

**STANDING COMMITTEE ON
ENVIRONMENT AND PUBLIC AFFAIRS**

**GENE TECHNOLOGY BILL 2001
GENE TECHNOLOGY AMENDMENT BILL 2001**

SESSION 3

**TRANSCRIPT OF EVIDENCE
TAKEN AT PERTH
ON MONDAY, 24 FEBRUARY 2003**

Members

**Hon Christine Sharp (Chairman)
Hon Kate Doust (Deputy Chairman)
Hon Jim Scott
Hon Louise Pratt
Hon Frank Hough
Hon Robyn McSweeney
Hon Bruce Donaldson**

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[12 noon]

POWLES, PROFESSOR STEPHEN
Professor and Research Director,
School of Plant Biology, University of Western Australia,
examined:

The CHAIRMAN: Welcome to this hearing. I apologise for getting you in here too early. We were grossly inaccurate in our calculations about how long we would take with the earlier witnesses. I hope it has at least been useful for you to hear the other kinds of evidence the committee is receiving. Could you state the capacity in which you appear before us?

Professor Powles: I am a professor at the University of Western Australia and Director of the Western Australian Herbicide Resistance Initiative. I am also chairman of GTTAC, the Gene Technology Technical Advisory Committee. That is the committee of experts that advises the Gene Technology Regulator and considers all the applications for genetically modified organisms for agricultural and medical use and so on.

The CHAIRMAN: Have you read, understood and signed a document entitled “Information for Witnesses”?

Professor Powles: I have.

The CHAIRMAN: If you use any further documents in your evidence, please provide the full reference. Please be aware that your evidence will become a matter for the public record. However, you have the right to request a closed session, and the committee will consider that request. As this is public evidence, you will be provided with a copy of your transcript. You are warned against premature release of the evidence before the transcript has been finalised as it will not be covered by parliamentary privilege.

Thank you very much for coming. Would you like to make an opening statement?

Professor Powles: Have you received my submission?

The CHAIRMAN: We are getting it now. We have not read it.

Professor Powles: It is the hard copy of a PowerPoint presentation, although I will not inflict that upon you. I do not know to what extent you would like me to go through the submission. I could spend anything from three or four minutes to three or four hours on it. I can summarise it.

The CHAIRMAN: We have roughly three-quarters of an hour with you, and I am sure there will be a few questions.

Professor Powles: I will not take up that amount of time going through this. You probably know that the difference between genetically modified and non-genetically modified organisms is simply the use of recombinant DNA technology. That is easy to say, but many people are confused about what the difference might be. Genetic modification is simply the use of recombinant DNA technology. If I were to take a gene out of a plant and put it back into the same plant using recombinant DNA technology, it would be genetic modification. If I were to take a gene from one plant and move it to another plant by techniques other than recombinant DNA technology, it would not be genetically engineered. There is a lot of loose terminology. People talk about “genetic engineering”, “GM”, “GMOs” and all that. I say “genetically modified” or “GM”, which is defined as the use of recombinant DNA technology. A lot of work such as plant and animal breeding uses

various forms of sophisticated technology. However, if the product does not involve recombinant DNA technology, it is not genetically modified.

That is important because many plants in Australia that are not genetically modified are grown on which very sophisticated manipulations are conducted.

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[12.15 pm]

Hon BRUCE DONALDSON: Could you give a few examples of those?

Professor Powles: So-called Triazine-tolerant canola, to which I will refer later, and so-called Clearfield canola are herbicide resistant and have been produced using sophisticated, modern biotechnology. They are not considered GM products because they did not involve recombinant DNA technology. The big difference is that non-GM products are not subject to regulation by the Office of the Gene Technology Regulator. Non-GM foods have to pass very few regulatory hurdles. Recombinant gene technology falls under the ambit of the Office of the Gene Technology Regulator.

As members noted earlier, GM crops are widely grown. It was said that they account for 70 million hectares of agricultural land; my figures estimate that they accounted for about 60 million hectares in 2002, and that figure was increasing.

Hon BRUCE DONALDSON: I projected that GM crops would total 70 million hectares by 2003.

