Quick quick slow is no-go in crab courtship dance

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A photo of the robotic male crab arms used in the experiment. Credit: Dr. Sophie Mowles - Anglia Ruskin University

Female fiddler crabs are sensitive to changes in the speed of a male's courtship display, significantly preferring displays that accelerate to those that are performed at a constant speed or slow down.

The new research is published in the journal *Biology Letters* and was carried out by Dr Sophie Mowles of Anglia Ruskin University, alongside academics from the Australian National University in Canberra.

Male fiddler crabs (*Uca mjoebergi*) wave their larger claw during courtship displays, which is a demanding exercise that leads to fatigue. A previous study by Dr Mowles has shown that male crabs that perform more vigorous, energetically costly, waving displays have higher physical fitness, meaning this signal is worth paying attention to from the perspective of a female crab.

To study the importance of tempo in mating decisions, Dr Mowles and her colleagues constructed robotic male fiddler crab arms that could move at a constant speed, slow down or speed up as the encounter progressed.

Female fiddler crabs were then introduced to these robotic crabs, and the research showed that females demonstrated a strong preference for escalating robots.

Even at points when all three robotic crabs were waving at the same frequency, the female crabs preferred the male robot whose speed was increasing. This indicates that the females realise the male might be on a trajectory to increase their wave rate further, while also demonstrating that they can conserve energy until necessary.

Dr Mowles, Lecturer in Animal and Environmental Biology at Anglia Ruskin University, said: "Dynamic signal repetition, as seen in the courtship display of male fiddler crabs, can incur significant energetic costs that reveal the quality of the displaying individual.

"They allow females to select physically fit mates as these 'signals of stamina' will reflect a male's ability to perform other demanding

activities associated with survival, and reduce the risk of mating with weaker signallers that might be diseased.

"A key feature of demanding displays is that they can change in intensity: energetically costly displays are likely to escalate when a male attempts to persuade a female to mate by increasing his signalling effort, but can eventually de-escalate as he becomes fatigued.

"Our findings show that females not only take into account the current level of courtship signal production, but also any changes in rate which might provide information about a male's quality. For example, a decreasing rate might indicate that the male, despite appearing to be a vigorous and effective signaller, has exhausted his energy reserves."

More information: Robotic crabs reveal that female fiddler crabs are sensitive to changes in male display rate, *Biology Letters*, rsbl.royalsocietypublishing.or … .1098/rsbl.2017.0695

Provided by Anglia Ruskin University