



Projekt Hof Ritzerau

Long-term research on the effects of organic farming on biotic and abiotic resources ("Hof Ritzerau", Northern Germany)

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Introduction

The farm "Hof Ritzerau" is situated approximately 60 km northeast of Hamburg in Schleswig-Holstein, Germany. About 70% of the farmland is arable land, 10% is used as grassland, the rest is composed of small water bodies, hedgerows, shrubs etc. Originally, "Hof Ritzerau" was farmed with conventional methods. Since 2001 the new owner gradually altered management to organic farming. Scientists from various disciplines and different research institutes form an interdisciplinary project focussing on the effects of organic farming on animals, plants, crop production, crop diseases, soils and economics.

The whole research project is in close collaboration with the owner and the manager of the farm, the local environmental agencies and the local forest officials. This allows that new management systems can be tested and implemented directly on site. There is also a great chance to adjust landuse systems in forestry and agriculture.

Chronological project structure

The project is divided into two main phases. The first phase was used to raise an inventory of the status quo from the view of all disciplines involved. The second phase is a continuous monitoring on various levels.

I. Phase, 2001-2003: Inventory of the status quo

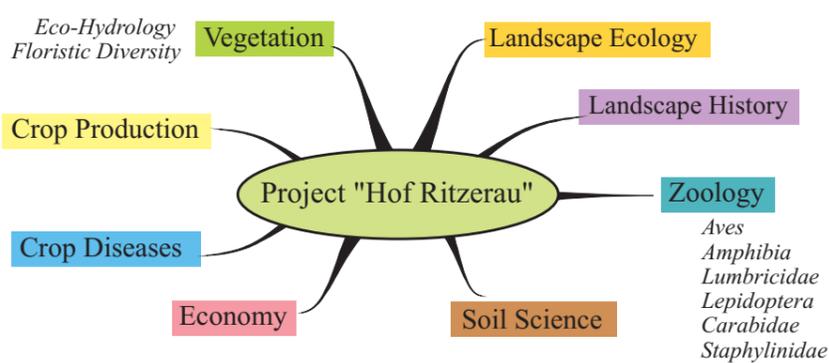
Analysis of the effects of landuse changes on biotic and abiotic resources and creation of new management concepts:

- Inventory of the initial hydrological situation, collection of hydrological and hydrochemical data
- Species inventory of ground- and rove-beetles, earthworms, amphibians, birds and vascular plants
- Mapping of vegetation, soiltypes and -properties
- Collection and creation of digital data basics such as a digital elevation model, long-term climate data, historical and geomorphological maps etc.
- Computer-aided landscape analysis for "Hof Ritzerau" and its catchment areas (determination of sensitive areas according to soil-erosion, nitrate leaching etc.)
- Ecohydrological analysis and monitoring of the effects of landuse change and rewetting of formerly drained minerotrophic fens
- Reestablishment of arable weed vegetation by sowing
- Analysis of the effects of different landuse systems on flora and fauna
- Evaluation of various crop rotations, sowing experiments (Bicropping)
- Creation and implementation of management strategies
- Grazing concepts

II. Phase, from 2004: Monitoring

Thanks to long-term funding, a continuous monitoring on various levels is possible.

Structure and objectives of the project "Hof Ritzerau"



Vegetation

Eco-Hydrology *

Ecohydrological investigations during landuse changes

Design of a monitoring program to investigate nutrient loads in surface waters during conversion from conventional to organic farming.

Monitoring of nutrient retention and outputs during the rewetting of a fen.

K. Schlangel, J. Schrautzer, Dept. of Geobotany, Ecology-Centre, University Kiel, Germany

Floristic Diversity *

Potentials and sources for a raised floristic diversity

Field borders as sites for spontaneous vegetation, reestablishment by sowing, dynamic in changes of the vegetation pattern.

O. Geweke, H. Roweck, Dept. of Landscape Ecology, Ecology-Centre, University Kiel, Germany

Landscape Ecology

Structural and functional landscape analysis and agriculture information system

Integration of scientific results in a GIS-based information system.

