

Report on the visit to Aventis, Lyon, France

25th August 2001 - 31st August 2001

Acknowledgements

We would like to thank the NRF for their financial support for the transformation project in collaboration with France as well as the TRIP project on transformation of soybean.

We would also like to thank ARC-Roodeplaat for the opportunity for this research and visit.

Purpose of visit

Dr. Bernard Pelissier from Aventis visited our laboratory in 2000 and a possible co-operation based on common research fields was planned, as some research of the two institutes being complementary to each other. Experiments were started by investigation on the transformation technique of soybean currently being used by the team at ARC-Roodeplaat in the Aventis laboratory. They however experienced problems implementing the transformation technique and Dr de Ronde was requested by the PRT (Mr. Gerhardt Scholtemeijer) and Aventis to visit France and to demonstrate the technique to Dr Pelissier group.

As the 2 groups have a SA/France bilateral together, the opportunity was also taken to hold the first meeting on the joint research at the Aventis laboratories in Lyon.



Introduction

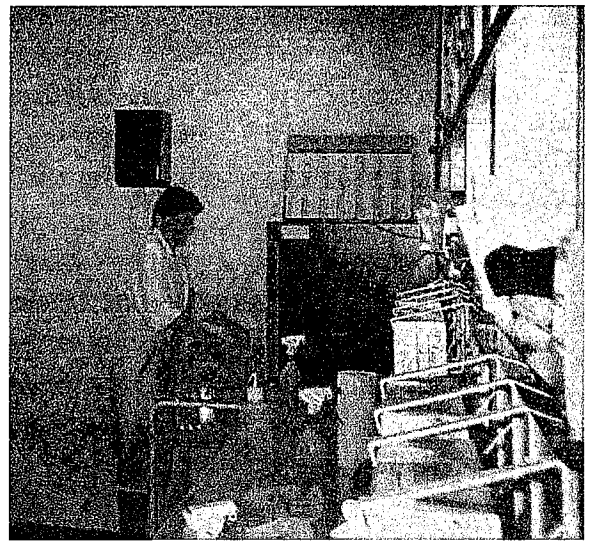
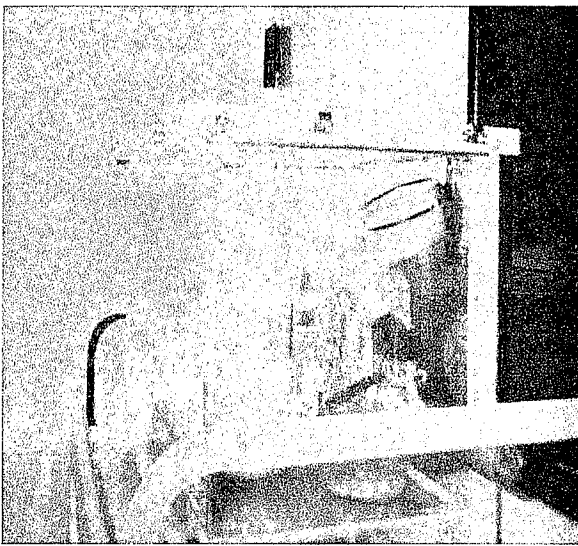
This collaboration started in 1999 when Stephanie Betka met Dr Johan Brink on a congress in La Havana. She becomes interested in the soybean transformation technique that he mentioned on his poster and asked him to make contact with Aventis-crop science biotechnology division. Johan again told me about it and gave me the information of Dr Bernard Pelissier. After a few email exchanges he proposed a visit to us in March 2000. Together with Mr. Gerhardt Scholtemeijer and Dr Monro Griessel from the PRT, Dr Hennie van Zijl and Johan, a meeting was held with Dr Bernard Pelissier (Aventis, France) and Karin Dorgeloh (Aventis South Africa). As we were busy to patent the transformation process, an agreement was made that they can start preliminary experiments on the transformation technique at Aventis, with the possibility to buy a license if results proved valuable. The transformation protocol was handed out to them and they started with the experiments in Lyon.

