

OR040*Museum specimens reveal resilience to disease in feral bees***Alexander Mikheyev**, Mandy Tin, Jatin Arora, Thomas Seeley

For several decades colonies of honeybees (*Apis mellifera*) managed by beekeepers have suffered high mortality due to parasites and pathogens, most notably the ectoparasitic mite *Varroa destructor* and its associated viruses. Consequently, beekeepers depend on regular applications of pesticides and antibiotics to maintain their colonies, but this way of beekeeping is not sustainable. There is, therefore, a pressing need for information about natural ways to strengthen the robustness of honeybee colonies. In contrast to the losses of managed colonies, feral colonies are thriving in many places, including some parts of the United States. Little is known about the historical abundance of feral colonies in the United States, but one well-studied population near Ithaca, NY had the same density in 2011 as it did in 1978, despite the arrival of *Varroa* and other diseases in the intervening years (Seeley, 2007). To investigate what selective events occurred in this population during this time, we conducted whole-genome re-sequencings of worker bees collected from feral colonies living near Ithaca, NY in 1977 and 2011, using a novel low-error PCR-free library preparation technique. An analysis of 516,702 SNPs reveals evidence for numerous 'soft' selective sweeps in the genomes of these feral honeybees. These sweeps, however, were localized around targets of selection, and do not correlate with a reduction of the effective population size. Indeed, the effective population size increased in the intervening 34 years, probably as a result of migration from other honeybee populations, such as African honeybees, whose characteristic alleles increased in frequency. These results suggest that feral honeybee colonies may be resilient to disease and capable of rapid selective responses when faced with novel parasites and pathogens. These studies of feral honeybee colonies suggest natural ways to maintain the health of managed honeybee colonies.