Synbreed – Synergistic Plant and Animal Breeding

Synbreed Consortium[§]

[§]Technische Universität München: Plant Breeding - Animal Breeding - Genome Oriented Bioinformatics - Genetics - Human Genetics • Helmholtz Zentrum München: Bioinformatics and Systems Biology - Human Genetics • Bayerische Landesanstalt für Landwirtschaft: Animal Breeding • Georg-August-Universität Göttingen: Animal Breeding and Genetics • Universität Hohenheim: Bioinformatics - Plant Breeding - Crop Plant Biodiversity and Breeding Informatics • Christian-Albrechts-Universität zu Kiel: Animal Breeding and Husbandry • Friedrich-Loeffler-Institut: Farm Animal Genetics • KWS SAAT AG • Lohmann Tierzucht GmbH

Motivation

Genetic improvement of crops and livestock holds great potential for future productivity gains and is one of the key drivers of innovation in agricultural production. Synbreed was established as a network of excellence for interdisciplinary, genome based research. It aims at developing knowledge and advanced technologies to promote a sustainable agricultural production that is guided by socioeconomic requirements.

Specific goals of Synbreed:

- Build an **interdisciplinary centre** for genome based research in plant and animal breeding
- Establish **high-throughput technology** platforms
- Optimize **genome-based breeding strategies** for maize, chicken and cattle
- Increase the number of **highly qualified young academics** and breeders

Background

Future productivity gains will depend to a large extent on the genetic improvement of crops and livestock. Therefore, research and development in breeding must fully exploit the potential of next generation technologies and integrate them into the breeding process. To meet the challenges of the future, the network Synbreed will focus on:

- **functional analysis of native biodiversity**
- **genetic analysis of complex traits**
- **development of optimal breeding strategies**

in maize, chicken and cattle.

Research

Biological resources (R1–R3) for maize, chicken and cattle are being created. Technological expertise from breeding, genetics and medicine is used to establish high-throughput technology platforms for sequencing, genotyping and metabolic profiling (T1, T2, T4).

A bioinformatics unit (T3) is providing tools for storage, distribution, visualization and analysis of multi-parallel sequencing and genotyping data. In the application projects (A1–A4) efficient statistical methods for genome based selection, prediction and population genetics will be developed.

Structural projects (S1, S2) coordinate the research network and provide training of young researchers. An independent research group with focus on population genetics will be implemented (S3) (Fig. 1).
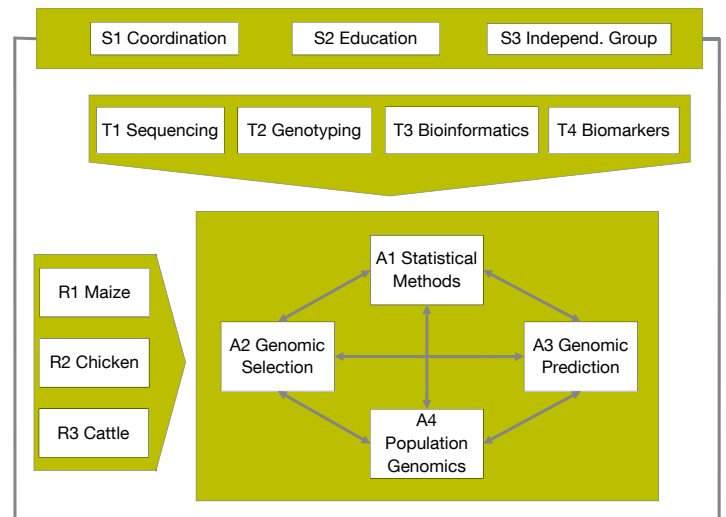

Figure 1: Project organization

Collaboration

Synbreed is a network of scientists from plant and animal breeding, molecular biology, bioinformatics and human genetics. 16 partners from four German universities, three non-university research institutions and two commercial breeding companies contribute to this innovative undertaking (Fig. 2). The convergence of scientific excellence and applied research will have a significant impact on the advancement of knowledge-based bioeconomy.

Figure 2: Partner

Outlook

Wide ranging synergies will be generated by Synbreed through the joint development of theoretical concepts as well as simulation and analysis tools. Data integration across disciplines and species will provide a basis for more efficient approaches towards genome-based breeding of plants and animals.

Contact: synbreed@wzw.tum.de
Information: www.synbreed.tum.de