

# Taking the Sneeze out of Rye grass

Relief may be close for the more than two million Australians who suffer from seasonal allergies to the pollen of perennial ryegrass, a crop widely grown in Australia and elsewhere as a feed or forage crop for dairy cattle and other animals. Their plight is shared by twenty million US allergy-sufferers.

In an innovative use of biotechnology, a new variety of ryegrass that does not cause the sneezing and itchy eyes of hay fever has been developed by Melbourne researchers.

The major allergens in ryegrass pollen are two proteins known as Lol p1 and Lol p2. Using 'antisense' gene-silencing technology, where a complementary strand of DNA to the gene of interest is used to inactivate the gene so that the protein is not expressed, the researchers have created new strains of ryegrass that do not express the Lol p1 and Lol p2 proteins.

"The genes are almost fully silenced – it's very effective," says Professor German Spangenberg, from the Molecular Plant Breeding Cooperative Research Centre, part of the new \$20 million Victorian Agribiosciences Centre (VABC) at La Trobe University in Bundoora, near Melbourne.

Field trials of the new grasses are being conducted in the US.

As well as reducing the allergen load, the researchers have improved several other traits, making the grass easier to digest and giving it a higher nutritional value. These traits can now be mixed and matched to create a variety of low allergen grasses suitable for different purposes.

In addition, the same technology can be used to improve the quality and remove allergens from other species of grasses including the tall fescues, which are widely grown in the US.

A new company, Gramina, has been established to commercialise the grasses both in Australia and worldwide.

Other programs involving pasture grasses at VABC include the development of grasses with lower lignin content, making them softer and more digestible and hence more palatable for the cows that eat the grasses. Conversely, grasses with a higher lignin content may be suitable for use in situations where tough turf is required – such as on golf greens and playing fields.

More nutritious grasses are also in development, utilising the genetic pathways that control the production of fructan, a carbohydrate that provides an excellent source of energy for dairy cattle.



Techniques to transform ryegrass with all of the desired traits simultaneously are being developed to speed up the process.

The improved traits can then be bred into a variety of elite ryegrass cultivars to create low allergy grasses suitable for many uses.

The first low - allergy grasses are likely to be released for commercial use in 2013 – there are still field trials to complete before final cultivars can be selected and grown up in sufficient quantities.

The VABC, which was funded by the Victorian State Government and by La Trobe University, is intended to be a one stop shop for academic, commercial research and development groups, according to Spangenberg, and comprises a consortium including La Trobe University, Department Of Primary Industries Victoria (DPIV), RMIT University, Monash University, Florigene Ltd - a division of Suntory, Molecular Plant Breeding CRC and GE HealthCare Biosciences.

#### Web links

<http://www.molecularplantbreeding.com>

<http://www.gramina.com.au>