ECOS
SCIENCE FOR SUSTAINABILITY
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Published: 13 August 2012

Gene sequencing enhances ‘mouse model’ for plant science

Just as the mouse has helped scientists unlock the secrets of human biology, a native Australian plant is set to help scientists identify the end-products of different plant genes, thanks to the recent sequencing of its DNA and RNA.

Credit: University of Sydney

Nicotiana benthamiana is a distant relative of commercial tobacco and is found only in remote areas of Western Australia, the Northern Territory and Queensland. The plant has been embraced by the scientific community for its ease of use as a model organism, in the same way mice are used to study human biology.

The release of the plant’s DNA and RNA sequences is the result of a collaborative effort between the University of Sydney, CSIRO Plant Industry and New Zealand’s Plant and Food Research.

‘This plant is already used in research laboratories around the world by biologists and biotechnologists,’ said Professor Peter Waterhouse from the School of Molecular Bioscience, who leads the University of Sydney’s researchers.

‘But just as determining the sequence of the human genome has been an incalculable aid to medical research, providing this genome sequence will be a major help to agricultural and particularly biotechnological research.

‘Having the RNA in addition to the DNA information will give researchers extra options and approaches to designing their genetic experiments. This achievement will speed up the development of new crops required for food, fibres, biofuels and personalised medicines.’

Finding out what each gene in a plant produces is a key step in agricultural sciences. ‘We used to wait six months for this type of information but using the unique properties of “benth”, as we sometimes call it, we can have results in less than a week,’ said Professor Waterhouse.

‘You can simply squirt genetic material into a leaf and have it produce your target product in a matter of days. Our results will make this process even faster and more accurate.’

The University has launched a **new website** in collaboration with its partner organisations to provide the genome sequences and a wealth of other material on the plant.

‘At this stage benth is a much exploited but little understood plant and this resource will change that completely,’ said Dr Craig Wood, a co-investigator from CSIRO Plant Industry.

‘Plant genomics is still frontier territory and we have pushed the boundaries with this project,’ said Dr Roger Hellens, from New Zealand’s Plant and Food Research.

‘This plant has increased the speed at which we can investigate the molecular controls of important horticultural traits.

‘It allows us to identify genes involved in pest and disease resistance, the metabolic pathways that produce compounds known to be good for human health, or to understand how a plant develops.

‘We can use this knowledge to identify the corresponding genes in horticultural plants of interest and develop molecular markers to speed up the breeding of new varieties with these traits.’

Source: University of Sydney

From **ECOS** online **http://www.ecosmagazine.com/?paper=EC12381**