In the mean time a possibility arises to have a bilateral agreement with someone in France on the SA/France NRF funded bilateral projects. Dr Bernard Pelissier was contacted and together we decided to propose a joint project together with Dr Michel Droux (CNRS) on "Enhancement of Crop Tolerance to Abiotic Stress". The project which was approved by the NRF is based on the deficiency of soybean in the sulfur amino acids, methionine and cysteine. In order to elevate the basal level of these amino acids, one strategy developed is to manipulate the biosynthetic pathway leading to these amino acids and derivatives. In this aspect, the enzymatic capacity of the limiting step in the assimilation of sulfate leading to synthesis of cysteine can be increased in plants using a transgenic approach. Over-expression of the serine acetyltransferase enzyme in the different plant cells compartment, the cytosol, the chloroplast and the mitochondria should led to an increase in the thiols compounds content. The final goal will be to increase resistance to abiotic stresses into soybean in order to contribute to food security.

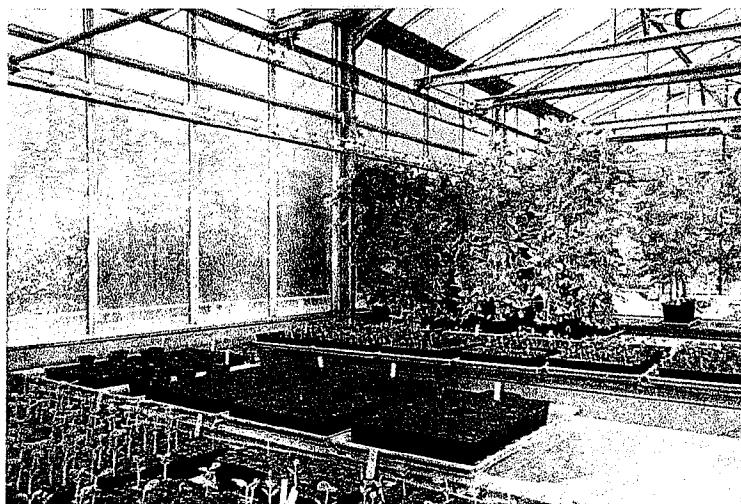
Results of the visit:

The visit to Aventis was two-fold. Firstly did I visit them to teach the transformation technique to them and secondly was it the first meeting on the bilateral.

A meeting was held with Dr Bernard Pelissier and Stephanie Betka on the methodology of the technique. I demonstrate the technique to them during the week and together we worked through the whole procedure. Some soybean seed of 'Ibis' and a construct (pCambia 3301 in *Agrobacterium tumefaciens* strain LBA 4404) containing the *bar* and *gus* genes, that worked well with the technique in our laboratory, were taken with for the demonstration procedure. We used this in parallel with their cultivar 'Jack' and construct (also in *Agrobacterium tumefaciens* strain LBA 4404) containing a *bromoxylin* gene. At the end of the week some seed was tested for the presence of the *gus* gene and the rest was planted in the greenhouse for further evaluation. Most of the seeds tested for *gus* displayed blue colouring which indicated that transient *gus* expression exist.



Vacuum infiltration of the soybean seed



Seed planted in seed trays in the greenhouse

Meetings were also held with Dr Michel Droux and Dr Bernard Pelissier on the SA/France bilateral. The detail of the mutual project was planned and discussed. Future co-operation will be based on regular communication and exchange visits for the purpose of evaluation of experiments, joint and complementary experiments and joint use of research facilities and equipment. Dr Michell Droux and his colleagues already started on the construction of the vector that we will be use in this study and they hope it to be finish in November 2001, when they will visit our laboratory. They supply me with tobacco seed with enhanced SAT expression to be tested in the greenhouse and tested for drought tolerance. The enzymes of the antioxidative pathway will be used as parameter for drought tolerance. Freeze-dried material will be send to Lyon for amino acid analysis.

