

## How Does the Ghaf Tree Thrive in the Challenging UAE Environment?

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With its arid landscape, scorching heat and minimal rainfall, the UAE in particular and the Middle East in general is an inhospitable climate for most flora and fauna. Nonetheless, there are certain plants and animals which have specially adapted to not only withstand but even thrive in such conditions. The humble ghaf tree is one such specimen.

Named the National Tree of the UAE in 2008, the ghaf tree commands a unique combination of genetic traits which make it capable of proliferating in the Emirati desert. Now, thanks to the advanced capabilities offered by genomics technology, we are better equipped than ever to understand how this tree can survive in the most extreme of climates. Given the looming environmental crisis facing our planet and all of its inhabitants, the research could prove to be instrumental in planning for the future.

### An impressive anomaly

Known scientifically as *prosopis cineraria*, the ghaf tree is renowned across the region for its ability to defy the odds and survive in elevated temperatures with little access to water. It plays an invaluable role in stabilising the quality of the soil and preventing excess harm from coming to the environment, while it also provides much-needed shade and sustenance for a variety of desert creatures.

The trees generally live for around 120 years and traditionally, it has been used in the UAE for medicinal purposes and to feed livestock among rural herdsmen. In recognition of the vital roles it plays both culturally and environmentally, the Emirati government officially christened the ghaf the country's National Tree in 2008. However, little was known about exactly how it could thrive where other species couldn't even survive... until now.

### Groundbreaking research

Genome mapping of the ghaf tree was first begun by the Khalifa Centre for Genetic Engineering and Biotechnology, but the latest study builds upon and completes that work. It was undertaken as a joint venture by the Environment Agency – Abu Dhabi and M42, a leading research company in the fields of healthcare, technology and sustainability.

The project made use of state-of-the-art sequencing platforms developed by Oxford Nanopore Technologies to provide whole-genome mapping of the tree. The results gave 240 times better genome coverage than previous data, with a 99% mapping rate that allows the scientists unprecedented insight into the unique genetic traits of the ghaf tree, as well as the functionality and expression patterns of its genes.

## Increasingly relevant in the modern world

By better understanding how the ghaf tree is capable of coping with extreme conditions, it's hoped the research will inform other studies and initiatives into futureproofing the species and perhaps even developing strains of other plants that are well-equipped to handle a warming world.

“Human health is intricately intertwined with environmental health, and this has become increasingly clear to the world at large,” [explained Dr Fahed al Marzooqi](#), Deputy Group COO of M42. “Our groundbreaking sequencing initiative aims to enhance the understanding of the ghaf tree's genetic adaptations for thriving in arid conditions, which safeguards and champions the UAE's natural legacy. The research also assumes critical significance as the world seeks to tackle the environment-warming effects of climate change.”