Self-Propagation of Artificial Genetic Elements:

Gene Drives, Risks & Tipping Points

Prospective assessment of potential hazards and exposure

June 19 – 20, 2018, Bremen (Germany)

Project GeneTip
– Genetic Innovations as triggers of
phase transitions in animal and plant population dynamics

SPONSORED BY THE
Federal Ministry
of Education
and Research

GeneTip

Synthetic Gene Drives – a powerful tool for genetic engineering

Currently there are several attempts made to release genetically engineered organisms into the environment with the purpose of introducing artificial genetic information into native populations. Most well known are insects carrying a so called gene drive that allows their artificial genes to be inherited in a much higher frequency than analyzed by Mendel. There are approaches under discussion to target flies, rats and various plant species. Applications include modifications of biological characteristics, reductions of population size and even driving populations towards extinction. In our project, the technologies are summarized as "self-propagating artificial genetic elements" (SPAGE).

According to EU regulation, the precautionary principle has to be applied in face of the release of genetically engineered organisms. Therefore, reasons for concern, potential hazards and exposure potentials combined with the release of such organisms must be identified. A special focus lies on potential tipping points within affected systems. We try to assess and compare expectable consequences of such releases into (agro-) ecosystems, and to estimate associated socioeconomic effects. Furthermore requirements regarding societal and legal framework and appropriate measures for a precaution-oriented technology design will be developed. This includes the possible need for action by regulatory authorities and policy makers.

At the conference we will discuss the following questions:

- How powerful and reliable are current SPAGE technologies?
- How vulnerable are affected systems and how can relevant tipping points be identified by prospective risk assessment?
- How to regulate these technologies in the light of the precautionary principle?
- Can risks combined with self-enforcing dynamic processes (tipping points) be identified?

Agenda

Tuesday (June 19):

12:30 – 13:00	*REGISTRATION*
13:00 – 13:05	Welcome Remarks by Arnim von Gleich (University of Bremen)
13:05 – 13:10	Welcome Address by Cornelia Andersohn (Deutsches Zentrum für Luft- und Raumfahrt e. V. (DLR), Bonn, Project Management Agency)
13:10 – 13:20	Introduction: Prospective Technology Assessment / Arnim von Gleich (University of Bremen)

Part I: Technology Characterization and Potential Applications of Gene Drives

13:20 – 13:40	Technology Characterisation of Gene Drives and Potential Applications / Bernd Giese (University of Natural Resources and Life Sciences, Vienna)
13:40 – 14:00	Reliability of CRISPR-Cas / Katharina Kawall (Fachstelle Gentechnik und Umwelt, Munich)
14:00 – 14:30	Scientific Communication and Governance of Emerging Technologies with Focus on Gene Drives / Kenneth Oye (MIT, Cambridge Mass.)

Coffee Break

Part II: Applications of SPAGE in Agriculture

14:50 – 15:10	Advantages of SPAGE in Agriculture to Combat Pest Insects / Luke Alphey (University of Oxford)
15:10 – 15:30	Potential Impact of GM-Insects on Organic Farming / R. Guy Reeves (Max Planck Institute for Evolutionary Biology, Plön)
15:30 – 15:50	SPAGE in Agriculture to Combat Pest Insects – the Perspective of Organic Agriculture / Emmanouil Kabourakis (Institute of Oliviculture, Subtropical Plants and Viticulture (NAGREF), Crete)

Coffee Break

Part III: Wider Implications

16:10 – 16:30	Differences of Current GMO to Gene Drive Organisms - Challenges for Risk Assessment / Samson Simon (Federal Agency for Nature Conservation, Bonn)
16:50 – 17:10	A Wider Ethical Perspective / Uta Eser (Büro für Umweltethik, Tübingen)
17:10 – 18:00	Discussion

Wednesday (June 20):

Part IV: Preliminary results of GeneTip Project

09:00 - 9:30	Gene Drives Touching Tipping Points / Broder Breckling / Universität Vechta and Arnim von Gleich (University of Bremen)
9:30 -10:00	Modelling of Gene Drives to Identify Bottlenecks and Tipping Points / Merle Preu (University of Vechta) / Broder Breckling (University of Vechta) / Johannes Frieß (University of Bremen)
10:00 – 10:20	Comments by R. Guy Reeves (Max Planck Institute for Evolutionary Biology, Plön)
10:20 – 11:00	Discussion

Coffee Break

11:00 – 11:20	Risk Assessment, Risk Management and Regulation / Christoph Then (Testbiotech, Munich)
11:20 – 11:40	Comments by Kenneth Oye (MIT, Cambridge Mass.)
11:40 – 12:00	Discussion
12:00 – 12:15	Concluding Remarks
12:15	*FAREWELL SNACK*

Location:

***Bremen** is one of the famous old Hanseatic cities.*
Situated at the mouth of the river Weser, Bremen has a long tradition in maritime trading. The historic center tells a lot from these days. And the quarters of Bremen are alive - with a remarkable multifaceted culture. The medieval marketplace with the world-famous UNESCO Heritage Townhall and the statue of Knight Roland is a sight well worth seeing...

And it´s also home of ‚The Bremen Town Musicians'!

Venue:

Guesthouse of the
University of Bremen,
with a view to the Weser River and
located across the historic city centre.

Auf dem Teerhof 58
28199 Bremen