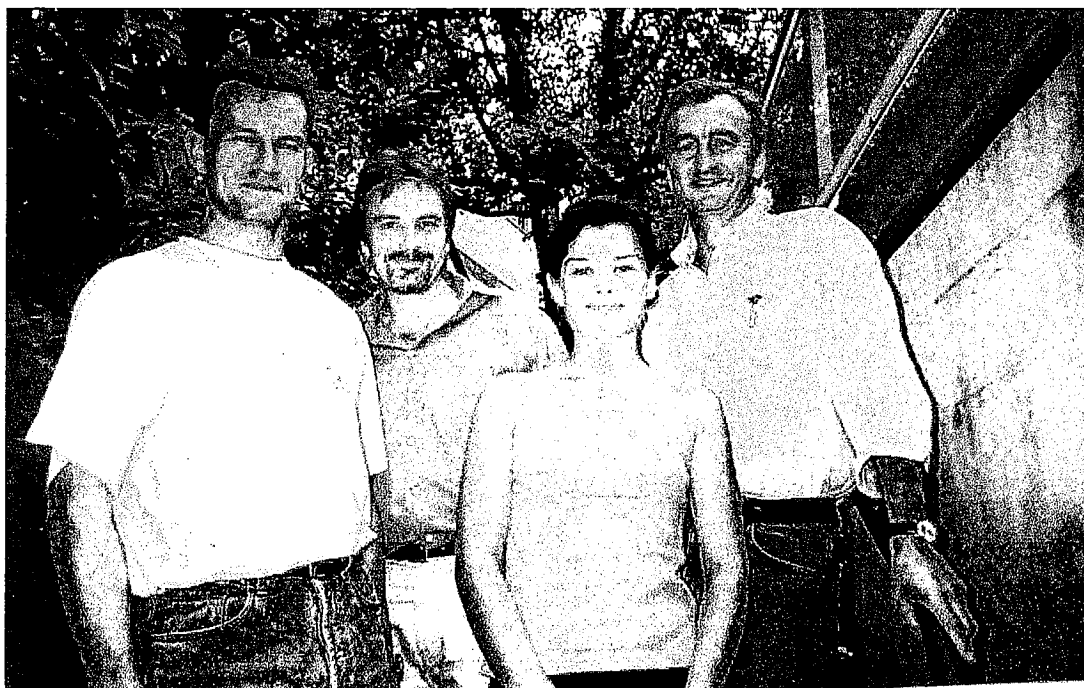
Valuable discussions were also held with researchers in the transformation research field as well as amino-acid pathway analysis. A lecture was presented to them on our research in the field of abiotic stress. It was proposed that someone could visit for 4 weeks next year in training of amino-acid analysis as part of the collaboration. CNRS will pay for the accommodation and daily allowance during this time. A possible joint project on salinity stress was also discussed.

Recommendations:

- Future co-operation will be based on regular communication and exchange visits for the purpose of joint planning and evaluation of experiments, joint and complementary experiments and joint use of research facilities and equipment.
- Collaboration with Aventis and CNRS should be maintained and extended
- Suggestions for further collaboration should be followed up

Names, addresses and specialization fields of contact persons

Frederic Schmitt Research Scientist Aventis Transformation of wheat and maize Frederic.Schmitt@aventis.com	Michel Droux Head of Research CNRS amino-acid research michel.droux@aventis.com +33 4 72 85 27 96 (Tel) +33 4 72 85 22 97 (Fax)
Stephanie Betka Scientist Aventis Transformation of soybean Stephanie.betka@aventis.com + 33 (0) 4 72 85 25 32 (Tel) + 33 (0) 4 72 85 22 97 (Fax)	Bernard Pelissier Cellular Biology Team leader, Aventis Soybean trait development bernard.Pelissier@aventis.com + 33 (0) 4 72 85 25 32 (Tel) + 33 (0) 4 72 85 22 97 (Fax)



Frederic, Michel, Stephanie, Bernard