New study shows a genetic link between feeding behavior and animal dispersal

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New research from the University of Toronto Scarborough shows that animal dispersal is influenced by a gene associated with feeding and food search behaviours.

The study, which was carried out by UTSC Professor Mark Fitzpatrick and PhD student Allan Edelsparre, provides one of the first aimed at gaining a functional understanding of how genes can influence dispersal tendencies in nature.

Using common fruit flies (*Drosophila melanogaster*), the researchers observed how two different foraging types – known as sitter flies and rover flies – moved over large distances when released in nature. They discovered that the rover flies, which are very active foragers as larvae, dispersed farther and more frequently than sitter flies, which are less active foragers.

"What is fascinating is that we were able to observe, both in nature and in the laboratory, a system that links their feeding activity as larvae and how far they disperse as adults to levels of the foraging gene in their brain," says Fitzpatrick.

In the laboratory, the researchers were also able to confirm that the foraging gene influences dispersal by artificially inducing higher levels of the gene in sitters, which caused them to disperse like rover flies.

Work on the dispersal tendencies of a variety of animals seem to

converge on the notion that dispersal is not a random process.

"Some individuals seem to have greater innate dispersal tendencies than others," says Edelsparre. Like humans, animals have personalities including shyness, aggressiveness, and sociability. Individuals with similar personalities often share several related behaviours and the authors suggest this may explain the link between feeding, food searching, and dispersal.

The findings may also shine light on links between feeding and dispersal in other animals. For example, dispersing naked more rats and lizards are more active eaters. Fitzpatrick and Edelsparre also point to studies tracing the chemical signatures and dental records of early humans. While the chemical isotopes and tooth wear of most specimens indicated they foraged and resided locally, a few specimens carried isotopes from very different habitats suggesting they may have immigrated from far away. Whether the foraging gene plays a role in their dispersal tendencies remains unknown.

The ability to predict differences in dispersal tendencies could also influence how we build and maintain natural corridors for threatened species or how we stop the spread of invasive species like the round goby, emerald ash borer, or the Asian longhorned beetle, adds Fitzpatrick. "We are at an exciting critical juncture where work on genes and genomes are merging with a wealth of work on behavioural personalities and animal movement ecology," he says.

The research is currently available online and will be published in the upcoming edition of *Ecology Letters*.

Provided by University of Toronto