Synoptical evaluation of spatial project-data.

E.-W. Reiche, A. Rinker, Digsyland, Germany

U. Hoernes, H. Roweck, Dept. of Landscape Ecology, Ecology-Centre, University Kiel, Germany

Soil Science

Analysis of soils with regard to altered landuse systems

1. Soil raster mapping, physical and chemical soil analysis
2. Analysis of the multidimensional waterflow in soils
3. Calculation of water, nutrient and carbon balances, determination of soil losses by water erosion

E.-W. Reiche, A. Rinker, Digsyland, Germany

F. H. Richter, J. Dörner, R. Horn, Soil Science, University Kiel, Germany

Crop Diseases

Impact of different crop rotation systems on the occurrence of pests in cereals

Investigation of the effect of different nitrogen supplies based on leguminous crops on the abundance of cereal aphids (*Homoptera: Aphididae*) and their natural enemies, especially parasitoids (*Hymenoptera*) in ecological winter wheat.

K. Lohaus, S. Vidahl, Institute of Plant Pathology and Plant Protection, University Göttingen, Germany

Landscape History

Reconstruction of the landscape development since the rise of agriculture

Investigation of the long term interactions of land use, climate, soil formation and soil erosion

H. R. Bork, Dept. of Ecotechnology and Ecosystem Development, Ecology-Centre, University Kiel, Germany

Zoology

Aves

Breeding birds and modern field cultivation

Numbers and breeding success of most bird species of agricultural landscape are steadily declining. What are the detailed causes for the decline? Does organic field cultivation offer new chances for these endangered species?

Bernd Koop, Bureau for ornithology and avifaunistic, Lebrade, Germany

Amphibia

Monitoring amphibian populations

To identify possible effects of ecological farming on newts, toads and frogs and their populations, the amphibian populations of 19 ponds - situated on the fields of "Hof Ritzerau" and on bordering areas - are monitored since March 2002.

C. Winkler, Bordesholm, Germany

Lumbricidae *

Temporal and spatial variance in the earthworm population

How are the abundance and biomass reactions of earthworms to the change from conventional to ecological farming on agricultural fields in a long-term aspect?

Are there large spatially different reactions and what are the causes for heterogeneity? How can the efficiency of earthworm activities be evaluated for ecological farming?

U. Irmiler, Dept. of Ecosystem Research, Ecology-Centre, University Kiel, Germany

Lepidoptera

Forest fringes and hedges as biotopes for butterflies and moths

Many species live on the boundary between forest, shrubberies and the open landscape. The structure of these boundaries is one important key factor for the degree of biodiversity. In this investigation different structured forest fringes and hedges - from highly effected by men to nature orientated - were monitored and compared as biotopes for caterpillars of all kinds of butterflies. The importance of close to nature boundaries in agricultured landscape for nature protection is shown.

D. Kolligs, Ecology-Centre, University Kiel, Germany

Carabidae, Staphylinidae *

Biodiversity change during conversion from conventional to organic farming

How important are small semi-natural habitats for the community of ground- (*Carabidae*) and rove-beetles (*Staphylinidae*) on large arable fields? What is the spatial pattern of biodiversity? What are the effects of conversion to organic farming?

L. Schröter, U. Irmiler, Dept. of Ecosystem Research, Ecology-Centre, University Kiel, Germany

Economy

Factors determining the efficiency of organic farming systems

The study evaluates the impact of selected parameters on the relative economic and technical efficiency of organic farming systems in Germany. Based on these results, optimal business strategies for organic farmers are derived.

G. Gubi, U. Latacz-Lohmann, Dept. of Agricultural Economics, University Kiel, Germany

Crop Production

Optimisation of crop rotation systems in organic farming

1. Optimisation of traditional organic crop rotation systems (e.g. by catch crops, higher crop diversity)
2. Development of new environmentally compatible crop rotation systems for organic farming (collective no-till cultivation of cereals with white clover, bicropping)

H. Neumann, R. Loges, F. Taube, Crop Science and Plant Breeding, University Kiel, Germany

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