Professor Powles: Soya beans are the most abundant GM crop in the world. It is staggering to realise that 50 per cent of the world's soya bean production in 2002 is so-called GM. Figure 5 in my submission refers to the adoption of GM herbicide-resistant soya beans. I am sure members have seen these figures and know about them. It is important for members to realise - I am sure that you do - that of the GM crops currently grown around the world, which cover a very large area, nearly all are Roundup Ready.

Hon JIM SCOTT: What percentage of crops grown in the world are GM crops?

Professor Powles: It is still a low percentage.

Hon JIM SCOTT: Is it two or five per cent?

Professor Powles: I do not know the exact number. In this order, the four major crops in the world are rice, wheat, maize and soya beans. Currently, only a little transgenic GM rice is grown and there is massive production of corn and soya beans. No GM wheat is produced at the moment. Members are also aware that North and South America are the world's major suppliers of soya beans. For example, the United States has 40 million hectares, or 100 million acres, of soya beans. About 80 per cent of that is GM and nearly all of it is Roundup Ready. Two blockbuster genes dominate current world GM crops: Roundup Ready, which endows resistance to the herbicide Roundup and is known as glyphosate, and Bt, which endows the plant with the ability to protect itself against certain insects, including lepidoptera. Those two crops, especially those that are Roundup Ready, absolutely dominate GM products. Currently when reference is made to GM crops, it largely refers to Roundup-ready crops. Figure five in my submission shows the adoption rate by United States growers of GM herbicide-resistant soya beans. Nearly all of those crops are Roundup Ready. Figure six shows the adoption of GM herbicide-resistant canola in Canada. The United States and Canada are two of our principal competitors with which we have close relations. The figures show that they have massively adopted Roundup-ready GM technology.

I do not come to this committee as an expert in marketing, but if we accept that US and Canadian grain growers are logical and rational people, we will see that they have massively adopted the technology that has been freely placed in front of them. Members will visit those countries. Clearly, farmers in those countries are finding products for their markets, otherwise they would not have adopted the technology at such a rate and nor would it have been sustained. I am sure that

members have been presented with a spectrum of views. The adoption of Roundup-ready canola in Canada and soya beans in North and South America has arguably been the fastest rate of adoption of any agricultural innovation ever produced. Certainly the North and South American growers have massively accepted them. Why have they done that? Why have North American soya bean growers adopted Roundup-ready soya beans? Why have Canadian growers adopted Roundup-ready canola? It is because of the perceived advantages. Some of those advantages for the North American system include farmers reducing the amount of time spent on cultivation, having more control over the weeds and producing higher yields. For these and other reasons, including simplicity, they have adopted and sustained the technology. It is important to recognise that the issue is about the adoption of herbicide resistance.

Hon JIM SCOTT: Does your submission make reference to these higher yields and lower herbicide use? Following a meeting some time ago at Muresk, I sent you some documentation - the Spensbrook studies - that offered an alternative view.

Professor Powles: As the member knows, there are a wide range of views about these matters. A plethora of reports of varying qualities can be obtained. I am happy to supply the member with that information. The figures that show the rate at which the growers adopt these crops speak for themselves.

Hon JIM SCOTT: Spensbrook put it down to the ease of work. Over time, the amount of work involved increased because of the weeds' growing resistance to Roundup.

Professor Powles: I would be happy to talk to the committee about the resistance of pests to herbicides. That has been my area of research for over 20 years; I know plenty about it.

It is important to understand the difference between GM and non-GM products. For example, figure nine of my submission shows the adoption of Triazine-resistant crops, so-called TP canola in Australia. My submission shows that Western Australian grain growers have massively adopted Triazine-resistant canola. They have not adopted canola; they have adopted Triazine-resistant canola. They have done that because they believe that in order to grow canola they must be able to control the weeds, which they cannot do when growing conventional canola. They need the Triazine-resistant canola gene. The Triazine-resistant canola gene originates from a weed in which smart-plant breeding by conventional means introduced that gene into canola, which was alien to it. As a result of the gene being stabilised, it is considered to be a non-GM product. That product has been massively adopted. Each year, somewhere between 80 to 95 per cent of the canola grown in Western Australia is herbicide resistant.

