Agri-science: the next generation

Following his highly commended entry at this year's BT Young Scientist and Technology Exhibition, second-year student, Niall Lyons, spoke to the *Veterinary Ireland Journal* about his project submission on the science behind milk proteins

Fianna Fáil party leader Micheál Martin with Niall Lyons at the BT Young Scientist and Technology Exhibition 2017. Photo: Conor McCabe.

In the 26-year history of the European Union Contest for Young Scientists, Ireland has won first place 14 times and this year's 53rd BT Young Scientist & Technology Exhibition 2017 (BTYSTE) again attracted inspirational and innovative individual and group entries from 4,591 students in total, an increase of over 3% on last year. There were 550 projects shortlisted to exhibit, with girls once again out-numbering the boys, with a gender split of 61% female to 39% male entrants. Students submitted ideas and innovations on subjects ranging from migration to climate change to concussion injuries, with social and behavioural sciences the most popular category (41% of entries). Agriculture, especially farming, was a key theme explored at the exhibition, with projects examining farm safety, energy sources, hygiene on a farm, animal husbandry and innovative ideas to help farmers. Michael Sheehan and Jack Murphy, both aged 14, from Coláiste Treasa in Kanturk, Co Cork, won the overall Group Winner Award for their investigation of prey availability for hen harriers in managed farmland.

Cork is the most represented county of the 31 counties competing, so far, in the history of the competition.

Niall Lyons, also 14 years old, continued this tradition by representing his Cork-based secondary school, Coláiste Chríost Rí, at the exhibition.

Niall's interest in the science of milk proteins began at an early age after suffering from extreme eczema as a child. "I come from a farming family; my father is a dairy farmer. As an experiment when I was younger, my mother decided to incorporate goat's milk into my diet to see if it would have any positive benefits on my eczema. Interestingly, the effect on my eczema was immediate and it completely cleared up. This is where my interest in the science behind A2 milk began. Through research, I discovered that goat's milk does not contain A1 proteins and that there are certain breeds of cow that only produce A2 milk. This lead to the realisation that people who can only drink goat's milk could also enjoy A2 cow's milk, if it was made available to the public," he said.

A2 milk is cow's milk that contains only the A2 type of beta-casein protein rather than the more common A1 protein found in regular milk. This A2 milk protein was present in all dairy herds until a natural mutation occurred in European herds 5,000 years ago. Niall, began his research by examining studies that highlight the benefits of A2 milk.

PERSONAL RESEARCH

Niall's research included examining studies discussing A1 milk, which releases beta-casomorphin7 (BCM7). According to Niall, this can affect people who may be lactose intolerant, and can cause skin irritation in those prone to flair-ups.

"I conducted a small study involving people, who suffered from eczema. When they drank A2 milk, they noticed no flair in their symptoms. I had several people involved in my studies who believed they were lactose intolerant and avoided dairy for this reason. Some of them discovered they could enjoy A2 milk without any side effects. Participants involved in this blind study were given A1 milk the first week and A2 milk for the second week. While taking A1 milk, they experienced stool problems but after digesting A2 milk,

these problems subsided," he said.
Research into the benefits of A2 milk are currently in their infancy and Niall believes that farmers and vets need to be made aware of the science behind milk proteins and their relationship with human and animal health.
"I don't think many farmers know about the benefits of A2 milk yet. Many farmers approached my stand at the BTYSTE enquiring about A2 milk as they had never heard of this specific type of milk before. Dairy cows can be tested by taking a hair from their tail and genotyping the sample to determine the cow's genetic make-up and discover if the cow has the A1 mutation," he said.

POSITIVE FEEDBACK

Feedback from the BT Young Scientist Exhibition was very supportive with many farmers showing their interest in Niall's project. "Farmers who spoke to me were amazed by my research and wanted to know how to breed their herds to produce A2 milk. The judges were impressed with my project and highly commended my exhibition. I believe if I had been able to conduct it on a larger scale, the findings would be more comprehensive."
With a clear passion for farming, Niall hopes to follow a career path in which he can blend his love for animals with his interest in science. "Before I began studying A2 milk and its benefits, I had always thought I would become a vet. Now, I think I would like to become a dairy scientist and specialise in the study of A2 milk. On the other hand, if I decided to become a vet, I hope to be able to continue my research and practise veterinary care at the same time, as it would allow me to coincide my research into dairy cows with human-interest results."