Nathan Laurent
P.O. Box 303
Highfields 4352

Dear FSANZ Officer,

My name is Nathan Laurent, I am an independent scholar of environmental policy based in Queensland, and I am writing to make a submission on the NBT Consultation Paper.

Thankyou for considering my submission.

Kind Regards,

Nathan Laurent B.Gen.St., B.A. hons, M.A. (research).

The consultation paper "Food derived using new breeding techniques" asks five questions of interested parties. In this submission, I address three of these questions with reference to a breeding technique that is probably not considered new, and which would be included under the term "tissue culture" in the consultation paper's Figure 1, namely, somaclonal variation. The point of this is to highlight the problem of clarity of definition in breeding techniques.

In a systematic review of literature on causes and detection of somaclonal variation, Bairu, et al. (2011, 147-165) note that "Somaclonal variation is defined as variation originating in cell and tissue cultures" and that "some scientists added another aspect to the definition and require that somaclonal variation be heritable through a sexual cycle". Although "the term somaclonal variation is now universally accepted to represent heritable variations arising in tissue culture", the study's authors point out that "unfortunately, it is not always possible to demonstrate heritability because of complex sexual incompatibilities, seedlessness, polyploidy or long generation cycles. Therefore, explaining the heritable nature of somaclonal variation for these types of plants could be difficult and almost impossible."

As Bairu, et al. note:

> High rates of somaclonal variation during micropropagation of many plants remain a major problem, especially in large-scale commercial operations. Early detection and elimination of variants is therefore essential to reduce the losses to growers. Efficient detection of variants can also be used to spot variants with useful agronomic traits. Somaclonal variants can be detected using various techniques which are broadly categorized as morphological, physiological/biochemical and molecular detection techniques.

They go on to outline the use of these various techniques to detect variants, noting that in general, "molecular techniques enable detection of variants in juvenile stages using nucleic acids as opposed to morphological and physiological methods where adult plant response is measured."

Bairu, et al. also note that "the causes of somaclonal variations are generally categorized as induced and preexisting." They suggest that while "visible pre-existing variations such as found in chimeric tissues could theoretically be cultured separately and later manifest themselves phenotypically in somaclones… these may not necessarily represent variations arising during tissue culture". Therefore, they conclude, the term somaclonal variation should be restricted to variations that were not visible to the naked eye during the culture initiation stage.

Turning to the consultation paper, the first question is: **Do you agree, as a general principle, that food derived from organisms containing new pieces of DNA should be captured for pre-market safety assessment and approval? Should there be any exceptions to this general principle?**

I agree that food derived from organisms containing new pieces of DNA should be captured for pre-market safety assessment and approval and that there should be no exceptions. This is consistent with Schedule 26 as it stands, which states that: “conventional breeding means all methods used to produce plants, excluding techniques that use gene technology”; and “transformation event means a unique genetic modification arising from the use of gene technology”.

Question 3 is: **Are you aware of other techniques not currently addressed by this paper which have the potential to be used in the future for the development of food products? Should food derived from other techniques, such as DNA methylation, be subject to premarket safety assessment and approval?**

Bairu, et al. note in their review that DNA methylation often affects somaclonal variation. My understanding is that somaclonal variation occurs and is used as a technique without DNA methylation, and I would argue that DNA methylation should therefore be considered a separate technique requiring premarket safety assessment and approval in the Australia and New Zealand context.

Question 4 is: **Do you think a process-based definition is appropriate as a trigger for pre-market approval in the case of NBTs? If no, what other approaches could be used? If yes, how could a process-based approach be applied to NBTs? Are there any aspects of the current definitions that should be retained or remain applicable?**

As indicated in my last answer, I believe NBT’s should be considered in terms of a process-based definition, with techniques additional or supplementary to somaclonal variation being a trigger for pre-market approval.

My concerns include food safety concerns, environmental impacts (including those on biodiversity) and GM contamination of neighbouring non-GM crops or wild relatives. It is my understanding that unintended changes to plant chemistry arising from the use of new GM techniques may result from: unforeseen interactions between the new or altered genes and the plant’s genes; gene irregularities arising from the genetic engineering process itself; and unintended alterations to plant biochemical pathways arising from the changed or new functions of the altered or new genes.

In my opinion, the new GM techniques and the products derived from them ought to be subject to a comprehensive case-by-case risk assessment, including full molecular characterisation and independent safety testing to minimise any potential risks to human health and the environment. All products derived from new GM techniques to be labelled to protect choice for farmers, producers and consumers. The precautionary principle ought to be enshrined in both the Gene Technology Act and the Food Standards Australia New Zealand Act, given the experimental nature of these technologies and the risks associated with them. The Government ought to impose strict liability on all dealings with GMOs licensed by the OGTR, so that liability for GM contamination and the resultant losses and costs rests fully on the licensees and the owners of GM patents. A moratorium on the

commercialisation of these new GM techniques ought to be introduced until our regulatory system for GMOs is adapted to deal with the potential risks posed by them.

References:

Bairu, M.W., Aremu, A.O. & Van Staden. 2011. 'Somaclonal variation in plants: causes and detection methods,' *Journal of Plant Growth Regulation*. 63 (2): 147–173.