Over the past couple of years, so-called Clearfield canola has been introduced. It is resistant to a group of herbicides. That gene was obtained by mutagenesis by using a chemical mutagen to eventually produce a mutated form of a particular gene that makes the canola resistant to the herbicide. Because that was achieved by modern plant-breeding techniques rather than genetic engineering - that is, it did not involve genetic modification - both Triazine-resistant canola and Clearfield canola have been introduced without being scrutinised by the regulator, unlike genetically modified crops. I have restated what is probably well known to members. I assure members that many people in the community do not realise that almost all the canola grown in this State is herbicide resistant and that farmers in this country have so rapidly adopted that technology. Whether it is Triazine-resistant canola in Western Australia or Roundup-resistant soya beans in the US, the growers have adopted a gene that they perceived to be advantageous to them.

Conventional canola, Clearfield canola and Triazine-resistant canola are grown in Australia. The issue before this committee and many other people is the possibility of the introduction of so-called genetically modified canola, which is either Liberty Link canola, or Roundup Ready. Both applications are before the Gene Technology Regulator for commercial release. Today and many other times, members have heard about some of the issues with regard to canola. Again, many people do not realise that the same issues that prevail for Roundup-ready canola prevail for canola

that we already grow. People who are concerned about gene flow and the potential for canola to cross with Australia's number one broad-leaf weed, the wild radish, for example, must understand that exactly the same issues that prevail for Roundup-ready canola prevail for Clearfield canola, which we already grow. The only difference between the Roundup-ready canola and the Clearfield canola is the gene that gives resistance.

People are concerned about the movement of GM products from one paddock to another. They are concerned about contamination of one bin with the remnants of another bin or contamination at the silo or some other point in the chain. The issues that prevail for GM crops are the same issues that prevail for much of the canola that is currently grown.

I will not go on. I have cited those matters in my submission, which provides a list of relevant publications. We have published an article highlighting the potential for canola to hybridise with wild radish. We have closely examined that matter over a number of seasons in this country. We have published our material relating to theoretical and applied genetics. Our study joins a number of other studies around the world that show it is very difficult for hybridisation to occur. However, never say never with regard to biology; members know that it can happen at very low frequency. We have also published articles in *Science*, which is the most highly regarded science magazine in the world, about the potential for gene flow between canola crops. I am sure members have seen that study; it was well publicised. We found that gene flow occurred up to 2.6 kilometres from the source. That gene flow was at a very low level. It is clear that gene flow from one canola crop to another can occur at very low levels. It is also clear that canola can move off the paddock, just as it does now. One of the important issues is what is so special about GM crops versus the non-GM crops.

I will not continue speaking forever. Basically I am referring to the points in my submission. In summary, the current issues focus on Roundup-ready canola. We heard about them just a few minutes ago. Much of the discussion is focused on Roundup-ready canola. There is no doubt that there is gene movement at very low levels with regard to Roundup-ready canola, just as there is with Clearfield canola, which we already grow. There is no doubt that the biology of canola means that there is a very low probability of crossing canola with a weed such as wild radish. There is no doubt that there is a small seed and that shattering occurs at the harvest, regardless of whether it is GM or a non-GM crop. Any fair individual will recognise that some issues must be dealt with.

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[12.30 pm]

We must rise above that and look at much longer term protection and GM being applied to a wide range of organisms. How much opposition has been heard to the use of genetic technologies in the production of human medicines? Genetic technology is being widely used, where possible, to aid the development of various medicinal products. Undoubtedly, the future will see real advances in plant use with intermediates in pharmaceuticals or even vaccine production.

A little later in the year, a famous US scientist called Charles Arenton will make a lecture tour throughout Australia. He will describe the development of plant vaccines; that is, human disease vaccines being developed in plants designed for developing nations. These and many other applications of GM technologies are not pie in the sky, but very serious long-term efforts here and internationally. Very little opposition arises to the use of GM in medicinal products. What about using plants for medicinal products?

I hope the committee's deliberations will look at some of the longer term perspectives, as well as short-term issues. An inordinate amount of attention is paid to short-term issues without recognition of the long-term benefits.

Hon KATE DOUST: Your document refers to how we already use clearfield canola and triazine-resistant canola. Were those types also used in Canada before farmers decided to use the GM-type products?

