

HIDDEN SECRETS OF ECOLOGY

Biodiversity experiments, climate change research and invasion ecology join up to assess European gradients of resilience in the face of climate extremes as SIGNAL co-ordinator Professor Anke Jentsch explains

Extrême weather events and the presence of invasive species can act as pressures threatening biodiversity, resilience and ecosystem services. Particularly in the open cultural landscape, these pressures can suddenly drive ecosystems across tipping points and beyond thresholds of system integrity. Yet, biodiversity itself holds a secret for buffering against change. Potential stabilising mechanisms include species richness, presence of key species such as legumes and within-species diversity. These potential buffers can be promoted by conservation management and political decisions.

SIGNAL – a pan-European Biodiversity research project funded by BiodivERsA and directed by Professor Anke Jentsch, a disturbance ecologist from Germany – jointly performs co-ordinated field experiments of high scientific novelty and societal relevance across ten European countries. The international team investigates the interaction of three major research directions, which have not yet been combined in ecology: biodiversity experiments, climate impact research, and invasion research.

This pressing issue in science and society is based upon a number of assumptions: Firstly, climate extremes suddenly shift European grasslands across thresholds of functional resilience and reduce ecosystem service provision (productivity, nutrient cycling, successional trajectory, conservation value). Resilience varies across the pan-European precipitation and continentality gradient; Secondly, non-native invasive species are additional pressures for grassland biodiversity and functioning, accelerating major system shifts in the face of extreme weather events. In turn, extreme weather events increase invisibility; and thirdly, biodiversity (species richness and legume presence) increases functional resilience in the face of extreme



Anke Jentsch – co-ordinator of the research network

weather events (drought). Key functional traits modify community response. Within-species diversity (provenance/ecotypes from various regions in Europe) increases functional resilience in the face of extreme weather events. The international team of researchers will thus investigate mechanisms of resilience in European grassland prone to novel climate extremes and identify early warning signals of thresholds and regime shifts by installation of replicated experimental manipulations of climate extremes at multiple grassland sites across Europe. The results will provide experimental evidence on mechanisms of resilience across European gradients, which may serve to regulate ecosystem services and foster the identification of early warning signals. SIGNAL will intensely serve the science/policy interface by delivering timely, highly relevant and understandable information to policy makers and stakeholders about European gradients of resilience and indicators of tipping points in the face of climate extremes, supporting EU policies and national legislative frameworks. SIGNAL, as an innovative pan-European research activity, takes science beyond current state-of-the-art research and results in regionally differentiated policy decision support.



SIGNAL experimental site in Germany with rain out shelters. Photo: Carsten Schaller



Professor Anke Jentsch
 Project Co-ordinator of SIGNAL
 Disturbance Ecology
 Bayreuth Center of Ecology and
 Environmental Research
 University of Bayreuth
 Germany

tel: +49 921552290

anke.jentsch@uni-bayreuth.de
www.bayceer.uni-bayreuth.de/signal/