Tiny beetle walks on the underside of the surface of water

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A pair of researchers from the University of Newcastle and the German Center for Integrative Biodiversity Research has documented a water scavenger beetle walking on the undersurface of a body of water. In their

paper published in the journal *Ethology,* John Gould and Jose Valdez describe the beetle and suggest some theories to explain the unique behavior.

Prior research has shown that some insects are so light relative to water surface tension that they are able to walk across the surface of water, albeit in a skating fashion—water striders are a prime example. In this new effort, the researchers have found a beetle that can walk along the undersurface, as if scurrying right-side-up across a plate of glass.

The find was made by Gould, who was scouting tadpoles in pools of water in Callaghan, Australia. At first, he thought the beetle was swimming across the surface—but a closer look showed the bug was not only upside down and submerged, but was using the surface as a means of transport. Intrigued, he captured the action on video and showed it to his colleague, Valdez. The two then scoured the literature for similar finds, but found very little. Some snails were able to slide along the undersurface after they applied some slime—but the literature documented nothing about beetles walking on an undersurface as easily as others do on dry land. After closely watching the video, the researchers discovered how the beetle was able to achieve its unique feat. First, it had placed a bubble along its abdomen that appeared to help with buoyancy. Additionally, the beetle exerted pressure on the undersurface—with each step, the beetle's foot pushed a small amount of water above surface level, giving it traction.

The researchers suggest more work is required—the first step, they note, will be finding another example of such mobility. After that, they would like to know if the beetle can walk the same way on top of the water—and if the beetles also use the air bubble to breathe while traveling underwater. They also note that the technique used by the beetle might be useful to roboticists.

More information: John Gould et al, Locomotion with a twist: Aquatic beetle walks upside down on the underside of the water's surface, *Ethology* (2021). DOI: 10.1111/eth.13203