Marc Van Montagu, ‘father’ of the first transgenic plant:
“GMO technology is like breathing”

Interview and photos by Sofia Frazoa

Thirty years after having created the first transgenic plant, molecular biologist Marc Van Montagu was one of the winners of the World Food Prize 2013. Although he would have expected further developments of the GMO technology, he believes something is now starting to change. Interviewed in his institute in Gent, Belgium, he ensures that this technology is harmless and can be a future solution for food and feed production. An interview by Sofia Frazoa (journalist)

What does it mean for you being awarded the World Food Prize 2013?

Marc Van Montagu – It’s a great honor as the World Food Prize has been recognizing, for the last 25 years, activities that are having a remarkable impact promoting food security. For the first time a clear message on behalf of GMOs was brought.

You are the first Belgian winning this prize. Is this an international recognition of your Institute and the research you have been doing for decades?

Marc Van Montagu – I consider it a tribute to all my former co-workers and particularly to the pioneer work of Jeff Schell. Thanks to an enthusiastic team of researchers we have been able to discover a natural vector for plant transformation and invent a procedure to produce transgenic plants.

Thirty years after creating the first transgenic plant, would you have expected a bigger development in this area?
Marc Van Montagu – Sure. We were convinced that it would be the start of enormous activities. For fundamental research it was, but not in the application. Severe regulations came in and our expectations have been destroyed since then.

Are you disappointed about that?

Marc Van Montagu – Disappointed... well, that’s a society problem. Society is disappointed because humans can’t handle each other better, because we can’t have a democratic society or they are disappointed with the banking system. This [transgenic plants] is just another human activity.

Yes, but shouldn’t be science and technology be seen as ways to improve people’s lives?

Marc Van Montagu – We still have the feeling that reason and science can bring wisdom to society. They are human activities.

So, this means that the GMO technology has stagnated?

Marc Van Montagu – Yes, for products and it happens all over Europe. Nobody makes something new. But science is also for fundamental research and that’s why 10 years ago I created the Institute of Plant Biotechnology Outreach. It’s to do something in emerging countries such as Brazil and China, working with people who want the progress of agriculture. They can create startups that are partially here and partially in more tropical countries. Europe has not got much land available anymore, except in Eastern Europe.

If this technology is used outside of Europe, why do we resist it so much being used here?

Marc Van Montagu – The resistance is purely emotional. There’s not the slightest reasonable argument against it. After all these years, nobody can perceive any danger related to health or the environment. On the contrary, many people say we should use bio-agriculture because it will be the only way out to have sustainable and intensive agriculture at the same time. All the old varieties can be used. We can’t start crossing again because it would take 40, 50 years and while you do the crossing you still lose a lot of properties.

There was a false alarm spread against GMO technology?

Marc Van Montagu – People want old varieties and we can use them as much as genes that we need today for protecting against diseases and for evolving for better update of nutrients. You don’t have to use so many fertilizers. But people started saying it was dangerous and now everybody believes it. People start believing chemicals are bad. How can you explain everything is chemical? The plants, the molecules, there are so many dangerous chemicals in nature. We learned that nature itself is very dangerous. Science helps to identify what is dangerous or not. We can’t see why GM’s should be dangerous...

Could this recognition pave the way for Europe to embrace GMOs?

Marc Van Montagu – The World Food Prize recognizes plant biotechnology as an innovation highly beneficial to society. As ignorance is our worst enemy, I agree that this award is a great
opportunity to amplify dialogue with our politicians. I deeply hope that this can mobilize policy makers and the society to take the right decision towards the approval of GMOs in Europe.

Some people say since they were created we didn’t have enough time to prove they are completely harmless.

Marc Van Montagu – That’s a false argument. The genes we put in are the same genes that are in nature. You are allowed to spray Bt gene (with the Bacillus thuringiensis bacteria) because that’s nature. But if you take out the gene and put it in a plant, using the gene technology, it would be dangerous. I don’t know how something like this can be dangerous. You do the same as crossing and the same that happens in nature. In nature, at each moment, there are pieces of DNA that jump, the jumping genes. People don’t know that a GMO is not the product but the technology. The judgment and all the arguments are related to what kind of final product you make. Why would it be dangerous?

Can you prove that it is not?

