

# Natural resistance

Words Gretel Sneath

**A former CSIRO senior research scientist says arguments that GM crops can benefit the environment do not take an ecological approach. Instead, Dr. Maarten Stapper describes them as a temporary band-aid, or 'techno-fix', masking the real cause of our problems - degrading soils.**

Soil is funny stuff. It can be the source of many crop disasters, but it's also the key to strong growth and internal resistance to insects and disease. Farming systems agronomist, Dr Maarten Stapper, says we must unlock the method for obtaining the right balance—and it needs to happen naturally rather than in a laboratory.

"It's all about harnessing the power of natural soil processes, improving their use of inputs and understanding those practices that negatively impact on soil health," he explains. "Healthy soil produces better crops and pastures, requiring less fertilisers and agro-chemicals for similar productivity, and resulting in healthier feed for animals and healthier food for humans."

Dr Stapper doesn't believe that can be achieved through Genetic Modification (GM), which he says tends to target the symptoms rather than the cause, supplying short-term solutions...and possible long-term problems. He says we should be working out how to get the most out of existing plant, animal and human genes in preference to investing time—and risk—into working out whether one gene will make a difference.

"Isolated genes can't fix soils degraded by farming—they only treat individual symptoms and not the wider cause of soil degradation, and are therefore simply a tiny part of a highly complex production system," he explains.

Such views have sent Dr Stapper off-side with many other scientists who vigorously support the GM concept. Indeed, it has been widely-publicised that he and the CSIRO parted ways in 2007 after 23 years, because of his biological farming direction and criticism of GM crops.

Dr Stapper says that he felt compelled to tone down his vocal opposition to GM crops. "I didn't want that because I have a connection with the farming community and they trust me," he says.

The CSIRO has denied that was the case. Either way, those very farming communities which instilled their trust in Dr Stapper are now reaping the benefits of his extensive knowledge. He now works as a private consultant assisting growers in the gradual transition from industrial to biological farming systems with more resilient soils. His research work, discussions with Landcare groups and a wide range of farmers have helped cement his belief that science must take a broader view to achieve the sustainable development of agricultural industries.



Dr Maarten Stapper



On field trials



"Current soil problems are the result of gross oversimplification of fertilisation and 'plant protection' practices that use harsh chemicals and ignore the delicate balance of microbes, trace minerals and nutrients in the soil," he explains.

Resistance is then nature's answer; a genetic adjustment to adapt to changed conditions and withstand the next attack. Supporters of GM argue that they are overcoming that resistance, but Dr Stapper says the solutions are only short term, and haven't been applied to the 'real world'.

"They don't get the whole picture, as the environmental climate the genes end up in is much more complex than a laboratory. These crops need to be tested in the field for 10 years before they can be said to be safe, and health and fertility testing should be done over at least four generations by feeding mice or rats GM food, for example, and then dissecting the animal and checking the condition of the liver, which is a main detoxifier of the body."

Dr Stapper is also concerned that GM developments will lead to the loss of independence in food production, and fears that the seed-chemical-fertiliser supply chain and its regulation will be controlled by a few multinationals.

"There is no independent science possible on GM crops as companies don't supply seed for such studies unless they see results first to prevent negatives becoming public. Hence experiments are designed to get the answers wanted," he claims.

Instead, Dr Stapper says we must look at the entire farming system, acknowledging that biological systems are non-linear and massively interconnected.

"Plant biology alone (eg. Genetically Modified Organisms) cannot provide the answers as plants interact strongly with a complex soil biology as influenced by soil, water and nutrients, climate and management. Increased complexity and diversity of the organisms, species and interactions within the soil foodweb allows the establishment of a living, self-organising, re-generating, healthy soil, which results in higher plant productivity," he explains. "The aim is to balance minerals and provide a food source for the soil biology and, by increasing their activity, to improve calcium and phosphorus availability, nitrogen fixation, decomposition of crop residues, and the health of plants and grazing animals without reliance on chemicals or drugs."

If chemicals are needed as a last resort, Dr Stapper says only fertilisers and herbicides with the least impact on soil biota

**Plant biology alone (eg. Genetically Modified Organisms) cannot provide the answers as plants interact strongly with a complex soil biology**

should be applied in small amounts, in conjunction with additives to make input more effective and to boost surviving microbes.

He says it's not as far fetched as it may sound - instead, it's a wholistic systems approach, where farming works with nature, rather than against it.

"In most districts today, there are properties applying such farming practices with resulting productivities above district average. These practices have been achieved with persistence by the manager - through trial and error, under financial pressure, and on fragile soils in our highly variable climate," he says.

"Biological agriculture leads to higher biodiversity on farms and a greatly reduced impact on catchment environments. This process can achieve a doubling of the organic carbon content of the soil, and, if practised Australia-wide, could capture most CO<sub>2</sub> released in the country and slow climate change."

For more information, log on to <http://biologicagfood.com.au>

**Recent high-profile Australian campaigns against GM practitioners**

**August 2008:** Bendigo Shire Council held a GM-free forum, as part of its bid to be a GM-free district.

**May 2008:** Greenpeace targeted GM food in a campaign using high-profile chefs, which was designed to pressure state and federal governments to ban GM foods and change labelling laws to make sure consumers know what they're eating. Sydney Chef, Neil Perry, was among those to sign a GM-free charter, agreeing not to include GM products in their ingredients.

**May 2008:** MADGE (Mothers Against Genetic Engineering) took its opposition to genetically altered food to the streets to coincide with a GM crops summit in Melbourne. MADGE was formed in 2007 when the Victorian ALP government announced it was reviewing the moratorium on GM food. The organisation slammed the limitations of the government review, saying the panel was only required to look at the economic aspects of lifting the ban, and there was no obligation to examine the health effects of GM crops or their effect on the environment.