Flies don't buzz about aimlessly!

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How you ever stopped to wonder how a fruit fly is able to locate and blissfully drown in your wine glass on a warm summer evening, especially since its flight path seems to be so erratic? Mark Frye at the University of California and Andy Reynolds at Rothamsted Research in the United Kingdom have been pondering this very question.

Fruit flies explore their environment using a series of straight flight paths punctuated by rapid 90° body-saccades. Some of these manoeuvres avoid obstacles in their path. But many others seem to appear spontaneously. Are the spontaneous flight paths really random, do they serve any real purpose?

Armed with a computer video tracking system and an array of mathematical techniques the two researchers have revealed how the flight patterns of starved fruit flies constitute an optimal scale-free searching strategy – like the fractal patterns of a snowflake, a fly flight path appears similar whether viewed up close, or from a distance.

The researchers also found that searching is intermittent, such that flies actively search by making tight turns, and fly straight some distance to begin searching again. Scale-free movement patterns have been found in diverse animals including zooplankton, wandering albatrosses, jackals, and even human hunter-gathers. Intermittent searchers include octopi, graylings, and mating crickets.

Andy Reynolds says, "Our results with freely flying Drosophila appear to be the first reported example of searching behaviour that is both scale-free and intermittent. This suggests that these behaviours are not part of two different searching strategies, but rather represent a single very effective and perhaps widely adopted strategy." Mark Frye believes, "This result is particularly exciting because it suggests a unified theory for one of the most critical behaviour animals exhibit – foraging for food."

The next step will be toward integrating these results with the neurobiology of fly flight to better understand how these tiny animals are so successful at crashing our dinner parties. The research will appear in the April 4th issue of the international, peer-reviewed, open-access online journal PLoS ONE.

Source: Public Library of Science