UNSW students sequence genome of the Wollemi Pine

December 17 2009, By Dan Gaffney

Wollemi pine frond and cone

(PhysOrg.com) -- UNSW students have sequenced the chloroplast genome of the ancient Wollemi Pine - a world first that could reveal how a "dinosaur" of the tree kingdom survived 200 million years of shifting continents and changing climates.

Using next-generation sequencing machines in the Ramaciotti Centre for Gene Function Analysis, the students have produced a draft sequence of the approximately 180,000 nucleotides of the DNA code of the Wollemi's chloroplast genome.

The Wollemi (Wollemia nobilis) was known to science from fossil records but was thought to be extinct until 1994 when David Noble

discovered it in a remote rainforest canyon in Wollemi National Park, 150 kilometres north-west of Sydney.

Fewer than a hundred trees are known to be growing wild, in three localities not far apart. These trees show an extremely low level of genetic diversity and are threatened by introduced fungal diseases and climate change. The Wollemi is being protected from extinction by secrecy surrounding the locations of the wild populations, and by widespread cultivation of the pine in Australia and around the world.

The students' preliminary findings show that the Wollemi chloroplast DNA is unique but shares some features with other pines such as the Kauri and Norfolk Island Pine. Further analysis of the data will provide clues to the evolution of the Wollemi and other pines.

The students presented their findings as a poster at the Australasian Microarray and Associated Technologies Association Conference held in October 2009.

The research project exposed students to leading-edge technology that allowed them to obtain sequence data equivalent to the size of the human genome in just a few months. Exposure to this technology is rare in degree-level science programs, and was made possible by the outstanding sequencing research facilities at UNSW and an ongoing collaboration between researchers at UNSW and the Royal Botanic Gardens Sydney.

Provided by University of New South Wales