

{rokbox title=|(A) Photo taken on 2 May 2022, showing the hectocotylized R3 arm (blue) and a normal arm tip (purple). (B) Photo from 28 January 2022, displaying terminology used for arms, with bifurcated R1 arms in orange :: Image: Authors|
thumb=|images/stories/ieo/imagenespublicaciones/centro-oceanografico-baleares-ieo-csic-persistence-memory-arm-usage-nine-armed-octopus-vulgaris-soule-et-al-2025-thumb.jpg|images/stories/ieo/imagenespublicaciones/centro-oceanografico-baleares-ieo-csic-persistence-memory-arm-usage-nine-armed-octopus-vulgaris-soule-et-al-2025.jpg{/rokbox}

Sam Ellington Soule, **Miguel Cabanellas-Reboredo**, Ángel F. González, Hidde Juijn and Jorge Hernández-Urcera, 2025.

[The Persistence of Memory: Behavioral Analysis and Arm Usage of a Nine-Armed *Octopus vulgaris*](#)

[:](#) Animals 2025, 15, 1034. <https://doi.org/10.3390/ani15071034>

Abstract: Anatomical abnormalities in octopuses, whose behavior is facilitated by flexible, neuron-rich arms, offer insights into life histories and the neurological implications of understudied conditions such as bifurcation. Although documentation is scarce, here we present in situ videos of nine-armed *O. vulgaris* with a functional bifurcated R1 arm. Analysis using RDAs and GLMs investigated the impact of the bifurcated arm on behavior and examined changes during growth. Analysis revealed a differential usage of between the bifurcated arms in addition to an initial specialization of the bifurcated arms for actions below the body, decreasing over time for only one of the arms as grew. Further, bifurcated and regrown arms were utilized more in safe behaviors than risky ones, with more severely injured arms showing a higher frequency of use in safe behaviors. These findings contribute to the growing knowledge of arm usage in octopuses, suggesting that arm bifurcation may lead to branchial neural differentiation and potentially indicate post-traumatic associated in *O. vulgaris*.

Keywords: cephalopods, *Octopus vulgaris*, nine-armed Octopus, bifurcation, arm use, behavior, adaptability, pain-associated memory