

On the origin of subspecies

February 11 2009

Scientists have sequenced over seventy strains of yeast, the greatest number of genomes for any species.

"Analysing so many strains has helped us to bring the small branches of Darwin's 'Tree of Life' into focus," said Dr Steve James of the National Collection of Yeast Cultures (NCYC) at the Institute of Food Research.

"We can sift through billions of DNA bases to clearly spot a wild yeast or the mosaic genome of a recent hybrid," says Dr Ian Roberts, leader of the NCYC research team and the collection's curator.

"This is a valuable test bed for the 1000 genomes project, in which the genomes of 1000 people are being sequenced," said Professor Ed Louis from the University of Nottingham. "This number of organisms has never been sequenced before."

The basic machinery of yeast is surprisingly similar to that of humans, and the project is already helping experts to develop the tools necessary for studying human genetic variation. Yeast can also be used to develop and test new drugs, such as for cancer.

The analysis to be published in *Nature* on Wednesday enables the scientists to study genetics in much finer detail than was ever possible for Darwin. They are able to see the differences within a species and use this knowledge in understanding yeast biodiversity and exploiting it for human benefit.

"Amongst other things, this dataset will help us to understand how yeast probiotics contribute to gut health," says Dr Roberts.

The scientists analysed strains that have long been associated with human activity (such as baking, wine and sake) and wild strains, mostly from oak bark. They found that rather than all being derived from one common ancestor, humans have domesticated yeast strains at many points in history and from many different sources.

The association between man and yeast stretches back thousands of years. Recent findings from the Malaysian rainforest of chronic intake of alcoholic nectar by wild treeshrews suggest that the association between fermented beverages and primates is ancient and not exclusive to humans.

Yeast production is a multi-billion dollar industry for brewing, baking, biofuel production, probiotics, and medical applications. The strains used in this study are publicly available alongside several thousand other yeasts at www.ncyc.co.uk.

Reference: 'Population genomics of domestic and wild yeasts', DOI 10.1038/nature07743

Source: Norwich BioScience Institutes

Citation: On the origin of subspecies (2009, February 11) retrieved 30 April 2024 from <https://phys.org/news/2009-02-subspecies.html>

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