

UKTAG – Biological Status Methods

Coastal Waters

Benthic Invertebrate Fauna (Dog whelks)

What do we use as an Indicator?

Dog whelks, *Nucella lapillus* (sea snails that live on rocky shores along the coast)

Why do we use benthic invertebrates?

Dogwhelks are a good indicator of the contamination of the hazardous substance called tributyltin (TBT). Dog whelks can be used to assess the levels of TBT as it has been shown that low levels of this pollutant in the water has led to deformities in the reproductive organs of female dogwhelks. These deformities are known as imposex and the larger the concentration of TBT in the surrounding waters then the more significant the deformity of the dog whelk. This can eventually lead to the decline in populations due to the pollutant affecting the dogwhelks ability to reproduce.



Sampling

Forty specimens of the adult common dog whelk are collected by hand from rocky shores at coastal sites between the high and low tide line. The number of females collected in each sample is recorded and each individual is categorised according to the extent to which it is affected by imposex. Each female dog whelk collected is assigned a Vas Deferens Sequence (VDS) score on a scale of zero to six, where a score of zero indicates that the female is unaffected, and a score of six indicates sterility due to imposex deformities.

What do we measure?

Vas deferens sequence index (VDSI)

The VDSI index describes the degree to which a community of dog whelks is affected by the imposex

condition. The VDSI is the average VDS score for the sampled female population.



How do we decide the Biological Status?

The observed measure is then compared with the measure that would be expected in undisturbed conditions. This reference value is zero (*i.e.* no signs of imposex in the sampled population).

The outcome is then expressed as an 'Ecological Quality Ratio' or EQR. An EQR close to one indicates that the dog whelks are close to their natural state; those close to zero indicate a high level of pollution. To calculate the biological status the measure is divided into the bands required by the Water Framework Directive; see the table below.

Bad status is represented by a zero score (*i.e.* no dog whelks present due to TBT pressure) and Poor status as >0 but <0.17.

Biological Status Boundary Values

Status	EQR Values
High	0.95
Good	0.34
Moderate	0.17

For more details see the [UKTAG Imposex in *Nucella lapillus* Method Statement](#)