Marc Van Montagu – People say “prove me that it is not dangerous”, but the absence you can’t prove. If you say a car is dangerous, people can even agree but will say they can manage it. If you say GMO is dangerous, as people don’t know what it is, they will believe it because they don’t find any advantages of it. GMO is very nicely blocked by the green movement, so nothing interesting can come. Here in Belgium, last July’s summer was so bad that all the biological potatoes were destroyed. Growers of this kind of potatoes have seen in our field experiments varieties of resistant potatoes from varieties they normally use. If you have done it by crossings, it would take you 35 years and you would have some new genes but have lost some others that control important characteristics.

You can’t prove GMO technology is 100% harmless, but you don’t accept it can be somewhat dangerous?

Marc Van Montagu – Surely not because if you say it’s dangerous, it’s up to you to say what you perceive as “dangerous”. People should think about why they are opposed to something and why they find it unethical. If they say that something is anti-natural, they should analyze what natural is.

Was this the evidence the world needed to prove that this technology is harmless?

Marc Van Montagu – The fact that the GMOs are being cultivated since 1994 without any harm to human health and to the environment is the greatest evidence that the technology is safe. I hope this award will help to give society and policy makers more confidence to take the necessary actions to adopt GM agriculture.

Why are GM plants so important and how can they change the world?

Marc Van Montagu – That’s the major proof that we still have to give. But we are convinced we will succeed. Breeders only see the plants we make in the laboratory but they want to see them in the field. The problem is that all the field trials are blocked so we can’t show anything. If you just think about what you find as knowledge, in the laboratory, we can make plants that
are better drought resistant and better uptake of nutrients giving higher yield. At the same time that can make more biomass and more parts of the plant can be edible. It’s amazing because evolution has never before reached the point of higher yield and it is the humanity that has been so reckless, using a polite word. I could say “stupid” or “criminal”.

Because humanity doesn’t acknowledge how important GMO technology is?

Marc Van Montagu – We will be 9 million probably in 2030/2035 and then we will have an enormous shortage. Everybody knows that climate instability will give storms, climate extreme variations. We have no plants ready to survive under such extreme conditions. Everybody agrees that if you destroy the forests, you will have more climate instability. So, let’s make new forests with higher yielding trees and trees that are disease resistant. Because the trees available at the moment are all result of global propagation. In the present monoculture that we have now, if a pathogen evolves, and it will evolve, this forest will be destroyed, and what will you do then? Plant another variety? But it takes time. It’s dramatic. If one really knows what science is and in this case science of ecology, then you start understanding what could be done. Educated people, especially teachers of biology, in secondary school, wouldn’t dare to say that GMOs is against nature.

Do you think that in the future we could regret not having used this technology before?

Marc Van Montagu – It’s already regrettable because so many damages have been done meanwhile. If you were in Costa Rica in the fifties and later in 99, they would say that in 50 years we have destroyed exactly the same amount of forest that Columbus did when he was there. Yes, it’s already highly regrettable now.

Another topic which many people are distrustful of: this technology can help stopping starvation in the world?

Marc Van Montagu – Of course no scientists will be able to do that.. Food is the beginning. That’s why the slogan of Rio +20 is “Fight hunger, Fight poverty, Save the planet”. And that’s what science does. You have to say: what should be done? You can’t say all the rich people should give their money to the poorest. Is this not slightly more absurd than saying GMOs can help the productivity when all the evidences are there?

Some anti-transgenic groups in Portugal say food exists, but it is not fairly distributed. Is this also an absurd argument?

Marc Van Montagu – Of course it is not well distributed and if we know about it, we must try to change it. But it takes a long time to change and they have never succeeded. It’s a slight improvement but it’s too slow. Now we have ways to accelerate it. And there’s no slightest argument against it. I only say that you will need new technologies because the old ones are out of date. You can’t force people to have no children or limit them to two. That’s always a choice. You can’t offend people’s feelings. And this is crucial. You make revolutions respecting people’s feelings, not by using reason.

How do you see the “appropriation” of this technology by the private sector?
Marc Van Montagu – That’s of course a major question and that’s the most brilliant success of Greenpeace and Friends of the Earth. They always said to scientists it was dangerous. As you can see, the argument of danger doesn’t exist. It is not because they have the patents - it’s only valid for 20 years anyway - because in all developing countries if people want to do it, they give it for free. All the multinationals are involved in programs there. But it’s the regulatory. The regulations adopted can’t be applied by small or medium enterprises or by developing countries. It’s a rule that Greenpeace and others included in it, also saying that farmers are victims of multinationals. All modern agriculture tries as much as possible to have hybrid vigor. In the United States, when hybrid vigor was introduced in the time of Depression, under Roosevelt, the minister of agriculture was also the owner of Pioneer company. So, he introduced hybrid vigor, then hybrid corn came and farmers would become much more free and suddenly a lot of the problems of the Depression got solved because of the rules.

