Global controversy in oyster systematics and a newly described species from SE Asia (Bivalvia: Ostreidae: Crassostreinae)

ABSTRACT

The diversity of native oysters in many regions is overshadowed by the global dominance of a few economically important species. Here we describe the Muar Oyster, Crassostrea (Magallana) saidii sp. nov., first reported as an established local fishery renowned for exceptional and distinctive flavour over 160 years ago by British colonial officials in Malaysia, but as yet never formally named or described as a species. This new species has a subtle but clear morphological diagnosis dependent on three-dimensional characters, which has long been recognised by local fishers to differentiate the new species from co-occurring C. (M.) belcheri (G. B. Sowerby II, 1871). The Indo-Pacific clade Magallana Salvi & Mariottini, 2016 in Salvi and Mariottini 2017 is a phylogenetically distinct group that nonetheless cannot be morphologically separated from the broader genus Crassostrea Sacco, 1897. Fossils or species known only from shell specimens, though morphologically distinct species, cannot be classified as Magallana, Talonostrea Li & Qi, 1994, or Crassostrea s.s.; therefore, we revise these groups as sub-genera within Crassostrea. Our analysis of the COI barcoding fragment from previously published sequences of all available Magallana species found that gene is not sufficient to separate several economically important species, and revealed more than 5% of sequences in GenBank represent identification errors. The new species Crassostrea (Magallana) saidii sp. nov., which is genetically, morphologically, and gastronomically distinct, is known from only one population under potential threat from urbanisation. Many more global species of Magallana remain undescribed. The systematics of this group is critical to understand the diversity of global oysters, and to understand the sustainable use of species grown worldwide for centuries as our food.

Keyword: Crassostrea; Phylogenetics; DNA taxonomy; Integrative taxonomy; Cryptic taxa; Tropical biodiversity; Malaysia; Magallana; Talonostrea