



The Bee Box
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Sentinel Apiaries

It is no doubt that climate is changing, and in some areas, very quickly. Flooding, drought, and extreme weather events are a few manifestations of this change. There is a term used by scientists that identifies a species of plant or animal endemic to a region that helps monitor what is happening in that environment. That phrase is “sentinel species” or “indicator species”.

By monitoring what is happening with these sentinel species, we can measure what is happening to the environmental conditions in that area. For example, some lichens or plants can monitor air pollution, acidity or heavy metals in soil. Species associated with healthy oceans or estuaries can be used to monitor water quality and disease outbreaks. Honey bees are also considered an indicator species. We can use Sentinel apiaries, a collection of honey bee colonies, to gather localized disease and other climate information such as the phenology, including pollen flow and nectar flow, of that area.

Bee Informed Partnership Sentinel Apiaries combines scale data with monthly disease load monitoring information.



Bee Informed Partnership Sentinel Apiary Map. All of the BIP logos are actual Sentinel apiaries with live hive scale data. This map can be found at beeinformed.org/programs/sentinel-hive-scale-program/

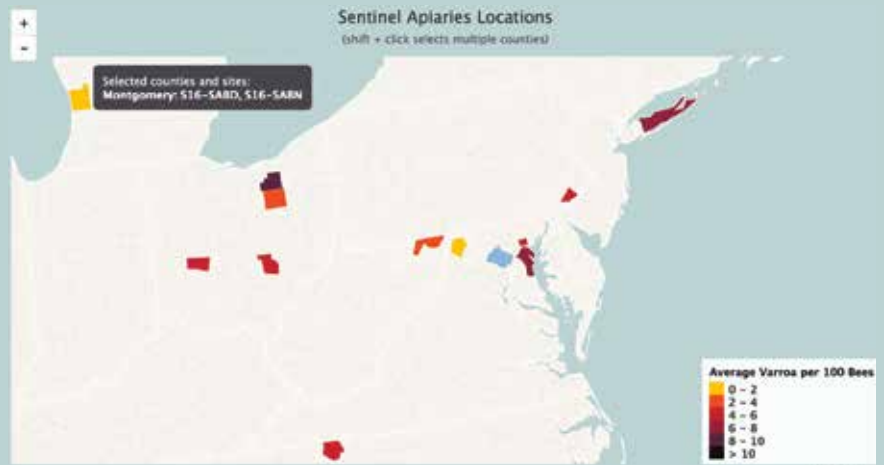


We have been testing the use of Sentinel Apiaries for several years now and the Bee Informed Partnership has an active Sentinel Apiary Program across the U.S. that is growing each week. Our Sentinel Apiaries include eight colonies and regular, monthly sampling and colony assessments during the beekeeping calendar. Of the eight colonies, at least one is mounted on a digital hive scale continually measuring the weight gains and losses, providing colony growth, swarm control, honey production and other feedback to the beekeeper and our researchers. Because much of these data are shared online, it enables other beekeepers in the area to also monitor what is happening in the environment.

The use of regular disease load monitoring (Varroa mites and Nosema spores) offers beekeepers the ability to make informed management decisions about treatment timing and efficacy. The hive scale data can indicate when food stores are low necessitating feeding, or when to add supers if weight gains are rapid. A noticeable drop in weight may also alert a beekeeper to a departing swarm.

Colony health assessment data are sent to the participating beekeepers each month. These reports allow beekeepers

Bee Informed Partnership heat map showing varying levels of Varroa mite infestations at the county level for a few states in the mid-Atlantic region.



within a region to compare their results and track what is happening at a national level.

One fairly new development is the addition of heat maps to show, at the county level, what the latest Varroa mite loads are. Varroa mites are large ectoparasites that are arguably the single greatest cause of colony mortality since they hit U.S. shores in the late 1980s. The European honey bees that make up our stock have little resistance to these mites. The mites breed within the honey bee brood and vector viruses to both adults and brood that destroy a colony if the infestation is not kept in check. These Varroa mites are found in every colony in the U.S. except for a few islands in Hawaii. These maps could alert beekeepers within those counties with high Varroa infestations to monitor their levels more frequently and, if found to be high, to treat their colonies with a miticide.

Sentinel Apiaries are providing near real-time data not only about what is happening to local and national honey bee colonies, but to our climate as a whole. As we watch the spring “green-up” trend happen earlier each year, the chance of an interruption in the mutualistic relationship between plants and pollinators increases. Tracking both will be key to monitoring, understanding and possibly creating models for the future. If you are a beekeeper and are interested in joining our Sentinel Apiary Program, please contact me at krennich@umd.edu.

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