Professor Powles: It is certainly true that triazine-resistant canola - which is dominant in Australian agriculture - was developed in Canada. However, it has been unsuccessful, and not one hectare is grown in Canada. It has been replaced by the clearfield canola, Roundup-ready canola and conventional canola. Although it is a Canadian invention, it found success in Australia.

Hon KATE DOUST: It has been successful here, but the Canadians made the shift to GM products because of a poor success rate. If it has been a success here, what would persuade our farmers to shift to GM products? What are its advantages?

Professor Powles: The gene that gives resistance to triazine imparts a yield penalty. Therefore, when you grow triazine-resistant canola and any other form of canola side by side, the yield penalty is apparent. Australian growers have adopted triazine-resistant canola because it is the only way to control weeds. When one has different canola growing side by side, the yield penalty is evident. If the weed control can be achieved with clearfield canola, roundup-ready and Liberty-link canola, the yield advantages when compared to triazine-resistant canola will be evident.

Hon BRUCE DONALDSON: The PowerPoint presentation indicates your area of expertise. Concerns have been raised about the frightening thought that we might develop a super-weed. You made it clear that glyphosate-resistant weeds could be established. You mentioned that diversity in herbicides and farming systems are required to overcome that difficulty. Is that like drenching sheep for worms - that is, every two or three years one changes the oral drench so that a resistance does not build up? We found that to be the case when we were farming. Can you elaborate on the need for diversification? Do we have alternative chemicals?

Professor Powles: You refer to my area of expertise. Whether talking about herbicide or antibiotics for humans or drenching for sheep, the phenomenon of resistance is the same: the bug develops resistance if one continues to use the same chemical. That problem is alive and well in this country. Therefore, Roundup-ready canola will increase our dependence on a chemical we already use. So, legitimately, this is raised as a concern about Roundup-ready canola. I fully acknowledge that position. If the Australian Government and the Australian community decide to introduce GM canola, the issue will need to be managed. I will deliver part of this PowerPoint presentation to a large group of farmers in a week. I will say to them, "If you grow Roundup-ready canola if and when it is introduced, you will need to be careful not to exacerbate a resistance problem in the weeds." I hope I have been clear to the committee that Roundup-ready canola has some significant biological issues for Australian agriculture to address.

Hon BRUCE DONALDSON: A lot of the resistance that developed with rye-grass was put down to farmers not applying the correct amount of chemical. They were getting results with about half the chemical than was achieved with greater oil-based products. These matters arose in Wongan Hills and Koorda. People diluted it too much, and this had a build-up effect. It has been a problem. Therefore, one would be a little cautious. We need another chemical on stand-by. You refer to diversifying with different chemicals. Can companies manufacture alternatives so that we do not continually repeat the use of one herbicide?

Professor Powles: The so-called "knockdown herbicide" market comprises glyphosate and parazate; they substitute for each other. For various market reasons, glyphosate has 90 per cent of the knockdown market. The only available alternative is parazate.

We introduced clearfield canola that is resistant to so-called group-B herbicides - I need not go into that matter here, only to indicate that widespread resistance has arisen to the group-B herbicides. We introduced the technology, and a percentage of farmers chose to use the technology because they believe they can manage it. If and when Roundup-ready canola is introduced, professional

grain growers will decide whether to use that tool. If they do so, they will believe they can manage the resistance issue.

Hon JIM SCOTT: One of my concerns that has developed over time is that Canadian farmers are seeing weeds emerge that are resistant to many herbicides. How do we ensure that we do not create such a position here? We have a limited number of knockdown chemicals. Every chemical maker will want to weed-resistant chemicals. Should we place some restrictions on that area to keep some chemicals off the GM trail so they can be used as a knockdown chemical in the non-farming environment, for instance, or even in farming situations?

Professor Powles: The answer to that question is very complex because it cuts across commercial realities.

Hon JIM SCOTT: Commercial realities also rely on being able to control the weed. Therefore, it is a commercial reality in that way as well.

