Lager yeast ancestors were full of eastern promise

February 26 2015, by Thomas Deane

There are few drinks as iconic as a 'pint of the black stuff'. It might, therefore, surprise beer connoisseurs to learn that the DNA of the all-important brewing yeast – the building blocks of the perfect Stout – is the same as that which encodes the yeast required to brew a clean, crisp lager.

That is the key implication to emerge from a genetic study carried out by researchers at Trinity College Dublin and UCD, which attempted to build a family tree of brewing yeasts through the ages. The geneticists analysed the genomes of 76 different strains of yeast taken from wineries, distilleries, bioethanol plants, bakeries, laboratories and natural isolates as they sought to paint a more complete picture of yeast evolution.

Lager yeasts are classified as either Group I or Group II. The Group II lager yeasts share DNA with Stout yeasts and, interestingly, with strains that are used to brew a South Indian speciality called 'Toddy'. Such a connection implies that toing and froing between continents in years gone by helped introduce particular strains to our brewing armoury.

Associate Professor in Microbiology in the School of Genetics and Microbiology at Trinity College Dublin, Ursula Bond, was one of the researchers behind the discovery.

The detailed findings, which have just been published in the peer-reviewed publication FEMS Yeast Research – provide other insights into

how the two groups of modern-day lager yeasts evolved. The geneticists believe that Group I and II yeasts arose by independent fusion events with a yeast species that was only formerly discovered in 2011.

This species was found in Patagonia and in China, but has never been found in the wild in Europe. The current hypothesis used to explain its presence in some of our favourite beers is that it came here on ships returning from the New World, or from trade links established with China along the Silk Road.

Only further genome analysis will fully unravel the family tree connections. The group, which also comprises researchers Chandre Monerawela and Tharappel James from Trinity, and Ken Wolfe from UCD, is now involved in a project to sequence the Stout and Toddy yeast strains as they seek answers to some of these questions.

Lager Yeasts

Yeasts have been used to ferment sugars into alcohol for several millennia, but fortune and chance were responsible for the emergence of the lager yeasts in Medieval Europe. With a nod to the discoverer of the microbe responsible for fermentation, Louis Pasteur, the new species was named Saccharomyces pastorianus.

The first fortuitous event was the introduction of a law in Bavaria in 1553, which restricted the brewing of beer to the winter months (from St Michaels Day to St Georges Day). This led to the natural selection of yeasts that could grow and ferment at low temperatures. The second contributing factor was the growing appetite in Europe for discovery and exploration of the New World.

Provided by Trinity College Dublin