

UCD Project: Fantastic Yeasts and Where to Find Them



5th and 6th class from Kilglass NS, Enniscrone, Co. Sligo who discovered the yeast *Ogataea degrootiae* for only the second time ever

Soil contains many different kinds of microbes, including yeasts and fungi, algae, protozoa, and bacteria. Yeasts have only one cell, though they hang around together in large groups. Yeast are more closely related to us than they are to bacteria, even though yeast might look more like a bacteria than a person.

We want to figure out what kinds of yeast are present in our environment, and how important they are. Some yeasts are used to bake bread, and some are used to make beer. Some make cheese, and some cause diseases of plants, and of people. Others break down materials in the soil. There are many, many different kinds (species) of yeasts. There are so many that they haven't all been named or even been discovered. In 2019 pupils from 15



primary schools in 13 counties in Ireland helped us to collect soil samples so that we could look for yeast species.

The soil samples were sent to UCD, where undergraduate students added some to a nice warm soup to encourage the yeast to grow. It's

hard to identify yeast species just by looking at them. However, every cell contains a set of instructions (DNA), that is different for every species on Earth. The species were identified by purifying the DNA and reading some of the letters in the instructions.

What did we find?



We identified yeasts from soils from every school! Sometimes we found several species, and sometimes we found only one. Maybe different organisms are more common in some soil samples or maybe some undergraduates are

better at isolating yeasts than others. The species we found are listed on the next page.

The most common species we identified is called *Kazachstania servazii*. This was named after the country where it was first identified, Kazakhstan, a long way from Ireland. We now know that *Kazachstania servazii* is very common in Irish soil, but we don't yet know what it does there. Some of the other species that we found where also identified a long way away, like *Barnettozyma californica* (guess where this

was isolated!). We know that this species can break down fats. We found 16 different species in the school samples.

Did we find any new species?

We didn't find any species that were never described before in the school soil samples, though we may have found two new species in other samples collected by the UCD undergraduates. However, we did find two very interesting species. One is called *Ogataea degrootiae*, collected by pupils from **Kilglass NS**, Co. Sligo. This species has only been described once before, in 2018, when it was discovered by school pupils in the Netherlands. Another species is called *Hanseniaspora scholastica*. We found this twice in 2019, in soil samples collected by pupils from **St Bernard's NS** in Co. Longford and from **Kilcommon NS** in Co. Tipperary. *Hanseniaspora scholastica* was first isolated by UCD students in 2017, and hasn't yet been described in other countries. We now know that *Hanseniaspora scholastica* is probably quite common in Ireland. No-one has ever worked out all the letters in the DNA instructions (called sequencing the genome) for *Ogataea degrootiae* or *Hanseniaspora scholastica*.

We have therefore chosen these for further studies, and we hope to sequence their genomes for the first time ever!

How to name a species

Species have very complicated scientific names, consisting of two words that are usually in Latin. For example, the scientific name for humans is "*Homo sapiens*" and for one of our yeasts is "*Ogataea degrootiae*". The first word tells you what the "genus" is; a genus is like a family of related species. There are no species other than humans in the genus "*Homo*", but there are lots of yeast species in the genus "*Ogataea*". Species in the same genus are related to each other, like dogs and wolves, which both belong to the genus "*Canis*". The second word is unique to each species, and can be decided by the first person to identify the species. For example, *Ogataea degrootiae* is named after a Dutch pupil called De Groot who collected the soil sample where it was discovered, and *Hanseniaspora scholastica* was named by UCD students because "scholastica" means student. Species names are usually written *in italics*.

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Species we identified in soil samples from schools (those in bold were selected for further study)

St Finians NS, Garryhill, Co. Carlow: *Pichia fermentans*, *Schwanniomyces capriotti*, *Candida sake*, *Kazachstania servazzii*

Urhan NS, Co. Cork: *Barnettozyma californica*, *Kazachstania servazzii*, *Cyberlindnera suaveolens*
Leap NS, Co. Cork: *Hanseniaspora uvarum*

Knockaderry NS, Co. Kerry: *Wickerhamomyces anomalus*

Allen NS, Co. Kildare: *Wickerhamomyces anomalus*

Abbeyleix South NS, Co. Laois: *Vanrija albida*

St. Brigid's NS, Co. Limerick: *Barnettozyma californica*

St. Bernard's NS Co. Longford: *Kazachstania servazzii*, ***Hanseniaspora scholastica***

Whitecross Primary School, Co. Meath: *Torulaspora delbrueckii*

St. Ciarán's NS, Co. Offaly: *Saccharomyces paradoxus*, *Kazachstania servazzii*

Castleplunkett NS, Co. Roscommon: *Wickerhamomyces anomalus*

Kilglass NS, Co. Sligo: *Naumovozyima castellii*, ***Ogataea degrootiae***, *Saccharomyces paradoxus*

Kilcommon NS, Co. Tipperary: *Hanseniaspora uvarum*, ***Hanseniaspora scholastica***, *Saccharomyces paradoxus*, *Barnettozyma californica*

New Ross Educate Together NS, Co. Wexford: *Candida tropicalis*

Gorey Educate Together, Co. Wexford: *Kazachstania servazzii*, *Kazachstania marxianus*, *Hanseniaspora uvarum*, *Torulaspora delbrueckii*.