An Exploration of the Effects of Magnets and Electromagnetic Radiation on European Honey Bee (Apis mellifera) Navigation

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In 2017, the Proceedings of the Royal Society B: Biological Sciences journal linked ferromagnetic material in bees' (Apis mellifera) abdomens to magneto-reception and bees' ability to navigate (Lambinet et. al., 2017). However, experimenters have not yet found out how radio waves effect said navigation. With the imminent implementation of 5G networks around the world, I decided to test the effects radio waves would have on Apis mellifera's ability to find a sugar and honey cache. To start, bees were timed as they traversed a PVC pipe track, with no additional stimuli, to find a food cache. This process was repeated with iron magnets or active cell phones on the sides of the track. When iron magnets were present it took 68.36 seconds, on average, to reach the food cache which was significantly longer than the control trials which had an average completion time of 15.85 seconds (t-Test, P=0.0070). Moreover, when trials that exposed bees to cell phone radio waves were conducted, the bees seemed more agitated and took a remarkable 155.22 seconds to traverse the 17.5 centimeters to the food cache, which was also significantly longer than the control (t-Test, P=0.00020). The findings from this study demonstrate that close proximity radio waves have an adverse effect on bee navigation suggesting that 5G implementation, with its higher concentration of antennas, could pose a significant challenge to Apis mellifera.