

Mobile phone-induced honeybee worker piping

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Abstract – The worldwide maintenance of the honeybee has major ecological, economic, and political implications. In the present study, electromagnetic waves originating from mobile phones were tested for potential effects on honeybee behavior. Mobile phone handsets were placed in the close vicinity of honeybees. The sound made by the bees was recorded and analyzed. The audiograms and spectrograms revealed that active mobile phone handsets have a dramatic impact on the behavior of the bees, namely by inducing the worker piping signal. In natural conditions, worker piping either announces the swarming process of the bee colony or is a signal of a disturbed bee colony.

worker bee / acoustic communication / mobile phone handset / worker piping / induction

1. INTRODUCTION

Honeybees are essential partners for the success of agriculture. The economical role of honeybees in worldwide pollination has been valued to be around 153 billion euros in the year 2005 (Gallai et al. 2009). Bee losses have been recorded for more than a century (Hart 1893; Aikin 1897; Beuhne 1910; Wilson and Menapace 1979). Scientists suspect many factors to be responsible for the killing of the bees, of which the varroa mite, pesticides, viruses, farming practices, monoculture, hygiene in the hive, and climatic factors are the most widely cited possibilities. Starting in 2003–2004, bee colonies worldwide suddenly began to show symptoms of the so-called colony collapse disorder (CCD). CCD initially affects the worker bees, which desert the hive. The queen bee is usually abandoned in the hive

with the young brood and with an abundance of honey, so that the colony can survive for a very short time. However, without the worker bee population, the colony becomes unsustainable and dies out. Never before have honeybees disappeared globally and at such a high rate.

Current theories about the potential cause(s) of CCD essentially include increased losses due to the invasive varroa mite (Donzé et al. 1998). Pesticide poisoning (through exposure to pesticides applied for crop pest control), potential immune-suppressing stress on bees (caused by one or a combination of several factors such as apiary overcrowding, pollination of crops with low nutritional value, pollen or nectar dearth), drought, monocultural practices, migratory stress (brought about by the moving of the bees in long distances), and increased transmission of pathogens have also been usually cited as a cause of CCD (U.S.D.A. 2007). Other causes might include genetically modified crops (Malone and Pham-Delegue 2001) and exceptionally cold winters.

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