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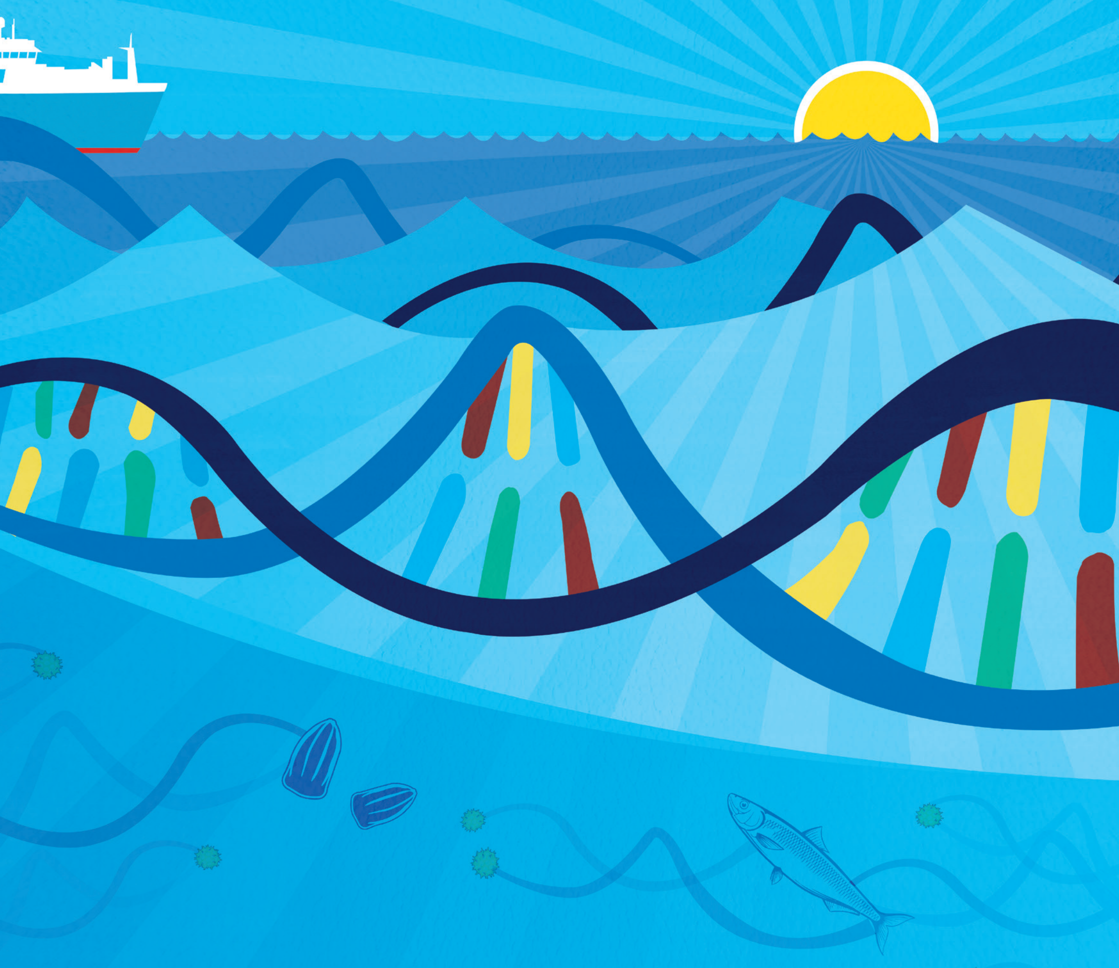

SHEDDING LIGHT ON MARINE BIODIVERSITY

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Centre for Environment
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Science

SHEDDING LIGHT ON MARINE BIODIVERSITY USING GENOMICS AND ENVIRONMENTAL DNA

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Over the last twenty years, methods to measure, assess and understand marine biodiversity have been transformed by the availability and power of modern techniques that characterise the cellular DNA (deoxyribonucleic acid) and RNA (ribosomal nucleic acid) ‘blueprints’ that define the identity of each and every species on our planet. These techniques are particularly important in defining the presence and character of species that are rare (such as endangered species), are cryptic (species that hide), or which are hard or difficult to detect using observational or chemical detection methods (very small plants or animals, such as bacteria or parasites). Genomic techniques can also be used to identify previously unrecognised variants or strains of different animals that may help to explain why changes in the distribution, abundance or health of plants or animals occur.

At present, one of the most productive areas of applied research using genomics is the study of diseases and pathogens, which are typically very hard to identify and classify using traditional methods. There are thousands of pathogens that can infect and damage the health of aquatic animals, with consequences for food security, animal welfare and the prosperity of those involved in the aquatic food chain. Cefas has been responsible for breakthroughs in our understanding of the taxonomy and prevalence of these pathogens and methods for their early detection. For example, Cefas has recently used metagenomic technology to identify a completely new group of parasites which infest bivalves and crabs, the Microcytida, and which is the most evolutionary divergent group of multicellular organisms ever discovered. Whole genome sequencing of bacteria is now providing great insight into the pathogenicity and spread of anti-microbial resistance in aquaculture.

Similar approaches are being used to clarify viral classification and the evolution of widespread pathogens such as White Spot Syndrome Virus that can devastate the productivity of shrimp aquaculture facilities in tropical environments. Current research is focusing on microbiomes of animals, and how these affect their health, emerging diseases in aquaculture and fisheries, environmental DNA (eDNA) methods to assess pathogen diversity and disease risk, and at the other end of the scale highly specific pond-side molecular assays to assist farmers in making management decisions.

For more information please visit:
https://bit.ly/2l9vrpQ

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