Professor Powles: I am a member of a group considering resistance issues generally. For instance, it would be lovely for inventors to come up with a new class of antibiotics to control existing resistant organisms. It would be nice to say to the inventors, "We want it held in reserve to control outbreaks of, for example, multiresistant tuberculosis." It would be nice for an inventor to produce a herbicide to be held in reserve to control multiresistant weeds. However, the commercial realities are far different. The concerns are real. We need to manage those precious resources. Glyphosate is a precious resource, despite being traded at the same price as Coca-Cola - that is another issue in itself. It is a precious resource, just as penicillin is a precious resource. It is difficult to balance the commercial and biological realities. We try to promote diversity: we say to growers that if they achieve fantastic weed control with glyphosate, stop using as much as they were using. In human medicine, we encourage doctors to wash their hands between treating patients and to minimise the prescription of antibiotics. There are no easy solutions. I do not know whether I have provided an answer.

Hon JIM SCOTT: You have sort of answered my question.

You referred in the presentation to GM plants producing vaccines and other pharmaceuticals relating to human diseases, such as cholera and hepatitis. I read a newspaper article in which an officer from the Department of Agriculture stated that a grain could be produced for hormone replacement therapy. People could achieve hormone replacement by consuming a loaf of bread. Is it the case that it will not be that simple because many people will be exposed to foods? If many vaccines and pharmaceuticals spread from farm to farm accidentally, one could end up with some dangerous products on the market. How do we deal with it? Also, the medical profession would be up in arms about people taking appropriate food when they believe they are sick.

Professor Powles: Quite. Hyperbole exists on both sides of the argument, with both opponents and proponents of gene technology. It is clearly not sensible to imagine any possible application of genetic modification when, biologically, it will not happen. That is not to say that some tremendously innovative developments will not occur. In specific answer to the question, every case will need to be examined on a case-by-case basis. The Office of the Gene Technology Regulator has been established with an array of experts to evaluate on a case-by-case basis.

Hon JIM SCOTT: Does federal legislation, and that of the various states, deal with that issue?

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[12.45 pm]

Professor Powles: As you know, the Gene Technology Regulator is empowered under the federal legislation to look at only the human and health and safety to the environment aspects. On those grounds, I am absolutely confident that those matters are subject to considerable scrutiny by the Gene Technology Regulator.

Hon LOUISE PRATT: Your submission contains a graph outlining the triazine-resistant canola uptake. I note that its use has started to trend down again in the past three years. What do you attribute that to?

Professor Powles: One is the introduction of Clearfield canola. Some of you would know that the acreage of canola also has gone down. There was a massive adoption of canola, and a massive dis-adoption over the past three years.

The CHAIRMAN: Has it not just gone up again?

Professor Powles: No. The production of canola in 2002 was very low as a result of two factors - the drought and unattractive prices. What will happen in 2003 is yet to be established.

Hon LOUISE PRATT: Is this a percentage of overall hectares?

Professor Powles: It is the percentage of the overall hectares that are triazine resistant. It has gone down.

Hon LOUISE PRATT: Clearfield canola has increased proportionately.

Professor Powles: Yes, because it was introduced in 2000 and it has found a small market.

Hon FRANK HOUGH: I must admit that when you made your opening statement, I was not listening; I was reading and half-listening. I should have been listening. You referred to the difference between GM and non-GM. You said that if you take a gene from canola and then put it back, it is genetically modified.

Professor Powles: If you use recombinant DNA.

Hon FRANK HOUGH: What if it is not?

Professor Powles: Let us say that wild radish has a useful trait and is resistant to an insect or has a desirable nutritional quality or some other agronomic advantage. If we were able to cross that by conventional means using any number of biotechnological tools but did not use recombinant DNA technology, that would be classed as a conventional cross and would not be genetically modified. However, if we were to do the same thing using the recombinant DNA technology - that is, the use of the particular enzymes that cut DNA - and we were to put that gene back in, it would be genetically modified. I do not think that that is widely appreciated by the community.

The CHAIRMAN: As probably Australia's expert on the general issue of herbicide resistance and in particular Roundup resistance, can you give us a brief overview of the current problem, aside from whether genetic modification will add to the problem?

Professor Powles: The current problem is that glyphosate is the world's most important herbicide and it is the most important herbicide to this nation. We were the first nation to observe glyphosate-resistant weeds. In 1998 I published the first worldwide report of glyphosate resistance showing that plants could develop resistance to this herbicide.

The CHAIRMAN: That was rye-grass.

