Developing tools to improve stock assessment

for the common whelk, *Buccinum undatum*:

Validation of growth line formation in

statolith microstructures

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The UK fishery for the common whelk *Buccinum*

*undatum* is one of the largest in Europe, with a value

of £16.3million in 2014. The increase in overseas

demand for whelks has driven an expansion of

the fishery in recent decades, leading to several

documented population declines. Stock assessment

is problematic as length-based age and maturity

assessments are ineffective, highlighting the need for

a robust age determination method. The aim of this

project is to validate the periodicity of growth rings

present in the calcium carbonate statoliths located in

the foot of the whelk. Analogous in function to the

fish otolith, the statolith contains a high resolution

archive of past growth. Using Secondary Ion Mass

Spectrometry (SIMS) the annual trace element

profiles in statoliths from 3 locations spanning the

length of the UK (the Shetland Isles, the Menai Strait

(North Wales) and Jersey) were reconstructed at

a 2μm resolution. This highlighted clear cycles of

24Mg with minimum values that correspond to the

visible statolith rings. This has been supported with

the stable oxygen isotope analysis of the matching

shells to reconstruct historical seawater temperature,

giving a second reliable age for each animal. The

results indicate that the visible statolith rings are

a good indication of age containing clear annual

trace element cycles, which match the number of

reconstructed temperature cycles. This validation

of statolith growth rings provides a new age

determination technique, which could potentially

lead to improved management of *B. undatum* fisheries

through age based analytical stock assessment.