects. Without a queen, there are no eggs; without eggs, there are no new bees. Bees have a relatively short life of only 42 days; without new bees, the hive can quickly fail. Knowing about the death of a queen is critical to the beekeeper.

Figure 1: One of my bee hives with the Flow Hive on top, Sensor mounted in the middle of frame. Note: I leave the bees with two full frames to allow them to store enough honey to last the heavy Sierra winters

Researchers have known for years that a healthy hive maintains a constant temperature in the mid-90 degrees F for the excellent development of bee larvae. The bees no longer maintain this constant temperature profile when a queen dies. Adding a temperature sensor to the hive can alert the beekeeper remotely when the hive temperatures drop below critical levels.

I founded iMatrix in 2018, intending to bring IoT to the Agriculture market. I felt there were many areas IoT could help improve agriculture, especially in the beekeeping and hydroponics verticals. We developed the core temperature/humidity, door monitoring, and leak detector sensors as we worked on these more complex sensor and control networks. I installed temperature sensors in the middle of the hive and a temperature and humidity sensor in the hive's roof. I was quickly able to see with the graphs generated by the NEO-1P sensor that the bees were doing a great job maintaining a relatively constant internal temperature; during winter in the Sierra, it can be pretty colde with a lot of snow, and I could see that the hive was alive and healthy due to the temperature reports from the hive.

Last week I received a text alert from the iMatrix System that one of the hive temperature sensors had dropped below my preset level.

I quickly checked the hive's history and saw it was no longer maintaining its normal operating temperature range. The graph below shows the rapid decline in hive temperature as the bees stopped maintaining the constant temperatures required for a healthy brood.

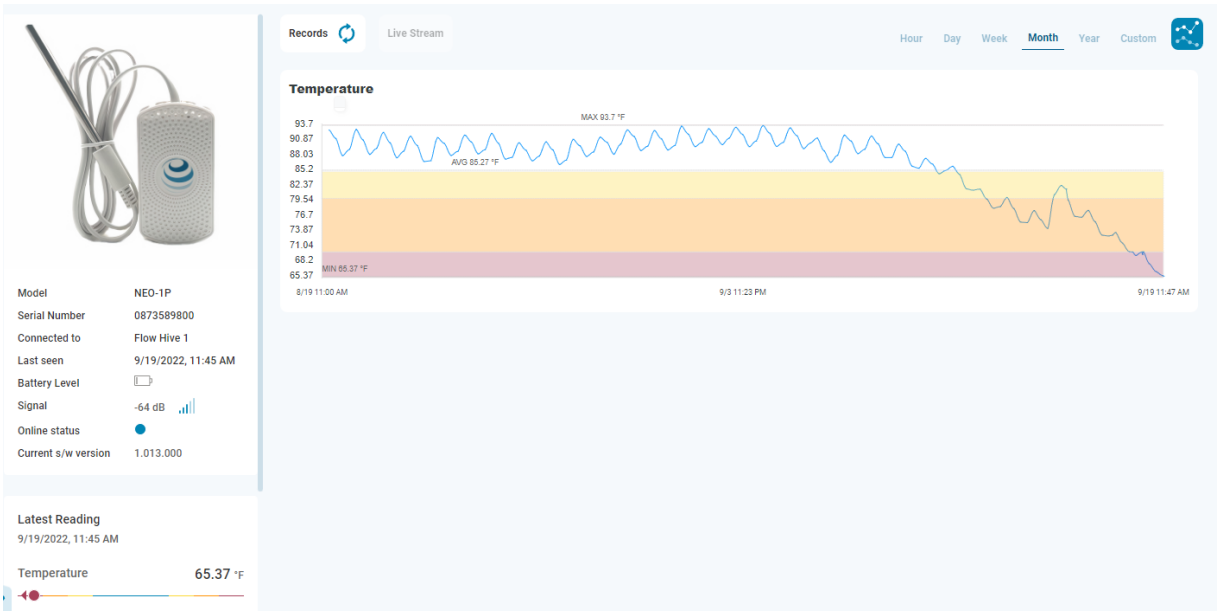

Figure 2: NEO-1P Ruggidized Wireless Temperature Sensor: https://www.agrowtronics.com/product/neo-1p/

Having the temperature sensors in my hives has allowed me to know when I need to take action to save the hive immediately. These sensors are networked and upload their data using Wi-Fi Gateways. The Wi-Fi gateway works excellently for the home beekeeper, but not all hives are within range of a Wi-Fi Gateway. To help in these situations, the iMatrix Sensors can connect to the iMatrix Mobile App running on a Tablet or Mobile phone and send this data to the iMatrix Cloud using the Virtual Gateway capability. This way, a beekeeper can come within a couple of hundred feet of the hives, scan them all, and easily up their history to the iMatrix Cloud.

Figure 3: iMatrix NEO-1P mounted in the Roof of the Flow Hive

Greg Phillips is the CEO and Founder of iMatrix Systems, Inc, providing a complete portfolio of wireless Humidity, Temperature, Air Quality, and CO2 Sensors.

In addition, the iMatrix Gateways enable all wireless sensor configuration, control, monitoring, and associated analytics to be managed through iMatrix's proprietary and robust Cloud services.

iMatrix's agriculture focused web site www.agrowtronics.com hosts a broad range of articles about Hyrdoponics and beekeeping. For details on the sensors and more information contact iMatrix Systems, Inc, www.imatrixsys.com
100 McFaul Way, Suite 201 / Box 12073, Zephyr Cove, NV 89448