

Terminator technology and the European Transcontainer project

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Munich Environmental Institute...

...is a member organisation of the German
campaign against Terminator Technology

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Presentation

- What is Transcontainer?
- Who's involved in Transcontainer?
- What are the critical issues (RBF)?
- How does RBF work and how could this system fail?
- Transcontainer and the CBD moratorium



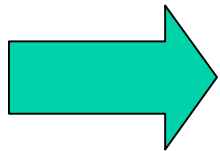
What is Transcontainer?

- “Transcontainer” is a project funded by the European Commission
 - Budget: 5,38 m€
 - EU contribution: 4,17 m€
- Specific Targeted Research or Innovation Project (STREP) within the Sixth Framework Programme
 - Priority 5: Food Quality and Safety



What are the aims of Transcontainer?

- to develop GM crop plants that are **biologically contained**,
- **promote co-existence of GM and non-GM agriculture in Europe** by using biological containment strategies in crops economically relevant for Europe,
- **improve and simplify rules for co-existence**,
- assess the **economic, environment and consumer impact** of implementing biological containment strategies in Europe,
- **enhance understanding and acceptance**, by stakeholders and the general public, **of co-existence** through biological containment strategies



Crops will only be tested in laboratories or greenhouses and they will not be tested in the field or commercialised within the scope of the project



Who's involved in Transcontainer?

- nine public research institutions from eight European countries
 - one governmental institution
- two small and medium-sized companies
 - one major European plant breeding company



Who's involved in Transcontainer?

- Plant Research International B.V., Wageningen, The Netherlands (coordinator), Drs. Kim Boutilier and Ruud de Maagd
- Swedish University of Agricultural Sciences, Umeå, Sweden, Prof. Ove Nilsson
- Research Institute for Vegetable Crops, Montanaso Lombardo, Italy, Dr. Giuseppe Rotino
- Vienna University, Campus Vienna Biocenter, Austria, Prof. Alisher Touraev
- University of Milan, Italy, Prof. Martin Kater
- National University of Ireland, Maynooth, Ireland, Prof. Philip J. Dix
- Wageningen University, Netherlands, Dr. Justus Wesseler
- Institute of Plant Genetics-Research (CNR-IGV), Perugia, Italy, Dr. Sergio Arcioni
- **Federal Office of Consumer Protection and Food Safety, Berlin, Germany, Dr. Detlef Bartsch**
- University of Plovdiv "Paisii Hilendarski", Plovdiv, Bulgaria, Prof. Ivan Minkov
- Schenkelaars Biotechnology Consultancy, Leiden, The Netherlands, Ir. Piet Schenkelaars
- **SweTree Technologies AB, Umeå, Sweden, Dr. Magnus Hertzberg**
- **DLF-TRIFOLIUM A/S, Store Heddinge, Denmark, Dr. Christian Sig Jensen**

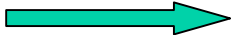

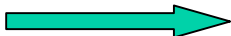


Workpackages

- 1: Project Management and Coordination
- 2: Chloroplast Transformation
- 3: Controllable Flowering
- 4: Controllable Fertility**
- 5: Technology Impact
- 6: Dissemination



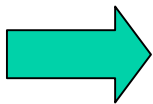
Which plants?

Chloroplast Transformation		Sugar Beet, oilseed rape
Controllable Flowering		sugar beet, forage crops, trees
Controllable Fertility		oilseed rape, forage crops, tomato, eggplant



Workpackage 4: Controllable Fertility

- **male sterility-based transgene containment system** based on amino acid depletion and complementation in oilseed rape and tomato
- **male sterility-based transgene containment system** based on TAF loss of function and complementation in oilseed rape
- **coupling of parthenocarpy to male sterility** in tomato (amino acid depletion) and eggplant (TAF loss-of-function)
- **restorable male sterility** strategies as a tool for F1 hybrid breeding in oilseed rape and tomato
- two-component ablation system in grasses in preparation for a **male sterility-based hybrid system** in European forage crops
- **To develop a seed lethal transgene containment system based on Recoverable Block of Function (RBF) in oilseed rape (University of Milan, Prof. Martin Kater)**



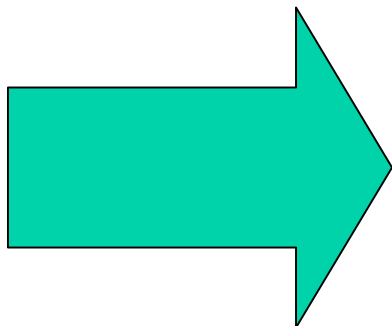
How does RBF work?

- **Idea:** block the germination of seeds that bear genetically engineered traits
- **Blocking Construct (BC):** gene causing lethality linked to the “gene of interest” – on the same piece of DNA – so that they are inherited together
- **Recovering Construct (RC):** another piece of DNA containing a gene that makes a product capable of canceling lethality
- RC can be turned on using an environmental or chemical trigger (heat shock, alcohol, antibiotics)



Recoverable Block of Function (RBF)

- Originally developed by Finnish research group UniCrop
- University of Milan group is applying for patent
- Bottom line of technology: to kill the plant and offer a means to bring it „back from the dead“



„Zombie Technology“ (ETC Group)



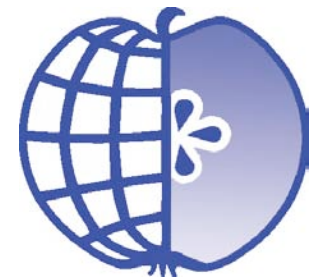
RBF is not a way to prevent spread of transgenic DNA!

- Pollen is still fertile and could contaminate neighbouring fields, making them sterile
- Constructs could become dysfunctional by gene silencing
- Segregation of the different genetic components
- insufficient inducer
-



RBF is a V-GURT Terminator!

- Finnish scientist who pioneered the RBF system in the 1990s classifies his work as a V-GURT technology
- 2004 report by the US National Research Council also refers to RBF as a V-GURT



Farmers and RBF

- would require farmers to restore fertility of their crops year after year
- Although Transcontainer researchers in the EU claim that the RBF system is not designed to restrict seed use per se, it does so nevertheless
- RBF will be linked to a proprietary engineered trait, which will also be protected by patents



Transcontainer:

„RBF only partially resembles a GURT, because its aim is not to restrict the use of the seeds but to facilitate co-existence with non-GM crops, and to limit the potential spread of transgenes to wild flora [...]

It should also be noted that farmers are not obliged to purchase seeds of GM oilseed rape with RBF.“



Transcontainer and the CBD

- “Technologies developed by Transcontainer will only partially resemble GURTs”
- “biological containment strategies commonly involve some interference with normal plant reproduction”
- “In contrast to GURTs, these biological containment technologies will also include functions to restore the fertility of the crops”
- “Trancontainer addresses an issue high on the political agenda in the EU, which is the co-existence of GM crops and non-GM crops”
- CBD moratorium only restricts field trials and commercial planting, but not laboratory trials
- CBD asks for research on the impact of GURTs



Conclusion

- under the guise of “necessary” research on GURTs and containment strategies, the EU funds the development of Terminator crops
- Transcontainer endorses GURTs and is perfectly in line with the corporate agenda
- biological containment is not failsafe and therefore not an answer to the industry’s contamination problems
- “biological containment strategies commonly involve some interference with normal plant reproduction” (flowers, seeds)
- Our goal should be: free, fertile, flowering plants or seeds



Green Terminator?



Main sources

Terminator: The sequel (ETC Group)
Transcontainer Website

