

Prototype Digital Twins

Honey bees in agricultural landscapes



- Focuses on regional-scale solutions for beekeeping
- Provides national-level maps tracking honey production and beehive health
- Assesses the impact of land use, climate, and beekeeping practices on honey bee survival
- Utilizes the BEEHAVE model to simulate colony behavior, with plans to expand across Europe

Crop Wild Relatives



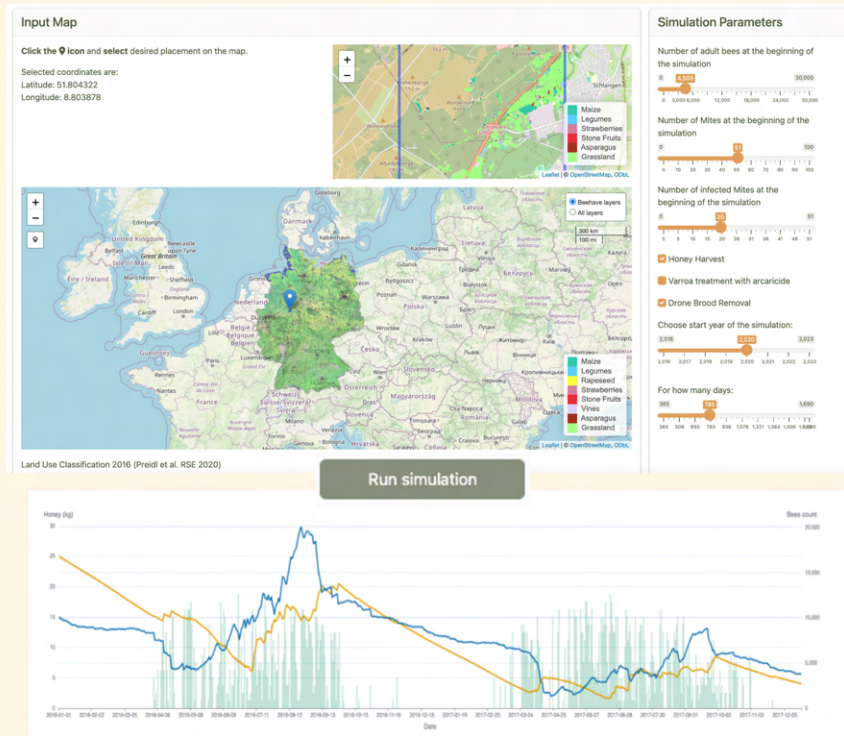
- Highlights genetic resources critical for food security
- Focuses on improving the nutritional quality and climate adaptability of crops like grasspea
- Uses GBIF mediated data to identify wild relatives with genetic traits that enhance crop resilience to climate change and resource limitations

Background

BioDT project integrates expertise in high-performance computing, ecology, and artificial intelligence to develop prototype digital twins (pDTs) for biodiversity and providing insights into how species interact with their environments and respond to global changes.

Objectives

- Establish the concept of DTs in the area of biodiversity to support better prediction of biodiversity dynamics
- Build and deploy prototype DTs for predicting species-environment interactions
- Support interoperability of data and services by developing a technical platform
- Be interoperable with other DT initiatives such as DestinE and with European Data Infrastructure



Technological approach

BioDT employs high-performance computing, big data, and remote sensing to generate accurate, dynamic simulations of biodiversity. It integrates data from biodiversity and environmental infrastructures, using Sentinel-2 satellite imagery, land-use classifications, and weather data to model species dynamics. It leverages EuroHPC infrastructures such as the LUMI and Karolina supercomputers.

Collaborative synergies

BioDT actively collaborates with Destination Earth and other Earth System Digital Twins. By integrating efforts and aligning methodologies, BioDT aims to contribute to a larger framework for global environmental monitoring.

Impact

- Interactive DT services for a broad range of biodiversity stakeholders
- Predictive tools for conservation strategies, enabling better management of species and ecosystems
- New methods for global biodiversity preservation and sustainability



Invasive Alien Species



Disease Outbreaks



Phylogenetic Diversity



Real-time Bird Monitoring



Ecosystem Services



Forest Biodiversity Dynamics



Prioritisation of DNA metabarcoding sampling locations



Grassland Biodiversity Dynamics



QR code