

## Flour powers

Mediawatch: **Bernard Dixon** looks at the reaction to the announcement last month of wheat genome data.

Scientists working in areas that are (rightly or wrongly) socially contentious might benefit by perusing readers' comments lodged on online newspaper websites after the appearance of announcements in their fields. On many occasions, they would find not only approving sentiments but also a surprising degree of hostility. The recent announcement of draft sequence coverage of the wheat genome provides a vivid example.

"British scientists have cracked the genetic code for wheat — paving the way for a new breed of crops resistant to disease," said the *Daily Mail* on 27 August. "The experts will today share the map of the wheat genome online for free, allowing growers around the world to develop super strains of the crop. The development could also lead to massively increased production — and in turn lower bread prices. But last night there were

fears the breakthrough could open the doors to genetically modified 'Frankenstein foods' as scientists will be able to manipulate the wheat DNA."

The UK's Biotechnology and Biological Sciences Research Council (BBSRC) triggered the media coverage by issuing a press release describing the collaborative work of groups at the universities of Liverpool and Bristol and the John Innes Centre in Norwich. "The genome sequences released comprise five read-throughs of a reference variety of wheat and give scientists and breeders access to 95% of all wheat genes," said the BBSRC document. "This is among the largest genome projects undertaken, and the rapid public release of the data is expected to accelerate significantly the use of the information by wheat breeding companies."

Here, then, are some of the online comments provided by readers: "These so-called scientists have NO idea what GM crops will do to humans, animals or any other form of life", "If GM wheat is engineered, then I guess many people will give up eating bread", "Quit Messing With Our Food Supply! Idiot

scientists, some things are meant to be left alone, especially things that You Have No Clue About", "Disguised GM wheat, trash it!".

The *Daily Mail's* 'Frankenstein' comment and past campaigning against genetic modification may have encouraged so-minded people to post remarks of this sort. Yet there were even stronger protests against *The Independent*, which not only highlighted potential benefits stemming from the wheat research but also lauded them in an editorial. Under the headline "Genome breakthrough heralds new dawn for agriculture," *The Independent's* science editor Steve Connor wrote: "In a scientific tour-de-force that has been hailed as the most significant breakthrough in wheat production since the cereal crop was cultivated by the first farmers more than 10,000 years ago, scientists have decoded the genome of the wheat plant. As a result, new breeds of disease-resistant crops could be producing higher wheat yields in as little as five years' time, raising the prospect of lower bread prices and greater food security in a more populated world."



**Crop insights:** Reporting of wheat genome details sparked debate. (Photo: Paul Glendell/Alamy.)

The accompanying editorial, headed “A victory in the battle against hunger”, said the news was “a cause for major congratulation” to the scientists involved, and for the decision to place their findings openly on the internet.

Now here are some readers’ responses: “I will never eat the crap. Are you out of your mind?”, “Sounds like ‘cure for cancer has been found’. Big corps would not allow their markets demise, just like the ‘cancer industry!’”, “GMO is a potential new plague brought about by mankind’s greedy behaviour – birth control and reforms are the solution to overpopulation, not GMO. The EU should ban GMO forthwith”, “The words ‘Play with the natural balance of nature at your peril’ come to mind. It seems akin to taking a buzzsaw to a finely tuned ecosystem. Taking random cuts through the chain of life that binds us all”, “I am NOT for GMO foods because of the KNOWN mutations they cause to the HUMAN genome”, “And there they sit, the Uber-Rich patent holders, their backyards filled with totally resilient wheat, while the rest of the world, without the means to afford it, or even the means to save themselves from starvation, will die in the swamps of Mother Nature’s own selective breeding program.”

Even in the USA, which never experienced the European anti-GM furor, press coverage was followed by angry ripostes. “Scientists have published the first genome of wheat, an achievement that should benefit food security challenged by the Earth’s population, climate change and emerging plant pests,” the *Discovery* channel announced.

“Scientists are too stupid to see the WHOLE picture of what this will do,” said one response, “It will only cause more intolerances, more digestive issues, more toxin accumulation in bowels (because the proteins which were easy to break down are now more ‘resilient’ to everything).” “Kiss wheat as we know it goodbye... Just like Monsanto Corp. There is no more natural soya,” said another. “I love science, but it’s supposed to help us understand nature, not change it.”

Misapprehensions maybe. Atypical perhaps. But the vox pop now available through the Internet on occasions of this sort provides sobering insights for scientists everywhere.

## New data issues

The extent to which datasets are openly shared raises privacy fears. **Michael Gross** reports.

In the final years of the last century, the human genome project and Craig Venter’s competing private sequencing effort raised hopes and fears that now, with hindsight, appear naïve. There were hopes for immediate medical benefits from identifying the genetic variations that cause common diseases, and there were fears that the ability to read the human genome would make humans ‘transparent’ in that their traits and indeed their fate could be predicted from the genome, an idea that has been explored in the movie ‘GATTACA’ (1997).

Ten years on, we have come to realise that this promised revolution is more complex, as the human genome has yielded no simple explanations for common medical conditions. In the meantime, however, sequencing capacity, speed and affordability have improved rapidly, such that many ‘personal’ genomes of specific individuals, can now be analysed, and even ancient genomes like that of *Homo neanderthalensis* have become accessible. The multitude of individual genomes, ideally connected to information about the phenotype of the genome carrier, is exactly what

researchers need in order to make medical sense of the genome, after realising that the answers are a lot more complicated than most people thought.

With personal genomics and genome-wide association studies, the hopes and fears of the millennium are returning in a new guise. Initiatives like the 1000 genomes project aim at making genomic information widely available, so it can be analysed by many researchers in different ways. Informed consent of the study participants is deemed sufficient to ward off unwanted side-effects.

On the other hand, not all study participants are sufficiently educated to be able to give their informed consent to a genomic study, and even the most knowledgeable participants cannot look into the future and work out what may happen to their genome data after they enter the public domain.

In the absence of political guidance in a field that moves much faster than legislation, bioethics experts in academia are attempting to set guidelines for good practice. This month, they held the first major international meeting on data sharing at St. Hugh’s College, Oxford. Adopting an innovative open discussion format, the conference addressed questions such as:

- How should data-generators be rewarded for their efforts to the scientific community?

