

'Tree of Life' fighting for life

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Scientists from The University of Nottingham have joined forces with researchers in Africa to tackle a lethal disease which is devastating a vital resource and foodstuff... the coconut palm.

Referred to worldwide as the 'Tree of Life', the coconut is an important source of livelihood for many smallholder and farmers in the developing world, providing food and drink, fuel-wood, oil, animal feed and building materials.

But a disease called 'Lethal Decline', caused by phytoplasma bacteria, has been [wreaking havoc](#) in the tropical and coastal regions of Africa in recent decades, causing severe hardship and environmental damage.

Researchers from the University's Division of Plant and Crop Sciences have returned from a trip to Ghana where they've been working with the country's [Oil Palm](#) Research Institute. The aims of the collaboration are to develop new ways of diagnosing the disease, to investigate how it spreads and to deploy new resistant varieties.

The disease causes yellowing of the palm leaves in the first instance, followed by the death of the whole crown of the palm which eventually rots away leaving only the bare trunk. Its spread has wiped out whole coconut plantations in some areas resulting in severe economic hardship for local communities.

Leading the team from Nottingham, Associate Professor in Molecular Plant Pathology, Dr. Matthew Dickinson, said: “We have already made significant progress towards one of our priorities. Thanks to a grant from the Leverhulme Trust and the Royal Society, we have been developing an in-field DNA extraction test kit for the phytoplasma that causes the disease which can be used quickly and efficiently in the field.

“The kit is a bit like a pregnancy test which gives a positive or negative result for the presence of the bacteria from a sample of the trunk of the palm in under an hour. Our recent field trip to Ghana proved the kit works well and after some refinement the intention is to roll it out in coconut growing regions of Africa where hopefully replanting can be managed to reduce further spread.”

African coconut breeders have identified some palm varieties which show resistance to or tolerance of the disease. In a second research project, funded by the Biotechnology and Biological Sciences Research Council and the Department for International Development, the Nottingham scientists are also examining the molecular and genetic basis of disease resistance and tolerance in these varieties. They have developed a DNA marker system so suitable hybrids can be identified when they are very young to ensure they are of the correct genotype for replanting.

As well as developing resistant breeds of palms, the scientists are also exploring how infection spreads from palm to palm, so that replanting can be managed to reduce further losses in future. It is thought insects

are the main carrier of the disease, but the team is trying to find out whether it can also be transmitted through the seed of the [palm](#).

To do this the researchers are experimenting by taking seeded embryos, cutting them in two, testing one half for the phytoplasma and growing the other half into a plantlet which in turn can be tested in its stem for the disease. Interim results of these tests suggest that the disease may not be passed on through seed.

One of the research team is Ndede Yankey, from Ghana, who is studying for a PhD at The University of Nottingham. He said: “This research will make a real difference to the communities in Africa who rely on coconut for their livelihood and subsistence. It will also provide African scientists with technologies that will help improve on current strategies for managing the disease”.

Provided by University of Nottingham

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