

Old bees' memory fades; mirrors recall of mammals

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Old bees have troubling finding their way to new homes, as learning behavior becomes inflexible with age. Credit: Photo credit: Christofer Bang/ASU.

A study published Oct. 19 in the open access journal Public Library of Science (PLOS) ONE, shows that not just human memories fade. Scientists from Arizona State University and the Norwegian University of Life Sciences examined how aging impacts the ability of honey bees to find their way home.

While [bees](#) are typically impressive navigators, able to wend their way home through complex landscapes after visits to flowers far removed from their nests, the study reveals that aging impairs the bees' ability to

extinguish the memory of an unsuitable nest site even after the colony has settled in a new home.

"From previous studies, we knew that old bees are characterized by poor learning when trained to floral odors in the laboratory," says Gro Amdam, an associate professor in the School of [Life Sciences](#) in ASU's College of Liberal Arts and Sciences. "So, we wanted to test whether aging also affects learning behavior that is important for a bee's survival in the wild."

A bee is very well-trained as a forager after three to four days of flight time, Amdam says. Whereas mature bees have piloted their way to and from the hive for five to 11 days and old bees have had more than two weeks of flight time.

To test how old bees adapt to a changed home location, researchers trained bees to a new nest box while their former nest was closed off. Groups composed of mature and old bees were given several days in which to learn the new home location and to extinguish the bees' memory of their unusable former nest box.

The scientists then disassembled the bees' new home and forced groups of mixed-age bees to choose between three alternative nest locations, including the former nest box. Old bees with symptoms of senescence preferentially oriented toward the former [nest](#) site, despite the experience that should have told them that it was unusable.

"Although many old bees fail in learning tasks, we also discovered that a few still perform with excellence," explains Daniel Münch, lead author of the study and a senior life sciences researcher in Norway.

The scientists believe that their findings with bees offer a new means to model and understand the variability found in brain function between

individuals; where some individuals' memories remain intact, while others' learning behavior becomes inflexible with age.

Provided by Arizona State University

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