The buzz of the chase

July 30 2008

Scientists from Queen Mary, University of London are helping to perfect a technique used to catch serial killers, by testing it on bumblebees.

Geographic profiling (GP) is a technique used by police forces around the world to help them prioritise lists of suspects in investigations of serial crimes. It uses the sites of a serial killer's crimes to predict where the killer is most likely to live.

Dr Nigel Raine, and Dr Steve Le Comber, from Queen Mary's School of Biological and Chemical Sciences, along with Kim Rossmo, the former detective who invented the technique, have used this criminology technique to look at patterns of foraging in bees.

Writing in the *Journal of the Royal Society Interface* the team found that by observing bees foraging in the lab, combined with computer model simulations, they could use GP to distinguish between different types of foraging behaviour. The work was funded by the Wellcome Trust, BBSRC and EPSRC.

GP relies on two things; the fact that most serial crimes happen close to the killer's home; and that the killer's home is surrounded by a 'buffer zone' - an area where the opportunity to commit a crime is comparatively low. These two parameters allow criminologists to create a geoprofile, which shows the areas where the killer is most likely to live. The more accurate the GP model – the more precise the geoprofile and the quicker the police can track down the killer.

Dr Raine explains: "GP is interesting to biologists because it can tell us which strategies animals use when foraging. The approach works well for very different animals: from bees and bats to great white sharks."

The research is also of interest to criminologists, as the experiments can be used to test the GP technique - something which is impossible to do with criminals, for obvious reasons. The results of the lab experiments allow the GP criminologists to perfect their technique, and predict the serial killer's location with more accuracy.

Although GP has been applied to bat foraging data by two of the authors, this bee study is the first time that the assumptions of GP technique have been tested using an experiment. This study suggests that bees could create their own 'buffer zone' around the hive where they don't forage, to reduce the risk of predators and parasites locating their nest.

The results showed that GP can be used to find the entrance to a bee hive, from observing the locations of the flowers that bees visit. This has implications for bee conservation. In future, GP could be applied to help locate bee nests, or areas of potential nesting habitat – a valuable tool for reversing the numbers of rare or endangered bumblebee species.

Source: Queen Mary, University of London