Professor Powles: That was rye-grass. Australia has the world's biggest problem of herbicide resistance, which is in rye-grass. Therefore, any threat to the continued sustainability of glyphosate is a real threat to Australian and, in particular, Western Australian agriculture.

The CHAIRMAN: Given that you are also the chairman of the Gene Technology Technical Advisory Committee, would your advice be that we should avoid the introduction of Roundup-ready canola because we do not want to increase the problem of Roundup resistance because it is so precious?

Professor Powles: The brief of the Gene Technology Regulator and the expert committee that reports to her is to evaluate the effects of a genetically modified application on the health of humans and the health of the environment. In order for resistance to glyphosate to be considered, it would

have to be considered within that framework; that is, if the introduction of Roundup-ready canola led to a resistance problem, would that have an adverse effect on the environment? That is something that will have to be considered by the Gene Technology Regulator and GTTAC, and has not yet occurred.

The CHAIRMAN: That consideration has not yet taken place, although we understand that the assessment is fairly well advanced, is it not?

Professor Powles: You would have to check with the Gene Technology Regulator. The clock has stopped on those applications and they have not yet gone before GTTAC.

The CHAIRMAN: We have not yet touched on GTTAC. Clearly you are performing a very important role in providing advice to jurisdictions, the federal Government and the Gene Technology Regulator. Can you explain to the committee how GTTAC works and performs its brief?

Professor Powles: GTTAC comprises 18 independent members. They are all technical experts. They embrace across the technologies. They are nearly all researchers and there is one lawyer. They embrace medical technologies, agricultural technologies and microbiological technologies. It is public knowledge who the 18 members are. They are widely known as leading Australian scientists. GTTAC meets bimonthly face to face in Canberra and on alternate ordinate months by telephone, so there are 12 meetings per year. GTTAC gives advice to the regulator on all technical matters that refer to genetically modified organisms. Any application, for example, for the intended release of a genetically modified organism, whether it be a bacterial culture or a GM crop, would be brought by the regulator to GTTAC for expert advice.

The CHAIRMAN: How many organisms has GTTAC so far given advice on?

Professor Powles: I cannot give you the exact number.

The CHAIRMAN: Is it dozens?

Professor Powles: Dozens. Most applications that come before GTTAC and, therefore, before the Gene Technology Regulator are experiments; they seek approval for experiments. The wider applications - the ones for intended release; for example, Roundup-ready canola or Bt cotton - are only a small percentage at the moment. As you know, Roundup-ready cotton and Bt-resistant cotton have been approved by the Gene Technology Regulator and are now grown in an extensive area.

The CHAIRMAN: To clarify what you said when I asked you about Roundup resistance and whether it is an issue with the commercial release of canola, has GTTAC not provided any technical advice so far to the regulator on the commercial release of GM canola?

Professor Powles: Not in a formal sense because the clock has stopped on the application while the regulator has sought further information from the proponents. When that full body of information is brought back to the Gene Technology Regulator, it will no doubt be brought by the regulator to GTTAC, but that has not yet occurred.

The CHAIRMAN: As you are charged with deciding on environment health and environmental impacts, how wide is the scope for considering the environment?

Professor Powles: I am obviously being speculative in answering that question.

The CHAIRMAN: I am asking you generally. That is your requirement under the Act, as I understand it. How widely or narrowly does the Act allow you or your committee to provide advice?

Professor Powles: It will always be on a case-by-case basis. These are subjective statements because how one extrapolates across that is difficult.

The CHAIRMAN: Of course, as is the judgment of the committee in many ways.

Professor Powles: Correct. On a case-by-case basis within the constraints of the Act, the wider impact on the environment is considered. For example, the issue that was raised earlier was that if Roundup-ready canola were to pose a threat to natural ecosystems in this State or nation, it would be a threat to the environment that would have to be considered. If, for example, Roundup-ready canola or Liberty Link canola, which are both GM, were to pose a threat to natural ecosystems, this would clearly fall within the ambit of the Gene Technology Regulator.

The CHAIRMAN: Has there been an occurrence so far in that work in which a problem was considered beyond the scope of your committee to provide advice on as defined under the Act?

