Study will determine whether viruses can help orchids

July 4 2011

Plant scientists from Murdoch University will be investigating whether the viruses hosted by orchids in Western Australia are actually benefitting them under the changing climatic conditions.

Professor Michael Jones, Dr Stephen Wylie and their team from the School of Biological Sciences and Biotechnology say that in some natural ecosystems, ancient associations between viruses and plants help to protect their hosts from physical stresses.

“Plant viruses have traditionally been blamed for causing disease and death in plants,” explained Professor Jones, whose study has been made possible by an ARC Linkage Grant. “But we think there may also be

benefits.

“An exciting part of this research will be to investigate the physiological responses of native orchids under heat and drought stresses and determine the roles viruses have in mediating that response.

“We will test whether the ancient associations between plants and viruses are maintained where both parties benefit in some way. For example, in the plant Arabidopsis, the Cauliflower mosaic virus infection induces the expression of some protective proteins which are also expressed when plants are stressed, such as by high and low temperatures and drought.”

The research team will employ new genome sequencing techniques, which can generate up to 30 gigabases of sequence data per run, to identify and understand the true diversity of viruses and virus-like elements in the orchids.

The team will then use special software to assemble virus genome sequences and determine the host plant’s response to the virus at the gene level.

Dr Wylie said: “This work will open the floodgates on new virus discovery in our region, with the techniques developed being applicable to a wide range of other biological systems worldwide.

“The results will also be of critical importance in informing conservation strategies for terrestrial orchids and other flora within WA.”

The Australian Orchid Foundation and Kings Park and Botanic Gardens in Perth will together contribute $90,000 towards the project over the next three years.

Professor Jones and Dr Wylie will also be collaborating with Professor

Kingsley Dixon, Science Director at Kings Park and Botanic Gardens in Perth, and Professor Marilyn Roossinck at the American-based Samuel Roberts Noble Foundation on the research.

Professor Roossinck's previous investigations stimulated the idea for the orchid project, said Professor Jones.

"She found that the mutualistic association between a virus, a fungus and a grass allowed the grass to grow at much higher soil temperatures."

The research will use the sequencing techniques developed during Dr Wylie's previous study with Department of Agriculture and Food Western Australia (DAFWA) researchers into the movement of viruses from plants grown in nurseries for rehabilitation projects, and between crops and native plants. As a result of his work, Dr Wylie discovered virus infections in critically endangered spider and donkey orchids in south-western Australia.

Provided by Murdoch University

Citation: Study will determine whether viruses can help orchids (2011, July 4) retrieved 19 April 2024 from https://phys.org/news/2011-07-viruses-orchids.html