

The Asian date mussel: a threat to Europe's benthic habitats and economies?

Biology & Impacts



- * Non-native
- * Filter-feeder
- * Mat-forming¹
- * Ecosystem engineer¹
- * Competes with native spp.²

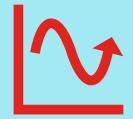
PhD Goals

To assess:

* Distribution



* Population dynamics



* impacts



Results (regional)



...of intertidal transects & subtidal benthic grab surveys: Population persistence on south coast of UK, 2011-2021^{3,4}
Ephemeral, seasonal, patchy populations (fig. 1)



Results (global)



...of global presence data review (of GBIF, OBIS, literature) & first run of Mahalanobis distance species distribution model (SDM) (fig. 2):

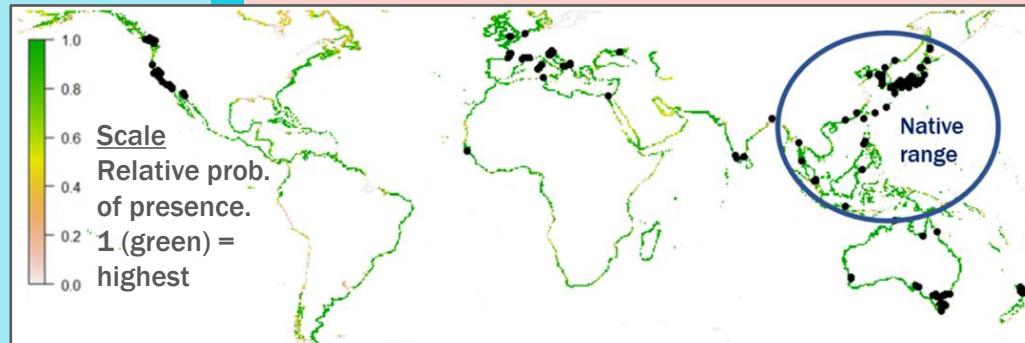
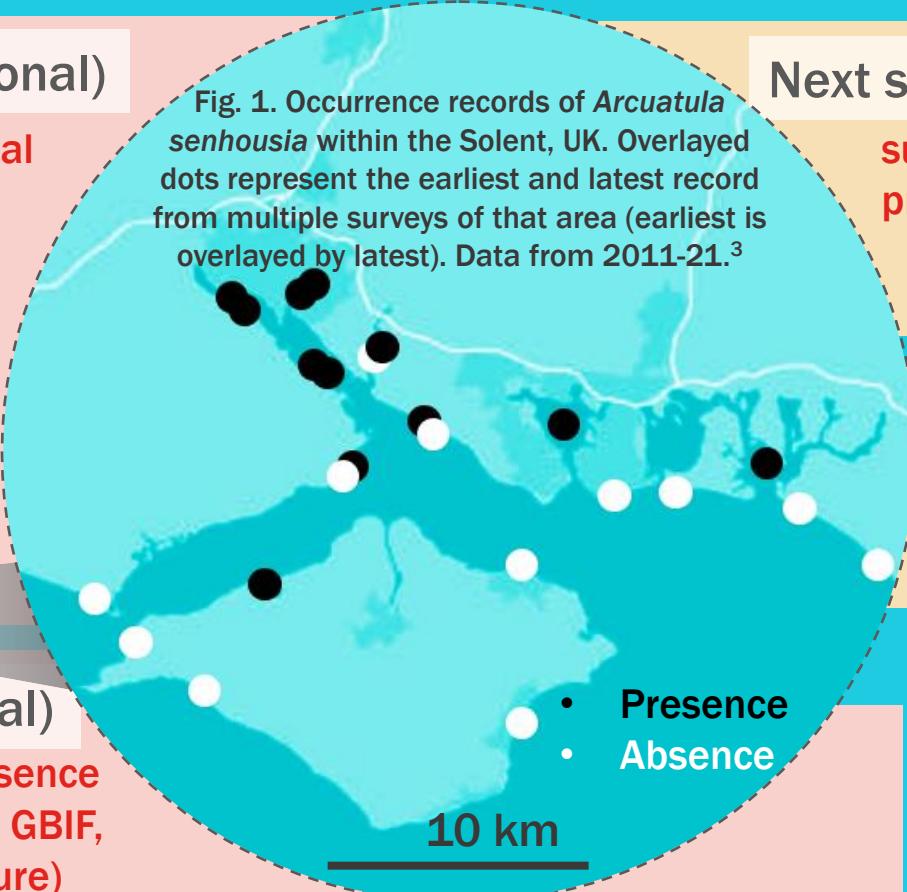


Fig. 2. Probability of presence across globe under current environmental conditions. Black dots are presence records from GBIF, OBIS & literature

Fig. 1. Occurrence records of *Arcuatula senhousia* within the Solent, UK. Overlaid dots represent the earliest and latest record from multiple surveys of that area (earliest is overlaid by latest). Data from 2011-21.³



Next steps

Continue intertidal transects & subtidal grab surveys, refine SDMs & project output to future climate scenarios, to determine current & future, local & global, extent of populations



Obtain individuals from monthly subtidal surveys across the year, to determine reproductive cycle & population dynamics

Analyse benthic associations from subtidal survey data & conduct mesocosm studies, to determine impacts on key habitats, species & ecosystem services



Associated with *Zostera* spp. (© Claude Nozères, Wiki. Commons)

Outcomes Inform risk assessments, coastal management & policy

1. Takenaka, R.; Komorita, T.; Tsutsumi, H. (2018) Accumulation of organic matter within a muddy carpet created by the Asian date mussel, *Arcuatula senhousia*, on the Midori River tidal flats, Japan. *Plankton Benthos Res.* 13: 1-9
2. Castorani, M. C. N.; Hovel, K. A. (2015) Invasive prey indirectly increase predation on their native competitors. *Ecology* 96: 1911-1922
3. Watson G. J.; Dyos J.; Barfield P.; Stebbing P.; Tidbury H.; Dey, KG, (in press) Evidence for self-sustaining populations of *Arcuatula senhousia* in the UK: a threat to Europe's coastal habitats and economies? *Scientific Reports*
4. Worsfold, T. M.; Pennisi, N.; Ashelby, C. W. (2020) *Theora lubrica* Gould, 1861 (Bivalvia: Semelidae), new to the UK, with notes on associated non-native species, and an earlier date of introduction for *Arcuatula senhousia* (Bivalvia: Mytilidae) to the UK. *Journal of Conchology* 43: 665-674