Professor Powles: There is the opportunity at any time for other experts to appear at GTTAC meetings, and that has occurred and does occur on a needs basis. If it were felt that, for example, there was not an expert in a particular area, such an expert would be invited to attend a GTTAC meeting.

The CHAIRMAN: Have your terms of reference under the Act proved to be restrictive at all in practical operational terms, given that we are the ones charged with looking at the adequacies of the legislation?

Professor Powles: Your question is that as it is working now, is it restrictive within the constraints of looking at the environment and human health. The answer is no, I have not found it to be restrictive.

The CHAIRMAN: You talked a lot at the beginning about triazine-tolerant canola, although you refrained from sharing with us some of the nightmares of the chemical that is at the basis of TT canola and some of the environmental problems that may result in our agricultural areas from the widespread use of triazine. Instead of that necessarily being an argument for not over-regulating GMOs - which seems to be the thrust of your argument, because we are already doing things that are quite harmful - when the widespread release of TT canola is considered, is there an equally good argument that there should be more regulation of agricultural crops generally if it is considered that they would have an adverse effect on the environment?

Professor Powles: That is an important point and if I gave that indication, I did not mean it to be so. If a mistake was made in the past, it would not be justification for making another one. Triazine-resistant canola has, as you intimate, several disadvantages. First, it has somewhere between a 20 and 30 per cent yield penalty, which is incurred every time it is grown. Secondly, it uses high rates of a herbicide that is known to be residual. There are downsides associated with that technology. However, for whatever reason, it has been commercialised and widely adopted and is also promoted as clean and green and non-GM. Therefore, in assessing any other applications, the principles of health and safety need to be paramount. Certainly, the evaluation of Roundup-ready canola, Liberty Link canola and any other GM organism needs to be on the basis of health and safety to the environment.

The CHAIRMAN: We are obviously charged with looking at the detail of the gene technology Bills before State Parliament. Are there any specific technical pieces of advice that you would like to give us as legislators about what you think should be done with those Bills? Are there some amendments you would like to propose, or do you think the Bills are perfectly adequate for the task?

Professor Powles: To be honest I have not looked at them in any detail.

The CHAIRMAN: They are virtually a mirror of the commonwealth Act, and you are familiar with the commonwealth Act.

Professor Powles: Yes, I am. The short answer is no. My understanding of the history of the development of the Gene Technology Act is that, after a lot of consultation, it was specifically designed to focus on health and environmental issues and did not consider, for example, the broader market implications.

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[1.00 pm]

I have asked myself that question a number of times: why were these other areas not included? I was told that it was requested specifically a number of times by a range of interested parties that it should be restricted to health, safety and environmental issues. I believe the establishment of the Office of the Gene Technology Regulator provides a mechanism that looks closely at those issues. The Gene Technology Regulator will not answer questions on marketing and other issues. The committee is asking me whether I think that is a good idea.

The CHAIRMAN: Yes. Were you convinced by those arguments or do you think there is an argument for some form of economic assessment before grains are released commercially?

Professor Powles: No. I am convinced by the argument that it be restricted to that. One may well ask why. My own view is that if we were to use the next 24 hours, I could find a range of bio-economic modelling papers that would extol the virtues of Roundup-ready canola and a range that would support the opposite. Both would be projections. I have also seen studies of the introduction of Roundup-ready soya beans in the United States. I can find analyses that are for it and against it. The figures show that the grain growers conducted their own economic analyses.

The CHAIRMAN: Thank you for attending today.

Professor Powles: Thank you for the opportunity to explain my perspective. Good luck with your work as it is important. You will see a range of perspectives in Canada.

The CHAIRMAN: We intend to make the most of the opportunity to converse with those further down the track than ourselves. We have a lot of submissions to examine. Other jurisdictions are making inquiries. There is a wealth of material for us to draw on.

Professor Powles: If the committee needs further contacts, I have many in Canada. The committee may wish to speak to Dr Linda Hall, who published the resistance model for canola. She published that canola can have genes resistant to three different groups of herbicides. Dr Hall is a former postdoctoral fellow of mine and very familiar with the Australian environment.

The CHAIRMAN: That would be very interesting. Our research officer will provide her e-mail address to provide that contact.

Committee adjourned at 1.04 pm