Private sector is a better helper with funds for research?

Marc Van Montagu – Yes, and slowly they are helping developing tropical varieties and the first thing is the Bt cotton. It is now in Africa and totals about 70% of production in the world. Small or medium enterprises in developing countries can do it with the help of the multinationals but nobody defends that, not even multinationals. What they can bring to agriculture progress is so much. Multinationals have many data on transcription factors that can be proved in field trials. They can show and prove all the interesting products they have. They don’t publish them because of competition. It is another world apart from the university.

Why don’t they bring those products to the market?

Marc Van Montagu – They don’t bring them if they don’t have at least several times the cost they have to invest in the regulation for it, not in the research. And that’s the absurd thing. The green movement is really... I use the word “criminal”. You don’t want to shock people but what do you say if all the tools are there to solve this, all the knowledge is there and is not being used because regulation doesn’t allow it? And this regulation is absolutely senseless. If you see that part, wouldn’t you call them “criminal”? If you think that 12% of the world population is starving at this moment, overpopulation goes on and destroys so many habitats in the world and all this could be avoided. Today we have the knowledge and the technology to face it.

It’s more about politics and economy than about science or evidences?

Marc Van Montagu – Sure. They are problems of our society. Science helps a bit but, meanwhile, humans find out more and more ways of creating trouble.

Is there still a place for the academy in GMO technology?

Marc Van Montagu – Innovations always come from the universities.

But they have to be supported by the private sector?
Marc Van Montagu – Industry makes products. I think you have to approach this in two ways: having more and more regulations of the private companies and seeing how you can stimulate production initiatives in state companies. Maybe one day. At the moment, we need the private industry. I don’t see how it will work without it.

Are we “all guinea pigs”, as Eric Séralini suggested in his documentary?

Marc Van Montagu – Everybody should think a little bit. All the academic and scientific organizations have said it: what he claims is nonsense. It is just to create fear, to have rats with tumors. But the rats have spontaneous tumors because they are genetically engineered rats for testing to see if medicine or chemical compounds are toxic or carcinogenic. So, they were made for that. But that’s another story.

He is a scientist.

Marc Van Montagu – Just because one scientist had such a type of behavior all scientists don’t have to do it. In every field of society, there are people that don’t behave along the lines. Everywhere there is a small fraction that cheats and tells nonsense. It is dangerous to accept money from the industry to create fear because the industry is interested in it. This industry was the retail that had invested so much in biological products.

Frankly, what can the risks of GMO technology be?

Marc Montagu – It’s like breathing! Absolutely equivalent. People think that human genes are different from bean genes. People don’t understand what evolution is. It’s complicated but it’s a responsibility for all biologists or doctors in medicine to explain. They should be able to explain. There’s no danger.

What happens after this award? Do you believe that something is going to change now or does GM agriculture still have a long walk ahead?

Marc Van Montagu – Not only the 2013 World Food Prize but also recent events such as the statements of the British prime minister on behalf of GM agriculture indicate that things could change in the near future. Europe cannot wait much longer to embrace GM agriculture. I don’t have the slightest doubt: in a certain number of years - could be 20, could be 50, I don’t know - all the plants we will use will be GMOs. It’s fantastic what we will be able to do.

Thus, being a researcher in plant biotechnology can become a profession for the future?

Marc Van Montagu – Absolutely. It’s the most important profession, I would even say. We will not solve the problems of environment by demonstrating and burning candles. We have to use science and technology to solve problems. We have to talk with environmental specialists. In agriculture, there are no molecular biologists or biotechnologists who will make new plants on their own. They will do it in good cooperation with people who observe the plants and who can immediately say where there is a problem. It will take time, but it can be done.

The young generation studying this subject could probably be disappointed and seeing no way out. Do you have any advice for them?
Marc Van Montagu – The best way we encourage them is by telling them to not only do science, but also to talk about science. Explain to society what the scientific method is. Science is not a dogma of truth, but a permanent question and challenge. If you can explain to society that they can choose these methods and at the same time cultivate their emotions, they will understand.

Another problem seems to be the lack of communication between scientists and common people, even through journalists. What can be done to diminish this gap?

Marc Van Montagu – That’s a very complicated thing. In science you always want to hear arguments and want to question. Nobody would dare to say that he changes his feelings. People never realize that in evolution we really work with emotions. Since we tried to survive we learned to do it with what you sometimes call intuition or preconceived ideas. If you don’t have information you can’t use reason.