Bio Media 9B: Honey Bees & Invasive Species

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Part A:

Invasive Species & Honey Bees 🐝

Without honey bees we would find ourselves without Avocados, Squash, Pumpkins, Mangoes, Almonds, Apples, Peppers, Cucumbers *and* Watermelons.

Honey bees hold a lot of importance in agricultural industries by virtue of their ability to pollinate a wide variety of crops. According to a 2019 ABC news article citing a policy analyst, honey bees generate approximately 20 billion dollars in agricultural revenue in the United States alone.

Unfortunately, these money-and-food generating machines face troubling circumstances as the article reports, with honey bee populations falling approximately 40% in the winter of 2019.

Invasive Threats

Honey bees face a variety of threats which have decimated their populations, most blatantly by the proliferation of the parasitic *Varroa destructor* mite. The mite can easily decimate bee populations through methods described by a 2019 article from the magazine *Science*:

> ***"****V. destructor weakens both adult and larval bees by consuming their fat stores. The mite also spreads viruses, including a lethal one that deforms wings, preventing bees from flying. Parasitized colonies lose workers, make less honey, and often fail within a year if not treated.****"***

While the article goes on to outline the efforts of scientists, engineers and beekeepers in exterminating the mites, current chemical treatments, the most viable option for ridding the mites, come with a large variety of drawbacks (like potentially destroying the colony anyway).

Additionally more full-proof solutions like selectively breeding honey bees to resist the mites, will take a long time to perfect and consequently run high costs.

The *Varroa destructor* mite is a relatively new threat to western honey bee populations, as explained by the *Science* magazine article the *Varroa destructor* originally only affected honey bees in Asia, but jumped over to the European variant during the 20th century.

Enter the Murder Hornet

Had the *Varroa destructor's* spread been prevented, perhaps we may not see as drastic fluctuations in honey bee populations today. While the *Varroa destructor* slipped through the cracks, there once again stands another invasive species, this time spotted in the pacific northwest which beekeepers have scrambled to contain: the *Vespa mandarinia* more fervently referred to as the "Murder Hornet".

Similarly to *Varroa destructor,* the Murder Hornet originates from Asia, however unlike the *Varroa destructor,* the Hornet does not operate like a parasite, rather it serves as a direct predator. According to a *Science News* article the catchy moniker originates from, "*its proclivity to nab a honeybee, bite off the bee's head carried home to nourish young hornets*" (Milus, 2020)--it's not a particularly amicable arthropod. The Murder Hornet invasion could easily further harm the already sensitive population of honey bees.

As reported by the *New York Times*, local beekeepers in Washington have mobilized to try and stem the spread of the violent predators by setting up make-shift traps across the state as well as going on "search-and-destroy" missions to remove the hornet's nests. Stopping the spread of the Murder Hornets is an incredibly difficult task; as mentioned by the *New York Times* article the pacific northwest makes an ideal environment for the Murder Hornets to spread with its wet and temperate climate.

It's additionally worth noting that the Murder Hornet has a ridiculously painful sting--which could make manually removing hornet hives that much more unpleasant.

Onwards

While it probably seems too early to definitively state the extent to which the murder hornets will affect net honey bee populations in North America, the invasive parasitic *Varroa destructor* continues to take a large toll on American honey bee populations. It would also come across improper to claim that things will eventually get better for honey bee populations, when no clear solution seems guaranteed.

While preventative measures like the inspection of traded goods might work for a time, we need effective protocols and procedures to account for when those measures may fail. Since if we can't find ways to stem the spread of invasive species like Murder Hornets, we may wake up one day without any honey bees.

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Part B) Explanation

1. **Why it's engaging/exciting:**

I found this story to be engaging and exciting because it ties together some recent news on current events here in the Pacific Northwest along with also more general knowledge on the state of the North American honey bee populations.

Additionally one of the species included in the article is called a "murder hornet" which intrinsically carries excitement as it is probably the coolest anthropod (albeit one which carries a lot of negative side-effects and I hope bee keepers can eradicate them from North America).

2. **Science included:**

Most of the science mentioned in this story relates to the entomological findings relating to the threats affecting honey bees, specifically the parasitic *Varroa destructor* along with the more recent threat of Murder Hornets. It includes a little bit of information as to the physiology of the species in terms of how they harm bee populations.

3. **The experience:**

This was a exercise in synthesizing a story that summarizing information about the new invasive species in the pacific northwest, the science behind trying to alleviate any potential issues and was also an exercise in **discovery** as I didn't really know much about the murder hornets before this project.

Additionally while I had heard that honey bee populations were decreasing I did not know it was being caused predominantly by a parasitic arthropod, which was kind of a neat tie-into learning about parasites in the last weeks module.

4. **The story form:**

I choose to write an expository article on honey bees and their negative relationship with invasive species since I couldn't really think of any other way to describe the information in a way that would come across as sincere, since making a more traditional narrative would have felt a little, weird since it deals with current threats to a lot of people's livelihoods and the biodiversity of North America at large.